



Raytheon

AWIPS System Manager's Manual: AWIPS II Operational Build 12.2.1

Document No. AWP.MAN.SMM.A2-OB12.2.1
1 March 2012

Prepared Under

Contract DG133W-05-CQ-1067
Advanced Weather Interactive Processing System (AWIPS)
Operations and Maintenance

Submitted to:

Walter Scott
Contracting Officer's Technical Representative
U.S. Department of Commerce
NOAA/NWS Acquisition Management Division
SSMC2, OST11, Room 15130
1325 East-West Highway
Silver Spring, MD 20910

By:

Raytheon
Raytheon Technical Services Company LLC
8401 Colesville Road, Suite 800
Silver Spring, MD 20910

Chapter 1

Introduction

Chapter 1: Introduction

Table of Contents

1.0	Introduction.....	1
1.1	Scope.....	1
1.2	Intended Audience	1
1.3	Organization of the Manual	1

1.0 *Introduction*

The *AWIPS System Manager's Manual (SMM)* provides information for use in managing the Advanced Weather Interactive Processing System (AWIPS) at a site level. System management includes controlling user access, supporting user functions, and some file and database maintenance. Each area of responsibility requires knowledge of and the ability to use AWIPS components.

AWIPS is part of the National Weather Service (NWS) modernization program. The operations and maintenance of AWIPS is being performed by Raytheon under U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) Contract DG133W-05-CQ-1067.

If you find errors in the manual, please write to the AWIPS Documentation Team at nws.hq.awips.doc.team@noaa.gov.

1.1 *Scope*

This manual is designed to serve as a guide for the management of Operational AWIPS.

As new AWIPS II releases are implemented, the SMM will continue to be updated to capture additional or changed functionality.

1.2 *Intended Audience*

This manual is intended for use by AWIPS system managers. Users are assumed to have a basic understanding of, and some experience using, UNIX, Linux, and Postgres.

1.3 *Organization of the Manual*

The *AWIPS System Manager's Manual* provides a detailed description of the system and its associated environments tailored for AWIPS system managers. It is organized into the following chapters and appendices:

Chapter 1	Introduction
Chapter 2	AWIPS System Architecture
Chapter 3	Individual User Accounts
Chapter 4	Data Flow Overview
Chapter 5	Ingest of Satellite Imagery
Chapter 6	Ingest of NWSTG Data
Chapter 7	Ingest of Radar Data
Chapter 8	Local Data Acquisition and Dissemination (LDAD) System
Chapter 9	Background Applications
Chapter 10	Asynchronous Product Scheduler
Chapter 11	Crons and Purging

Chapter 12	Database Management
Chapter 13	Event Notification
Chapter 14	Message Handling System
Chapter 15	Localization
Chapter 16	Customization
Chapter 17	AWIPS System Monitor
Chapter 18	Failover Management Procedures
Chapter 19	System Backup and Recovery Procedures
Chapter 20	System Console
Chapter 21	System Shutdown and Startup Procedures
Chapter 22	Maintenance Management Procedures
Chapter 23	NCF Archive
Chapter 24	Data Archive Server
Chapter 25	AWIPS II/EDEX Administration Guide
Appendix A	Abbreviations and Acronyms
Appendix B	Decoding and Storage Data Flow Exhibits
Appendix C	Directories for /awips2/edex/data and /data/fxa
Appendix D	Glossary
Appendix E	Mass Storage Design
Appendix F	NWS/AWIPS Security Policy
Appendix G	AWIPS Password Management Policy
Appendix H	SBN Products for WAN Transmission During an SBN Failure
Appendix I	Administrative Tips
Appendix J	WarnGen Templates
Appendix K	NCF Trouble Ticket Worksheet and Instructions
Appendix L	LDAD Configuration Samples and Firewall Architecture
Appendix M	Acceptable Formats for Importing Climate Data
Appendix N	AWIPS National Datasets
Appendix O	NWRWAVES User's Manual & Documentation
Appendix P	Diagnosing System Health
Appendix Q	AWIPS Applications and Version Numbers
Appendix R	System Architecture Diagrams
Appendix S	CAVE Localization Perspective
Appendix T	Service Backup
Appendix U	AWIPS II Component Categorization

Chapter 2

AWIPS System Architecture

Chapter 2. AWIPS System Architecture

Table of Contents

	<i>Page</i>
2.0 AWIPS System Architecture: Overview.....	1
2.1 AWIPS Communications Network.....	1
2.1.1 AWIPS Satellite Broadcast Network.....	3
2.1.2 AWIPS WAN.....	4
2.1.2.1 Very Small Aperture Terminal (VSAT) WAN Backup	10
2.1.3 LAN.....	10
2.1.4 Routers.....	10
2.1.5 Circuits	16
2.1.6 NESDIS Interface Router	16
2.2 Site Hardware Architecture.....	16
2.2.1 Rack Components.....	17
2.2.1.1 Satellite Broadcast Network (SBN).....	23
2.2.1.2 Synchronous Communications (Radar).....	25
2.2.1.3 Application Server.....	25
2.2.1.4 Data Servers	25
2.2.1.4.1 Data Server File Systems and Raw Partitions	28
2.2.1.4.1.1 File Systems on the Linux Data Server (DX).....	28
2.2.1.4.1.2 Raw Partitions for PostgreSQL on the Linux Data Server	33
2.2.1.4.2 AX File Systems.....	34
2.2.1.5 LDAD Hardware	36
2.2.1.5.1 LDAD Server File Systems	38
2.2.1.6 Workstations	40
2.2.1.6.1 Reserved	41
2.2.1.6.2 Linux Workstation File Systems	41
2.2.1.7 Linux Preprocessor	44
2.2.1.7.1 Preprocessor Server File Systems.....	47
2.3 NCF Time Source	49
2.4 Printers	49
2.5 AWIPS Software.....	50
2.5.1 AWIPS Contractor-Developed Software.....	50
2.5.2 Government-Developed Software	50
2.5.3 Commercial Off-the-Shelf (COTS) Software and Freeware	51
2.5.3.1 AWIPS II: COTS Software and Freeware	51

2.5.3.2	Mobile Code Technologies.....	54
2.6	AWIPS I and AWIPS II	54
2.6.1	What's Changed in AWIPS.....	54
2.6.2	What's Not Changed in AWIPS.....	54
2.7	Basic AWIPS II Software Deployment.....	55
2.8	AWIPS II Server Clustering.....	57
2.9	Basic AWIPS II Communication Architecture	58
2.10	Basic AWIPS II Logging Architecture.....	59
2.11	Basic AWIPS II Data Storage Architecture	60
2.12	Basic AWIPS II Visualization Architecture.....	60
2.13	Basic AWIPS II Data Processing Architecture	61
2.13.1	Basic AWIPS II Data Receipt Architecture.....	61
2.13.2	Basic AWIPS II Data Decoding Architecture	63
2.13.3	Basic AWIPS II Data Storage Architecture.....	64
2.13.3.1	AWIPS II Raw Data Storage	64
2.13.3.2	AWIPS II Processed Data Storage	65
2.13.3.3	PyPIES (Python Process Isolated Exchange Storage)	68
2.13.4	Basic AWIPS II Data Retrieval Architecture	68
2.14	Basic AWIPS II Data Retransmission Design	69
2.15	Basic AWIPS II Data Purge Architecture	70
2.15.1	AWIPS II Processed Data Storage Purge Architecture	70
2.15.2	AWIPS II Raw Data Storage Purge Architecture	71
2.16	AWIPS II LOCALIZATION STORE.....	71
2.16.1.1	Purging Processed Data Storage.....	72
2.16.1.2	Purging Raw Data Storage	74

List of Exhibits

Exhibit 2.0-1.	AWIPS System Boundaries and Subsystems.....	2
Exhibit 2.1.1-1.	AWIPS Communications Network.....	3
Exhibit 2.1.2-1.	WFOs Connected to Adjacent RFCs	6
Exhibit 2.1.2-2.	WFOs Connected to Alternate RFCs.....	7
Exhibit 2.1.2-3.	RFCs to RFCs and RFCs to NCF	8
Exhibit 2.1.2-4.	RFCs to BNCF	9
Exhibit 2.1.2.1-1.	Block Diagram of VSAT System Setup at a WFO.....	11
Exhibit 2.1.4-1.	Interconnection of Wide Area Network Devices	12
Exhibit 2.1.4-2.	WFO Router Connection Diagram	13
Exhibit 2.1.4-3.	IP Router Connection Diagram for NC	14

Exhibit 2.1.4-4. RFC Router Connection Diagram.....	15
Exhibit 2.2-1. Stand-Alone WFO Site Hardware Architecture	18
Exhibit 2.2-2. RFC Site Hardware Architecture	19
Exhibit 2.2-3. LDAD Hardware Architecture.....	20
Exhibit 2.2-4. AWIPS WFO Network Diagram	21
Exhibit 2.2.1-1. Standard Stand-Alone WFO/RFC Rack Configuration.....	22
Exhibit 2.2.1.6-1. AWIPS Workstation	40
Exhibit 2.2.1.7-1. Linux Preprocessors (PX) Architecture	44
Exhibit 2.2.1.7-2. Linux Preprocessor (PX) Hardware.....	45
Exhibit 2.2.1.7-3. Linux Preprocessor (PX) Interfaces	46
Exhibit 2.2.1.7-4. PX Processor Back Panel.....	46
Exhibit 2.7-1. Overall AWIPS II Data Flow	56
Exhibit 2.9-1. AWIPS II Inter-Process Communication.....	59
Exhibit 2.12-1. AWIPS II Visualization	61
Exhibit 2.13.1-1. AWIPS II Data Receipt.....	62
Exhibit 2.13.2-1. AWIPS II Data Decoding	63
Exhibit 2.13.4-1 AWIPS II Data Retrieval	68
Exhibit 2.14-1. AWIPS II Message Retransmission.....	69
Exhibit 2.15.1-1 AWIPS II Processed Data Storage Purge.....	70
Exhibit 2.15.2-1. AWIPS II Raw Data Storage Purge	71
Exhibit 2.16-1. CAVE/Localization Store Interaction.....	72

List of Tables

Table 2.2.1.4-1. Data Server Configurations at AWIPS Sites	26
Table 2.2.1.4-2. WFO Archive Server Configuration at AWIPS Sites.....	27
Table 2.2.1.4-3. RFC Archive Server Configuration at AWIPS Sites.....	28
Table 2.2.1.5-1. Port Assignments	36
Table 2.2.1.6-1. Workstation Processor Configurations at AWIPS Sites.....	41
Table 2.2.1.7-1. Linux Preprocessor Configurations at AWIPS Sites	45
Table 2.5.3.1. COTS Software and Freeware Used in AWIPS II	51
Table 2.7-1. AWIPS II Software	57
Table 2.8-1. AWIPS II Server Failover Strategies	57
Table 2.8-2. AWIPS II Server Aliases	58
Table 2.10-1. Log Locations for AWIPS II Components	59
Table 2.11-1. AWIPS II Data Storage.....	60
Table 2.13.1-1. AWIPS II Interfaces to Data Sources	62

2.0 AWIPS System Architecture: Overview

The design of the AWIPS system architecture is driven by the requirements for expandability, flexibility, availability, and portability. This system has been designed for easy expandability to allow for the introduction of new functionality and the augmentation of network and processing capacities. AWIPS can accommodate the evolving state of operational forecasting to enable the NWS to meet the objectives of the modernization effort. AWIPS is designed so that software and data can be migrated to new platforms as technology evolves.

The AWIPS system architecture illustrated in Exhibit 2.0-1 gives a macro-level view of the AWIPS system with the various types of AWIPS sites and the interfaces to external entities, including the following:

- Network Control Facility (NCF)
- Satellite Broadcast Network (SBN)
- Wide Area Network (WAN)
- Weather Forecast Office (WFO)
- River Forecast Center (RFC)
- National Center (NC)
- NOAAPORT Receive System (NRS)

Information flows into the AWIPS NCF (ANCF) in Silver Spring, Maryland, or the Backup NCF (BNCF) in Fairmont, West Virginia, from the National Weather Service Telecommunications Gateway (NWSTG) and the National Environmental Satellite, Data, and Information Service (NESDIS). These data are sent to all AWIPS and NRS sites via the SBN.

The WAN provides additional communications infrastructure utilizing TCP/IP (point-to-point (PTP) and point-to-multipoint (PTM)) communications, which allows AWIPS sites to communicate with each other. In addition to the data received from the NCF, AWIPS sites have access to data from local sources, such as the Automated Surface Observing System (ASOS), the Weather Surveillance Radar-1988 Doppler (WSR-88D) radar, and Terminal Doppler Weather Radars.

2.1 AWIPS Communications Network

The AWIPS Communications Network (ACN) is a nationwide communications system consisting of an SBN and a WAN.

The SBN provides PTM communications between the NCF and all sites. It is used to distribute satellite, radar, grid, text, graphic, synoptic, BUFR (Binary Universal Form for data Representation), and point data to the sites from the National Centers for Environmental Prediction (NCEP), NESDIS, the NWSTG, AWIPS sites, and other data sources.

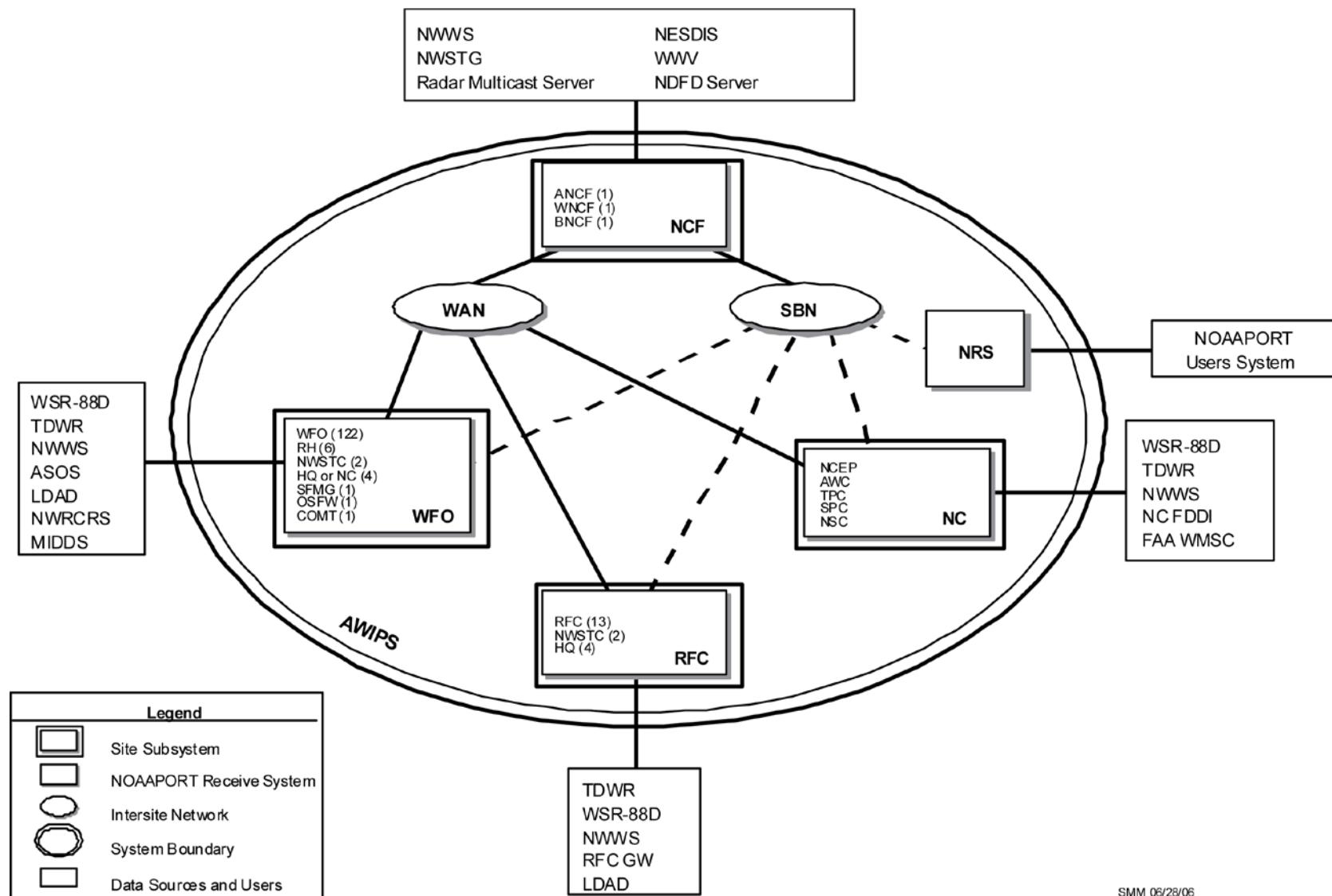


Exhibit 2.0-1. AWIPS System Boundaries and Subsystems

The WAN provides TCP/IP (PTP, PTM) communications between all AWIPS sites. It is used to send data from one site to any other site. There is also a backup system that consists of a dial-up modem that the NCF can use to dial into a site.

2.1.1 AWIPS Satellite Broadcast Network

The SBN is a PTM network that distributes weather data from the NCF or the BNCF to receiving sites throughout the United States (see Exhibit 2.1.1-1). The network consists of the Satellite Broadcast Processor (SBP); the uplink Master Ground Station (MGS) antenna in Hauppauge, New York, and the backup MGS (BMGS) antenna at the NASA Independent Verification and Validation (IV&V) Facility in Fairmont, West Virginia; the SES-1 satellite; the downlink antenna at the locations receiving data; and the satellite Digital Video Broadcast (DVB) receivers at the sites. Primary data transmitted are Geostationary Operational Environmental Satellite (GOES)-EAST and GOES-WEST satellite imagery, model data, observational data, and text products.

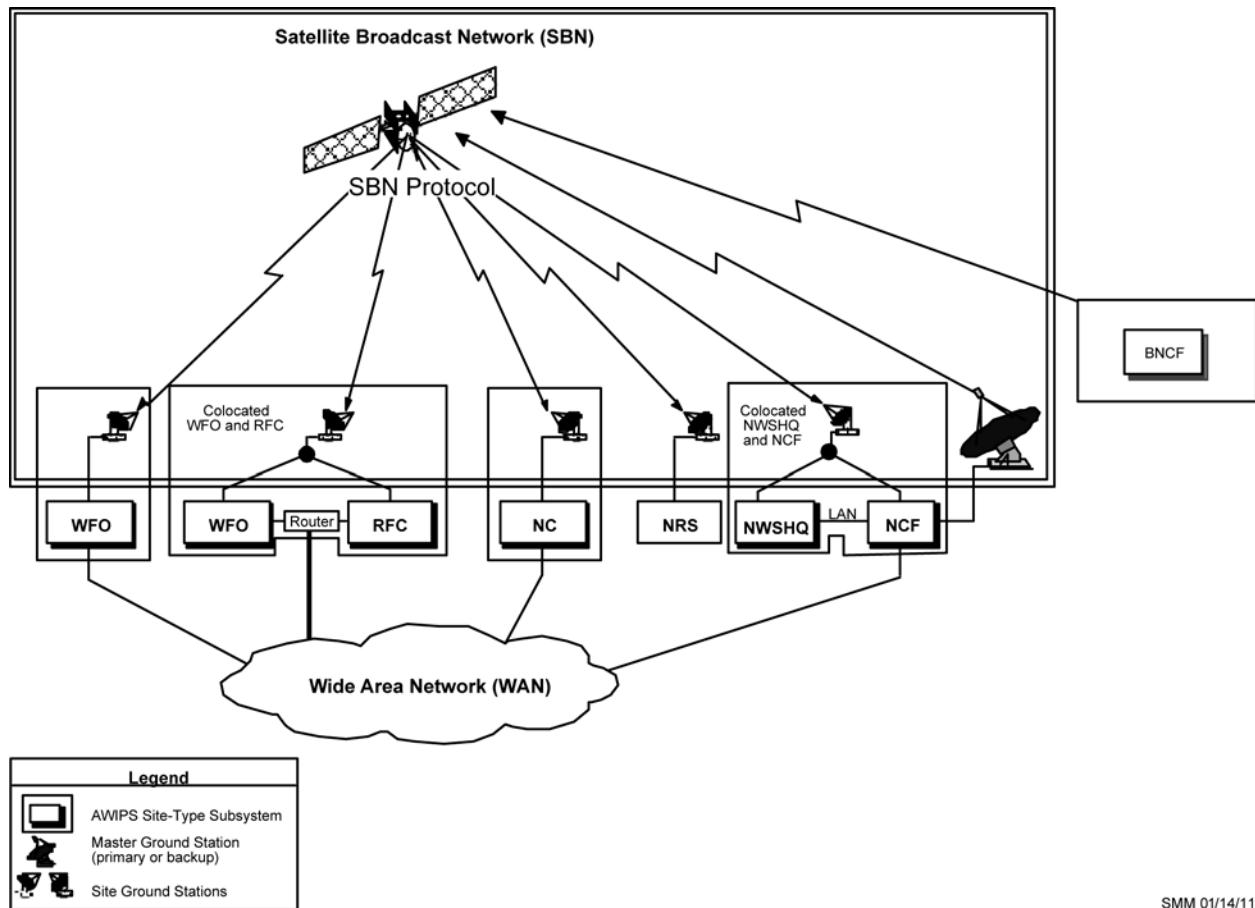


Exhibit 2.1.1-1. AWIPS Communications Network

The NCF and the BNCF receive the satellite and model data from NESDIS and the NCEP, respectively. At the NCF or the BNCF, the data are processed, stored on disk, and sent to the MGS in Hauppauge or the BMGS in Fairmont. The primary MGS is a commercial satellite communications facility owned by Globecom Systems, Inc. (Globecom or GSI); the BMGS is a Government-owned facility. Both the primary and the backup MGS transmit the data to a commercial communications satellite (SES-1) that transmits the data to the sites.

The MGS uses the frequency division multiple access (FDMA) transmission technique, which requires a totally independent modulator for each data stream. Four different substreams are required to transmit SBN data. Each site receiving data can be customized to receive only those streams that are appropriate for its mission. Ninety percent of the sites need only two of the four data streams. A channel failure does not result in total loss of all data streams, only the affected channel.

2.1.2 AWIPS WAN

The AWIPS WAN is a terrestrial network designed to support distribution of PTP and PTM data among all AWIPS sites. The WAN give field sites, NCs, and headquarters sites the ability to communicate with each other and send data to the central facility for rebroadcast. The data include products and messages generated by the local AWIPS office and observation data generated or received by the local AWIPS office from systems external to AWIPS. Messages or information intended for transmission from one AWIPS site to another (PTP) will be sent via the WAN. The WAN also supports PTM distribution of data so that all AWIPS offices can send data to the NCF. It also supports other types of traffic at sites as follows:

- Interactive capabilities
- Request/reply data
- Retransmission requests for lost products
- Error and fault notification from sites to the NCF
- Remote log-in from site to site
- Distribution of software releases from the NCF
- Remote diagnostic action by the NCF
- Network management.

The WAN provides an infrastructure for field sites to provide backup support for other sites if an operations failure occurs.

The WAN is also used to synchronize all AWIPS system clocks using the Network Time Protocol (NTP). The AWIPS time source is located at the NCF/BNCF; it receives and decodes time from the National Institute of Standards and Technology (NIST) time-signal broadcast call letters (WWV) external time source and provides that information to AWIPS. This time information is obtained through a dial-up connection to the timing source. After the NCF/BNCF communication server is synchronized with the NIST WWV, it synchronizes all other local area network (LAN) clocks at the site. The

NCF/BNCF broadcasts the time to all the other AWIPS sites over the WAN. All AWIPS system clocks are synchronized to within 1 second of the NIST WWV time.

The colocated WFO/RFC sites and the NCF/BNCF are major nodes of the network. They currently use Generic Routing Encapsulation (GRE) tunnels through OPSnet to act as hubs, identical to the hub and spoke topology used in the previous AWIPS dedicated circuit network. [Note: The transition of the GRE tunnels is on hold until OPSnet completes the transition from Sprint to Verizon. This is projected to occur in May 2012. Once the transition to Verizon is complete, a new schedule for GRE tunnel elimination will be developed.]

WFOs, Regional Headquarters (RHQ), and NCs are the spur nodes of the network. The WAN consists of circuits linking the following site types:

- WFOs to adjacent RFCs (Exhibit 2.1.2-1)
- WFOs to alternate RFCs (Exhibit 2.1.2-2)
- RFCs to RFCs and RFCs to NCF (Exhibit 2.1.2-3)
- RFCs to BNCF (Exhibit 2.1.2-4).

Verizon and Sprint are the FTS2001 service providers. The FTS2001 contract provides the circuits used in AWIPS to interconnect the sites. In Alaska, the frame relay Permanent Virtual Circuits (PVC) are provided by GCI. The circuits provide site interconnection at up to 1.5 Mbps. The WAN's high availability is achieved by incorporating real-time network management, supplying capacious circuits, providing multiple paths between nodes, and implementing backup circuits for dedicated links.

The types of circuits used in the WAN are as follows:

- GRE is used to send IP packets from one AWIPS network to another, without being parsed or treated like IP packets by any intervening routers. GRE tunnels provide WAN node-to-node connectivity to conterminous United States (CONUS) AWIPS sites. For CONUS AWIPS sites, the terrestrial network uses the NOAAAnet. It is based on fast packet technology and aimed at high-speed, bursty data applications such as LAN connections. The NOAAAnet utilizes Multi-Protocol Label Switching (MPLS) for WAN connectivity. See Section 2.1.4, Routers, which diagrams the GRE tunnel from the WFO to the RFC and from the RFC to the NCF.
- Dedicated Transmission Service (DTS) for Hawaii, Guam, and Puerto Rico provides intersite communications and connections to CONUS AWIPS sites.
- Switched Data Service (SDS) circuits provide backup for AWIPS sites. Dial backup circuits are provided at all locations. Each non development site has an FTS2001 SDS circuit connected to a router port for use as a dial-up backup to the dedicated link. Colocated WFO/RFC sites have four SDS circuits.
- Monitor and control functions use Switched Voice Service (SVS) circuits for backup.
- Integrated Services Digital Network (ISDN) circuits provide backup for AWIPS sites along with the SDS circuits.

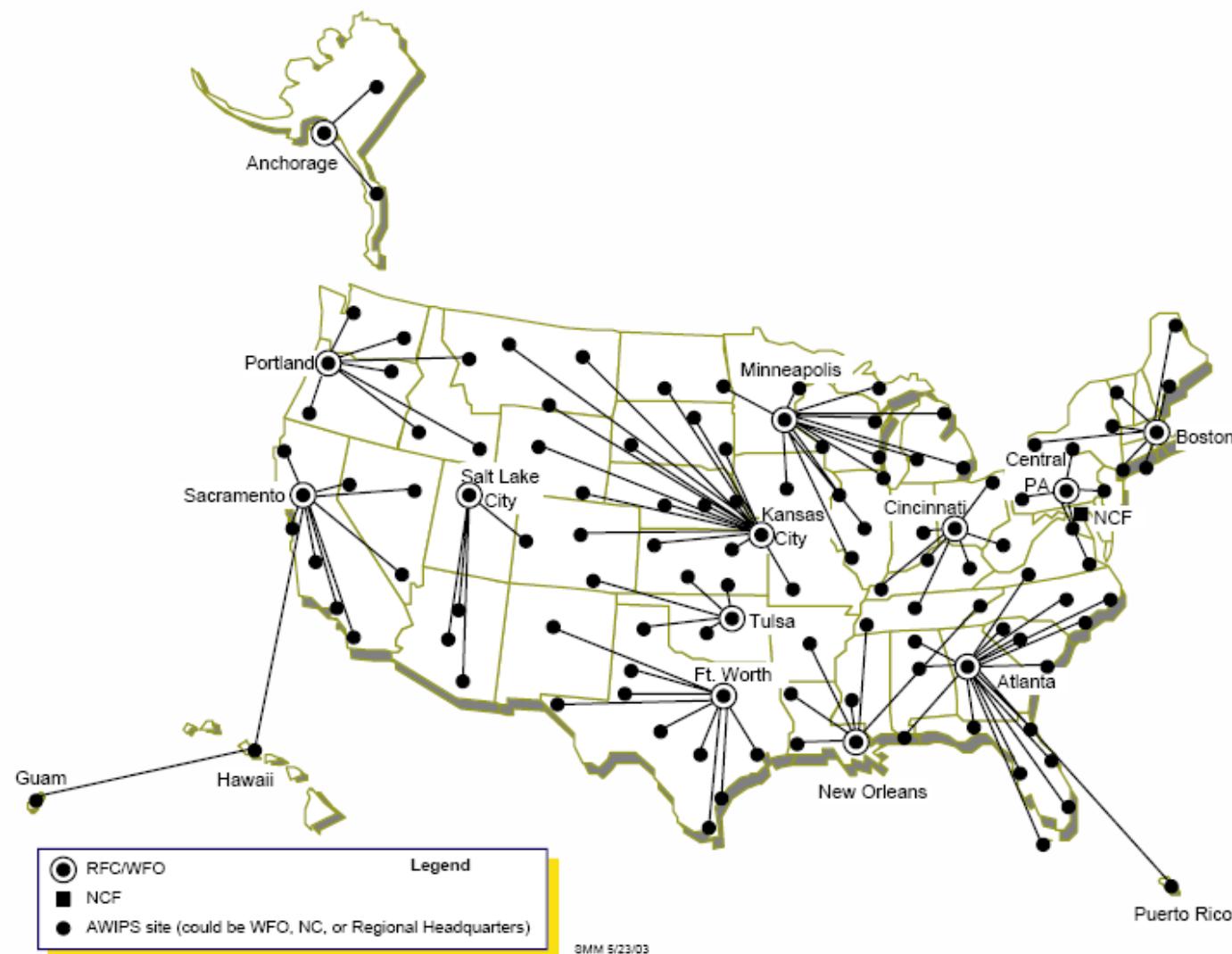


Exhibit 2.1.2-1. WFOs Connected to Adjacent RFCs

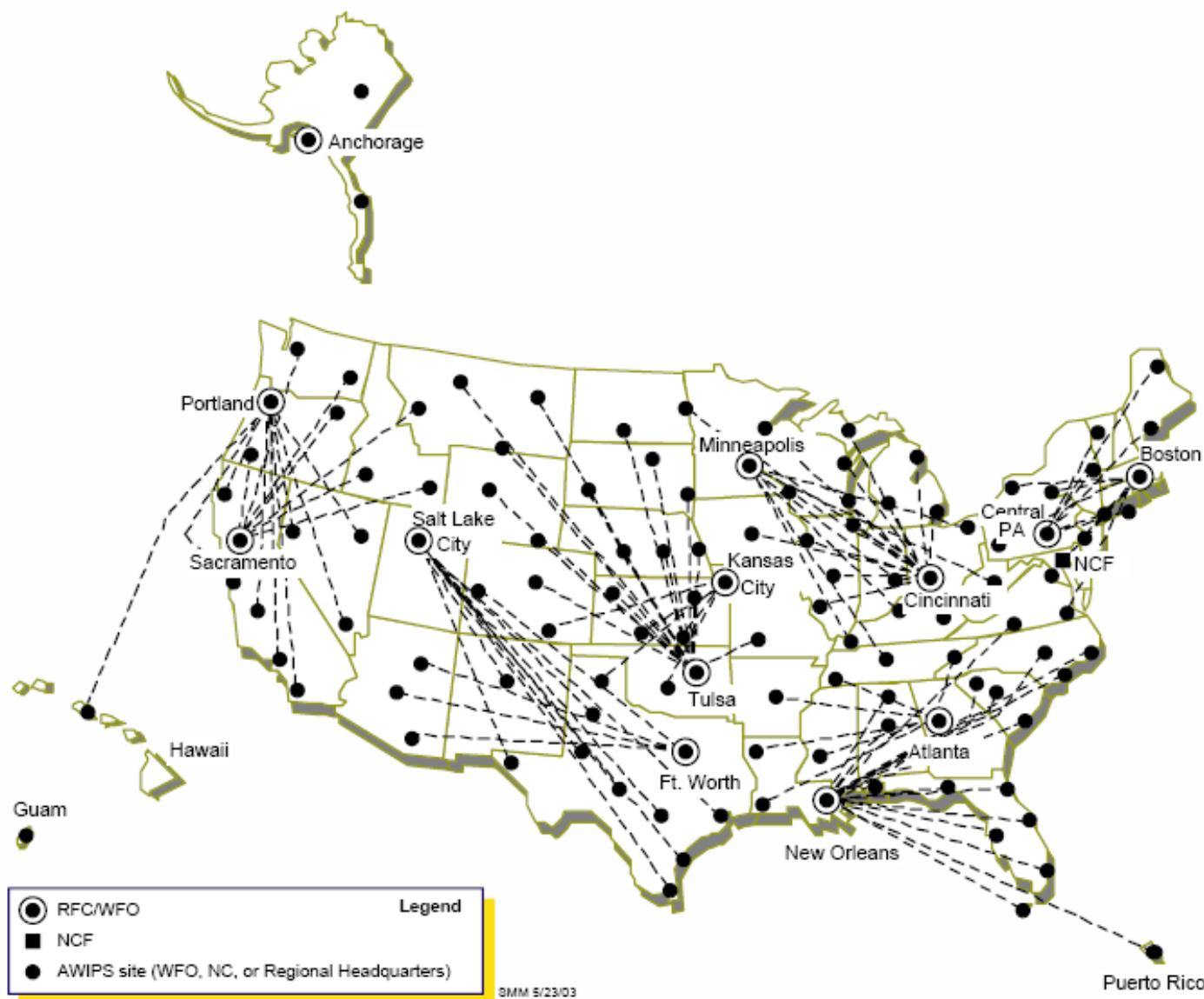


Exhibit 2.1.2-2. WFOs Connected to Alternate RFCs

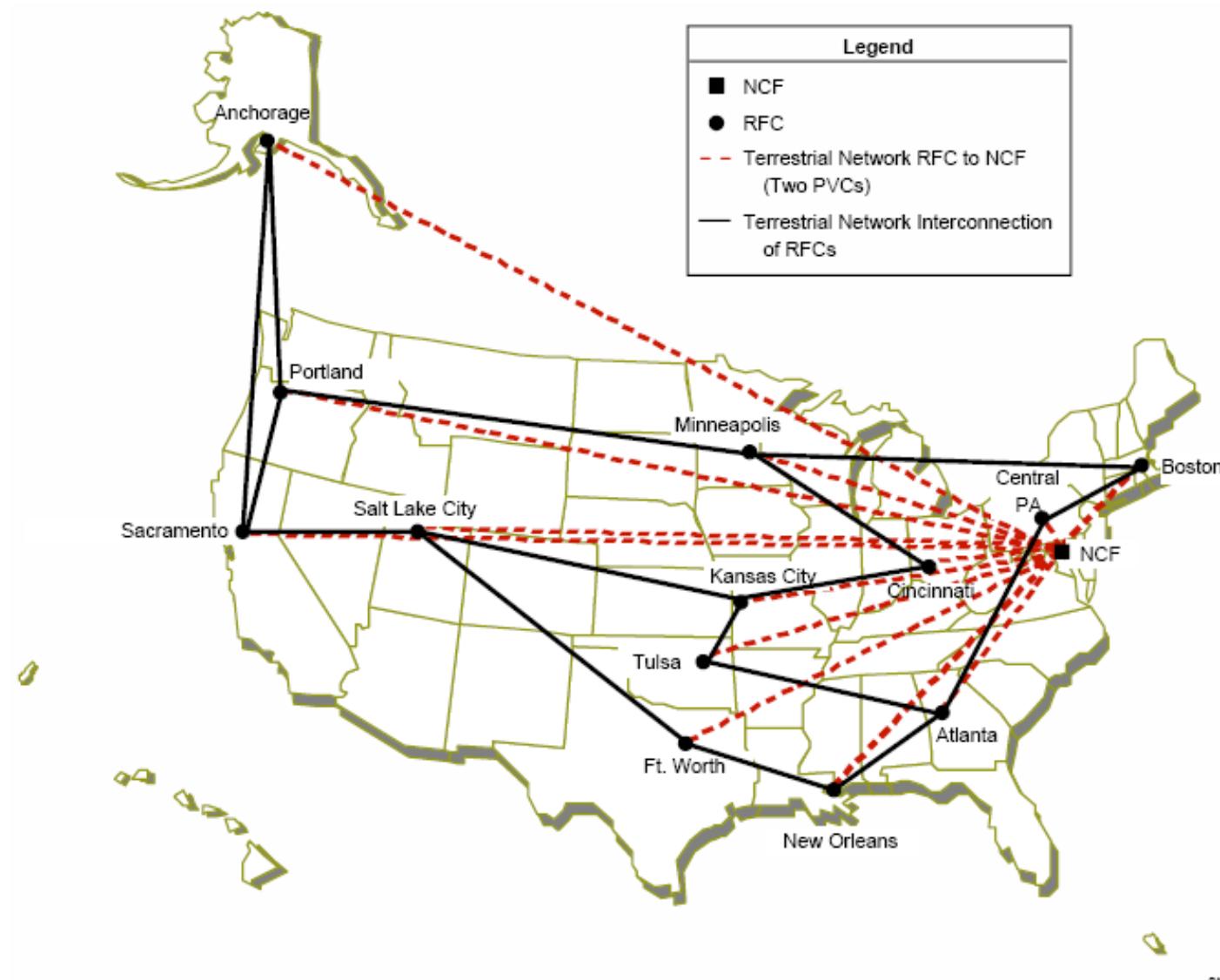


Exhibit 2.1.2-3. RFCs to RFCs and RFCs to NCF



Exhibit 2.1.2-4. RFCs to BNCF

2.1.2.1 Very Small Aperture Terminal (VSAT) WAN Backup

When a site loses its AWIPS WAN connection for what is expected to be an extended period of time due to some kind of disaster, or when a test of the system is desired, the NWS will notify Raytheon that the backup system (one or more of the VSAT systems) is required. At the same time, the NWS will work with the affected region and site to ensure access to the affected site for the equipment and a Field Site Representative (FSR). The Raytheon AWIPS Team will immediately deploy a Flyaway Satellite Terminal and an FSR to the affected site(s). The FSR will set up the terminal and, working with the local Electronic Systems Analyst (ESA), connect the satellite terminal to the site LAN in place of the non-functional WAN. Once the terminal becomes operational, the deployed technician will return home. The AWIPS NCF will monitor the communications link via existing T1 lines to the Network Operations Center (NOC) of the Long Island International Teleport (LIIT) at Hauppauge, NY, as it does for the AWIPS WAN. LIIT is operated by Raytheon AWIPS teammate Globecomm.

The NWS Radar Operations Center (ROC) will be kept in the loop on all VSAT deployment activities in order to be available for possible backup support.

When the AWIPS WAN has been returned to operational status, the Raytheon AWIPS Team FSR will return to the site to disconnect and take down the satellite terminal and return it to its storage location.

Detailed deployment procedures are outlined in AWP.PLN.AWB-01.02, *AWIPS VSAT WAN Backup: Deployment Plan and Concept of Operations*, dated May 5, 2011. A block diagram of the VSAT system setup at a WFO is provided in Exhibit 2.1.2.1-1.

2.1.3 LAN

The AWIPS site LAN comprises industry-standard 100/1000Base-T Ethernet network technologies to support the distribution of data throughout the AWIPS sites. The LAN provides concurrent transmission of data at speeds of 1000 Mbps, and a 1 Gbps wire speed is provided to each Ethernet interface. The LAN is implemented via CISCO 2960 switches for all AWIPS sites.

2.1.4 Routers

Cisco routers are used to pass data from the site LAN to the WAN and to the site LAN from the WAN. WFO routers are sized to connect to one LAN and employ two Ethernet connections to the Site CE Router. RFC and NC routers are sized to connect to two LANS and employ between two Ethernet connections to the Site CE Router. Exhibits 2.1.4-1 through 2.1.4-4 show how the routers interface with the LAN and the WAN.

NOTE: At a colocated site, the RFC provides the routers for both the RFC and the WFO.

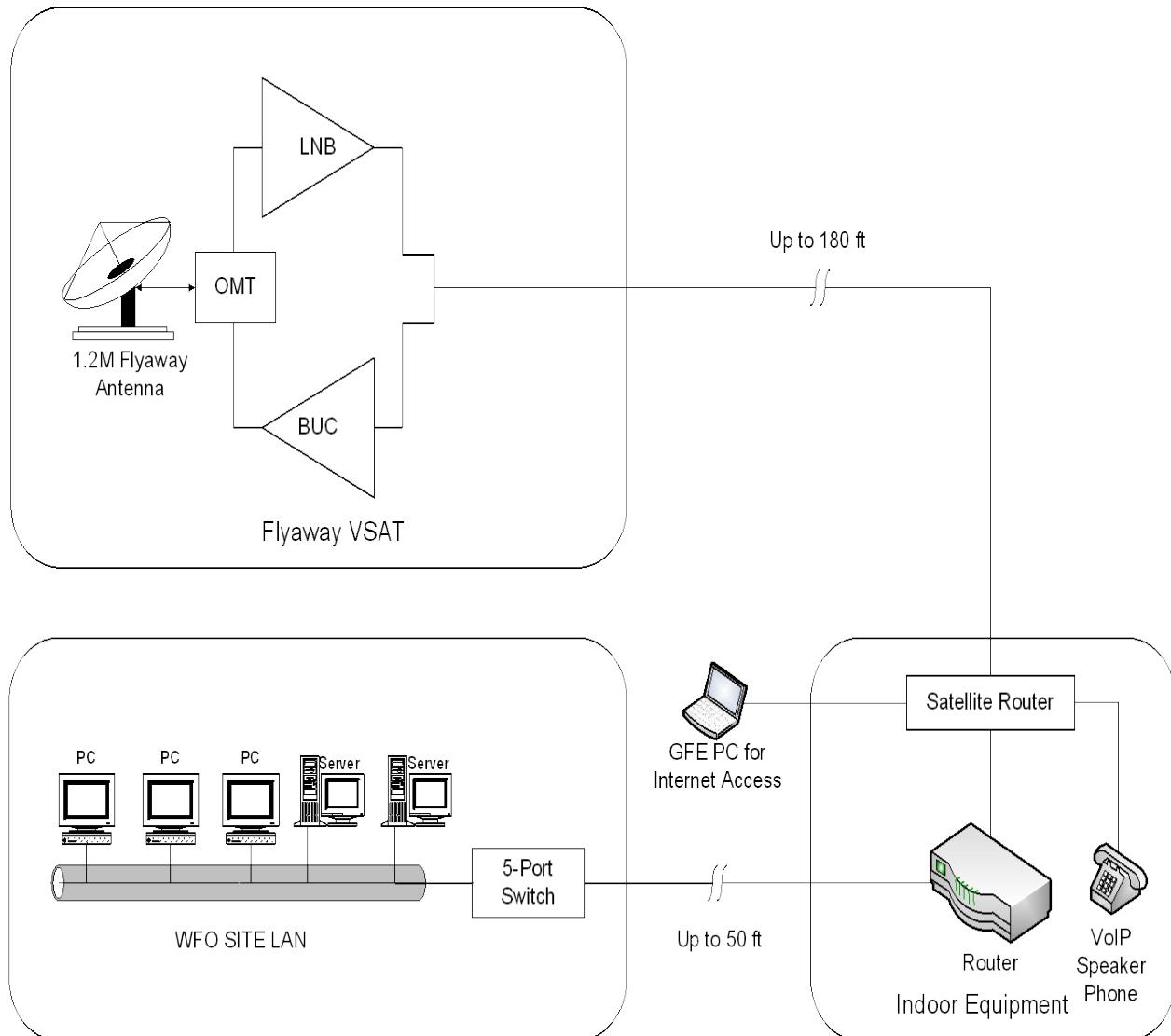


Exhibit 2.1.2.1-1. Block Diagram of VSAT System Setup at a WFO

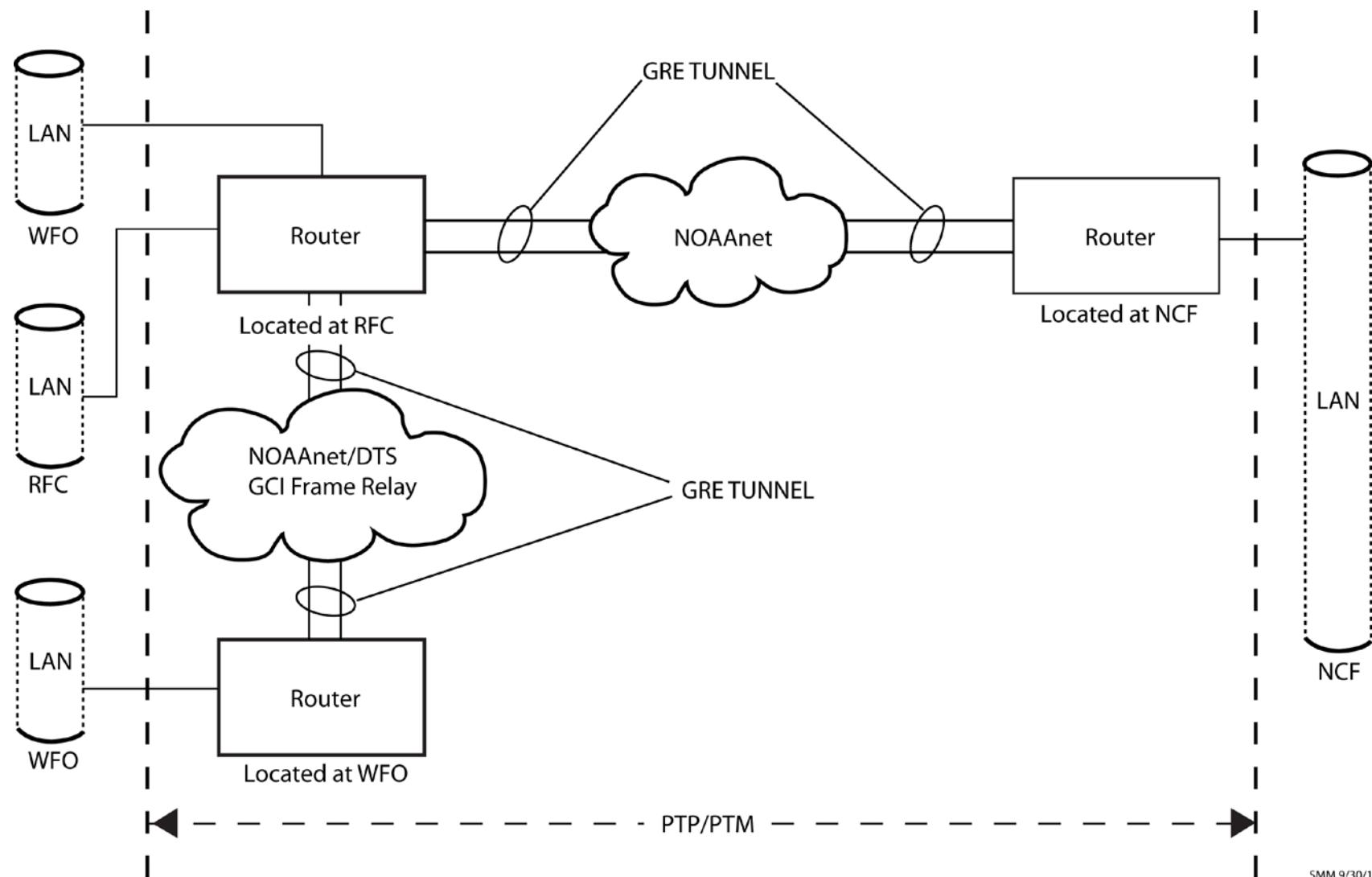


Exhibit 2.1.4-1. Interconnection of Wide Area Network Devices

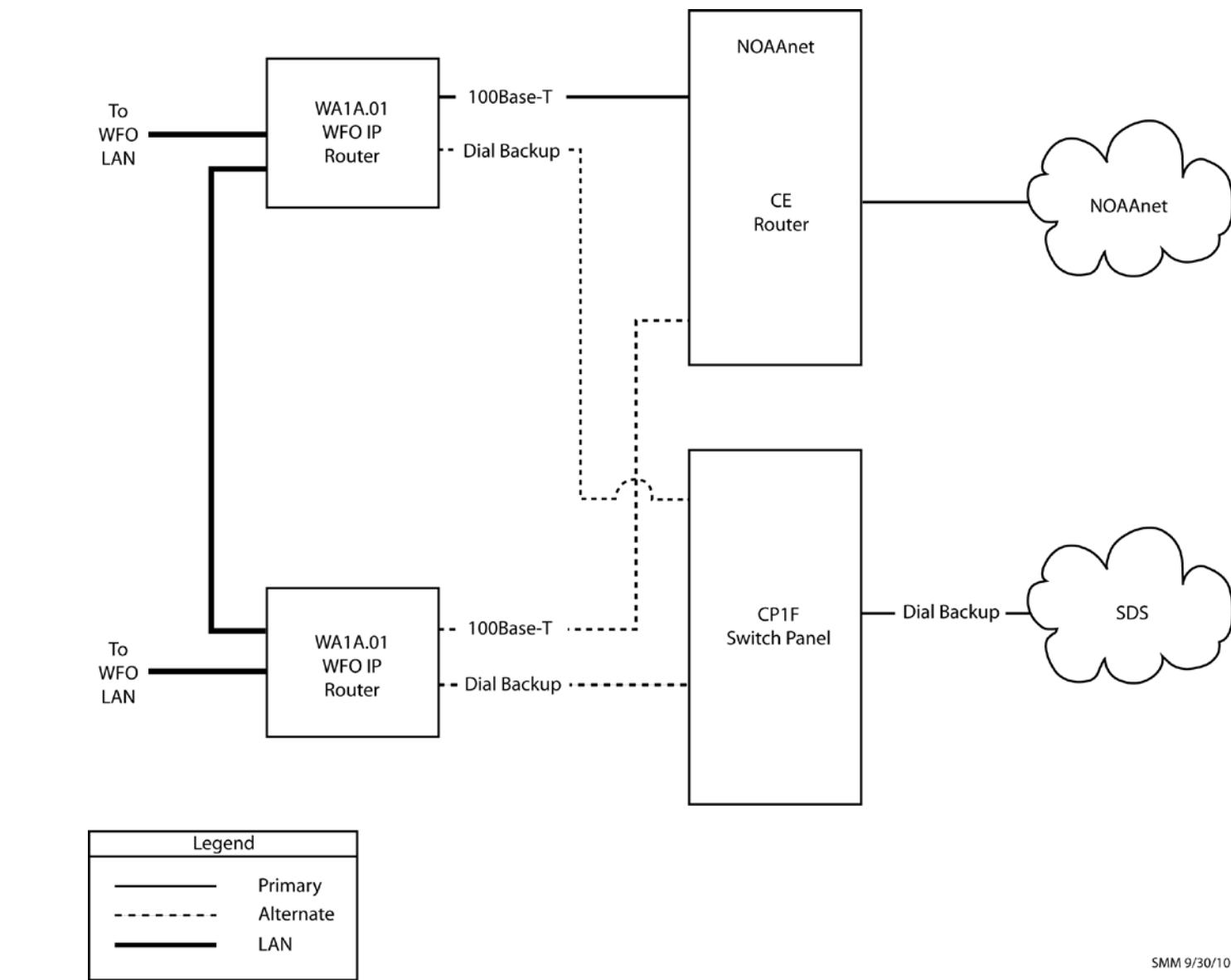


Exhibit 2.1.4-2. WFO Router Connection Diagram

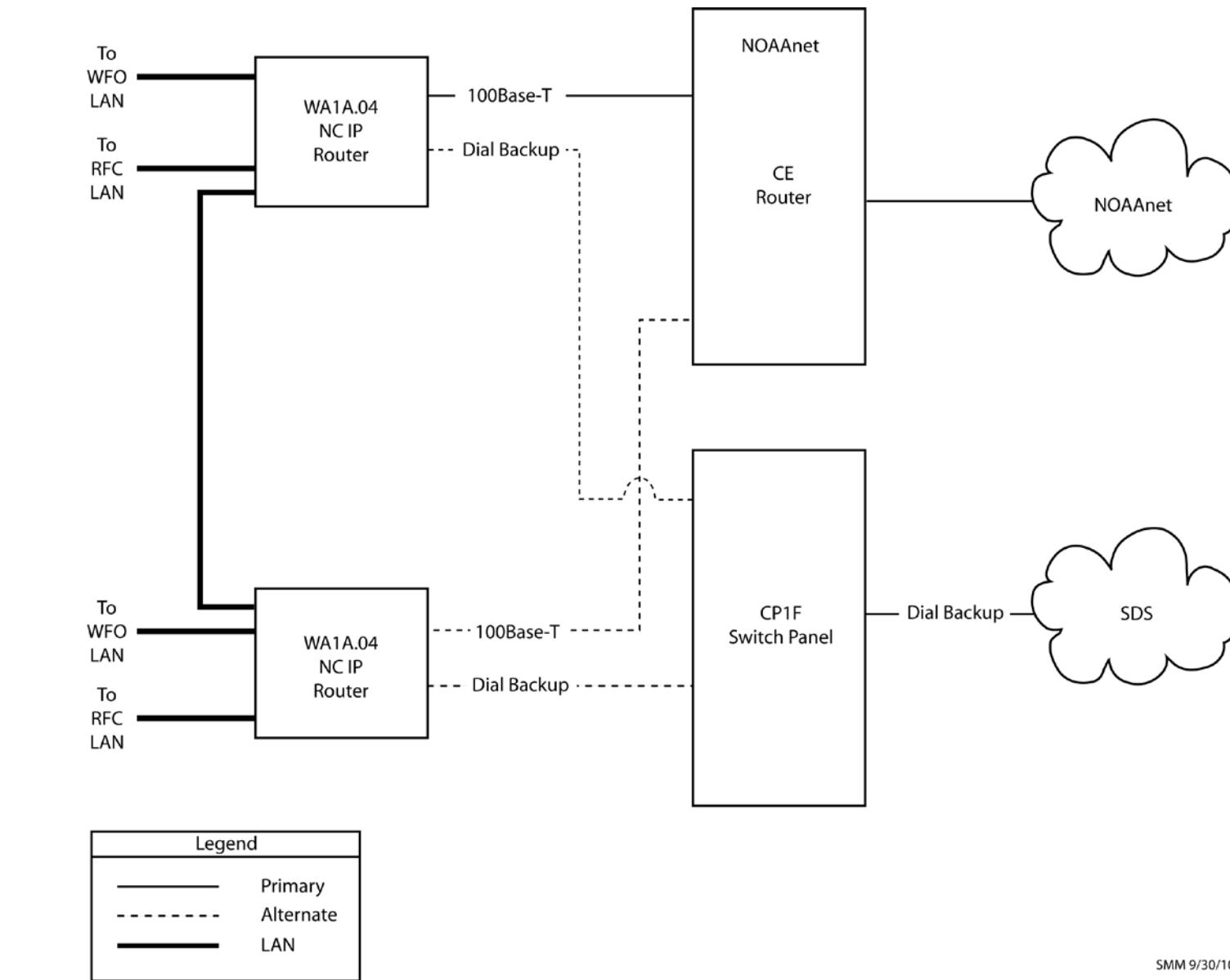


Exhibit 2.1.4-3. IP Router Connection Diagram for NC

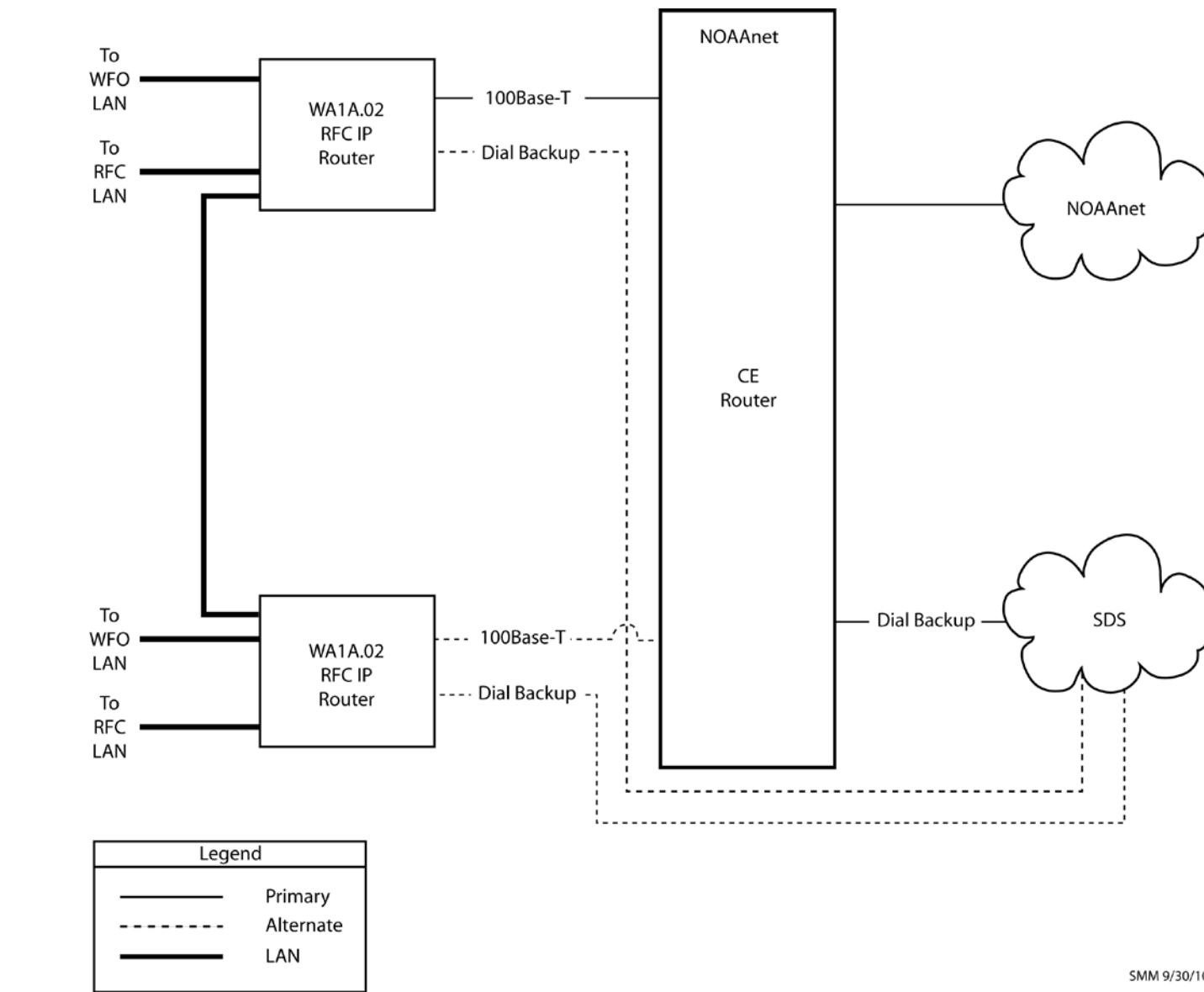


Exhibit 2.1.4-4. RFC Router Connection Diagram

2.1.5 Circuits

The communications processor (CP) circuits provide connectivity between AWIPS and external systems. Four terrestrial NESDIS circuits provide connectivity between the NESDIS site and the NCF, and two terrestrial circuits provide connectivity between NESDIS and the BNCF. These circuits are external to AWIPS and outside the ACN.

2.1.6 NESDIS Interface Router

Ten routers provide the AWIPS-NESDIS routing function and are located only at the NESDIS site, the NCF, and the BNCF. Five routers are located at NESDIS: three are at the ANCF, and two are at the BNCF.

2.2 Site Hardware Architecture

The AWIPS site hardware architecture has been standardized across all AWIPS site types (WFOs, RFCs, and NCs) so that the only differences are in quantity (i.e., number of workstations and amount of disk space) and, at the NCs, some additional peripheral items.

Each AWIPS site functions independently with its own hardware. Because the RFC sites and the colocated WFO system share the WAN routers, the WFO systems do not have WAN routers.

Each site has a site ground station (SGS) that receives the SBN signal. The SGS is provided and supported by Globecomm, under subcontract to Raytheon. The Pacific Tsunami Warning Center (PTWC) has the antenna that serves the WFO in Guam, Honolulu WFO, and Pacific Region Headquarters.

The SGS consists of the following:

- A receive-only antenna that provides the physical interface to the SBN.
- A low-noise-block (LNB) down-converter that converts the C-band satellite signal to lower L-band frequencies.
- The interfacility link (IFL), which is the cable from the antenna to the DVB Receivers.
- Redundant DC power supplies that provide power to the LNB.
- DVB receivers that receive the digital data stream from the SBN and transmit it to the CPs.

Colocated AWIPS sites take advantage of an IFL splitter to share the SGS antenna feed. Locations with more than two AWIPS installations also use an IFL splitter with multiple output ports (up to 8 per splitter).

All AWIPS sites use client/server technology to achieve function reuse, failure recovery, and functional partitioning. The servers are as follows:

- **WFO Archive Server (WAX).** WAX, a Linux-based device, HWCI DS1E, maintains a temporary archive of selected data ingested within the last 5 days at WFOs.
- **RFC Archive Server (RAX).** RAX, a Linux-based device, provides additional disk storage capacity for hydrologic data via Postgres database and provides the processing power and associated software to process this hydrologic data at RFCs.
- **Linux Data Servers (DX).** The DXs provide site-level decoding, message handling and data acquisition processing and hosts the DNS, NTP, SNMP, and LDAD TerminalServer. It also provides site-level data repository and database resources.
- **Workstations.** The AWIPS workstations are used to access all site-level system functions; they are also used to process and display textual, graphical, and image data.
- **Communications Processors.** The CPs provide site-level interface and processing to external communications.
- **Local Data Acquisition and Dissemination (LDAD) server.** The LDAD server provides local data acquisition, data quality control, and dissemination interfaces for local NWS offices.

Note: Some NC systems do not have LDAD servers.

- **Linux Preprocessors (PX).** The PXs provide additional data processing and storage ability for hydrometeorological applications.

The following exhibits illustrate the site hardware architecture:

- WFO (Exhibit 2.2-1)
- RFC (Exhibit 2.2-2)
- LDAD (Exhibit 2.2-3).

The WFO network diagram (Exhibit 2.2-4) represents the interface between the AWIPS LAN and the NOAAnet. The diagram illustrates the physical connections between the AWIPS routers and the NOAAnet routers.

2.2.1 *Rack Components*

Hardware is usually installed at each site in standard WFO and RFC rack configurations, as shown in Exhibit 2.2.1-1. There are stand-alone WFO rack configurations and collocated WFO rack configurations. Collocated WFO racks include all stand-alone equipment except for routers, which are provided by the colocated RFC.

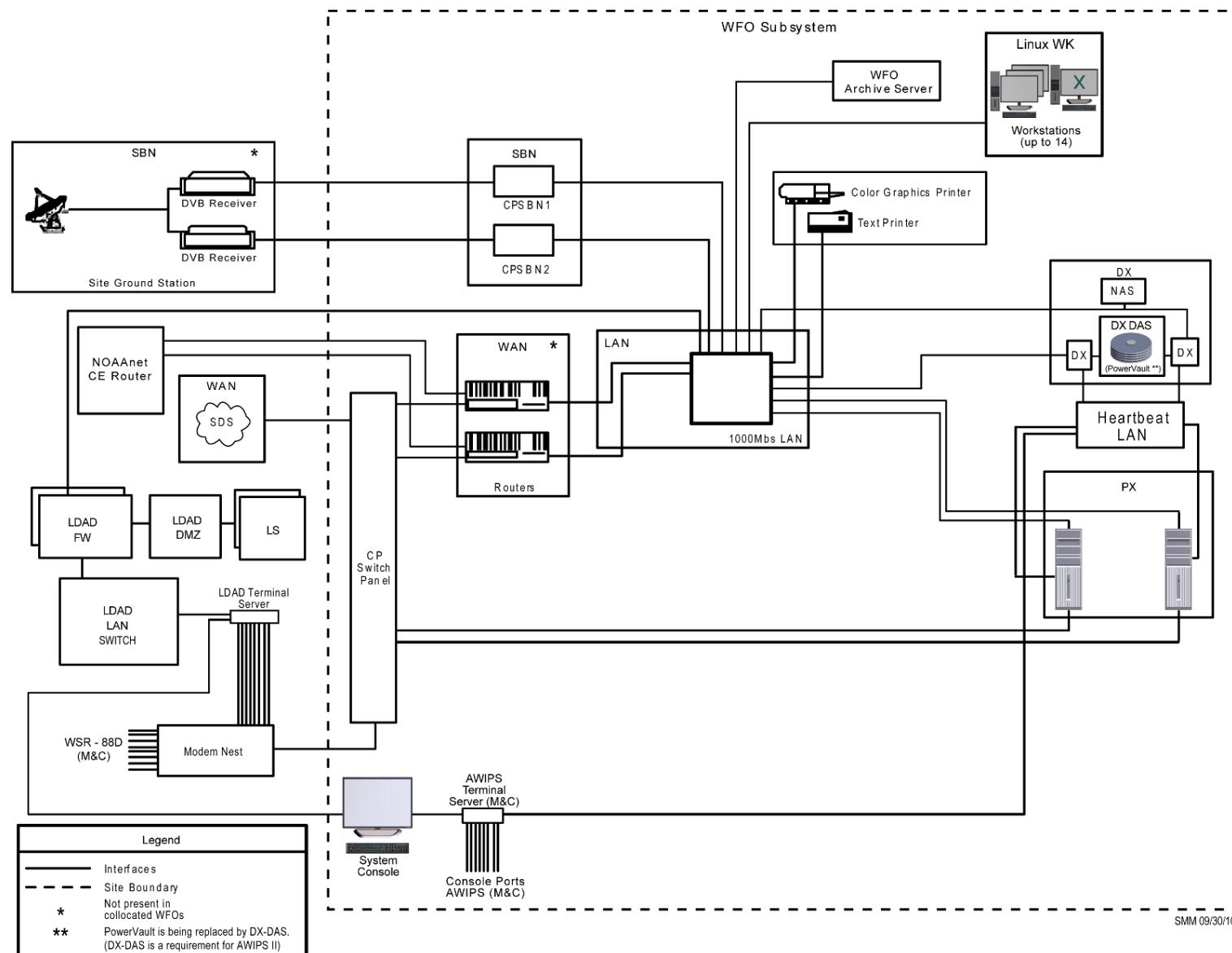


Exhibit 2.2-1. Stand-Alone WFO Site Hardware Architecture

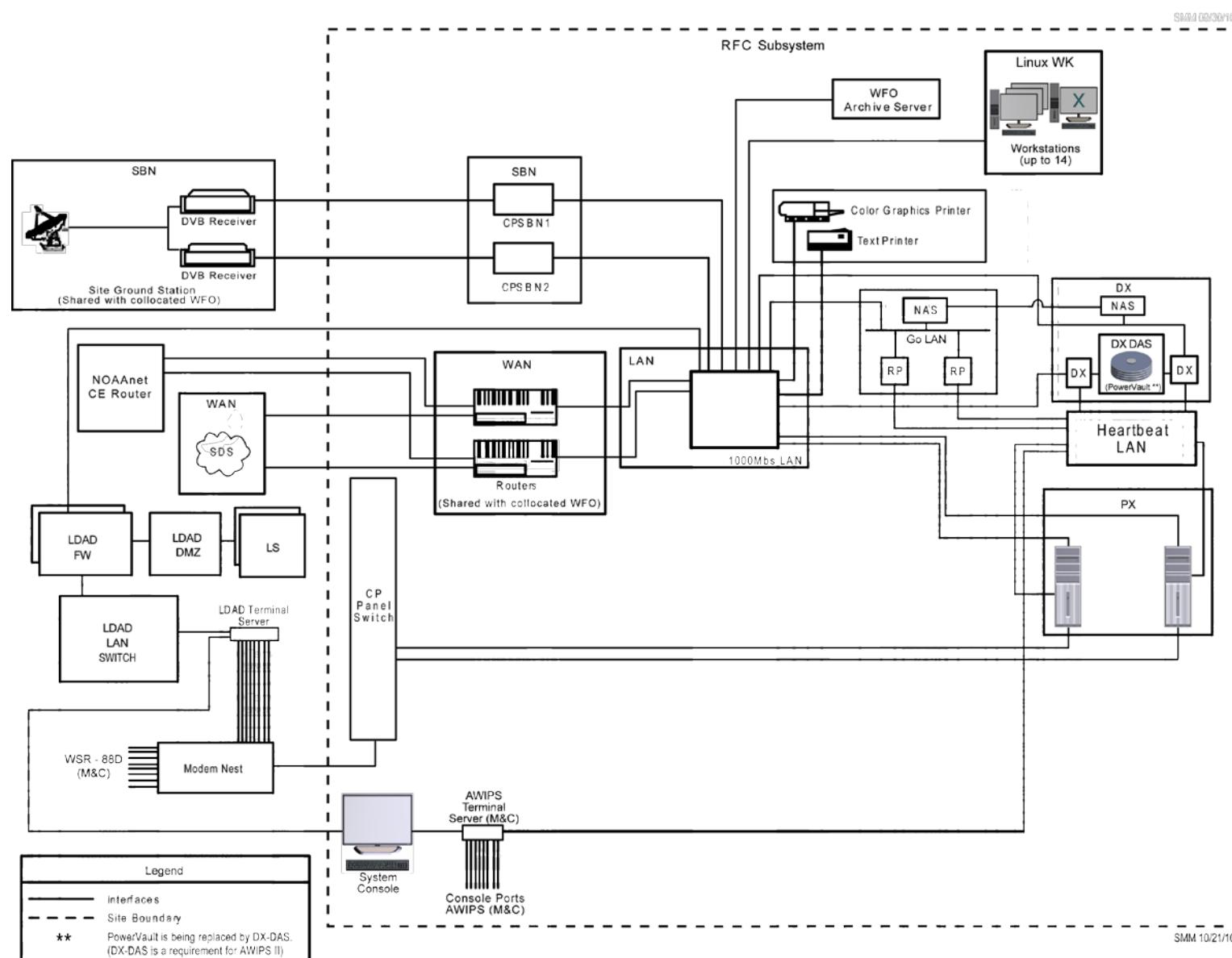
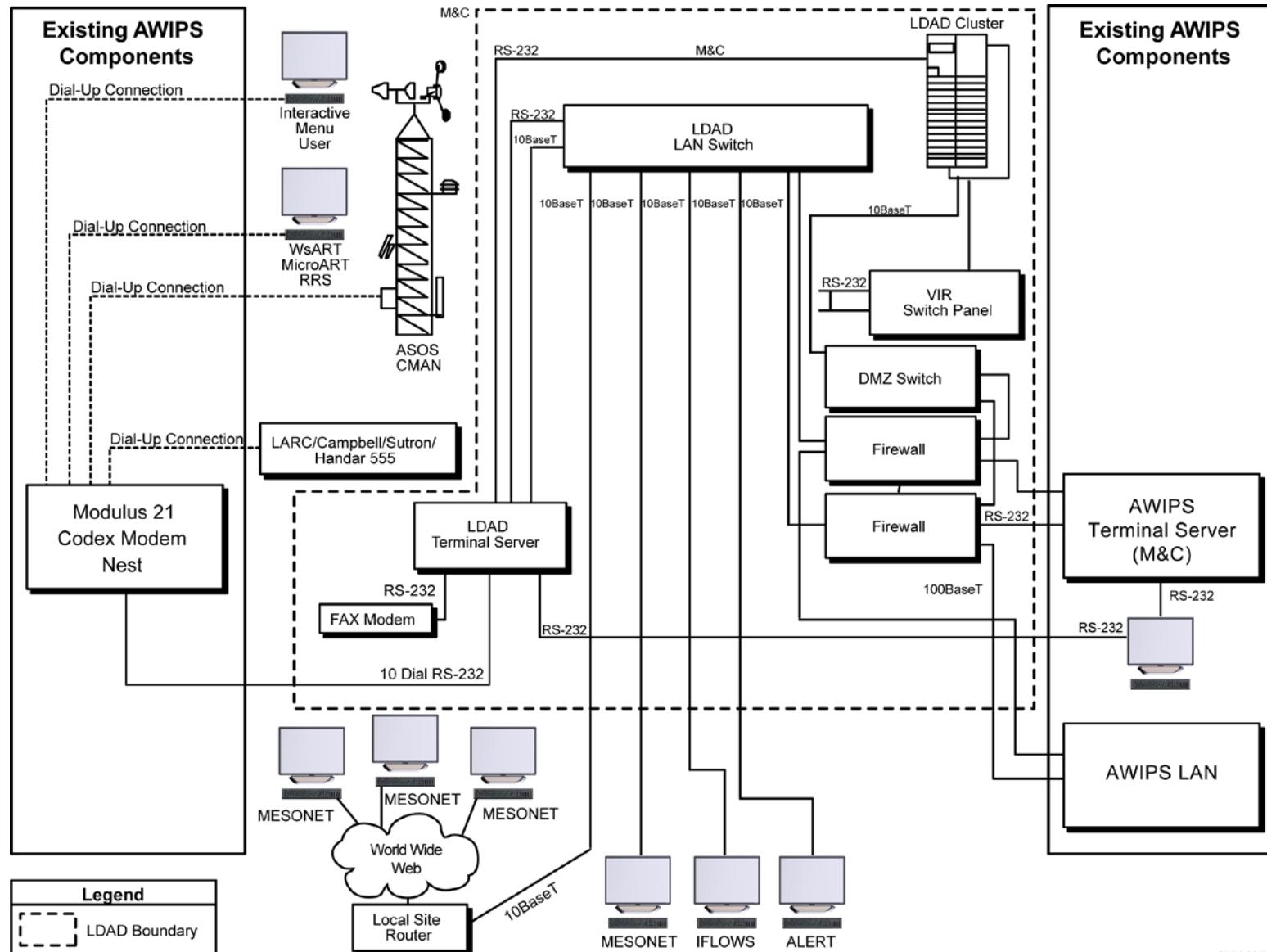
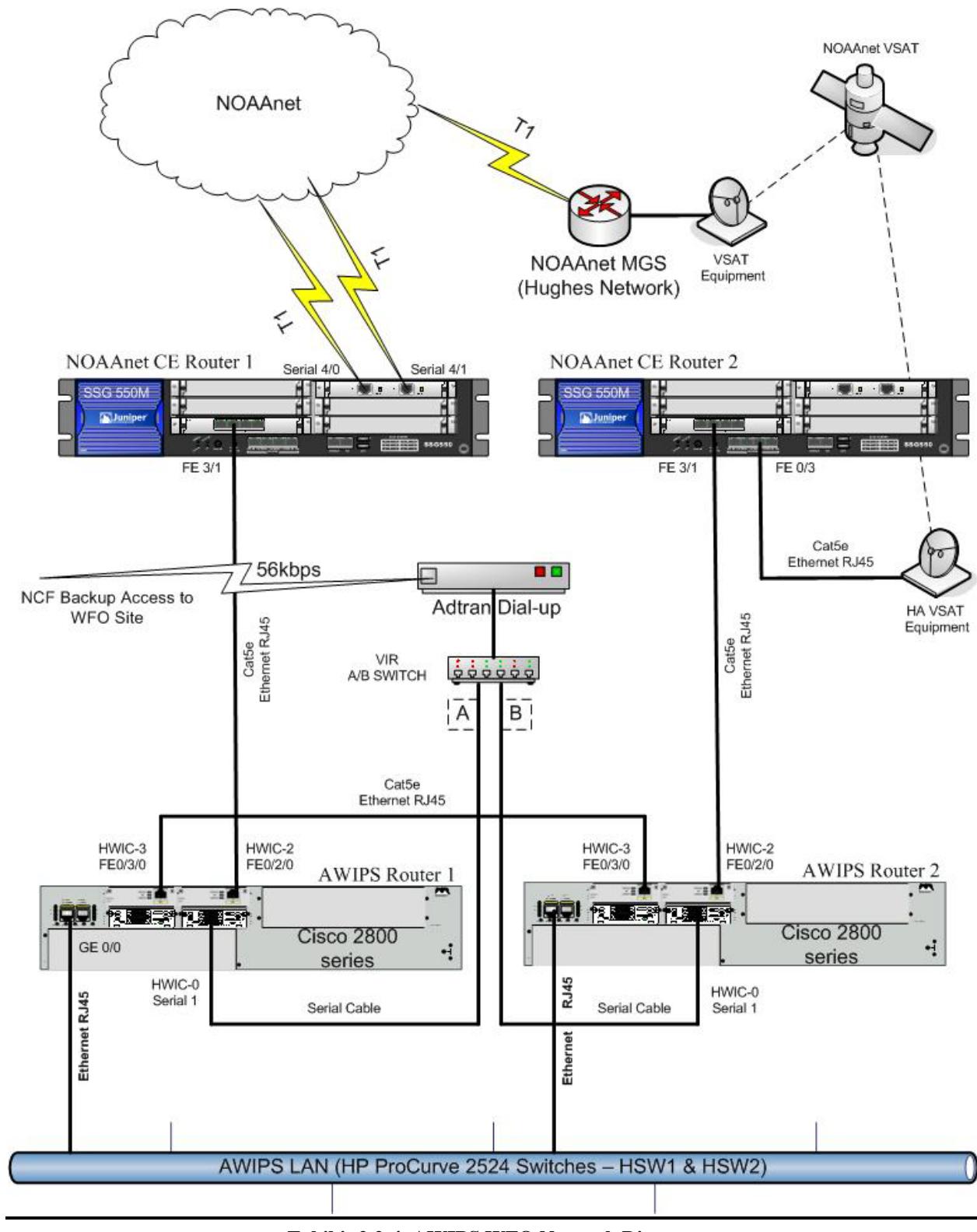


Exhibit 2.2-2. RFC Site Hardware Architecture





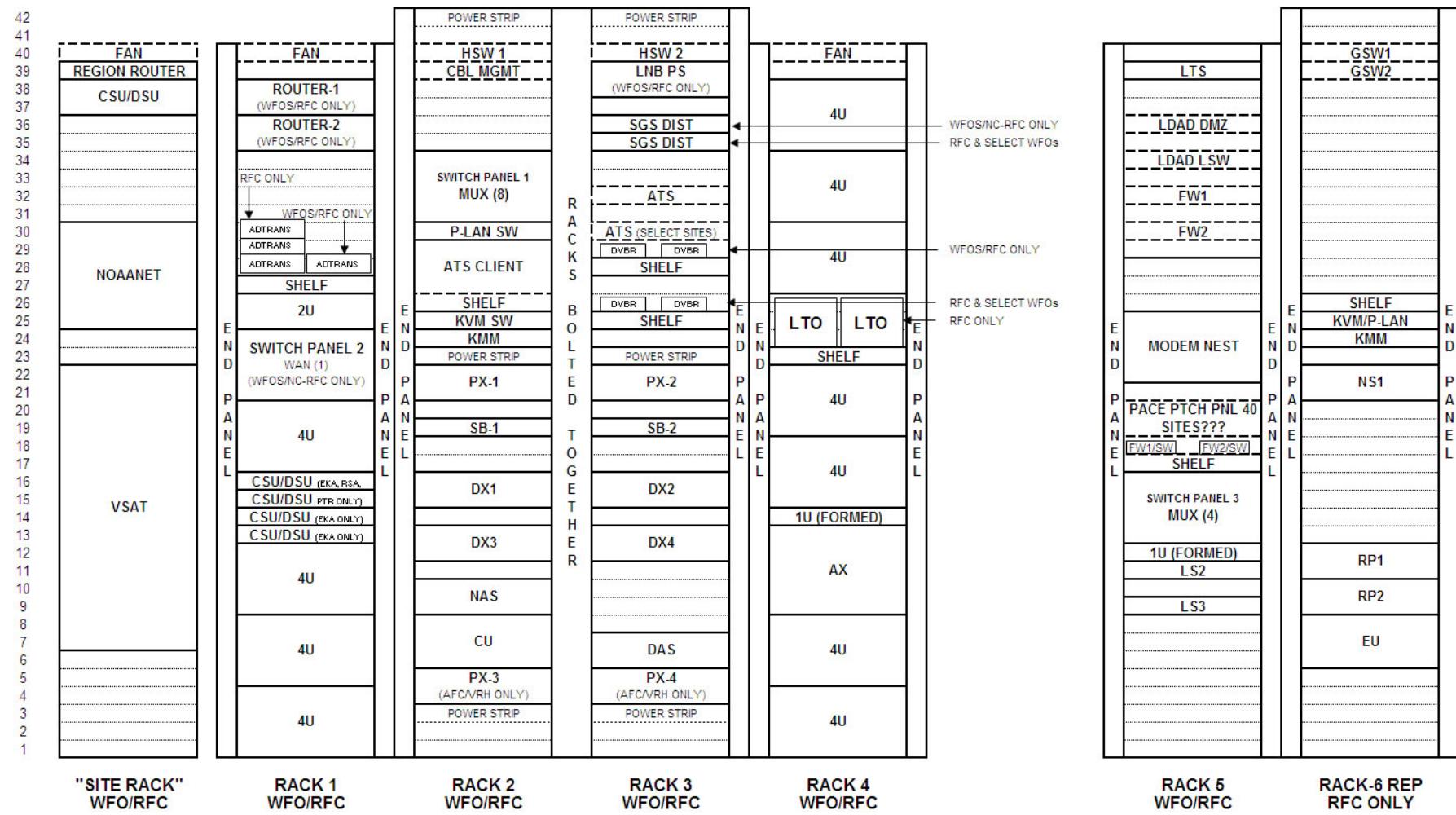


Exhibit 2.2.1-1. Standard Stand-Alone WFO/RFC Rack Configuration

2.2.1.1 Satellite Broadcast Network (SBN)

The Communications Processors for the SBN (Communications Processors - Satellite Broadcast Network [CPSBN]) accept data from the DVB receivers, separate the individual products from the data stream, and transfer the products to the Linux data servers for additional processing.

- **DVB Receivers**

Each AWIPS site has two DVB receivers that receive SBN data. Each DVB receiver receives all of the SBN data transmitted to the site and each receiver acts as a backup for the other. The DVB receivers replaced the demodulators, and the demodulators have been removed from the AWIPS hardware rack. The DVB receiver output is a dedicated LAN segment directly connected to the associated CPSBN.

- **Satellite Broadcast Processors**

At each AWIPS site, there are two CPSBNs responsible for receiving GOES products and a combination of NCEP products from the NCF.

NOTE: No site has more than two CPSBNs unless it has an NRS.

CPSBN1 and CPSBN2 function as a heartbeat cluster; failover is managed automatically or manually. Note that only a single high-availability package is currently used on this cluster. The package name is a2cp1apps. In failover mode, package execution shifts to the backup server. Note that there is software (notably the LDM(U) processes) that runs on both CPSBN1 and CPSBN2 and is not part of the a2cp1apps package. The a2cp1apps package manages the cp1f floating server name. Note that floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.

Each CPSBN is an HP DL380 G6 server with a 2.26 GHz E5520 processor, 6 GB of RAM, and 4 Ethernet LAN ports.

IP Virtual Server is installed on the CPSBNs. IPVS acts as a load balancer at the front of the DX3/DX4 EDEX cluster real servers; it directs requests from the workstations for TCP/UDP-based services to the real servers, and makes services of the real servers appear to the workstations as a virtual service on a single IP address. IPVS is aliased as ec. Clients such as CAVE connect to the EDEX server via the ec alias; this provides for continuation of service in the event of system failover.

Queue Processor Interface Daemon (QPID) is a JVM message broker configured to run on the CPSBN machines. It is responsible for keeping a queue of messages sent by ingest processes alerting an EDEX cluster of new or available data. Each EDEX process in an EDEX cluster is responsible for retrieving the next product in the queue, deleting that product from the queue, and acting upon the data product based on the information inside the JVM message. In this respect, it works on a first-come-first-

serve basis. So the EDEX process that has the most system resources available and is processing most quickly will, in theory, get to more products before the others.

The file systems on the CPSBNs are as follows:

- **root (/), /tmp, /usr, /var.** Linux mandates that these file systems exist. They are maintained as separate logical volumes to reduce the risk of any of these file systems filling up and affecting system operations. All of the file systems are ext3. The /tmp file system will be re-created with each boot sequence and performs no journaling.
- **/boot.** This file system is used to store the Linux kernel and boot-up instructions.
- **/dev/shm.** This is the designated shared memory.
- **/home.** This file system contains the entire user working areas.
- **/awips.** This file system is used to store baselined software and any associated log or configuration files. It may contain binary applications, scripts, logs, or data as required to support operations.
- **/data.** This file system is used to store the data received over the SBN and also the acquisition and SBN process logs. Subdirectories will further isolate application- or product-specific logs.
- **/awips2.** This file system is used to store baselined AWIPS II software.
- **/data/fxa.** This file system stores AWIPS data products that are not maintained within the RDBMS. This would include the LDAD data.

The following example illustrates CPSBN mount points for the WFOs.

```
[root@cpsbn1-tbw3 ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	317M	166M	66%	/
/dev/mapper/vg00-lvol_awips2	1.1G	524M	440M	55%	/awips2
/dev/mapper/vg00-lvol08	260M	42M	206M	17%	/home
/dev/mapper/vg00-lvol07	102G	1.5G	95G	2%	/data
/dev/mapper/vg00-lvol06	520M	241M	253M	49%	/awips
/dev/mapper/vg00-lvol03	16G	5.0G	9.6G	35%	/usr
/dev/mapper/vg00-lvol04	3.1G	1.1G	1.8G	38%	/var
/dev/mapper/vg00-lvol02	520M	20M	474M	4%	/tmp
/dev/cciss/c0d0p1	208M	20M	178M	10%	/boot
tmpfs	3.2G	0	3.2G	0%	/dev/shm
/dev/ram0	1.6G	1.1G	493M	68%	/data/ldm/data
nas1:/dataFXA	516G	450G	66G	88%	/data/fxa
nas1:/awipscm	52G	21G	31G	41%	/awipscm

```
[root@cpsbn1-tbdr ~]# df -H
```

The following example illustrates CPSBN mount points for the RFCs

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	319M	163M	67%	/
/dev/mapper/vg00-lvol08	260M	12M	236M	5%	/home

/dev/mapper/vg00-lvol07	102G	702M	96G	1%	/data
/dev/mapper/vg00-lvol06	520M	154M	340M	32%	/awips
/dev/mapper/vg00-lvol03	16G	5.0G	9.6G	35%	/usr
/dev/mapper/vg00-lvol04	3.1G	220M	2.7G	8%	/var
/dev/mapper/vg00-lvol_awips2	1.1G	519M	446M	54%	/awips2
/dev/mapper/vg00-lvol01	520M	20M	474M	4%	/tmp
/dev/cciss/c0d0p1	208M	20M	178M	10%	/boot
tmpfs	3.2G	0	3.2G	0%	/dev/shm
/dev/ram0	1.6G	1.1G	493M	68%	/data/ldm/data
nas1:/qpid	11G	2.3G	8.1G	22%	
					/awips2/qpid/messageStore
nas1:dataFXA	516G	383G	134G	75%	/data/fxa

2.2.1.2 Synchronous Communications (Radar)

- **Switch Panel**

The switch panel provides redundant, remotely controllable communications interfaces for the PX asynchronous multiplexers (mux). Specifically, the switch panel switches incoming and outgoing signals from the primary to the spare PX mux or ports when directed. The switch panel is controlled locally by the System Console and remotely from the NCF through the System Console. The switch panel provides a passive patch capability for each communications line. This allows communications problems to be monitored and diagnosed without disconnecting any communications equipment.

The VIR switches provide the ability to switch between primary and backup equipment. The switches may be operated remotely (by the NCF) or manually at the site (by the system managers). There are redundant connections and pathways to all AWIPS hardware except between the antenna and the DVB receivers (there is only one IFL).

- **Modem Nest**

AWIPS accommodates a variety of site-specific communications requirements through a high-reliability rack-mounted Modem Nest with redundant power supplies. The Modem Nest supports up to 16 single modem cards. Every site has either a 10-modem-card modem nest or a 16-modem-card modem nest.

2.2.1.3 Application Server

Application servers have been decommissioned at all sites except the NCF.

2.2.1.4 Data Servers

The data server systems support the functions for processing, archiving, and retrieval. The processing and storage functions receive and store data that were acquired and distributed via the multiple CPs and service data requests to all workstations. The archiving functions provide general capabilities for retrieving site archive data, storing data in the

site archive (both automatic and requested storage), and retrieving data from the site archive. The data server hardware components are the DX (1-4) servers, the archive servers (WAX and RAX), and the network attached storage (NAS).

- **Data Server Processors**

Four Linux-based DX processors (two primary and two secondary) are deployed at every AWIPS site. The DXs provide the centralized computing and centralized database functions. They support the processing required to store and process many types of data and products that are acquired, derived, or manually entered. They also store software, map backgrounds, and site-specific data.

The PostgreSQL object-relational database management system is supported by Network Appliance (NetApp) FAS2020C rack-mounted mass storage. These devices are direct-connected to DL380G6 Linux Data Servers (DX1 and DX2). Refer to Appendix E, Mass Storage Design, for a description of the disk allocations.

DX1 and DX2 function as a heartbeat cluster; failover is managed automatically or manually. Note that both DX1 and DX2 normally run separate high-availability packages: a2dx1apps on DX1 and a2dx2apps on DX2. In failover mode, both packages shift to the same server. Access to DX1 and DX2 is via server name alias: dx1f points to the server running the a2dx1apps package; dx2f points to the server running the a2dx2apps package. Note that the floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.

DX3 and DX4 are independent servers, both of which run the EDEX server software. There is no failover between DX3 and DX4. Both servers are load balanced and share data processing responsibilities; if one server is stopped, the other will pick up the entire data processing load. Processing load balancing between DX3 and DX4 is provided by QPID as data messages are removed from QPID queues and processed by the EDEX instance having available processing capacity. Client request balancing for DX3 and DX4 is managed by Internet Protocol Virtual Server (IPVS) (the pulse service). Both QPID and IPVS run on CPSBN1 and CPSBN2.

Additional information on IPVS, including monitoring tools, is provided in Chapter 25, AWIPS II/EDEX Administration Guide. The DX configurations are summarized in Table 2.2.1.4-1. Each Linux DX is connected to the Gigabit LAN.

Table 2.2.1.4-1. Data Server Configurations at AWIPS Sites

Type	Site	Processor	RAM	CACHE	Internal Storage
HP DL380 G6	All Sites (DX server)	2 2.26 GHz Xeon CPU Quad Core	6 GB	1 MB L2 cache	2x146 GB
Dell PowerEdge 2950	All AWIPS Sites	Dual Quad Core 2.0 GHz	4 GB SDRAM	6 MB	2X 146 GB

- **River Ensemble Processors (REP)**

The River Ensemble Processor (REP) suite, part of the NWS' Advanced Hydrologic

Prediction Service (AHPS) program, was designed as a high-performance “blank slate” on which the River Forecast Centers can load new or site-modified applications in an environment that is very similar to AWIPS. It includes an availability infrastructure that allows failing-over of processes and crons if desired. This hardware hosts “baseline” Office of Hydrology (OH) applications implemented via AWIPS or AHPS, as appropriate. The REP provides the RFCs with a platform that was designed for easy expansion based on mission requirements. The REP suite is a self-contained unit that includes a rack, a NAS device, two commodity servers, and a GbE LAN. The REP was preconfigured, including IP addresses, to facilitate installation and allow the RFCs to take advantage of the additional processing power as soon as desired. The two Linux Operating System commodity servers have a file system structure that is consistent with current operations.

The REP NAS provides storage at the RFCs for the hydrologic data for the prediction models run on the REP processors. The new RFC NAS is a clustered Sun STK5320 with two shelves (where WFOs only have one shelf) of 16x500GB, per shelf (8TB), for a total raw capacity of 16TB. It is connected to the Gigabit Ethernet and has two FibreChannel adapters. The file system structure of the NAS is consistent with current operations and is ready to support installation of hydrology software.

The hardware specifications for the REP are as follows.

- Dell PowerEdge 2950 (RFC) (REP)
- Dual Quad Core CPU
- 8 GB DDR, 6 MB L2 cache
- Hard disk drive, 146 GB [2 x 146 GB] RAID 1

- **WFO Archive Server**

The WFO AX (WAX) (DS1E) is a Linux-based device dedicated to performing data archiving tasks. The AWIPS data archiving system maintains a temporary archive of selected data ingested within the last 5 days. At any time, data can be selected and moved to more permanent storage or written to a CD or DVD. Large data sets (up to 4.7 GB) can be written to a single digital disk, allowing for easy transport and ingest by the Weather Event Simulator (WES), a training system external to AWIPS that has been implemented at all WFOs.

The WAX configurations are summarized in Table 2.2.1.4-2.

Table 2.2.1.4-2. WFO Archive Server Configuration at AWIPS Sites

Type	Site	Processor	RAM	CACHE	Internal Storage
HP ML350	Stand-alone WFOs and Collocated WFOs	1X Dual Core 2.66 GHz CPU	1 GB	512 KB	3X 146 GB

An RS-232-C interface connects the WAX processor console port to the site CP/monitor and control interface for monitor control.

- **RFC Archive Server**

The RFC AX (RAX) (DS1E) is a Linux-based device dedicated to providing additional disk storage capacity and processing power for hydrologic data. The server hosts Postgres and has the processing power and associated software to process large collections of hydrologic data. It is not a redundant server; however, it does have an SCSI RAID Level 5 storage array. It also has a DVD/CDR, and data can be selected and moved to more permanent storage or written to a CD or DVD.

The RAX configurations are summarized in Table 2.2.1.4-3.

Table 2.2.1.4-3. RFC Archive Server Configuration at AWIPS Sites

Type	Site	Processor	RAM	CACHE	Internal Storage
HP ML350	RFCs	1X Dual Core 2.66 GHz CPU	4 GB	512 KB	6X 146 GB

An RS-232-C interface connects the RAX processor console port to the site CP/monitor and control interface for monitor control.

- **Network Attached Storage**

The NAS (DS1F) provides storage at AWIPS sites and at the RFCs, storage for REP hydrologic data as well. The NAS is a Sun ST5320 with 8TB (WFO) or 16TB (RFC) of storage. It is connected to the Gigabit Ethernet.

- **Archive Storage**

A portable 1 TB Hard Disk Drive (HDD) with eSATA interface to the Archive Server has been added to the Archive Storage system, a prerequisite for AWIPS II. The DX and REP Tape Drive's FibreBridge connection has been removed; the tape drive is now directly connected to the Archive Server via the LVD SCSI interface.

2.2.1.4.1 Data Server File Systems and Raw Partitions

The DX file systems support the following:

- Operating system
- COTS applications
- Developed applications.

2.2.1.4.1.1 File Systems on the Linux Data Server (DX)

The file systems on the Linux-OS DXs are as follows:

- **root (/), /tmp, /usr, /var.** Linux mandates that these file systems exist.
- **/boot.** This file system contains the Linux kernel and boot-up instructions.
- **/dev/shm.** This file system is the Linux shared memory.

- **/awips/fxa.** This file system stores baselined Forecast Systems Laboratory (FSL)-developed (presently Earth System Research Laboratory/Global Systems Division (ESRL/GSD)) WFO-Advanced software and any associated log or configuration files. It may contain binary applications, scripts, logs, or data that are required to support operations.
- **/awips/ifps.** This file system is for baselined IFPS software and data.
- **/awips/ladad.** This file system contains scripts and data for LDAD server.
- **/awips/ops.** This file system stores baselined contractor-developed software and any associated log or configuration files. It may contain binary applications, scripts, logs, or data as required to support the operations.
- **/data/logs.** This file system contains the operational logs for software executing on the platform. Subdirectories will further isolate application- or product-specific logs.
- **/awips2.** This file system is used to store base-lined AWIPS II software.
- **/awips2/data.** Contains database files (only on DX1/2)
- **/awips2/edex/data/hdf5.** On DX1/2: contains the HDF5 component of the data store. On DX3/4, LX, and XT workstations: contains shared static data and hydro apps.

The following directory is mounted on the DX floating point from the NAS.

- **/data_store.** Folders are usually laid out exactly like the sbn folders on the EDEX server with each plug-in having a folder on the data store. But some of them do not follow the same convention, for e.g., data sent to the 'metar' endpoint will be found in the /data_store/text folder. See Chapter 6 for more details on other data types. Additionally, if new format ingest is being worked, you will also find new data types not yet found on the development or integration systems. Those files will be located in /data_store/experimental.

The following directories are also mounted on the DX from the DAS:

- **/awips/dev.** This file system contains the source code and libraries required for local software development at field sites. The /awips/dev file system is NFS-exported to support development from the workstations.
- **/awips/adapt.** This file system contains the AWIPS Decision Assistance Production Preparation Tools (ADAPPT) software for the most recent software installation at WFO sites. This includes the Hourly Weather Roundup (HWR), Climate, the Interactive Forecast Preparation System (IFPS), the Local AWIPS Model Output Statistics (MOS) Program (LAMP), and Pre-LAMP software. This file system may contain binary applications, scripts, logs, or data.
- **/awips/GFESuite.** This file system contains the GFESuite software. This file system may contain binary applications, scripts, logs, or data.

- **/awips/hydroapps.** This file system contains the NWS WFO Hydrologic Forecast System (HFS) and NWS River Forecast System (NWSRFS) baseline software for the most recent software installation.
- **/awips/rep.** This file system (RFCs only) is mounted from the secondary NAS(NS1) and is used for REP.
- **/data/fxa.** This file system stores AWIPS data products that are not maintained within the RDBMS. This would include the LDAD data.
- **/data/GFE.** This file system (WFOs only) stores the GFESuite data products.
- **/data/local.** This file system contains locally acquired or site-specific data and is the file system that sites should use to store locally developed software. Each site specifies what is included in this file system, so it may contain binary applications, scripts, logs, or data.
- **/data/x400.** This directory contains the Message Handling System (MHS) files.
- **/data/adapt.** This file system (WFOs only) contains the IFPS, GFESuite, and LAMP data, including GIF and text file products, topographic maps, shapefiles, IFPS database grids and maps, and GFESuite databases, products, and topographic maps at WFO sites.
- **/home.** This file system contains all the user working areas.
- **/DS_shared.** This directory contains the GNU compiler collection, an obsolete logs directory, an MHS directory that is still in use and an obsolete HP service Guard Directory.
- **/awips2.** This file system is used to store baselined AWIPS II software.
- **/awips/storage.** A location for the storage of miscellaneous AWIPS related files.
- **/awips2/GFESuite.** Contains scripts and data relating to inter site coordination (ISC) and service backup.
- **/awips2/edex/data/utility.** Contains localization store and EDEX configuration files.

An example of mount points for a dx3/4 at the WFO's follows.

```
[root@dx3-tbw3 ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.2G	633M	423M	60%	/
/dev/mapper/vg00-lvol05	5.4G	1.1G	4.1G	21%	/awips/fxa
/dev/mapper/vg00-lvol06	1.4G	82M	1.2G	7%	/awips/ifps
/dev/mapper/vg00-lvol07	1.1G	144M	820M	15%	/awips/ldad
/dev/mapper/vg00-lvol08	285M	133M	138M	50%	/awips/ops
/dev/sda1	104M	26M	74M	26%	/boot
/dev/mapper/vg00-lvol09					

	2.1G	38M	1.9G	2%	/data/logs
none	4.3G	0	4.3G	0%	/dev/shm
/dev/mapper/vg00-lvol02	1.1G	19M	945M	2%	/tmp
/dev/mapper/vg00-lvol03	11G	6.6G	3.1G	68%	/usr
/dev/mapper/vg00-lvol04	3.1G	505M	2.4G	18%	/var
/dev/mapper/vg00-lvol_awips2	43G	14G	27G	35%	/awips2
nas1:awipsADAPT	1.1G	742M	285M	73%	/awips/adapt
nas1:awipsDEV	4.2G	590k	4.2G	1%	/awips/dev
nas1:awipsgfesuit	104G	18G	86G	18%	/awips/GFESuite
nas1:awipsHYDRO	11G	964M	9.4G	10%	/awips/hydroapps
nas1:datalocal	52G	27G	26G	51%	/data/local
nas1:datax400	615M	221M	394M	36%	/data/x400
nas1:DSshared	1.6G	410M	1.2G	27%	/DS_shared
nas1:dataADAPT	2.7G	433M	2.3G	17%	/data/adapt
nas1:dataGFE	17M	99k	17M	1%	/data/GFE
nas1:awipsHOME	118G	71G	48G	60%	/home
nas1:datafxa	516G	291G	225G	57%	/data/fxa
nas1:storage	271G	43G	228G	16%	/awips/storage
nas1:/localapps	52G	656k	52G	1%	/localapps
nas1:/dvol/diagnostic	156M	3.9M	152M	3%	/mnt/nas
nas1:/GFESuite2	11G	852k	11G	1%	/awips2/GFESuite
nas1:/aiidata	541G	17G	524G	4%	/awips2/edex/data
dx2f:/data_store	178G	55G	114G	33%	/data_store

An example of mount points for a dx3/4 at the RFC's follows.

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.2G	644M	413M	61%	/
/dev/mapper/vg00-lvol_awips2	43G	14G	27G	35%	/awips2
/dev/mapper/vg00-lvol05	5.4G	2.3G	2.9G	44%	/awips/fxa
/dev/mapper/vg00-lvol06	1.4G	36M	1.3G	3%	/awips/ifps
/dev/mapper/vg00-lvol07	1.1G	92M	873M	10%	/awips/ldad
/dev/mapper/vg00-lvol08	285M	67M	204M	25%	/awips/ops
/dev/sdal	104M	26M	74M	26%	/boot
/dev/mapper/vg00-lvol09	2.1G	81M	1.9G	5%	/data/logs
none	4.3G	0	4.3G	0%	/dev/shm
/dev/mapper/vg00-lvol02	1.1G	19M	945M	2%	/tmp
/dev/mapper/vg00-lvol03	11G	7.0G	2.7G	73%	/usr
/dev/mapper/vg00-lvol04	3.1G	549M	2.4G	19%	/var
nas1:awipsADAPT	1.1G	166M	862M	17%	/awips/adapt
nas1:awipsDEV	4.2G	1.7M	4.2G	1%	/awips/dev
nas1:awipsgfesuit	104G	26G	78G	25%	/awips/GFESuite
nas1:awipsHYDRO	104G	45G	59G	44%	/awips/hydroapps
nas1:datalocal	155G	22G	134G	14%	/data/local

nas1:dataX400	615M	13M	602M	3%	/data/x400
nas1:DSshared	1.6G	230M	1.4G	15%	/DS_shared
nas1:awipsHOME	118G	32G	87G	27%	/home
nas1:dataFXA	516G	383G	134G	75%	/data/fxa
nas1:aiidata	516G	5.3G	510G	2%	/awips2/edex/data
nas1:GFESuite2	11G	88M	11G	1%	/awips2/GFESuite
nas1:/localapps	52G	99k	52G	1%	/localapps
dx2f:/data_store	179G	41G	130G	24%	/data_store

The mount points for a WFO DX1/2 (postgres /awips2/data is only present where a2dx1apps is running).

[root@dx2-tbw3 ~]# df -H

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.2G	479M	578M	46%	/
/dev/mapper/vg00-lvol05	5.4G	1.4G	3.7G	28%	/awips/fxa
/dev/mapper/vg00-lvol06	1.4G	82M	1.2G	7%	/awips/ifps
/dev/mapper/vg00-lvol07	1.1G	85M	879M	9%	/awips/ldad
/dev/mapper/vg00-lvol08	285M	125M	145M	47%	/awips/ops
/dev/cciss/c0d0p1	104M	25M	74M	26%	/boot
/dev/mapper/vg00-lvol09	11G	2.9G	7.1G	29%	/data/logs
none	3.2G	0	3.2G	0%	/dev/shm
/dev/mapper/vg00-lvol02	1.1G	27M	938M	3%	/tmp
/dev/mapper/vg00-lvol03	11G	7.4G	2.3G	77%	/usr
/dev/mapper/vg00-lvol04	3.1G	494M	2.4G	18%	/var
/dev/mapper/vg00-lvol_awips2	43G	2.8G	38G	7%	/awips2
nas1:awipsADAPT	1.1G	742M	285M	73%	/awips/adapt
nas1:awipsDEV	4.2G	590k	4.2G	1%	/awips/dev
nas1:awipSGFESuit	104G	18G	86G	18%	/awips/GFESuite
nas1:awipSHYDRO	11G	964M	9.4G	10%	/awips/hydroapps
nas1:dataLOCAL	52G	27G	26G	51%	/data/local
nas1:dataX400	615M	221M	394M	36%	/data/x400
nas1:DSshared	1.6G	410M	1.2G	27%	/DS_shared
nas1:dataADAPT	2.7G	433M	2.3G	17%	/data/adapt
nas1:dataGFE	17M	99k	17M	1%	/data/GFE
nas1:awipsHOME	118G	71G	48G	60%	/home
nas1:dataFXA	516G	291G	225G	57%	/data/fxa
nas1:aiidata/utility	541G	17G	524G	4%	/awips2/edex/data/utility
nas1:/storage	271G	43G	228G	16%	/awips/storage
nas1:/GFESuite2	11G	852k	11G	1%	/awips2/GFESuite
nas1:/localapps	52G	656k	52G	1%	/localapps
/dev/mapper/vg_aiildm-awipsiildm	178G	56G	114G	33%	/data_store

The mount points for a RFC DX1/2 is illustrated below.

[root@dx2-tbdr ~]# df -H

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.2G	476M	581M	46%	/
/dev/mapper/vg00-lvol_awips2	43G	1.1G	40G	3%	/awips2
/dev/mapper/vg00-lvol05	5.4G	1.9G	3.3G	36%	/awips/fxa
/dev/mapper/vg00-lvol06	1.4G	83M	1.2G	7%	/awips/ifps
/dev/mapper/vg00-lvol07	1.1G	91M	873M	10%	/awips/ldad
/dev/mapper/vg00-lvol08	285M	72M	199M	27%	/awips/ops
/dev/cciss/c0d0p1	104M	38M	61M	39%	/boot
/dev/mapper/vg00-lvol09	11G	1.7G	8.2G	18%	/data/logs
none	3.2G	0	3.2G	0%	/dev/shm
/dev/mapper/vg00-lvol02	1.1G	26M	938M	3%	/tmp
/dev/mapper/vg00-lvol03	11G	7.9G	1.8G	82%	/usr
/dev/mapper/vg00-lvol04	3.1G	681M	2.3G	24%	/var
nas1:awipsADAPT	1.1G	166M	862M	17%	/awips/adapt
nas1:awipsDEV	4.2G	1.7M	4.2G	1%	/awips/dev
nas1:awipsgfesuit	104G	26G	78G	25%	/awips/GFESuite
nas1:awipshydro	104G	45G	59G	44%	/awips/hydroapps
nas1:datalocal	155G	22G	134G	14%	/data/local
nas1:datax400	615M	13M	602M	3%	/data/x400
nas1:dsshared	1.6G	230M	1.4G	15%	/DS_shared
nas1:awipshome	118G	32G	87G	27%	/home
nas1:datafxa	516G	383G	134G	75%	/data/fxa
nas1:/aiidata/utility	516G	5.3G	510G	2%	/awips2/edex/data/utility
nas1:gfesuite2	11G	88M	11G	1%	/awips2/GFESuite
nas1:/localapps	52G	99k	52G	1%	/localapps
/dev/mapper/vg_aieldm-awipsiildm	179G	41G	130G	24%	/data_store

2.2.1.4.1.2 Raw Partitions for PostgreSQL on the Linux Data Server

The raw partition for PostgreSQL on the DX is mounted to the dx1f device from the FAS2020 Direct Attached Storage Device.

The following is an example of the PostgreSQL mount point on the dx1f.

```
[root@dx1-tbw3 ~]# df -H /awips2/data
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg_aieldb-awipsiadb	159G	21G	131G	14%	/awips2/data

```
[root@dx2-tbdr ~]# df -H /awips2/data
```

Filesystem	Size	Used	Avail	Use%	Mounted on

```
/dev/mapper/vg_aiidb-awipsiadb    159G    27G    124G   18% /awips2/data
```

2.2.1.4.2 AX File Systems

The AX file systems support the following:

- Operating system
- COTS applications
- Developed applications
- Archived Data.

The file systems on the AX for WFO and RFC are as follows:

- **root(/), /tmp, /usr, /var.** Linux mandates that these file systems exist.
- **/boot.** This file system contains the Linux kernel and boot-up instructions.
- **/awips/archiver.** This file system stores the archiver data. It contains scripts, logs, configuration files, and documentation.
- **/local.** This file system contains scripts and logs related to the installation of AWIPS software.
- **/data.** This file system contains the archiver (5-day rollover and compressed) and local radar data.
- **/dev/shm.** This file system is the Linux shared memory input queue.
- **/awips/ops.** This file system stores baselined software and any associated log or configuration files. It may contain binary applications, scripts, logs, or data as required to support operations.
- **/awips/fxa.** This file system stores baselined FSL-developed (presently ESRL/GSD) WFO-Advanced software and any associated log or configuration files. It may contain binary applications, scripts, logs, or data, as required to support operations.

- **RFC Mount Points**

- **/rfc_arc.** This file system is at RFCs only and may contain binary applications, scripts, logs or data for RFC hydrological operations.
- **/rfc_arc_data.** This file system is at RFCs only and contains flat files of archived hydrological data and products for RFC hydrological operations.

- **NFS Mount Points**

- The following directory is mounted by the AX server from the dx2f in support of AWIPS functions.
 - **/data_store**
- The following directories are mounted by the AX server from the NAS in support of AWIPS functions.
 - **/data/fxa**

- /data/local
- /home
- RFCs only
 - /awips/rep
 - /awips/hydroapps
 - /home

Refer to Chapter 24, Data Archive Server, for additional information.

An example of mount points for a WFO AX follows.

[root@ax-tbw3 ~]# **df -H**

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	578M	410M	59%	/
/dev/mapper/vg00-lvol08	1.1G	20M	952M	3%	/awips/archiver
/dev/mapper/vg00-lvol06	1.1G	653M	319M	68%	/awips/fxa
/dev/mapper/vg00-lvol10	309M	65M	229M	23%	/awips/ops
/dev/cciss/c0d0p1	104M	38M	62M	38%	/boot
/dev/mapper/vg00-lvol11	265G	163G	89G	65%	/data
none	530M	0	530M	0%	/dev/shm
/dev/mapper/vg00-lvol12	2.1G	37M	2.0G	2%	/local
/dev/mapper/vg00-lvol02	520M	20M	474M	5%	/tmp
/dev/mapper/vg00-lvol03	9.2G	6.4G	2.4G	74%	/usr
/dev/mapper/vg00-lvol04	3.1G	860M	2.1G	30%	/var
nas1:dataFXA	516G	291G	225G	57%	/data/fxa
nas1:dataLOCAL	52G	27G	26G	51%	/data/local
nas1:awipshOME	118G	71G	48G	60%	/home
nas1:/localapps	52G	656k	52G	1%	/localapps
nas-tape:awipshOME	118G	71G	48G	60%	/tmp/home
dx2f:/data_store	178G	56G	113G	34%	/data_store

An example of mount points for a RFC AX follows.

[root@ax-tbdr ~]# **df -H**

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	503M	469M	52%	/
/dev/mapper/vg00-lvol10	309M	39M	254M	14%	/awips/ops
/dev/cciss/c0d0p1	104M	61M	38M	62%	/boot
/dev/mapper/vg00-lvol11	681G	269G	377G	42%	/data
none	1.9G	0	1.9G	0%	/dev/shm
/dev/mapper/vg00-lvol12	2.1G	37M	1.9G	2%	/local

```

/dev/mapper/vg00-lvol06      2.1G   365M   1.6G   19% /rfc_arc
/dev/mapper/vg00-lvol08      5.1G   160M   4.7G   4%  /rfc_arc_data
/dev/mapper/vg00-lvol02      520M    25M   469M   5%  /tmp
/dev/mapper/vg00-lvol03      9.2G   7.6G   1.1G   88% /usr
/dev/mapper/vg00-lvol04      3.1G   577M   2.4G   20% /var
nas1:dataFXA                516G   383G   134G   75% /data/fxa
nas1:dataLOCAL               155G   22G    134G   14% /data/local
nas1:awipsHOME               118G   32G    87G   27% /home
nas1:awipsHYDRO              104G   45G    59G   44% /awips/hydroapps
nas1:/localapps              52G    99k    52G   1%  /localapps
dx2f:/data_store             179G   41G    130G  24% /data_store

```

2.2.1.5 LDAD Hardware

- **LDAD Terminal Server**

The LDAD Terminal Server is a Cyclades Alterpath ACS32, which provides an Ethernet interface for connection to the LDAD LAN Switch and 32 serial ports for connections to communication devices, such as the modems in the Modem Nest, and Console Management ports such as the LS2/3 Servers. Each port can be configured to a maximum speed of 56 K. The terminal server in an average configuration is used to connect 10 dial-in/dial-out modems (including MicroART, RRS, and ASOS), four dedicated modems, a fax modem, and various console connections. Port assignments are shown in Table 2.2.1.5-1 as an example.

Table 2.2.1.5-1. Port Assignments

Port	Function
1	Used to dial-out to devices configured for 7 bits, even parity
2	Used to dial-out to devices configured for 8 bits, no parity
3	First dial-in line, 8 bits, no parity
4	Second dial-in line, 8 bits, no parity
5	Third dial-in line, 8 bits, no parity
6	Fourth dial-in line, 8 bits, no parity
7	Fifth dial-in line, 8 bits, no parity
8	Sixth dial-in line, 8 bits, no parity
9	MicroART Modem
10	ASOS Modem
21	First Dedicated Modem
22	Second Dedicated Modem
23	Third Dedicated Modem
24	Fourth Dedicated Modem
30	Fax Modem

The LDAD Server system is configured with a block of IP addresses assigned by the site. These Class C IP Addresses were assigned to the site (non-AWIPS IP addresses) by the NWS, and generally a block of 15 IP addresses should be set aside specifically for LDAD usage. IP addresses are required for the Terminal Server, software services (i.e., Radius) running on the Terminal Server, certain ports on the Terminal Server (dependent upon function), the LDAD firewalls, and the NAT (Network Address Translation) Table stored on the firewalls.

- **LAN Switch**

The LDAD LAN Switch is an SMC Networks 8024 Ethernet switch with 24 1000BaseT ports. The LAN Switch provides connectivity to external users/systems, the LDAD Terminal Server (Management/Modem RS-232), and the Untrusted side of the LDAD Firewalls (FW1/2). Refer to Appendix L, LDAD Configuration Samples and Firewall Architecture, for more information about the LDAD Firewall.

- **Asynchronous Interface**

The asynchronous interface provides up to 4 asynchronous serial connections between the LDAD Server and external interfaces.

- **Fax Modem (WFOs only)**

A modem in the new Modem Nest has replaced the stand-alone Motorola fax modem; it is used by WFOs to transmit weather data to the external user community.

- **Firewall**

Two Juniper SSG320M firewalls are employed to provide network security for the LDAD and AWIPS systems. Each AWIPS site will have two firewalls controlled by central configuration management servers. The central configuration management servers are located at the NCF, and at the BNCF in Fairmont, West Virginia. Control over the firewall configurations is tiered, with the central configuration management server having ultimate control. The regions have a client Netscreen Security Manager (NSM) that connects to the NCF Central Server, which in turn connects back to the firewall. Individual AWIPS sites (forecast offices) will not have direct control over their own configurations.

The firewalls are stateful inspection firewalls, and use NAT to prevent AWIPS IP addresses from being advertised outside of the AWIPS network. (Refer to Appendix L for more on Firewall Architecture.)

- **LDAD Server**

The LDAD server cluster is a pair of HP ProLiant DL320 Linux servers that act as a primary and hot spare. The LDAD server machines provide the focal point for all external communications between the AWIPS site and the community, functioning as a pass-through device for all incoming and outgoing data.

Only one of the two machines (ls2 and ls3) is actively working as the LDAD server at any time, and it will be the one that is reachable through the address 192.168.1.10 ("ls1" or "ls") via the LDAD LAN switch. In this document, "the active LS" refers to whichever machine is actively working as the LDAD server.

The LS1 LDAD server (LS2/LS3 listening address) interface is configured on both LDAD servers but it will only be up on the active LS. The active LS is running LDAD ingest processes, listening on the address 192.168.1.10, and reachable through the AWIPS LAN via the hostname "ls1" or "ls."

The ls2/ls3 servers have unique interfaces (ls2-192.168.1.11, ls3-192.168.1.12) that are up at all times. The ls2/3 heartbeat is a private lan pair (ls2-172.16.0.2, ls3-172.16.0.1).

The ls2/ls3 servers share a external IP address for access to the site local LAN and the Internet for data push/pull collection. This external ldad address is assigned by the site and configured by the region in the site's LDAD firewall. Packets are routed by the firewall using Mapped IP (MIP) to the active LS. There is no external network interface connection on the LDAD server.

The VIR switch provides the capability to switch asynchronous serial connections between LS2 and LS3.

2.2.1.5.1 LDAD Server File Systems

- **root (/), /tmp, /usr, /var.** These file systems are maintained as separate logical volumes to reduce the risk of any of these file systems filling up and affecting system operations. All of the remaining file systems are ext3. The **/tmp** file system will be re-created with each boot sequence and performs no journaling.
- **swap space.** The **swap space** is divided into two LVs (Logical Volume) on two separate spindles. The primary swap space on the root drive is also designed as a dump space in the event of a system panic. This is designated as a swap/dump file system.
- **/opt.** This is used to load COTS applications.
- **/data/logs.** This file system contains the operational logs for software executing on this platform. Subdirectories will further isolate application- or product-specific logs. It also stores all non-system LDAD logs (all FSL- and OST-developed software logs).
- **/ldad.** This file system stores baselined FSL-developed (presently ESRL/GSD) software and any configuration files. It may contain binary applications, scripts, or data as required to support LDAD functions.
- **/data/ldad.** This file system contains scripts and data for LDAD server.

- **/data/Incoming.** This file system is used for temporary storage of raw data acquired from external observation systems (e.g., local automatic remote collector [LARC] gauges, mesonet sensors, and precipitation gauges).
- **/home.** This file system contains all of the user working areas.

An example of mount points on the LDAD servers follows.

```
[root@ls2-tbdw ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	7.2G	1.9G	4.9G	29%	/
/dev/mapper/vg00-lvol04	3.1G	1.6G	1.4G	53%	/var
/dev/mapper/vg00-lvol02	1.1G	108M	856M	12%	/tmp
/dev/mapper/vg00-lvol07	35G	7.6G	26G	24%	/data/ldad
/dev/mapper/vg00-lvol10	3.1G	138M	2.8G	5%	/ldad
/dev/mapper/vg00-lvol09	5.1G	413M	4.5G	9%	/home
/dev/mapper/vg00-lvol08	1.1G	563M	401M	59%	/data/logs
/dev/mapper/vg00-lvol11	2.1G	132M	1.8G	7%	/opt
/dev/mapper/vg00-lvol06	2.1G	37M	1.9G	2%	/data/Incoming
/dev/mapper/vg00-lvol03	13G	6.4G	5.3G	55%	/usr
/dev/md0	104M	25M	74M	26%	/boot
tmpfs	530M	0	530M	0%	/dev/shm

```
[root@ls2-tbdr ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	7.2G	2.6G	4.3G	38%	/
/dev/md0	104M	25M	74M	26%	/boot
/dev/mapper/vg00-lvol04	3.1G	1.3G	1.7G	44%	/var
/dev/mapper/vg00-lvol02	1.1G	26M	939M	3%	/tmp
/dev/mapper/vg00-lvol07	35G	20G	14G	60%	/data/ldad
/dev/mapper/vg00-lvol10	3.1G	133M	2.8G	5%	/ldad
/dev/mapper/vg00-lvol09	5.1G	952M	3.9G	20%	/home
/dev/mapper/vg00-lvol08	1.1G	739M	225M	77%	/data/logs
/dev/mapper/vg00-lvol11	2.1G	183M	1.8G	10%	/opt
/dev/mapper/vg00-lvol06	2.1G	37M	1.9G	2%	/data/Incoming

```
/dev/mapper/vg00-lvol03           13G    6.3G    5.3G  55% /usr  
tmpfs                          530M     0    530M   0% /dev/shm
```

2.2.1.6 Workstations

Workstations (shown in Exhibit 2.2.1.6-1) provide the primary human/machine interface in AWIPS and perform a variety of mission-related and system management functions at a site, including the capabilities for displaying alphanumeric, image, and graphic data; displaying animations; and toggling, zooming, and panning displays. It has four HWCs: WK1B; WK1C, Color X-Terminal; WK1F, Type IV Workstation (NCF only); and WK1G, Linux Workstation.



Exhibit 2.2.1.6-1. AWIPS Workstation

AWIPS forecasters use the Linux workstations on mission-critical functions. Upgraded Linux OS X-terminals have replaced the HP Color X-Terminals. New Workstations + X-terminals have three 19-inch LCD monitors and an internal CD-ROM, which support all AWIPS workstations.

All data are centrally stored and managed at the site. Data in use at the workstation, such as image or graphic products, are retrieved from the Data Server or the Linux Preprocessor and presented at the workstation. The product may be manipulated for display and retained at the workstation for as long as it is being used. Upon completion, it is removed from the local workstation unless the user or the application retains it.

The color X-terminal (WK1C) is a Linux-based workstation platform with one 19-inch monitor. It is connected to the GBLAN and is used primarily for text messaging functions. The Linux workstations (WK1G HWC) support a processing capacity of at least 48 MIPS and include online storage for applications software. They provide high-speed 100 Mbps connectivity to the site LAN and support other interfaces.

The AWIPS Linux workstations are equipped with three 19-inch LCD monitors and support all AWIPS workstation applications.

Workstations are sized to handle the WK HWCI load and are expandable to meet functional and performance requirements as they evolve throughout the AWIPS life cycle. Multiple workstations at each site provide for redundancy. If a workstation fails, a forecaster can move to another workstation and resume work.

The 100 Mbps interface connects to the site LAN (HWCI) via Ethernet for the Linux workstation. The RS-232-C interface connects to the site Monitor and Control Interface HWC.

The file systems on the workstations support the operating system, COTS applications, and developed applications. The workstation configuration has no database requirement; therefore, it does not need to support any raw partitions.

Table 2.2.1.6-1 summarizes the workstation configurations.

Table 2.2.1.6-1. Workstation Processor Configurations at AWIPS Sites

Type	Site	Processor	RAM	CACHE	Internal Storage
HP Z600	All WFO/RFCs (LX Replacement)	2 CPUs @ 2.26 GHZ	6 GB	8 MB	146 GB
HP XW4400	All WFO/RFCs (X-term replacement)	Dual Core 1.8 GHz	1 GB	2 MB L2 Cache	80 GB

2.2.1.6.1 Reserved

2.2.1.6.2 Linux Workstation File Systems

- **root (/), /tmp, /usr, and /var.** Linux mandates that these file systems exist.
- **/boot.** This file system stores the Linux kernel and boot-up instructions.
- **swap space.** Swap space is a dedicated partition defined in /etc/fstab and activated at boot time. Swap space is used to store inactive pages of memory when system RAM is full.
- **/local.** This file system contains the output files for the Linux configuration and setup and the Red Hat, GFESuite, and WFOA software installations.
- **/awips/chps_local.** Reserved for CHPS.
- **/ chps.** Reserved for CHPS.

- **/dev/shm.** This file system is the Linux shared memory input queue.
- **/awips/ifps.** This file system is for baselined IFPS software and data.
- **/awips/lad.** This file system will store baselined FSL-developed WFO-Advanced software and any associated configuration files. It may contain binary applications, scripts, or data as required to support operations.
- **/awips/fxa.** This file system stores baselined FSL-developed (presently ERL/GSD) WFO-Advanced software and any associated logs or configuration files. It may contain binary applications, scripts, logs, or data as required to support operations.
- **/awips/ops.** This file system stores baselined Contractor-developed software and any associated log or configuration files. It may contain binary applications, scripts, logs, or data as required to support operations.
- **/data.** This file system stores data products needed on the workstation.
- **data/dhm.** Data Hydrological Modeling on LX.
- **NFS Mount Points.** The following directory is mounted from the dx2f in support of AWIPS functions:
 - **/data_store**
- The following directories are mounted from the NAS in support of AWIPS functions.
 - **/awips/adapt**
 - **/awips/dev**
 - **/data/adapt (WFOs only)**
 - **/data/fxa**
 - **/awips/hydroapps**
 - **/awips/GFESuite**
 - **/data/local**
 - **/data/verify**
 - **/home**
 - **/usr/local/viz/edex/data/hdf5**
 - **/awips/rep (RFCs only for REP)**
 - **/awips/chps_share (RFCs only)**

The following is an example of WFO Linux workstation mounts.

```
[root@lx1-tbw3 ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg01-lvol01	1.1G	506M	459M	53%	/
/dev/sda3	104M	20M	79M	21%	/boot
/dev/mapper/vg01-lvol02	508M	12M	471M	3%	/tmp
/dev/mapper/vg01-lvol03	16G	9.1G	5.4G	63%	/usr

```

/dev/mapper/vg01-lvol04      3.1G   300M   2.6G  11% /var
/dev/mapper/vg01-lvol06      4.6G   2.1G   2.4G  47% /awips/fxa
/dev/mapper/vg01-lvol08      1.6G   83M    1.4G  6%  /awips/ifps
/dev/mapper/vg01-lvol09      1.1G   75M    889M  8%  /awips/ldad
/dev/mapper/vg01-lvol10      305M   85M    205M  30% /awips/ops
/dev/mapper/vg01-lvol11      4.1G   77M    3.8G  2%  /data
/dev/mapper/vg01-lvol12      2.1G   37M    1.9G  2%  /local
none                         3.2G   0       3.2G  0%  /dev/shm
nas1:awipsADAPT             1.1G   742M   285M  73% /awips/adapt
nas1:awipsDEV                4.2G   599k   4.2G  1%  /awips/dev
nas1:awipsHOME               118G   71G    48G   60% /home
nas1:awipsHYDRO              11G    964M   9.4G  10% /awips/hydroapps
nas1:dataADAPT               2.7G   433M   2.3G  17% /data/adapt
nas1:dataFXA                 516G   291G   225G  57% /data/fxa
nas1:dataLOCAL               52G    27G    26G   51% /data/local
nas1:awipsgfesuit/ws         104G   18G    86G   18% /awips/GFESuite
nas1:/storage                 271G   43G    228G  16% /awips/storage
nas1:/verify                  1.1T   1.4G   1.1T  1%  /data/verify
nas1:/localapps               52G    656k   52G   1%  /localapps
nas1:/awipscm                 52G    17G    36G   32% /awipscm
nas1:/GFESuite2               11G    852k   11G   1%  /awips2/GFESuite
/dev/mapper/vg01-lvol07      1.1G   19M    946M  2%  /data/dhm
dx2f:/data_store              178G   57G    113G  34% /data_store
nas1:/aiidata/share            541G   17G    524G  4%  /awips2/edex/data/share

```

lx1-tbdr:root:1001\$ **df -H**

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	378M	586M	40%	/
/dev/sda1	104M	29M	70M	30%	/boot
/dev/mapper/vg00-lvol02	508M	19M	463M	4%	/tmp
/dev/mapper/vg00-lvol03	16G	11G	4.4G	71%	/usr
/dev/mapper/vg00-lvol04	3.1G	642M	2.3G	23%	/var
/dev/mapper/vg00-lvol06	4.6G	2.3G	2.2G	51%	/awips/fxa
/dev/mapper/vg00-lvol08	1.6G	36M	1.5G	3%	/awips/ifps
/dev/mapper/vg00-lvol09	1.1G	74M	890M	8%	/awips/ldad
/dev/mapper/vg00-lvol10	305M	65M	225M	23%	/awips/ops
/dev/mapper/vg00-lvol11	4.1G	80M	3.8G	3%	/data
/dev/mapper/vg00-lvol12	2.1G	37M	1.9G	2%	/local
none	3.2G	0	3.2G	0%	/dev/shm
nas1:awipsADAPT	1.1G	166M	862M	17%	/awips/adapt

nas1:awipsDEV	4.2G	1.7M	4.2G	1%	/awips/dev
nas1:awipsHOME	118G	32G	87G	27%	/home
nas1:awipsHYDRO	104G	45G	59G	44%	/awips/hydroapps
nas1:dataFXA	516G	383G	134G	75%	/data/fxa
nas1:localLOCAL	155G	22G	134G	14%	/data/local
nas1:awipsGFESuit/ws	104G	26G	78G	25%	/awips/GFESuite
nas1:/verify	1.1T	18G	1.1T	2%	/data/verify
nas1:/localapps	52G	99k	52G	1%	/localapps
/dev/mapper/vg00-lvol07		1.1G	19M	946M	2% /data/dhm
dx2f:/data_store	179G	41G	130G	24%	/data_store
nas1:/aiidata/share	516G	5.3G	510G	2%	/awips2/edex/data/share

2.2.1.7 Linux Preprocessor

Two PX preprocessors (PX1 and PX2) are at every AWIPS site to run applications. The PX architecture is shown in Exhibit 2.2.1.7-1.

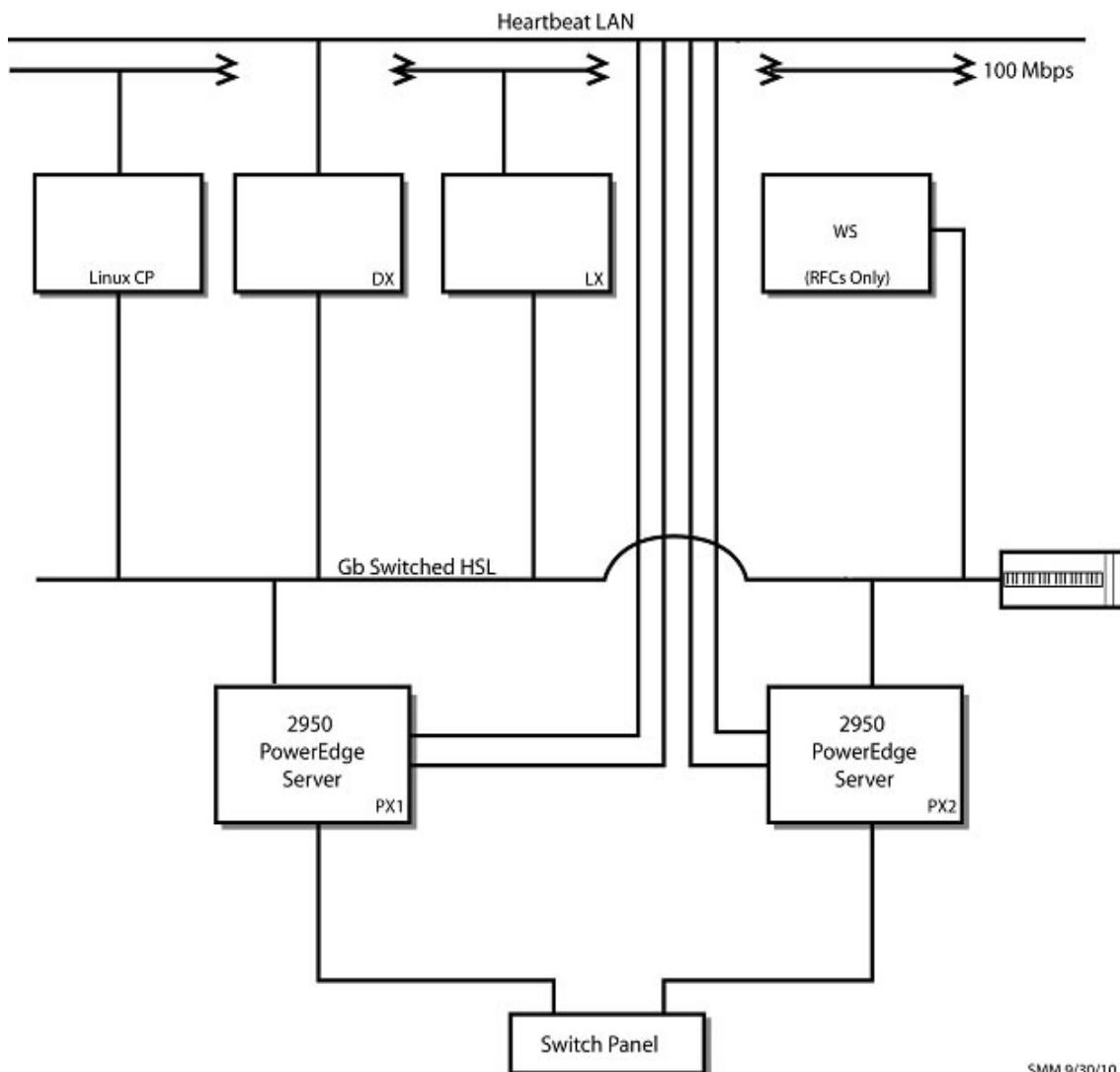


Exhibit 2.2.1.7-1. Linux Preprocessors (PX) Architecture

The PXs at the site are each sized to handle the full system load in the event one of them fails. Each contains 2X 146 GB of internal storage. Refer to Exhibit 2.2.1.7-2, Linux Preprocessor (PX) Hardware.

The PX configuration is summarized in Table 2.2.1.7-1.

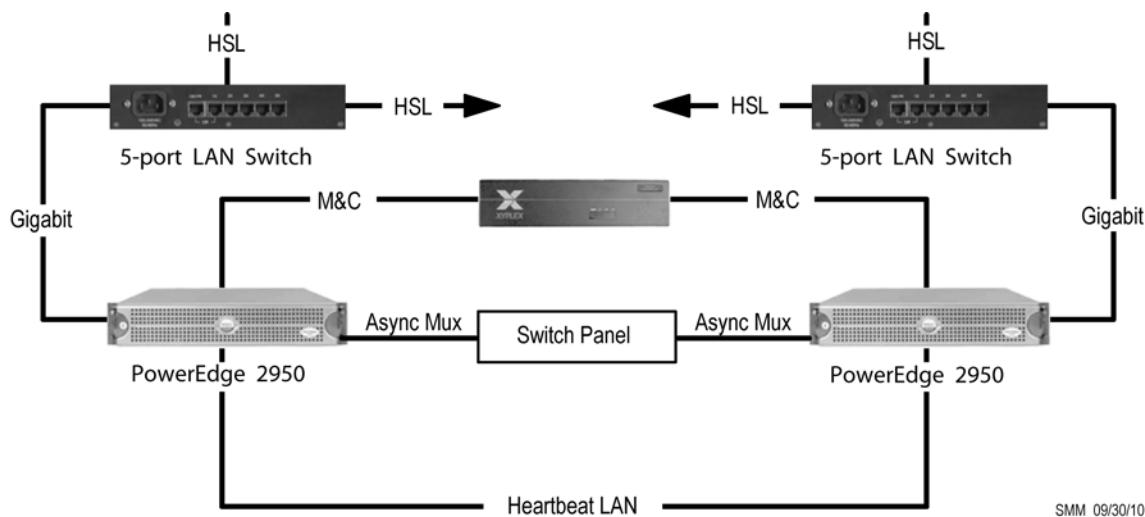


Exhibit 2.2.1.7-2. Linux Preprocessor (PX) Hardware

Table 2.2.1.7-1. Linux Preprocessor Configurations at AWIPS Sites

Type	Site	Processor	RAM	CACHE	Internal Storage
Dell PowerEdge 2950	All AWIPS Sites	Dual Quad Core 2.0 GHz	8 GB SDRAM	6 MB	2X 146 GB

The PX preprocessors maintain a continuous heartbeat between the two processors and accomplish an automatic processing switch to the other processor should a processor fail. Each PX executes a predefined software package, and each PX can take over the responsibility for all PX functions on the failure of one of the PXs.

The PX has LAN and asynchronous serial interfaces. The serial interface is Electronics Industry Association (EIA) RS-232 and is used to provide a system console connection.

Exhibit 2.2.1.7-3 shows the PX processor interfaces. The RS-232-C interfaces represent the site monitor and control interface, which provides console port interfaces to the CP, workstation, SBN, LAN, and WAN. The 1 Gbps interface connects to the site LAN.

- **Linux Preprocessor Processors (PX1A)**

Two PX preprocessors (PX1A), a primary and a secondary server, are deployed to every AWIPS site. The PX preprocessors are Dell 2950 PowerEdge servers.

Exhibit 2.2.1.7-4 depicts the back panel of the PX processor.

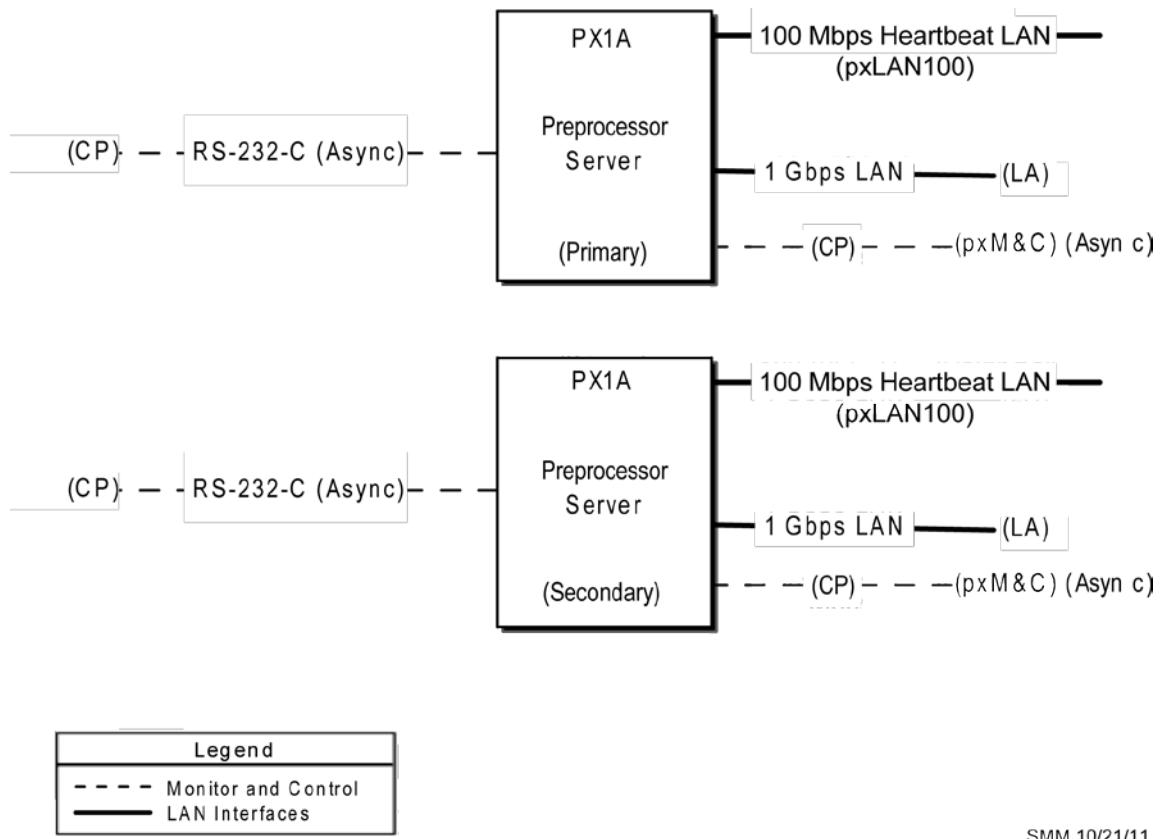
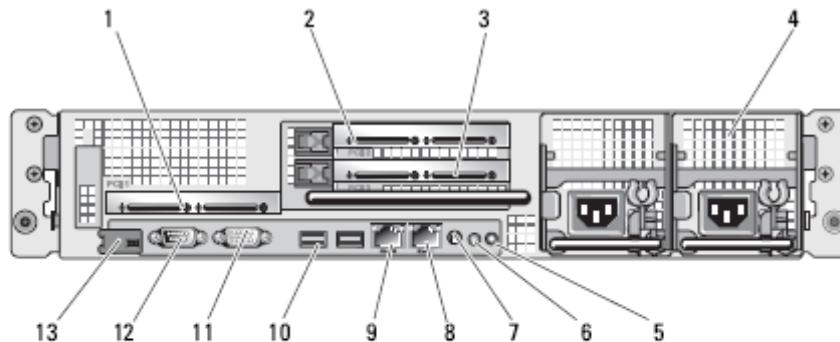


Exhibit 2.2.1.7-3. Linux Preprocessor (PX) Interfaces



- | | | |
|--|--------------------------------|---------------------------|
| 1 center PCI riser (slot 1) | 2 left PCI riser (slot 2) | 3 left PCI riser (slot 3) |
| 4 power supplies (2) | 5 system identification button | 6 system status indicator |
| 7 system status indicator connector | 8 NIC2 connector | 9 NIC1 connector |
| 10 USB connectors (2) | 11 video connector | 12 serial connector |
| 13 remote access controller (optional) | | |

Exhibit 2.2.1.7-4. PX Processor Back Panel

2.2.1.7.1 Preprocessor Server File Systems

The PX file systems support the following:

- Operating system
- COTS applications
- Developed applications.

The file systems on the PX are as follows:

- **root (/).** This file system is superuser's (**root**) home directory.
- **/boot.** This file system contains boot-related files (kernel).
- **/tmp.** This file system is used to store temporary files that users and system programs create.
- **/usr.** This file system holds most user-related documents, command-related files, and installation files.
- **/var.** This file system contains system log files for most applications (mail, print spoolers, and system information).
- **swap space.** The swap space is divided into one logical volume on the root disk. The primary swap space on the root drive is also designed as a dump space in the event of a system panic. This is designated as a swap/dump file system.
- **/awips/ops.** This file system is used to store baselined contractor-developed software and any associated log or configuration files. It contains binary applications, scripts, logs, or data as required to support operations.
- **/awips/fxa.** This file system stores baselined WFO-Advanced software developed by the FSL (presently ESRL/GSD) and any associated configuration files. It may contain binary applications, scripts, or data as required to support operations.
- **/awips/ifps.** This file system is for baselined IFPS software and data.
- **/awips/laps.** This file system will store baselined FSL-developed Local Analysis and Prediction System (LAPS) software and any associated configuration files. It may contain binary applications, scripts, or data as required to support operations.
- **/awips/ldad.** This file system will store baselined FSL-developed WFO-Advanced software and any associated configuration files. It may contain binary applications, scripts, or data as required to support operations.
- **/data/logs.** This file system contains the operational logs for software executing on the platform. Subdirectories will further isolate application- or product-specific logs.
- **/dev/shm.** This file system contains the shared memory.
- **NFS Mount Points.** The following directories are mounted from the NAS:
 - **/home**

- /data/GFE
- /data/fxa
- /awips/adapt
- /awips/GFESuite
- /awips/hydroapps
- /data/adapt
- /data/local
- /awips/dev

The following is an example of the PX mount points at the WFOs.

```
[root@px1-tbw3 ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	835M	130M	87%	/
/dev/mapper/vg00-lvol99	43G	1.6G	39G	4%	/awips2
/dev/mapper/vg00-lvol06	5.1G	1.5G	3.4G	30%	/awips/fxa
/dev/mapper/vg00-lvol07	1.6G	36M	1.5G	3%	/awips/ifps
/dev/mapper/vg00-lvol08	1.1G	144M	820M	15%	/awips/laps
/dev/mapper/vg00-lvol09	1.1G	180M	784M	19%	/awips/ldad
/dev/mapper/vg00-lvol10	305M	86M	203M	30%	/awips/ops
/dev/sda1	104M	25M	74M	26%	/boot
/dev/mapper/vg00-lvol11	2.1G	540M	1.4G	28%	/data/logs
none	2.2G	0	2.2G	0%	/dev/shm
/dev/mapper/vg00-lvol02	508M	18M	465M	4%	/tmp
/dev/mapper/vg00-lvol03	9.2G	7.7G	1.1G	89%	/usr
/dev/mapper/vg00-lvol04	3.1G	980M	2.0G	34%	/var
nas1:/storage	271G	43G	228G	16%	/awips/storage
nas1:awipsADAPT	1.1G	742M	285M	73%	/awips/adapt
nas1:awipsDEV	4.2G	590k	4.2G	1%	/awips/dev
nas1:awipSGFESuit/ws	104G	18G	86G	18%	/awips/GFESuite
nas1:awipSHOME	118G	71G	48G	60%	/home
nas1:awipSHYDRO	11G	964M	9.4G	10%	/awips/hydroapps
nas1:dataGFE	17M	99k	17M	1%	/data/GFE
nas1:dataADAPT	2.7G	433M	2.3G	17%	/data/adapt
nas1:dataFXA	516G	291G	225G	57%	/data/fxa
nas1:dataLOCAL	52G	27G	26G	51%	/data/local
nas1:/localapps	52G	656k	52G	1%	/localapps
nas1:verify	1.1T	1.4G	1.1T	1%	/data/verify
dx2f:/data_store	178G	56G	114G	33%	/data_store
nas1:/aiidata	541G	17G	524G	4%	/awips2/edex/data
nas1:/GFESuite2	11G	852k	11G	1%	/awips2/GFESuite

The following is an example of the PX mount points at the RFCs.

```
[root@px1-tbdr ~]# df -H
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg00-lvol01	1.1G	637M	327M	67%	/
/dev/mapper/vg00-lvol_awips2	43G	1.6G	39G	4%	/awips2
/dev/mapper/vg00-lvol06	5.1G	1.1G	3.8G	22%	/awips/fxa
/dev/mapper/vg00-lvol08	1.1G	97M	867M	11%	/awips/laps
/dev/mapper/vg00-lvol07	1.6G	36M	1.5G	3%	/awips/ifps
/dev/mapper/vg00-lvol09	1.1G	107M	857M	12%	/awips/ldad
/dev/mapper/vg00-lvol10	305M	61M	228M	22%	/awips/ops
/dev/sdal	104M	25M	74M	26%	/boot
/dev/mapper/vg00-lvol11	2.1G	151M	1.8G	8%	/data/logs
none	2.2G	0	2.2G	0%	/dev/shm
/dev/mapper/vg00-lvol02	508M	14M	469M	3%	/tmp
/dev/mapper/vg00-lvol03	9.2G	7.2G	1.5G	83%	/usr
/dev/mapper/vg00-lvol04	3.1G	1.7G	1.3G	59%	/var
nas1:awipsADAPT	1.1G	166M	862M	17%	/awips/adapt
nas1:awipsDEV	4.2G	1.7M	4.2G	1%	/awips/dev
nas1:awipshOME	118G	32G	87G	27%	/home
nas1:awipshYDRO	104G	45G	59G	44%	/awips/hydroapps
nas1:dataGFE	17M	66k	17M	1%	/data/GFE
nas1:dataADAPT	2.7G	99k	2.7G	1%	/data/adapt
nas1:dataFXA	516G	383G	134G	75%	/data/fxa
nas1:dataLOCAL	155G	22G	134G	14%	/data/local
nas1:awipsgFESuit/ws	104G	26G	78G	25%	/awips/GFESuite
nas1:/localapps	52G	99k	52G	1%	/localapps
nas1:verify	1.1T	18G	1.1T	2%	/data/verify
dx2f:/data_store	179G	41G	130G	24%	/data_store
nas1:/aiidata	516G	5.3G	510G	2%	/awips2/edex/data
nas1:GFESuite2	11G	88M	11G	1%	/awips2/GFESuite

2.3 NCF Time Source

The NCF time source is located at the ANCF and the BNCF. It receives, decodes, and provides AWIPS with time from the NIST WWV external time source. After the ANCF/BNCF Comm Server is synchronized with the NIST WWV, it synchronizes all other LAN clocks at the site. All AWIPS system clocks are synchronized to within 1 second of the NIST WWV time using the network time protocol over the WAN. NRSs are synchronized over the SBN.

2.4 Printers

All AWIPS sites have a text printer and a color graphics printer.

The text printer is a Dell W5300N with 112MB of memory. It is set up as a shared printer on the AWIPS site. The text printer is a monochrome printer designed for a small to medium user group of from one to nine users. It has a print speed of at least four pages per minute (ppm) and a recommended print engine duty cycle of at least 20,000 pages per month. With a minimum of 300 dots per inch (dpi) and at least 20 scalable typefaces, the text printer can process files in standard ASCII or in PostScript format. The printer can generate hard copy outputs on 8.5-by-11-inch paper and 8.5-by-14-inch paper. The text printer has its own IP address and is connected to the GB LAN (Ethernet).

The color graphics printer is a Dell 5100CN with 256MB of memory. The color graphics printer generates publication-quality color output for use in publications and journals and prints high-quality black and white products. The color graphics printer can generate laser-quality output of 300 dpi on paper up to 8.5-by-14 inches (legal size). The color graphics printer has its own IP address and is connected to the GB LAN (Ethernet).

2.5 *AWIPS Software*

AWIPS software is divided into three general classes:

1. AWIPS contractor-developed software
2. Government-developed software
3. COTS software and Freeware

2.5.1 *AWIPS Contractor-Developed Software*

AWIPS contractor-developed software categories are as follows:

- **Communications Software.** Receives and processes the satellite signal. This software processes the signal from the demodulators and stores the decoded products in the AWIPS database.
- **Monitor and Control (M&C) Software.** Tracks functioning of the AWIPS system at the site and transmits the collected information to the NCF. This software allows the NCF to control site hardware and software, if needed.
- **EDEX System Deployment.** A fully functional AWIPS II EDEX installation requires deployment and operation of several pieces of software. These include a PostgreSQL database, a Unidata Local Data Manager (LDM) as a data source, an AWIPS II Radar Server (RCM), an Apache Qpid messaging service, and the EDEX software itself.

2.5.2 *Government-Developed Software*

The Government has developed most of the AWIPS weather applications.

- NOAA's Earth System Research Laboratory/Global Systems Division (GSD, formerly FSL) developed the AWIPS D2D user interface, IFPS (jointly, with MDL), LAPS, and LDAD applications.

- The NWS Meteorological Development Laboratory (MDL) developed the background hydrometeorological applications, including Climate, AvnFPS, SCAN, FFMP, IFPS (jointly, with FSL), HWR, LAMP, Pre-LAMP, Guardian, FSI, SNOW, GFE, and ADAPPT Foundation.
- Other Government-developed software appear as stand-alone applications, for example, the Office of Hydrologic Development (OHD) and the WFO Hydrologic Forecast System (HFS) applications (HydroView, RiverPro, and HydroBase). These applications are documented in their own manuals.

NOTE: Most of the Government-developed software has been transitioned to Raytheon Software Maintenance and Support for maintenance.

2.5.3 *Commercial Off-the-Shelf (COTS) Software and Freeware*

2.5.3.1 *AWIPS II: COTS Software and Freeware*

AWIPS relies on COTS software when possible. Often the COTS software is invisible to users. For example, all of the individual hardware items that compose the AWIPS system are commercially available, and all of them use the software that their manufacturers provide. COTS software is documented via the commercial documentation provided with the COTS software package.

Table 2.5.3.1 lists the COTS software and freeware used in AWIPS II.

Table 2.5.3.1. COTS Software and Freeware Used in AWIPS II

Component	Version	Description
ActiveMQ	5.4.0	JMS (still used by AlertVIZ and internally in parts of Camel)
Apache Batik	1.6	Batik is a Java-based toolkit for applications or applets that want to use images in the Scalable Vector Graphics (SVG) format for various purposes, such as display, generation or manipulation.
Apache MINA	1.1.7	Network application framework
Ant	1.7.0	Java Build Tool
Ant-Contrib	1.0b3	Additional useful tasks and types for Ant
Antlr	2.7.6	Parser generator
Atomikos TransactionEssentials	3.6.2	Transaction management system
Bitstream Vera Fonts	1.10	Font library from Gnome
bzip2	none	Stream compression algorithm
C3p0 (mchange)	0.9.1	c3p0 is an easy-to-use library for making traditional JDBC drivers "enterprise-ready" by augmenting them with functionality defined by the jdbc3 spec and the optional extensions to jdbc2.
Camel	2.4.0	Enterprise Service Bus
cglib	2.1.3	Byte Code Generation Library is high level API to generate and transform JAVA byte code.
CherryPy	3.1.2	Object-oriented HTTP framework
commons-beanutils	1.8.3	Apache Common Libraries

Component	Version	Description
commons-codec	1.4.1	Apache Common Libraries
commons-collection	3.2	Apache Common Libraries
commons-configuration	1.6	Apache Common Libraries
Commons-cli	1.2	Apache Common Libraries
commons-digester	1.8.1	Apache Common Libraries
commons-httpclient	3.1	Apache Common Libraries
commons-lang	2.3	Apache Common Libraries
commons-logging	1.1.1	Apache Common Libraries
commons-pool	1.3	Apache Common Libraries
commons-validator	1.2	Apache Common Libraries
dom4j	1.6.1	
dwr (direct web remoting) Getahead	11.3	
ehcache	1.3.0	Caching Support
GEOS	3.0.2	Geometry Engine, Required for PostGIS
GeoTools Java API	2.6.4	Java API for Manipulation of Geospatial Data
Geronimo-jms	1.1.1	The goal of the Geronimo project is to produce a server runtime framework that pulls together the best Open Source alternatives to create runtimes that meet the needs of developers and system administrators.
GRIBJava	8.0	Grib Java Decoder
h5py	1.3.0	HDF5 for Python
hdf5	2.5	Core HDF5 APIs
Hibernate	3.5.0	Data Access Layer
IzPack	4.2.0	Installer creator for EDEX
JAI	1.1.3	Java API for Image Manipulation
JAI – Image I/O	1.1	Plug-ins for JAI
Jasper	1.900.1	
Java	1.6_17	Development Kit
JBoss Cache	3.2.1.ga	Enterprise-grade clustering solutions to Java-based frameworks
Jep	2.3+	Java Python interface
Jetty	7.2.2	Jetty provides an HTTP server, HTTP client, and javax.servlet container
JGraphT	0.6.0	JGraphT is a free Java graph library that provides mathematical graph-theory objects and algorithms
JMock	2.0.0	Java Mock Object Framework
jna (java native access)		JNA provides Java programs easy access to native shared libraries (DLLs on Windows) without writing anything but Java code—no JNI or native code is required. This functionality is comparable to Windows' Platform/Invoke and Python's ctypes. Access is dynamic at runtime without code generation.
jogl	1.1.1-rc8	Provides hardware-supported 3D graphics
Jscience	4.3.1	Library for Scientific Calculations and Visualizations
JTS Topology Suite	1.10	Java API for 2D spatial data
JUnit	4.3.1	Java Unit Test Framework
Log4J	1.2.16	Logging Component used by Commons Logging
libgfortran	4.1.2	Fortran Library
matplotlib	0.99.1.1-r7813	Python 2D Plotting Library
Mozilla Rhino	1.6R7	Implementation of JavaScript embedded in Java

Component	Version	Description
NCEP Grib2 Libraries		Libraries for decoding & encoding data in GRIB2 format
cvgrib	1.1.8 and 11.9	Fortran GRIB1 <--> GRIB2 conversion utility
g2clib	1.1.8 and 11.9	"C" grib2 encoder/decoder
g2lib	1.1.8 and 1.1.9	Fortan grib2 encoder/decoder and search/indexing routines
w3lib	1.6 and 1.7	Fortran grib1 encoder/decoder and utilities
NumPy	1.3.0	Numerical Python Scientific package for Python
objectweb asm	2.1	ASM is an all purpose Java bytecode manipulation and analysis framework. It can be used to modify existing classes or dynamically generate classes, directly in binary form
Openfire	3.7	Collabration Server – Not used but eventually will replace Wildfire. Only 3.7 approved.
PostGIS	1.3.5	Geographic Object Support for PostgreSQL
PostgreSQL	8.4.7	Database
Proj	4.6.1	Cartographic Projections library
pydev	1.5	Python Development Environment
PyTables	2.1.2	Python package for managing hierarchical datasets
Python	2.7.1	Dynamic programming language
Python megawidgets	1.3.2	Toolkit for building high-level compound widgets in Python using the Tkinter module
Qpid	0.7	Open Source AMQP (Advanced Message Queueing Protocol) Messaging
SciPy	0.7.0	Python Library of Scientific Tools
ScientificPython	2.8	Python library for common tasks in scientific computing
slf4j	1.6.1	The Simple Logging Facade for Java or (SLF4J) serves as a simple facade or abstraction for various logging frameworks
smack	2.2.1	Smack is an Open Source XMPP (Jabber) client library for instant messaging and presence.
stomp.py	revision 18	Python client library for accessing messaging servers
Spring Framework	2.5.6	Layered Java/J2EE application platform
SWT Add-ons	0.1.1	Add-ons for Eclipse SWT widgets
Symphony ognl	2.7.3	Object-Graph Navigation Language; an expression language for getting/setting properties of Java objects.
Thrift	20080411p1	Binary Serialization Framework
Tomcat Native	1.1.17	Library for native memory control
TPG	3.1.2	Parser generator for Python
Velocity	1.5.0	Templating Engine
Wildfire	3.1.1	Collaboration Server
xmlltask	1.15.1	Facility for automatically editing XML files as part of an Ant build
Developmental Tools Delivered w/ADE		
Eclipse	3.6.1	Java IDE
Eclipse CDT	5.0.2	C/C++ IDE for Eclipse
Java	1.6_17	Development Kit
Subclipse	1.4.8	Eclipse plugin for Subversion support

2.5.3.2 *Mobile Code Technologies*

NIST SP 800-53, Information Security, Appendix B, provides the following definitions regarding mobile code:

- *Mobile Code Software*: Programs or parts of programs obtained from remote information systems, transmitted across a network, and executed on a local information system without explicit installation or execution by the recipient.
- *Mobile Code Technologies Software*: Technologies that provide the mechanisms for the production and use of mobile code (e.g., Java, JavaScript, ActiveX, VBScript).
- AWIPS II mobile code consists of micro engine scripts that are written in Python. These micro engine scripts execute only within EDEX.

[Note to Reviewers: An additional reference will be included here and in Appendix F, Security Policy, once the NWS provides details regarding conformance to National Institute of Standards and Technology Special Publication 800-28, Version 2, Guidelines on Active Content and Mobile Code, March 2008.]

2.6 *AWIPS I and AWIPS II*

2.6.1 *What's Changed in AWIPS*

AWIPS II continues to use heartbeat software to manage application packages on the PX1/2 and DX1/2 clusters. Although heartbeat is no longer used on the DX3/4 server pair, it has been added to the CPSBN1/2 server pair. AWIPS II clustering strategy and heartbeat packages are discussed in section 2.8, “AWIPS II Server Clustering”

Because AWIPS II does not utilize the heartbeat cluster on DX3/4, any locally defined crons that were formerly managed by the dx3apps and dx4apps packages has been moved to another server.

There are new mounts on the Direct Attached Storage (DAS). File system mounts are covered in section 2.11, “Basic AWIPS II Data Storage Architecture.”

AWIPS II software performs its own logging; log locations vary with the different AWIPS II software components. AWIPS II logging is covered in section 2.10, “Basic AWIPS II Logging Architecture.”

2.6.2 *What's Not Changed in AWIPS*

AWIPS II reuses a number of the existing AWIPS I applications. These include:

- MHS (Message Handling System)
- Climate software
- HWR

- NWRWAVES/NWREditor/CRS
- FSI (server path has changed; the GUI has been wrapped)
- LDAD (Local Data Acquisition and Dissemination)
- NWWS (NOAA Weather Wire Service)
- ASYNC Scheduler
- LSR (Local Storm Report)
- FloodEvent Archiver
- HydroGen
- RiverPro
- WFO/RFC Archiver (Weather Forecast Office/River Forecast Center Archiver)
- LAPS/MSAS (Local Analysis and Prediction System/MAPS Surface Assimilation System)
- Chatserver
- LegalArchiver
- Certain Command Line Interfaces (textdb, fxaAnnounce, sendMsgToGuardian)

For the AWIPS I software that has been retained, basic management techniques are unchanged; high-availability packages and server cron configuration files are still used (the package filenames start with *a2*, for example, *a2px2apps*). Log names and locations remain the same.

2.7 Basic AWIPS II Software Deployment

AWIPS II replaces a large portion of the existing AWIPS data ingest, processing, and storage capabilities. It also consolidates many forecaster applications into a single visualization tool. The primary AWIPS II application for data ingest, processing, and storage is the Environmental Data EXchange (EDEX); the primary AWIPS II application for forecaster visualization/data manipulation is the Common AWIPS Visualization Environment (CAVE).

AWIPS II takes a unified approach to data ingest; most data types follow a standard path through the system. Variations on this basic data flow include local radar (Open Radar Product Generator (ORPG) / Supplemental Product Generator (SPG)) products, and Local Data Acquisition and Dissemination (LDAD) delivered products. AWIPS II provides interfaces for communicating with the ORPG/SPG and LDAD servers.

At a high level, data flow describes the path that a piece of data follows through the system. This path starts with the data source and includes storing the raw data, decoding the data, and storing the decoded data in a form that makes it available for display and/or manipulation by the forecaster. This process is described in Chapters 4 – 7 of this manual.

AWIPS II supports automated processing using a cron-like capability built into the EDEX process. EDEX also provides database and Processed Data Storage management; Raw data storage is managed by the Local Data Manager (LDM) process. Script running in response to data arrival is also supported within EDEX. These topics are covered in Chapters 11 and 12 of this manual.

In addition to programs developed specifically for AWIPS, AWIPS II uses several commercial off-the-shelf (COTS) and Free or Open Source software (FOSS) products to assist in its operation. These applications include the Unidata LDM, the Apache web server, the Queue Processor Interface Daemon (QPID) Apache AMQP Message Broker, and the Java and Python runtime systems.

At a high level, data flow describes the path taken by a piece of data from its source to its display by a client system. This basic data flow concept is shown in Exhibit 2.7-1.

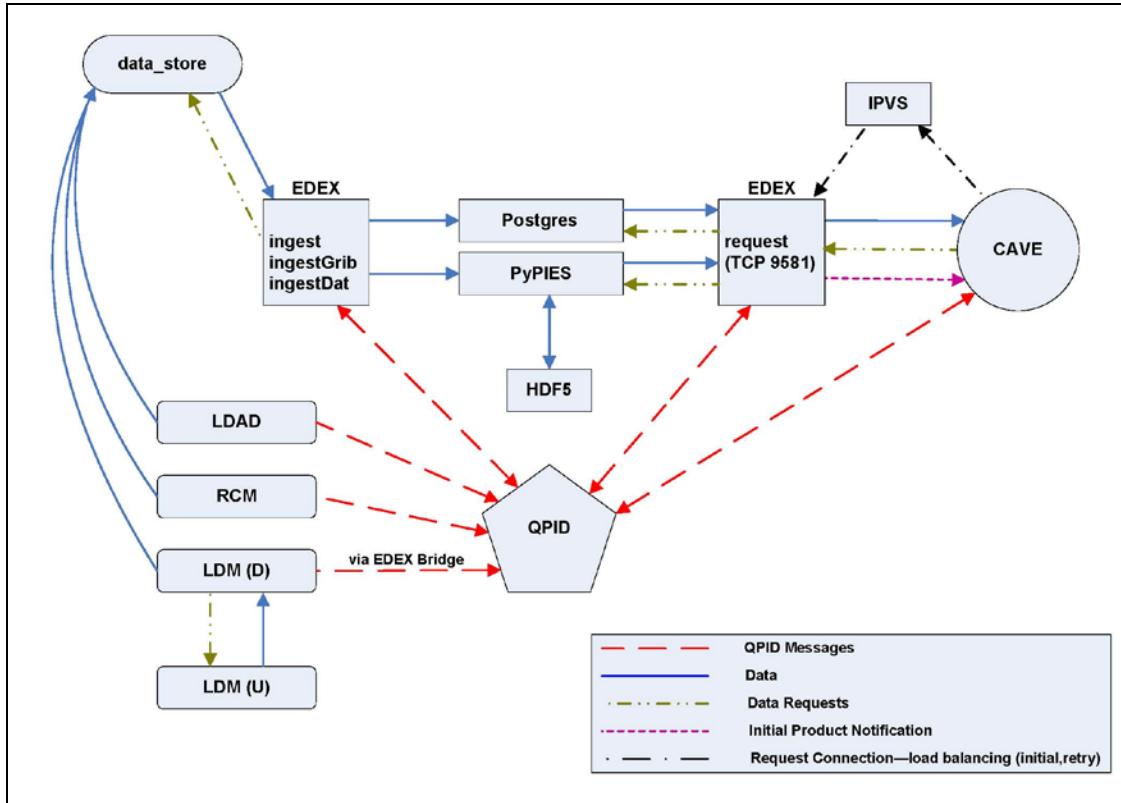


Exhibit 2.7-1. Overall AWIPS II Data Flow

AWIPS II installs new AWIPS II-specific software on several of the existing AWIPS systems, both servers and workstations.

Table 2.7-1 lists the specific AWIPS II-provided software installed on each system.

On the servers – CPSBN1 and CPSBN2, PX1 and PX2, and DX1–4 – AWIPS II software is installed in `/awips2`. On the workstations, AWIPS II software is installed in `/usr/local/viz`.

Table 2.7-1. AWIPS II Software

System	Key Software Packages
CPSBN1 and CPSBN2	LDM Upstream (LDM(U)), IPVS, LDM Downstream (LDM(D))
PX1 and PX2	Rehosted Applications
DX1 and DX2	PostgreSQL Data Base Management System (DBMS), PyPIES, Radar-Coded Message (RCM), LDM Downstream (LDM(D))
DX3 and DX4	EDEX (ingest, ingestGrib, ingestDat, request)
LX Workstations	CAVE, AlertViz
XT Workstations	CAVE, AlertViz

2.8 AWIPS II Server Clustering

As a general rule, the AWIPS II server software is deployed on pairs of servers. This approach is used to maximize processing availability; various failover strategies are employed, as detailed in Table 2.8-1

Table 2.8-1. AWIPS II Server Failover Strategies

Server Pair	Failover Strategy
CPSBN1 and CPSBN2	CPSBN1 and CPSBN2 function as a heartbeat cluster; failover is managed automatically or manually. Note that only a single high-availability package is currently used on this cluster. The package name is a2cp1apps. In failover mode, package execution shifts to the backup server. Note that there is software (notably the LDM(U) processes) that runs on both CPSBN1 and CPSBN2 and is not part of the a2cp1apps package. The a2cp1apps package manages the cp1f floating server name. Note that floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.
PX1 and PX2	PX1 and PX2 function as a heartbeat cluster; failover is managed automatically or manually. Note that both PX1 and PX2 normally run separate high-availability packages; a2px1apps on PX1 and a2px2apps on PX2. In failover mode, both packages shift to the same server. Access to PX1 and PX2 is via floating server names: px1f points to the server running the a2px1apps package; px2f points to the server running the a2px2apps package. Note that the floating server names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.
DX1 and DX2	DX1 and DX2 function as a heartbeat cluster; failover is managed automatically or manually. Note that both DX1 and DX2 normally run separate high-availability packages: a2dx1apps on DX1 and a2dx2apps on DX2. In failover mode, both packages shift to the same server. Access to DX1 and DX2 is via server name alias: dx1f points to the server running the a2dx1apps package; dx2f points to the server running the a2dx2apps package. Note that the floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.
DX3 and DX4	DX3 and DX4 are independent servers, both of which run the EDEX server software. There is no failover between DX3 and DX4. Both servers are load balanced and share data processing responsibilities; if one server is stopped, the other will pick up the entire data processing load. Processing load balancing between DX3 and DX4 is provided by QPID as data messages are removed from QPID queues and processed by the EDEX instance having available processing capacity. Client request balancing for DX3 and DX4 is managed by Internet Protocol Virtual Server (IPVS) (the pulse service). Both QPID and IPVS run on CPSBN1 and CPSBN2.

As indicated in Table 2.8-1, server name aliasing is used to direct clients to the appropriate member of each cluster. “Appropriate member” generally refers to the server running a specific high-availability package; in the case of DX3 and DX4, however, it refers to an available EDEX process.

AWIPS II server aliases and their target servers are listed in Table 2.8-2. Note that the floating names, e.g., dx1f and px1f, are managed by the high-availability packages; as a result, the floating server names are only available when the packages are running and cannot be used when starting or stopping the high-availability packages.

Table 2.8-2. AWIPS II Server Aliases

Server Alias	Target System
dx1f	The server, DX1 or DX2, which is currently running the a2dx1apps high-availability package.
dx2f	The server, DX1 or DX2, which is currently running the a2dx2apps high-availability package.
px1f	The server, PX1 or PX2, which is currently running the a2px1apps high-availability package.
px2f	The server, PX1 or PX2, which is currently running the a2px2apps high-availability package.
cp1f	The server, CPSBN1 or CPSBN2, which is currently running the a2cp1apps high-availability package.
ec, edexcluster	Connections are redirected to DX3 or DX4, based on a least connections strategy. In a least connections strategy, a new connection request is forwarded to the server, DX3 or DX4, currently having the lower number of connections. This alias only applies to connections on port 9581. These connections are managed by IPVS service, which is managed by the a2cp1apps high-availability package, which runs on CPSBN1 or CPSBN2.

2.9 Basic AWIPS II Communication Architecture

The AWIPS II ingest and request processes are a highly distributed system; messaging is used for Inter-Process Communication (IPC). Exhibit 2.9-1 shows the basic IPC architecture.

Exhibit 2.9-1 shows the basic lines of communication that are used for IPC in AWIPS II. There are three primary communication channels:

1. Advanced Message Queuing Protocol (AMQP) messages are routed between the various AWIPS II processes via the QPID message broker.
2. Transport Control Protocol (TCP) messages are routed between EDEX and other AWIPS II components.
3. TCP messages from CAVE to EDEX are routed through the IPVS to request load balancing between DX3 and DX4.

Combined with the clustering strategies discussed in “AWIPS II Server Clustering,” the Communication Architecture provides improved system availability and processing load balancing.

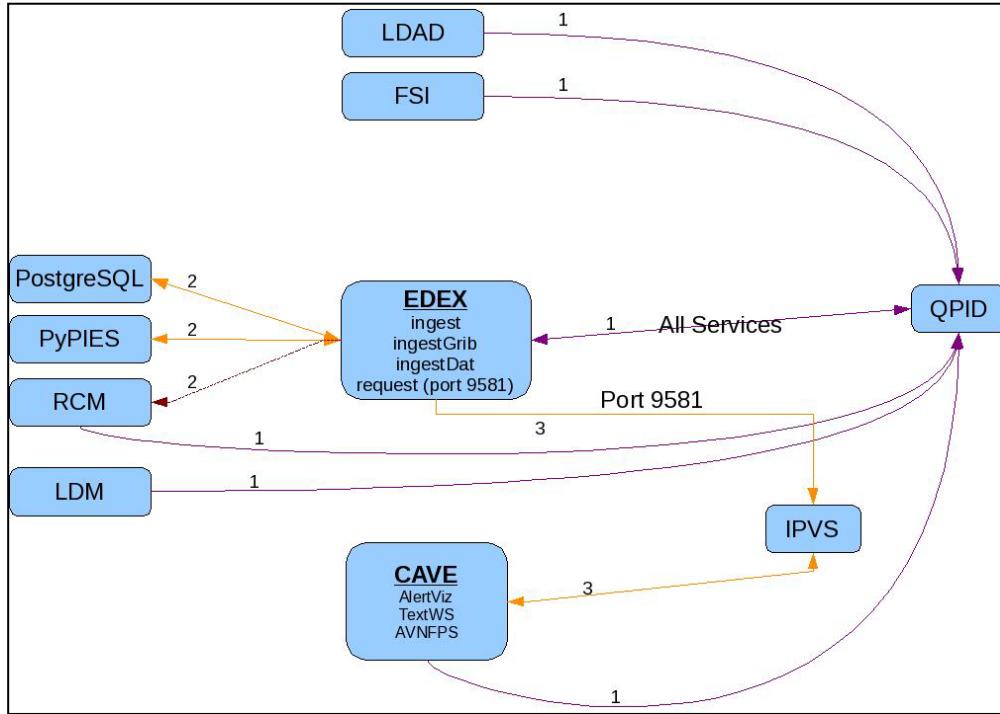


Exhibit 2.9-1. AWIPS II Inter-Process Communication

2.10 Basic AWIPS II Logging Architecture

AWIPS II does not implement a standardized logging strategy; rather, each AWIPS II component provides process logs that may be examined to determine process status and assist in system troubleshooting. Table 2.10-1 lists log locations for these components.

Table 2.10-1. Log Locations for AWIPS II Components

Server	Process	Log Directory
dx1f	Radar Server	/awips2/rcm/data/logs
	PostgreSQL DBMS	/awips2/data /awips2/data/pg_log
	PyPIES	/awips2/pypes/logs /awips2/http_pypes/var/log/httpd /tmp
dx2f	LDM(D)	/usr/local/ldm/logs
	scour	/usr/local/ldm/logs
	cron	/var/logs Note: logs to cron log.
dx3/dx4	EDEX	/awips2/edex/logs
cpsbn1/ cpsbn2	QPID	/awips2/qpidd/var/log /var/logs Note: logs to message log.
	LDM(U)	/usr/local/ldm/logs
LX/XT	AlertViz	~/caveData/logs
	CAVE	~/caveData/etc/user/\${USER}/logs

For more information on AWIPS II process logging, including log naming patterns and configuration, see the applicable sections of Chapter 25 of this manual.

2.11 Basic AWIPS II Data Storage Architecture

AWIPS II stores on two shared data servers – the Direct Attached Storage (DAS) server and the Network Attached Storage (NAS) server. Both of these servers provide for shared data access; this provides improved system resiliency in the event of server failure. DAS access is limited to the DX1/2 cluster; NAS access is available from any server or workstation on the Local Area Network (LAN), although not all systems are mounted to access the data on the NAS. The AWIPS II Raw Data Storage is directly accessible only from dx2f; however, other systems, notably DX3 and DX4, also access this data. They do so using a file system map to dx2f:/data_store. The primary AWIPS II data storage locations are listed in Table 2.11-1.

Table 2.11-1. AWIPS II Data Storage

Data Component	Location	Access From
AWIPS II Raw Data Storage	das1:/aiildm	dx2f
AWIPS II HDF5 Data Storage	das1:/aiihdf5	dx1f
AWIPS II Database	das1:/aiidb	dx1f
AWIPS II QPID Shared Data	nas1:/qpid	cp1f
AWIPS II EDEX Shared Data	nas1:/aiidata	dx3, dx4, px1, px2
AWIPS II Service Backup	nas1:/GFESuite2	dx1-4, px1-2
AWIPS II Service Backup	nas1:/aiidata/utility	dx1, dx2
AWIPS II Hydroapps and Avnfps Applications	nas1:/aiidata/share	lx, xt

Note that for mounts that are accessed from a floating server name, e.g., dx2f, the mounts are managed by the high-availability package that provides the floating name. For example, the mount to das1:/aiildm, which is accessed using the dx2f floater, is managed by the a2dx1apps high-availability package.

2.12 Basic AWIPS II Visualization Architecture

AWIPS II uses the CAVE application as its main data visualization/manipulation tool. CAVE incorporates a number of the legacy AWIPS I applications such as Display Two-Dimensional (D2D), Graphical Forecast Editor (GFE), and Text Workstation. AWIPS II has also reengineered GUARDIAN into AlertViz. CAVE and AlertViz are installed on both the LX and the XT workstations.

Exhibit 2.12-1 shows the basic visualization architecture.

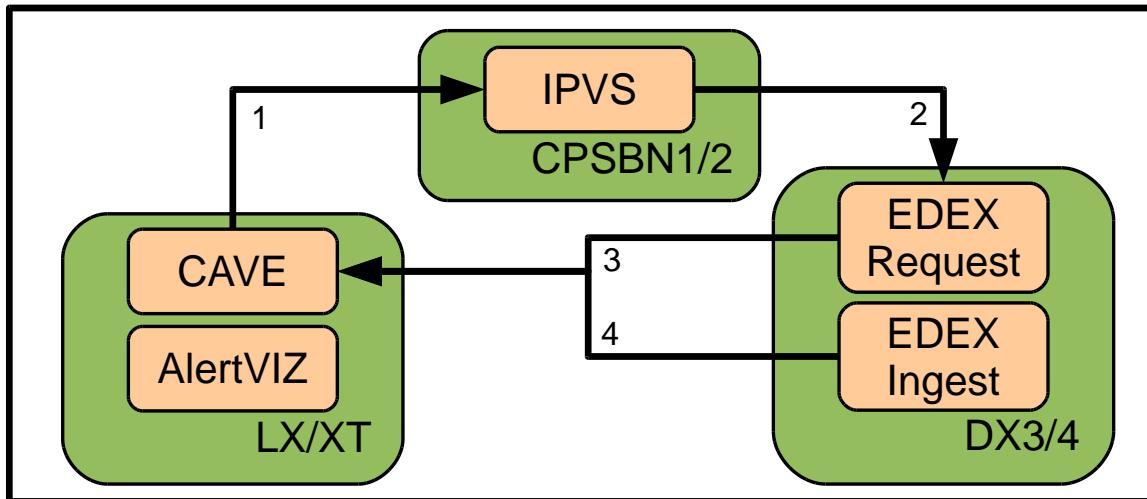
**Exhibit 2.12-1. AWIPS II Visualization**

Exhibit 2.12-1 shows the basic information/data flow between CAVE and EDEX. AlertViz will display CAVE errors as well as messages from other parts of the system. The information/data flow is as follows:

1. Data requests are sent from CAVE to a virtual server name (ec). The virtual server name is resolved by IPVS.
2. IPVS forwards the data request to the available EDEX Request process on either DX3 or DX4.
3. The EDEX Request process returns the requested data to CAVE.
4. The EDEX Ingest process broadcasts data-ingested messages that are picked up by CAVE.

CAVE can be started in various modes by passing its switches through the command line (or via application launchers). For example, CAVE can be launched to emulate the Text Workstation or only to display the D2D perspective. See SMM Chapter 25 for more information on the CAVE command line switches.

2.13 Basic AWIPS II Data Processing Architecture

AWIPS II separates data processing into four logically separate components:

1) data receipt; 2) data decoding; 3) data storage; and 4) data request. These components are distributed over the various systems in AWIPS II. This distribution is designed to provide improved data throughput coupled with improved system resiliency. AWIPS II reuses a number of existing components in data processing.

2.13.1 Basic AWIPS II Data Receipt Architecture

AWIPS II receives data from three main sources: the Satellite Broadcast Network (SBN); the LDAD network; and the Open Radar Product Generator (ORPG)/Supplemental Product Generator (SPG) network. Regardless of the data source, the received data is fed

to data ingest, which is performed by the EDEX software on DX3 and DX4. This basic data receipt concept is shown in Exhibit 2.13.1-1.

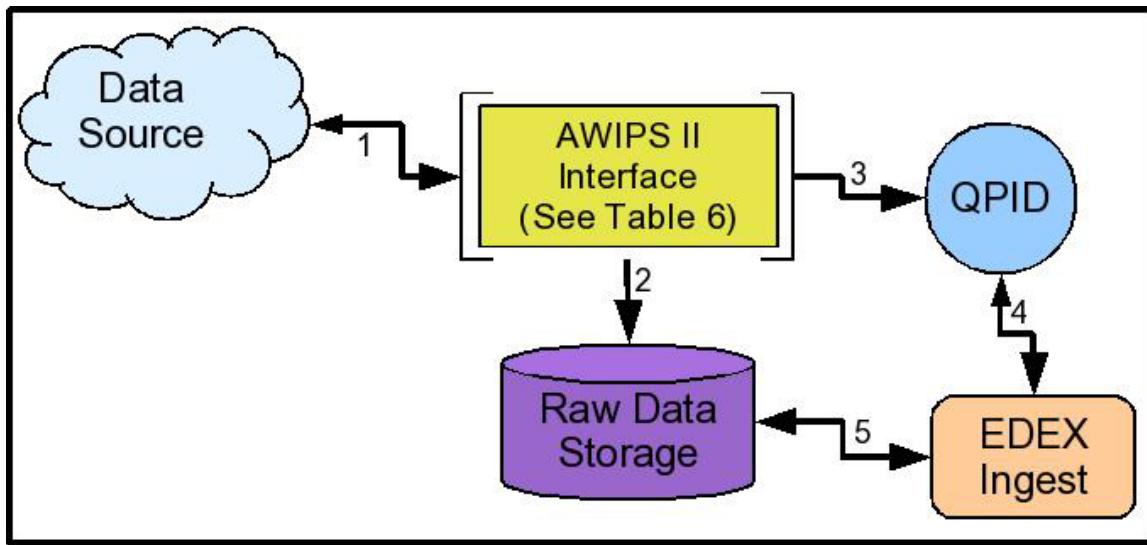


Exhibit 2.13.1-1. AWIPS II Data Receipt

As shown in Exhibit 2.13.1-1:

1. The AWIPS II interface process obtains a data product from the data source.
2. The interface process writes the data to a file in Raw Data Storage.
3. The interface process posts a “data available” message to the QPID message broker.
4. The EDEX Ingest process obtains the “data available” message from QPID and removes the message from the message queue.
5. The EDEX Ingest process obtains the data file from Raw Data Storage.

AWIPS II either modifies or provides interfaces between the existing AWIPS components and AWIPS II data ingest. The AWIPS II interfaces are shown in Table 2.13.1-1.

Table 2.13.1-1. AWIPS II Interfaces to Data Sources

Source	AWIPS II Interface
SBN	LDM(U) on CPSBN1/2 cluster obtains data from the SBN and feeds the data to LDM(D) on the DX1/2 cluster. LDM(D) writes the data to a file in Raw Data Storage and posts a “data available” message to the QPID message broker on the CPSBN1/2 cluster.
LDAD	LDAD has been modified to feed data into the AWIPS II ingest data flow. Specifically, three new router processes have been added to the LDAD suite on PX1/2. These router processes are routerStoreEDEX, routerShefEncoderEDEX, and routerStoreTextEDEX. These processes allow baseline LDAD data flows to be processed by EDEX.
ORPG/SPG	The Radar Server on the DX1/2 cluster interacts with ORPG/SPG to obtain radar data. When the data is obtained, the server writes the data to a file in Raw Data Storage and posts a “data available” message to the QPID message broker on the CPSBN1/2 cluster.

Note that this architecture provides separation between data sources and ingest processing. Any data source that follows this architecture will be able to provide data for EDEX to process.

2.13.2 Basic AWIPS II Data Decoding Architecture

Data decoding is defined as the process of converting data from a raw format into a decoded format that is usable by the AWIPS II visualization software. In AWIPS II, data decoding is performed by the EDEX Ingest processes, which run on both DX3 and DX4. The basic data decoding concept is shown in Exhibit 2.13.2-1.

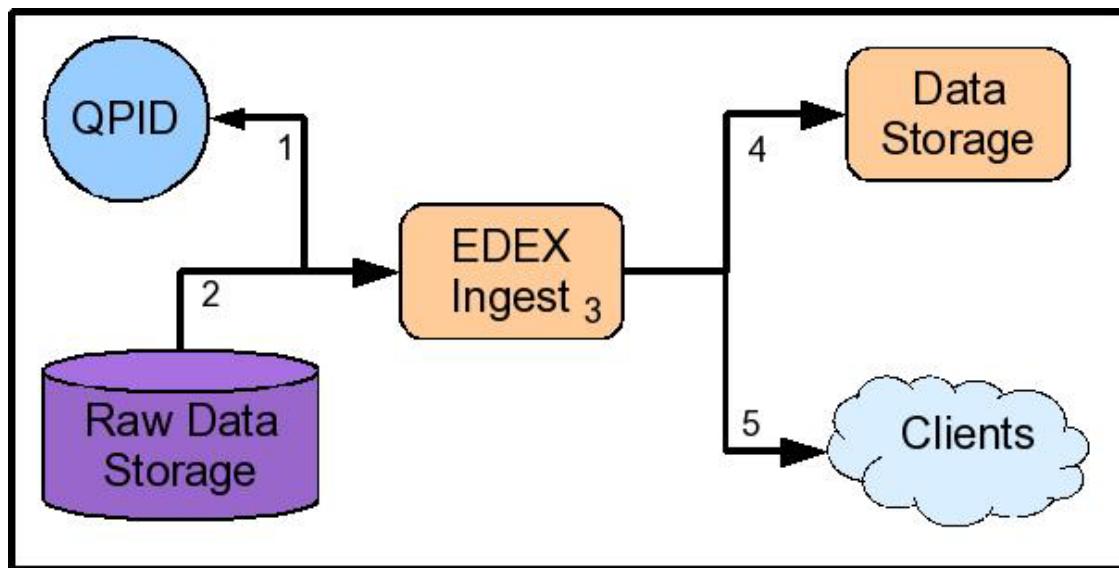


Exhibit 2.13.2-1. AWIPS II Data Decoding

As shown in Exhibit 2.13.2-1:

1. The EDEX Ingest process obtains the “data available” message from the QPID message broker. The EDEX Ingest process determines the appropriate data decoder based on the message contents and forwards the message to the decoder. Finally, the message is removed from the message queue.
2. The EDEX Ingest process reads the data from Raw Data Storage.
3. The EDEX Ingest Process decodes the data.
4. The EDEX Ingest process forwards the decoded data to Data Storage.
5. The EDEX Ingest process sends a message to a client queue that decoded data is available.

The current architecture has two EDEX Ingest processors, DX3 and DX4. Load balancing of Ingest processing among multiple Ingest processes is provided by the QPID message broker. Although multiple EDEX Ingest processes are possible, each “data available”

message is serviced by whichever EDEX Ingest processor gets the message first. Either EDEX Ingest processor may be taken offline without stopping data ingest.

It is also important to note that in AWIPS II all data types are processed on both Ingest Processors. Although a specific data file is processed by a single EDEX Ingest process, data files for a data type are processed on both Ingest processors.

Once this process is complete, clients may obtain and perform additional processing on the data. This includes display of the data in CAVE, additional processing such as SmartInit scripts that are run on Gridded Binary (GRIB) data, text watch/warn triggered scripts, etc.

2.13.3 Basic AWIPS II Data Storage Architecture

AWIPS II provides data storage in two areas – Raw Data Storage and Processed Data Storage. These two data storage areas use a combination of PostgreSQL database tables, HDF5 files, and raw data files to store data.

Raw Data Storage contains the raw data that has been received from various data sources. This area is available via Network File System (NFS) mount, which allows the Raw Data Storage area to be accessible from various servers. The servers may write data to this area or read data from this area for processing. The Raw Data Storage area is physically located on the AWIPS II Direct Attached Storage (DAS) and is maintained by LDM(D) on dx2f.

Processed Data Storage contains the decoded data. Processed Data Storage also hosts a collection of static data such as topological and map data. Most of this data is physically stored on either the AWIPS II Network Attached Storage (NAS) or the DAS device. Access to the data is via NFS-mounted files systems. The Processed Data Storage area is maintained by EDEX.

2.13.3.1 AWIPS II Raw Data Storage

AWIPS II Raw Data Storage is contained in a file system on the AWIPS II DAS. It is mounted as a local volume by the server running the a2dx2apps high-availability package on the DX1/2 cluster. This allows the LDM(D) to write to data files in Raw Data Storage efficiently. The EDEX Data Servers (DX3 and DX4), the PX servers and AX servers, and the LX and XT workstations mount Raw Data Storage via NFS mounts to the appropriate DX server using the dx2f virtual server name. Raw Data Storage is mounted on /data_store on all these systems. The accessibility of the Raw Data Storage is shown in Exhibit 2.13.3.1-1

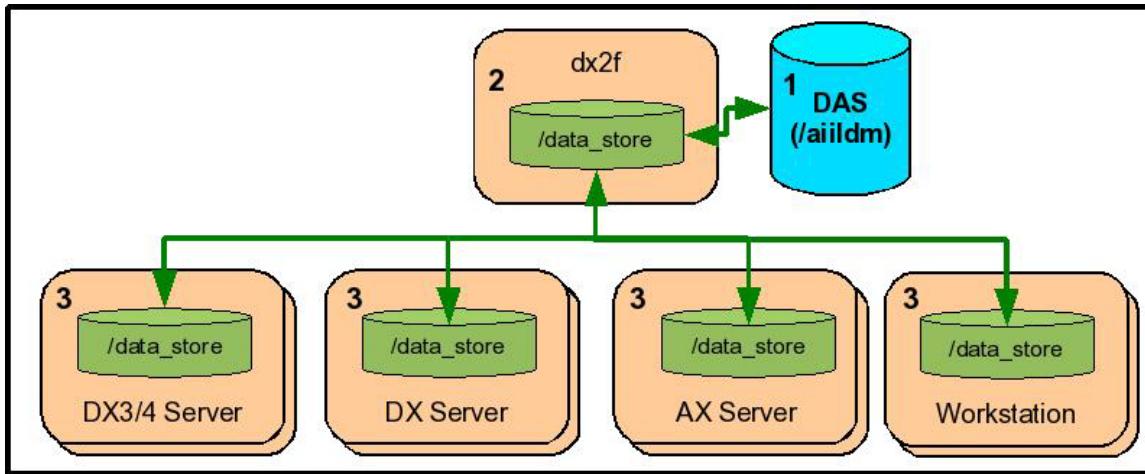


Exhibit 2.13.3.1-1. AWIPS II Raw Data Storage

As shown in Exhibit 2.13.3.1-1:

1. AWIPS II Raw Data Storage is located in a file system (/aiildm) on the AWIPS II DAS.
2. The active server of the DX1/2 cluster (dx2f) mounts /data_store to Raw Data Storage as a local mount on /data_store. To make Raw Data Storage accessible to other systems, dx2f exports /data_store as an NFS mount point.

Other systems needing access to Raw Data Storage use NFS to mount /data_store to Raw Data Storage on DX1/2 (dx2f:/data_store). The basic structure of Raw Data Storage is

/data_store/<data type>

The directory structure under each data type as well as the file names used for the raw data are determined by the configuration of LDM(D).

Procedures for verifying the mount points are presented in Chapter 25 of this manual.

2.13.3.2 AWIPS II Processed Data Storage

The AWIPS II Processed Data Storage is used to store decoded data. The decoded data is stored in a PostgreSQL database and/or HDF5 files, depending on the type of data. (Processed data storage is covered in Chapters 4 – 7; techniques for checking data storage are covered in Chapter 25.) The basic structure of the Processed Data Storage is shown in Exhibit 2.13.3.2-1.

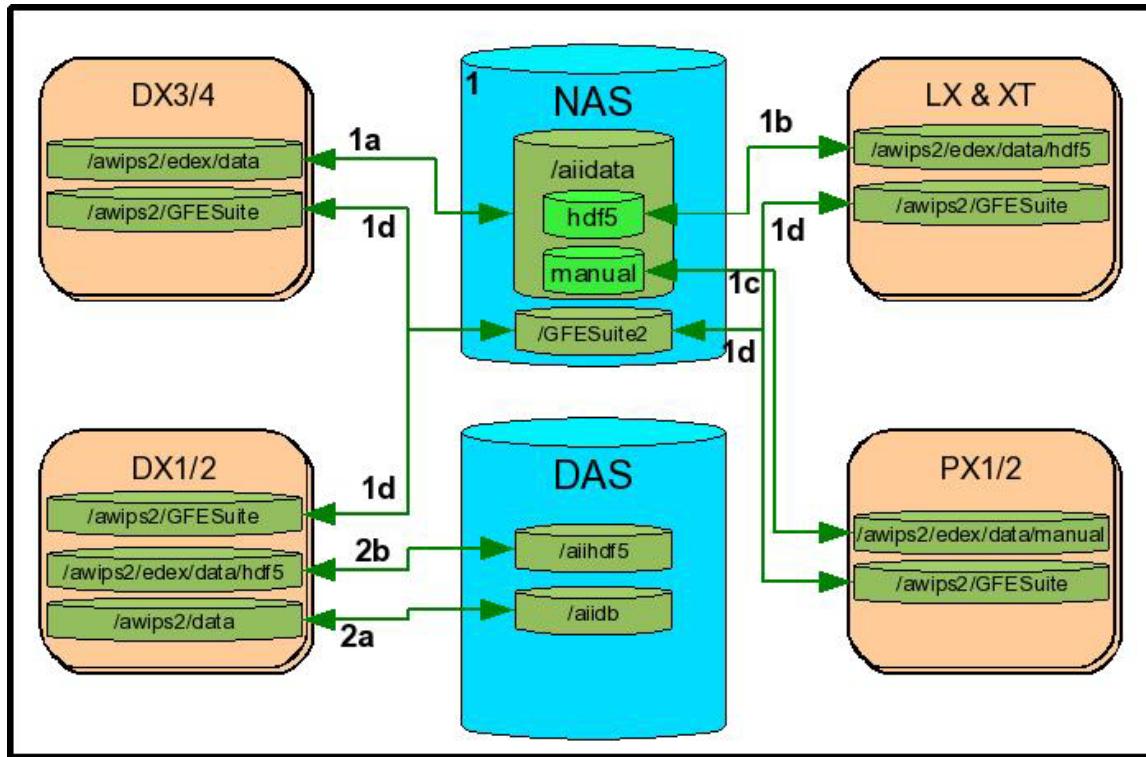


Exhibit 2.13.3.2-1 AWIPS II Processed Data Storage

As shown in Exhibit 2.13.3.2-1, Processed Data Storage is located on the DAS and NAS devices. Note that file systems on the DAS are accessible only from the DX1/2 cluster.

1. On the NAS, two file systems contain portions of Processed Data Storage. The two file systems are /aiidata and /GFESuite2.
 - a. Processes on DX3/4 have access to the entire NAS:/aiidata file system via NFS mount on /awips2/edex/data. This provides access to the Localization Store, hydro applications, and static data.
 - b. Processes on the LX and XT workstations have access to the HDF5 portion of the NAS:/aiidata file system via NFS mount on /awips2/edex/data/hdf5. This provides access to hydro applications and topological data.
 - c. Processes on PX1/2 have access to the manual portion of the NAS:/aiidata file system. This provides access to the manual inbox for data insertion.
 - d. Processes on DX servers, PX servers, and the LX and XT workstations have access to the NAS:/GFESuite2. This provides access to the Service Backup and Inter-Site Coordination (ISC) functionality.
2. On the DAS, two file systems contain portions of Processed Data Storage. The two file systems are /aiihdf5 and /aiidb.
 - a. Processes on DX1/2 have access to the DAS:/aiidb file system via local mount on /awips2/data. This provides access to the PostgreSQL database tables.

- b. Processes on DX1/2 have access to the DAS:/aiihdf5 via local mount on /awips2/edex/data/hdf5. This provides access to HDF5-based data storage for decoded imagery, forecast grids and point data.

Note that client applications such as CAVE do not directly access the HDF5 files in Processed Data Storage. Rather, CAVE interacts through the EDEX Request process, as shown in Exhibit 2.13.3.2-2.

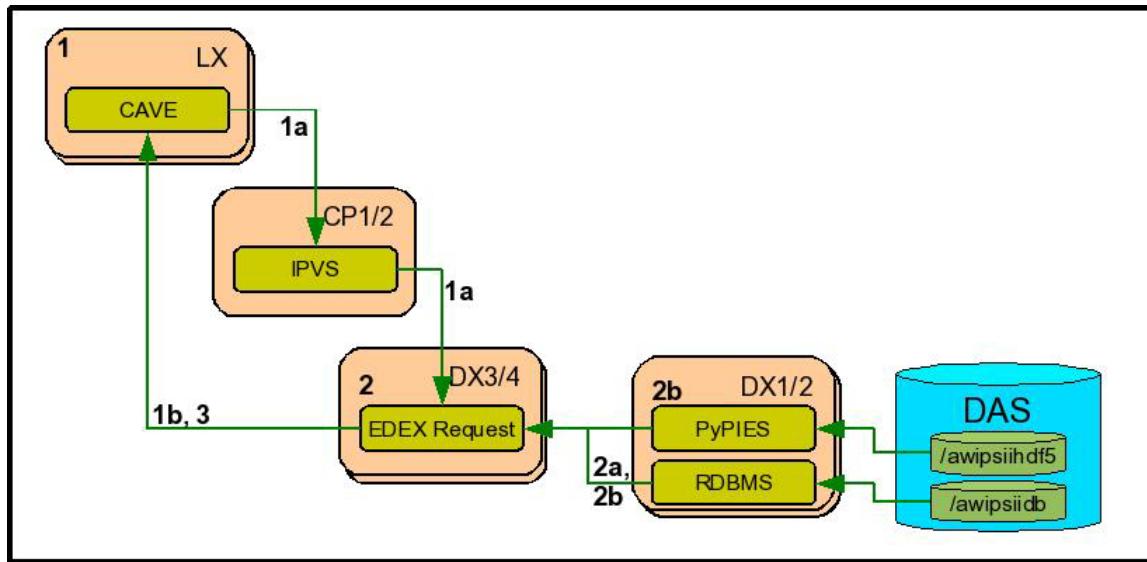


Exhibit 2.13.3.2-2 CAVE/Processed Data Storage Interaction

As shown in Exhibit 2.13.3.2-2, CAVE data retrieval consists of the following:

1. CAVE sends a data request to an EDEX Request process on DX3 or DX4.
 - a. On the CP cluster, IPVS simply forwards the connection request to either DX3 or DX4. Note that EDEX is not aware of the IP aliasing.
 - b. Once the connection is made, EDEX and CAVE communicate directly.
2. The EDEX Request process obtains metadata and data from Processed Data Storage.
 - a. Metadata is obtained from the PostgreSQL database (DBMS).
 - b. Depending on the data type, data is retrieved from the PyPIES server or the PostgreSQL database.
 - i. Imagery, point data, and gridded data are retrieved from the PyPIES server.
 - ii. Other decoded data, such as text products, are retrieved from the PostgreSQL database.
3. The data and metadata are returned to CAVE for display. Note that the response is directly from EDEX Request to CAVE; it does not pass through IPVS.

CAVE is also capable of inserting data into Processed Data Storage.

Procedures for verifying access to Processed Data Storage are presented in Chapter 25.

2.13.3.3 PyPIES (*Python Process Isolated Exchange Storage*)

PyPIES was created for AWIPS II to isolate the management of HDF5 Processed Data Storage from the EDEX processes. PyPIES manages access, i.e., reads and writes, of data in the HDF5 files. In a sense, PyPIES provides functionality similar to a DBMS; all data being written to an HDF5 file is sent to PyPIES, and requests for data from an HDF5 file are processed by PyPIES.

PyPIES is implemented in two parts:

1. The PyPIES manager is a Python application that runs as part of an Apache HTTP server on dx1f. It is the PyPIES manager that handles requests to store and retrieve data. The Apache HTTP server provides request management and isolates the HDF5 read/write to a separate process.
2. The PyPIES logger is a Python process that coordinates logging.

PyPIES is controlled by the httpd-pypes System V script; it is part of the a2dx1apps high-availability package.

2.13.4 Basic AWIPS II Data Retrieval Architecture

Data retrieval is the process used by an AWIPS II client to obtain data with the EDEX Servers. In making the data retrieval, the client interacts with an EDEX Request process; the Request process obtains the requested data from the Processed Data Store and returns it to the client. The basic data retrieval process is shown in Exhibit 2.13.4-1.

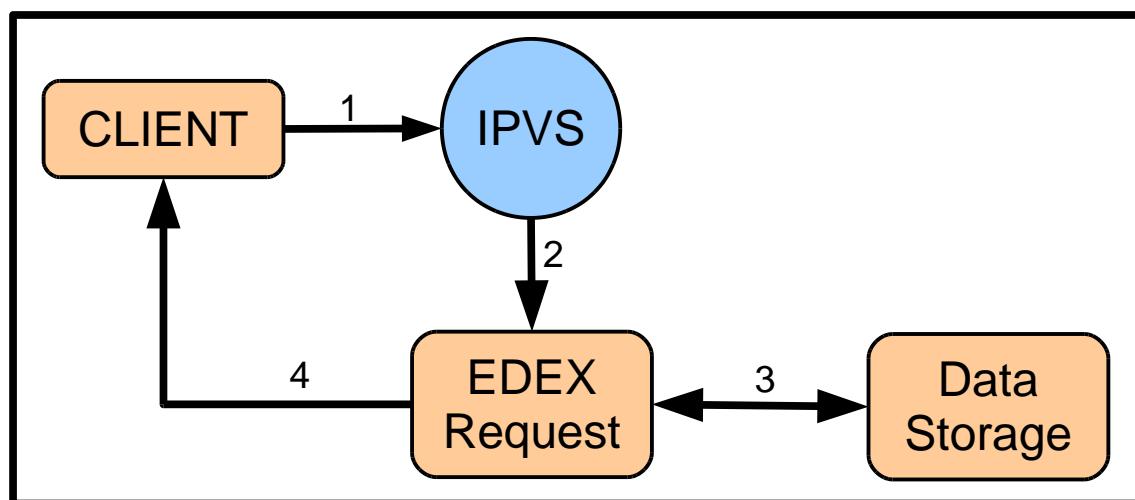


Exhibit 2.13.4-1 AWIPS II Data Retrieval

As shown in Exhibit 2.13.4-1:

1. The client sends a request via TCP protocol to a virtual host name managed by IPVS.

2. IPVS forwards the request, which includes the return address of the client, to an available EDEX Request process.
3. The EDEX Request process obtains the requested data from the AWIPS II Processed Data Store.
4. The EDEX Request process forwards the requested data directly to the client.

This architecture allows the client access via any available EDEX Request process, resulting in improved system reliability and accessibility. Note that data retrieval from the Processed Data Store follows the same pattern as data storage: Retrieval of HDF5 stored data is performed via the PyPIES process; retrieval of database data is via the PostgreSQL DBMS.

2.14 Basic AWIPS II Data Retransmission Design

AWIPS II uses the sequence numbers provided by the SBN to implement an automated retransmission capability for missed products delivered by the SBN. The retransmission capability has been implemented via a daemon process, `sbn_retransmit`, which is installed as part of the LDM installation on the CPSBN1/2 cluster. The AWIPS II Message Retransmission Design is shown in Exhibit 2.14-1. Notice that AWIPS II reuses most of the existing retransmission infrastructure.

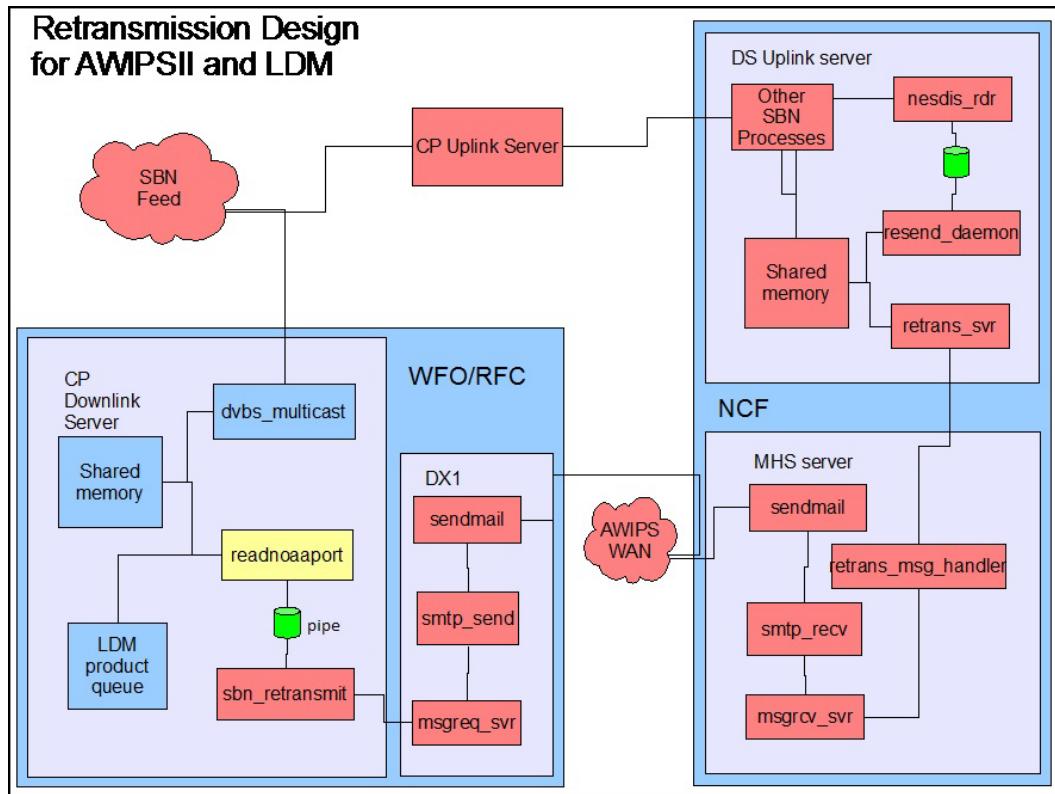


Exhibit 2.14-1. AWIPS II Message Retransmission

To determine if a product retransmission is required, sbn_retransmit monitors the LDM product queue. When a gap is detected, sbn_retransmit forwards a request to the Network Control Facility (NCF) for a retransmission of the missing products.

2.15 Basic AWIPS II Data Purge Architecture

AWIPS II stores data in two separate collections: 1) the AWIPS II Raw Data Storage, which contains unprocessed data; and 2) the AWIPS II Processed Data Storage, which contains decoded and other processed data. These two data collections use different purge mechanisms.

2.15.1 AWIPS II Processed Data Storage Purge Architecture

AWIPS II has implemented a data plug-in based purge strategy. The default purge strategy is version-based, similar to AWIPS I's version-based purge strategy. Each data plug-in is able either to use the default strategy or to implement its own strategy. The GFE and text data plug-ins implement their own purge strategies based on the purge strategies used in AWIPS I; all other data plug-ins currently use the default, version-based purge strategy.

Rules for the version-based purge are defined in XML files located in the AWIPS II Localization Store, which is in /awips2/edex/data/utility on DX3/4. See Chapter 11 for more information on the purging and purge rules.

The basic Processed Data Storage purge strategy is shown in Exhibit 2.15.1-1.

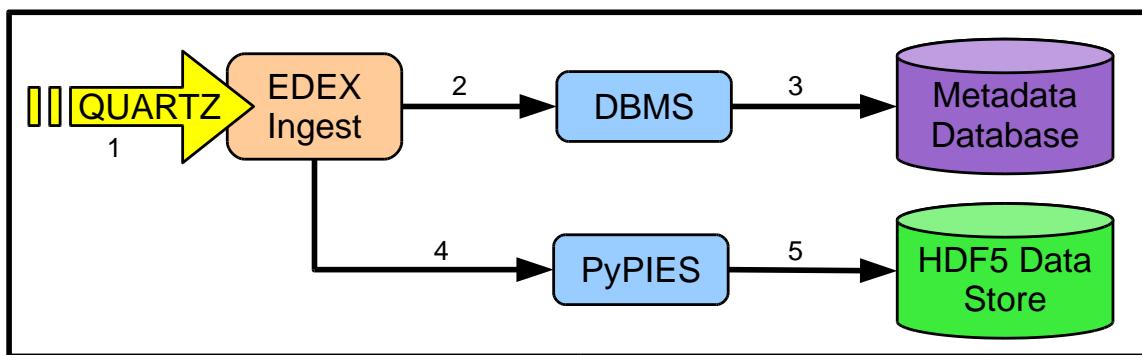


Exhibit 2.15.1-1 AWIPS II Processed Data Storage Purge

As shown in Exhibit 2.15.1-1:

1. A quartz event is triggered in the EDEX Ingest process causing the Purge Service to execute.
 - a. The EDEX Purge Service obtains a purge lock; if the lock is already taken, the Purge Service exits. This strategy ensures that only a single EDEX Ingest process actually performs the purge.
 - b. The EDEX Purge Service obtains the purge rules for each data plug-in.

2. The EDEX Purge Service sends a delete message to the PostgreSQL DBMS.
3. The PostgreSQL DBMS deletes the data from the database table(s).
4. If HDF5 data is to be purged, the EDEX Purge Service sends a purge message to the PyPIES service.
5. The PyPIES service deletes the data from the HDF5 file(s).

2.15.2 AWIPS II Raw Data Storage Purge Architecture

Purging the AWIPS II Raw Data Storage is managed by a cron job on the LDM(D) server (dx2f). This cron causes the LDM scour process to run. The purge process is age based. The directories to manage, and the retention time for each directory, are configured in the scour.conf file located in the etc directory under the LDM home directory (normally /usr/local/lmd). The AWIPS II Raw Data Storage purge process is shown in Exhibit 2.15.2-1.

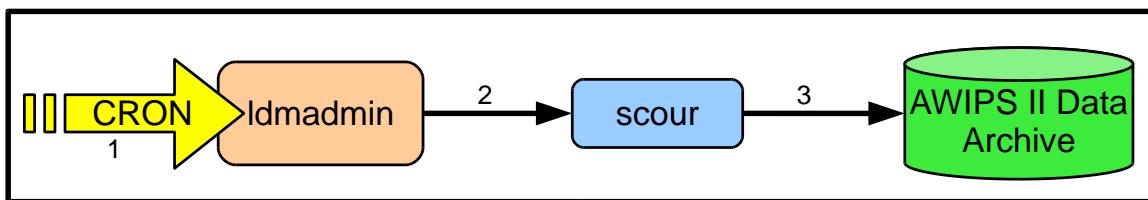


Exhibit 2.15.2-1. AWIPS II Raw Data Storage Purge

As shown in Exhibit 2.15.2-1:

1. An *ldm* user cron job executes *ldmadmin*.
2. *ldmadmin* executes the LDM *scour* program.
3. The LDM *scour* program deletes outdated data from AWIPS II Raw Data Storage.

2.16 AWIPS II Localization Store

AWIPS II uses a Base/Site/User model for localizing/customizing software. The Localization Store consists of a directory structure (/aiidata/utility) that is visible at /awips2/edex/data/utility on the EDEX Data Servers (DX 3 and DX4). When CAVE is started on an LX workstation (or as the *Text Workstation* application on an XT workstation), CAVE obtains the latest localization information from the EDEX Request process and updates the local localization cache, found in <user-home>/caveData. This caching mechanism allows CAVE to: 1) use the latest available localization data for operation; and 2) utilize the same user data on any workstation. CAVE's localization interaction is shown in Exhibit 2.16-1.

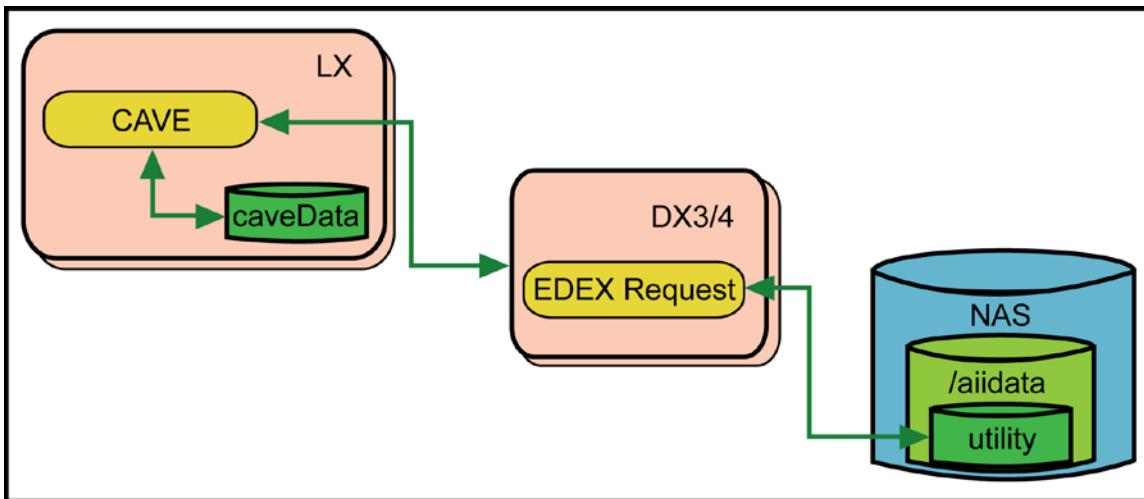


Exhibit 2.16-1. CAVE/Localization Store Interaction

As shown in Exhibit 2.16-1, the centralized Localization Store is accessed via the EDEX Request process. This access occurs when CAVE is started and as files for the site localization are modified. Prior to requesting a localization file, the cached copy in `caveData` is checked for currency; the file is requested from EDEX only if the cached copy is out of date. In that case, the file from the Localization Store overwrites the local copy.

Modification of a site's localization is performed using the Localization Perspective in CAVE. Any changes made using the Localization Perspective are propagated back to the Localization Store.

[**Note:** Do not manually modify files located under `caveData`; manual changes are not propagated to the Localization Store and will be overwritten when CAVE is restarted.]

2.16.1 AWIPS II Data Purging

In AWIPS II, Data Purging is performed in two separate scenarios: purging outdated data from Raw Data Storage; and purging outdated data from Processed Data Storage.

Data purging is covered in detail in Chapter 11 of this manual.

2.16.1.1 Purging Processed Data Storage

Purging of data from Processed Data Storage is performed by an EDEX Ingest process running on the DX3/4 cluster. The purge is triggered by a quartz timer event that fires at 30 minutes after each hour.

EDEX logs Data Purge events into a separate log; the purge log is named `edex-ingest-purge-yyyymmdd.log` where `yyyymmdd` is the date stamp of the log. For example, for June 10, 2011, the name of the purge log is `edex-ingest-purge-20110610.log`. Among the

purge events logged are the start and end of the purge. Because the EDEX Ingest process manages the purge, purge events may also log to the EDEX Ingest log.

EDEX uses a cluster locking mechanism that prevents both EDEX Ingest processes from performing the purge, although the purge may occur on either EDEX server. As a result, the EDEX Ingest logs on both DX3 and DX4 must be examined to verify purging and/or to identify purging problems.

Data purging is performed based on purging strategies defined for each data decoder in EDEX. A default, time-based purge strategy is provided for decoders that do not provide a purging strategy. Time-based purging is based on the reference time of the data. Determination of the reference time is decoder based. In the default purge strategy, all data more than 24 hours old at the time of the purge is deleted.

Purging rules are defined in XML files in the Localization Store on DX3/4. The purge rule files are located in the /awips2/edex/data/utility/edex_static file tree and follow the base/site localization pattern. The base purge rule files are located in base/purge under edex_static; the site purge rule files are located in site/XXX/purge under edex_static, where XXX is the site identifier, e.g., OAX.

The order of precedence for the purge rules is site – base – default; that is, site rules override base rules, which override default rules. When modifying a purge rule, the correct process is to copy the base file to the site purge rules folder and modify that copy.

Note that the purge rules folder is shared between DX3 and DX4 so the modification is performed on either DX3 or DX4 – not both. Note also that changes to the purge rules are only picked up by the EDEX Ingest process as it starts; when changes are made you will need to restart the EDEX Ingest process to update the rules.

Finally, when the EDEX Ingest process starts, it reads the purge rule files and updates the *purge_rules* table in the AWIPS II metadata database. This table can be queried to provide a quick look at the purge rules for any data decoder plug-in.

To see a list of the data plug-ins that have purge rules, perform the following:

1. Log into the AWIPS II database.
Enter: **psql -h dx1f -U awips -d metadata**
2. Query to determine the plug-ins in the *purge_rules* table.
Enter: **select distinct pluginname from purge_rules;**

To see a list of default purge rules, perform the following:

1. Log into the AWIPS II database.
Enter: **psql -h dx1f -U awips -d metadata**
2. Query to determine the default purge rules.
Enter: **select * from purge_rules where key='default';**

Note that the output in each row is rather long; a more readable list may be generated by replacing the “*” in the SQL *select* statement with *key,pluginname,delta,logonly,modtime,versionstokeep*.

To see a list of purge rules for a specific data decoder, e.g., satellite, perform the following:

1. Log into the AWIPS II database.

Enter: **psql -h dx1f -U awips -d metadata**

2. Query to determine the purge rules for the data decoder.

Enter: **select * from purge_rules where key='satellite';**

Again, the output in each row is rather long; a more readable list may be generated by replacing the “*” in the SQL *select* statement with *key,pluginname,delta,logonly,modtime,versionstokeep*.

To query for other data decoders, replace *satellite* in the SQL *select* statement with the desired data decoder plug-in name.

To verify the data purge, you need to look at the size of two directory structures on dx1f: the hdf5 data structure in /awips2/edex/data/hdf5; and the PostgreSQL table spaces in /awips2/data. One strategy for doing this is to set up a cron job to determine the space used in these two directory trees and write the results to a log file. This file can be examined periodically and should show generally stable disk usage over time. A simple script to perform this function:

```
#!/bin/bash
SPACE_DB=$(du /awips2/data -sh)
SPACE_HDF=$(du /awips2/edex/data/hdf5 -sh)
TIME_NOW=$(date "+%D %T")
echo "${TIME_NOW} DB: ${SPACE_DB} HDF5: ${SPACE_HDF}" >>
/tmp/space_usage.log
```

This script can be run approximately every 10 minutes to provide a good picture of disk space usage for Processed Data Storage. Note that it must be run by the *awips* user on the server running the a2dx1apps high-availability package.

2.16.1.2 Purging Raw Data Storage

Purging of data from Raw Data Storage is performed using the *scour* process which is part of LDM(D). The Raw Data Purge is controlled by a cron job which is part of the a2dx2apps high-availability package. (This cron job is defined in the a2dx2cron, which is staged in /etc/ha.d/cron.d on DX1 and DX2 and can be found in /etc/cron.d on the server running a2dx2apps.) The cron job is executed as the *ldm* user. The directories and retention times for Raw Data Storage are controlled by *scour.conf*, which is located in the etc subdirectory of the *ldm* user home directory dx2f.

Each row in *scour.conf* contains either two or three entries. The first entry is the directory to manage; the second entry is the retention time of the directory contents in days. When

present, the third entry specifies a file name pattern that is used to determine which files to delete; if no pattern is specified, all visible files are deleted. Files are deleted from the specified directory and all subdirectories. Note that *scour* may retain files that are older than the configured retention times. This will occur when the directory containing the files has not been modified (by writing a new file to the directory or its subdirectories) since the last execution of *scour*.

To determine/verify the Raw Data Storage purge schedule, log into dx2f as *root*, switch user to the *ldm* user, and list the cron table.¹ Perform the following:

1. Log into dx2f as *root*.
Enter: **ssh root@dx2f**
2. Change directory to the cron table directory (/etc/cron.d).
Enter: **cd /etc/cron.d**
3. List the cron table file (a2dx2cron).
Enter: **cat a2dx2cron**

Look for a cron table entry containing *ldmadmin scour*.

To determine the directories being managed by *scour*, log into dx2f as *root*, switch user to the *ldm* user and list the *scour.conf* file. Perform the following:

1. Log into dx2f as *root*.
Enter: **ssh root@dx2f**
2. Switch user to the *ldm* user.
Enter: **su - ldm**
3. Change directory into ~/etc.
Enter: **cd etc**
4. List the *scour.conf* file.
Enter: **cat scour.conf**

AWIPS II makes minimal use of Linux cron jobs for data processing. Instead, operations such as data purging, SmartInit, and other periodic data processing operations are triggered using quartz timer events. The quartz timer is a time-based event generator that is part of the Camel SOA infrastructure which underlies the EDEX processes. The quartz timer mechanism allows EDEX services to run at specified times. At the present time, the EDEX quartz timer events are configured internally to EDEX and are not configurable in the field.

AWIPS II uses heartbeat-managed cron jobs on the PX1/2 cluster and the DX1/2 cluster. The crons are staged in /etc/ha.d/cron.d and are installed into /etc/cron.d when activated. The files for the AWIPS II crons have “a2” as the initial characters of the file names – a2px1cron, a2px2cron, a2dx1cron, and a2dx2cron.

For additional information on cron usage in AWIPS II, see Chapter 11 of this manual.

¹ This can be performed in a single step using **ssh root@dx2f “cat /etc/cron.d/a2dx2cron”**.

Chapter 3

Individual User Accounts

Chapter 3. Individual User Accounts

Table of Contents

	<i>Page</i>
3.0 Introduction to Individual User Accounts	1
3.1 General Guidance on Individual User Accounts	1
3.2 Managing Individual User Accounts Using setupAwipsUser.sh.....	1
3.2.1 Creating a New User Account	2
3.2.2 Re-Create Desktop and ssh Keys for an Existing User Account.....	4
3.2.3 Removing an Existing User Account.....	6
3.3 High-Level View of setupAwipsUser.sh	7
3.4 Changing User or Device Password Using the Command Line	7
3.4.1 Password Rules	7
3.4.2 Change Non-Root Accounts	8
3.4.2.1 User Change to Password.....	8
3.4.2.2 Root Change to User Account Password	8
3.4.3 Change Root Password on Linux Devices.....	9
3.4.4 Change NAS CLI and Console Root Passwords	9
3.4.4.1 Change NAS CLI Root Account.....	9
3.4.4.2 Change NAS Console Root Account	11
3.4.4.3 Test CLI Root Password.....	12
3.5 Synchronizing SSH Keys with verifySSHkeys.sh.....	13
3.6 Synchronizing CRS SSH Keys with installCRSssh.sh.....	13
3.7 Recover from a Screensaver Lockout.....	16

3.0 *Introduction to Individual User Accounts*

Individual user accounts provide AWIPS users with a way to log in to AWIPS, use its resources, and provide system security for AWIPS. The AWIPS System Manager sets up individual user accounts. For each user, the same account will be used on both the graphics and the text workstations.

3.1 *General Guidance on Individual User Accounts*

User names should follow the convention <first initial><last name>, all lower case. If necessary, the last name should be truncated so that the user name is no more than eight characters long. Use an integer at the end of the user name if necessary to prevent duplication. Examples: **gbush**, **gbush2**, **gwashing**, **gwashin2**.

Account names must be:

- Eight or fewer characters
- Start with a letter
- Only lower case letters and numbers
- Unique.

User passwords should have the following characteristics:

- Contain at least six characters and no more than ten characters
- Include at least two alphabetic characters (either upper or lower case)
- Include at least one numeric (0 to 9) or special character (-, \$, %, &, *, _, +, =)
- Should not include the characters @, #, \ (backslash)
- Should not include a comma as the first character
- Should not be any version of the login name.

3.2 *Managing Individual User Accounts Using setupAwipsUser.sh*

You must use the script **/home/awipsadm/install/setupAwipsUser.sh**, rather than any system GUI or direct calls to command line utilities, to manage individual user accounts. This script can be used to add a new user, remove an existing user, and re-synch ssh for an existing user. This will ensure that the AWIPS workstation software is running in an environment that has been tested and which is supported by the NCF.

The general format of the **setupAwipsUser.sh** command is:

setupAwipsUser.sh <username> [SSH] [PROMPT|REMOVE|<user real name>]

Script options are displayed by executing the script with no options:

```
[root@dx1-ntcb install]# ./setupAwipsUser.sh
ERROR : please include a username as a parameter!

USAGE : /home/awipsadm/install/setupAwipsUser.sh <username> <SSH|RSH>
[PROMPT|REMOVE|<real name>]
    <username> can be up to 8 characters
    <SSH|RSH> must be either SSH to use Secure shell or RSH to use remote
shell
    use PROMPT as the third parameter to make the script interactive
    use REMOVE as the third parameter to disable a user created by this
script
    <real name> is the real name field for /etc/passwd [EXAMPLE: John E.
Doe,x8605]
                                it can be up to 9 space delimited strings

[root@dx1-ntcb install]#
```

3.2.1 Creating a New User Account

To create a new individual account for “George Washington,” log on to DX1 as user **root** and execute the following commands:

TYPE: cd /home/awipsadm/install

TYPE: ./setupAwipsUser.sh gwashing SSH "George Washington"

Note: The new user will be added to /awips/fxa/data/fxa-users, but the user will not be removed from this file when the account is removed from the system. Over time, this file will grow and will require manual trimming by the ESA or ITO.

```
[root@dx1-ntcb install]# ./setupAwipsUser.sh gwashing SSH George Washington
Checking that gwashing is not an existing administrator user name
/usr/local/bin/ssh test to lx1 passes!
We will use lx1 to populate desktop for new account...

Account name entered ----> gwashing

This is a new user account.
Real name entered ----> George Washington
User id entered ----> 127

Setting up account for gwashing...
*****
NOTE that you must create a password for gwashing!
Then execute /var/yp/ypmake on dx1.

As root on dx1:

prompt> passwd gwashing
prompt> /var/yp/ypmake

(gwashing is locked until a password is created.)
```

```
*****  
pushing out passwd changes via NIS...  
gmake[1]: Entering directory `/var/yp/ntcb.awips1'  
gmake[1]: `ypservers' is up to date.  
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'  
gmake[1]: Entering directory `/var/yp/ntcb.awips1'  
Updating passwdbyname...  
Updating passwd.byuid...  
Updating groupbyname...  
Updating group.bygid...  
Updating shadowbyname...  
Updating netidbyname...  
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'  
creating .cshrc for gwashing...  
creating .login for gwashing...  
creating .sawfishrc for gwashing...  
/home/awipsadm/install/GnomeLXdesktop.tar exists not recreating it!  
.gnome files  
.kde files  
fixing desktop files...  
Running install-gnome-kde.sh gwashing  
  
Creating gwashing desktop files...  
mv: cannot stat `./.gnome2/nutilus-scripts/D2D (lx) - TextWS (xt)': No such  
file or directory  
mv: cannot stat `./.gnome2/nutilus-scripts/AWIPS start-up menu': No such file  
or directory  
mv: cannot stat `./.gnome-desktop/zzzztemp\'s Home': No such file or directory  
mv: cannot stat `./.gnome2/nutilus-scripts/D2DlxTextWSxt': No such file or  
directory  
mv: cannot stat `./.gnome2/nutilus-scripts/AWIPSstartupmenu': No such file or  
directory  
mv: cannot stat `./.gnome-desktop/zzzztempHome': No such file or directory  
mv: cannot stat `./.kde/share/apps/konqsidebartng/entries/zzzztemp.desktop':  
No such file or directory  
tarring up new desktop and installing into /home/gwashing...  
  
Done creating gwashing desktop...  
  
Updating User's AWIPS Desktop Complete...  
setting up /usr/local/bin/ssh keys for gwashing...  
Making /home/gwashing/.ssh  
Generating public/private dsa key pair.  
Your identification has been saved in /home/gwashing/.ssh/id_dsa.  
Your public key has been saved in /home/gwashing/.ssh/id_dsa.pub.  
The key fingerprint is:  
b9:23:75:16:5f:70:fd:90:d1:c3:14:f9:c0:73:f8:65 root@dx1-ntcb  
chown: cannot access `/home/gwashing/.gnome/magicdev': No such file or  
directory  
Copying gwashing's .ssh dir to dx1:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to dx2:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to dx3:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to dx4:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to px1:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to px2:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to ax:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to lx1:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to lx2:/awips/.ssh/gwashing  
Copying gwashing's .ssh dir to lx3:/awips/.ssh/gwashing
```

```

Copying gwashing's .ssh dir to lx4:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to lx5:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt1:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt2:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt3:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt4:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt5:/awips/.ssh/gwashing
Adding gwashing to /awips/fxa/data/fxa-users on workstations...
Copying /awips/fxa/data/fxa-users to lx1-ntcb...
Copying /awips/fxa/data/fxa-users to lx2-ntcb...
Copying /awips/fxa/data/fxa-users to lx3-ntcb...
Copying /awips/fxa/data/fxa-users to lx4-ntcb...
Copying /awips/fxa/data/fxa-users to lx5-ntcb...
Copying /awips/fxa/data/fxa-users to xt1-ntcb...
Copying /awips/fxa/data/fxa-users to xt2-ntcb...
Copying /awips/fxa/data/fxa-users to xt3-ntcb...
Copying /awips/fxa/data/fxa-users to xt4-ntcb...
Copying /awips/fxa/data/fxa-users to xt5-ntcb...

done running setupAwipsUser.sh...
[root@dx1-ntcb install]#

```

3.2.2 Re-Create Desktop and ssh Keys for an Existing User Account

The script can be used to regenerate the desktop and ssh keys for an individual user. You will be prompted to continue.

```

[root@dx1-ntcb install]# ./setupAwipsUser.sh gwashing SSH George Washington
Checking that gwashing is not an existing administrator user name
/usr/local/bin/ssh test to lx1 passes!
We will use lx1 to populate desktop for new account...

Account name entered ----> gwashing

This user account already exists.
Ensuring gid, shell, and home dir are standard for gwashing...

pushing out passwd changes via NIS...
gmake[1]: Entering directory `/var/yp/ntcb.awips1'
gmake[1]: `ypservers' is up to date.
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'
gmake[1]: Entering directory `/var/yp/ntcb.awips1'
Updating passwd.byname...
Updating passwd.byuid...
Updating netid.byname...
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'
creating .cshrc for gwashing...
creating .login for gwashing...

This is an existing user - do you want to rebuild the desktop (y/n)?
y

setupdesktop=y
creating .sawfishrc for gwashing...
/home/awipsadm/install/GnomeLXdesktop.tar exists not recreating it!
  .gnome files
  .kde files
fixing desktop files...
Running install-gnome-kde.sh gwashing

```

```
Creating gwashing desktop files...
mv: cannot stat `./.gnome2/nautilus-scripts/D2D (lx) - TextWS (xt)': No such
file or directory
mv: cannot stat `./.gnome2/nautilus-scripts/AWIPS start-up menu': No such file
or directory
mv: cannot stat `./.gnome-desktop/zzztemp\'s Home': No such file or directory
mv: cannot stat `./.gnome2/nautilus-scripts/D2DlxTextWSxt': No such file or
directory
mv: cannot stat `./.gnome2/nautilus-scripts/AWIPSstartupmenu': No such file or
directory
mv: cannot stat `./.gnome-desktop/zzztempHome': No such file or directory
mv: cannot stat `./.kde/share/apps/kongsidebartng/entries/zzztemp.desktop':
No such file or directory
tarring up new desktop and installing into /home/gwashing...

Done creating gwashing desktop...

Updating User's AWIPS Desktop Complete...
setting up /usr/local/bin/ssh keys for gwashing...
Recreating /home/gwashing/.ssh
Generating public/private dsa key pair.
/home/gwashing/.ssh/id_dsa already exists.
Overwrite (y/n)? Your identification has been saved in
/home/gwashing/.ssh/id_dsa.
Your public key has been saved in /home/gwashing/.ssh/id_dsa.pub.
The key fingerprint is:
a8:7e:b0:8d:ee:dc:62:f3:c2:2e:e7:26:53:dd:f5:86 root@dx1-ntcb
chown: cannot access `/home/gwashing/.gnome/magicdev': No such file or
directory
Copying gwashing's .ssh dir to dx1:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to dx2:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to dx3:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to dx4:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to px1:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to px2:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to ax:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to lx1:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to lx2:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to lx3:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to lx4:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to lx5:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt1:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt2:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt3:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt4:/awips/.ssh/gwashing
Copying gwashing's .ssh dir to xt5:/awips/.ssh/gwashing
Adding gwashing to /awips/fxa/data/fxa-users on workstations...
Copying /awips/fxa/data/fxa-users to lx1-ntcb...
Copying /awips/fxa/data/fxa-users to lx3-ntcb...
Copying /awips/fxa/data/fxa-users to lx4-ntcb...
Copying /awips/fxa/data/fxa-users to lx5-ntcb...
Copying /awips/fxa/data/fxa-users to xt1-ntcb...
Copying /awips/fxa/data/fxa-users to xt2-ntcb...
Copying /awips/fxa/data/fxa-users to xt3-ntcb...
Copying /awips/fxa/data/fxa-users to xt4-ntcb...
Copying /awips/fxa/data/fxa-users to xt5-ntcb...

done running setupAwipsUser.sh...
```

3.2.3 Removing an Existing User Account

You will be prompted to enter REMOVE to continue. You will need to manually edit /awips/dfa/data/dfa-users and remove the account on every LX and XT workstation.

```
[root@dx1-ntcb install]# ./setupAwipsUser.sh gwashing SSH REMOVE
Checking that gwashing is not an existing administrator user name

WARNING : YOU ARE ABOUT TO DISABLE gwashing

ARE YOU SURE YOU WANT TO DISABLE gwashing?
enter REMOVE to continue:REMOVE

gwashing BEING DISABLED!

Using userdel on gwashing and then running ypmake
gmake[1]: Entering directory `/var/yp/ntcb.awips1'
gmake[1]: `ypservers' is up to date.
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'
gmake[1]: Entering directory `/var/yp/ntcb.awips1'
Updating passwd.byname...
Updating passwd.byuid...
Updating group.byname...
Updating group.bygid...
Updating shadow.byname...
Updating netid.byname...
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'
Removing gwashing from ax archiver authorized_keys2 file
Removing gwashing from ls ldd authorized_keys2 file

/home/gwashing is being backed up to /home/gwashing.SAVEOLDUSER

Removing gwashing's .ssh dir from dx1:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from dx2:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from dx3:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from dx4:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from px1:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from px2:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from ax:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from lx1:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from lx2:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from lx3:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from lx4:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from lx5:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from xt1:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from xt2:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from xt3:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from xt4:/awips/.ssh/gwashing
Removing gwashing's .ssh dir from xt5:/awips/.ssh/gwashing

gwashing DISABLED!

[root@dx1-ntcb install]#
```

3.3 *High-Level View of setupAwipsUser.sh*

A high-level view of what the `setupAwipsUser.sh` script does follows. For further details, please review the script itself.

- Prompts for certain information unless that information is provided on the command line (new user's real name [e.g., George J. Washington], account name [e.g., **gwashing**], etc.).
- Creates a new account with shell **/bin/csh** (you can specify **ksh** if your site is an RFC), group **fxalpha** (group ID 200), and home directory in **/home**. It also creates the new home directory.
- Creates the new user's **.cshrc** file. The **.cshrc** will source **\$FXA_HOME/.cshrc**.
- Creates the new user's **.login** file. The **.login** file will call **xhost** to allow processes running on the server to pop up windows on the user's display.
- Creates a **.sawfishrc** file for the new user. The **.sawfishrc** file will cause F11 key presses or left-clicks on the background (root) window to post the AWIPS menu.
- Installs and configures various Gnome, Sawfish, .KDE and other setup files and directories to ensure that the user has a standard environment that will work on the AWIPS three-headed graphics workstation and on the text workstation.
- Generates and installs SSH keys so that scripts running under the user's account can transfer files and execute commands remotely.
- Adds the new user name to the D-2D user list maintained in **/awips/fxa/data/fxa-users**.

NOTE: You can also use **setupAwipsUser.sh** to reconfigure an existing account for use with AWIPS software. The account's environment files will be overwritten, its home directory may be changed, and its group ID may be changed.

The **setupAwipsUser.sh** script has a number of other options. Please see the header documentation in the script for a description of them.

3.4 *Changing User or Device Password Using the Command Line*

3.4.1 *Password Rules*

User names and device passwords can be changed/updated using a Terminal window and Linux commands. The `/etc/passwd` file should be the same on all devices. User passwords should have the following characteristics:

- Contain at least six characters and no more than 10 characters
- Include at least two alphabetic characters (either upper or lower case)
- Include at least one numeric (0 to 9) or special character (-, \$, %, &, *, _, +, =)

- Should not include the characters @, #, \ (backslash)
- Should not include a comma as the first character
- Should not be any version of the login name.

3.4.2 Change Non-Root Accounts

User accounts are controlled through NIS and can be updated by the user or by root.

3.4.2.1 User Change to Password

From a workstation, the user can update their NIS controlled password with the **yppasswd** command.

```
lx1-ntcb{gwashing}102: yppasswd
Changing NIS account information for gwashing on dx1-ntcb.
Please enter old password:
Changing NIS password for gwashing on dx1-ntcb.
Please enter new password:
Please retype new password:

The NIS password has been changed on dx1-ntcb.

lx1-ntcb{gwashing}103:
```

The user can test their change by performing an **su** to his or her account.

```
lx1-ntcb{gwashing}105: su - gwashing
Password:
lx1-ntcb{gwashing}101:
```

3.4.2.2 Root Change to User Account Password

The superuser can change a user account password by updating /etc/shadow on the NIS master server (dx1) with the **passwd** command then updating the NIS shadow file with **/var/yp/ypmake**.

```
[root@dx1-ntcb ~]# passwd gwashing
Changing password for user gwashing.
New UNIX password:
Retype new UNIX password:
NIS password could not be changed.
passwd: all authentication tokens updated successfully.

[root@dx1-ntcb ~]# /var/yp/ypmake
gmake[1]: Entering directory `/var/yp/ntcb.awips1'
gmake[1]: `ypservers' is up to date.
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'
gmake[1]: Entering directory `/var/yp/ntcb.awips1'
Updating shadowbyname...
Updating netidbyname...
gmake[1]: Leaving directory `/var/yp/ntcb.awips1'
[root@dx1-ntcb ~]#
```

3.4.3 Change Root Password on Linux Devices

The root account is not under NIS control so the root password must be changed on every AWIPS device. To change root password on the Linux devices, log in to each (LX, AX, DX, and PX) separately as root. A simple loop at the shell prompt from the dx1 is a fast way to change the root password. **Tip:** You can speed up the process further by typing the root password at the command line prompt, highlight it with your mouse and then press the middle mouse button when prompted for the root password.

```
[root@dx1-ntcb ~]# for i in $DX_SERVERS $PX_SERVERS ax cpsbn1 cpsbn2
$LX_WORKSTATIONS $XT_WORKSTATIONS
> do
> echo $i
> ssh $i passwd root
> echo
> done
dx1-ntcb
New UNIX password:
Retype new UNIX password:
Changing password for user root.
passwd: all authentication tokens updated successfully.

dx2-ntcb
New UNIX password:
...
```

3.4.4 Change NAS CLI and Console Root Passwords

The NAS root account must be changed for both the console and CLI mode.

3.4.4.1 Change NAS CLI Root Account

From a workstation, ssh to the ATS as root and start the ts_menu. The ATS root password is “access”.

[Note: The output that follows is ats1 from dx1-tbdw.]

```
[root@dx1-tbdw ~]# ssh root@ats1
Password: <access>
[root@ats1 root]# ts_menu
```

Select option 8 from the ATS menu to connect to the NAS.

```
Serial Console Server Connection Menu for your Master Terminal Server

 1 DX1          2 DX2          3 DX3          4 DX4
 5 PX1          6 PX2          7 AX           8 NAS
 9 02-b6-65P9   10 02-b6-65P10  11 PSW          12 DMZ
13 ROUTER1     14 ROUTER2     15 HSW1         16 HSW2
17 FW1          18 FW2          19 VIR          20 ADTRAN1
21 LX1          22 LX2          23 LX3          24 LX4
25 02-b6-65P25 26 02-b6-65P26  27 02-b6-33P27 28 02-b6-65P28
29 02-b6-65P29 30 02-b6-65P30  31 XT1          32 XT2
33 XT3          34 XT4          35 XT5          36 02-b6-65P36
37 CPSBN        38 CPSBN2       39 M&C_modem   40 DX1-DAS
41 DX2-DAS      42 02-b6-65P42  43 02-b6-65P43 44 02-b6-65P44
45 02-b6-65P45 46 02-b6-65P46  47 OPEN         48 OPEN

Type 'q' to quit, a valid option[1-48], or anything else to refresh : 8

Entering character/text Mode
Escape character is ^]
```

If you see -> or **SUNSP00144F793780 login:** then you are already at the CLU prompt. If you see the NAS Console prompt **nas1-<site>** then type <Shift><Esc><9> to stop the NAS Console.

```
nas1-ntca > <Shift><Esc><9>
Serial console stopped.
->
```

Change the CLI root password by typing **set /SP/users/root password**. You will be prompted twice to enter the new password.

```
-> set /SP/users/root password
Changing password for user /SP/users/root...
Enter new password: *****
Enter new password again: *****
New password was successfully set for user /SP/users/root
```

After you have successfully changed the NAS root password, restart the NAS console by typing **start /SP/console** then press Enter twice.

```
-> start /SP/console
Are you sure you want to start /SP/console (y/n)? y
Serial console started. To stop, type ESC (
<Enter><Enter>
```

3.4.4.2 Change NAS Console Root Account

Change the NAS root password at the Console prompt by typing “password”. You will be prompted twice to enter the new password.

```
nas1-ntca > password
Changing password for admin
<CR> to abort, * to clear password
enter new password for admin      : *****
enter again to confirm          : *****
password changed
nas1-ntca > 02/07/11 19:43:53 I Environment saved.
```

When you have successfully changed the NAS root password, exit the NAS telnet connection by typing <Ctrl><]> then “e” to exit.

```
nas1-ntca > ^
Console escape. Commands are:
l      go to line mode
c      go to character mode
z      suspend telnet
b      send break
t      toggle binary
e      exit telnet
e
```

Exit the ATS menu by typing “q”, then type “exit” to close the ats1 connection. [Note: The output that follows is ats1 from dx1-tbdw.]

```
Serial Console Server Connection Menu for your Master Terminal Server

 1 DX1           2 DX2           3 DX3           4 DX4
 5 PX1           6 PX2           7 AX            8 NAS
 9 02-b6-65P9   10 02-b6-65P10  11 PSW          12 DMZ
13 ROUTER1      14 ROUTER2      15 HSW1         16 HSW2
17 FW1          18 FW2          19 VIR          20 ADTRAN1
21 LX1          22 LX2          23 LX3          24 LX4
25 LX5          26 02-b6-65P26   27 02-b6-65P27   28 02-b6-65P36
29 02-b1-33P29 30 02-b1-33P30   31 XT1          32 XT2
33 XT3          34 XT4          35 XT5          36 02-b6-65P36
37 CPSBN1       38 CPSBN2       39 M&C_modem   40 DX-DAS
41 DX2-DAS      42 02-b6-65P43   43 02-b6-65P43   44 02-b6-65P44
45 02-b6-65P45 46 02-b6-65P46   47 OPEN          48 02-b1-OPEN

Type 'q' to quit, a valid option[1-48], or anything else to refresh : q
[root@ats1 root]# exit
logout
Connection to ats1 closed.
```

3.4.4.3 Test CLI Root Password

Perform step 1 to connect to the NAS and stop the Console. At the CLI prompt, type “**exit**” to close the CLI session. You should see the “SUNSP00144F793780 login:” prompt.

```
-> exit
SUNSP00144F793780 login:
```

Login to the NAS using the new root password. If you are successful you will see the CLI prompt.

```
SUNSP00144F793780 login: root
Password:

Sun(TM) Integrated Lights Out Manager
Version 1.1.1

Copyright 2006 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

->
```

Restart the NAS Console by typing “start /SP/console”. Perform step 2 to disconnect from the NAS.

```
-> start /SP/console  
Are you sure you want to start /SP/console (y/n)? y  
Serial console started. To stop, type ESC (   
nas1-ntcb >
```

3.5 Synchronizing SSH Keys with *verifySSHkeys.sh*

The VerifySSHkeys.sh script sets up and synchronizes every account's keys across every machine on the platform so that when you log in to any machine, it recognizes your keys. Since it recognizes your keys, you don't need a password between machines. Please Note: After running verifySSHkeys.sh the fxa user keys must be re-synchronized with CRS using installCRSssh.sh

On PX1 as root,

TYPE: `cd /home/awipsadm/ssh`

TYPE: `./VerifySSHkeys.sh`

NOTE: Please make sure that no users are logged on to other servers. Also note that it will take up to 10 minutes to execute this script.

3.6 Synchronizing CRS SSH Keys with *installCRSssh.sh*

This installCRSssh script is used only at sites with Console Replacement System [CRS]. AWIPS products configured to be sent to CRS are transferred via ssh. In order to facilitate this communication, AWIPS ssh keys for the fxa user must be installed on the CRS system. Please use caution! Without the correct configuration, NWR messages in AWIPS will not be sent to CRS.

The installCRSssh script will prompt for the root password on the CRS systems twice. The script assumes the root password is the same on 0mp and 5mp. If the passwords are different, then either change the root password on the CRS system to match, or contact the NCF for assistance.

The script will then copy over the fxa key to 0mp and 5mp. It will also copy back the rsa key for 0mp and 5mp, and install it in the known_hosts on each AWIPS device.

Note: If any keys are ever regenerated, such as running VerifySshKeys.sh, or VIP keys on CRS, then the installCRSssh.sh script must be run again.

For future maintenance of the AWIPS to CRS connection, provide the root password of 0mp and 5mp to the NCF.

As user root on **DX1**, follow the procedure below.

```
TYPE: script -a -f /local/install/installCRSkeys.out
TYPE: cd /home/awipsadm/ssh
TYPE: ./installCRSssh.sh (Takes about 2 minutes.)
TYPE: exit
```

Verify that the script worked correctly. As user fxa on **DX1**, type the following commands:

```
ssh crs@0mp uname -a
ssh crs@5mp uname -a
```

The commands should succeed without being prompted to enter either ‘yes’ or a password.

The commands should work on any device as user fxa. If problems are encountered, contact the NCF for assistance.

```
[root@dx1-ntcb ssh]# ./installCRSssh.sh
Starting CRS SSH Key setup, Wed Mar  9 14:17:30 GMT 2011
Compiling CRS authorized_keys file...
Spawning process for CRS host and user keys...
Please type in root password for 0MP and 5MP and press enter:
Verify password and press enter:

Attempting to contact 0MP...
spawn scp crs@0MP:/usr/local/etc/ssh_host_rsa_key.pub /tmp/crs_0MPkey
crs@0mp's password:
ssh_host_rsa_key.pub                                         100%  218
  0.2KB/s   00:00

0MP completed!

Attempting to contact 5MP...
spawn scp crs@5MP:/usr/local/etc/ssh_host_rsa_key.pub /tmp/crs_5MPkey
crs@5mp's password:
ssh_host_rsa_key.pub                                         100%  218
  0.2KB/s   00:00

5MP completed!

Attempting to contact 0MP...
spawn scp /tmp/crs_userkey crs@0MP:

crs@0mp's password:
crs_userkey                                                 100% 1804
  1.8KB/s   00:00
spawn telnet 0MP
Trying 165.92.107.241...
Connected to 0MP.
Escape character is '^].
SCO UnixWare 7.1.1 (0MP) (pts/5)
```

```
login: crs
Password:
UnixWare 7.1.1
OMP
OMP{crs} su - root -c 'cp /crs/.ssh/authorized_keys
/crs/.ssh/authorized_keys.bak'
Password:
OMP{crs} su - root -c 'cat /crs/crs_userkey >> /crs/.ssh/authorized_keys'
Password:
OMP{crs} exit
Connection closed by foreign host.

OMP completed!

Attempting to contact 5MP...
spawn scp /tmp/crs_userkey crs@5MP:
crs@5mp's password:
crs_userkey                                         100% 1804
    1.8KB/s   00:00
spawn telnet 5MP
Trying 165.92.107.242...
Connected to 5MP.
Escape character is '^]'.
login: crs
Password:
UnixWare 7.1.1
5MP
5MP{crs} su - root -c 'cp /crs/.ssh/authorized_keys
/crs/.ssh/authorized_keys.bak'
Password:
5MP{crs} su - root -c 'cat /crs/crs_userkey >> /crs/.ssh/authorized_keys'
Password:
5MP{crs} exit
Connection closed by foreign host.

5MP completed!
Editing AWIPS hosts ssh_known_hosts files...
ax done
cpsbn1 done
cpsbn2 done
dx1-ntcb done
dx2-ntcb done
dx3-ntcb done
dx4-ntcb done
lx1-ntcb done
lx2-ntcb done
lx3-ntcb done
lx4-ntcb done
lx5-ntcb done
px1-ntcb done
px2-ntcb done
xt1-ntcb done
xt2-ntcb done
xt3-ntcb done
xt4-ntcb done
xt5-ntcb done
ls2 done
ls3 done
Finished with CRS SSH Key setup, Wed Mar  9 14:18:36 GMT 2011
[root@dx1-ntcb ssh]#
```

```
dx1-ntcb{fxa}9: ssh crs@0mp uname -a
UnixWare 0MP 5 7.1.1 i386 x86at SCO UNIX_SVR5
dx1-ntcb{fxa}10:
dx1-ntcb{fxa}10: ssh crs@5mp uname -a
UnixWare 5MP 5 7.1.1 i386 x86at SCO UNIX_SVR5
dx1-ntcb{fxa}11:
```

3.7 *Recover from a Screensaver Lockout*

If a locking screen saver is running on a workstation and the password holder is not available, there are two ways to bring the workstation back into service:

- Kill the X server and thereby force a logout.

TYPE: [Ctrl][Alt][Backspace]

- The X server and all its clients (D2D, for example) will be killed. In a few seconds you will have a new login screen.

NOTE: This method is strongly discouraged for routine logouts because it may cause problems with the AWIPS application software (undeleted temporary files, open socket connections, etc.). All currently known cases where an abnormal exit causes future problems have been fixed, but it is impossible to test for every situation.

- Kill the screen saver.

If a locking screen saver is running on an AWIPS workstation, there will be one or more processes called **xscreensaver** running. If you log into the locked workstation from another workstation and kill all of those processes, the screen savers will disappear and you will be able to continue with the login session that was previously locked.

The **xscreensaver** processes are owned by the account that logged in to the workstation. You can kill them only if you are logged in on that account or on the **root** account. Effectively, that means that only **root** can use this method, because if you could log in to the user account with the password you could unlock the screen saver in the normal way.

The locking screen saver is meant to serve a security purpose. A **root** user who kills the **xscreensaver** processes is defeating that purpose. A locked screen saver should not be killed except in cases of operational necessity.

Chapter 4

Data Flow Overview

Chapter 4: Data Flow Overview

Table of Contents

	<i>Page</i>
4.0 Data Flow Overview	1
4.1 AWIPS Satellite Broadcast Network and Local Data Grids.....	1
4.1.1 AWIPS Satellite Broadcast Network	1
4.1.2 Local Data Grids	3
4.2 WSR-88D/Terminal Doppler Weather Radar (TDWR) Network	3
4.3 Local Data Processes	3
4.4 Data Routing Overview	4
4.5 Configuration Files	10
4.5.1 LDM Configuration	10
4.5.2 EDEX Data Distribution Files	10
4.5.2.1 Potential Problems.....	12
4.6 Monitoring Data Ingest.....	13
4.6.1 Edex Log Types	13
4.6.2 Edex Log Format	15
4.7 General Monitoring of the EDEX system.....	17
4.7.1 Edex Log Event Levels.....	19
4.8 Monitoring the LDM Data Flow.....	20
4.9 Product Identifier	25
4.10 Qpid.....	27

List of Exhibits

Exhibit 4.3-1. Code Sharing in AWIPS II	4
Exhibit 4.4-1. AWIPS II Servers Overview.....	5
Exhibit 4.4-2. LDM Data Flow.....	6
Exhibit 4.4-3. Radar Data Flow	9

List of Tables

Table 4.3-1. AWIPS II Software Functional Groups.....	4
---	---

4.0 Data Flow Overview

The AWIPS data management system is responsible for the storage, retrieval, and maintenance of meteorological data sets. The various hardware and software components of this system handle data from two primary sources: the AWIPS Satellite Broadcast Network (SBN) and the WSR-1988 Doppler Weather Radar (WSR-88D) network.

4.1 AWIPS Satellite Broadcast Network and Local Data Grids

4.1.1 AWIPS Satellite Broadcast Network

The main source of nationally distributed data for AWIPS is the SBN. Hardware components unique to the SBN include the demodulators, the communications processors (CPSBN1 and CPSBN2), and the visible infrared (VIR) switches, which connect the digital video broadcast (DVB) receivers to the communications processor SBNs (CPSBN). Refer to Exhibits 2.2-1, 2.2-2, and 2.2.1-1 in Chapter 2.

Descriptions of the four channels follow.

1. **GOES.** The GOES Channel contains information from the GOES East and the GOES West satellites. The GOES East satellite is a data stream consisting of the following imagery products: visible infrared; and water vapor for the Eastern Conterminous United States (CONUS), Puerto Rico, supernational composites, and Northern Hemisphere (NH) composites. The GOES West satellite is a data stream consisting of the following imagery products: visible infrared and water vapor for CONUS, Alaska, and Hawaii as well as supernational composites, and NH composites.
2. **NMC.** From the NWS Telecommunications Gateway (NWSTG), a data stream consisting of model output from the National Centers for Environmental Prediction (NCEP); the observations, forecasts, watches and warnings produced by NWS Forecast Offices; WSR-88D radar products; and most observational data over North America.
3. **NMC2.** The NWSTG2 channel supplements the NWSTG channel. It contains all Model Grid data.
4. **NOAAPORT_OPT Channel.** This channel's data stream includes GOES DCP data, GMS/GOES-West/GOES-East/METEOSAT-5/METOSAT-7 composites for visible infrared, and water vapor products (every 3 hours), and OCONUS grids.

Each channel requires its own demodulator.

Under normal conditions, both NWSTG and NMC2 products and GOES satellite images are obtained from the SBN on CPSBN1. The CP ingest is controlled by the cp1f heartbeat package.

```
[root@cpsbn1-ntcb ~]# s300_stats
cpsbn1-ntcb pid[1511] upd/rfsh(0/30s) GMT Thu Dec 15 22:29:30 2011
                                         Start [Thu Dec 15 22:29:30]
```

	LAST 1 sec	START AVG	MAX	MIN
EBNO (per NEST)	13.24	13.24	13.24	13.24
VBER	0.00e+00	0.00e+00	0.00e+00	0.00e+00
EBNO (per VBER)	10.00	10.00	10.00	10.00
Signal	60%	60%	60%	60%
RFStatusValid:	OK	LOCK Signal:	OK	Data: OK
Tot Unlock Signal/Data:	0.0/0.0	secs		
Uncorrected DVB Pkts:	0	{+0 last}		
LAN Packets:	Rcv=0	XmitErr=0	Drop=0	Xmit=502
IP:10.0.5.10	MAC:00-06-76-05-00-69	Port:6516	(via eth1)	Mode: DVBS2
Firmware 2.7 - RF Code(0x0)				
SymbolRate=15.119 Ms/s	Freq=1154 MHz	(+177 kHz)	Modulation Code[13]=2/3	
8PSK				
LNB_Power[0]=OFF				
PID_List:	101	102	103	104
FreqOff[0xb1]	Signal Strength (in DBM)[-45]	C/N=15.9	EbNo=13.2	
dvb_stats:	End execute			

A more detailed discussion of the basic data flow follows (see section 4-4). In the case of failover, initial download of these products shifts to CPSBN2. Refer to Chapter 18, Failover Management Procedures, for detailed information.

The vast majority of products on the SBN can be used without restriction. However, there are three exceptions: binary lightning; ACARS (Aircraft Communications Addressing and Reporting System); and one-degree ECMWF (European Centre for Medium-Range Weather Forecasts) products. Use of these three products is restricted to official duties, which include data utilization for the purposes of analysis/warning/forecast product preparation, research projects, and training. In general, these three products may not be redistributed to parties outside of NWS, especially on a routine or ongoing basis.

Concerning the one-degree resolution ECMWF grids, the following should also be noted:

- First, redistribution of one-degree (high resolution) ECMWF grids from AWIPS is prohibited. This limitation is formalized in a 2007 NOAA/ECMWF inter-agency agreement. The one-degree (i.e., "Hi Res") ECMWF grids in AWIPS are intended for use only in the conduct of official duties within NWS offices and at designated AWIPS test and support sites (such as AWIPS support contractor test beds and the OAR/Global Systems Division AWIPS node). ECMWF products – and products that are directly and exclusively derived from them – may not be accessed from AWIPS for provision to third parties.
- Second, the ECMWF grids should be considered "data of opportunity." By that it is meant that the availability and timeliness of the ECMWF grids could, at times, be somewhat inconsistent or inferior (i.e., relative to other scheduled NOAA operational products). The potential for somewhat-degraded availability and timeliness is related to the external nature of the data source (i.e., the European Center) and the characteristics of some of the intermediate product dissemination legs.

4.1.2 Local Data Grids

Several gridded data sets are produced on the local AWIPS system rather than being received across the AWIPS SBN:

- GFE: Graphical Forecast Editor
- MPE: Multisensor Precipitation Estimator
- HPE: High-resolution Precipitation Estimator.

4.2 WSR-88D/Terminal Doppler Weather Radar (TDWR) Network

The WSR-88D and Terminal Doppler Weather Radio (TDWR) radar networks plus a few additional Federal Aviation Administration (FAA) radar sites provide additional data sources for AWIPS. Most sites receive their radar data via TCP/IP; the others have dedicated modems. The hardware components involved in radar acquisitions include the Open Radar Product Generator (ORPG), the Supplemental Product Generator (SPG), the radar modems, and the VIR switches that connect the modems to the Synchronous Communication Processors (CPSYNC).

For sites that receive radar data via TCIP/IP, the data enters AWIPS from the ORPG and the SPG via the AWIPS LAN.

For sites that acquire radar data via dedicated modems, CPSYNC1 handles the radar data stream, while CPSYNC2 sits idle. The VIR switches allow the radar data stream to be switched from one CP to the other in the event of a hardware failure. Refer to Chapter 18, Failover Management Procedures, for detailed information.

Note: The AWIPS 2 RadarServer currently only supports "dialing" in the sense that it can make Class 2 connections over TCP/IP (i.e., the AWIPS WAN). Actual X.25-over-modem dial-up is not supported.

4.3 Local Data Processes

AWIPS II software is broadly separated into two components: the Common AWIPS Visualization Environment (CAVE) and the Environmental Data EXchange (EDEX).

- CAVE provides an integrated set of tools for data visualization and manipulation.
- EDEX supports data acquisition, decoding, storage, and preprocessing. Both CAVE and EDEX utilize a plug-in architecture to support flexible deployments. All AWIPS II components are Eclipse Rich Client Platform (RCP) plug-ins; thus all AWIPS II components utilize a standard organizational structure. This enables code sharing between CAVE and EDEX.

Most data processing in AWIPS II requires both an EDEX component for decoding, processing, and storing the data and a CAVE component for retrieving, rendering, and manipulating the data. As a result, processing for each data type is generally separated into three parts: 1) a data decoder bundled with EDEX; 2) a rendering component bundled with CAVE; and 3) a common library bundled with both CAVE and EDEX. This three-part approach to data processing is illustrated in Exhibit 4.3-1.

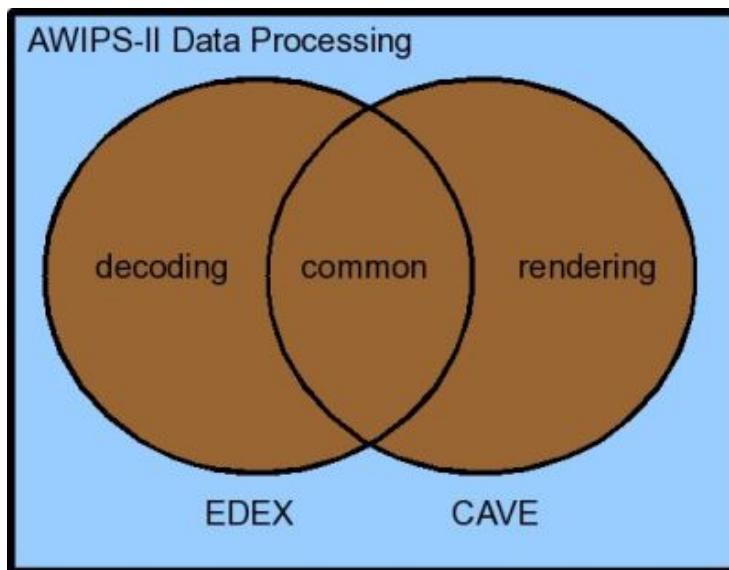


Exhibit 4.3-1. Code Sharing in AWIPS II

As a consequence of the architectures chosen, a breakdown of AWIPS II into traditional Computer Software Configuration Items (CSCI) is problematical. A more productive approach is to look at functional groupings of software. Table 4.3-1 contains the mapping of the AWIPS II software into functional groups. This table illustrates how CAVE and EDEX fit into the general Software Functional Group.

Table 4.3-1. AWIPS II Software Functional Groups

Functional Group	Description
Installer Projects	Provide support for build component distribution installers for AWIPS II.
Software Build Projects	Provide support for building major software systems.
Static Data Projects	Include static data files, base configuration files, and standard Python scripts.
EDEX Infrastructure Projects	Provide basic Service Oriented Architecture (SOA) infrastructure for EDEX. Also provide some shared (library) projects.
EDEX Data Decoder Projects	Provide EDEX data decoding functionality.
EDEX/AWIPS Interface Projects	Provide runtime interfaces between EDEX and AWIPS software.
EDEX/CAVE Common Projects	Provide a library of functionality and interfaces common to both CAVE and EDEX.
CAVE Core Projects	Provide basic CAVE infrastructure.
CAVE Plug-in Projects	Provide CAVE data rendering functionality.
FOSS Projects	Provide standard versions of FOSS software used to support AWIPS II.

4.4 Data Routing Overview

Exhibit 4.4-1 illustrates the four DX servers, two PX servers, two CPs, DAS, NAS, and the workstations. For clustering information, refer to Chapter 2.

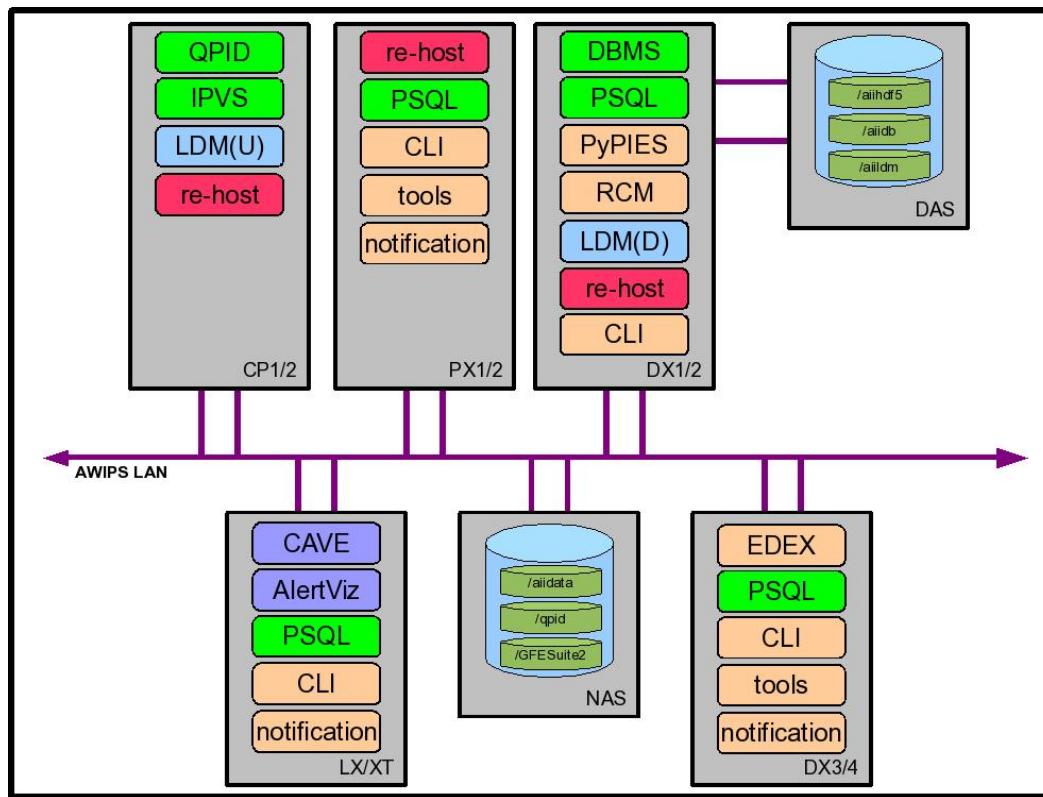


Exhibit 4.4-1. AWIPS II Servers Overview

The LDM data flow, illustrated in Exhibit 4.4-2, is a 12-step process. Descriptions of each step follow the exhibit.

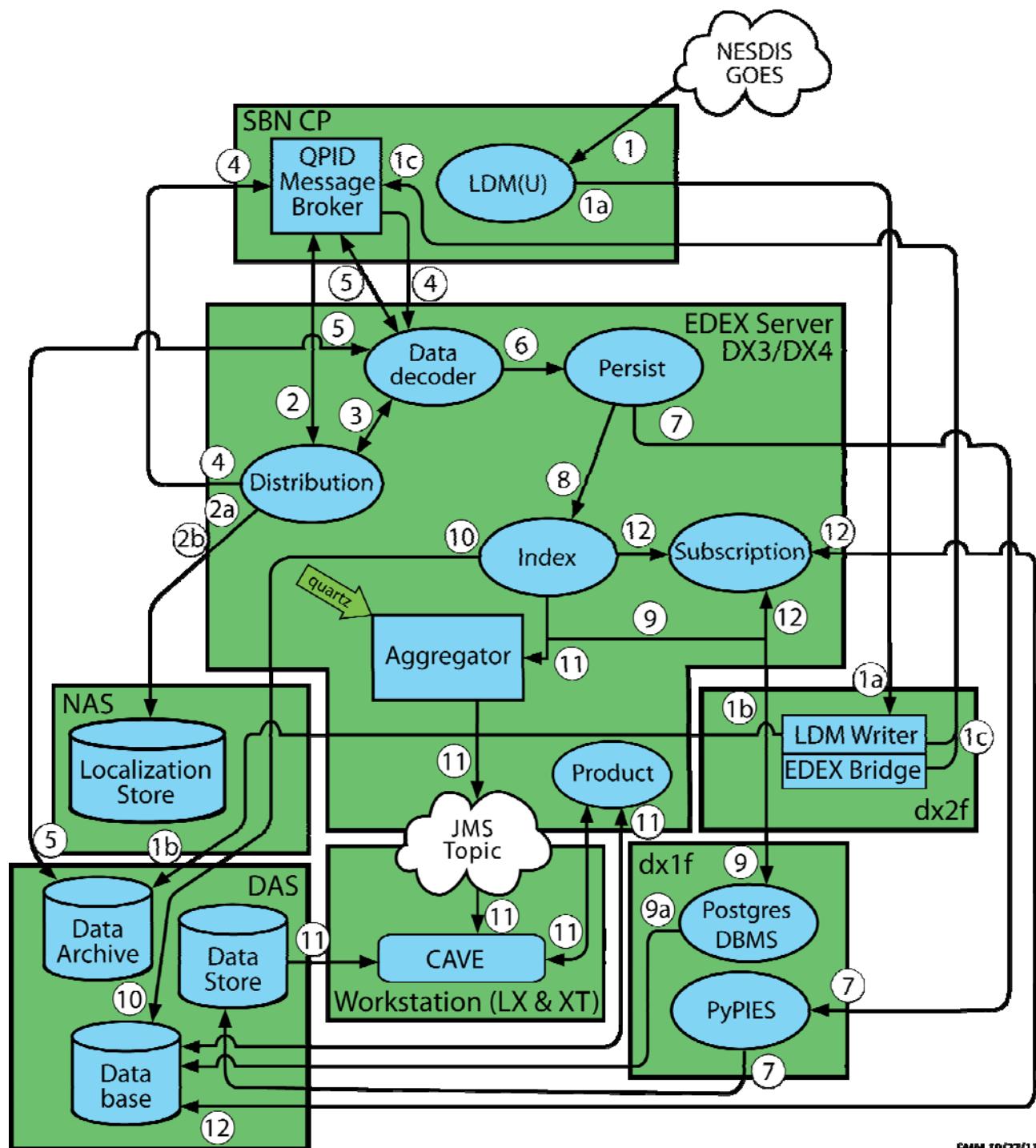


Exhibit 4.4-2. LDM Data Flow

1. Data is obtained by the LDM from the SBN.
 - a. The LDM forwards the product to the LDM Writer instance.
 - b. The LDM Writer instance writes the product to the Data Archive.

- c. The LDM writer instance uses the EDEX Bridge to post a message containing product information to the QPID Message Broker. The product information is the WMO header and the path to the product file.
2. The EDEX Distribution endpoint obtains the WMO (World Meteorological Organization) header for the product file identified by the message. The WMO header is matched against data distribution mappings contained in the data distribution directory to determine product routing. (The WMO header is usually included in the message; if it is not, the Distribution service uses the product file name from the message to determine routing.)

Note: The files in the data distribution directory are XML (eXtensible Markup Language) files that contain regular expressions which match WMO headers with the appropriate data decoder plug-in.

- a. At EDEX startup, the EDEX Distribution endpoint reads the Data Distribution files from the Data Distribution directory in the Localization Store. It uses the contents of these files to generate the routing table used to determine data routing. The Data Distribution directory is located at /awips2/edex/data/utility/edex_static/base/distribution.
- b. The EDEX Distribution endpoint monitors the Data Distribution directory; when a file in that directory is modified, it rereads that file and rebuilds its routing table.
3. The EDEX Distribution Service determines the Data Decoder Plug-In registered to handle the data in the product file.
4. The EDEX Distribution Service forwards the message to the appropriate Data Decoder Plug-In via the QPID Message Broker.
5. The EDEX Data Decoder Service on the EDEX (DX) cluster pulls the message from the QPID Message broker. The Data Decoder Service reads the file pointed to by the message, decodes the data, and determines the appropriate metadata.
6. The decoded data and metadata are sent to the EDEX Persist endpoint.
7. The EDEX Persist endpoint sends the data to PyPIES and PyPIES writes the data to the EDEX data store in HDF5 format.
8. The EDEX Persist endpoint sends the metadata obtained to the EDEX Index endpoint.
9. The EDEX Index endpoint sends the metadata to the PostgreSQL DBMS.
 - a. The PostgreSQL DBMS writes the metadata to the database.
10. The index endpoint does not merely get the dataURI; it also persists the data object to the database. Persistence to the database is executed via a plug-in defined data access object. If the data access object does not override the persistence behavior, then a default persistence strategy is used. The default strategy for persisting data to the database is to first check to see if the data received already exists. If it already exists,

then persistence to the database is not attempted for that data. If the data is unique, then it is persisted to the database.

11. (Client notification) The Data URI is forwarded to the EDEX URI Aggregator.
 - a. Every 5 seconds the aggregated Data URIs are sent to the JMS Alert Topic.
 - b. CAVE monitors the JMS Alert Topic to obtain a list of available data. CAVE determines if it should render the available data.
 - c. CAVE retrieves metadata from the EDEX server via a product query sent to the EDEX thrift endpoint.
 - d. CAVE retrieves product data from the EDEX server by accessing the EDEX data store's HDF5 files and CAVE renders the data, updating its display as appropriate.
12. (Subscription) The Data URI is forwarded to the EDEX Subscription endpoint. (This does not apply to Satellite Data Flow)
 - a. The EDEX Subscription endpoint checks the active subscription list to determine if a subscription has been registered for the product.
 - 1) If no subscription has been registered for the product, no further action is taken.
 - b. The EDEX Subscription endpoint obtains the script information from the database.
 - c. The EDEX Subscription endpoint obtains a micro-engine to execute the script. The micro-engine executes the subscription script for the product.

It is important to note that some, but not all, Radar Products follow a slightly different ingest path. This path is shown in Exhibit 4.4-3. The main differences are as follows:

- The Radar Server on the Database (DX) cluster obtains a Radar product from the ORPG.
- The Radar Server writes the product to the Data Archive.
- The Radar Server posts a message containing product information to the QPID Message Broker.

NOTE: Refer to Chapter 7, Ingest of Radar Data, for a more detailed explanation of the Radar data flow.

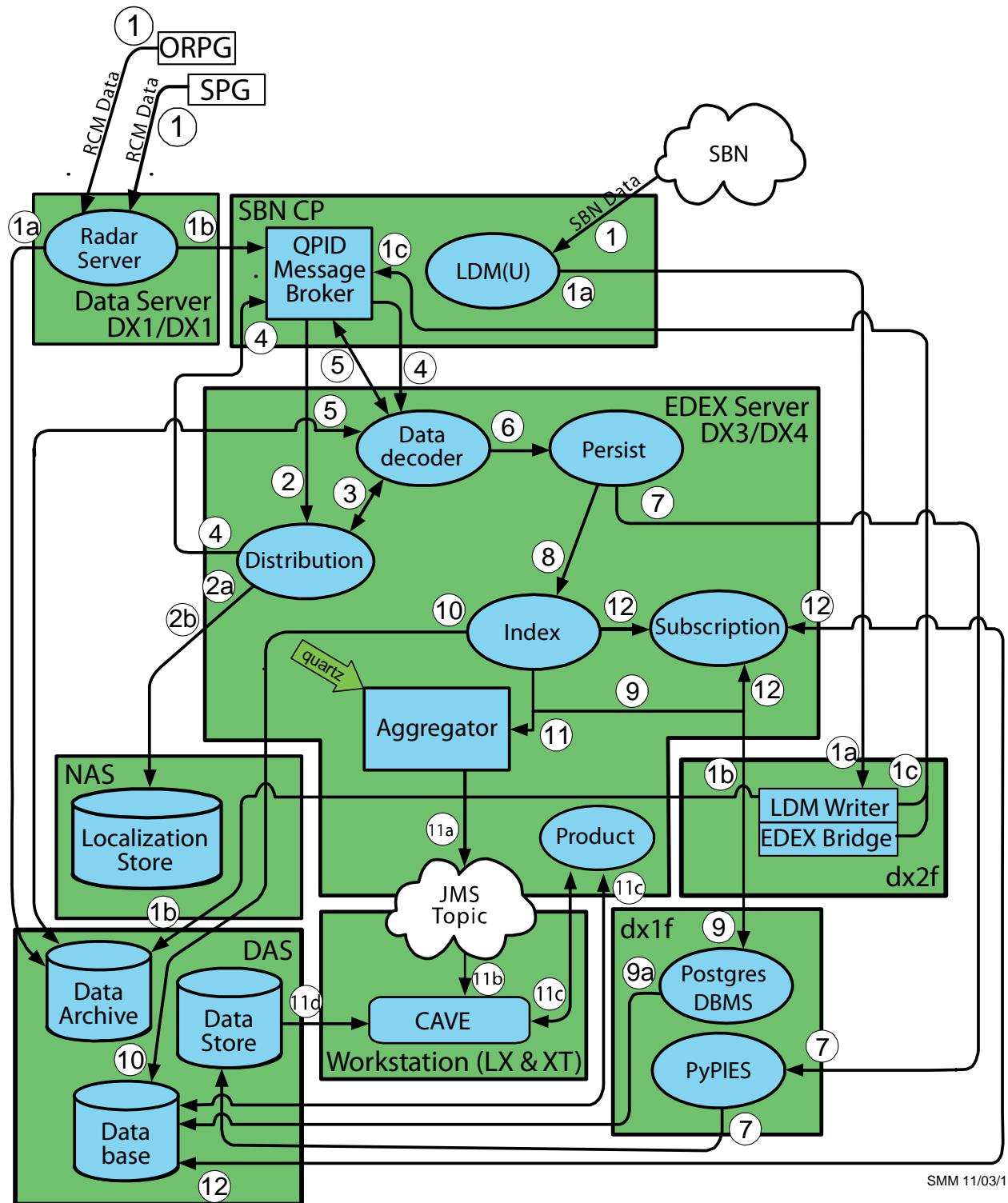


Exhibit 4.4-3. Radar Data Flow

4.5 Configuration Files

Data flow in AWIPS II is controlled by two sets of configuration files: 1) LDM configuration files; and 2) EDEX Data Distribution files. All of these files are normally set at system installation; the files are editable, but extreme care must be taken during editing because malformed files can cause system failure.

The LDM configuration files control the data that is delivered from the SBN to the EDEX Ingest process; the EDEX Data Distribution files control the internal flow of data to the appropriate data decoders.

4.5.1 LDM Configuration

There are two LDM servers. One is on CPSBN, which ingests everything (upstream) from the SBN that the site will not edit; the other is the downstream LDM on the DX2, where the site will edit the two configuration files: **pqact.conf** and **ldmd.conf**. These files are located in the etc subdirectory of the LDM user's home directory on the LDM server.

- **ldmd.conf** controls which servers the LDM can get data from, who can request from that server, and what data feeds it will request.

NOTE: Modifying ldmd.conf will have a severe impact on the data flow.

- **pqact.conf** controls how data sent to an instance of LDM is handled. This includes the data types to be handled and the location of the raw data archive.

NOTE: Modifying pqact.conf will have a severe impact on the data flow.

4.5.2 EDEX Data Distribution Files

EDEX Data Distribution files are XML files that are bundled with the EDEX Data Decoders. When EDEX is installed on DX3 and DX4, the Data Distribution files are installed into /awips2/edex/data/utility/edex_static/base/distribution, referred to as the "base distribution directory." In the standard AWIPS II installation, the base distribution directory is physically located on the Network Attached Storage (NAS); each EDEX installation accesses it via a Network File System (NFS) mount in /awips2/edex/data. As a result, changes made to a data distribution file on one of the EDEX servers (DX3 or DX4) will be available on the other EDEX server.

When EDEX is first started, the Distribution Service reads the Data Distribution files and generates a distribution table matching regular expressions with Data Decoders. The regular expressions are defined in the Data Distribution files and are matched against the WMO header of a data file. If the match is met, the file is routed to the data decoder.

NOTE: There is one XML distribution file per data decoder. Using regular expressions, each XML file specifies which WMO headers are appropriate for that decoder.

Each Data Decoder has a Data Distribution file in the base distribution directory. The Data Distribution files are named <data type>.xml. For example, the Data Distribution file for satellite data is named satellite.xml. Each Data Distribution file is a properly formatted XML document with the following format:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<requestPatterns xmlns:ns2="group">
    <regex>pattern</regex>
    <regex>pattern</regex>
</requestPatterns>
```

Example for Radar

```
<regex>^SDUS[234578]. .*</regex>
    <regex>^RadarServer.*</regex>
</requestPatterns>
```

Example for Satellite,

```
<requestPatterns xmlns:ns2="group">
    <regex>TI.... ....</regex>
</requestPatterns>
```

The “pattern” in each regex tag is a regular expression that is used to identify a data file. Normally, the regular expression matches the WMO header of the data in the file; it can also match the name of the file containing the data.

For example, satellite.xml contains a single regular expression: TI.... (TI, 4 dots, space, 4 dots). Because a dot in a regular expression matches any character, this pattern matches a WMO header starting with the characters TI.

For example: **TIGE04 KNES**

The Distribution Service monitors the base distribution directory. When one of the data distribution files changes, the Distribution Service reads the file and updates its routing table. When the re-read occurs, a message similar to the following message will appear in the EDEX Ingest log file.

```
INFO <date> <time> [<thread>] DISTRIBUTION: Change to
distribution file detected. satellite.xml has been modified.
```

When distribution patterns are reloaded on the D2D, an entry is written to the EDEX Ingest process logs in each of the EDEX servers.

Once the file has been reloaded, the modified patterns are used for file routing.

To understand why and when to edit these files, consider the following: The LDM uses the expressions defined in pqact.conf to determine which data to write to files in the data archive. The LDM generates a message that includes the WMO header information and forwards it to the EDEX Distribution Service via QPID. When the EDEX Distribution Service retrieves the message from QPID, it uses the Data Distribution files in the data distribution directory to determine two things: 1) the data files to process; and 2) the data decoder to process the files.

As a consequence of this action:

- Any time a new entry is placed in the pqact.conf file on LDM Downstream on the dx2f, a corresponding entry needs to be added to the appropriate Data Distribution file in the data distribution directory.
- Any time an entry is removed from the pqact.conf file, the corresponding entry should be removed from the appropriate Data Distribution file in the data distribution directory.

NOTE: When making the changes, remember that the files being edited need to be correctly formatted and make sure that there are no typos. Both LDM and EDEX will fail to start if these files are not properly formatted.

Refer to Chapter 15, Localization, for more information on editing these files.

The structure of the message sent to QPID external.dropbox via the EDEX bridge is as follows.

- The WMO header of the data contained in the file, if it is available
- The location of the data file in the data archive
- The start time for the computation of ingest latency
- The destination queue for the message.

The difference between using the manual end point and “external.dropbox” is who produces the message. “external.dropbox” is a message queue within QPID. In order to access “external.dropbox” directly, you need to create an application that can generate the appropriate message. If you do so, you must copy the file into the data archive (or another accessible location – it must be accessible to both DX3 and DX4.) On the other hand, when you use the manual endpoint, all you do is copy the data file into /awips2/edex/data/manual on DX3/4 and EDEX does the rest.

NOTE: You should only copy the file you want to be ingested into the manual inbox. Do not try to interface directly with QPID.

4.5.2.1 Potential Problems

Problem 1: What if the manual endpoint does not clean up after itself well? That is, it copies its data to /tmp/sbn/manual; this directory is not purged so it could fill up and cause a system crash.

Discussion: This is only a problem if the installation is not performed correctly. EDEX should not be moving files from /awips2/edex/data/manual to /tmp/sbn/manual; it should be moving manually ingested files from /awips2/edex/data/manual to /data_store/manual. The LDM scour utility should be managing this directory with the rest of /data_store. (Note that this is more of a software issue than a documentation issue. If the reviewer really believes this is a problem he or she should write a ticket (Trac or TTR) to address the issue.)

Problem 2: Obviously, using the manual endpoint for data ingest is easier (at the current time) than interfacing with QPID, although a script could easily be written to facilitate using QPID to ingest data (as done in WTDB). What if, because of its ease of use, the manual endpoint becomes the choice of use for local app developers (and in fact for some regular AWIPS developers for HPE/MPE, LAPS, MSAS, etc.)? The problem is that a regular process that uses the manual endpoint for data ingest compromises the integrity of the data archive.

Discussion: See comments above. If EDEX is configured correctly when it is installed, this is not an issue. (Note that this is more of a software issue than a documentation issue. If the reviewer really believes this is a problem, he or she should write a ticket (Trac or TTR) to address the issue.)

4.6 *Monitoring Data Ingest*

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting with “edex-“ are the EDEX logs. The EDEX logs roll over daily and are date stamped. The naming convention for EDEX logs is edex-{instance name}-yyyymmdd.log.

As of 16 Feb 2012 (Version; AWIPS Build 12.1.2), the following logs are on EDEX:

edex-ingest-20120116.log
edex-ingestDat-20120116.log
edex-ingest-gen_areal_ffg-20120116.log
edex-ingest-gen_areal_qpe-20120116.log
edex-ingestGrib-20120116.log
edex-ingest-purge-20120116.log
edex-ingest-radar-20120116.log
edex-ingest-satellite-20120116.log
edex-ingest-shef-20120116.log
edex-ingest-shef-performance-20120116.log
edex-ingest-smartInit-20120116.log
edex-ingest-text-20120116.log
edex-ingest-trigger-20120116.log
edex-ingest-unrecognized-files-20120116.log
edex-request-20120116.log
edex-request-productSrvRequest-20120116.log

4.6.1 *Edex Log Types*

The logs break down into four different types:

1. **EDEX process logs.** Each EDEX process writes to a separate log. The log file names are `edex-ingest-yyyymmdd.log`, `edex-ingestDat-yyyymmdd.log`, `edex-ingestGrib-yyyymmdd.log`, and `edex-request-yyyymmdd.log`. These logs contain startup messages and most other messages, including errors, for the EDEX processes. The specific logs present depend on how EDEX is started. **Note: The ingest DAT log is available only on large memory servers.**
2. **Data type-specific logs.** Logs with names similar to `edex-ingest-<data-type>-yyyymmdd.log` contain messages relating to a specific data type. These include both status messages and error messages. For a data type having its own log file, this is the log to examine to find and diagnose problems. The `ingest-shef` log file describes the shef decoder, although it is fed by the NWSTG feed.
3. **edex-ingest-unrecognized-files log.** This log is probably among the most important of them all. The `edex-ingest-unrecognized-files-yyyymmdd.log` can be checked to determine if data ingest is failing due to a problem with distribution files. Unfortunately, the unrecognized file log only identifies the file that was unrecognized; it does not provide a path to the file.
4. **EDEX startup logs.** Files with names starting with “start” capture messages generated by the `edex_camel` service script. They are `start-edex-ingest`, `start-edex-ingestGrib`, `start-edex-ingestDat`, and `start-edex-request` logs. In normal operation, these log files will be zero size.

The following process logs are discussed in detail.

- *edex-ingestGrib-<yyyymmdd>.log*
edex-ingestGrib handles the Grid Products.
- *edex-ingest-satellite-<yyyymmdd>.log*
edex-ingest-satellite handles the Satellite products.
- *edex-ingest-radar-<yyyymmdd>.log*
edex-ingest-radar handles the Radar products.
- *edex-ingest-text-<yyyymmdd>.log*
edex-ingest-text handles other products (metar, sfccobs etc.).
- *edex-ingest-<yyyymmdd>.log*
edex-ingest handles other products (lightning, MOS, etc.).
- *edex-ingestDAT-<yyyymmdd>.log*
edex-ingestDAT handles backend data services for the Decision Aid Tools, such as FFMP and SCAN.

The log file is a plain ASCII text file and can be viewed using any text viewing utility such as *more*, *less*, *view*, or *tail*.

To get a general view of processing, open a terminal session to the server and enter the following commands:

On DX3/DX4:

```
TYPE: cd /awips2/edex/logs
TYPE: date +%F
2012-01-16
TYPE: ls edex-*20120116*
edex-ingest-20120116.log
edex-ingestDat-20120116.log
edex-ingest-gen_areal_ffg-20120116.log
edex-ingest-gen_areal_qpe-20120116.log
edex-ingestGrib-20120116.log
edex-ingest-purge-20120116.log
edex-ingest-radar-20120116.log
edex-ingest-satellite-20120116.log
edex-ingest-shef-20120116.log
edex-ingest-shef-performance-20120116.log
edex-ingest-smartInit-20120116.log
edex-ingest-text-20120116.log
edex-ingest-trigger-20120116.log
edex-ingest-unrecognized-files-20120116.log
edex-request-20120116.log
edex-request-productSrvRequest-20120116.log
```

For ingestGrib,

```
TYPE: tail -f edex-ingestGrib-20120116.log
```

For Satellite,

```
TYPE: tail -f edex-ingest-satellite-20120116.log
```

For Radar,

```
TYPE: tail -f edex-ingest-radar-20120116.log
```

For other products (Refer chapter 6)

```
TYPE: tail -f edex-ingest-20120116.log
```

```
TYPE: tail -f edex-ingest-text-20120116.log
```

4.6.2 Edex Log Format

To monitor a specific ingest stream, a little understanding of the logging strategy used by EDEX is required. After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <<date-time>> [thread] Ingest: <<type>>:: <<file name>> <<statistics>>

Where,

- <<**date-time**>> is the date-time stamp (format yyyy-mm-dd hh:mm:ss,ttt)
- [thread] identifies the Camel thread that ran the decoder.
- <<**type**>> identifies the data type, e.g., grib, radar.
- <<**file name**>> is the path to the file that was processed, including the unique product sequence number.
- <<**statistics**>> lists the ingest statistics for the file. There are two statistics provided: *process time* and *latency*. (See note at the end of this section for more information on latency.)

A typical log entry for a grib product in edex-ingestGrib-YYYYMMDD.log is

```
INFO 2012-01-16 00:11:42,406 [gribThreadPool-4] Ingest: EDEX:
Ingest - grib:::
/data_store/grib2/GRID197/LAMP/20120115/1800Z_F012_TSTM02-
LAUC06_KWNO_54223321.grib2.20120115 processed in: 0.4920 (sec)
Latency: 20,501.6760 (sec)
```

The information from this entry is formatted as:

Date: 2012-01-16
 Time: 00:11:42
 Thread: [gribThreadPool-4]
 Type: grib
 Path to File:
 /data_store/grib2/GRID197/LAMP/20120115/1800Z_F012_TSTM02-
 LAUC06_KWNO_54223321.grib2.20120115
 Sequence Number: 54223321
 Process Time: 0.4920 (sec)
 Latency: 20,501.6760 (sec)

A typical log entry for Satellite in edex-ingest-satellite-YYMMDD.log is

```
INFO 2012-01-16 00:31:48,029 [satelliteThreadPool-1] Ingest:
EDEX: Ingest - satellite::: /data_store/sat/GOES-
13/VIS/20120115/24km_NHEM-COMP_1815.satz_467204.20120115
processed in: 0.1560 (sec) Latency: 21,538.4310 (sec)
```

A typical log entry for Radar in edex-ingest-radar-YYMMDD.log is

```
INFO 2012-01-16 00:01:37,277 [radarThreadPool-1] Ingest: EDEX:
Ingest - radar:::
/data_store/radar/KUDX/N0R/SDUS53_1827_KUDX_N0R_117601609.rad
processed in: 0.0490 (sec) Latency: 19,947.7680 (sec)

INFO 2012-01-16 00:01:37,509 [radarThreadPool-1] Ingest: EDEX:
Ingest - radar:::
/data_store/radar/kdmx/V/elev4_3/res0_25/level256/kdmx.99.2012011
```

```
5_1826 processed in: 0.1590 (sec) Latency: 19,945.0320 (sec)
```

A typical log entry for products like metar, MOS in edex-ingest-text-YYMMDD.log is

```
INFO 2012-01-16 00:03:42,597 [textThreadPool-1] Ingest: EDEX: Ingest - text::  
/data_store/text/15/18/SRPA20_KWAL_151828_29142384.20120115 processed in:  
0.0220 (sec) Latency: 20,057.0280 (sec)
```

A typical log entry for all other products (e.g.: binlightning) in edex-ingest-YYMMDD.log is

```
INFO 2012-01-16 01:12:09,070 [genericThreadPool-32] Ingest: EDEX: Ingest -  
binlightning::  
/data_store/binlightning/KWBC/15/SFUS41_US_KWBC1518_117612189.nldn.2012011  
5 processed in: 0.0130 (sec) Latency: 23,577.1360 (sec)
```

This information is logged into the EDEX process logs for every file that is ingested. The general format of the message is *INFO <date> <time> [thread] Ingest: <type>:: <file> processed in: <time> Latency: <time>*. (Note that there are two spaces between INFO and the start of the date stamp.) This pattern can be used to monitor the EDEX Ingest process logs for ingest latency, using the pattern to filter out undesirable messages.

NOTE: Latency is the elapsed time between when the AWIPS II system first contacts a data file and when the data has been ingested, decoded, and is ready for retrieval by either CAVE or another client application. The “first contact” depends on the data type. For most data types, latency measurement starts when the product has been downloaded by the LDM Writer on the DX2. This latency start time is part of the message generated by the LDM’s EDEX Bridge and sent to QPID (on the CP1/2 cluster) for processing by EDEX. For Radar products obtained from the ORPG via the AWIPS II Radar Server, latency measurement starts when the product is downloaded by the Radar Server on the DX1/2 cluster. In the case of ORPG products, the latency start time is part of the message sent by the Radar Server to QPID. Note that this latency measure is strictly internal for the AWIPS II data ingest subsystem.

4.7 General Monitoring of the EDEX system

To monitor the edex logs for other specific events,

- Open a terminal session to the dx3 or dx4 EDEX server.
- Change directory to the edex log directory /awips2/edex/logs.
- Tail the current log file and pipe the output into grep with the appropriate search string. To determine the search string, first examine the appropriate EDEX log to find the event you want to monitor, and then determine the search pattern.

Here are some specific events captured from the EDEX log.

```
INFO 2012-01-16 20:01:24,969 [EDEXMain] SetupSrv:  
run_create_mpe_climo_lists executed successfully
```

```
INFO 2012-01-16 20:01:25,397 [EDEXMain] SetupSrv:  
    run_create_freezing_station_list executed successfully  
INFO 2012-01-16 20:01:25,980 [EDEXMain] SetupSrv:  
    run_create_mpe_beam_height_file executed successfully  
INFO 2012-01-16 20:04:36,457 [Thread-225] FFMPPTemplates: time:  
    75485  
INFO 2012-01-16 20:04:36,458 [Thread-225] FFMPPTemplates:  
    FFMPPTemplate: Finishing thread ALL  
INFO 2012-01-16 20:04:37,662 [Thread-226] FFMPPTemplates:  
    FFMPPTemplate: Finishing thread COUNTY  
INFO 2012-01-16 20:04:37,721 [Thread-227] FFMPPTemplates:  
    FFMPPTemplate: Finishing thread VIRTUAL  
INFO 2012-01-16 20:05:50,325 [CPGThread1] AppsDefaults: Updating  
    AppsDefaults instance  
  
WARN 2012-01-16 16:53:20,193 [genericThreadPool-31]  
    PointDataPluginDao: EDEX: EDEX - Error storing pointdata batch  
    to database, applying dup check and storing batch individually  
  
ERROR 2012-01-16 16:53:18,699 [genericThreadPool-11]  
    BufrMosDecoder: Error decoding bufrm data  
  
java.lang.IndexOutOfBoundsException: Index: 29, Size: 29  
    at java.util.ArrayList.RangeCheck(ArrayList.java:547)  
    at java.util.ArrayList.get(ArrayList.java:322)  
    at  
com.raytheon.edex.plugin.bufrm.decoder.BufrMOSDataAdapter.cr  
eateMOSData(BufrMOSDataAdapter.java:219)  
    at  
com.raytheon.edex.plugin.bufrm.BufrMosDecoder.decode(BufrMos  
Decoder.java:107)  
    at sun.reflect.GeneratedMethodAccessor617.invoke(Unknown  
Source)  
    at  
sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMeth  
odAccessorImpl.java:25)  
    at java.lang.reflect.Method.invoke(Method at  
org.apache.camel.component.bean MethodInfo.invoke(MethodInfo.j  
ava:260)  
    at  
org.apache.camel.component.bean MethodInfo$1.proceed(MethodInf  
o.java:164)  
    at  
org.apache.camel.component.bean.BeanProcessor.process(BeanProc  
essor.java:159)  
    at  
org.apache.camel.util.AsyncProcessorHelper.process(AsyncProces  
sorHelper.java:70)
```

```

        at
org.apache.camel.processor.DelegateAsyncProcessor.processNext(
DelegateAsyncProcessor.java:98)

        at
org.apache.camel.processor.DelegateAsyncProcessor.process(Dele
gateAsyncProcessor.java:89)

        at
org.apache.camel.management.InstrumentationProcessor.process(I
nstrumentationProcessor.java:68)od.java:597)

```

4.7.1 Edex Log Event Levels

Note that each “event” starts with either FATAL, ERROR, WARN, INFO, or DEBUG and continues to the start of the next “event.”

- The ERROR level designates error events that might still allow the application to continue running.
- The FATAL level designates very severe error events that will presumably lead the application to abort.
- The INFO level designates informational messages that highlight the progress of the application at coarse-grained level.
- The WARN level designates potentially harmful situations.
- The DEBUG Level designates fine-grained informational events that are most useful to debug an application.

A “significant event” is anything a developer has decided should be logged. The AWIPS II system is built on top of a number of Open Source projects (Camel, Hibernate, etc.), which is referred to as *platform code*. Some of the logging is from the platform code. An example of logging generated by the platform code is a database error. Database errors are usually generated by the platform code. An example of a database error (somewhat truncated) is

```

ERROR 2012-01-16 18:15:59,933 [genericThreadPool-5]
JDBCEceptionReporter: ERROR: update or delete on table
"taf" violates foreign key constraint "fk5e120f1d80f77fb"
on table "taf_change_groups"

Caused by: org.postgresql.util.PSQLException: ERROR: update
or delete on table "taf" violates foreign key constraint
"fk5e120f1d80f77fb" on table "taf_change_groups"

```

Other ERROR messages are generated by AWIPS II-specific code. An example of an error generated by AWIPS II code is

```

ERROR 2012-01-16 18:16:08,426 [genericThreadPool-72] TextDecoder:
Message failed parsing for WMO message header: [SAAP32 FAPR
251800 RRA], products stored [0/1]

```

As a general rule, all “ERROR” messages and most “WARN” messages are important. (Unfortunately, some messages logged as ERROR should be WARN.) INFO messages can also be important. The only person who can determine if a message is important is the person analyzing the log. For example, every file that is ingested is logged with an INFO message. The message will be similar to

```
INFO 2012-01-16 00:00:02,923 [genericThreadPool-58] Ingest:  
EDEX: Ingest - sfcobs::  
/data_store/text/19/23/SXUS23_KWNB_192300_456441603.20111020  
processed in: 0.3390 (sec) Latency: 0.2940 (sec)
```

This message can become important in either of these scenarios:

- If a user is attempting to trace dataflow through the system, this message verifies that the file SXUS23_KWNB_192300_456441603.20111020 has been ingested.
- If a user is interested in system performance, the actual latency time reported becomes important.

In fact, what is not logged can also be “important.. The best example here is trying to trace data through the system. If the LDM reports that a file was written to the data archive but there is no corresponding “processed” log entry in the EDEX logs, this is significant/important information and it needs to be checked out.

4.8 Monitoring the LDM Data Flow

The data flow from the LDM may be monitored using the *ldmadmin* tool. The *watch* option on this tool provides a running list of the LDM’s activity. This will show the data passing through the LDM. To use this tool, first log onto the upstream LDM server (CPSBN) as the ldm user, and then enter:

ldmadmin watch

(Type ^D when finished)

```
Jan 17 17:45:48 pqutil INFO:      5885 20120117174548.059      HDS  
121452889 HULZ85 KWBK 171200 /mSPEC62MRF  
!grib/ncep/SPEC62MRF/#040/201201171200/F150/UGRD/850 mb/  
Jan 17 17:45:48 pqutil INFO:      8469 20120117174548.071      HDS  
121452890 HPLZ89 KWBK 171200 /mSPEC62MRF  
!grib/ncep/SPEC62MRF/#040/201201171200/F150/PRMSL/MSL/  
Jan 17 17:45:48 pqutil INFO:      8469 20120117174548.086      HDS  
121452891 HHLZ85 KWBK 171200 /mSPEC62MRF  
!grib/ncep/SPEC62MRF/#040/201201171200/F150/HGT/850 mb/  
Jan 17 17:45:48 pqutil INFO:      3299 20120117174548.103      HDS  
121452892 HRLZ70 KWBK 171200 /mSPEC62MRF  
!grib/ncep/SPEC62MRF/#040/201201171200/F150/RH/700 mb/  
Jan 17 17:45:48 pqutil INFO:      8469 20120117174548.114      HDS  
121452893 HPLZ89 KWBK 171200 /mSPEC62MRF  
!grib/ncep/SPEC62MRF/#040/201201171200/F150/PRMSL/MSL/  
RAH 171747 /pNVWRAX  
Jan 17 17:53:26 pqutil INFO:      4933 20120117175326.778 NEXRAD3
```

```

121465740 SDUS55 KPIH 171750 /pN0SSFX
Jan 17 17:53:26 pqutil INFO: 36325 20120117175326.781 IDS|DDPLUS
121465741 FOUS52 KMHX 171753 /pAFMMHX
Jan 17 17:53:26 pqutil INFO: 123 20120117175326.781 IDS|DDPLUS
121465742 SAMO31 ZMUB 171800
Jan 17 17:53:26 pqutil INFO: 116 20120117175326.781 IDS|DDPLUS
121465743 SPCN46 CWAO 171751
Jan 17 17:53:26 pqutil INFO: 121 20120117175326.781 IDS|DDPLUS
121465744 S

```

Use the -f option and specify a FEED TYPE to see only products from that LDM feed. Examples follow.

ldmadmin watch -f NNEXRAD

(Type ^D when finished)

```

Jan 17 17:49:15 pqutil INFO: 23445 20120117174915.668 NEXRAD3
121460924 SDUS51 KPBZ 171748 /pN0QPBZ !nids/
Jan 17 17:49:15 pqutil INFO: 12145 20120117174915.688 NEXRAD3
121460925 SDUS51 KCTP 171748 /pN0SCCX
Jan 17 17:49:15 pqutil INFO: 5961 20120117174915.708 NEXRAD3
121460926 SDUS74 KTSA 171747 /pN0ZSRX
Jan 17 17:49:15 pqutil INFO: 2996 20120117174915.728 NEXRAD3
121460927 SDUS51 KBOX 171746 /pNTPBOX
Jan 17 17:49:15 pqutil INFO: 2074 20120117174915.748 NEXRAD3
121460928 SDUS35 KLKN 171739 /pNVWLRX
Jan 17 17:49:15 pqutil INFO: 30662 20120117174915.768 NEXRAD3
121460929 SDUS54 KLCH 171748 /pN0QPOE !nids/
Jan 17 17:49:15 pqutil INFO: 7301 20120117174915.788 NEXRAD3
121460930 SDUS72 KJAX 171748 /pN0ZVAX

```

ldmadmin watch -f GRID

(Type ^D when finished)

```

Jan 16 21:09:20 pqutil INFO: 94404 20111215210920.056 NGRID
557854 MUEV86 KWBD 151800
!grib2/ncep/DGEX_115/#185/201112151800F102/UREL/30-0 hPa PDLY

Jan 16 21:09:20 pqutil INFO: 90262 20111215210920.058 NGRID
557855 MUEV86 KWBD 151800
!grib2/ncep/DGEX_115/#185/201112151800F102/UREL/120-90 hPa PDLY

Jan 16 21:09:20 pqutil INFO: 84787 20111215210920.060 NGRID
557856 MTEV86 KWBD 151800
!grib2/ncep/DGEX_115/#185/201112151800F102/TMPK/60-30 hPa PDLY

Jan 16 21:09:20 pqutil INFO: 98890 20111215210920.100 NGRID
557857 MHEV85 KWBD 151800
!grib2/ncep/DGEX_115/#185/201112151800F102/HGHT/850 hPa PRES

```

lmdadmin watch -f NIMAGE
(Type ^D when finished)

```
Jan 16 18:03:50 pqutil INFO: 42291 20111020180350.374 NIMAGE
116164576 satz/ch2/MISC/PW/20111020 1629/AK-NATIONAL/1km/ TICB17
KNES 201629

Jan 16 18:04:04 pqutil INFO: 126419 20111020180404.398 NIMAGE
116164647 satz/ch2/MISC/60/20111020 1629/AK-NATIONAL/1km/ TICB60
KNES 201629
```

lmdadmin watch -f IDS
(Type ^D when finished)

```
Jan 17 17:57:38 pqutil INFO: 123 20120117175738.586
IDS|DDPLUS 30189308 SXOR50 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 163 20120117175738.586
IDS|DDPLUS 30189309 SRNY20 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 179 20120117175738.587
IDS|DDPLUS 30189310 SRPA30 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 144 20120117175738.587
IDS|DDPLUS 30189311 SRSC20 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 142 20120117175738.592
IDS|DDPLUS 30189312 SRPR20 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 130 20120117175738.593
IDS|DDPLUS 30189313 SXCO50 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 139 20120117175738.605
IDS|DDPLUS 30189314 SRKY30 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 96 20120117175738.615
IDS|DDPLUS 30189315 SRFL20 KWAL 171757

Jan 17 17:57:38 pqutil INFO: 266 20120117175738.627
IDS|DDPLUS 30189316 SXCN40 KWAL 171757
```

To see connections, open with ldm.

netstat -ta | grep ldm

```
[ldm@cpsbn2-tbw3 ~]$ netstat -ta | grep ldm
tcp        0      0 cpsbn2-tbw3.er.:unidata-ldm *:*
LISTEN
tcp        0      0 cpsbn2-tbw3.er.:unidata-ldm dx2-tbw3:54591
ESTABLISHED
```

To monitor the product queue v.

pqmon

```

Jan 17 18:00:07 pqmon NOTE: Starting Up (24814)
Jan 17 18:00:07 pqmon NOTE: nprods nfree nempty      nbytes
maxprods maxfree minempty   maxext age
Jan 17 18:00:07 pqmon NOTE: 29607      2    92461    499993360
79851        9    42218     8824 877
Jan 17 18:00:07 pqmon NOTE: Exiting

```

[**Note:** The pqmon command is useful for looking at the state of the products queue, and whether or not the existing product queue size is sufficient for the amount of data coming in.]

To check for the running of the LDM

ps -U ldm -u ldm u

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
ldm	26148	0.0	0.0	2740	1088	?	Ss	18:49	0:00	rpc.ldmd -I
165.92.107.50	-P 388	-q /usr/local/ld								
ldm	26149	0.6	2.5	162136	160752	?	S	18:49	1:03	
dvbs_multicast	-b 40000	-m 224.0.1.1								
ldm	26151	0.1	2.5	162136	160752	?	S	18:49	0:11	
dvbs_multicast	-b 40000	-m 224.0.1.2								
ldm	26152	0.4	2.5	162136	160744	?	S	18:49	0:41	
dvbs_multicast	-b 40000	-m 224.0.1.3								
ldm	26153	0.0	2.2	162136	142900	?	S	18:49	0:06	
dvbs_multicast	-b 40000	-m 224.0.1.4								
ldm	26154	0.3	18.0	1171264	1120848	?	S	18:49	0:36	readnoaaport
-m 224.0.1.1	-n -u 3	-t mhs -r 1								
ldm	26155	0.0	8.2	1194420	516264	?	S	18:49	0:03	readnoaaport
-m 224.0.1.2	-n -u 4	-t mhs -r 1								
ldm	26156	0.2	17.9	1175164	1119900	?	S	18:49	0:19	readnoaaport
-m 224.0.1.3	-n -u 5	-t mhs -r 1								
ldm	26157	0.0	5.6	1173776	350904	?	S	18:49	0:05	readnoaaport
-m 224.0.1.4	-n -u 6	-t mhs -r 1								
ldm	31233	0.0	0.0	4964	1728	pts/0	S	21:02	0:00	-bash
ldm	32073	0.4	0.2	995088	12496	?	S	21:22	0:00	rpc.ldmd -I
165.92.107.50	-P 388	-q /usr/local/ld								
ldm	32108	0.0	0.0	4552	1136	pts/0	R+	21:22	0:00	ps -U ldm -u
ldm u										

NOTE: At each AWIPS site, there are two CPSBNs responsible for receiving GOES products and a combination of NCEP products from the NCF. No site has more than two CPSBNs unless it has an NRS.

Although each of the two CPSBNs (CPSBN1 and CPSBN2) receive the entire stream of data, for AWIPS II only one CP is configured to forward the entire data to AWIPS data acquisition server. The data are split by channels, and at any point in time only one CPSBN forwards channel data so duplicate data are not being ingested. Because each CPSBN can process the entire data stream, they back each other up. When one CPSBN is

actively processing all 4 channels, the other CPSBN will be the hot spare. To check channels received, examine the ldmd.conf file to look at running ldm processes; the config_dvb command is not implemented in AWIPS II.

[**Note:** The CP ingest is tied to the cp1f package. The hb_stat output will show the following.]

```
Heartbeat Status Monitor                Jan 17 18:09:34
=====
===== M e m b e r   S t a t u s =====
Member      Status    IP address
-----
cpsbn1-tbw3  Up       165.92.24.50
cpsbn2-tbw3  Up       165.92.24.51
=====
===== S e r v i c e   S t a t u s =====
Service     IPAddr     Cronfile    Owner    Start Time
-----
a2cp1apps   165.92.24.98  a2cp1cron,a2SIT cpsbn1-tbw3 2011-10-13 01:20:47
```

```
[root@cpsbn1-tbdw]# grep EXEC /usr/local/ldm/etc/ldmd.conf | grep -v "##"
EXEC      "dvbs_multicast -b 40000 -m 224.0.1.1"
EXEC      "dvbs_multicast -m 224.0.1.2"
EXEC      "dvbs_multicast -b 40000 -m 224.0.1.3"
EXEC      "dvbs_multicast -m 224.0.1.4"
EXEC      "readnoaaport -m 224.0.1.1 -n -u 3 -t mhs -r 1"
EXEC      "readnoaaport -m 224.0.1.2 -n -u 4 -t mhs -r 1"
EXEC      "readnoaaport -m 224.0.1.3 -n -u 5 -t mhs -r 1"
EXEC      "readnoaaport -m 224.0.1.4 -n -u 6 -t mhs -r 1"
```

[**Note:** These numbers in bold in the example above correspond to the different channels of SBN downlink. There is one dvbs_multicast process that listens to each multicast address and processes that particular channel.]

```
[root@cpsbn1-tbdw]# ps -fu ldm
UID      PID  PPID  C STIME TTY          TIME CMD
ldm      23108     1  0 Jan16 ?
2                   00:00:00  ldmd -I 165.92.24.51 -P 388 -M
ldm      23114  23108  0 Jan16 ?
ldm      23115  23108  0 Jan16 ?
                                         00:09:38 readnoaaport -m 224.0.1.1 -n -u
                                         00:00:34 readnoaaport -m 224.0.1.2 -n -u
```

```

ldm      23116 23108 0 Jan16 ?          00:08:32 readnoaaport -m 224.0.1.3 -n -u
ldm      23117 23108 0 Jan16 ?          00:01:18 readnoaaport -m 224.0.1.4 -n -u
ldm      23120 23108 0 Jan16 ?          00:06:08 ldmd -I 165.92.24.51 -P 388 -M
2
ldm      24189 24187 0 17:51 ?          00:00:00 sshd: ldm@pts/0
ldm      24190 24189 0 17:51 pts/0       00:00:00 -bash
ldm      25446 24190 0 18:14 pts/0       00:00:00 ps -fu ldm

```

4.9 Product Identifier

The LDM writer uses patterns in pqact.conf to determine where to write data files, including the path and file name.

For example, take an entry that matches an LDM product with these fields:

Use the following reference to help decipher a pqact.conf entry.

```

NNEXRAD      ^ ( SDUS[ 2-8 ] . | NXUS6. )
(K|P|T)(LWX|BGM|CHS|RLX|ILN|CLE|AKQ|JKL|CTP|MHX|MRX|OKX|PHI)
(..)(..)(...) /p(..)(...)
      FILE   -overwrite -log -close -edex
/data_store/radar/\2\8\7\5\6_\2\8_\7_(seq).rad

```

The first part, NNEXRAD, is the FEEDTYPE.

The Regular Expression describes any product starting with SDUS and follows with any number between 2 and 8 OR starting with NXUS6.

The () store that strings into the variable \1, which can be used when storing to physical disk.

(K|P|T) matches either a K, P or T and stores that to the variable \2 .

(LWX|BGM|CHS|RLX|ILN|CLE|AKQ|JKL|CTP|MHX|MRX|OKX|PHI) matches any of those site IDs and stores it to variable \3 .

(..)(..)(..) matches the next 6 characters of any type and stores them in pairs to \4, \5 and \6 respectively.

/p matches the exact string /p

(...)(...) matches the next 6 characters of any type and stores them in trios to \7 and \8.

So the following line would match this entry in pqact and store in the following location:

Product:

```
NEXRAD3 56424268  SDUS51  KLWX 211529 /pTZLDCA !nids/
```

Storage Location:

```
/data_store/radar/KDCA/TZL/1529_KDCA_TZL_56424268.rad
```

For DPA products, the pattern is nearly identical:

In this case, only DPA products are matched, so the NNN entry is hard coded as DPA.

Product:

```
NEXRAD3 56424268 SDUS51 KLWX 211529 /pDPADCA !nids/
```

Storage Location:

```
/data_store/radar/KDCA/TZL/1529_KDCA_DPA_56424268.rad
```

The number before the ".rad" is the sequence number (56424268 in this case) that is set at the Gateway when transmitted over the SBN and can be traced to the ldm logs on the active cpsbn.

[**Note:** Sequence numbers are NOT reset at all. The only exception occurs when the data channels are moved from one DSUP to another. Also, it will be different when the operations are moved from ANCF to BNCF servers.]

To determine which cpsbn is active, perform the following steps and look for running ldm processes.

CPSBN1 Example:

```
[root@cpsbn1-tbdw ~]# ps -ef | grep ldm
root      2733  2651  0 13:10 pts/0    00:00:00 grep ldm
ldm      21726     1  0 Oct21 ?        00:00:00 rpc.ldrmd -I
165.92.29.180 -P 388 -q /usr/local/ldm/data/ldm.pq
/usr/local/ldm/etc/ldrmd.conf
ldm      21732 21726  0 Oct21 ?        00:04:44 readnoaaport -m
224.0.1.1 -n -u 3 -t mhs -r 1
ldm      21733 21726  0 Oct21 ?        00:00:10 readnoaaport -m
224.0.1.2 -n -u 4 -t mhs -r 1
ldm      21734 21726  0 Oct21 ?        00:02:57 readnoaaport -m
224.0.1.3 -n -u 5 -t mhs -r 1
ldm      21735 21726  0 Oct21 ?        00:00:19 readnoaaport -m
224.0.1.4 -n -u 6 -t mhs -r 1
ldm      21736 21726  0 Oct21 ?        00:00:39 rpc.ldrmd -I
165.92.29.180 -P 388 -q /usr/local/ldm/data/ldm.pq
/usr/local/ldm/etc/ldrmd.conf
```

CPSBN2 Example:

```
[root@cpsbn2-tbdw ~]# ps -ef | grep ldm
root      21927 21847  0 13:12 pts/0    00:00:00 grep ldm
```

So in this case, CPSBN1 is active and looks for the sequence number 56424286 (as above) in the ldm logs.

4.10 Qpid

In the qpid commands that follow, you are looking for queues in which the msg column has a large number. This means that messages are coming in, but nothing is taking them out.

You could also look at the msgIn and msgOut columns to get the same type of picture on the health of the system. The NCF has set up monitors based on this data in order to keep track of the health of the system, and restart things if necessary.

```
[root@cpsbn1-tbw3 ~]# ps -ef | grep qpid
root      19499 19419  0 18:37 pts/3    00:00:00 grep qpid
awips     20960        1 10 Jan16 ?          02:18:02 /awips2/qpid/sbin/qpid --daemon --config /awips2/qpid/etc/qpid.conf

[root@cpsbn1-tbw3 ~]# qpid-queue-count -Smsg -L10

Queues
queue                                         msg   bytes   cons
=====
=====
scheduledQCScanWork                         255    0      2
fssobsGenerate                            1     428      2
Ingest.Mesowest                           0     0      2
practiceActiveTable                      0     0      4
_edex.alerts.utility@amq.topic_ce9841f3-2ce7-464b-b44c-d04cbadf11f6
                                         0     0      1
Ingest.ldadmanual                          0     0      2
Ingest.bufrsigwx                           0     0      2
_edex.alerts@amq.topic_423da7ea-d854-4be9-be4d-f120d1d4ab4d0
                                         0     0      1
scheduledSoundingWork                     0     0      2
dqcPreprocScheduledWork                   0     0      2
```

```
[root@cpsbn1-tbw3 ~]# qpid-stat -q -S msg -L 10
```

```
Queues
queue                                         dur autoDel excl msg   msgIn
msgOut  bytes  bytesIn  bytesOut  cons bind
=====
=====
external.dropbox                           Y           719k  13.4m
12.7m   49.0m  916m    867m     0     2
Ingest.Grib                                Y           36.7k  3.79m
3.75m   3.28m  339m    336m     8     2
Ingest.Text                               Y           33.5k  6.22m
6.18m   1.96m  361m    359m     4     2
Ingest.dhr                                 Y           27.6k  359k
332k   1.69m  21.7m   20.1m     1     2
Ingest.Radar                               Y           10.2k  1.54m
1.53m   644k   97.1m   96.4m     2     2
Ingest.modelsounding                      Y           4.58k  841k
836k   269k   49.2m   48.9m     2     2
Ingest.obs                                Y           3.33k  398k
394k   196k   23.3m   23.1m     2     2
```

```

scheduledQCScanWork                                1.92k  2.23k
313      0      0      0      2      2
Ingest.sfcobs                                     Y
189k    21.2k  11.1m  11.1m  2      2
     _edex.alerts@amq.topic_855e6313-17de-49d7-966e-8655cb3cee06   Y      Y
119k    3.93m  690m   686m   1      2

```

```
[root@cpsbn1-tbw3 ~]# qpid-stat -q -S msg -L 3
```

Queues									
queue	dur	autoDel	excl	msg	msgIn	msgOut	bytes	bytesIn	
bytesOut	cons	bind							
external.dropbox	Y				711k	13.4m	12.7m	48.3m	916m
868m	0	2							
Ingest.Grib		Y			36.2k	3.79m	3.76m	3.25m	339m
336m	8	2							
Ingest.Text		Y			32.1k	6.22m	6.19m	1.88m	361m
359m	4	2							

Chapter 5

Ingest of Satellite Imagery

Chapter 5. Ingest of Satellite Imagery

Table of Contents

	<i>Page</i>
5.0 Ingest of Satellite Imagery: Overview	1
5.1 Satellite Ingest Data Flow.....	1
5.1.1 Data Archive and File Naming Conventions for Satellite Data.....	4
5.1.1.1 LDM Configuration	6
5.1.2 Decoding – Satellite Data	6
5.1.3 Data Ingest and Logging of Satellite Products	6
5.2 Monitoring the LDM Data Flow and GOES data.....	8
5.3 GOES Troubleshooting and Tips.....	9
5.3.1 Troubleshooting	9
5.3.2 Tips	10
5.4 Data Archive Directory.....	16

List of Exhibits

Exhibit 5.1-1. Satellite Ingest Data Flow.....	2
Exhibit 5.1.1-1. Acquire and Ingest of Satellite Products	5

5.0 *Ingest of Satellite Imagery: Overview*

All GOES imagery products received by AWIPS sites are distributed frame by frame over two of the four NOAAPORT/SBN Channels.

Descriptions of the four channels follow.

1. **GOES.** The GOES Channel contains information from the GOES East satellite and the GOES West satellite. The GOES East satellite is a data stream consisting of these imagery products: visible infrared and water vapor for the Eastern Conterminous United States (CONUS), Puerto Rico, supernational composites, and Northern Hemisphere (NH) composites. The GOES West satellite is a data stream consisting of the following imagery products: visible infrared and water vapor for CONUS, Alaska, and Hawaii; supernational composites, and NH composites.
2. **NMC.** From the NWS Telecommunications Gateway (NWSTG), a data stream consisting of model output from the National Centers for Environmental Prediction (NCEP); the observations, forecasts, watches, and warnings produced by NWS Forecast Offices; WSR-88D radar products; and most observational data over North America.
3. **NMC2.** The NWSTG2 channel supplements the NWSTG channel. It contains all Model Grid data.
4. **NOAAPORT_OPT Channel.** This channel's data stream includes GOES DCP data, GMS/GOES-West/GOES-East/METEOSAT-5//METEOSAT-7 composites for visible infrared and water vapor products (every 3 hours), and OCONUS grids.

5.1 *Satellite Ingest Data Flow*

The Satellite Ingest data flow, illustrated in Exhibit 5.1-1, is a 12-step process. Descriptions of each step follow.

1. Satellite data is obtained by the LDM from the SBN.
 - a. The LDM forwards the product to the LDM Writer instance.
 - b. The LDM Writer instance writes the product to the Data Archive.
 - c. The LDM writer instance uses the EDEX Bridge to post a message containing product information to the QPID Message Broker. The product information is the WMO header and the path to the product file.

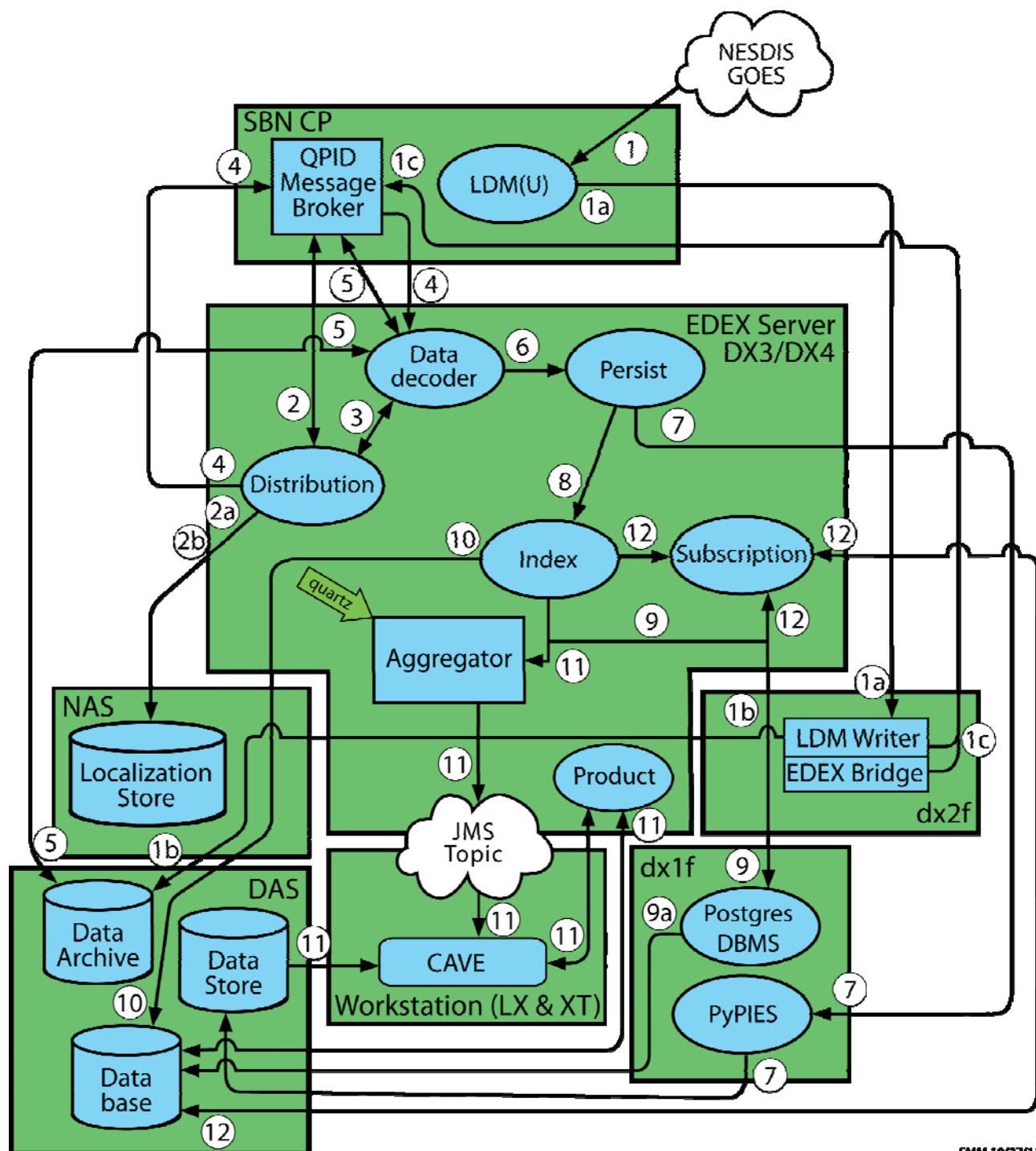


Exhibit 5.1-1. Satellite Ingest Data Flow

2. The EDEX Distribution endpoint on the EDEX (DX) cluster pulls the message from the QPID Message Broker. The WMO header is matched against data distribution mappings contained in the data distribution directory to determine product routing. (The WMO header is included in the message; if it is not, the Distribution service uses the product file name from the message to determine routing.) **Note:** The files in the data distribution directory are XML files that contain regular expressions that match WMO headers with the appropriate data decoder plug-in.
 - a. At EDEX startup, the EDEX Distribution endpoint reads the Data Distribution files from the Data Distribution directory in the Localization Store. It uses the contents of these files to generate the routing table used to determine data routing. The Data Distribution directory is located at /awips2/edex/data/utility/edex_static/base/distribution.
 - b. The EDEX Distribution endpoint monitors the Data Distribution directory; when a file in that directory is modified, it re-reads that file and rebuilds its routing table.
3. The EDEX Distribution Service determines the Data Decoder Plug-In registered to handle the data in the product file.
4. The EDEX Distribution Service forwards the message to the appropriate Data Decoder Plug-In via the QPID Message Broker.
5. The EDEX Data Decoder Service on the EDEX (DX) cluster pulls the message from the QPID Message broker. The Data Decoder Service reads the file pointed to by the message, decodes the data, and determines the appropriate metadata.
6. The decoded data and metadata are sent to the EDEX Persist endpoint.
7. The EDEX Persist endpoint sends the data to PyPIES, and PyPIES writes the data to the EDEX data store in HDF5 format.
8. The EDEX Persist endpoint sends the metadata obtained to the EDEX Index endpoint.
9. The EDEX Index endpoint sends the metadata to the PostgreSQL DBMS.
 - a. The PostgreSQL DBMS writes the metadata to the database.
10. The index endpoint persists the data object to the database. It doesn't just get the dataURI. Persistence to the database is executed via a plugin defined data access object. If the data access object does not override the persistence behavior, then a default persistence strategy is used. The default strategy for persisting data to the database is to first check to see if the data received already exists. If it already exists, then persistence to the database is not attempted for that data. If the data is unique, then it is persisted to the database.
11. (Client notification) The Data URI is forwarded to the EDEX URI Aggregator.
 - a. Every 5 seconds the aggregated Data URIs are sent to the JMS Alert Topic.

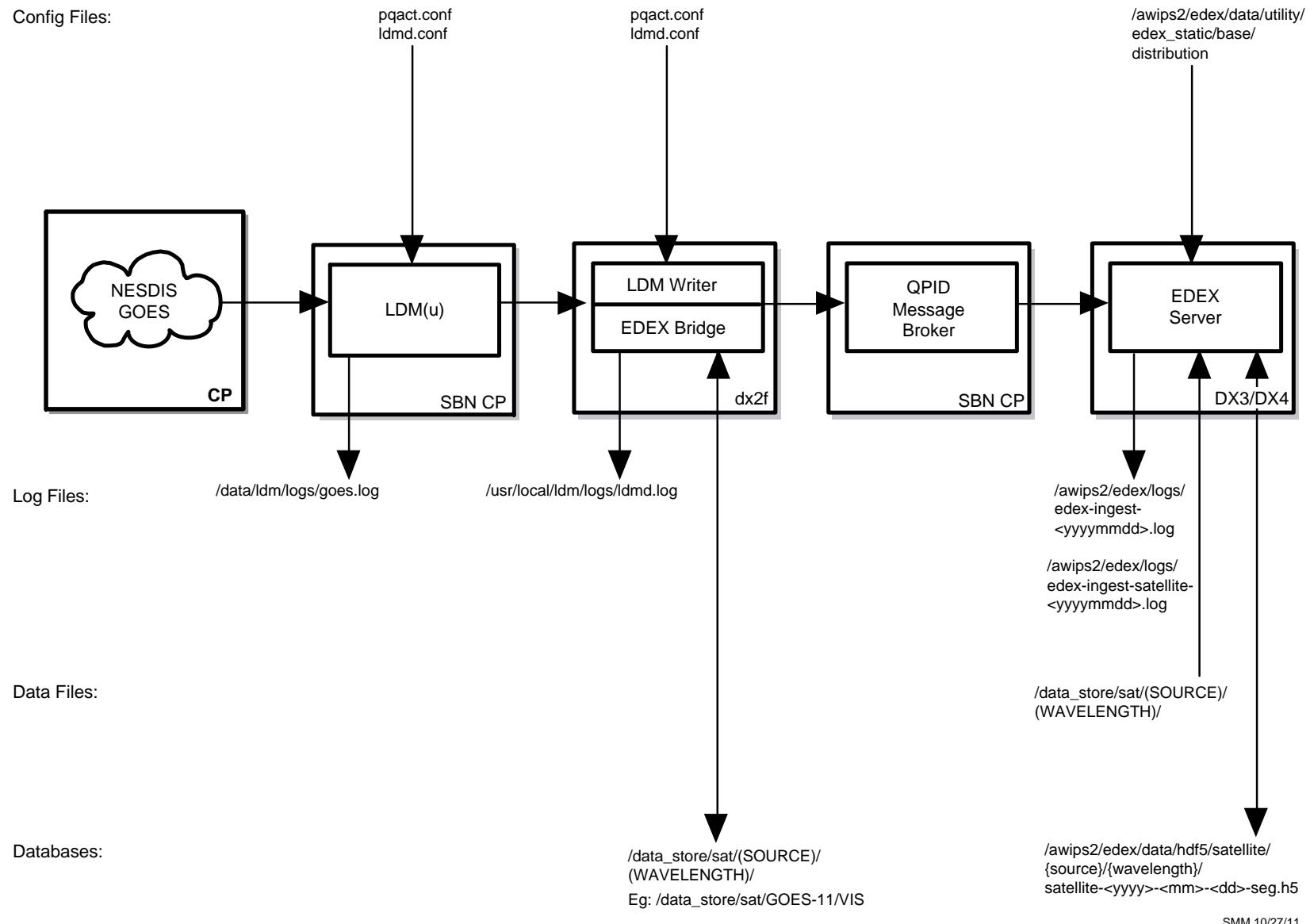
- b. CAVE monitors the JMS Alert Topic to obtain a list of available data. CAVE determines if it should render the available data.
 - c. CAVE retrieves metadata from the EDEX server via a product query sent to the EDEX thrift endpoint.
 - d. CAVE retrieves product data from the EDEX server by accessing the EDEX data store's HDF5 files and CAVE renders the data, updating its display as appropriate.
12. (Subscription) The Data URI is forwarded to the EDEX Subscription endpoint.
(Note: This does not apply to Satellite Data)
- a. The EDEX Subscription endpoint checks the active subscription list to determine if a subscription has been registered for the product.
 - 1) If no subscription has been registered for the product, no further action is taken.
 - b. The EDEX Subscription endpoint obtains the script information from the database.
 - c. The EDEX Subscription endpoint obtains a micro-engine to execute the script.
 - 1) The micro-engine executes the subscription script for the product.

5.1.1 Data Archive and File Naming Conventions for Satellite Data

As illustrated in Exhibit 5.1.1-1, the satellite data received over the SBN are stored in the following directory structure.

/data_store/sat/<SECTOR ID>/<PHYSICAL ELEMENT>/

- The <SECTOR ID> is the satellite the image was derived from. GOES_WEST and GOES_EAST are not always GOES-11 and GOES-13. This depends on how NESDIS moves the satellites in and out of storage orbits. This is important because GOES-11 and GOES-13 have blackout periods during which they do not send products. For example, east CONUS is predominately covered by GOES-13, but for a short period in the early morning, its source of data is GOES-11. In the case of supernational products, GOES-11 is the source for the top and bottom of the hour, and GOES-13 is the source at 15 and 45 minutes past the hour.
- The <PHYSICAL ELEMENT> indicates if it is a element in the visible infrared, water vapor, etc. ranges.

**Exhibit 5.1.1-1. Acquire and Ingest of Satellite Products**

5.1.1.1 LDM Configuration

LDM behavior is controlled by the two configuration files: **ldmd.conf** and **pqact.conf**. These files are located in /usr/local/ldm/etc on the LDM (PX) server.

- **ldmd.conf** controls which servers the LDM can get data from, who can request from that server, and what data feeds it will request.

NOTE: Modifying **ldmd.conf** will have a severe impact on the data flow.

- **pqact.conf** controls how data sent to an instance of LDM is handled. This includes the data types to be handled as well as the archive locations of the data.

NOTE: Modifying **pqact.conf** will have a severe impact on the data flow.

5.1.2 Decoding – Satellite Data

Data decoding operations are performed on the EDEX (DX3/4) servers. Both EDEX servers share the load in the ingest process, which includes decoding the raw data, writing the decoded data into the Data Store, writing metadata to the database, and broadcasting a notification that the newly ingested data is available.

The Ingested Satellite files are stored in the Data Store. The physical directory is on the DAS and is available on DX1f. On an EDEX (DX3/4) server, the mount point to the Data Store is /awips2/edex/data. The Data Store contains several sub-directories; the ingested data is located under “hdf5.”

The current satellite data in the HDF5 store is organized according to the pattern /awips2/edex/data/hdf5/satellite/satellite/satellite-YYYY-MM-DD-HH--<code>.h5,

Where

<code> is a hash code that represents the ingest machine name (e.g., ..satellite-2012-01-16-03--1152700366.h5)

5.1.3 Data Ingest and Logging of Satellite Products

All satellite data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs.

The edex-ingest-satellite log file handles the satellite products.

The EDEX logs roll over daily and are date stamped.

For the satellite decoder, the instance name is “ingest,” so the satellite ingest log for Jan 16, 2012, is named **edex-ingest-satellite-20120116.log**.

NOTE: Each EDEX Server (DX3 and DX4) has its own set of separate log files. Both sets of log files have the same names and structure, but they contain different information.

The log file is a plain ASCII text file and can be viewed using any text-viewing utility such as *more*, *less*, *view*, or *tail*.

To get a general view of processing, open a terminal session to the server and enter the following commands:

On DX3/DX4,

TYPE: cd /awips2/edex/logs

TYPE: date +%F

2012-01-16

TYPE: ls edex*20120116*

edex-ingest-20120116.log

edex-ingestDat-20120116.log

edex-ingest-gen_areal_ffg-20120116.log

edex-ingest-gen_areal_qpe-20120116.log

edex-ingestGrib-20120116.log

edex-ingest-purge-20120116.log

edex-ingest-radar-20120116.log

edex-ingest-satellite-20120116.log

edex-ingest-shef-20120116.log

edex-ingest-shef-performance-20120116.log

edex-ingest-smartInit-20120116.log

edex-ingest-text-20120116.log

edex-ingest-trigger-20120116.log

edex-ingest-unrecognized-files-20120116.log

edex-request-20120116.log

edex-request-productSrvRequest-20120116.log

Note: edex-ingestDat log file is only available on large memory servers. Refer to Chapter 4, section 4.6 for more information.

TYPE: tail -f edex-ingest-satellite-20120116.log

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <<date-time>> [thread] Ingest: <<type>>:: <<file name>> <<statistics>>

Where,

<<**date-time**>> is the date-time stamp (format yyyy-mm-dd hh:mm:ss,ttt)

[thread] identifies the Camel thread that ran the decoder.

<<type>> identifies the data type, e.g. grib, radar, etc.

<<file name>> is the path to the file that was processed.

<<statistics>> lists the ingest statistics for the file. There are two statistics provided; *process time* and *latency* (refer to the note at the end of this section for more information on latency)

The satellite log entry is as follows.

```
INFO 2012-01-16 23:59:17,629 [satelliteThreadPool-1] Ingest: EDEX: Ingest - satellite::  
/data_store/sat/GOES-15/SOUND-7.43/20120116/10km_HI-  
NATIONAL_2324.satz_468987.20120116 processed in: 0.1710 (sec) Latency: 0.2170
```

NOTE: Latency is the elapsed time between when the AWIPS II system first contacts a data file and when the data has been ingested, decoded, and is ready from retrieval by either CAVE or another client application. The “first contact” depends on the data type. For most data types, latency measurement starts when the product has been downloaded by the LDM Writer on DX2f. This latency start time is part of the message generated by the LDM’s EDEX Bridge and sent to QPID (on the CP 1/2 cluster) for processing by EDEX. Note that this latency measure is strictly internal for the AWIPS II data ingest subsystem. This information is logged into the EDEX process logs for every file that is ingested.

5.2 Monitoring the LDM Data Flow and GOES data

The data flow from the LDM may be monitored using the *ldmadmin* tool. The *watch* option on this tool provides a running list of the LDM’s activity. This will show the data passing through the LDM. To use this tool, first log onto the LDM (U) server (CPSBN) as the ldm user.

Use the -f option and specify a FEED TYPE to see only products from that LDM feed:

ldmadmin watch -f NIMAGE

Press <Ctrl>+<D> to terminate the process

```
Jan 17 18:03:50 pqutil INFO: 42291 20111020180350.374 NIMAGE  
116164576 satz/ch2/MISC/PW/20111020 1629/AK-NATIONAL/1km/ TICB17  
KNES 201629
```

```
Jan 17 18:04:04 pqutil INFO: 126419 20111020180404.398 NIMAGE  
116164647 satz/ch2/MISC/60/20111020 1629/AK-NATIONAL/1km/ TICB60  
KNES 201629
```

To see connections open with ldm:

netstat -ta | grep ldm

tcp 0 0 cpsbn2-tbw3.er.:unidata-ldm *:*	LISTEN
---	--------

```
tcp      0      0 cpsbn2-tbw3.er.:unidata-ldm dx2-tbw3:54591
ESTABLISHED
```

To monitor the product queue via:

pqmon

```
Jan 17 19:25:02 pqmon NOTE: Starting Up (30228)
Jan 17 19:25:02 pqmon NOTE: nprods nfree nempty      nbytes maxprods maxfree
minempty maxext age
Jan 17 19:25:02 pqmon NOTE: 45103   1  76966  499949896   79851    9  42218
52920 1510
Jan 17 19:25:02 pqmon NOTE: Exiting
```

To check for the running of the LDM

ps -U ldm -u ldm u

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
ldm	23108	0.0	0.0	3180	1252	?	Ss	Jan16	0:00	ldmd -I 165.92.
root	23110	0.4	2.6	163204	163200	?	SL	Jan16	5:12	dvbs_multicast
root	23111	0.0	2.6	163204	163200	?	SL	Jan16	0:27	dvbs_multicast
root	23112	0.3	2.6	163204	163200	?	SL	Jan16	3:53	dvbs_multicast
root	23113	0.0	2.6	163204	163200	?	SL	Jan16	0:32	dvbs_multicast
ldm	23114	0.7	10.7	678836	670652	?	S	Jan16	9:33	readnoaaport -m
ldm	23115	0.0	10.0	700920	626912	?	S	Jan16	0:34	readnoaaport -m
ldm	23116	0.6	10.9	690256	681924	?	S	Jan16	8:32	readnoaaport -m
ldm	23117	0.1	10.3	680392	641240	?	S	Jan16	1:18	readnoaaport -m
ldm	23120	0.4	7.9	501320	493620	?	S	Jan16	6:05	ldmd -I 165.92.
ldm	24189	0.0	0.0	10128	1728	?	S	17:51	0:00	sshd: ldm@pts/0
ldm	24190	0.0	0.0	4964	1656	pts/0	Ss	17:51	0:00	-bash
ldm	25039	0.0	0.0	4560	1156	pts/0	R+	18:02	0:00	ps -U ldm -u ld

5.3 GOES Troubleshooting and Tips

5.3.1 Troubleshooting

Common problems seen with GOES data and their possible remedies follow.

- **Problem A:** The product loop for incoming images is not auto-updating on a workstation, or products are not available at a workstation.
- **Potential Solution to Problem A:** Check another workstation for similar problems. It may be that only one workstation is having difficulties. If this is the case, exit and restart CAVE on that workstation.
- **Problems B, C, and D**
 - **Problem B:** No GOES product loops are updating at the site.
 - **Problem C:** Data products are arriving late on the workstation.

- **Problem D:** No GOES products.
- **Potential Solutions to Problems B, C, and D**
 - If the problem is unique to a single workstation, try restarting CAVE. As a last resort, try restarting the workstation.
 - If the problem is more general, try to verify that data is actually available. See section 5.2 for monitoring tools.
 - If data is not available, contact the NCF.

5.3.2 *Tips*

For diagnostic purposes, it is essential to be able to trace the flow of data products from their data source through data ingest/decoding and into the data store. (For purposes of this section, the data source is the server/process where the data first enters the AWIPS II system.) In AWIPS II, all data ingest/decoding is performed by the EDEX Ingest processing running on DX3/4, but the actual sources vary. Recipes for tracing various types of data from their source to the AWIPS II Data Store follow.

Tracing SBN Data into HDF5

SBN data includes satellite imagery, radar data, GRIB data, and many of the text products. All products in this group follow a single path through the system: CPSBN1/2->PX1/2->DX3/4->Data Store (metadata database). These products are also archived in the Data Archive.

Some types of data, generally area based data such as radar, satellite, and forecast grids, as well as certain point data, notably METAR observations, store data in HDF5 files under /awips2/edex/data/hdf5. These files can also be examined to determine if the data has been successfully stored. This recipe presents a procedure for tracing a product and verifying that it has been stored into the HDF5 data store.

In general, to trace an SBN product, you first identify the product's WMO header. As an example, we will trace a GOES 13 product through the system. The general pattern is *Tlxxxx XXXX ddhhmm*. The specific WMO header we will trace is *TICW40 KNES 231430*.

1. Verify that the product was received on CPSBN (CP1).

We verify that the product was received by logging on to CP1 and examining the LDM log. To facilitate the examination, *grep* is used to limit the output. The LDM logs are stored in /usr/local/ldm/logs. The current satellite LDM log is named *goes.log*.

The steps to follow:

```
[root@dx1-tbdw ~]# ssh cpsbn1
```

```
[root@cpsbn1-tbdw]# cd ~ldm/logs
[root@cpsbn1-tbdw]# ls *.log
goes.log  ldmd.log  nwstg2.log  nwstg.log  oconus.log
[root@cpsbn1-tbdw]# ls -l goes.log
-rw-rw---- 1 root fxalpha 369016 Jan 17 14:46 goes.log
[root@cpsbn1]# tail -1 goes.log
Jan 17 14:46:22 cpsbn1-tbdw readnoaaport[21733] NOTE: satz/ch2/GOES-11/SOUND-VIS/20120117 1430/WEST-CONUS/10km/ TICW40 KNES 231430
inserted [cat 3 type 2 ccb 0/0 seq 343135 size 666923]
```

The sequence number (in this case **343135**), is uniquely assigned to this product at the time of transmission by the NWSTG. It may be used to track the product as it is ingested and stored.

2. Verify that the product was received on the dx2f cluster and written to the data archive by logging on to dx2f and checking two locations – the LDM log and the data archive. In both cases, the key to finding the product is the sequence number discovered in step 1

The steps to follow:

```
[root@dx1-tbdw ~]# ssh dx2f
```

```
[root@dx2-tbdw ~]# cd ~ldm/logs
```

```
[root@dx2-tbdw logs]# ls
ldmd.log      ldmd.log.2  ldmd.log.4  ldmd.log.6  scour.log
ldmd.log.1    ldmd.log.3  ldmd.log.5  ldmd.log.7
```

```
[root@dx2-tbdw logs]# ls -l ldmd.log
-rw-r--r-- 1 ldm fxalpha 203592893 Jan 17 14:42 ldmd.log
```

```
[root@dx2-tbdw logs]# grep satz_343135 ldmd.log
```

```
Jan 17 14:46:24 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/sat/GOES-11/SOUND-VIS/20120117/10km_WEST-
CONUS_1430.satz_343135.20120117": 666923 20120117144622.988 NIMAGE
343135 satz/ch2/GOES-11/SOUND-VIS/20120117 1430/WEST-CONUS/10km/ TICW40
KNES 231430
```

```
[root@dx2-tbdw logs]# find /data_store/sat | grep 343135
/data_store/sat/GOES-11/SOUND-VIS/2011023/10km_WEST
CONUS_1430.satz_343135.20120117
```

Note: In this case, find was used because the data archive directory structure for satellite data is somewhat complex. ls can be used, but the search time is considerably longer than using find.

3. Verify that the product has been ingested.

Generally, we can verify that the product has been ingested by examining the EDEX Ingest process logs and looking for an entry identifying the file ingest. This is complicated somewhat by the fact that the product may have been ingested on either DX3 or DX4. There is no way to predict the correct server, so we simply check them both. If the product has been ingested, it will appear in the log on either DX3 or DX4. The basic process is to *grep* for the sequence number in the EDEX Ingest process logs.

The steps to follow on DX3:

```
[root@dx1-tbdw ~]# ssh dx3  
[root@dx3-tbdw ~]# cd /awips2/edex/logs  
[root@dx3-tbdw logs]# date +%F  
2012-01-17  
[root@dx3-tbdw logs]# grep satz_343135 *20120117*.log
```

If the *grep* command results in a single line of output the product ingest has been confirmed and you can proceed to the next step. If the *grep* command results in no output, you will need to repeat these steps on DX4.

```
[root@dx3-tbdw logs]# ssh dx4  
[root@dx4-tbdw ~]# cd /awips2/edex/logs  
[root@dx4-tbdw logs]# grep satz_343135 *20120117*.log  
edex-ingest-satellite-2011023.log:INFO 2012-01-17  
14:46:25,773 [satelliteThreadPool-1] Ingest: EDEX: Ingest -  
satellite:: /data_store/sat/GOES-11/SOUND-  
VIS/20120117/10km_WEST-CONUS_1430.satz_343135.20120117  
processed in: 0.1940 (sec) Latency: 0.2240 (sec)
```

Note: grep satz.343135.was used to match the file naming pattern used by LDM when it writes data to the data archive..

4. Verify that the product has been stored into the database.

These steps are performed on the DX1 as user awips. Unfortunately, identifying the specific conditions on the SQL query is essentially a hit and miss proposition as the satellite table does not have a WMO header or sequence number field.

In the LDM log output in step 2, we see the following string:

```
Jan 17 14:46:24 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/sat/GOES-11/SOUND-VIS/20120117/1km_WEST-
CONUS_1430.satz_343135.20120117": 666923 20120117144622.988
NIMAGE 343135 satz/ch2/GOES-11/SOUND-VIS/20120117 1430/WEST-
CONUS/10km/ TICW40 KNES 231430
```

From this information, we can determine a match for the data URI field (datauri like '%GOES-11%'), and use grep -i to pattern match on “west”, “conus”, “vis”, “sound”, and a date/time of “20120117:” Using grep in Linux on the output is much simpler than trying to use Postgres data type conversion functions within the psql statement. Also, the more complicated the psql statement is, the more load is put on the Posgres engine to perform the search.

```
[root@dx1-tbdw ~]# su – awips
```

```
[awips@dx1-tbdw ~] psql metadata -c "select * from satellite where datauri like
'%GOES-11%';" | grep -i west | grep -i conus | grep -i sound | grep
'2012-01-17'

504426273 | 0 | 2012-01-17 07:30:15 | [] |
2012-01-17 07:30:15 | 2012-01-17 07:30:15 | /satellite/2012-01-
17_07:30:15.0/NESDIS/GOES-11(L)/West_CONUS/Sounder_Visible_Imagery
| 2012-01-17 07:40:18.944 | -1152538345 | GOES-11(L) |
1280 | Sounder Visible imagery | 35794 |
0 | -135 | West CONUS | 1100 |
NESDIS | | 0 | 0 | 667897505
```

Each field is separated by a “|”. The datauri is field 7, starting with “/satellite”. This will identify the HDF5 file and path to the data.

Using the datauri identified in the previous step, we can identify the rest of the individual fields by connecting to the metadata database. Note that reftime and inserttime match the “2012-01-17 07:” search string.

```
[root@dx1-tbdw ~]# su – awips
```

```
[awips@dx1-tbdw ~]$ psql metadata
```

Welcome to psql 8.3.4, the PostgreSQL interactive terminal.

Type:

- \copyright for distribution terms
- \h for help with SQL commands
- \? for help with psql commands
- \g or terminate with semicolon to execute query
- \q to quit
- metadata=# \x
- Expanded display is on.

```

metadata=# select * from satellite
metadata-# where datauri like
metadata-# '%satellite/2012-01-17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_Imagery%';

-[ RECORD 1 ]-----
id | 504426273
forecasttime | 0
reftime | 2012-01-17 07:30:15
utilityflags | []
rangeend | 2012-01-17 07:30:15
rangestart | 2012-01-17 07:30:15
datauri | /satellite/2012-01-17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_Imagery
inserttime | 2012-01-17 07:40:18.944
hdffileid | -1152538345
creatingentity | GOES-11(L)
numrecords | 1280
physicalelement | Sounder Visible imagery
satheight | 35794
satsubpointlat | 0
satsubpointlon | -135
sectorid | West CONUS
sizerecords | 1100
source | NESDIS
units |
upperrightlat | 0
upperrightlon | 0
coverage_gid | 667897505

```

5. Verify that the data is in the HDF5 file.

The HDF5 data archive is located in /awips2/edex/data/hdf5, which is visible from either database server (DX1 or DX2). Data that is stored in HDF5 is located under /awips2/edex/data/hdf5/<type>; in this case <type> is satellite. Under /awips2/edex/data/hdf5/<type>, the directory structure depends on the datatype.

Within that directory, the HDF5 files are named <type><date-hour>-<hdf5 id>.h5: The <type> is the data type; the date-hour stamp has format yyyy-mm-dd-hh as

determined by the data reference time; the <hdf5 id> is the value of the hdffileid field, identified in Step (4). In this case, searching todays “satellite-2012-01-17*” files for the datauri in postgres finds the hdf5 entry in satellite-2012-01-17-1152538345.h5

The steps to follow:

```
[root@dx1-tbdw ~]# su - awips
[awips@dx1-tbdw ~]$ cd /awips2/edex/data/hdf5/satellite
[awips@dx1-tbdw satellite]$ find . -name "*1152538345.h5"
```

This will list all the .h5 files including the above file with satellite-2012-01-17-1152538345.h5.

Next,

Check the awips user LD_LIBRARY_PATH for /awips2/tools/lib. If it is not present, add it to the variable value.

```
[awips@dx1-tbdw satellite]$ echo $LD_LIBRARY_PATH
LD_LIBRARY_PATH=/awips2/edex/lib:/awips2/python/lib:/awips2/postgresql/lib:/awips2/pgsql/lib:/awips2/notification/lib:/awips2/tools/lib:/awips/ops/sharedlib

[awips@dx1-tbdw satellite]$ export
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/awips2/tools/lib

[awips@dx1-tbdw satellite]$ echo $LD_LIBRARY_PATH
LD_LIBRARY_PATH=/awips2/edex/lib:/awips2/python/lib:/awips2/postgresql/lib:/awips2/pgsql/lib:/awips2/notification/lib:/awips2/tools/lib:/awips/ops/sharedlib

Search /awips2/edex/data/hdf5/satellite/<SECTOR ID>/<PHYSICAL ELEMENT>/satellite-2012-01-17* for the datauri.

[awips@dx1-tbdw bin]$ ./h5ls -r /awips2/edex/data/hdf5/satellite/"West CONUS"/"Sounder Visible imagery"/satellite-2012-01-17* | grep
`/satellite/2012-01-17_07:30:15.0/NESDIS/GOES
11(L)/West_CONUS/Sounder_Visible_Imagery'

/awips2/edex/data/hdf5/satellite/West CONUS/Sounder Visible
imagery/satellite-2012-01-17--1152538345.h5//satellite/2012-01-
17_07:30:15.0/NESDIS/GOES-11(L)/West_CONUS/Sounder_Visible_imagery
Group

/awips2/edex/data/hdf5/satellite/West CONUS/Sounder Visible
imagery/satellite-2012-01-17--1152538345.h5//satellite/2012-01-
17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_imagery/Data Dataset {521/Inf,
448/Inf}

/awips2/edex/data/hdf5/satellite/West CONUS/Sounder Visible
imagery/satellite-2012-01-17--1152538345.h5//satellite/2012-01-
17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_imagery/Data-interpolated Group
```

```

/awips2/edex/data/hdf5/satellite/West CONUS/Sounder Visible
imagery/satellite-2012-01-17-07--1152538345.h5//satellite/2012-01-
17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_imagery/Data-interpolated/0 Dataset,
same as /satellite/2012-01-17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_imagery/Data

/awips2/edex/data/hdf5/satellite/West CONUS/Sounder Visible
imagery/satellite-2012-01-17-07--1152538345.h5//satellite/2012-01-
17_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_imagery/Data-interpolated/1 Dataset
{260/Inf, 224/Inf}

```

The critical line in this output is the one starting /Data. It shows that that the satellite data has been ingested and stored. The “Data-interpolated” lines indicate that the data has been stored in different resolutions/decimations. The numbers in parentheses following Dataset provide the pixel resolution of each image.

5.4 Data Archive Directory

This /data_store directory lists the SECTOR ID and PHYSICAL ELEMENT of the satellite data.

Determining Satellite SECTOR ID

```

TYPE:      cd /data_store/sat
TYPE:      ls > ~/sat-sectors.txt
TYPE:      cat ~/sat-sectors.txt
COMP
DMSP
GOES-11
GOES-12
GOES-13
MISC
POES

```

Determining Satellite PHYSICAL ELEMENT in the Data Archive

```

TYPE:      cd $ DATA_ARCHIVE/sat
TYPE:      ls * | grep -v ":" | grep -P "^\w" >
~/sources.txt
TYPE:      sort ~/sources.txt > ~/sorted-sources.txt
TYPE:      uniq ~/sorted-sources.txt ~/sat-sources.txt

```

TYPE: cat ~/sat-sources.txt

11

12.0

13.3

3.9

40

60

CLD

COMP:

CTP

DMSP:

GOES-11:

GOES-12:

GOES-13:

IR

LI

MISC:

POES:

PRXX

PW

sat-sectors.txt

SFC-T

SOUND-11.03

SOUND-14.06

SOUND-3.98

SOUND-4.45

SOUND-6.51

SOUND-7.02

SOUND-7.43

SOUND-VIS

VIS

WV

Chapter 6

Ingest of NWSTG Data

Chapter 6: Ingest of NWSTG Data

Table of Contents

	<i>Page</i>
6.1 Ingest of NWSTG and NCEP Data: Overview	1
6.2 Ingest of NWSTG Products	1
6.3 Gridded Data.....	2
6.3.1 Data Archive and File Naming Conventions	4
6.3.2 Decoding the Grib Data	13
6.3.3 Data Ingest and Logging of Grib Data.....	13
6.3.4 Data Archive and File Naming Conventions for Other Gridded Data	16
6.3.5 Decoding Other Gridded Data	16
6.3.6 Data Ingest and Logging of Other Gridded Products	17
6.4 Lightning Data	18
6.4.1 Data Archive and File Naming Conventions for Lightning Data.....	20
6.4.2 Decoding Lightning Data.....	20
6.4.3 Data Ingest and Logging of Lightning Products.....	20
6.5 METAR Data	22
6.5.1 Data Archive and File Naming Conventions for Metar Data	22
6.5.2 Decoding Metar Data.....	24
6.5.3 Data Ingest and Logging of Metar Products	24
6.6 MOS Data	25
6.6.1 Data Archive and File Naming Conventions for MOS Data	25
6.6.2 Decoding BufrMOS Data	27
6.6.3 Data Ingest and Logging of BufrMOS Products	28
6.7 Decoding BUFR Data: BufrDriver	30
6.7.1 Data Archive and File Naming Conventions for the BUFR Data	32
6.7.2 Decoding BUFR Data.....	37
6.7.3 Data Ingest and Logging of BUFR Products	38
6.8 Decoding Synoptic Observation Data: SynopticDecoder.....	39
6.8.1 Data Archive and File Naming Conventions for Synoptic Data	42
6.8.2 Decoding Synoptic Data	42
6.8.3 Data Ingest and Logging of Synoptic Products	42
6.9 Decoding Special Sensor Microwave Imager (SSM/I) Data	43
6.9.1 Data Archive and File Naming Conventions for SSM/I Data	45
6.9.2 Decoding SSM/I Data.....	45
6.9.3 Data Ingest and Logging of SSM/I Products	45

6.10 convSIGMET Data	46
6.10.1 Data Archive and File Naming Conventions for convSIGMET Data	46
6.10.2 Decoding convSIGMET Data.....	47
6.10.3 Data Ingest and Logging of ConvSIGMET Products	47
6.11 Tracing NWSTG (TAF) Products Using the Sequence Number.....	48

List of Exhibits

Exhibit 6.3-1. NWSTG (grib and non-grib) Data Flow.....	2
Exhibit 6.3.3-1. Acquire and Ingest of NWSTG Products	14
Exhibit 6.4-1. Acquire and Ingest of Lightning Products.....	19
Exhibit 6.5-1. Acquire and Ingest of METAR Products.....	23
Exhibit 6.6-1. Acquire and Ingest of MOS Products.....	26
Exhibit 6.7-1 Acquire and Ingest of BUFR Products	31
Exhibit 6.8-1. Acquire and Ingest of Synoptic Products	41
Exhibit 6.9-1. Acquire and Ingest of SSM/I Products	44

List of Tables

Table 6.3-1. Data Store Mapping of Grid Data	5
Table 6.7.2-1. BUFR Data: Directories and File Names	37
Table 6.2.7-2. Report Code Definitions.....	38
Table 6.8-1. Data URI Codes for Various Synoptic Observation Types.....	40

6.1 *Ingest of NWSTG and NCEP Data: Overview*

The main source of nationally distributed data for AWIPS is the Satellite Broadcast Network (SBN). The SBN delivers products over four channels; the product sets for the NWSTG and NWSTG2 channels include the following:

- | | |
|--------------------------------|---|
| • NCEP and other model outputs | GFS, GFS Ensembles, NGM, NAM, MesoNAM, NOGAPS, RUC40, RUC80, ECMWF, UKMET, GWW, QPE, FFG, SNOW, ENSEMBLE, GLERL, RTGSST, DGEX, and HPCGuide |
| • BUFR data | NAM Model Soundings, GOES Soundings, POES Soundings, ACARS, QuikSCAT ocean winds, GOES High Density Winds, NAM, GFS, NCWF, ASCAT and SSM/I |
| • Surface observations | METAR, lightning, maritime, hydro |
| • Upper air observations | RAOB, profiler, aircraft |
| • Other text products | TAF, CCF, and other coded and plain language text products |
| • NCEP Redbook graphics | Digitized graphics produced by NCEP |

6.2 *Ingest of NWSTG Products*

This chapter describes the method by which AWIPS receives the following data products:

- Gridded data (Section 6.3)
- Lightning data (Section 6.3)
- METAR data (Section 6.4)
- MOS data (Section 6.5)
- Model soundings, GOES soundings, POES soundings, ACARS data, QuikSCAT winds, GOES High Density Winds, NAM, GFS, and NCWF (Section 6.6)
- Synoptic observation data (Section 6.7)
- SSM/I data (Section 6.8)
- Advisory Data (Section 6.9)
- ConvSIGMET Data (Section 6.10)

6.3 *Gridded Data*

The data flow for the NWSTG (grib and non-grib) data is illustrated in Exhibit 6.3-1. As the exhibit shows, the data flow is a 12-step process. Descriptions of each step follow.

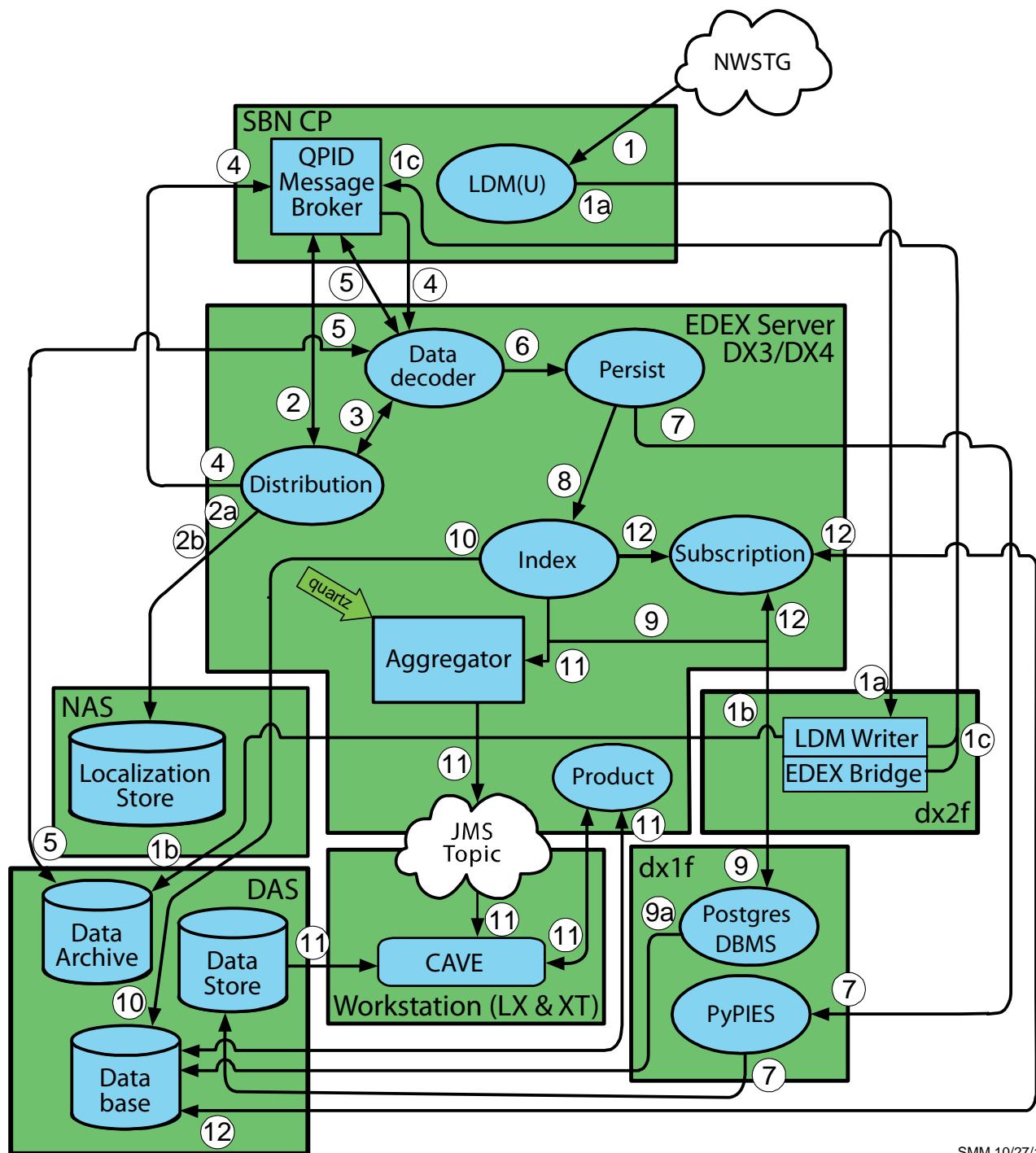


Exhibit 6.3-1. NWSTG (grib and non-grib) Data Flow

1. NWSTG data (grib and non-grib) are obtained by the LDM from the SBN. Most gridded model data are produced by the NCEP. These data are transmitted over the NWSTG channel of the SBN in GRIB (Gridded Binary) or GRIB2 format.
 - a. The LDM forwards the product to the LDM Writer instance.
 - b. The LDM Writer instance writes the product to the Data Archive.
 - c. The LDM Writer instance uses the EDEX Bridge to post a message containing product information to the QPID Message Broker. The product information is the WMO header and the path to the product file.
2. The EDEX Distribution endpoint on the EDEX (DX) cluster pulls the message from the QPID Message Broker. The WMO header is matched against data distribution mappings contained in the data distribution directory to determine product routing. (The WMO header is included in the message; if it is not, the Distribution service uses the product file name from the message to determine routing.) **Note:** The files in the data distribution directory are XML files that contain regular expressions that match WMO headers with the appropriate data decoder plug-in.
 - a. At EDEX startup, the EDEX Distribution endpoint reads the Data Distribution files from the Data Distribution directory in the Localization Store. It uses the contents of these files to generate the routing table used to determine data routing. The Data Distribution directory is located at /awips2/edex/data/utility/edex_static/base/distribution.
 - b. The EDEX Distribution endpoint monitors the Data Distribution directory; when a file in that directory is modified, it re-reads that file and rebuilds its routing table.
3. The EDEX Distribution Service determines the Data Decoder Plug-In registered to handle the data in the product file.
4. The EDEX Distribution Service forwards the message to the appropriate Data Decoder Plug-In via the QPID Message Broker.
5. The EDEX Data Decoder Service on the EDEX (DX) cluster pulls the data type specific message from the QPID Message broker. The Data Decoder Service reads the file pointed to by the message, decodes the data, and determines the appropriate metadata.
6. The decoded data and metadata are sent to the EDEX Persist endpoint.
7. The EDEX Persist endpoint sends the data to PyPIES, and PyPIES writes the data to the EDEX data store in HDF5 format.
8. The EDEX Persist endpoint sends the metadata obtained to the EDEX Index endpoint.
9. The EDEX Index endpoint sends the metadata to the PostgreSQL DBMS.
 - a. The PostgreSQL DBMS writes the metadata to the database.

10. The EDEX Index endpoint extracts the Data URI for the product from the metadata.
11. (Client notification) The Data URI is forwarded to the EDEX URI Aggregator.
 - a. Every 5 seconds the aggregated Data URIs are sent to the JMS Alert Topic.
 - b. CAVE monitors the JMS Alert Topic to obtain a list of available Data. CAVE determines if it should render the available data.
 - c. CAVE retrieves metadata from the EDEX server via a product query sent to the EDEX thrift endpoint.
 - d. CAVE retrieves product data from the EDEX server by accessing the EDEX data store's HDF5 files and CAVE renders the data, updating its display as appropriate.
12. (Subscription) The Data URI is forwarded to the EDEX Subscription endpoint.
 - a. The EDEX Subscription endpoint checks the active subscription list to determine if a subscription has been registered for the product.
 - 1) If no subscription has been registered for the product, no further action is taken.
 - b. The EDEX Subscription endpoint obtains the script information from the database.
 - c. The EDEX Subscription endpoint obtains a micro-engine to execute the script.
 - 1) The micro-engine executes the subscription script for the product.

6.3.1 Data Archive and File Naming Conventions

Most gridded model data are produced by the NCEP. These data are transmitted over the NWSTG channel of the SBN in GRIB (Gridded Binary) or GRIB2 format. They are stored in data archive.

On the LDM (dx2f) server, the data archive is located at **/data_store/grib** or **/data_store/grib2**. The **/data_store mount** is shared through NFS from the dx2f server DAS partition to all workstations, DXs, and PXs.

By default, any grib products that are ingested on DX3/DX4 will be available here. These GRIB1 and GRIB2 files are stored in a raw data archive as described below. In addition, when new products are being tested, they are stored under /data_store/experimental/grib.

Data Storage is not standard across all grids anymore. It is generally stored at
/data_store/grib/GRID_NUMBER/GRID_NAME/YYYYMMDD/

e.g.,**/data_store/grib/GRID202/GFS/20120117/ 1200Z_F120_VGRD-YVIO85_KWBC_469640851.00.20120117**

and

/data_store/grib2//GRID_NAME/GRID_TYPE/

e.g.,`data/store/grib2/
ECMWF_HiRes/ecmwf_decrypted/ecmwf_decrypted_MVZZ99_26_1200_469100201.2
0120117.Uz0Hmg.grib2`

Table 6.3-1 lists the known models currently in the data store.

Table 6.3-1. Grid Models

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
AK-NamDNG5	AK-NamDNG5	7	0	198	89	[LM][ADEHKR-V]A[A-TZ][089][068]_KWBE	0, 6, 12, 18
AK-RTMA	AK-RTMA	7	4	198	109	L[HNPRT-V]AA98_KWBR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
HI-RTMA	HI-RTMA	7	4	196	109	L[HNPRT-V]HA98_KWBR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
Guam-RTMA	Guam-RTMA	7	4	199	109	L[HNPRT-V]GA98_KWBR	0, 3, 6, 9, 12, 15, 18, 21
AKWAVE239	AKWAVE	7	0	239	122	O[A-CJKMNPY]N[ACEGI-Z]88_KWBJ	0, 6, 12, 18
AKwave10	AKwave10	7	0	15	11	E[A-CJ-RWY]E[A-Z]88_KWBJ	0, 6, 12, 18
AKwave4	AKwave4	7	0	16	11	E[A-CJ-RWY]F[A-Z]88_KWBJ	0, 6, 12, 18
AUTOSPE	SPE	9	170	240	190	ZETA98_KNES	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
AVN	GFS180	7	0	202	81, 96, 77	[YZ][BCFHOPRT-VX]I[A-OT-W][0-57-9][05-9]_KWBC	0, 6, 12, 18
AVN203	GFS190	7	0	203	81, 96, 77	[YZ][BCEFOPRT-VX]JJ[A-OT-W][0-57-9][05-9]_KWBC	0, 6, 12, 18
AVN211	GFS80	7	0	211	81, 96, 77	[YZ][BCEFOPRT-Y]Q[A-Z][0-9][0-35-9]_KWBC	0, 6, 12, 18
AVN225	GFS75	7	0	225	81, 96, 77	[YZ][E-HO-RT-Y]Z[A-OT-W][0-9][04-9]_KWBC	0, 6, 12, 18
AVN37	GFSGbl	7	0	37	81, 96, 77, 94	H[CEGHOPRT-V]I[A-KMOQS][0-9][025-9]_KWBC	0, 6, 12, 18
AVN38	GFSGbl	7	0	38	81, 96, 77, 94	H[CEGHOPRT-V]J[A-K][0-9][025-9]_KWBC	0, 6, 12, 18
AVN39	GFSGbl	7	0	39	81, 96, 77, 94	H[CEGHOPRT-V]K[A-KMOQS][0-9][025-9]_KWBC	0, 6, 12, 18
AVN40	GFSGbl	7	0	40	81, 96, 77, 94	H[CEGHOPRT-V]L[A-KMOQS][0-9][025-9]_KWBC	0, 6, 12, 18
AVN41	GFSGbl	7	0	41	81, 96, 77, 94	H[CEGHOPRT-V]M[A-K][0-9][025-9]_KWBC	0, 6, 12, 18
AVN42	GFSGbl	7	0	42	81, 96, 77, 94	H[CEGHOPRT-V]N[A-K][0-9][025-9]_KWBC	0, 6, 12, 18
AVN43	GFSGbl	7	0	43	81, 96, 77, 94	H[CEGHOPRT-V]O[A-K][0-9][025-9]_KWBC	0, 6, 12, 18
AVN44	GFSGbl	7	0	44	81, 96, 77, 94	H[CEGHOPRT-V]P[A-K][0-9][025-9]_KWBC	0, 6, 12, 18
Aviation	Aviation	7	8	252	191, 105	[YZ][AIJLV][WX][A-DGJM][1-9][0-9]_KKCI	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 230
							1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
CPCoutlook-Short	CPCoutlook-Short	7	7	197	201	LTMZ98_KWNC	0
CPCoutlook211	CPCoutlook-Long	7	7	211	30	H[ET]QV[01][0-9]_KWNC	12
DGEX185	DGEX	7	0	185	115	[LM][AEHOPRT-VXZ]E[M-WZ][0257-9][05689]_KWBD	6, 18
DGEX186	DGEX	7	0	186	115	[LM][AEHOPRT-VXZ]F[M-WZ][0257-9][05689]_KWBD	0, 12
ECMF-MODEL0	ECMWF-MODEL0	98	0	255113		H[UV]ZA98_ECMF	0, 12
ECMF10	ECMWF-LowRes	98	0	10	140	H[HPRT-V]J[AEIKMOQS][257-9][058]_ECMF	0, 12
ECMF2	ECMWF-LowRes	98	0	2	140	H[HPRT-V]B[AEIKMOQSZ][257-9][058]_ECMF	0, 12
ECMF6	ECMF-LowRes	98	0	6	140	H[DUV]F[AEIKMOQ][278][05]_ECM[FW]	0, 120 12
ECMF1	ECMWF-LowRes	98	0	255101		H[HPRT-V][AI][AEIKMOQSZ][257-9][058]_ECMF	0, 120 12
ECMF11	ECMWF-LowRes	98	0	255111		H[HPRT-V][CK][AEIKMOQSZ][257-9][058]_ECMF	0, 120 12
ECMF4	ECMWF-LowRes	98	0	255104		H[HPRT-V][DL][AEIKMOQSZ][257-9][058]_ECMF	0, 120 12
ECMF5	ECMWF-LowRes	98	0	255105		H[DUV]E[AEIKMOQ][278][05]_ECM[FW]	0, 120 12
ECMF7	ECMWF-LowRes	98	0	255107		H[DUV]G[AEIKMOQ][278][05]_ECM[FW]	0, 120 12
ECMF8	ECMWF-LowRes	98	0	255108		H[DUV]H[AEIKMOQ][278][05]_ECM[FW]	0, 120 12
ECMWF-HiRes	ECMWF-HiRes	98	0	232			0, 12
ENPWAVE253	ENPwave	7	0	253	124	O[A-CJKMNPY]Q[ACEGI-Z]88_KWBJ	0, 6, 12, 18
ENSEMBLE38	GFSensemb	7	2	38	81, 80, 96, 82, 94	H[EHPRT-V]J[A-WZ][257-9][0589]_KWBK	0, 12
ENSEMBLE39	GFSensemb	7	2	39	81, 80, 96, 82, 94	H[EHPRT-V]K[A-WZ][257-9][0589]_KWBK	0, 12
ENSEMBLE40	GFSensemb	7	2	40	81, 80, 96, 82, 94	H[EHPRT-V]L[A-WZ][257-9][0589]_KWBK	0, 12
EPwave10	EPwave10	7	0	14	11	E[A-CJ-RWY]D[A-Z]88_KWBJ	0, 6, 12, 18
ETA	NAM80	7	0	211	84	[YZ][ACE-HO-RT-Z]Q[A-JM][0-9][03-9]_KWBE	0, 12
ETA207	NAM95	7	0	207	84	[YZ][CE-HO-RT-Z]N[A-JM][0-9][035689]_KWBE	0, 12
ETA212	NAMWX	7	0	212	89	[YZ][ADEST]R[A-IKLO-Q][09][08]_KWBD	0, 12
ETA218	NAM12	7	0	218	84	[LM][AC-HKMO-Z]B[A-TZ][0-9][0-9]_KWBE	0, 6, 12, 18

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
ETA242	AK-NAM12	7	0	242	84	[LM][AC-HKMO-Z]S[A-TZ][0-9][0-9]_KWBE	0, 6, 12, 18
FFG-ALR	FFG-ALR	9	161	240161	151	ZEGZ98_KALR	1, 15, 18
FFG-FWR	FFG-FWR	9	162	240162	151	ZEGZ98_KFWR	1, 7, 15, 19
FFG-KRF	FFG-KRF	9	156	240156	151	ZEGZ98_KKRF	1, 16
FFG-MSR	FFG-MSR	9	157	240157	151	ZEGZ98_KMSR	1, 16
FFG-ORN	FFG-ORN	9	154	240154	151	ZEGZ98_KORN	0, 1, 7, 13, 18, 19
FFG-PTR	FFG-PTR	9	159	240159	151	ZEGZ98_KPTR	14
FFG-RHA	FFG-RHA	9	155	240155	151	ZEGZ98_KRHA	0, 6, 14, 18
FFG-RSA	FFG-RSA	9	153	240153	151	ZEGZ98_KRSA	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
FFG-STR	FFG-STR	9	152	240152	151	ZEGZ98_KSTR	10
FFG-TAR	FFG-TAR	9	158	240158	151	ZEGZ98_KTAR	2, 15
FFG-TIR	FFG-TIR	9	160	240160	151	ZEGZ98_KTIR	1, 12, 18
FFG-TUA	FFG-TUA	9	150	240150	151	ZEGZ98_KTUA	1, 12, 18, 20
GFS160	AK-GFS	7	0	160	81, 96, 77	[LM][A-CE-HMO-Y]G[A-Z][0-9][0-9]_KWBC	0, 6, 12, 18
GFS161	SJU-GFS	7	0	161	81, 96, 77	[LM][A-CE-HMO-Y]T[A-Z][0-9][0-9]_KWBC	0, 6, 12, 18
GFS199	Guam-GFS	7	0	199	81, 96, 77	[LM][AEHKMP-RT-VZ]G[A-WZ][089][068]_KWBT	0, 6, 12, 18
GFS201	GFS360	7	0	201	81, 96	[LMYZ][BCEGHOPRT-V]A[A-Z][1-57-9][05-9]_KWBC	0, 6, 12, 180, 6, 12, 18
GFS212	GFS40	7	0	212	81, 96, 77	[LM][A-CE-HMO-Y]R[A-Z][0-9][0-9]_KWBC	0, 6, 12, 18
GFS213	GFS90	7	0	213	81, 96, 77	[LMYZ][BCE-HO-RT-Y]H[A-Z][0-57-9][05-9]_KWBC	0, 6, 12, 180, 6, 12, 18
GFS254	PR-GFS	7	0	254	81, 96, 77	[LM][A-CE-HMO-Y]O[A-Z][0-9][0-9]_KWBC	0, 6, 12, 18
GFSGuide	GFSGuide	7	4	232	81, 96, 77	L[UV]I[B-VX-Z]88_KWBJ	0, 6, 12, 18
GFSLAMPTstorm	GFSLAMP-Grid	7	14	197	108	L[AB]U[BC][0-2][0-9]_KWNO	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
GRLKwave	GRLKwave	7	0	176	131	E[A-CJ-RY]I[A-T]88_KWBJ	3, 9, 15, 21
GWW21	GWW21	7	0	21	10	H[HKLUV]A[CEIK]9[38]_KWBC	0, 12
GWW22	GWW22	7	0	22	10	H[HKLUV]B[CEIK]9[38]_KWBC	0, 12
GWW23	GWW23	7	0	23	10	H[HKLUV]C[CEIK]9[38]_KWBC	0, 12
GWW233	GWW	7	0	233	10	O[A-CJKMNPY]J[ACEGI-Z]88_KWBJ	0, 6, 12, 18
GWW24	GWW24	7	0	24	10	H[HKLUV]D[CEIK]9[38]_KWBC	0, 12
GlobalWave	GlobalWave	7	0	11	11	E[A-CJ-RWY]A[A-Z]88_KWBJ	0, 6, 12, 18
HPC-MODEL0	HPC-MODEL0	7	5	198	0	LVR[E-J][01][68]_KWNH	12
HPCGuide	HPCGuide	7	5	197	183	L[A-DF-H]U[E-H][01][0268]_KWBN	12, 18

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
HPCGuide-AK	HPCGuide-AK	7	5	198	183	L[ADHMNPSUV]R[E-J][0-2][2468]_KWNH	12
HPCqpf	HPCqpf	7	5	226	180	ZEX[B-N]98_KWNH	0, 6, 12, 18
HPCqpfNDFD	HPC	7	5	197	180	[LM]E[MN][B-KM-OSU]98_KW[BN][CH]	0, 120, 6, 12
							183 6, 15, 18
HurWave238	HurWave238	7	0	238	123	O[A-CJKMNPY]O[ACEGI-OXY]88_KWBJ	0, 6, 12, 18
HurWave253	HurWave253	7	0	253	125	O[A-CJKMNPY]S[ACEGI-OXY]88_KWBJ	0, 6, 12, 18
MOSGuide	GriddedMOS	7	14	197	96	L[A-JRSU-Y]U[A-J][0-2][0-35689]_KWBQ	0, 12
MOSGuide-AK	AK-GriddedMOS	7	14	1023	96	L[A-JRSU-Y]R[A-J][0-2][0-35689]_KWBQ	0, 12
MPE-Local-ALR	MPE-Local-ALR	9	161	240161	160	ZETA98_KALR	3, 4, 5, 6, 7, 8, 9, 20, 21, 22
MPE-Local-MSR	MPE-Local-MSR	9	157	240157	160	ZETA98_KMSR	2, 3, 4, 5, 6, 7, 8, 9, 10, 21, 22
MPE-Local-ORN	MPE-Local-ORN	9	154	240154	160	ZETA98_KORN	6, 18, 19, 20, 21, 22
MPE-Local-RSA	MPE-Local-RSA	9	153	250153	160	ZETA98_KRSA	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
MPE-Local-SJU	MPE-Local-SJU	9	105	240105	160	ZETA98_KALR	3, 4, 5, 6, 7, 8, 9, 22
MPE-Local-STR	MPE-Local-STR	9	152	250152	160	ZETA98_KSTR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
MPE-Local-TAR	MPE-Local-TAR	9	158	240158	160	ZETA98_KTAR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23
MPE-Local-TIR	MPE-Local-TIR	9	160	250160	160	ZETA98_KTIR	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
MPE-Local-TUA	MPE-Local-TUA	9	150	240150	160	ZETA98_KTUA	3, 4, 5
MPE-Mosaic-ALR	MPE-Mosaic-ALR	9	161	240161	161	ZETA98_KALR	0, 2, 14, 16, 17, 19, 20, 22
MPE-Mosaic-FWR	MPE-Mosaic-FWR	9	162	240162	161	ZETA98_KFWR	0, 1, 2, 12, 18, 20, 21, 22, 23
MPE-Mosaic-MSR	MPE-Mosaic-MSR	9	157	240157	161	ZETA98_KMSR	0, 2, 12, 13, 14, 15, 16, 17, 18, 20, 22, 23
MPE-Mosaic-ORN	MPE-Mosaic-ORN	9	154	240154	161	ZETA98_KORN	0, 2, 6, 11, 13, 18
MPE-Mosaic-RHA	MPE-Mosaic-RHA	9	155	240155	161	ZETA98_KRHA	12, 13
MPE-Mosaic-SJU	MPE-Mosaic-SJU	9	105	240105	161	ZETA98_KALR	0, 2, 11, 15, 16, 17, 20, 21, 23
MPE-Mosaic-TAR	MPE-Mosaic-TAR	9	158	240158	161	ZETA98_KTAR	0, 2, 5, 6, 11, 12, 15, 18, 20, 21, 22, 23
MRF	gfsLR	7	0	202	80, 82, 78, 94	Y[CEGHPRT-V]J[ACEGI-Y][02-57-9][0-2589]_KWBH	0
MRF203	gfs190	7	0	203	80, 82, 78, 94	Y[CEGHPRT-V]J[ACEGI-Y][02-57-9][0-2589]_KWBH	0
MRF204	GFS150	7	0	204	80, 82, 78, 94	Y[CEGHPRT-V]K[ACEGI-Y][02-57-9][0-2589]_KWBH	0
MRF205	GFS150	7	0	205	80, 82, 78, 94	Y[CEGHPRT-V]L[ACEGI-Y][02-57-9][0-2589]_KWBH	0

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
MRF21	gfsLR21	7	0	21	80, 82, 78, 94	HTA[L-QUY]98_KWBC	0
MRF22	gfsLR22	7	0	22	80, 82, 78, 94	HTB[L-QUY]98_KWBC	0
MRF23	gfsLR23	7	0	23	80, 82, 78, 94	HTC[L-QUY]98_KWBC	0
MRF24	gfsLR24	7	0	24	80, 82, 78, 94	HTD[L-QUY]98_KWBC	0
MRF25	gfsLR25	7	0	25	80, 82, 78, 94	H[HPUV]E[L-Y][59][089]_KWBC	0
MRF26	gfsLR26	7	0	26	80, 82, 78, 94	H[HPUV]F[L-Y][59][089]_KWBC	0
NCWF	NCWF	7	8	302	190	ZDIA98_KKCI	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
NOHRSC-SNOW	NOHRSC-SNOW	9	163	255	185	[YZ][ES]QA88_KMSR	1111
NamDNG5	NamDNG5	7	0	197	89	[LM][ADEHKR-V]M[A-TZ][089][068]_KWBE	0, 6, 12, 18
OPCWave180	OPCWave-W-ATL	7	6	180	30	LJNT98_KWBC	0, 5, 6, 13, 16, 18
OPCWave181	OPCWave-NE-PAC	7	6	181	30	LJPN98_KWBC	0, 5, 13, 18
OPCWave182	OPCWave-TE-PAC	7	10	182	30	LJPZ98_KNHC	0, 4, 12, 16, 17
PR-NamDNG5	PR-NamDNG5	7	0	195	89	[LM][ADEHKR-V]C[A-TZ][089][068]_KWBE	0, 6, 12, 18
PR-RTMA	PR-RTMA	7	4	195	109	L[HNPRT-V]CA98_KWBR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
PROB3HR	PROB3HR	7	14	236	0	Z[DE]W[A-D][89]8_KWNO	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE	QPE	7	4	240	182	ZETA98_KWNE	12
QPE-ALR	QPE-ALR	9	161	240161	152	ZETA98_KALR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-Auto-TUA	QPE-Auto-TUA	9	150	240150	159	ZETA98_KTUA	0, 1, 2, 11, 13, 14, 16, 18, 19, 20, 22
QPE-FWR	QPE-FWR	9	162	240162	152	ZETA98_KFWR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-KRF	QPE-KRF	9	156	240156	152	ZETA98_KKRF	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-MSR	QPE-MSR	9	157	240157	152	ZETA98_KMSR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-ORN	QPE-ORN	9	154	240154	152	ZETA98_KORN	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-RFC-PTR	QPE-RFC-PTR	9	159	250159	172	ZETA98_KPTR	14
QPE-RFC-RSA	QPE-RFC-RSA	9	153	260153	172	ZETA98_KRSA	13, 14, 20
QPE-RFC-STR	QPE-RFC-STR	9	152	250152	172	ZETA98_KSTR	2, 12, 13, 17, 21, 23
QPE-RHA	QPE-RHA	9	155	240155	152	ZETA98_KRHA	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
QPE-STR	QPE-STR	9	152	250152	152	ZETA98_KSTR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-TIR	QPE-TIR	9	160	250160	152	ZETA98_KTIR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-TUA	QPE-TUA	9	150	240150	152	ZETA98_KTUA	0, 1, 2, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
QPE-XNAV-ALR	QPE-XNAV-ALR	9	161	240161	171	ZETA98_KALR	13, 14, 20, 21, 23
QPE-XNAV-FWR	QPE-XNAV-FWR	9	162	240162	171	ZETA98_KFWR	15, 16, 19, 21
QPE-XNAV-KRF	QPE-XNAV-KRF	9	156	240156	171	ZETA98_KKRF	12, 13, 14, 15, 16, 20
QPE-XNAV-MSR	QPE-XNAV-MSR	9	157	240157	171	ZETA98_KMSR	12, 19
QPE-XNAV-ORN	QPE-XNAV-ORN	9	154	240154	171	ZETA98_KORN	13
QPE-XNAV-RHA	QPE-XNAV-RHA	9	155	240155	171	ZETA98_KRHA	16, 20
QPE-XNAV-SJU	QPE-XNAV-SJU	9	105	240105	171	ZETA98_KALR	13, 14, 20
QPE-XNAV-TAR	QPE-XNAV-TAR	9	158	240158	171	ZETA98_KTAR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
QPE-XNAV-TIR	QPE-XNAV-TIR	9	160	250160	171	ZETA98_KTIR	13, 14, 20
QPE-XNAV-TUA	QPE-XNAV-TUA	9	150	240150	171	ZETA98_KTUA	13, 14, 15, 16, 21
QPF-ALR	QPF-ALR	9	161	226	180	YEI[GM-S]98_KALR	0, 12
QPF-FWR	QPF-FWR	9	162	226	180	YEI[GM-U][89]8_KFWR	0, 12
QPF-KRF	QPF-KRF	9	156	226	180	YEI[GM-O]98_KKRF	11, 13, 18, 23
QPF-MSR	QPF-MSR	9	157	226	180	YEI[GM-O]98_KMSR	13, 18, 22
QPF-ORN	QPF-ORN	9	154	226	180	YEI[GM-O]98_KORN	0, 6, 12, 18
QPF-PTR	QPF-PTR	9	159	226	180	YEI[GM-U][89]8_KPTR	14
QPF-RHA	QPF-RHA	9	155	226	180	YEI[GM-S]98_KRHA	2, 6, 7, 11, 18, 23
QPF-RSA	QPF-RSA	9	153	226	180	YEIG98_KRSA	13
QPF-STR	QPF-STR	9	152	226	180	YEIG98_KSTR	13, 18
QPF-TAR	QPF-TAR	9	158	226	180	YEI[GM-S]98_KTAR	0, 7, 12, 18
QPF-TIR	QPF-TIR	9	160	226	180	YEI[GM-S]98_KTIR	0, 12, 17
QPF-TUA	QPF-TUA	9	150	226	180	YEI[GM-O]98_KTUA	0, 12, 18
RFCqpf	RFCqpf	7	5	226	181	YEI[GM-U][89]8_KWNH	0, 6, 12, 18
RTGSST	RTG-SST-Analysis	7	4	235	44	OTLA88_KWBI	0
RTGSSTHR	RTG-SST-HR-Analysis	7	4	173	44	ETWA88_KWBI	0
RTMA	RTMA	7	4	197	109	L[AENPRT-V]MA98_K[NW][BE][RS]	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 230
							1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
RTMA-Mosaic	RTMA-Mosaic	7	4	184	109	L[EHNPR-V]IA98_KWBR	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
RUC	RUC80	7	0	211	86	[YZ][EG-JOPRT-V]Q[A-CE](1-9)[03-9]_KWBG	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
RUC130	RUC13	7	0	130	105	L[E-HJKM-Z]D[A-M][0-9][0-9]_KWBG	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
RUC236	RUC40	7	0	236	105	Y[ADF-KO-W]W[A-JM][0-9][04-9]_KWBG	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23
SPCGuide	SPCGuide	7	9	197	0	LDI[YZ][1-8][0-7]_KWNS	0, 4, 7, 8, 12, 14, 15, 16, 17, 19, 20
SREF212	SREF	7	2	212	113	[LM][AD-FHKNP-W]R[A-TZ][0257-9][035689]_KWBL	3, 9, 15, 21
SREF216	AK-SREF	7	2	216	113	[LM][DEHNP-W]V[A-TZ][2357-9][05689]_KWBL	3, 9, 15, 21
SREF243	PR-SREF	7	2	243	113	[LM][DEHMNP-RT-W]X[A-TZ][2357-9][05689]_KWBL	3, 9, 15, 21
SeaIce	SeaIce	7	0	219	120	OENA88_KWBM	0
SeaIce173	SeaIce173	7	0	173	120	EEWA88_KWBM	0
SeaIce220	SeaIce220	7	0	220	120	OESA88_KWBM	0
SeaIce235	SeaIce235	7	0	235	120	OEXA88_KWBM	0
SeaSfcAnalysis21	SeaSfcAnalysis21	7	4	21	44	HTAA93_KWBC	0
SeaSfcAnalysis22	SeaSfcAnalysis22	7	4	22	44	HTBA93_KWBC	0
SeaSfcAnalysis23	SeaSfcAnalysis23	7	4	23	44	HTCA93_KWBC	0
SeaSfcAnalysis24	SeaSfcAnalysis24	7	4	24	44	HTDA93_KWBC	0
SeaSfcAnalysis37	SeaSfcAnalysis37	7	4	37	44	HTIA88_KWBC	0
SeaSfcAnalysis38	SeaSfcAnalysis38	7	4	38	44	HTJA88_KWBC	0
SeaSfcAnalysis39	SeaSfcAnalysis39	7	4	39	44	HTKA88_KWBC	0
SeaSfcAnalysis40	SeaSfcAnalysis40	7	4	40	44	HTLA88_KWBC	0
SeaSfcAnalysis41	SeaSfcAnalysis41	7	4	41	44	HTMA88_KWBC	0
SeaSfcAnalysis42	SeaSfcAnalysis42	7	4	42	44	HTNA88_KWBC	0
SeaSfcAnalysis43	SeaSfcAnalysis43	7	4	43	44	HTOA88_KWBC	0
SeaSfcAnalysis44	SeaSfcAnalysis44	7	4	44	44	HTPA88_KWBC	0
SeaSfcAnalysis61	SeaSfcAnalysis61	7	4	61	44	HTTA93_KWBC	0
SeaSfcAnalysis62	SeaSfcAnalysis62	7	4	62	44	HTUA93_KWBC	0
SeaSfcAnalysis63	SeaSfcAnalysis63	7	4	63	44	HTVA93_KWBC	0
SeaSfcAnalysis64	SeaSfcAnalysis64	7	4	64	44	HTWA93_KWBC	0
TPCSurgeProb-AK	TPCSurgeProb-AK	7	14	198	12	LHR[A-F][0-2][0-9]_KNHC	0, 6, 12, 18
TPCSurgeProb197	TPCSurgeProb197	7	14	197	12	LHU[A-F][0-2][0-9]_KNHC	0, 6, 12, 18
TPCWindProb	TPCWindProb	7	10	231	30	[LM]DG[A-OT-W]98_KNHC	0, 6, 12, 18
UKMET37	UKMET	74	0	37	44, 45, 15	H[EHOPRT-V]II[A-K][1-9][05-9]_EGRR	0, 6, 12, 18
UKMET38	UKMET	74	0	38	44, 45, 15	H[EHOPRT-V]JJ[A-K][1-9][05-9]_EGRR	0, 6, 12, 18
UKMET39	UKMET	74	0	39	44, 45, 15	H[EHOPRT-V]K[A-K][1-9][05-9]_EGRR	0, 6, 12, 18
UKMET40	UKMET	74	0	40	44, 45, 15	H[EHOPRT-V]L[A-K][1-9][05-9]_EGRR	0, 6, 12, 18
UKMET41	UKMET	74	0	41	44, 45, 15	H[EHOPRT-V]M[A-K][1-9][05-9]_EGRR	0, 6, 12, 18

Name	Title	Center	Subcenter	Grid	Process	Regex	Forecast Hours
UKMET42	UKMET	74	0	42	44, 45, 15	H[EHOPRT-V]N[A-K][1-9][05-9]_EGRR	0, 6, 12, 18
UKMET43	UKMET	74	0	43	44, 45, 15	H[EHOPRT-V]O[A-K][1-9][05-9]_EGRR	0, 6, 12, 18
UKMET44	UKMET	74	0	44	44, 45, 15	H[EHOPRT-V]P[A-K][1-9][025-9]_EGRR	0, 6, 12, 18
WAFS	WAFS	7	0	45	81, 80, 96, 82, 94	Y[HT]X[CE]50_KWBC	0, 6, 12, 18
WCwave10	WCwave10	7	0	13	11	E[A-CJ-RWY]C[A-Z]88_KWBJ	0, 6, 12, 18
WCwave4	WCwave4	7	0	17	11	E[A-CJ-RWY]G[A-Z]88_KWBJ	0, 6, 12, 18
WNAWAVE238	WNAwave	7	0	238	121	O[A-CJKMNPY]M[ACEGI-Z]88_KWBJ	0, 6, 12, 18
WNAwave10	WNAwave10	7	0	12	11	E[A-CJ-RWY]B[A-Z]88_KWBJ	0, 6, 12, 18
WNAwave4	WNAwave4	7	0	18	11	E[A-CJ-RWY]H[A-Z]88_KWBJ	0, 6, 12, 18
mesoEta212	NAM40	7	0	212	84	[YZ][EGHLOPR-WYZ]R[A-MO-S][0-9][0-35-9]_KWBE	0, 6, 12, 18
mesoEta215	NAM20	7	0	215	84	[YZ][AC-GP-Z]U[A-MO-S][0257-9][05689]_KWBE	0, 6, 12, 18
mesoEta216	AK-NAM40	7	0	216	84	[YZ][AHOPRT-V]V[A-MO-S][0-9][0-79]_KWBE	0, 12
mesoEta217	AK-NAM20	7	0	217	84	[YZ][D-GKP-Z]Y[A-MO-S][089][0689]_KWBE	0, 12
mesoEta237	PR-NAM12	7	0	237	84	Y[EGHO-RT-VX]Z[ADG][1-9][0-35-9]_KWBE	0, 6, 12, 18
mrfNH	gfsLR	7	0	201	80, 82, 78, 94	Y[CEGHPRT-V]A[ACEGI-Y][02-57-9][0-2589]_KWBH	0
GLERL	GLERL	161	1	306	99	OLNC88_KWNB	3, 13
CanadianModel	CanadianModel	54	0	21	41	HVA25_CWAO	0
AK-NOGAPS	AK-NOGAPS	58	20	242	120	OESA88_KNWC	12
UKMET-MODEL1	UKMET-MODEL1	74	0	999002	89, 19, 89	H[HT-V]VA[257-9][0589]_EGRR	0, 12
HI-NamDNG5	HI-NamDNG5	7	0	196	89	[LM][ADEHKR-V]H[A-TZ][089][068]_KWBE	0, 6, 12, 18
OPCWave180	OPCWave-W-ATL	7	6	180	30	LJNT98_KWBC	13, 18
RCM	RCM	8	0	301	0	HAXA00_KWBC	0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23

The LDM behavior is controlled by the two configuration files: **ldmd.conf** and **pqact.conf**. These files are located in the etc subdirectory of the LDM user's home directory on the LDM (PX1) server.

- **ldmd.conf** controls which servers the LDM can get data from, who can request from that server, and what data feeds it will request.

NOTE: Modifying **ldmd.conf** will have a severe impact on the data flow.

- **pqact.conf** controls how data sent to an instance of LDM is handled. This includes the data types to be handled as well as the archive locations of the data.

NOTE: Modifying **pqact.conf** will have a severe impact on the data flow.

6.3.2 Decoding the Grib Data

Data decoding operations are performed on the EDEX (DX3/4) servers. Both EDEX servers share the load in the ingest process, which includes decoding the raw data, writing the decoded data into the Data Store, writing metadata to the database, and broadcasting a notification that the newly ingested data is available.

The Ingested grid files are stored in the Data Store. On an EDEX (DX3/4) server, the mount point to the Data Store is /awips2/edex/data. The Data Store contains several subdirectories; the ingested data is located under "hdf5" – all ingested grib data is under /awips2/edex/data/hdf5/grib.

- a) The basic directory structure is /awips2/edex/data/hdf5/grib/{model}.
- b) Within each model, a separate HDF5 file is maintained for each forecast hour of a model run. The naming convention for the HDF5 files is {model}-yyyy-mm-dd-hh-FH-{forecasthour}.h5. For example, the GFS212 1200Z 0 forecast hour from June 28, 2010 is in a file named GFS212-2010-06-28-12-FH-000.h5.
- c) The internal structure of the HDF5 file reflects the Data URI, which is part of the metadata stored in the PostgreSQL database.

6.3.3 Data Ingest and Logging of Grib Data

As illustrated in Exhibit 6.3.3-1, all data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

- a) EDEX logs roll over daily and are date stamped. The naming convention for EDEX logs is edex-{instance name}-yyymmdd.log.
- b) For the grib decoder, the instance name is “ingestGrib”, so the GRIB ingest logs for October 22, 2011 are named edex-ingestGrib-20111022.log. Note that there should be one log on both of the EDEX servers (DX3/4).

The log file is a plain ASCII text file and can be viewed using any text viewing utility such as *more*, *less*, *view*, or *tail*.

Open a terminal session to the server and enter the following commands:

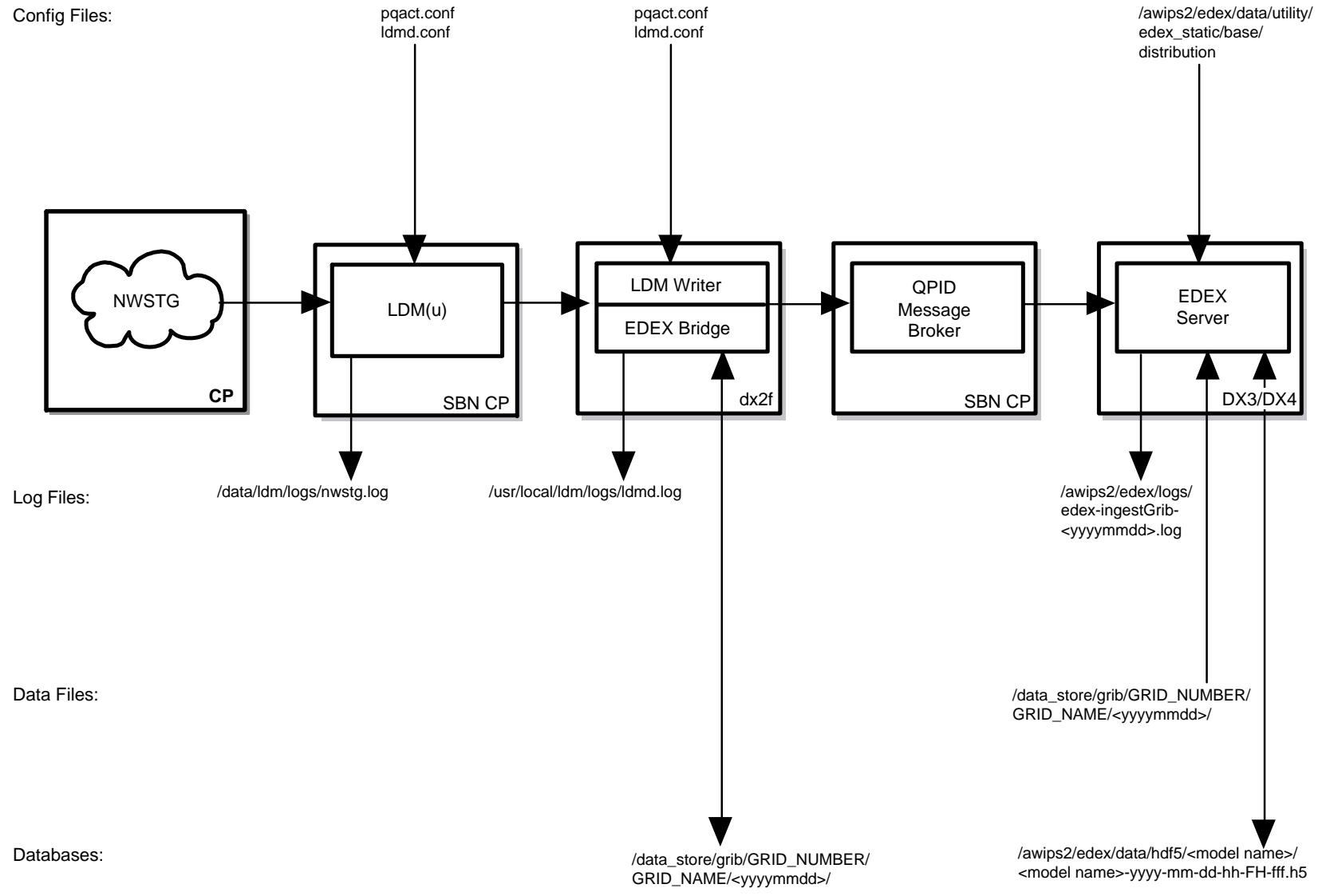


Exhibit 6.3.3-1. Acquire and Ingest of NWSTG Products

On DX3/DX4

```

TYPE:      cd /awips2/edex/logs
TYPE:      date +%F
2011-10-22
TYPE:      ls edex*20111022*
edex-ingest-20111022.log
edex-ingestDat-20111022.log
edex-ingest-gen_areal_ffg-20111022.log
edex-ingest-gen_areal_qpe-20111022.log
edex-ingestGrib-20111022.log
edex-ingest-purge-20111022.log
edex-ingest-radar-20111022.log
edex-ingest-satellite-20111022.log
edex-ingest-shef-20111022.log
edex-ingest-shef-performance-20111022.log
edex-ingest-smartInit-20111022.log
edex-ingest-text-20111022.log
edex-ingest-trigger-20111022.log
edex-ingest-unrecognized-files-20111022.log
edex-request-20111022.log
edex-request-productSrvRequest-20111022.log

TYPE:      tail -f edex-ingestGrib-20111022.log

```

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <<date-time>> [thread] Ingest: <<type>>:: <<file name>> <<statistics>>

Where,

- <<date-time>> is the date-time stamp (format yyyy-mm-dd hh:mm:ss,ttt)
- [thread] identifies the Camel thread that ran the decoder
- <<type>> identifies the data type, e.g. grib, or radar
- <<file name>> is the path to the file that was processed
- <<statistics>> lists the ingest statistics for the file. There are two statistics provided; process time and latency. (Please refer to the note at the end of this section for more information.)

A log entry for grib2 is

```
INFO 2011-10-22 14:32:06,191 [gribThreadPool-2] Ingest: EDEX: Ingest
- grib:: /data_store/grib2/GRID161/SSIGFS/20111022/0000Z_F000_HGHT-
```

LHTA91_KWBC_21446887.grib2.20111022 processed in: 0.1330 (sec)
Latency: -0.1380 (sec)

NOTE: Latency is the elapsed time between when the AWIPS II system first contacts a data file and when the data has been ingested, decoded, and is ready for retrieval by CAVE or another client application. The “first contact” depends on the data type. For most data types, latency measurement starts when the product has been downloaded by the LDM Writer on DX2f. This latency start time is part of the message generated by the LDM’s EDEX Bridge and sent to QPID (on the CP1/2 cluster) for processing by EDEX. For Radar products obtained from the ORPG via the AWIPS II Radar Server, latency measurement starts when the product is downloaded by the Radar Server on the DX1/2 cluster. In the case of ORPG products, the latency start time is part of the message sent by the Radar Server to QPID. Note that this latency measure is strictly internal for the AWIPS II data ingest subsystem. This information is logged into the EDEX process logs for every file that is ingested. Additional latency can occur, for example, due to communication issues between the Radar Server and the ORPG. Other sources of latency are possible. For example (this is a hypothetical example), if a client application queries a server each minute for available products, there is an average latency of 30 seconds in that query. To quantify, or even to identify, all possible sources of latency in a system is beyond the scope of this discussion.

6.3.4 Data Archive and File Naming Conventions for Other Gridded Data

The remaining gridded data (other than GRIB1 and GRIB2) received over the SBN are stored in the following directory.

/data_store/grib/GRID_NUMBER/GRID_NAME/YYYYMMDD/

6.3.5 Decoding Other Gridded Data

Data decoding operations for the Gridded Data (other than GRIB1 and GRIB2) are performed on the EDEX (DX3/4) servers. Both EDEX servers share the load in the ingest process, which includes decoding the raw data, writing the decoded data into the Data Store, writing metadata to the database, and broadcasting a notification that the newly ingested data is available.

The ingested grid files are stored in the Data Store.

On an EDEX (DX3/4) server, the mount point to the Data Store is /awips2/edex/data. The Data Store contains several subdirectories; the ingested data is located under "hdf5" – all ingested grib data is under /awips2/edex/data/hdf5/grib.

- The basic directory structure is /awips2/edex/data/hdf5/grib/{model}.
- Within each model, a separate HDF5 file is maintained for each model run. The naming convention for the HDF5 files is *yyyy-mm-dd-hhmm*.h5.

```
/awips2/edex/data/hdf5/grib AVN211/AVN211-2011-03-30-0600-FH-000.h5  
/awips2/edex/data/hdf5/grib AVN225/AVN225-2011-03-30-0600-FH-000.h5  
/awips2/edex/data/hdf5/grib AVN/AVN-2011-03-30-0600-FH-000.h5  
/awips2/edex/data/hdf5/grib/DGEX185/DGEX185-2011-03-30-0600-FH-000.h5  
/awips2/edex/data/hdf5/grib/ENPWAVE253/ENPWAVE253-2011-03-30-0600-FH-  
000.h5  
/awips2/edex/data/hdf5/grib/ETA218/ETA218-2011-03-30-0600-FH-000.h5  
/awips2/edex/data/hdf5/grib/GFS161/GFS161-2011-03-30-0600-FH-000.h5
```

The internal structure of the HDF5 file reflects the Data URI, which is part of the metadata stored in the PostgreSQL database

6.3.6 Data Ingest and Logging of Other Gridded Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

The log file is a plain ASCII text file and can be viewed using any text viewing utility such as *more*, *less*, *view*, or *tail*.

Open a terminal session to the server and enter the following commands:

On DX3/DX4:

```
[root@dx3-tbdw ~]# cd /awips2/edex/logs  
[root@dx3-tbdw logs]# date +%F  
TYPE: date +%F  
2011-10-22  
TYPE: ls edex*20111022*  
edex-ingest-20111022.log  
edex-ingestDat-20111022.log  
edex-ingest-gen_areal_ffg-20111022.log  
edex-ingest-gen_areal_qpe-20111022.log  
edex-ingestGrib-20111022.log  
edex-ingest-purge-20111022.log  
edex-ingest-radar-20111022.log  
edex-ingest-satellite-20111022.log  
edex-ingest-shef-20111022.log  
edex-ingest-shef-performance-20111022.log  
edex-ingest-smartInit-20111022.log  
edex-ingest-text-20111022.log  
edex-ingest-trigger-20111022.log
```

```
edex-ingest-unrecognized-files-20111022.log  
edex-request-20111022.log  
edex-request-productSrvRequest-20111022.log  
  
[root@dx3-tbdw logs]# tail -f edex-ingestGrib-20111022.log
```

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <>date-time>> [thread] Ingest: <>type>>:: <>file name>> <>statistics>>

The product sequence number is to the left of the .grb (_<seq>.grb).

The log entry:

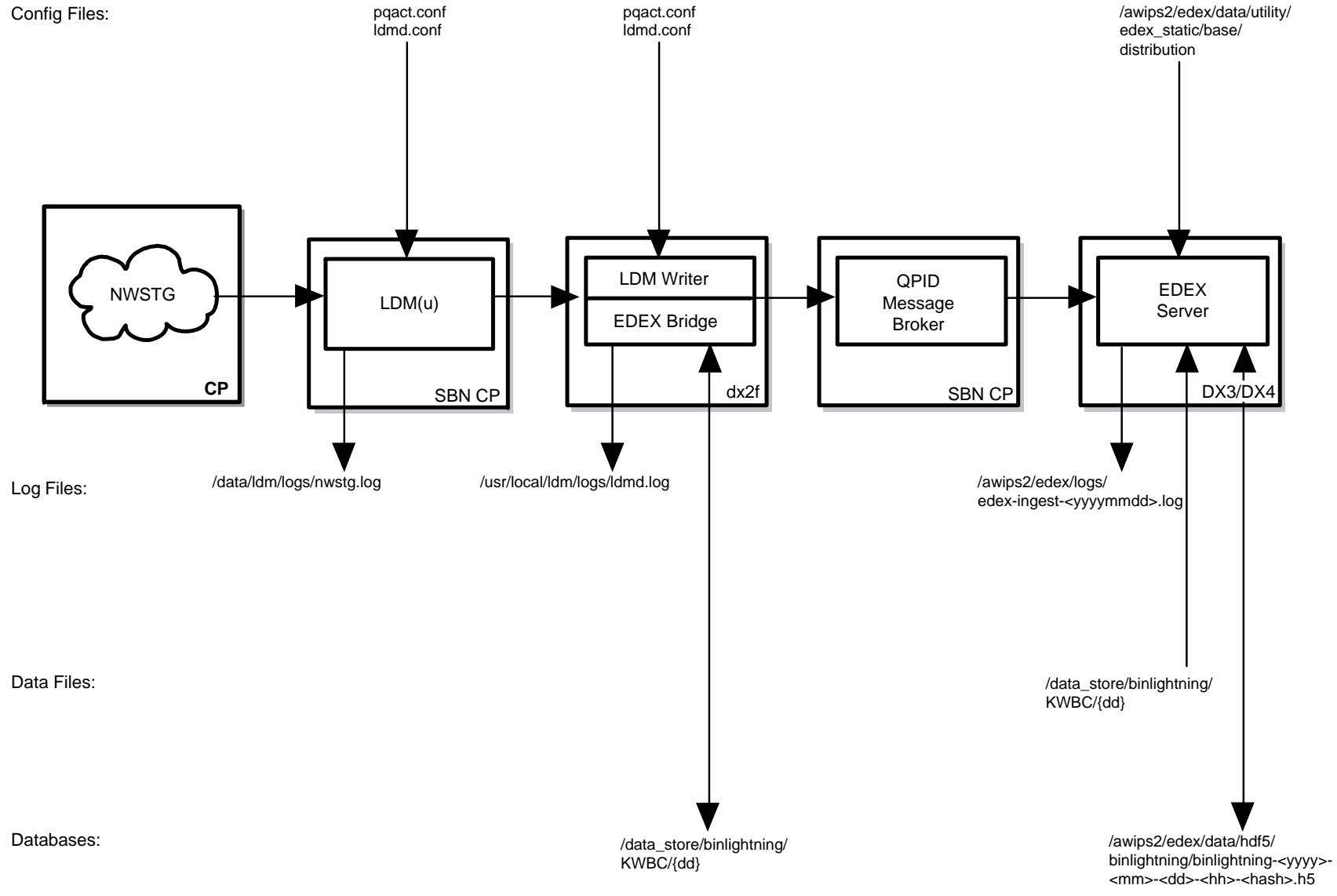
```
INFO 2011-10-22 09:01:23,332 [gribThreadPool-1] Ingest: EDEX:  
Ingest - grib::  
/data_store/grib2/GRID185/DGEX_115/20111022/0600Z_F090_TMPK-  
MTEU70_KWBD_21544841.grib2.20111022 processed in: 0.2190 (sec)  
Latency: -0.0460 (sec)  
  
INFO 2011-10-22 09:29:59,363 [gribThreadPool-2] Ingest: EDEX:  
Ingest - grib::  
/data_store/grib/GRID201/SSIGFS/20111022/0600Z_F000_TMP-  
YTAA25_KWBC_460786927.00.20111022 processed in: 0.1380 (sec)  
Latency: -0.0670 (sec)
```

6.4 *Lightning Data*

Lightning data are collected by the National Lightning Detection Network (NLDN) and received from the SBN. This data set contains the location that a lightning strike was detected (given by latitude and longitude) and the time that the flash occurred, recorded to the nearest second. The lightning flash's signal strength is recorded in kiloamperes. Also included is the multiplicity and polarity (either positive or negative) of each flash.

Note: For more information on the proprietary nature of the lightning data and redistribution restrictions, please refer to:
http://www.nco.ncep.noaa.gov/sib/restricted_data/restricted_data_pmb/lightning/

See Exhibit 6.4-1 for the flow of the acquisition and ingest of lightning products.

**Exhibit 6.4-1. Acquire and Ingest of Lightning Products**

6.4.1 Data Archive and File Naming Conventions for Lightning Data

The lightning data received over the SBN are stored in
/data_store/binlightning/<KWBC>/

The files are:

/data_store/binlightning/KWBC/{dd}

Where dd is the two digit date.

e.g., /data_store/binlightning/KWBC/21/
SFUS41_US_KWBC2023_458297234.nldn.20111021

6.4.2 Decoding Lightning Data

Data decoding operations are performed on the EDEX (DX3/4) servers. Both EDEX servers share the load in the ingest process, which includes decoding the raw data, writing the decoded data into the Data Store, writing metadata to the database, and broadcasting a notification that the newly ingested data is available.

The physical directory is on the DAS and is available on DX1f. On an EDEX (DX3/4) server, the mount point to the Data Store is /awips2/edex/data. The Data Store contains several subdirectories; the ingested data is located under "hdf5".

The ingested Lightning data files are stored in the Data Store. All ingested lightning data is under /awips2/edex/data/hdf5/binlightning.

The basic directory structure is:

/awips2/edex/data/hdf5/binlightning/binlightning-<yyyy>-<mm>-<dd>-
<hh>-<hash>.h5

There are two hdf5 files for each hour, one for dx3 and one for dx4.

```
[root@dx1-tbdw binlightning] # ls /awips2/edex/data/hdf5/binlightning/  
binlightning-2011-10-20-20--1152538866.h5  
binlightning-2011-10-20-20--1181168017.h5
```

NOTE: In the above example, 1152538866, 1181168017 are identifiers tied to the EDEX server (DX3 or DX4) that processed/decoded the data.

6.4.3 Data Ingest and Logging of Lightning Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

The log file is a plain ASCII text file and can be viewed using any text viewing utility such as *more*, *less*, *view*, or *tail*.

To get a general view of processing, open a terminal session to the server and enter the following commands:

On DX3/DX4:

```
TYPE:      cd /awips2/edex/logs  
  
TYPE:      date +%F  
  
2011-10-18  
  
TYPE:      ls edex*20111018*  
  
edex-ingest-20111018.log  
edex-ingestDat-20111018.log  
edex-ingest-gen_areal_ffg-20111018.log  
edex-ingest-gen_areal_qpe-20111018.log  
edex-ingestGrib-20111018.log  
edex-ingest-purge-20111018.log  
edex-ingest-radar-20111018.log  
edex-ingest-satellite-20111018.log  
edex-ingest-shef-20111018.log  
edex-ingest-shef-performance-20111018.log  
edex-ingest-smartInit-20111018.log  
edex-ingest-text-20111018.log  
edex-ingest-trigger-20111018.log  
edex-ingest-unrecognized-files-20111018.log  
edex-request-20111018.log  
edex-request-productSrvRequest-20111018.log  
  
TYPE:      tail -f edex-ingest-20111018.log
```

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <>date-time>> [thread] Ingest: <>type>>:: <>file name>> <>statistics>>

A log entry will be as follows.

```
INFO 2011-10-18 00:01:02,661 [genericThreadPool-33] Ingest: EDEX: Ingest -  
binlightning:  
/data_store/binlightning/KWBC/17/SFUS41_US_KWBC1723_452407728.nldn.2011101  
8 processed in: 0.0600 (sec) Latency: 0.0260 (sec)
```

6.5 METAR Data

METAR data are received over the NWSTG channel of the SBN. The raw data arrive in text format as one singular report or as a collective report that contains data from several stations.

See Exhibit 6.5-1 for the flow of the acquisition and ingest of METAR products.

6.5.1 Data Archive and File Naming Conventions for Metar Data

METAR data ingested from the SBN are written to the following directory.

/data_store/text/

Under nearly every plug-in folder you will find a set of directories representing the various hours in which these products were issued. For metar, under /data_store/text, you will find folders with the day of the month.

```
[root@dx3-tbdw data_store]# ls /data_store/text/<dd>
```

Where <dd> is the day of the month.

Under the <dd> you will find folders ranging from 00 through 2 that represent the hour.

```
00 02 04 06 08 10 12 14 16 18 20 22  
01 03 05 07 09 11 13 15 17 19 21 23
```

If you change directory to /data_store/text/19/12, you will find all observations issued between 12z and 13z.

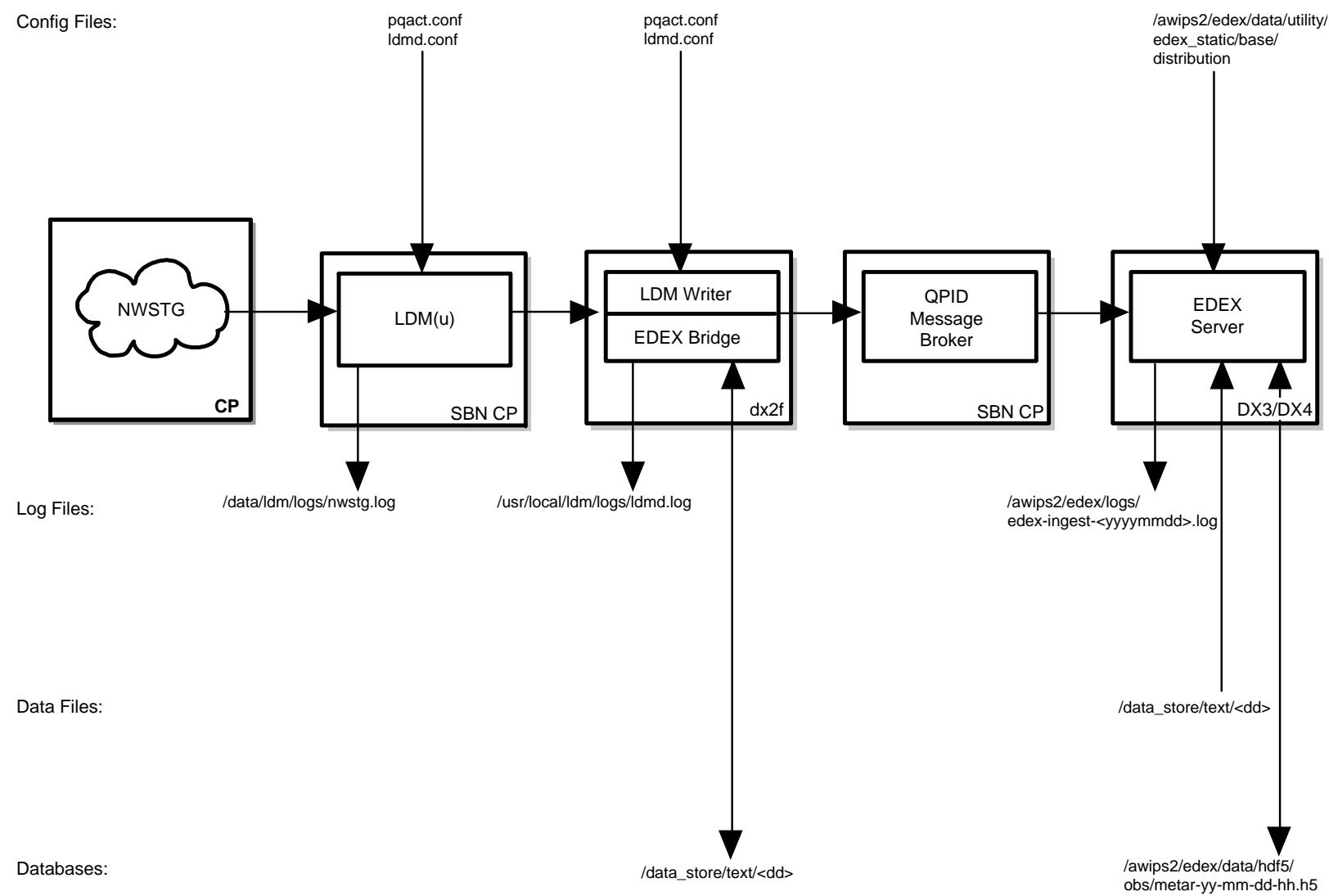
Typical entries are:

```
[root@dx3-tbdw data_store]# ls /data_store/text/19/12  
SAUS41_KCAR_301257_124171831.20111019  
SAMX41_KWBC_301245_124181397.20111019  
SACN41_CWAO_301200_124116733.20111019  
SPUS41_KWBC_301249_124162499.20111019
```

The first two characters are SA = regular observation and SP = special observation. The third and fourth characters denote the country (US = United States; MX = Mexico, CN = Canada).

In the last entry (SPUS41_KWBC), 301249 denotes the day/hour/minute from the WMO header, and 124162499 represents the unique sequence number assigned by the NWSTG at transmission over the SBN. It is the number used for automatic product reships. 20111019 represents the date.

NOTE: The KWBC files are often, but not always, collectives.

**Exhibit 6.5-1. Acquire and Ingest of METAR Products**

6.5.2 Decoding Metar Data

METAR data is decoded by the obs decoder, which is part of the EDEX Ingest process running on the DX3/4 cluster.

The Ingested METAR Data files are stored in the Data Store and in the AWIPS II database. Metadata for the METAR data is stored in the awips schema of the metadata database; the decoded METAR is stored in HDF5 files in the Data Store.

In the AWIPS II database, metadata for decoded METARs is stored in the obs table of the awips schema of the metadata database.

The physical directory is on the dx1f DAS and is not shared through NFS with any other server or workstation. The workstations and dx3/4 have a NAS mount to /aiidata/hdf5, which is miscellaneous shared data for hydroapps and aviation. Access to the dx1f hdf5 data is through the following process: CAVE communicates with the EDEX request jvm when it wants a product. EDEX request queries postgres to get the metadata for the data requested (last 10 satellite images, for example). Inside the metadata is "where" in hdf5 that data resides, so EDEX jvm requests that data from pypes. Once it receives the hdf5 data, it passes it to CAVE, so that CAVE is not reading a file; the hdf5 data for display is passed over the network by EDEX request jvm.

6.5.3 Data Ingest and Logging of Metar Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting "edex-" are the EDEX logs.

The log file is a plain ASCII text file and can be viewed using any text viewing utility such as *more*, *less*, *view*, or *tail*.

Open a terminal session to the server and enter the following commands:

On DX3/DX4

```
TYPE:      cd /awips2/edex/logs  
TYPE:      date +%F  
2011-10-19  
TYPE:      ls edex*20111019*  
edex-ingest-20111019.log  
edex-ingestDat-2011109.log  
edex-ingest-gen_areal_ffg-20111019.log  
edex-ingest-gen_areal_qpe-20111019.log  
edex-ingestGrib-20111019.log  
edex-ingest-purge-20111019.log
```

```
edex-ingest-radar-20111019.log
edex-ingest-satellite-20111019.log
edex-ingest-shef-20111019.log
edex-ingest-shef-performance-20111019.log
edex-ingest-smartInit-20111019.log
edex-ingest-text-20111019.log
edex-ingest-trigger-20111019.log
edex-ingest-unrecognized-files-20111019.log
edex-request-20111019.log
edex-request-productSrvRequest-20111019.log

TYPE: tail -f edex-ingest-20111019.log
```

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

```
INFO 2011-10-19 00:00:13,896 [genericThreadPool-41] Ingest: EDEX: Ingest - obs:: /data_store/text/25/23/SAUS41_KLWX_252359_467529325.20111019 processed in: 0.0170 (sec) Latency: 0.3110 (sec)
```

6.6 *MOS Data*

The MOS data is received over the SBN's NWSTG channel.

See Exhibit 6.6-1 for the flow of the acquisition and ingest of MOS products.

6.6.1 *Data Archive and File Naming Conventions for MOS Data*

The MOS data received over the SBN are stored in the following directory.

```
/data_store/bufrmos/{dd}
```

Where {dd} signifies the day of the month in which the statistical guidance based on model forecasts was issued.

Under <dd> you will find folders ranging from 00 through 23

```
[root@dx1-tbdw bufrmos]# ls /data_store/bufrmos/{dd}
```

```
00 02 04 06 08 10 12 14 16 18 20 22  
01 03 05 07 09 11 13 15 17 19 21 23
```

If you change to /data_store/bufrmos/19/00, you will find all the guidance issued between 00z and 01z.

Here is an example with the GFSLAMP, GFS, ETA, HPC, NGM and MRF files under the MOS data.

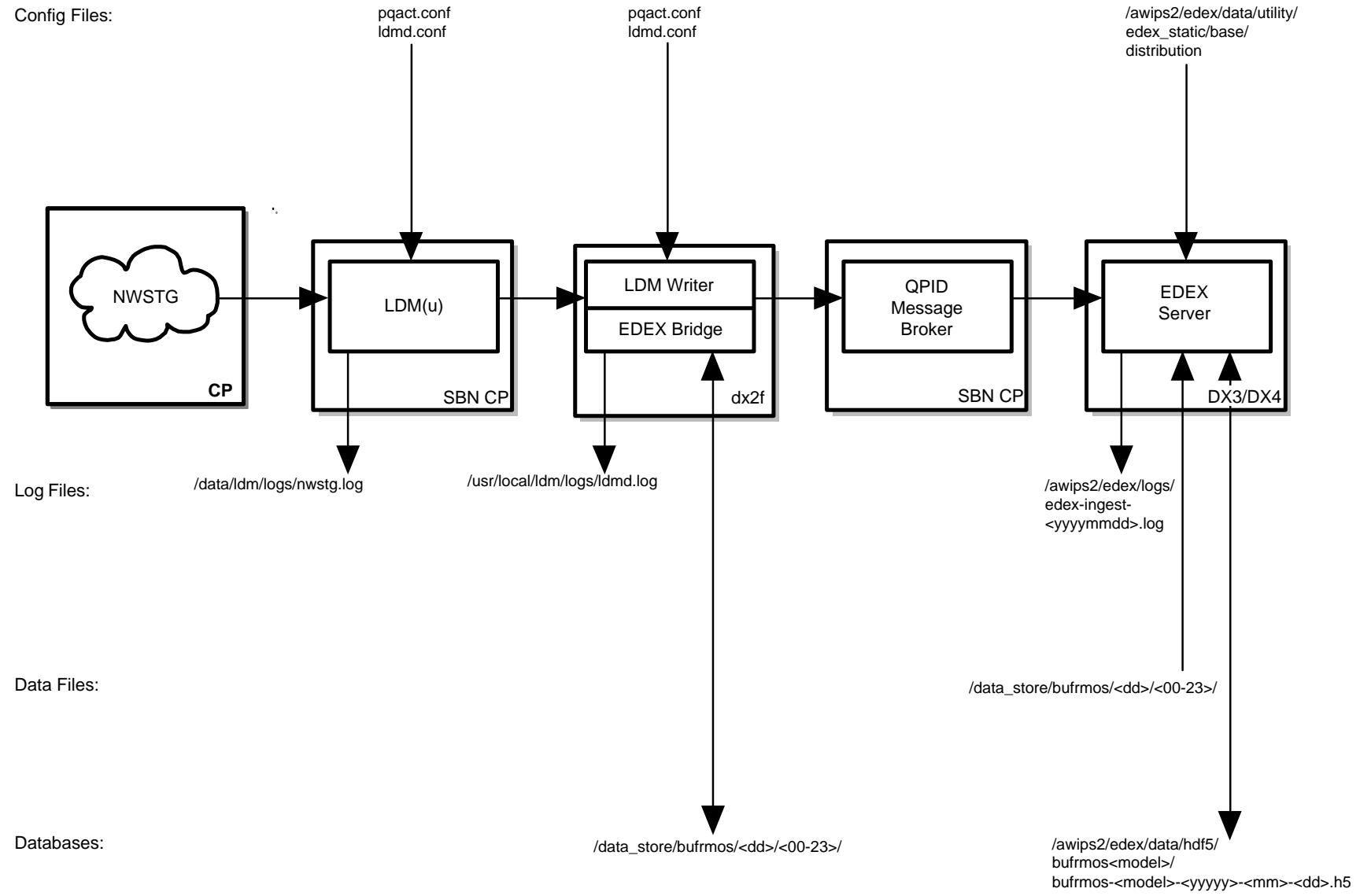


Exhibit 6.6-1. Acquire and Ingest of MOS Products

JSMF10_KWNO_300000_143710496.20111019 (GFSLAMP)
JSML36_KWNO_300000_144004297.20110119 (GFS)
JSML12_KWNO_061200_3526466.20110119 (ETA)
JSMT72_KWNH_060000_3461881.20111019 (HPC)
JSMT42_KWNH_060000_3875681.20111019 (NGM)
JSMT62_KWN0_060000_3784680.20111019 (MRF)

6.6.2 Decoding BufrMOS Data

Data decoding operations are performed on the EDEX (DX3/4) servers. Both EDEX servers share the load in the ingest process, which includes decoding the raw data, writing the decoded data into the Data Store, writing metadata to the database, and broadcasting a notification that the newly ingested data is available.

The physical directory is on the DAS and is available on DX1f. On an EDEX (DX3/4) server, the mount point to the Data Store is /awips2/edex/data. The Data Store contains several subdirectories; the ingested data is located under "hdf5".

The Ingested MOS files are stored in the Data Store.

All ingested bufrmosLAMP data are under
/awips2/edex/data/hdf5/bufrmosLAMP/<model>-<yyyy>-<mm>-<dd>-<hh>.h5

E.g.: /awips2/edex/data/hdf5/bufrmosLAMP/bufrmos-LAMP-2011-10-19-11.h5

All ingested bufrmosGFS data are under /awips2/edex/data/hdf5/bufrmosGFS/<model>-<yyyy>-<mm>-<dd>-<hh>.h5

E.g.: /awips2/edex/data/hdf5/bufrmosGFS/bufrmos-GFS-2011-10-19-11

All ingested bufrmosETA data are under /awips2/edex/data/hdf5/bufrmosETA/<model>-<yyyy>-<mm>-<dd>-<hh>.h5

E.g.: /awips2/edex/data/hdf5/bufrmosETA/bufrmos-ETA-2011-10-19-11

All ingested bufrmosHPC data are under /awips2/edex/data/hdf5/bufrmosHPC/<model>-<yyyy>-<mm>-<dd>-<hh>.h5

E.g.: /awips2/edex/data/hdf5/bufrmosHPC/bufrmos-HPC-2011-10-19-11

All ingested bufrmosMRF data are under
/awips2/edex/data/hdf5/bufrmosMRF/<model>-<yyyy>-<mm>-<dd>-<hh>.h5

E.g.: /awip All ingested bufrmosNGM data are under
/awips2/edex/data/hdf5/bufrmosNGM/<model>-<yyyy>-<mm>-<dd>-<hh>.h5

E.g.: /awips2/edex/data/hdf5/bufrmosNGM/bufrmos-NGM-2011-10-19-11
 s2/edex/data/hdf5/bufrmosMRF/bufrmos-NGM-2011-10-19-11

6.6.3 Data Ingest and Logging of BufrMOS Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

Open a terminal session to the server and enter the following commands:

On DX3:

```
[root@dx3-tbdw ~]# cd /awips2/edex/logs
[root@dx3-tbdw logs]# date +%F
2011-10-19

[root@dx3-tbdw logs]# ls edex-*20111019*
edex-ingest-20111019.log
edex-ingestDat-2011109.log
edex-ingest-gen_areal_ffg-20111019.log
edex-ingest-gen_areal_qpe-20111019.log
edex-ingestGrib-20111019.log
edex-ingest-purge-20111019.log
edex-ingest-radar-20111019.log
edex-ingest-satellite-20111019.log
edex-ingest-shef-20111019.log
edex-ingest-shef-performance-20111019.log
edex-ingest-smartInit-20111019.log
edex-ingest-text-20111019.log
edex-ingest-trigger-20111019.log
edex-ingest-unrecognized-files-20111019.log
edex-request-20111019.log
edex-request-productSrvRequest-20111019.log

[root@dx3-tbdw logs]# grep bufrmos edex-ingest-20111019.log | tail -1
INFO 2011-10-19 22:18:37,351 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/18/JXML31_KWNO_191800_456310881.20111019
processed in: 17.9430 (sec) Latency: 78.6090 (sec)

[root@dx3-tbdw logs]# ssh dx4 "grep bufrmos /awips2/edex/logs/edex-
ingest-20111019.log | tail -1"
INFO 2011-10-19 22:19:02,014 [genericThreadPool-4] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/18/JXML33_KWNO_191800_456310904.20111019
```

processed in: 23.3580 (sec) Latency: 102.2670 (sec)

The following are examples of looking for a specific bufrmos types by using the AWIPS1 acq_patterns.txt ingest pattern threads. The grep examples should be performed on both dx3 and dx4.

For GFS extended MRF data:

`^JSMT6[1-6].*`

`^JSMT7[1-6].KWNO.*`

```
[root@dx3-tbdw logs]# grep "JSMT6[1-6]" edex-ingest-20111019.log
```

INFO 2011-10-19 04:55:44,635 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JSMT62_KWNO_190000_454760739.20111019
processed in: 0.9480 (sec) Latency: 137.5350 (sec)

INFO 2011-10-19 04:55:50,166 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JSMT64_KWNO_190000_454760749.20111019
processed in: 1.4110 (sec) Latency: 142.0640 (sec)

For NGM data:

`^JSMT4[1-6].*`

```
[root@dx3-tbdw logs]# grep "JSMT4[1-6]" edex-ingest-20111019.log
```

For HPC data:

`^JSMT7[1-6].KWNH.*`

```
[root@dx3-tbdw logs]# grep "JSMT7[1-6].KWNH" edex-ingest-20111019.log
```

INFO 2011-10-19 14:35:48,037 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JSMT72_KWNH_190000_455564966.20111019
processed in: 1.0140 (sec) Latency: -0.0390 (sec)

INFO 2011-10-19 14:35:48,273 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JSMT72_KWNH_190000_455564966.20111019
processed in: 0.1950 (sec) Latency: 0.8510 (sec)

For GFS data:

`^JSML3[1-6].*`

```
[root@dx3-tbdw logs]# grep "JSML3[1-6]" edex-ingest-20111019.log
```

INFO 2011-10-19 04:18:50,033 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JSQL36_KWNO_190000_454702219.20111019
processed in: 6.9800 (sec) Latency: 6.2240 (sec)

INFO 2011-10-19 04:18:57,506 [genericThreadPool-11] Ingest: EDEX: Ingest -

bufrmos:: /data_store/bufrmos/19/00/JXML36_KWNO_190000_454702219.20111019
processed in: 4.3170 (sec) Latency: 13.5510 (sec)

INFO 2011-10-19 04:19:02,993 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JXML35_KWNO_190000_454702246.20111019
processed in: 5.4840 (sec) Latency: 18.1560 (sec)

For ETA data:

`^JXML1[1-6].*`

```
[root@dx3-tbdw logs]# grep "JXML1[1-6]" edex-ingest-20111019.log
```

INFO 2011-10-19 02:58:51,552 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JXML14_KWNO_190000_454589368.20111019
processed in: 12.1590 (sec) Latency: 37.4680 (sec)

INFO 2011-10-19 02:59:05,184 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/00/JXML11_KWNO_190000_454589369.20111019
processed in: 13.5910 (sec) Latency: 51.2370 (sec)

For GFSLAMP data:

`^JSMF1[1-6].KWNO.*`

```
[root@dx3-tbdw logs]# grep "JSMF1[1-6].KWNO" edex-ingest-20111019.log
```

INFO 2011-10-19 04:30:52,223 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/04/JSMF12_KWNO_190400_115333208.20111019
processed in: 7.1640 (sec) Latency: 6.4440 (sec)

INFO 2011-10-19 04:30:57,975 [genericThreadPool-11] Ingest: EDEX: Ingest -
bufrmos:: /data_store/bufrmos/19/04/JSMF16_KWNO_190400_115333209.20111019
processed in: 5.7510 (sec) Latency: 11.2400 (sec)

6.7 Decoding BUFR Data: BufrDriver

Data ingested in BUFR format include model soundings, GOES soundings, POES soundings, ACARS data, GOES High Density Wind (hdw) data, QuikSCAT ocean wind data, mtsat High Density Wind (mtsathdw), and ncwf.

See Exhibit 6.7-1 for the flow of the acquisition and ingest of BUFR products.

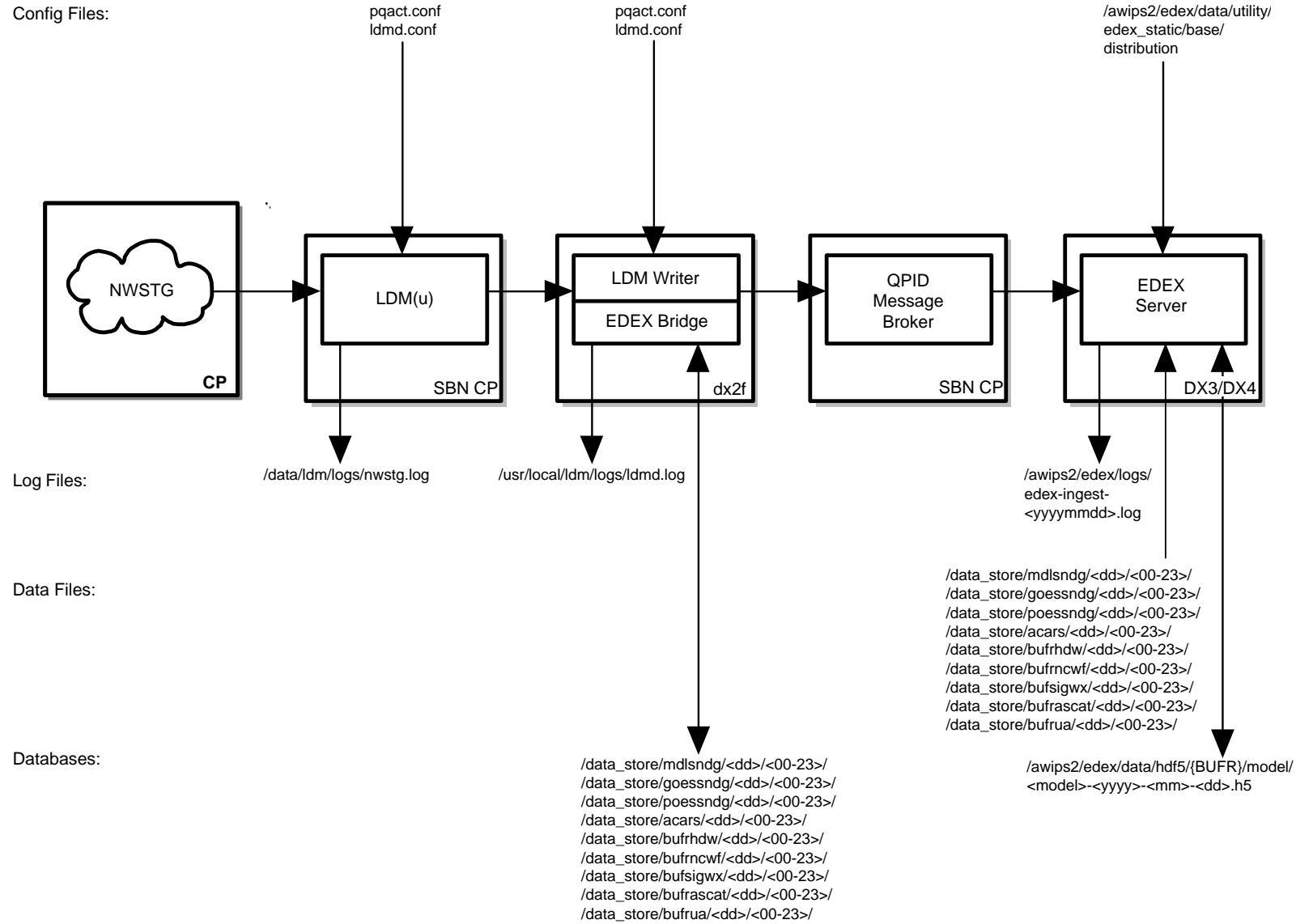


Exhibit 6.7-1 Acquire and Ingest of BUFR Products

6.7.1 Data Archive and File Naming Conventions for the BUFR Data

The Bufr data (miscellaneous point data) received over the SBN are stored in the following directories.

For model soundings:

/data_store/mdlsndg/{hh}

Where, {hh} signifies the hour.

```
[root@dx3-tbdw mdlsndg]# ls /data_store/mdlsndg
04 08 10 14 16 20 21 22
[root@dx3-tbdw mdlsndg]# ls /data_store/mdlsndg/02
JUSB43_KWBC_190400_454723920.20111019
JUSX49_KWBC_190400_454726950.20111019
JUSB43_KWBC_190400_454723921.20111019
JUSX49_KWBC_190400_454726958.20111019
JUSB43_KWBC_190400_454723922.20111019
JUSX49_KWBC_190400_454726980.20111019
```

For GOES soundings:

/data_store/goessndg/{hh}

Where, {hh} signifies the hour

```
[root@dx3-tbdw data_store]# ls /data_store/goessndg
00 02 04 06 08 10 12 14 16 18 20 22
01 03 05 07 09 11 13 15 17 19 21 23
[root@dx3-tbdw 02]# ls /data_store/goessndg/02
JUTX01_KNES_190225_454551159.20111019
JUTX04_KNES_190247_454579114.20111019
JUTX01_KNES_190225_454551163.20111019
JUTX04_KNES_190247_454579115.20111019
JUTX01_KNES_190225_454551165.20111019
JUTX04_KNES_190247_454579118.20111019
JUTX01_KNES_190225_454551180.20111019
JUTX04_KNES_190247_454579122.20111019
JUTX01_KNES_190225_454551183.20111019
JUTX04_KNES_190247_454579125.20111019
```

JUTX01_KNES_190225_454551186.20111019
 JUTX04_KNES_190247_454579135.20111019
 JUTX01_KNES_190225_454551193.20111019
 JUTX05_KNES_190202_454522314.20111019
 JUTX01_KNES_190225_454551208.20111019
 JUTX05_KNES_190202_454522318.20111019

For POES soundings:

/data_store/poessndg/{hh}

Where, {hh} signifies the hour.

```
I
[root@dx3-tbdw data_store]# ls /data_store/poessndg
 00  02  04  06  08  10  12  14  16  18  20  22
 01  03  05  07  09  11  13  15  17  19  21  23

[root@dx3-tbdw data_store]# ls /data_store/poessndg/02
IUTX01_KNES_190242_454574393.20111019
IUTX07_KNES_190245_454478099.20111019
IUTX01_KNES_190243_454574403.20111019
IUTX07_KNES_190245_454558294.20111019
IUTX01_KNES_190244_454574430.20111019
IUTX07_KNES_190246_454478216.20111019
IUTX01_KNES_190245_454574378.20111019
IUTX07_KNES_190246_454558313.20111019
IUTX01_KNES_190246_454574359.20111019
IUTX07_KNES_190247_454478086.20111019
IUTX01_KNES_190247_454574446.20111019
IUTX07_KNES_190247_454558308.20111019
IUTX01_KNES_190248_454574352.20111019
IUTX07_KNES_190248_454478182.20111019
```

For ACARS data:

/data_store/acars/acars_decrypted

/data_store/acars/acars_raw

/data_store/acars_raw_decrypted

```
[root@dx3-tbdw data_store]# ls /data_store/acars/acars_decrypted
```

```
acars_decrypted_IUAX02_KARP_192212_456306375.jYnfBP.acars.20111019
acars_decrypted_IUAX02_KARP_192212_456306375.Zns7z9.acars.20111019
acars_decrypted_IUAX02_KARP_192212_456306675.Gperxd.acars.20111019
acars_decrypted_IUAX02_KARP_192212_456306675.ImxbgQ.acars.20111019
acars_decrypted_IUAX02_KARP_192212_456306717.9xQTxS.acars.20111019
acars_decrypted_IUAX02_KARP_192212_456306717.lEdi5W.acars.20111019
acars_decrypted_IUAX02_KARP_192217_456313290.JxNdzQ.acars.20111019
acars_decrypted_IUAX02_KARP_192217_456313290.sCLiwo.acars.20111019
acars_decrypted_IUAX02_KARP_192217_456313363.dATNAv.acars.20111019
```

```
[root@dx3-tbdw data_store]# ls /data_store/acars/acars_raw
```

```
acars_decrypted_IUAX02_KARP_192237_456363302.IN6Lzs
acars_decrypted_IUAX02_KARP_192237_456363302.sVgQgc
acars_decrypted_IUAX02_KARP_192237_456363515.dPM8y3
acars_decrypted_IUAX02_KARP_192237_456363515.F71sQ7
acars_decrypted_IUAX02_KARP_192242_456363877.0SShiQ
acars_decrypted_IUAX02_KARP_192242_456363877.7TzKdD
acars_decrypted_IUAX02_KARP_192242_456363985.3ZdN4K
acars_decrypted_IUAX02_KARP_192242_456363985.pzhPc7
```

```
[root@dx3-tbdw data_store]# ls /data_store/acars/acars_raw_unencrypted
```

```
20111018 20111019
```

```
[root@dx3-tbdw data_store]# ls /data_store/acars/acars_raw_unencrypted/20111019
```

```
IUAB01_EGRR_182145_454185111.bufr IUAH01_EGRR_182358_454369012.bufr
IUAB01_EGRR_182145_454185112.bufr IUAH01_EGRR_190000_454371658.bufr
IUAB01_EGRR_182216_454233391.bufr IUAH01_EGRR_190002_454373977.bufr
IUAB01_EGRR_182226_454248014.bufr IUAK01_PANC_182100_454158070.bufr
IUAB01_EGRR_182239_454270773.bufr IUAK01_PANC_182200_454243878.bufr
IUAB01_EGRR_182250_454287185.bufr IUAK01_PANC_182300_454326872.bufr
```

NOTE: In ACARS, EGRR refers to UK, British Met Office, and PANC refers to NWS/NCEP Anchorage Alaska.

For GOES High Density Wind (HDW) data:

data_store/bufrhdw/{hh}

Where, {hh} signifies the model runtime hour.

```
[root@dx3-tbdw data_store]# ls /data_store/bufrhdw
 00  02  05  07  09  12  14  17  19  21
 01  03  06  08  11  13  15  18  20  23
```

```
[root@dx3-tbdw data_store]# ls /data_store/bufrhdw/02
JQCX11_KNES_060256_136202016.bufr
JQCX11_KNES_060256_136202074.bufr
JQCX21_KNES_060256_136202011.bufr
JQCX21_KNES_060256_136202031.bufr
JQCX31_KNES_060256_136202000.bufr
JQCX31_KNES_060256_136202030.bufr
JQCX41_KNES_060256_136202072.bufr
JQCX51_KNES_060256_136202068.bufr
JQCX61_KNES_060256_136202064.bufr
```

For ncwf (national convective weather forecast) data:

data_store/bufrncwf/{hh}

Where, {hh} signifies the hour in which the forecast was issued.

```
[root@dx3-tbdw data_store]# ls /data_store/bufrncwf/<dd>
```

Where <dd> signifies the day in which the forecast was issued.

```
 00  02  04  06  08  10  12  14  16  18  20  22
 01  03  05  07  09  11  13  15  17  19  21  23
```

```
[root@dx3-tbdw data_store]# ls /data_store/bufrncwf/19/02
```

```
JSAT98_KKCI_190202_454527281.20111019
JSAT98_KKCI_190232_454564710.20111019
JSAT98_KKCI_190207_454534073.20111019
JSAT98_KKCI_190237_454571570.20111019
JSAT98_KKCI_190212_454539062.20111019
JSAT98_KKCI_190242_454576967.20111019
JSAT98_KKCI_190217_454545004.20111019
JSAT98_KKCI_190247_454582008.20111019
JSAT98_KKCI_190222_454551351.20111019
JSAT98_KKCI_190252_454587715.20111019
JSAT98_KKCI_190227_454564503.20111019
```

JSAT98_KKCI_190257_454594910.20111019

For bufrsigwx data:

data_store/bufrsigwx/{hh}

Where, {hh} signifies the hour in which the forecast was issued.

```
[root@dx3-tbdw data_store]# ls /data_store/bufrsigwx
```

00 06 12 18

```
[root@dx3-tbdw data_store]# ls /data_store/bufrsigwx/00
```

```
JUBE99_KKCI_060000_41715198.bufr
JUCE00_KKCI_060000_41715197.bufr
JUFE00_KKCI_060000_41715200.bufr
JUJE00_KKCI_060000_41710706.bufr
JUME00_KKCI_060000_41710708.bufr
JUNE00_KKCI_060000_41710707.bufr
JUOE00_KKCI_060000_41710778.bufr
JUTE00_KKCI_060000_41710777.bufr
JUTE97_KKCI_060000_41715202.bufr
JUVE00_KKCI_060000_41715199.bufr
JUWE96_KKCI_060000_41715201.bufr
```

For bufrascat data:

data_store/bufrascat/{hh}

Where, {hh} signifies the hour

```
[root@dx3-tbdw data_store]# ls /data_store/bufrascat
```

00	02	04	06	08	10	12	14	16	18	20	22
01	03	05	07	09	11	13	15	17	19	21	23

```
[root@dx3-tbdw data_store]# ls /data_store/bufrascat/02
```

```
JSXX01_KNES_060218_136132857.bufr
JSXX01_KNES_060237_136153848.bufr
JSXX02_KNES_060238_136153844.bufr
JSXX02_KNES_060257_136202078.bufr
```

For bufrua data:

data_store/bufrua/{dd}

Where <dd> signifies the day in which the forecast was issued.

```
[root@dx3-tbdw data_store]# ls /data_store/bufrua/19
```

```
00 02 04 06 08 12 14 16 19 21  
01 03 05 07 11 13 15 18 20 23
```

```
[root@dx3-tbdw data_store]# ls /data_store/bufrua/19/02
```

```
IUSY42_KWBC_190240_454569094.bufr.20111019
```

```
IUSZ42_KWBC_190215_454537894.bufr.20111019
```

```
IUSY43_KWBC_190200_454518634.bufr.20111019
```

```
IUSZ43_KWBC_190210_454531283.bufr.20111019
```

```
IUSY43_KWBC_190205_454525682.bufr.20111019
```

```
IUSZ44_KWBC_190210_454531280.bufr.20111019
```

```
IUSY43_KWBC_190210_454531288.bufr.20111019
```

```
IUSZ46_KWBC_190205_454525690.bufr.20111019
```

```
IUSY43_KWBC_190245_454575417.bufr.20111019
```

```
IUSZ48_KWBC_190210_454531287.bufr.20111019
```

6.7.2 Decoding BUFR Data

Data decoding operations are performed on the EDEX (DX3/4) servers. Both EDEX servers share the load in the ingest process, which includes decoding the raw data, writing the decoded data into the Data Store, writing metadata to the database, and broadcasting a notification that the newly ingested data is available.

The Ingested BUFR are stored in the Data Store.

The physical directory is on the DAS and is available on DX1f. On an EDEX (DX3/4) server, the mount point to the Data Store is /awips2/edex/data. The Data Store contains several subdirectories; the ingested data is located under “hdf5.”

The basic directory structure is /awips2/edex/data/hdf5/{BUFR}/model. See Table 6.7.2-1 for directories and file names.

Table 6.7.2-1. BUFR Data: Directories and File Names

Directory	Filename
modelsounding	modelsounding-2011-10-19-00.h5
goessounding	goessounding-2011-10-19-08.h5
poessounding	poessounding-2011-10-19-08.h5
bufrhdw	hdw-2011-10-19-11.h5
bufrncwf	bufrncwf-2011-10-19-22.h5

Directory	Filename
bufrascat	ascat-2011-07-04-12.h5
bufrsigwx	SWBOTH: sigwxVTS-2011-07-04-18.h5 SWH: sigwxCAT-2011-07-05-06.h5, sigwxCLOUD-SWH-2011-07-05-00.h5, sigwxJETS-2011-07-05-06.h5 SWM: sigwxCLOUD-SWM-2011-07-04-18.h5, sigwxCLOUD-SWM-2011-07-05-06.h5, sigwxCAT-2011-07-05-00.h5, sigwxCAT-011-07-05-06.h5
bufrua	bufrua-2011-10-25-06.h5

The report codes in the DataURI for bufrua data support data queries that CAVE uses when it generates menus or creates certain data displays. The codes are actually somewhat arbitrary; selected by the AWIPS II developer, they are not documented outside the code, and are not particularly meaningful outside of the development environment. Table 6.2.7-2 provides the rough meaning of the codes.

Table 6.2.7-2. Report Code Definitions

Report Code	Meaning
2020	mandatory data from a level below the level having a pressure of 100MB
2021	significant wind data from a level below the level having a pressure of 100MB
2022	significant temperature data from a level below the level having a pressure of 100MB
2030	mandatory data from a level above the level having a pressure of 100MB
2031	significant wind data from a level above the level having a pressure of 100MB
2032	significant temperature data from a level above the level having a pressure of 100MB

6.7.3 Data Ingest and Logging of BUFR Products

On DX3/DX4:

```
[root@dx3-tbdw ~]# cd /awips2/edex/logs
```

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log.

Log entries for each of the corresponding BUFR products are shown below.

For model sounding:

```
INFO 2011-10-19 08:54:50,208 [genericThreadPool-56] Ingest: EDEX: Ingest - modelsounding:: /data_store/mdlsndg/08/JUSA41_KWNO_190800_455075843.20111019 processed in: 1.3430 (sec) Latency: 0.5870 (sec)
```

For POES sounding:

```
INFO 2011-10-19 10:18:13,658 [genericThreadPool-36] Ingest: EDEX: Ingest - poessounding:: /data_store/poessndg/10/IUTX07_KNES_191012_455210706.20111019 processed in: 0.0050 (sec) Latency: -0.7650 (sec)
```

For GOES sounding:

INFO 2011-10-19 10:47:48,986 [genericThreadPool-41] Ingest: EDEX: Ingest - goessounding:: /data_store/goessndg/10/JUTX03_KNES_191046_455257189.20111019 processed in: 0.0070 (sec) Latency: -0.0680 (sec)

For hdw:

INFO 2011-10-27 12:32:26,321 [genericThreadPool-49] Ingest: EDEX: Ingest - bufrhdw:: /data_store/bufrhdw/11/JQCX61_KNES_271151_469283399.bufr processed in: 3.1880 (sec) Latency: 3.9060 (sec)

For ncwf:

INFO 2011-10-19 10:53:48,769 [genericThreadPool-72] Ingest: EDEX: Ingest - bufrncwf:: /data_store/bufrncwf/19/10/JSAT98_KKCI_191048_455265390.20111019 processed in: 0.0520 (sec) Latency: -0.7240 (sec)

For bufrascat:

INFO 2011-10-27 12:33:40,711 [genericThreadPool-42] Ingest: EDEX: Ingest - bufrascat:: /data_store/bufrascat/11/JSXX07_KNES_271157_469286249.bufr processed in: 17.3590 (sec) Latency: 18.0180 (sec)

For bufrsigwx:

INFO 2011-10-19 12:45:43,294 [genericThreadPool-73] Ingest: EDEX: Ingest - bufrsigwx:: /data_store/bufrsigwx/06/JUNE00_KKCI_190600_115512070.bufr processed in: 0.1000 (sec) Latency: 0.6030 (sec)

For bufrua:

INFO 2011-10-19 12:50:14,623 [genericThreadPool-19] Ingest: EDEX: Ingest - bufrua:: /data_store/bufrua/19/12/IUSZ61_KWBC_191250_455405241.bufr.20111019 processed in: 0.2140 (sec) Latency: 0.1400 (sec)

For ACARS:

INFO 2011-10-19 12:51:03,738 [genericThreadPool-65] Ingest: EDEX: Ingest - acars:: /data_store/acars/acars_raw_unencrypted/20111019/IUAD01_EGRR_191255_455406205.bufr processed in: 0.0230 (sec) Latency: -0.8330 (sec)

6.8 *Decoding Synoptic Observation Data: SynopticDecoder*

Synoptic data is ingested from the SBN and handled by the SBN. Synoptic data is a specific, highly machine friendly, data format (i.e., it is easy for a machine to generate and decode). It also contains maritime/buoy data. The synoptic files are plain (ASCII) text files. A fairly large number of different synoptic types exist, but they are all surface observations.

Table 6.8-1 illustrates the surface obs type and data URI report type code.

Table 6.8-1. Data URI Codes for Various Synoptic Observation Types

Sfc Ob Type	Data URI Report Type Code
Synoptic Fixed Land	1001
Synoptic Mobile Land	1002
Synoptic Ship	1003
Synoptic CMAN	1004
Synoptic Moored Buoy	1005
Drifting Buoy	1006
Synoptic MAROB	1007

Here are some WMO headers for maritime data.

FZNT25 KNHC ddhhmm

FZNT26 KNHC ddhhmm

FZNT27 KNHC ddhhmm

Note: The Data URI for surface observations has the general form: /sfcobs/data time/report type code/correction indicator/station ID/latitude/longitude.

See Exhibit 6.8-1 for the flow of the acquisition and ingest of synoptic products.

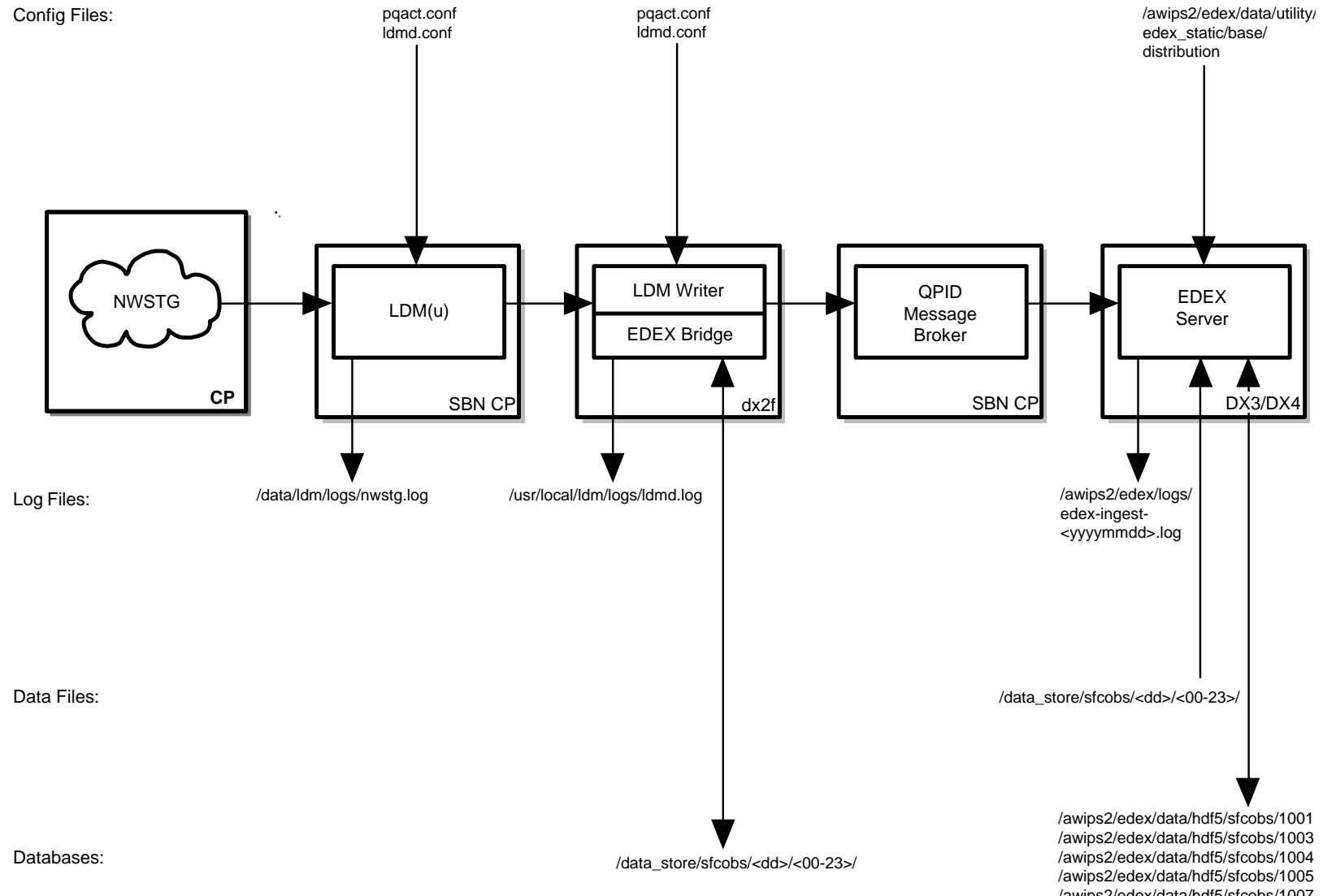


Exhibit 6.8-1. Acquire and Ingest of Synoptic Products

6.8.1 Data Archive and File Naming Conventions for Synoptic Data

For sfcobs data:

data_store/text/{dd}

Where, {dd} signifies the day the data was issued..

```
S[root@dx3-tbdw text]# ls /data_store/sfcobs/19
 00  02  04  06  08  10  12  14  16  18  20  22
 01  03  05  07  09  11  13  15  17  19  21  23

[root@dx3-tbdw text]# ls /data_store/sfcobs/19/02
SXUS23_KWNB_192300_456441603.20111019
```

6.8.2 Decoding Synoptic Data

The Ingested Synoptic Data files are stored in the Data Store.

The physical directory is on the dx1f DAS and is not shared through NFS to any other server or workstation.

The hdf5 basic directory structure is /awips2/edex/data/hdf5/sfcobs/

```
[root@dx1-tbdw sfcobs]# ls /awips2/edex/data/hdf5/sfcobs/
1001 1003 1004 1005 1007

[root@dx1-tbdw sfcobs]# ls /awips2/edex/data/hdf5/sfcobs/1004
sfcobs-2011-07-04-03.h5  sfcobs-2011-09-20-12.h5  sfcobs-2011-10-17-12.h5
sfcobs-2011-07-04-22.h5  sfcobs-2011-09-21-12.h5  sfcobs-2011-10-17-18.h5
sfcobs-2011-07-04-23.h5  sfcobs-2011-09-22-12.h5  sfcobs-2011-10-17-23.h5
sfcobs-2011-07-05-05.h5  sfcobs-2011-09-23-12.h5  sfcobs-2011-10-18-00.h5
sfcobs-2011-07-11-22.h5  sfcobs-2011-09-24-12.h5
```

6.8.3 Data Ingest and Logging of Synoptic Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

On DX3/DX4:

```
[root@dx3-tbdw ~]# cd /awips2/edex/logs
```

```
[root@dx3-tbdw logs]# date +%F
2011-10-19
[root@dx3-tbdw logs]# ls edex-*20111019*
edex-ingest-20111019.log
edex-ingest-satellite-20111019.log
edex-ingestDat-20111019.log
edex-ingest-shef-20111019.log
edex-ingest-gen_areal_ffg-20111019.log
edex-ingest-smartInit-20111019.log
edex-ingestGrib-20111019.log
edex-ingest-text-20111019.log
edex-ingest-purge-20111019.log
edex-ingest-trigger-20111019.log
edex-ingest-radar-20111019.log
edex-request-20111019.log
[root@dx3-tbdw logs]# tail -f edex-ingest-20111019.log
```

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

```
INFO <>date-time<> [thread] Ingest: <>type<>:: <>file name<> <>statistics<>
INFO 2011-10-19 00:00:02,923 [genericThreadPool-58] Ingest:
EDEX: Ingest - sfcobs::
/data_store/text/19/23/SXUS23_KWNB_192300_456441603.20111020
processed in: 0.3390 (sec) Latency: 0.2940 (sec)

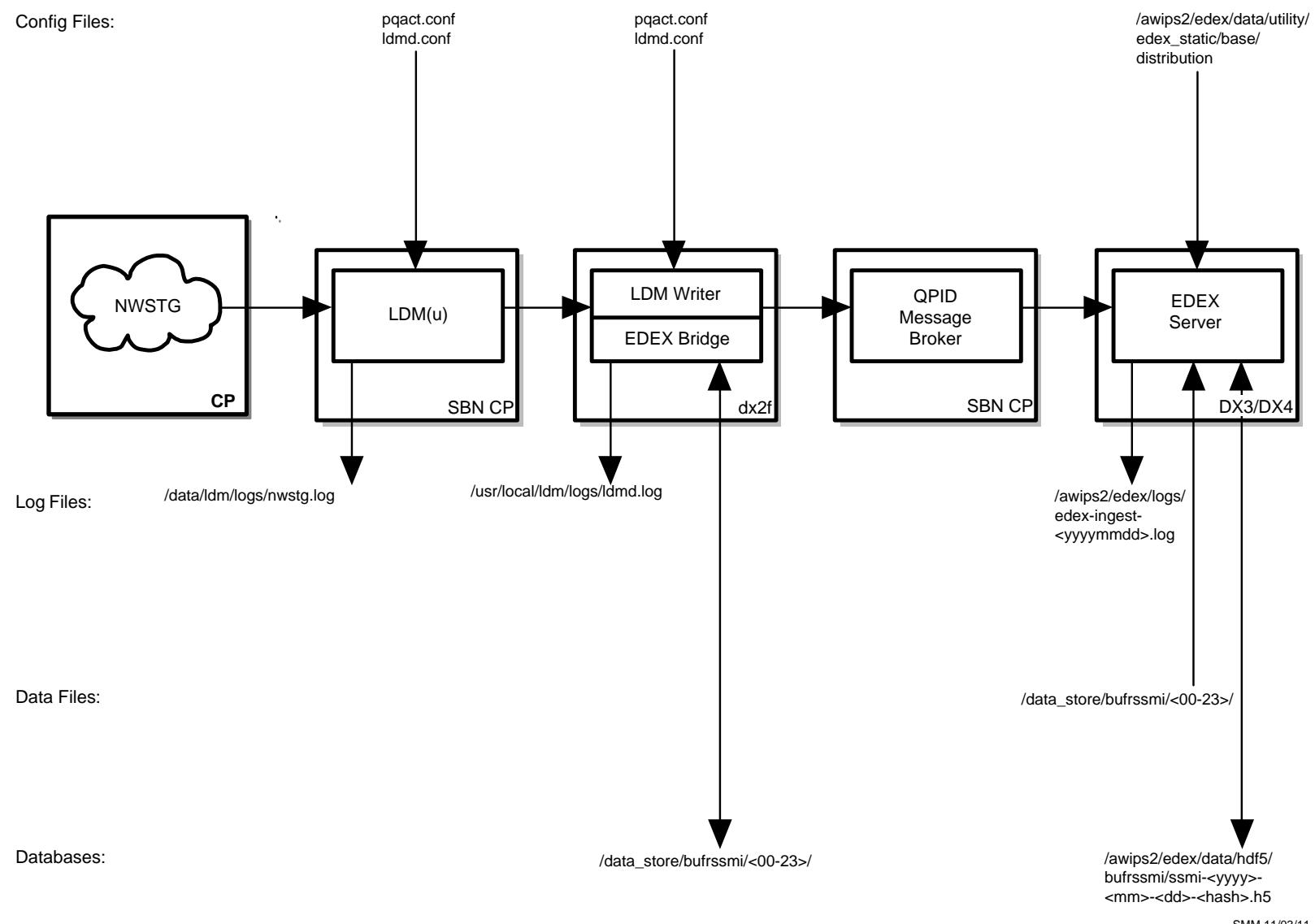
INFO 2011-10-19 00:00:22,493 [genericThreadPool-58] Ingest:
EDEX: Ingest - sfcobs::
/data_store/text/20/00/SMVE01_KWBC_200000_456442068.20111020
processed in: 0.2000 (sec) Latency: -0.6790 (sec)

INFO 2011-10-19 00:00:26,429 [genericThreadPool-58] Ingest:
EDEX: Ingest - sfcobs::
/data_store/text/20/00/SMVD01_KWBC_200000_456442105.20111020
processed in: 0.7340 (sec) Latency: 0.6860 (sec)
```

6.9 Decoding Special Sensor Microwave Imager (SSM/I) Data

SSM/I data are received via the SBN.

See Exhibit 6.9-1 for the flow of the acquisition and ingest of SSM/I products.

**Exhibit 6.9-1. Acquire and Ingest of SSM/I Products**

6.9.1 Data Archive and File Naming Conventions for SSM/I Data

SSM/I data ingested via the SBN is written to the /data_store/bufrssmi/hh where hh is the SSM/I data hour as obtained from the WMO header that accompanies the data.

Under the data type folder, i.e., bufrssmi, you will find a set of directories representing the various hours these products were issued. For SSM/I data, under /data_store/bufrssmi you will find folders ranging from 00 through 23. If you change to /data_store/bufrssmi/12, you will find all observations issued between 12z and 13z.

6.9.2 Decoding SSM/I Data

The hdf5 basic directory structure is /awips2/edex/data/hdf5/bufrssmi/ssmi-<yyyy>-<mm>-<dd>-<hh>.h5

```
[root@dx1-tbdw sfcobs]# ls /awips2/edex/data/hdf5/bufrssmi/
ssmi-2011-10-26-16.h5
ssmi-2011-10-26-17.h5
ssmi-2011-10-27-11.h5
ssmi-2011-10-27-14.h5
ssmi-2011-10-27-15.h5
ssmi-2011-10-27-16.h5
ssmi-2011-10-27-17.h5
ssmi-2011-10-27-19.h5
ssmi-2011-10-27-20.h5
ssmi-2011-10-27-22.h5
```

6.9.3 Data Ingest and Logging of SSM/I Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

The log file is a plain ASCII text file and can be viewed using any text viewing utility such as *more*, *less*, *view*, *tail*, etc.

To get a general view of processing, open a terminal session to the server and enter the following commands:

On DX3:

TYPE: cd /awips2/edex/logs

TYPE: ls edex-*

This will list the edex log files.

TYPE: tail -f edex-ingest-20111027.log

On DX4:

TYPE: cd /awips2/edex/logs

TYPE: ls edex-*

This will list all the edex log files.

TYPE: tail -f edex-ingest-20111027.log

After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <<date-time>> [thread] Ingest: <<type>>:: <<file name>> <<statistics>>

A log entry will be as follows.

```
INFO 2011-10-27 13:32:43,120 [genericThreadPool-52] Ingest: EDEX: Ingest -  
bufrssmi:: /data_store/bufrssmi/13/ISXA21_KWNO_271300_469396017.bufr processed  
in: 4.9250 (sec) Latency: 5.5700 (sec)
```

6.10 convSIGMET Data

6.10.1 Data Archive and File Naming Conventions for convSIGMET Data

convSIGMET data ingested via the SBN is written to the /data_store/convsigmet/{hh}, where hh is the convsigmet hour as obtained from the WMO header that accompanies the data. Nonconvsigmet and intlsigmet are also stored as /data_store/nonconvsigmet/{hh} and /data_store/intlsigmet/{hh}.

```
[root@dx3-tbdw data_store]# ls /data_store/text/<dd>
```

Where dd is day the data was issued.

18 19 20

```
[root@dx3-tbdw data_store]# ls /data_store/text/19/02
```

00	02	04	06	08	10	12	14	16	18	21	23
01	03	05	07	09	11	13	15	17	20	22	

```
[root@dx3-tbdw data_store]# ls /data_store/convsigmet/02
```

WSUS31_KKCI_070255_137954421.txt

```
WSUS32_KKCI_070255_137954420.txt  
WSUS33_KKCI_070255_137954422.txt
```

6.10.2 Decoding convSIGMET Data

convSIGMET data is decoded by the convsigmet data decoder, which is part of the EDEX Ingest process running on the DX3/4 cluster.

The ingested convSIGMET Data files are stored in the AWIPS II database. The decoded convsigmets are stored in the awips schema of the metadata database. The convsigmet, convsigmet_location, and convsigmet_section tables are used to store the data.

NOTE: The decoders for nonconvsigmet and intlsigmet are **nonconvsigmet** and the **intlsigmet** decoders respectively. For the database, the tables used for **nonconvsigmet** data are **nonconvsigmet** and **nonconvsigmet_location**. For **intlsigmet**, the tables used are **intlsigmet** and **intlsigmet_location**. As with **convsigmet**, all tables are part of the AWIPS II **metadata** database.

6.10.3 Data Ingest and Logging of ConvSIGMET Products

All data ingest operations are logged in the EDEX logs on the EDEX (DX3/4) server. In a standard installation, the EDEX logs are located in /awips2/edex/logs. This directory contains several log files; the files starting “edex-“ are the EDEX logs.

Open a terminal session to the server and enter the following commands:

On DX3/DX4:

```
[root@dx3-tbdw ~]# cd /awips2/edex/logs  
[root@dx3-tbdw logs]# date +%F  
2011-10-19  
[root@dx3-tbdw logs]# ls edex-*20111019*  
edex-ingest-20111019.log  
edex-ingestDat-2011109.log  
edex-ingest-gen_areal_ffg-20111019.log  
edex-ingest-gen_areal_qpe-20111019.log  
edex-ingestGrib-20111019.log  
edex-ingest-purge-20111019.log  
edex-ingest-radar-20111019.log  
edex-ingest-satellite-20111019.log  
edex-ingest-shef-20111019.log  
edex-ingest-shef-performance-20111019.log  
edex-ingest-smartInit-20111019.log  
edex-ingest-text-20111019.log  
edex-ingest-trigger-20111019.log
```

```
edex-ingest-unrecognized-files-20111019.log  
edex-request-20111019.log  
edex-request-productSrvRequest-20111019.log
```

To monitor the ingest stream, a little understanding of the logging strategy used by EDEX is required. After ingest of each data file is complete, the ingest endpoint prints a single line to the EDEX system log. The format of the log entry is

INFO <><date-time>> [thread] Ingest: <><type>>:: <><file name>> <><statistics>>

A log entry will be as follows.

```
INFO 2011-10-19 01:03:34,868 [genericThreadPool-59] Ingest: EDEX: Ingest -  
convsigmet:: /data_store/text/20/00/WSUS32_KKCI_200055_456512923.20111020  
processed in: 0.2800 (sec) Latency: 0.1190 (sec)
```

```
INFO 2011-10-19 01:03:35,597 [genericThreadPool-59] Ingest: EDEX: Ingest -  
convsigmet:: /data_store/text/20/00/WSUS31_KKCI_200055_456512941.20111020  
processed in: 0.0480 (sec) Latency: -0.1540 (sec)
```

```
INFO 2011-10-19 01:03:37,530 [genericThreadPool-59] Ingest: EDEX: Ingest -  
convsigmet:: /data_store/text/20/00/WSUS33_KKCI_200055_456512991.20111020  
processed in: 0.0040 (sec) Latency: -0.2320 (sec)
```

NOTE: The nonconvsigmet and intlsigmet follow the same data logging and ingest operations as illustrated above for convsigmet.

6.11 Tracing NWSTG (TAF) Products Using the Sequence Number

In general, to trace an SBN product, you must first identify the product's WMO header. The following example traces a TAF through the system. The general pattern is *FTUS43 XXXX ddhhmm*. The specific WMO header being traced in the example is *FTUS43 KOAX 141500*.

NOTE: In the normal AWIPS II system, CP1 and CP2 are clustered as are PX 1/2 and DX 1/2. In this example, it is assumed that CP1, DX1, and DX2 are the active members of each cluster.

1. Verify that the product was received on CPSBN (CP1).

Verify that the product was received by logging on to CP1 and examining the LDM log. To facilitate the examination, grep is used to limit the output. The LDM logs are stored in the logs directory under the LDM home directory. The active LDM logs are goes.log, nwstg2.log, nwstg.log and oconus.log. The grep command filters FTUS43 by site EAX and displays the most current entry by piping the output to tail -1.

The steps to follow:

```
[root@cpsbn1-tbdw logs]# /usr/local/ldm/logs
```

```
[root@cpsbn1-tbdw logs]# ls -l *.log
-rw-rw---- 1 root fxalpha 684021 Oct 22 00:01 goes.log
-rw-rw---- 1 root fxalpha 216333705 Oct 22 00:12 nwstg.log
-rw-rw---- 1 root fxalpha 63321602 Oct 22 00:00 nwstg2.log
-rw-rw---- 1 root fxalpha 56902788 Oct 22 00:12 oconus.log

[root@cpsbn1-tbdw logs]# grep -l "FTUS43" *.log
nwstg.log

[root@cpsbn1-tbdw logs]# grep "FTUS43 KEAX" nwstg.log | tail -1
Oct 21 04:27:05 cpsbn1-tbdw readnoaaport[10056] NOTE: FTUS43
KMKX 210400 AAA /pTAFMSN inserted [cat 1 type 4 ccb 2/0 seq
460087807 size 235]
```

The sequence number (in this case 460087807) is a sequence number that is uniquely assigned to this product. It may be used to track the product as it is ingested and stored.

2. Verify the product was received on the DX cluster and written to the data archive.

We verify that the product was received on the dx2f LDM(D) and written to the data archive by logging onto dx2f and checking two locations: the LDM log and the data archive. In both of these cases, the key to finding the product the sequence number discovered in step (1).

The steps to follow:

Login to DX2f,

```
[root@dx2-tbdw ~]# cd ~ldm/logs
[root@dx2-tbdw logs]# ls
ldmd.log      ldmd.log.2    ldmd.log.4    ldmd.log.6    scour.log
ldmd.log.1    ldmd.log.3    ldmd.log.5    ldmd.log.7

[root@dx2-tbdw logs]# grep 460087807 ldmd.log
Oct 22 00:00:19 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/22/00/FTUS43_KWBC_220000_460087807.20111022"
:          203 20111022000017.724 IDS|DDPLUS 460087807 FTUS43
KWBC 220000 CCA
```

```
[root@dx2-tbdw data_store]# find /data_store/text/ | grep 460087807
/data_store/text/22/00/FTUS43_KWBC_220000_460087807.txt
```

3. Verify that the product has been ingested.

Generally, we can verify that the product has been ingested by examining the EDEX

Ingest process logs and looking for an entry identifying the file ingest.

This is complicated somewhat by the fact that the product may have been ingested on either DX3 or DX4. There is no way to predict the correct server, so we simply check them both. If the product has been ingested, it will appear in the log on either DX3 or DX4. The basic process is to grep for the sequence number in the EDEX Ingest process logs.

The steps to follow on DX3:

```
[root@dx2-tbdw data_store]# ssh dx3
[root@dx3-tbdw ~]# cd /awips2/edex/logs
[root@dx3-tbdw logs]# date +%F
2011-10-19
[root@dx3-tbdw logs]# ls edex*20111019*
edex-ingest-20111019.log
edex-ingestDat-2011109.log
edex-ingest-gen_areal_ffg-20111019.log
edex-ingest-gen_areal_qpe-20111019.log
edex-ingestGrib-20111019.log
edex-ingest-purge-20111019.log
edex-ingest-radar-20111019.log
edex-ingest-satellite-20111019.log
edex-ingest-shef-20111019.log
edex-ingest-shef-performance-20111019.log
edex-ingest-smartInit-20111019.log
edex-ingest-text-20111019.log
edex-ingest-trigger-20111019.log
edex-ingest-unrecognized-files-20111019.log
edex-request-20111019.log
edex-request-productSrvRequest-20111019.log

[root@dx3-tbdw logs]# grep 460087807 edex-ingest-20111019.log
[root@dx3-tbdw logs]# ssh dx4 "grep 460087807 /awips2/edex/logs/edex-
ingest-20110407.log"
INFO 2011-10-19 11:42:52,085 [genericThreadPool-17] Ingest:
taf:: /data_store/ text/22/00/FTUS43_KWBC_220000_460087807.txt
processed in: 0.0580 (sec) Latency: 0.1930 (sec)
```

4. Verify that the metadata for the product is in the database.

While these steps can be performed on several of the servers, we use DX3 to perform the test. In general, we will log onto DX3 and execute PSQL to connect to the database on DX1 and perform the query. Once connected, we query for the

previously identified WMO header and sort by reftime for the most current entry.

The steps to follow:

```
[root@dx1-tbdw ~]# su - awips
[awips@dx1-tbdw ~]$ psql metadata
```

Welcome to psql 8.3.4, the PostgreSQL interactive terminal.

Type: \copyright for distribution terms

- \h for help with SQL commands
- \? for help with psql commands
- \g or terminate with semicolon to execute query
- \q to quit

metadata=# \x

Expanded display is on.

```
metadata=# select * from awips.taf
metadata=# where wmoheader like '%FTUS43 KWBC 220000%'
metadata=# order by reftime;
```

-[RECORD 1]-----+

id	49527267
forecasttime	0
reftime	2011-10-19 11:34:00
utilityflags	[PERIOD_USED]
rangeend	2011-10-19 12:00:00
rangestart	2011-10-18 12:00:00
datauri	/taf/2011-10-18_11:34:00.0[2011-10-18_12:00:00.0--2011-10-19_12:00:00.0]/KWBC/null
	/null/071134Z
inserttime	2011-10-18 11:34:16.351
amdindicator	
bulletin_time	2011-10-18 11:00:00.349
corindicator	
issue_time	2011-10-18 11:34:00
issue_timestring	071134Z
remarks	
stationid	KWBC
taftext	TAF KWBC 071134Z 0712/0812 09009KT P6SM
OVC100\r	FM071800 11009KT P6SM VCSH OV

```
C070\r      FM072300 10007KT P6SM OVC100=\r
wmoheader      | FTUS43 KWBC 220000
location_gid   | 0001-KWBC
-[ RECORD 2 ]-----+-----  
-----
```

Chapter 7

Ingest of Radar Data

Chapter 7. Ingest of Radar Data

Table of Contents

	<i>Page</i>
7.0 Ingest of Radar Data: Overview	1
7.1 Radar Ingest Operation	5
7.1.1 SBN Radar Ingest Operation	5
7.1.2 ORPG Radar Ingest Operation	5
7.2 Data Archiving.....	7
7.2.1 Radar Archive Structure	7
7.2.1.1 Available SBN Radar Site Identifiers	8
7.2.1.2 Available ORPG Radar Site Identifiers	9
7.2.1.3 Available SBN Product Categories.....	9
7.2.1.4 Available ORPG Product Categories.....	10
7.2.2 EDEX Ingest Radar Data Logging	11
7.2.2.1 Radar Server Logs	12
7.2.2.2 Configuring Radar Server Logging	12
7.2.3 SBN Radar Configuration Files	14
7.2.3.1 SBN Radar Configuration Files – LDM	14
7.2.3.2 SBN Radar Configuration Files – PQACT	14
7.2.3.3 SBN Radar Configuration Files – EDEX Data Distribution Files.....	15
7.2.4 ORPG Radar Configuration Files	16
7.2.4.1 ORPG Radar Configuration Files – Radar Server	16
7.2.4.2 ORPG Radar Configuration Files – EDEX Data Distribution files.....	18
7.2.5 Storing Decoded SBN Radar Data.....	18
7.2.5.1 AWIPS II Metadata Database – Radar Metadata	19
7.2.5.2 AWIPS II Data Store – Radar Products.....	19
7.2.6 Audible Radar-Alerting	20
7.3 WAN/SBN Radar Product Distribution from Site to NCF.....	23
7.4 RPS list	27
7.5 Two-Way Communication.....	32

List of Exhibits

Exhibit 7.0-1. Radar Ingest Data Flow	2
Exhibit 7.1-1. Acquire and Ingest of Radar Products	6
Exhibit 7.2.6-1. Alert Visualization Configuration dialog	20
Exhibit 7.2.6-2. Alert Visualization Configuration Sources & Priorities.....	21

Exhibit 7.2.6-3. Alert Visualization Configuration Sources & Priorities Audio.....	21
Exhibit 7.2.6-4. Alert Visualization Configuration Sources & Priorities Audio File.....	22
Exhibit 7.2.6-5. Alert Visualization Configuration List	23
Exhibit 7.4-1. RPS List Editor	28
Exhibit 7.4-2. RPS List Editor View Menu	29
Exhibit 7.4-3. RPS List Editor View Menu List	30
Exhibit 7.4-4. RPS List Editor View Menu List Edit	31
Exhibit 7.4-5. RPS List Editor View Menu List New Entry	32
Exhibit 7.5-1. Sending Environmental Data.....	33
Exhibit 7.5-2. Sending Radar Applications	34

List of Tables

Table 7.3-1. WSR-88D Products on AWIPS.....	24
---	----

7.0 *Ingest of Radar Data: Overview*

The AWIPS WSR-88D/TDWR radar data ingest is responsible for providing products to be sent and receiving centrally collected radar products over the SBN; requesting/receiving data from one or more associated ORPGs/SPGs; sending Radar Precipitation Bias Table to the ORPG; and making the data available to the AWIPS workstations. More specifically, the radar ingest system is responsible for initiating and maintaining connections with multiple ORPGs/SPGs, forwarding data requests from the workstations to the ORPGs/SPGs, receiving and processing data and status messages from the ORPGs/SPGs, and forwarding status messages to the workstations.

Two additional EDEX “tasks” are involved here. They are both part of the EDEX RPG Environmental Data Service (rpgenvdata), and are triggered by Quartz timers. They are:

Send Environmental Data	Timer: Fires every hour on the hour
send Bias Table	Timer: Fires 26 and 46 minutes after each hour

Both tasks are managed by the EDEX Ingest Process on DX3 and DX4. The triggering mechanism is “clustered quartz”; this means that the event fires on both DX3 and DX4, but a locking mechanism is employed so that only one of the servers performs the work. Messages, status, error, etc., are logged to the EDEX Ingest process log (edex-ingest-yyyyymmdd.log); search for RPGEnvData. See Section 7.5 for detailed explanation.

Radar data comes from two sources: 1) the SBN for nationally distributed data; and 2) the Radar Server for locally collected radar data, including routine data and one-time as well as multiple requests from network radars.

SBN data is delivered via the Local Data Manager (LDM) on PX1/2, and the locally collected data is delivered via the Radar Server on DX1/2.

Radar Ingest Data Flow is illustrated in the Exhibit 7.0-1. As shown in the exhibit, the data flow is a 12-step process. Descriptions of each step of the process follow.

1. Radar Data are received from two sources: The Radar Server on the DX1/2 cluster obtains radar data from the ORPG/SPG; and radar data obtained from the SBN is received from the LDM on the CP1/2 and PX1/2 clusters.
 - a. The Radar Server and the LDM writes the product to a file on the Data Archive. (Refer to Section 7.1.)
 - b. The Radar Server and LDM post their messages containing product information to the QPID Message
 - c. The LDM writer instance uses the EDEX Bridge to post a message containing product information to the QPID Message Broker. The product information is the WMO header and the path to the product file.

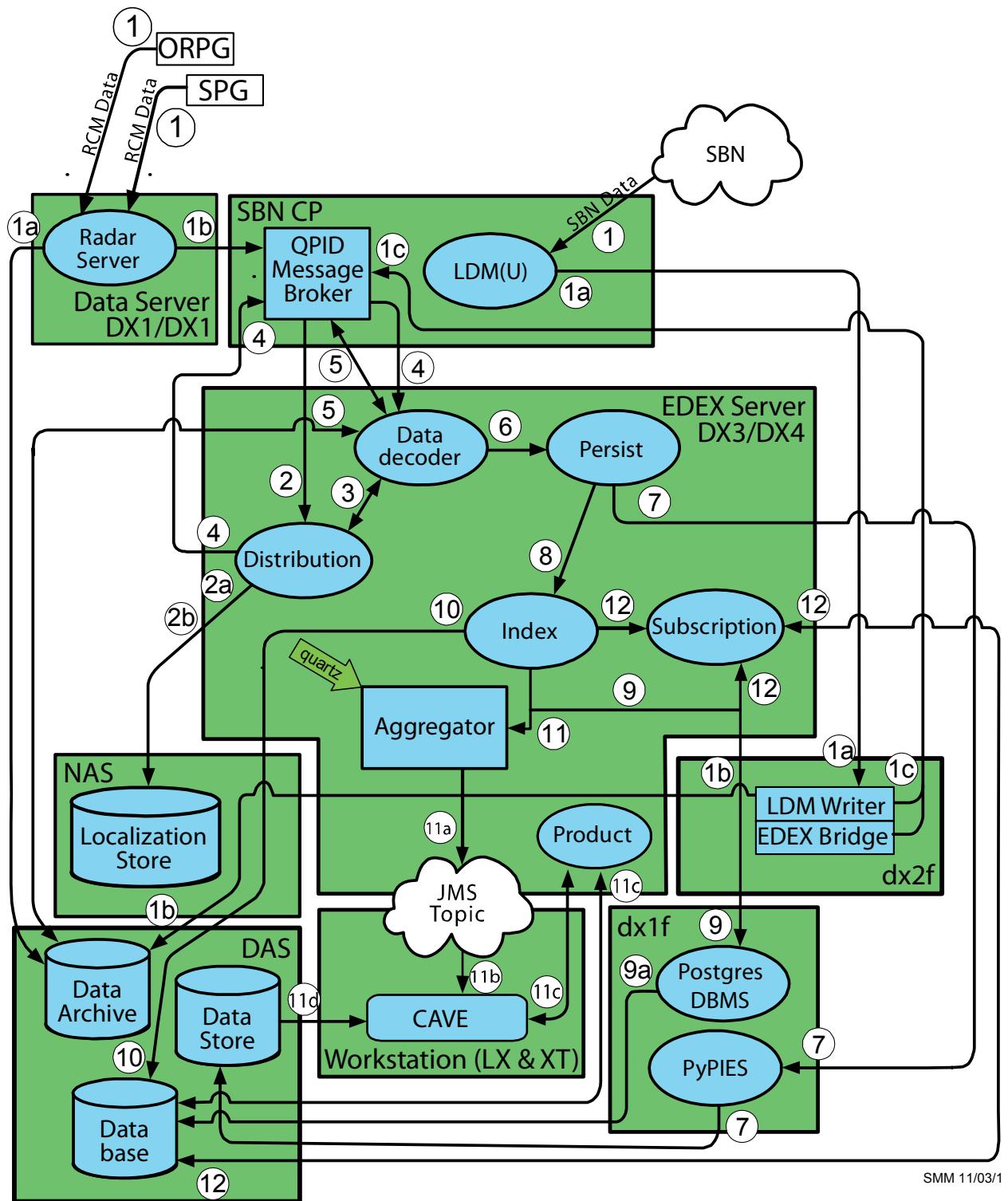


Exhibit 7.0-1. Radar Ingest Data Flow

2. The EDEX Distribution endpoint obtains the WMO (World Meteorological Organization) header for the product file identified by the message. The WMO header is matched against data distribution mappings contained in the data distribution directory to determine product routing. (The WMO header is usually included in the message; if it is not, the Distribution service uses the product file name from the message to determine routing.)

Note: The files in the data distribution directory are XML (eXtensible Markup Language) files that contain regular expressions which match WMO headers with the appropriate data decoder plug-in.

- a. At EDEX startup, the EDEX Distribution endpoint reads the Data Distribution files from the Data Distribution directory in the Localization Store. It uses the contents of these files to generate the routing table used to determine data routing. The Data Distribution directory is located at /awips2/edex/data/utility/edex_static/base/distribution.
- b. The EDEX Distribution endpoint monitors the Data Distribution directory; when a file in that directory is modified, it rereads that file and rebuilds its routing table.
3. The EDEX Distribution Service determines the Data Decoder Plug-In registered to handle the data in the product file.
4. The EDEX Distribution Service forwards the message to the appropriate Data Decoder Plug-In via the QPID Message Broker.
5. The EDEX Data Decoder Service on the EDEX (DX) cluster pulls the message from the QPID Message broker. The Data Decoder Service reads the file pointed to by the message, decodes the data, and determines the appropriate metadata.
6. The decoded data and metadata are sent to the EDEX Persist endpoint.
7. The EDEX Persist endpoint sends the data to PyPIES and PyPies writes the data to the EDEX data store in HDF5 format.
8. The EDEX Persist endpoint sends the metadata obtained to the EDEX Index endpoint.
9. The EDEX Index endpoint sends the metadata to the PostgreSQL DBMS. The PostgreSQL DBMS writes the metadata to the database.
10. The index endpoint does not merely get the dataURI. It also persists the data object to the database. Persistence to the database is executed via a plug-in defined data access object. If the data access object does not override the persistence behavior, then a default persistence strategy is used. The default strategy for persisting data to the database is to first check to see if the data received already exists. If it already exists, then persistence to the database is not attempted for that data. If the data is unique, then it is persisted to the database.

11. (Client notification) The Data URI is forwarded to the EDEX URI Aggregator.

Every 5 seconds the aggregated Data URIs are sent to the JMS Alert Topic.

CAVE monitors the JMS Alert Topic to obtain a list of available data. CAVE determines if it should render the available data.

CAVE retrieves metadata from the EDEX server via a product query sent to the EDEX Thrift endpoint.

CAVE retrieves product data from the EDEX server by accessing the EDEX data store's HDF5 files and CAVE renders the data, updating its display as appropriate.

12. (Subscription) The Data URI is forwarded to the EDEX Subscription endpoint.

The EDEX Subscription endpoint checks the active subscription list to determine if a subscription has been registered for the product.

If no subscription has been registered for the product, no further action is taken.

The EDEX Subscription endpoint obtains the script information from the database.

The EDEX Subscription endpoint obtains a micro-engine to execute the script. The micro-engine executes the subscription script for the product.

The Radar Server manages the following types of requests (please note that the forecaster interaction is via the CAVE Radar menu):

- Routine Product Set (RPS) list
- One-Time Request (OTR)
- Alert request
- Radar Multiple Request (RMR)
- Centrally collected radar products
- Radar Precipitation Bias Table.

The **RPS list** contains the products to be sent routinely to the workstation and the products to be centrally collected for transmission over the SBN. The list is sent to the ORPG/SPGon system start-up, when the radar mode changes, or when a forecaster at the workstation modifies one of the adaption RPS lists and sends it to the ORPG/SPG. An RPS list sent to an ORPG/SPG contains both a national and a local component if a site is identified as the office responsible for the national collection and distribution of radar data. National products take precedence over local products.

The **OTR** enables a forecaster at the workstation to request that a product be sent on a one-time basis only. When requesting data from a dedicated radar, the forecaster can also request that the product be sent for more than one volume scan. The request is terminated when it has been completed.

An alert request is generated at the workstation when the forecaster wants to be notified of an alert condition. When the threshold values specified in the request are exceeded, the ORPG sends an alert message. The forecaster can also request that a product be provided along with the alert.

The RMR enables a forecaster at the workstation to request a single product (like an OTR) or a package of products, schedule requests for products at a specified frequency, and/or request products from any number of dedicated and dial-out ORPGs/SPGs.¹

The NCF sends centrally collected radar products to all AWIPS sites over the SBN. Specified sites are tasked to collect and send certain products to the NCF via the WAN.

Radar Precipitation Bias Tables are available for transmission from AWIPS to an interested receiving ORPG site.

The new Radar Server takes the place of the following AWIPS I processes.

- RadarServer
- DialServer
- ORPGCommsMgr
- ORPGReqMgr.

7.1 Radar Ingest Operation

7.1.1 SBN Radar Ingest Operation

As illustrated in Exhibit 7.1-1, SBN radar product ingest is performed by the EDEX Ingest processes on DX3 and DX4. EDEX operation is controlled by the edex_camel service script located in /etc/init.d on DX3 and DX4.

7.1.2 ORPG Radar Ingest Operation

As illustrated in Exhibit 7.1-1, ORPG radar product ingest is controlled by the AWIPS II Radar Server, which is installed on the DX1/2 cluster. The Radar Server is controlled by the edex_rcm service script located in /etc/init.d on DX1 and DX2.

¹ For information on how to perform an OTR, see Section 7.3 of the AWIPS II CAVE-D2D User's Manual (UM). Also see UM Section 7.1 for information on configuring an alert request and UM Section 7.4 for information on how to perform an RMR.

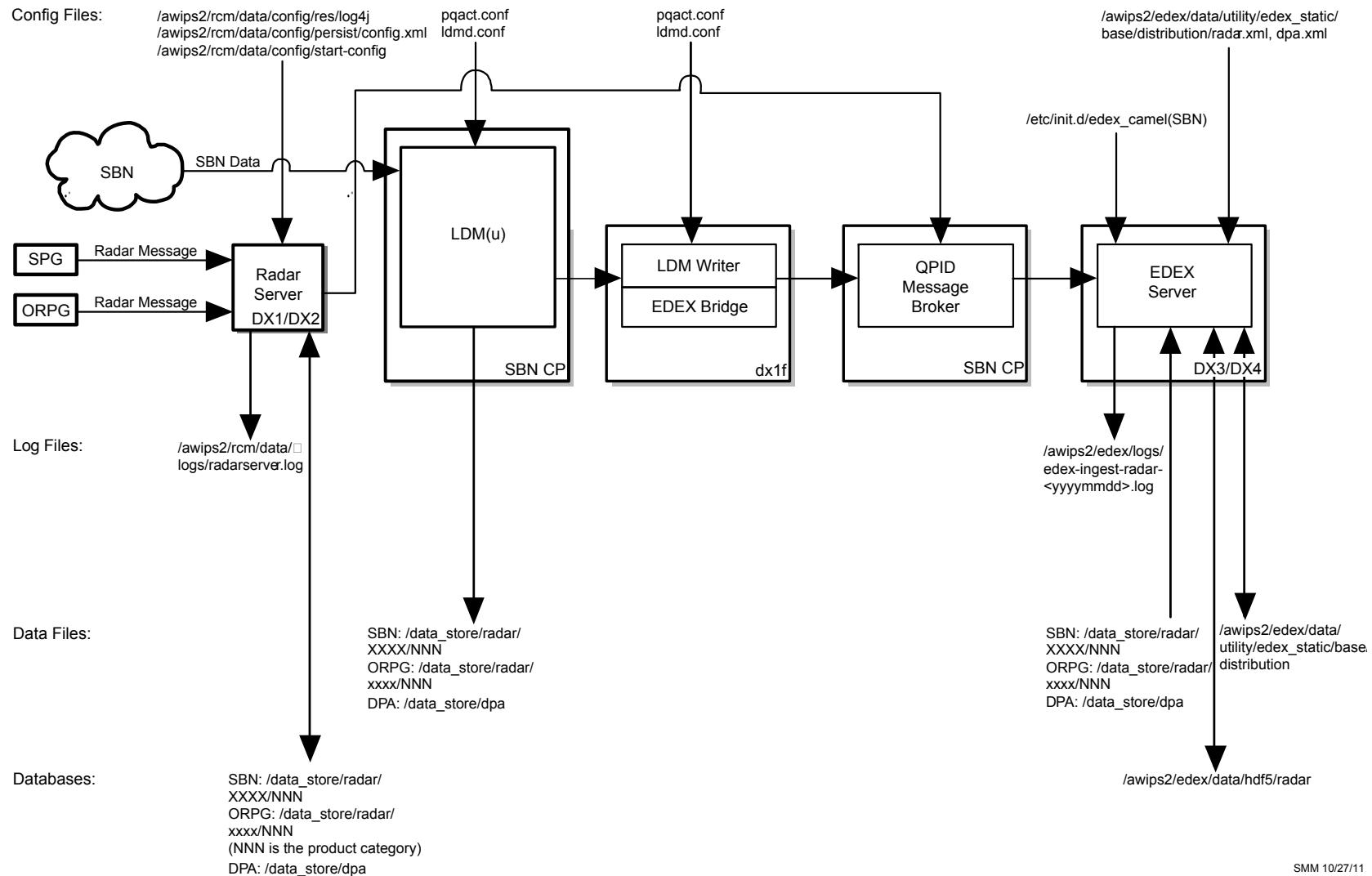


Exhibit 7.1-1. Acquire and Ingest of Radar Products

7.2 *Data Archiving*

Radar products are written to the Data Archive in three separate locations:

- SBN radar products are written to /data_store/radar/XXXX where XXXX is an uppercase, four- or three-character radar site identifier (customizable via the LDM).
- ORPG radar products are written to /data_store/radar/xxxx where xxxx is the lowercase, four-character radar site identifier.
- Digital Precipitation Array (DPA) data is potentially stored in both the SBN and the ORPG data sections. At this point, the SBN stores a subset of the radar data it receives into /data_store/dpa. This is the “DPA” data, which is used by the DPA process in EDEX. Because the DPA has been Rehosted (rather than rewritten), the options for placing the data were limited. In essence, the path (below /data_store) to the data was built into the software being rehosted. DPA products are written to /data_store/dpa and /data_store/radar.

The Data Archive is located on PX1 and available to other systems via an NFS mount at /data_store.

7.2.1 *Radar Archive Structure*

SBN Radar Products

The general structure of the SBN radar product archive is determined by the header information on the radar products. For radar data, the archive structure is

/data_store/radar/KXXX/NNN

and the files are named:

SDUSii_HHMM_XXXX_NNN_sequence.rad

Where,

SDUSii ⇔ product identifier
HHMM ⇔ the product time stamp
XXXX ⇔ product originator (transmitting wfo identifier – this is customizable via the LDM)
NNN ⇔ the product category

E.g.: SDUS21_1320_KCCX_N1Q_459293941.rad

LDM assigns the sequence number. Its design minimizes the likelihood of file overwrites.

ORPG Radar Products

ORPG Radar products are written to the Data Archive in directories under /data_store/radar. Each site that the Radar Server is configured for has a single directory

at this level. (The directory's name is the radar site identifier in lower case. Technically, however, it does not have to be lower case; it could be in either case.) Each site directory contains several subdirectories; each of these subdirectories is the mnemonic of the products in the directory. Under each product mnemonic, products are organized into product-dependent structures. Subdirectories are generally self-explanatory. Three common directory structure patterns in the Radar Server Data Store are

```
/data_store/radar/<site>/<mnemonic>/<elevation>/<resolution>/<level>  
/data_store/radar/<site>/<mnemonic>/<elevation>/<resolution>/<az>/<level>  
/data_store/radar/<site>/<mnemonic>/<layer>/<resolution>/<level>
```

Where site is the radar site and mnemonic is the product mnemonic.

The exact directory structure used by the Radar Server is determined by the Radar Server software and is unchanged from AWIPS 1 and it's preserved primarily to support FSI.

DPA Products

The archive structure for the DPA products is similar to the ORPG Radar Products except that, since application products in the archive are DPA, the product category and radar site identifier are not included in the directory structure. For DPA products, the archive structure is /data_store/dpa and the files are named:

SDUSii_HHMM_XXXX_DPA_sequence.rad

Where,

SDUSii ⇔ product identifier

HHMM ⇔ the product time stamp

XXXX ⇔ product originator (transmitting wfo identifier – this is customizable via the LDM)

NNN ⇔ the product category

E.g.: SDUS54_0841_KHGX_DPA_191653228.rad

NOTE: The final multi-digit number in the file name will vary depending on the sequence value at the time LDM writes the file to the Data Archive.

7.2.1.1 Available SBN Radar Site Identifiers

The list of potential radar sites available in the Data Archive depends on the configuration of the LDM and the EDEX Distribution Service. It is possible to query the Data Archive to determine available site identifiers. This query is performed using a command line script; the script can run on any workstation with access to the Data Archive.

Enter the following command in a console window or x-term:

```

TYPE:      cd /data_store/radar
TYPE:      ls | grep -P "^[A-Z]{3}$" > ~/radar-sites.txt
TYPE:      sort ~/radar-sites.txt > ~/sorted-radar-sites.txt
TYPE:      cat ~/sorted-radar-sites.txt | tr [:cntrl:] ' ' >
~/radar-sites.txt
TYPE:      cat ~/radar-sites.txt ; echo

ABR ABX ADW AKQ ARX BOS BOX BWI CXX CYS DAL DCA DFW DIX DMX DOX DVN EAX EMX ENX EPZ
EWR FCX FDX FSD FWS GLD GRK GUA HDX HKI HKM HMO HWA IAD JFK LNX LWX MAF MCI MPX MSP
OAX OKX PBZ PHL PIT TWX TYX UDX UEX

```

NOTE: This procedure provides a list of radar sites from which Radar Data has been received over the SBN. It does not provide a list of current sites or current data.

7.2.1.2 Available ORPG Radar Site Identifiers

The list of ORPG radar sites available for the Radar Server depends on the configuration of the Radar Server and the EDEX Distribution Service. It is possible to query the Data Archive to determine available site identifiers. This query is performed using a command line script that may be performed from any workstation with access to the Data Archive.

Enter the following commands in a console window or X-Term:

```

TYPE:      cd /data_store/radar
TYPE:      ls | grep -P "^[a-z]{4}$" > ~/radar-sites.txt
TYPE:      sort ~/radar-sites.txt > ~/sorted-radar-sites.txt
TYPE:      cat ~/sorted-radar-sites.txt | tr [:cntrl:] ':' ' '
> ~/radar-sites.txt
TYPE:      cat ~/radar-sites.txt ; echo
koax

```

7.2.1.3 Available SBN Product Categories

The list of Product Categories available in the Data Archive will depend on the configuration of the LDM and the EDEX distribution server. It may also vary from radar site to radar site. It is possible to query the Data Archive to get a rough list of available product categories. This query is performed using a command line script; the script may be performed from any workstation with access to the Data Archive.

Enter the following commands in a console window or X-Term:

```

TYPE:      cd /data_store/radar

```

```

TYPE: rm ~/products.txt
TYPE: for a in `ls | grep -P "^[A-Z]"`;do ls $a > ~/products.txt; done
TYPE: sort ~/products.txt > ~/sorted-products.txt
TYPE: uniq ~/sorted-products.txt ~/radar-products.txt
TYPE: cat ~/radar-products.txt | tr [:cntrl:] ' ' > ~/radar-products.txt
TYPE: cat ~/radar-products.txt ; echo

DHR DPA DSP DVL EET N0Q NOR N0S NOU NOV N0Z N1P N1Q N1R N1S N1U N1V N2Q
N2R N2S N2U N3Q N3R N3S N3U NAQ NAU NBQ NBU NCR NET NMD NTP NVL NVW TR0
TR1 TR2 TV0 TV1 TV2 TZL

```

NOTE: This procedure provides a list of product categories for Radar Data received over the SBN. It does not provide a list of current product categories or current data.

7.2.1.4 Available ORPG Product Categories

Product categories for a specific site may be determined by listing that site's directory in /data_store/radar. To determine product categories available regardless of site, use the following script:

```

TYPE: cd /data_store/radar
TYPE: rm ~/products.txt
TYPE: for a in `ls | grep -P "^[a-z]{4}$"`;do ls $a > ~/products.txt; done
TYPE: sort ~/products.txt > ~/sorted-products.txt
TYPE: uniq ~/sorted-products.txt ~/radar-products.txt
TYPE: cat ~/radar-products.txt | tr [:cntrl:] ' ' > ~/radar-products.txt
TYPE: cat ~/radar-products.txt ; echo

APR CZ DHR DMD DPA DVL EET ET HI LRM M MD OHP OSD OSW PRR RCM SPD SRM SS
SSD SSW STI STP SW TRU TVS UAM ULR V VIL VWP Z

```

NOTE: This procedure provides a list of product categories for Radar Data that has been received over the SBN. It does not provide a list of current product categories or current data.

7.2.2 EDEX Ingest Radar Data Logging

Radar Ingest processing follows the same general strategy for logging as the remaining data decoders; both routine messages and error messages are logged to the EDEX process logs. The process logs are located in /awips2/edex/logs on each of the EDEX servers, DX3 and DX4. The logs to examine are the EDEX Ingest process log and the EDEX Radar Ingest process log.

Note: The EDEX Ingest process logs contain startup messages and most other messages, including errors, for the EDEX processes. The EDEX Radar Ingest process log contains messages relating to a radar type. These include both status messages and error messages.

To monitor basic EDEX ingest, log into either DX3 or DX4 and change the directory to /awips2/edex/logs.

TYPE: tail -f edex-ingest-yyyymmdd.log

where yyyyymmdd is the date stamp of the current log file.

To monitor messages specific to Radar Product ingest, log into either DX3 or DX4 and change directory to /awips2/edex/logs.

TYPE: tail -f edex-ingest-radar-yyyymmdd.log

where yyyyymmdd is the date stamp of the current log file.

The LDM writer uses patterns in pqact.conf to determine where to write data files, including the path and file name. A typical entry is something like this:

```
NNEXRAD      ^ ( SDUS[ 234578 ]. | NXUS6 . )
( K | P | T ) ( LWX | BGM | CHS | RLX | ILN | CLE | AKQ | JKL | CTP | MHX | MRX | OKX | PHI )
( . . . ) ( . . . ) /p( . . . ) ( . . . )

FILE      -overwrite -close -log -edex
/data_store/radar/\2\8\7\5\6_\2\8_7_(seq).rad
```

This results in a log entry similar to

```
INFO 2011-10-22 00:00:01,009 [radarThreadPool-1] Ingest:
EDEX: Ingest - radar:::
/data_store/radar/KDIX/NMD/SDUS31_2353_KDIX_NMD_460087421.ra
d processed in: 0.0330 (sec) Latency: -0.2390 (sec)
```

The number before the ".rad" (460087421 in this case) is set by the LDM and can be traced upstream from EDEX. These sequence numbers (product identifiers) can be traced to the LDM logs on the cpsbn2 (goes.log, nwstg.log, etc.) in /data/lmd/logs.

NOTE: For additional information on monitoring EDEX and EDEX based ingest operations, see Chapter 25.

7.2.2.1 Radar Server Logs

The Radar Server also maintains its own logging. Radar Server logs are located in /awips2/rcm/data/logs. The current Radar Server log is radarserver.log. In normal conditions, the Radar Server creates a new log file daily and retains up to 3 old logs. Old logs are named radarserver.log.yyyy-mm-dd.

To monitor basic Radar Server operation, log onto the active member of the DX1/2 cluster and change directory to /awips2/rcm/data/logs.

TYPE: tail -f radarserver.log.

The basic structure of the Radar Server is the same as the EDEX logging. Routine messages fit one of two patterns:

INFO <time-stamp> [thread] RadarServer: Stored <message>

```
INFO 00:00:01,939 [TCM Read kdmx #2] RadarServer: kdmx:  
message code=19 size=16468 elev=1.3 sequence=3 vs=2011-10-21  
23:58:37 #74
```

INFO <time-stamp> [thread] RadarServer: <site>: <message>

```
INFO 00:00:01,968 [TCM Read kdmx #2] RadarServer: Stored  
message in  
/data_store/radar/kdmx/Z/elev1_5/res1/level16/kdmx.19.201110  
21_2358
```

These messages will normally occur in pairs. These patterns can be used to perform a quick status check on the Radar Server.

To monitor product arrival for a specific site, log onto the active member of the DX1/2 cluster and change directory to /awips2/rcm/data/logs. Once in that directory,

TYPE: tail -f radarserver.log | grep "RadarServer:

<site>:"

(replace <site> with the site identifier)

To monitor Radar Server writes, log onto the active member of the DX1/2 cluster and change directory to /awips2/rcm/data/logs. Once in that directory,

TYPE: tail -f radarserver.log | grep "RadarServer:

Stored"

7.2.2.2 Configuring Radar Server Logging

Radar Server logging is controlled by a file called log4j.properties which is located in /awips2/rcm/data/config/res on each server in the DX1/2 cluster.

Unlike EDEX configuration files, this directory is not shared between the servers, so any desired changes will need to be made on both servers. The baseline version of log4j.properties for the Radar Server contains the following entries.

```

log4j.rootLogger=INFO, rolling
log4j.logger.RadarServer=INFO, rolling
log4j.additivity.RadarServer=false
log4j.appenders.console=org.apache.log4j.ConsoleAppender
log4j.appenders.console.layout=org.apache.log4j.PatternLayout
log4j.appenders.console.layout.ConversionPattern=%-5p %d [%t] %c{1}: %m%n
log4j.appenders.rolling=com.raytheon.rcm.server.DailyPurgingRollingFileAppender
log4j.appenders.rolling.layout=org.apache.log4j.PatternLayout
log4j.appenders.rolling.layout.ConversionPattern=%-5p %d{HH:mm:ss,SSS} [%t]
%c{1}: %m%n
log4j.appenders.rolling.File=${com.raytheon.rcm.logDir}/radarserver.log
log4j.appenders.rolling.DatePattern='yyyy-MM-dd
log4j.appenders.rolling.MaxFiles=3
```

Default log4j.properties for Radar Server

NOTE: Extreme care must be taken in modifying this file; an error will cause logging and perhaps operational problems in the Radar Server. The only line that should be modified is the final one on the file:

log4j.appenders.rolling.MaxFiles=3

This line specifies the number of old logs to retain. Change the 3 to the desired number of old files. Then restart the Radar Server for the changes to take effect

The last line in the log4j.properties file specifies the number of old log files to keep. Log files are rolled daily, that is, a new log file is opened each day. Normally, as installed, three log files are retained. This means the current log file plus the previous two are retained. This also handles file purging – when the radar server is started, and each day thereafter, excess log files are deleted. For example, to retain a total of six old logs, change the final entry to "log4j.appenders.rolling.MaxFiles=6".

NOTE: The only reason to change log4j.properties (a configuration file) is to change the number of old logs being retained. This file applies only to the AWIPS II Radar Server, the application that bridges AWIPS II EDEX Ingest and the ORPG. It is located at /awips2/rcm/data/config/res on DX1 and DX2. Configuration files located in /awips2/edex/conf on both DX 3 and DX4 control all other EDEX process logging. These files are log4j.xml and log4j-ingest.xml. Any changes related to logging of other data types must be made in these files. There are some caveats. First, each server (DX3 and DX4) holds a copy of each of these logs. Changes made to one of these files on one server must be propagated to the other. The changes are read only at EDEX startup. Second, these are XML files, which can be sensitive to errors. If the files are edited, the editing can cause malformed XML, which can in turn cause logging issues. It does not appear to cause EDEX to quit, but there are startup issues, and, depending on where the XML error occurs, logging can be affected. Most changes to the EDEX logging strategy need to be made to one or both of these files, but this is not recommended.

7.2.3 SBN Radar Configuration Files

There are two types of Radar Configuration Files: 1) the LDM PQACT files; and 2) EDEX Distribution Service files.

7.2.3.1 SBN Radar Configuration Files – LDM

The radar data flow is controlled via the LDM configuration files on both CPSBN1 and PX1. There are two critical configuration files – **ldmd.conf** and **pqact.conf**. They are located in ~ldm/etc directory.

- **ldmd.conf.** Controls which servers the LDM can get data from, who can request from the LDM, and which data feeds it will request. Once LDM is installed and the basic data flow has been established, this file should not be modified.
- **pqact.conf.** Controls how data sent to this LDM is handled. This is the file to modify when changes to data flow are required.

7.2.3.2 SBN Radar Configuration Files – PQACT

Radar data flow controlled in pqact.conf is archived into two separate areas: radar products and Digital Precipitation Array (DPA) products. In general, LDM writes radar products to directories under /data_store/radar and DPA products under /data_store/dpa.

A typical pqact.conf entry controlling radar product routing is

```
##### Added by config_pqact #####
NNEXRAD ^ (SDUS [234578].NXUS6.)
(K|P|T)(MOB|BRO|FWD|LCH|CRP|SJT|HGX|EWX|SHV|LIX) (..)(..)(..)
/p(...)(...)
FILE -overwrite -log -close -edex
/data_store/radar\2\8\7\1_5\6_\2\8_\7_(seq).rad
```

The first part, NNEXRAD, is the FEEDTYPE.

The Regular Expression describes any product starting with SDUS and follows with any number between 2 and 8 OR starting with NXUS6.

The () store that string into the variable \1 which can be used when storing to physical disk.

(K|P|T) matches either a K, P or T and stores that to the variable \2 .

(LWX|BGM|CHS|RLX|ILN|CLE|AKQ|JKL|CTP|MHX|MRX|OKX|PHI) matches any of those site IDs and stores it to variable \3 .

(..)(..)(..) matches the next 6 characters of any type and stores them in pairs to \4, \5, and \6 respectively.

/p matches the exact string /p

(...)(...) matches the next 6 characters of any type and stores them in trios to \7 and \8 .

So the following line would match this entry in pqact and store in the following location:

Product:

```
NEXRAD3 56424268 SDUS51 KLWX 211529 /pTZLDCA !nids/
```

Storage Location:

```
/data_store/radar/KDCA/TZL/1529_KDCA_TZL_56424268.rad
```

For DPA products, the pattern is nearly identical:

In this case, only DPA products are matched, so the NNN entry is hard coded as DPA.

One final note: Because the originator is specified in the first line of the entry (“KABR” in this case), there will be an entry in **pqact.conf** for each originator for each data type.

7.2.3.3 SBN Radar Configuration Files – EDEX Data Distribution Files

In addition to the configuration files that control the LDM, the EDEX ingest subsystem uses a set of configuration files to determine which decoder(s) will handle the data. These files are initially installed with EDEX; once EDEX has been started, they are located in the AWIPS II localization store in /awips2/edex/data/utility/edex_static/base/distribution. (Recall that to access the localization store, you log onto DX3.)

The files in /awips2/edex/data/utility/edex_static/base/distribution contain acceptance patterns for each decoder. As a general rule, the files are named <data type>.xml. For radar data, the file is radar.xml; for DPA data, the file is dpa.xml.

Here is a sample version of the radar.xml file.

```
<requestPatterns >
    <regex>^SDUS[ 234578] . .* </regex>
    <regex>^RadarServer.* </regex>
</requestPatterns>
```

Here is a sample version of the dpa.xml file

```
<requestPatterns xmlns:ns2="group">
    <regex>^SDUS8. ....DPA* </regex>
    <regex>^SDUS5. .* </regex>
    <regex>^.{4}.81.* </regex>
    <regex>^RadarServer.*.81 </regex>
</requestPatterns>
```

SDUS* entries support the SBN radar data; RadarServer entries support the ORPG ingest of local radars.

Each <regex/> tag contains a Perl 5 style regular expression that will be matched against the WMO header of a data file; if the pattern matches, the decoder can handle the data in the file. As a general rule, there should be a pattern in this file that corresponds to each pattern in the pqact.conf file. If this is not the case, some data archived by LDM may not be processed.

Both radar.xml and dpa.xml may be edited to change data acceptance rules for the Distribution Service. This is normally performed as part of the site localization. See Chapter 15, Localization, for more information.

NOTE: Use care in editing these files; malformed XML can result in a failure of the EDEX Ingest process to start.

7.2.4 *ORPG Radar Configuration Files*

There are two types of configuration files: Radar Server configuration and EDEX Data Distribution files.

7.2.4.1 *ORPG Radar Configuration Files – Radar Server*

The radar data flow is controlled via the RCM configuration files on DX1/2. The configuration files are located in the /awips2/rcm/data/config directory tree. Basic Radar Server operation is controlled by two configuration files:

- **Start-config.** Contains basic information required for Radar Server operation. This file is initialized by the AWIPS II installer; it should not be modified.
- **config.xml.** Contains configuration information defining data flow. This file is located in /awips2/rcm/data/config/persist. It may be modified to change the list of radars being processed by the Radar Server. ORPG Radar Configuration Files – config.xml.

config.xml provides basic information that the Radar Server uses to communicate with the rest of the AWIPS system. The basic format of config.xml is shown in the following sample file, which shows two radars being accessed via Radar Server – koax and ktlx.

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<config>
    <pupID>617</pupID>
    <regionCode>3</regionCode>
    <wmoSiteID>KOAX</wmoSiteID>
    <collectionEnabled>false</collectionEnabled>
    <tdwrCollectionLimited>true</tdwrCollectionLimited>
    <decompressProducts>false</decompressProducts>
    <endpointConfig>
        <archiveRoot>/data_store/radar</archiveRoot>
        <connectionURL>
            amqp://guest:guest@/edex?brokerlist='tcp://cpsbn1-oma:5672'
        </connectionURL>
        <prefixPathWithRadar>false</prefixPathWithRadar>
        <topic>external.dropbox</topic>
    </endpointConfig>
    <radars>
        <radar>
            <radarID>koax</radarID>
            <nexradID>519</nexradID>
            <enabled>true</enabled>
            <dedicated>true</dedicated>
            <collectionEnabled>true</collectionEnabled>
            <sendEnvironmentalData>false</sendEnvironmentalData>
            <linkType>TCP_WAN</linkType>
            <links>
                <link>
                    <dedicated>true</dedicated>
                    <linkAddress>147.18.105.142:4501</linkAddress>
                    <linkIndex>27</linkIndex>
                    <linkType>TCP_WAN</linkType>
                    <maxRpsListSize>-1</maxRpsListSize>
                    <tcmPassword>passwd</tcmPassword>
                </link>
            </links>
            <productAvailabilityFieldUsable>
                True
            </productAvailabilityFieldUsable>
        </radar>
        <radar>
            <radarID>ktlx</radarID>
            <nexradID>1</nexradID>
            <enabled>true</enabled>
            <dedicated>true</dedicated>
            <collectionEnabled>true</collectionEnabled>
            <sendEnvironmentalData>false</sendEnvironmentalData>
            <linkType>TCP_WAN</linkType>
            <links>
                <link>
                    <dedicated>true</dedicated>
                    <linkAddress>147.18.105.142:5502</linkAddress>
                    <linkIndex>27</linkIndex>
                    <linkType>TCP_WAN</linkType>
                    <maxRpsListSize>-1</maxRpsListSize>
                    <tcmPassword>passwd</tcmPassword>
                </link>
            </links>
            <productAvailabilityFieldUsable>
                True
            </productAvailabilityFieldUsable>
        </radar>
    </radars>
</config>

```

Sample Radar Server config.xml

7.2.4.2 ORPG Radar Configuration Files – EDEX Data Distribution files

The EDEX ingest subsystem uses a set of configuration files to determine which decoder(s) will handle data. These files are initially installed with EDEX; once EDEX has been started, they are located in the AWIPS II localization store in /awips2/edex/utility/edex_static/base/distribution. (Recall that to access the localization store, you log onto DX3.)

The files in /awips2/ edex/utility/edex_static/base/distribution contain acceptance patterns for each decoder. As a general rule, the files are named <data type>.xml. For data from the Radar Server, the file is radar.xml.

Typical contents of radar.xml are:

```
<requestPatterns xmlns:ns2="group">
    <regex>^SDUS[ 234578] . KABR.*</regex>
    <regex>^SDUS[ 234578] . KCYS.*</regex>
    <regex>^SDUS[ 234578] . KDMX.*</regex>
    <regex>^SDUS[ 234578] . KGLD.*</regex>
    <regex>^SDUS[ 234578] . KGID.*</regex>
    <regex>^SDUS[ 234578] . KEAX.*</regex>
    <regex>^SDUS[ 234578] . KARX.*</regex>
    <regex>^SDUS[ 234578] . KMPX.*</regex>
    <regex>^SDUS[ 234578] . KLBF.*</regex>
    <regex>^SDUS[ 234578] . KDVN.*</regex>
    <regex>^SDUS[ 234578] . KUNR.*</regex>
    <regex>^SDUS[ 234578] . KFSD.*</regex>
    <regex>^SDUS[ 234578] . KTOP.*</regex>
    <regex>^SDUS[ 234578] . PHFO.*</regex>
    <regex>^SDUS[ 234578] . PGUM.*</regex>
    <regex>^koax.*</regex>
    <regex>^RadarServer.*</regex>
</requestPatterns>
```

For the Radar Server, the key is the final <regex/> tag; this specifies that a message containing a header starting with “RadarServer” is to be routed to the radar decoder. This tag is normally present in radar.xml and should not be changed. If changed, EDEX will likely cease processing radar data from the Radar Server.

7.2.5 Storing Decoded SBN Radar Data

Decoded radar data is stored in two locations: the AWIPS II Data Store and the AWIPS II metadata database

- The AWIPS II Metadata Database is hosted in PostgreSQL on the DX 1/2 cluster. The Radar metadata is stored in the radar and radar_spatial table of the awips schema of the metadata database.
- Decoded radar products are stored in HDF5 files in the AWIPS II Data Store.

7.2.5.1 AWIPS II Metadata Database – Radar Metadata

AWIPS II software uses a PostgreSQL database to store product metadata, i.e., data that helps to identify decoded data. Physically, the database resides on the PowerVault – DAS. The PostgreSQL database Server software runs on the DX 1/2 cluster.

For AWIPS II, metadata is stored in the awips schema of the metadata database. Radar metadata resides in two tables: radar and radar_spatial.

The radar table is a dynamic table that includes an entry for each decoded radar product that is available on the AWIPS II system. The radar_spatial table is a static table that contains spatial data relating to the radar sites.

When Radar Data has been successfully ingested, the radar records are written to HDF5 files in the AWIPS II Data Store, and then the metadata is written to the database. At that point, the decoded data is available to client applications such as CAVE.

7.2.5.2 AWIPS II Data Store – Radar Products

Decoded radar products are written to the AWIPS II Data Store. The data store is physically located on the NAS. The EDEX processes and other clients such as CAVE access it via NFS mounts.

On the EDEX servers, DX3 and DX4, the AWIPS II Data Store is mapped to /awips2/edex/data/hdf5/<site>/. On the LX and XT workstations, it is also mapped to /awips2/edex/data/hdf5/<site>/.

Under /awips2/edex/data/hdf5/<site>/, the decoded radar products are stored in the radar site subdirectory. For example, under /awips2/edex/data/hdf5/radar/<kakq>/.,

```
TYPE: ls -l

-rw-r--r-- 1 awips awips    70537296 Oct 22 01:02 radar-kakq-2011-10-22-00.h5
-rw-r--r-- 1 awips awips    79169280 Oct 22 02:05 radar-kakq-2011-10-22-01.h5
-rw-r--r-- 1 awips awips    70136416 Oct 22 03:03 radar-kakq-2011-10-22-02.h5
-rw-r--r-- 1 awips awips    55465208 Oct 22 04:06 radar-kakq-2011-10-22-03.h5
-rw-r--r-- 1 awips awips    42830568 Oct 22 05:04 radar-kakq-2011-10-22-04.h5
-rw-r--r-- 1 awips awips    41884312 Oct 22 06:02 radar-kakq-2011-10-22-05.h5
-rw-r--r-- 1 awips awips    42019072 Oct 22 07:00 radar-kakq-2011-10-22-06.h5
-rw-r--r-- 1 awips awips    49247384 Oct 22 08:08 radar-kakq-2011-10-22-07.h5
-rw-r--r-- 1 awips awips    42152640 Oct 22 09:06 radar-kakq-2011-10-22-08.h5
-rw-r--r-- 1 awips awips    41540848 Oct 22 10:04 radar-kakq-2011-10-22-09.h5
-rw-r--r-- 1 awips awips    40897016 Oct 22 11:02 radar-kakq-2011-10-22-10.h5
-rw-r--r-- 1 awips awips    41872984 Oct 22 12:01 radar-kakq-2011-10-22-11.h5
-rw-r--r-- 1 awips awips    46712360 Oct 22 13:10 radar-kakq-2011-10-22-12.h5
-rw-r--r-- 1 awips awips    41904200 Oct 22 14:07 radar-kakq-2011-10-22-13.h5
```

```
-rw-r--r-- 1 awips awips      41402416 Oct 22 15:06 radar-kakq-2011-10-22-14.h5  
-rw-r--r-- 1 awips awips      7394056 Oct 22 15:17 radar-kakq-2011-10-22-15.h5
```

7.2.6 Audible Radar-Alerting

AlertVIZ includes the capability to use audible alerting of messages on workstations that have audio capabilities. Adding an audio component to Radar Alerts involves modifying the AlertVIZ configuration on the workstation. To do this, use the configuration dialogs built into AlertVIZ.

- a. Right click on the AlertVIZ icon in the system tray and select *Configuration*. This will display the *Alert Visualization Configuration* dialog. (See Exhibit 7.2.6-1.)

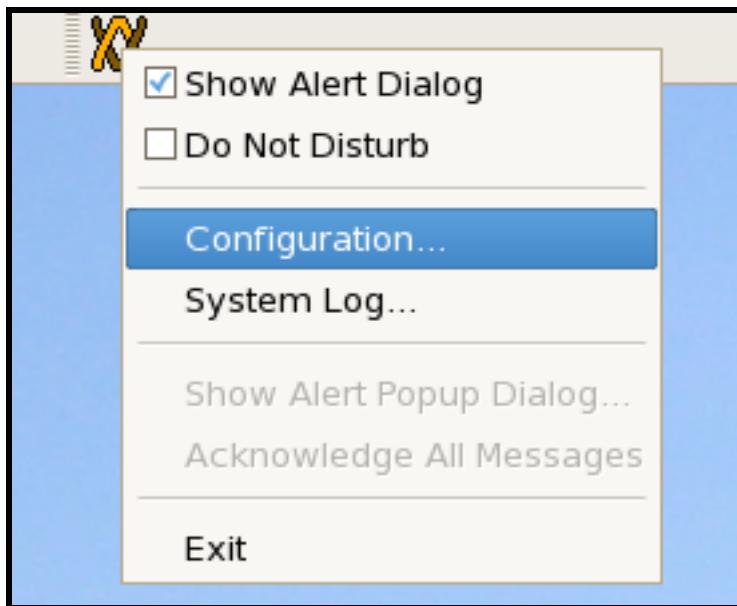


Exhibit 7.2.6-1. Alert Visualization Configuration dialog

- a. On the *Alert Visualization Configuration* dialog, select *RADAR* from the list box under *Sources & Priorities* at the lower left of the dialog. This will load the alerting information for RADAR into the lower control group. (See Exhibit 7.2.6-2).

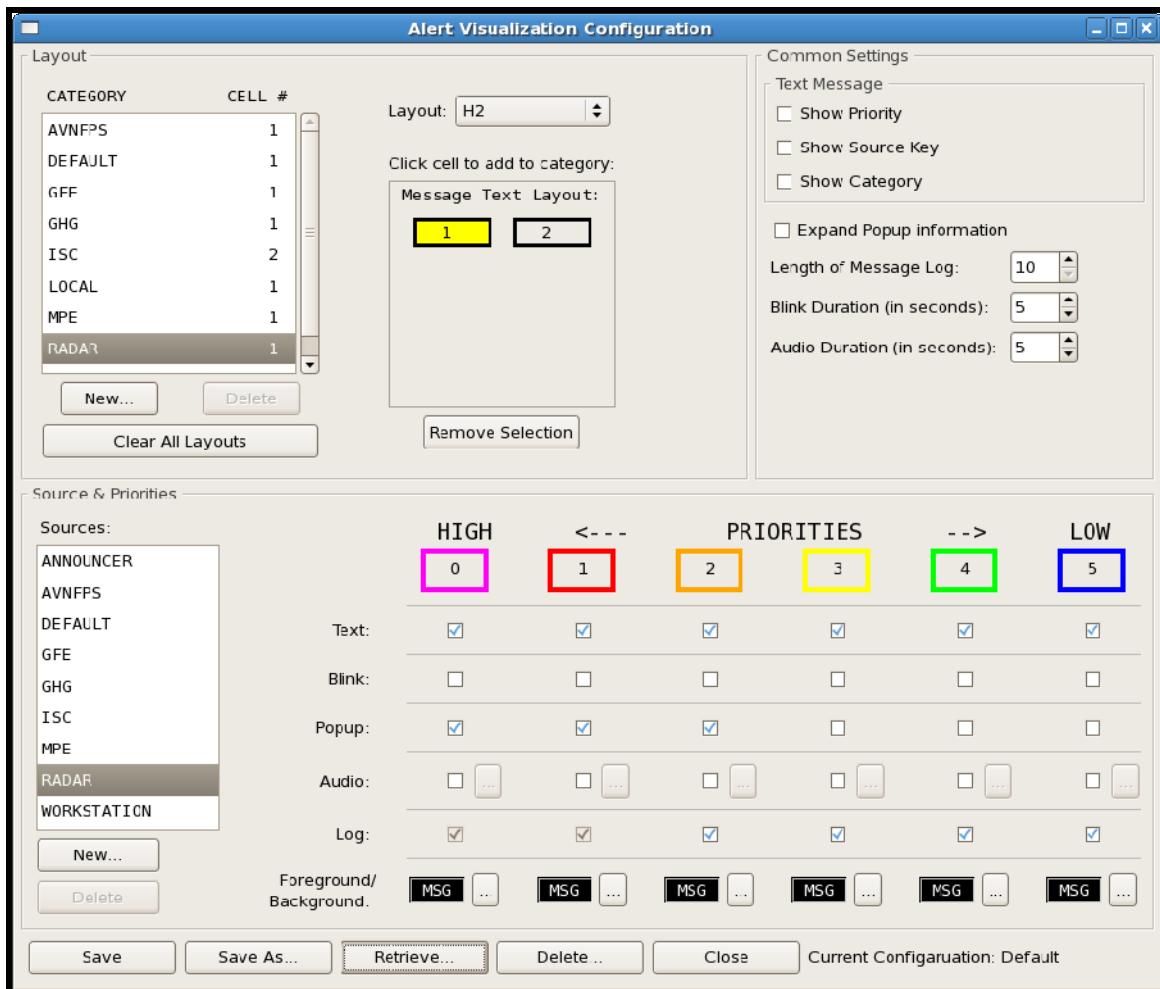


Exhibit 7.2.6-2. Alert Visualization Configuration Sources & Priorities

- b. In the *Sources & Priorities* control group, make sure *RADAR* in the *Sources* menu is selected in the list box, and then click the *Audio* check box under *HIGH*. (See Exhibit 7.2.6-3.)

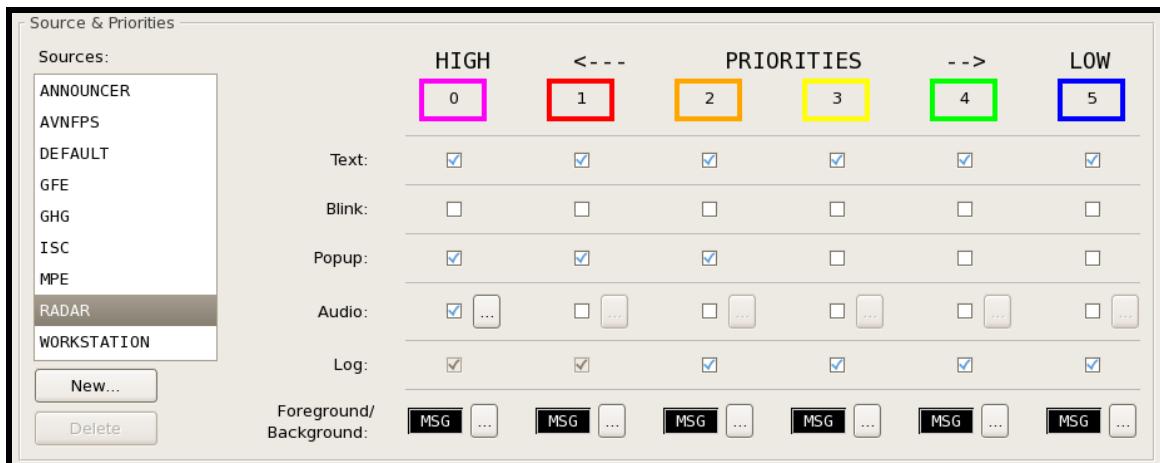


Exhibit 7.2.6-3. Alert Visualization Configuration Sources & Priorities Audio

- c. Selecting the *Audio* checkbox activates the *Audio* browse button. Click the *browse* button. This will display the *Audio File Selection* dialog. This dialog displays the currently available audio files. (See Exhibit 7.2.6-4.)

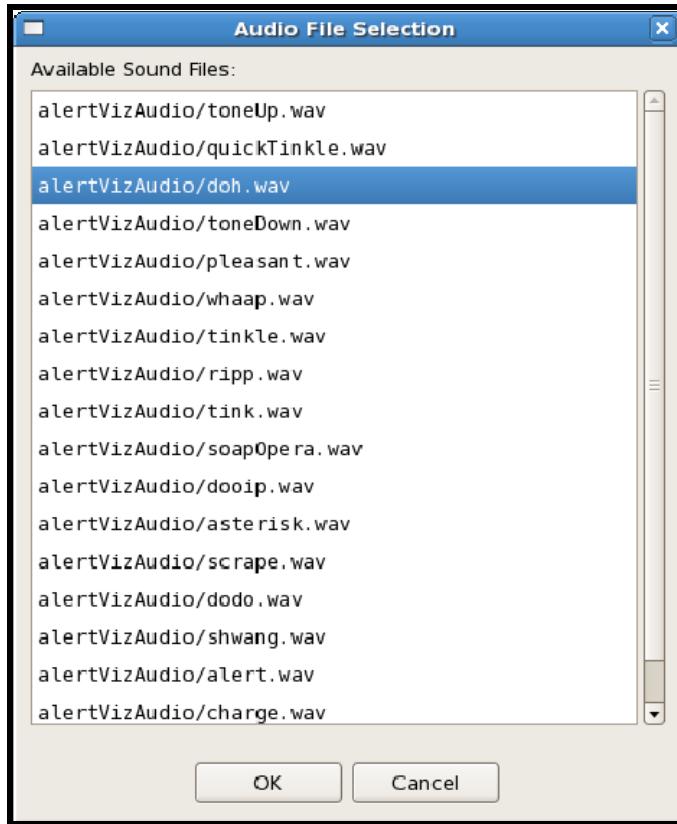


Exhibit 7.2.6-4. Alert Visualization Configuration Sources & Priorities Audio File

- d. Select desired sound file and click *OK*.
- e. To save the modification to the Alert VIZ configuration, click the *Save As ...* button at the bottom of the *Alert Visualization Configuration* dialog. This opens the *Configuration List* dialog in save mode. (See Exhibit 7.2.6-5.)

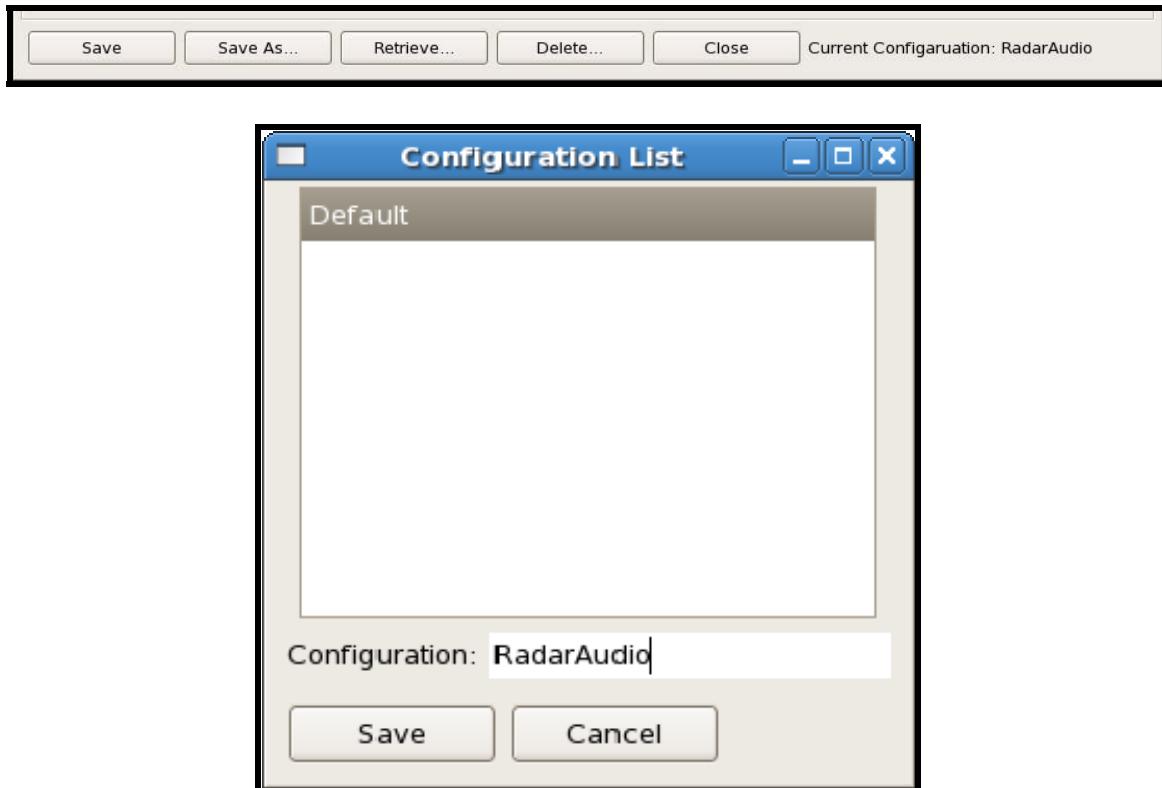


Exhibit 7.2.6-5. Alert Visualization Configuration List

- f. Once the dialog is open, enter a name for the configuration and click *Save*. The *Alert Visualization Configuration* dialog will update to show your new configuration as the current configuration.

Once the configuration has been changed, a restart of Alert VIZ will result in the new configuration being loaded.

Note that the new configuration is saved in the AWIPS-II data localization store for the current user. As a result, the newly updated configuration is available for that user on all workstations.

7.3 WAN/SBN Radar Product Distribution from Site to NCF

The AWIPS WAN/SBN distribution capability allows sites to distribute radar products over the WAN to the NCF for redistribution to all AWIPS sites over the SBN. Table 7.3-1 lists the product number and name, levels, layer, resolution and range, product ID, and format for WSR-88D products on AWIPS.

Table 7.3-1. WSR-88D Products on AWIPS

Prod Num	Lvls	Lyr	Resol	Range	Prod ID	Product Name	Format
2	0	0	0	0	GSM	General Status Msg (GSM)	GSM
3	0	0	0	0	PRR	Product Request Resp (PRR)	PRR
6	0	0	0	0	AAP	Alert AdaptationParms (AAP)	AAP
8	0	0	0	0	PTL	Product List (PTL)	PTL
9	0	0	0	0	AM	Alert Message (AM)	AM
16	8	0	1	230	Z	Reflectivity (Z)	Radial
17	8	0	2	460	Z	Reflectivity (Z)	Radial
18	8	0	4	460	Z	Reflectivity (Z)	Radial
19	16	0	1	230	Z	Reflectivity (Z)	Radial
20	16	0	2	460	Z	Reflectivity (Z)	Radial
21	16	0	4	460	Z	Reflectivity (Z)	Radial
22	8	0	0.25	60	V	Velocity (V)	Radial
23	8	0	0.5	115	V	Velocity (V)	Radial
24	8	0	1	230	V	Velocity (V)	Radial
25	16	0	0.25	60	V	Velocity (V)	Radial
26	16	0	0.5	115	V	Velocity (V)	Radial
27	16	0	1	230	V	Velocity (V)	Radial
28	8	0	0.25	60	SW	Spectrum Width (SW)	Radial
29	8	0	0.5	115	SW	Spectrum Width (SW)	Radial
30	8	0	1	230	SW	Spectrum Width (SW)	Radial
31	16	0	2	230	USP	User Select Precip (USP)	Radial
32	256	0	1	115	DHR	Digital Hybrid Scan Refl (DHR)	Radial
33							
34	8	0	1	230	CFC	Clutter Filter Control (CFC)	Radial
35	8	0	1	230	CZ	Composite Ref (CZ)	Raster
36	8	0	4	460	CZ	Composite Ref (CZ)	Raster
37	16	0	1	230	CZ	Composite Ref (CZ)	Raster
38	16	0	4	460	CZ	Composite Ref (CZ)	Raster
39	0	0	1	230	CZC	Composite Ref Contour (CZC)	Graphic
40	0	0	4	460	CZC	Composite Ref Contour (CZC)	Graphic
41	16	0	4	230	ET	Echo Tops (ET)	Raster
42	0	0	4	230	ETC	Echo Tops Contour (ETC)	Graphic
43	16	0	1	230	SWR	Svr Wx Anal - Ref (SWR)	Radial
44	16	0	0.25	230	SWV	Svr Wx Anal - Vel (SWV)	Radial
45	8	0	0.25	230	SWW	Svr Wx Anal - SW (SWW)	Radial
46	16	0	0.5	230	SWS	Svr Wx Anal - Shear (SWS)	Radial
47	0	0	4	230	SWP	Severe Wx Prob (SWP)	Graphic
48	8	0	0	0	VWP	VAD Wind Profile (VWP)	Graphic
49	16	0	0	26	CM	Combined Moment (CM)	Raster
50	16	0	1	230	RCS	Ref X-Sect (RCS)	Raster
51	16	0	0.5	230	VCS	Vel X-Sect (VCS)	Raster

Prod Num	Lvls	Lyr	Resol	Range	Prod ID	Product Name	Format
52	8	0	0.5	230	SCS	SW X-Sect (SCS)	Raster
53	8	0	1	50	WER	Wk Echo Region (WER)	Raster
55	16	0	0.5	230	SRR	Storm Rel Vel Region (SRR)	Radial
56	16	0	1	230	SRM	Storm Rel Velocity (SRM)	Radial
57	16	0	4	230	VIL	Vert Integ Liq (VIL)	Raster
58	0	0	0	345	STI	Storm Track (STI)	Graphic
59	0	0	0	230	HI	Hail Index (HI)	Graphic
60	0	0	0	230	M	Mesocyclone (M)	Graphic
61	0	0	0	230	TVS	Tornadic Vortex Sig (TVS)	Graphic
62	0	0	0	460	SS	Storm Structure (SS)	Text
65	8	1	4	460	LRM	Lyr 1 Comp Ref Max (LRM)	Raster
66	8	2	4	460	LRM	Lyr 2 Comp Ref Max (LRM)	Raster
67	8	2	4	460	APR	Lyr 1 Comp Ref MAX (APR)	Raster
73	0	0	0	0	UAM	User Alert Message (UAM)	Text
74	0	0	0	460	RCM	Radar Coded Message (RCM)	Text
75	0	0	0	0	FTM	Free Text Message (FTM)	Text
77	0	0	0	0	PTM	PUP Text Message (PTM)	Text
78	16	0	2	230	OHP	One Hour Precip (OHP)	Radial
79	16	0	2	230	THP	Three Hour Precip (THP)	Radial
80	16	0	2	230	STP	Storm Total Precip (STP)	Radial
81	256	0	4	230	DPA	Digital Precip Array (DPA)	Raster
82	8	0	40	230	SPD	Supplemental Precip Data (SPD)	Text
83	0	0	0	0	IRM	Intermediate Radar Message (IRM)	Text
84	8	0	0	0	VAD	Vel Az Display (VAD)	Graphic
85	8	0	1	230	RCS	Ref X-Sect (RCS)	Raster
86	8	0	0.5	230	VCS	Vel X-Sect (VCS)	Raster
87	0	0	2	0	CS	Combined Shear (CS)	Raster
88	0	0	2	0	CSC	Combined Shear Contour (CSC)	Graphic
89	8	3	4	460	LRA	Lyr 3 Comp Ref Avg (LRA)	Raster
90	8	3	4	460	LRM	Lyr 3 Comp Ref Max (LRM)	Raster
93	256	0	1.00	115	DBV	ITWS Digital Velocity (DBV)	Radial
94	256	0	1.00	460	DZ	8-bit Refl Array (DZ)	Radial
99	256	0	0.25	230	V	8-bit Velocity Array (V)	Radial
100	0	0	0	0	VSDT	VAD Site Adapt Params (VSDT)	Text
101	0	0	0	0	STIT	Storm Track Alpha block (STIT)	Text
102	0	0	0	0	HIT	Hail Index Alpha block (HIT)	Text
103	0	0	0	0	MT	Mesocyclone Alpha block (MT)	Text
104	0	0	0	0	TVST	TVS Alpha block (TVST)	Text
105	0	0	0	0	CST	Combined Shear Params (CST)	Text
106	0	0	0	0	CSCT	Combined Shr Cntr Params (CSCT)	Text
107	0	0	0	0	OHPT	1hr Rainfall Params (OHPT)	Text
108	0	0	0	0	THPT	3hr Rainfall Params (THPT)	Text

Prod Num	Lvls	Lyr	Resol	Range	Prod ID	Product Name	Format
109	0	0	0	0	STPT	Storm Total Params (STPT)	Text
136	16	0	4	0	CZFMP	Comp Refl Mos Filt Prec(CZFMP)	Raster
137	16	0	8	0	CZFMP	Comp Refl Mos Filt Prec(CZFMP)	Raster
139	16	0	4	0	CZM	Composite Refl Mosaic (CZM)	Raster
144	16	0	8	0	CZM	Composite Refl Mosaic (CZM)	Raster
153	256	0	0.25	460	HZ	Super-Res Reflectivity (Z)	Radial
154	256	0	0.25	300	HV	Super-Res Velocity (V)	Radial
155	256	0	0.25	300	HSW	Super-Res Spec Width (SW)	Radial
159	8	0	4	300	ZDR	Differential Refl (ZDR)	Raster
158	16	0	0.25	300	ZDR	Differential Refl (ZDR)	Raster
161	256	0	0.25	300	CC	Correlation Coeff (CC)	Radial
160	16	0	1.0	230	CC	Correlation Coeff (CC)	Radial
163	256	0	0.25	300	KDP	Specific Diff Phase (KDP)	Radial
162	16	0	1.0	230	KDP	Specific Diff Phase (KDP)	Radial
165	256	0	0.25	300	HC	Hydrometer Class (HC)	Radial
164	16	0	1.0	230	HC	Hydrometer Class (HC)	Radial
177	256	0	0.25	230	HHC	Hybrid Hydrometer Class (HHC)	Radial
176	65536	0	0.25	230	DPR	Digital Inst Precip rate (DPR)	Radial
169	16	0	2.0	230	OHA	One Hour Accum (STA)	Radial
171	16	0	2.0	230	STA	Storm Total Accum (STA)	Radial
172	256	0	0.25	230	STA	Storm Total Accum (DSA)	Radial
173	256	0	0.25	230	DUA	User Select Accum (DUA)	Radial
174	256	0	0.25	230	DOD	One Hour Diff (DOD)	Radial
175	256	0	0.25	230	DSD	Storm Total Diff (DSD)	Radial
	256	0	0.25	230	DP	Differential Phase (DP)	Radial
	256	0	0.25	230	PRE	Inst Precip Rate (PRE)	Radial
166	0	0	0.0	230	ML	Melting Layer (ML)	Graphic
170	256	0	0.25	230	DAA	One Hour Unbiased Accum (DAA)	Radial
199	16	0	4	0	OHPM	One Hour Precip Mosaic (OHPM)	Raster
200	16	0	8	0	OHPM	One Hour Precip Mosaic (OHPM)	Raster
204	16	0	4	0	ETM	Echo Tops Mosaic (ETM)	Raster
205	16	0	8	0	ETM	Echo Tops Mosaic (ETM)	Raster
208	0	0	0	0	CSAM9	Com Storms Att Mosaic B9 (CSAM9)	Raster
209	0	0	0	0	CSAM	Comb Storms Att Mosaic (CSAM)	Raster
210	16	0	4	0	CPAM	Cum Precip Accum Mosaic (CPAM)	Raster
211	16	0	4	0	ODPM	24-Hr Precip Mosaic (ODPM)	Raster
212	16	0	4	0	CZMP	Comp Refl Mosaic Precip (CZMP)	Raster
213	16	0	8	0	CZMP	Comp Refl Mosaic Precip (CZMP)	Raster
216	16	0	8	0	CPAM	Cum Precip Accum Mosaic (CPAM)	Raster
217	16	0	8	0	ODPM	24-Hr Precip Mosaic (ODPM)	Raster
246	16	0	2	0	ZNM	Refl Mos Non Filt (ZNM)	Raster
247	16	0	2	0	ZNMC	Refl Mos Non Filt Clr (ZNMC)	Raster

Prod Num	Lvls	Lyr	Resol	Range	Prod ID	Product Name	Format
249	16	0	2	0	ZM	Base Reflectivity Mosaic (ZM)	Raster
250	16	0	4	0	ZM	Base Reflectivity Mosaic (ZM)	Raster
251	16	0	8	0	ZM	Base Reflectivity Mosaic (ZM)	Raster
253	16	0	4	0	ZMGA	Base Refl Mos Griff+Alb (ZMGA)	Raster
254	8	0	4	0	LRMM	Layer Comp Refl Low Mos (VILM)	Raster
255	8	0	8	0	LRMM	Layer Comp Refl Med Mos (VILM)	Raster
256	8	0	8	0	LRMM	Layer Comp Refl High Mos (VILM)	Raster
257	16	0	4	0	VILM	Vert Int Liquid Mosaic (VILM)	Raster

Note: Level III data are radar products generated from the Level II base data. The products are used to assist forecasters and others in weather analysis, predictions, and warnings. Level III products used to be recorded on WORM Optical Disks at NWS sites in the early 1990s. Currently, the required products are provided electronically in near real-time to an NWS Central Collection Facility (CCF). When products were written to the WORM Optical Disks, all products were saved and archived. Now, only required products are collected at the CCF and then archived by National Climatic Data Center (NCDC). Regardless of how the Level III products have been received, the NCDC archives the products in compressed tape archive format on the NCDC Hierarchical Data Storage System (HDSS). The Level III Products archive is made available via the World Wide Web on the on the NCDC Home Page.

For more information on this subject, go to:

http://www.roc.noaa.gov/WSR88D/Level_III/Level3Info.aspx

For the default list of the products for which there are central collection requirements, use the following link to go to the most current Government-furnished list:

http://www.nws.noaa.gov/ndm/masterfiles_iw/prodList.txt

For WSR-88 D additional and discontinued products, go to

http://www.roc.noaa.gov/WSR88D/Level_III/Level3Info.aspx

Scroll down to the section “Changes That May Impact RPCCDS Users” and click on the notices.

7.4 RPS list

The RPS list is edited using a Graphical User Interface (GUI) that is part of CAVE. It is accessed via the Radar menu in the D2D perspective.

NOTE: When you add products to the RPS list with the AWIPS RPS List Editor, you specify the specific parameters but not the Product Number. If the product is entered in the RPS list with incorrect parameters, it will be interpreted as a

different product and not distributed automatically to the WAN. It is very important that the data level, resolution, and elevation be specified correctly in the RPS list or the product will not be distributed properly.

To edit the RPS list:

1. Start CAVE and, if necessary, open the D2D perspective.
2. Select *RPS List Editor...* under the CAVE menu. The RPS List Editor will display. (See Exhibit 7.4-1.)

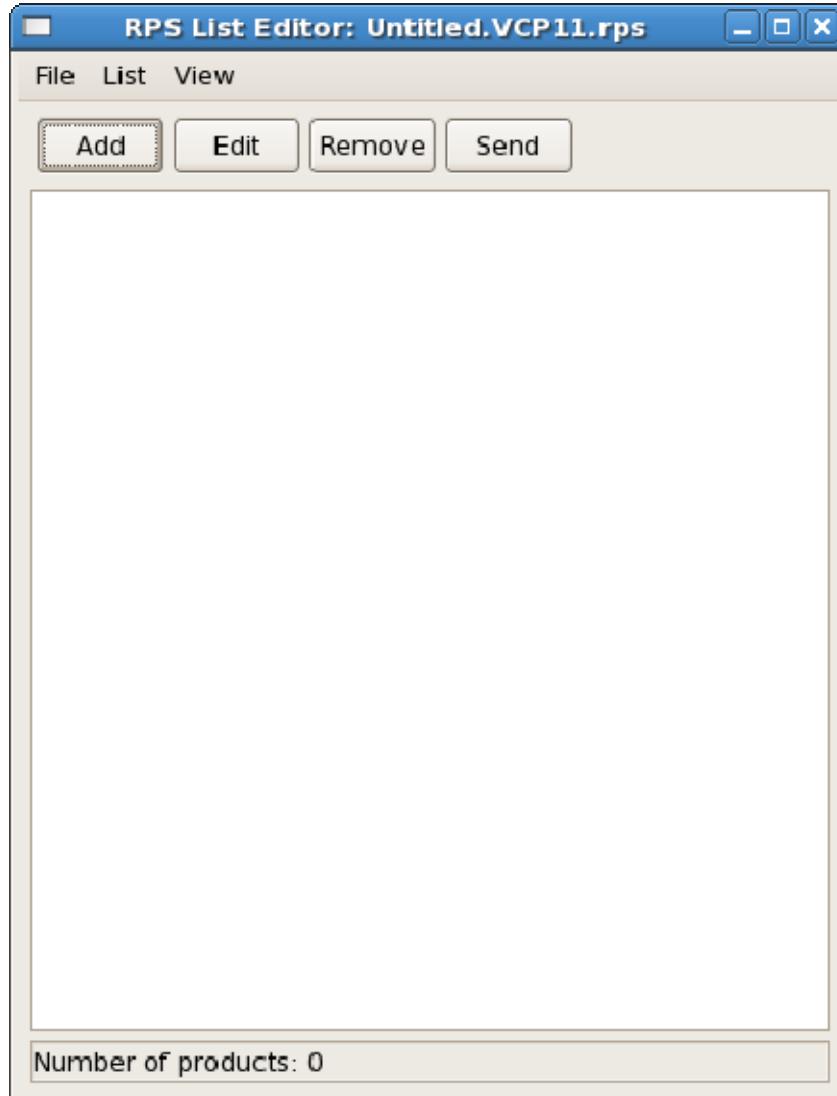


Exhibit 7.4-1. RPS List Editor

3. Select the list you want to edit under the View Menu. (See Exhibit 7.4-2.)

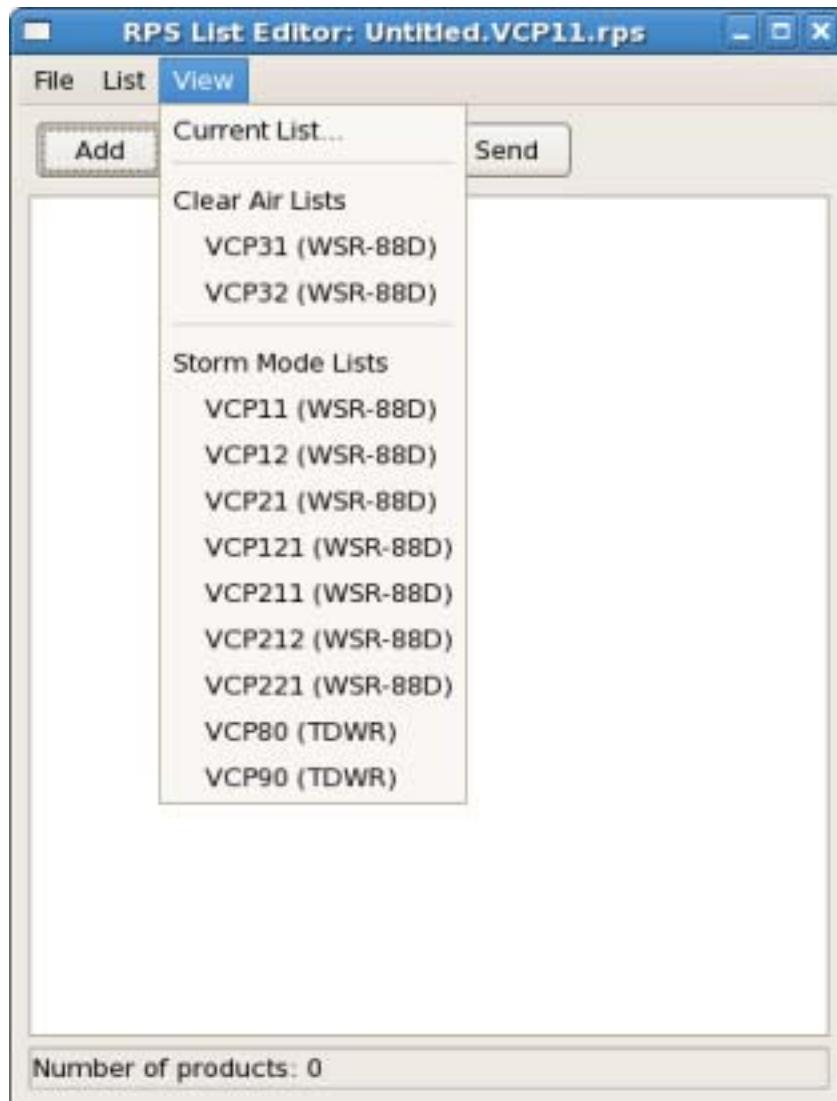


Exhibit 7.4-2. RPS List Editor View Menu

4. After selecting the desired list, it will be displayed in the RPS List Editor. (See Exhibit 7.4-3.)

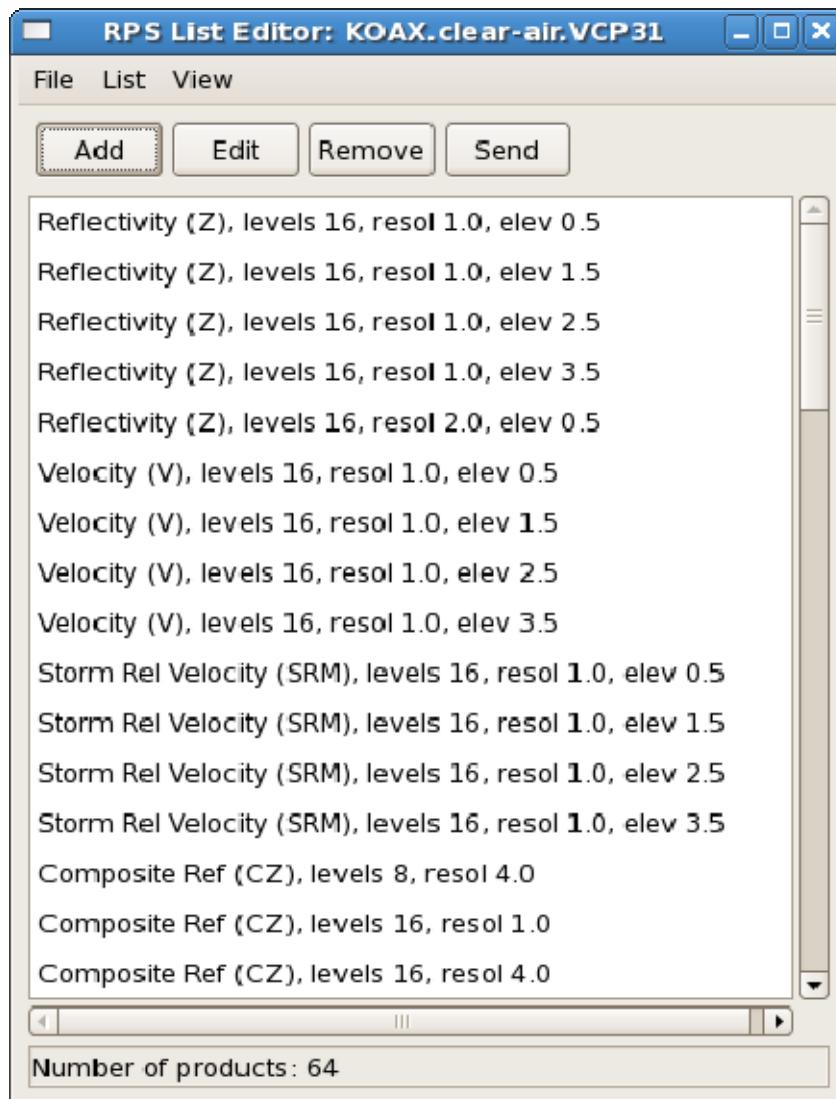


Exhibit 7.4-3. RPS List Editor View Menu List

5. To edit a list entry, select the entry and click *Edit*. Once the entry is displayed in a separate dialog, modify the appropriate values and click *OK*. (See Exhibit 7.4-4.)

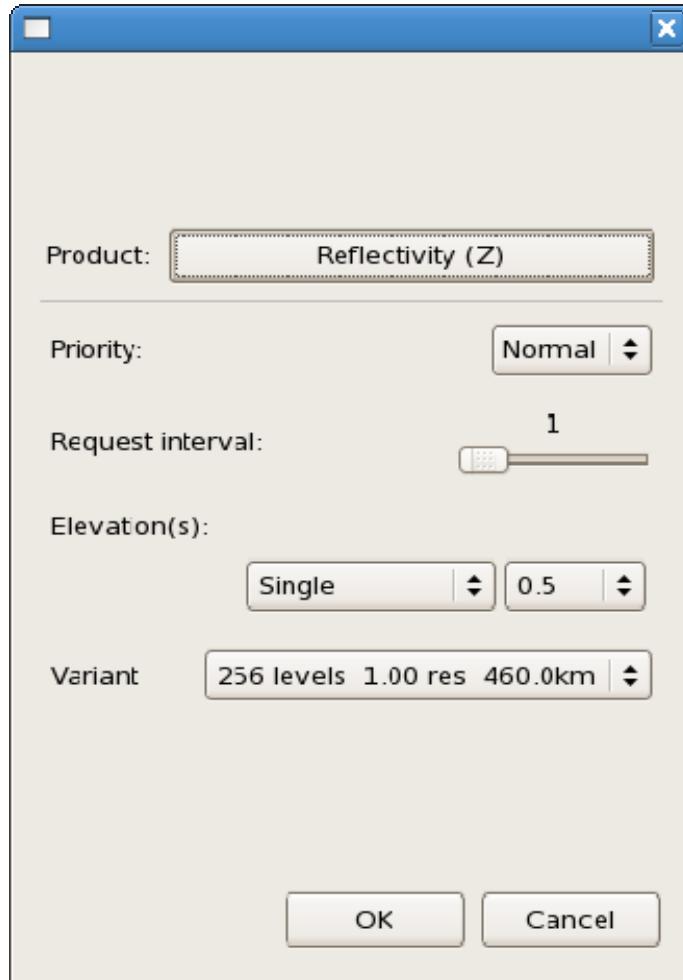


Exhibit 7.4-4. RPS List Editor View Menu List Edit

6. To add a new list entry, click *New*. Once the dialog is displayed, select the appropriate entries and click *OK*. (See Exhibit 7.4-5.)

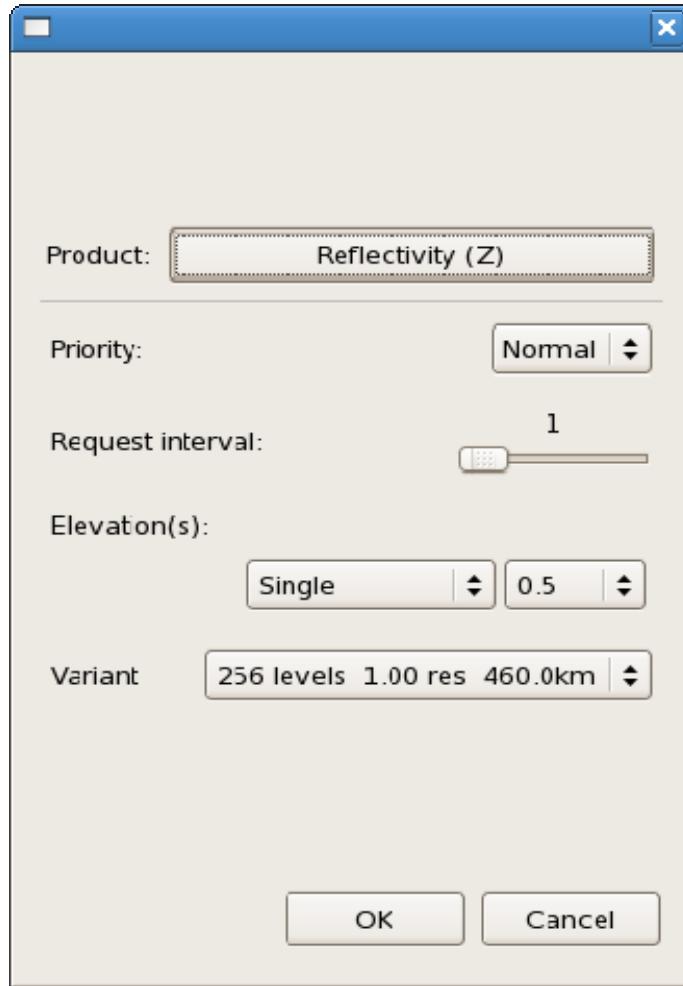


Exhibit 7.4-5. RPS List Editor View Menu List New Entry

7. To delete a list entry, select the entry and click *Remove*.
8. To submit the list, click *Send*.

7.5 Two-Way Communication

As illustrated in Exhibit 7.5-1, the Quartz timer task in EDEX initiates either environmental data or bias table task. The EDEX queries the RadarServer for the list of ORPGs/SPGs (For the environmental data task, EDEX queries the grib data set based on the settings in EnvironParamsLevelTable.xml and generates environmental data message. For the bias table task, EDEX looks for bias table messages that were generated by the hdyro software). The EDEX sends the messages to the RadarServer and the RadarServer sends the messages to the ORPGs/SPGs.

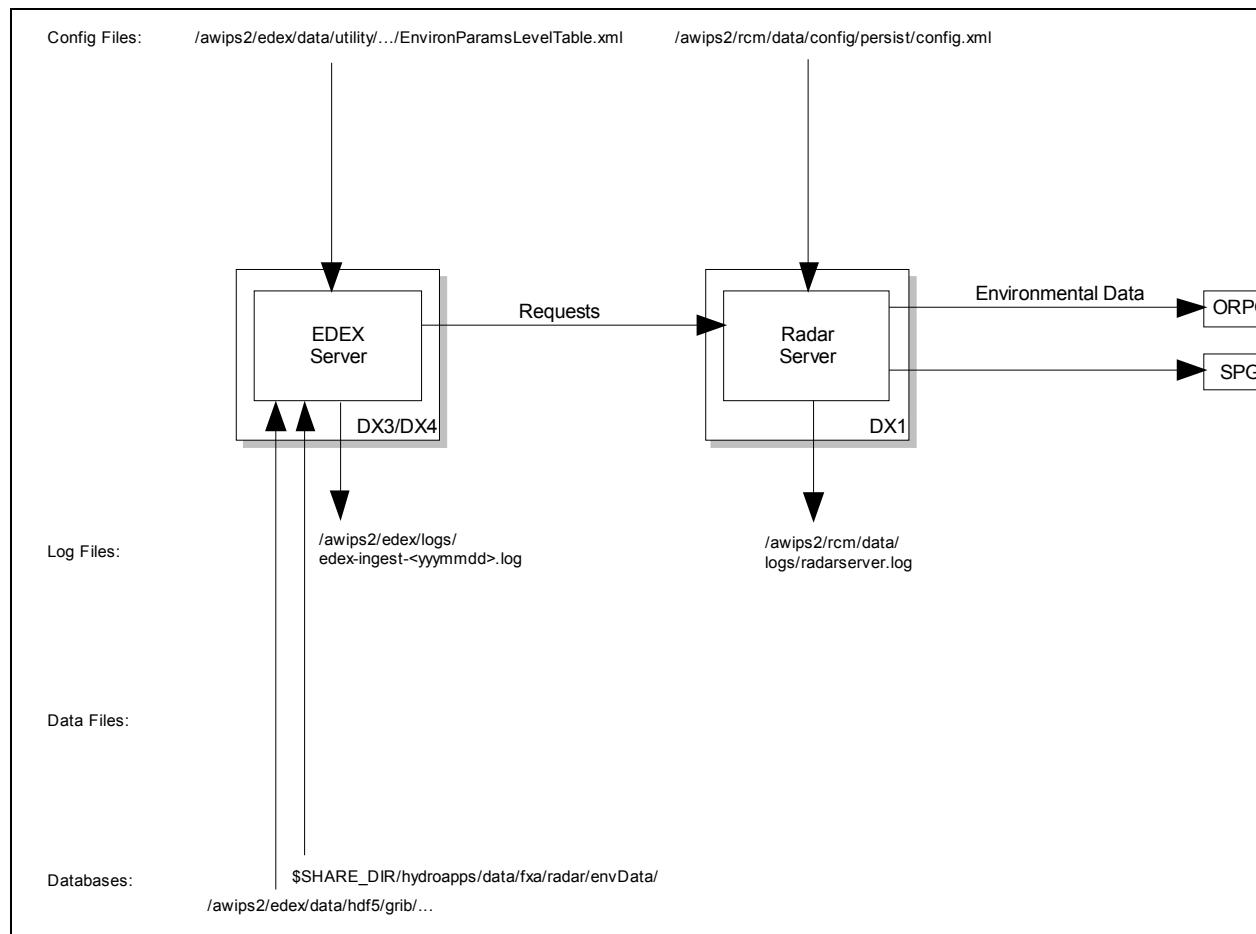
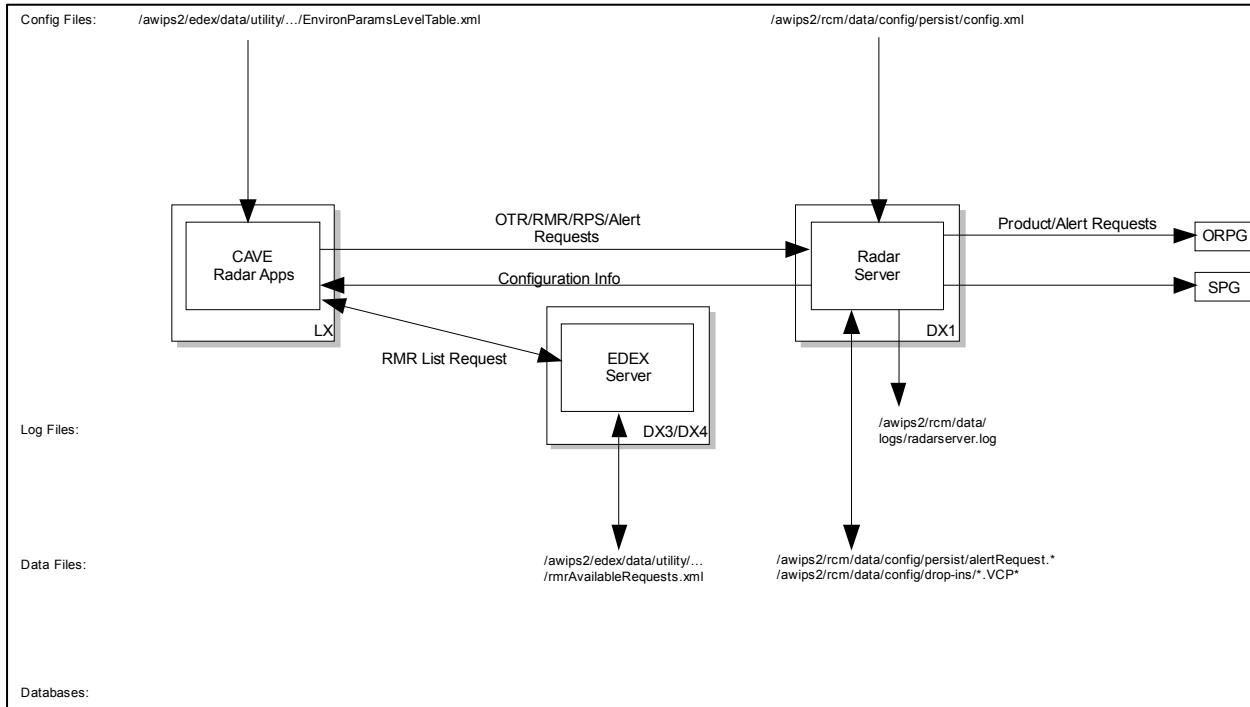


Exhibit 7.5-1. Sending Environmental Data

As illustrated in Exhibit 7.5-2:

- **For OTRs:** The CAVE sends requests to the RadarServer which are forwarded to the ORPG and the RadarServer sends OTR status back to CAVE (Not shown).
- **For RMRs:** The CAVE reads and writes the list of available RMRs using the EDEX localization requests. Then the Requests to activate/deactivate RMR requests are sent to the RadarServer. The RadarServer sends the OTR requests to the ORPGs/SPGs according to the contents of the RMR and the RadarServer sends RMR status events back to CAVE while the RMR window is open (not shown).
- **For RPS:** The CAVE queries the RadarServer for the current RPS list. To activate an RPS list, CAVE first sends a request to the RadarServer which then sends an RPS message to the ORPG/SPG.
- **For Alert Requests:** The CAVE queries the RadarServer for the current alert request state and then CAVE sends the updated alert requests to the RadarServer. The RadarServer stores the alert requests in /awips2/rcm/data/config/persist/ and then sends an alert request message to the ORPG.

**Exhibit 7.5-2. Sending Radar Applications**

Chapter 8

Local Data Acquisition and Dissemination (LDAD) System

Chapter 8. Local Data Acquisition and Dissemination (LDAD) System

Table of Contents

	<i>Page</i>
8.0 Introduction to LDAD	1
8.1 LDAD Functionality	2
8.2 LDAD Hardware Configuration	2
8.2.1 LAN Hub	2
8.2.2 LDAD Terminal Server	2
8.2.3 Modem Nest.....	4
8.2.4 LDAD Firewall	4
8.2.5 LDAD Server.....	5
8.3 LDAD Software Configuration.....	5
8.3.1 LDAD Gateway	7
8.3.2 Scheduler	11
8.3.3 Communications Server.....	11
8.3.4 Inter-Gateway Communication.....	12
8.3.5 Local Data Management.....	12
8.3.6 Preprocessors	13
8.3.7 Decoder and Storage	13
8.4 Rsync.....	13
8.4.1 Rsync with AWIPS (internal) and External (non-AWIPS) Systems	14
8.4.2 Rsync Configuration Files	14
8.5 LDAD Linux Server Heartbeat Cron Package	14
8.6 Quality Control and System Monitoring	17
8.6.1 Quality Control	17
8.6.2 System Monitoring	18
8.7 Acquire LARC/Handar 555 Data.....	19
8.7.1 User Interface: ldadScheduler.....	23
8.7.2 ldadServer	25
8.7.3 tell_co.....	26
8.7.4 listener.....	27
8.7.5 CO_serv	28
8.8 Decode LARC/Handar 555 Data	29
8.8.1 newLDADdataNotification.....	30
8.8.2 CO_serv	33
8.8.3 listener.....	34
8.8.4 preProcessLDAD.pl.....	35

8.8.5 preprocessLARC.pl.....	35
8.8.6 LDAD_ROUTER	36
8.8.7 DataController	37
8.8.8 routerLdadDecoder	38
8.8.9 routerStoreTextEDEX	39
8.8.10 routerStoreEDEX.....	40
8.8.11 routerShefEncoderEDEX.....	42
8.8.12 distributeProduct.....	43
8.9 Acquire Campbell Data.....	44
8.9.1 User Interface: ldadScheduler.....	51
8.9.2 ldadServer	51
8.9.3 tell_co.....	52
8.9.4 listener.....	53
8.9.5 CO_serv	54
8.9.6 process_expect.....	56
8.9.7 callSite.ksh	56
8.9.8 campbell decoder	56
8.10 Decode Campbell Data	57
8.10.1 newLDADdataNotification.....	61
8.10.2 CO_serv	62
8.10.3 listener.....	63
8.10.4 preprocessCAMPBELL.pl	64
8.10.5 LDAD_ROUTER	65
8.10.6 DataController	66
8.10.7 routerLdadDecoder	67
8.10.8 routerStoreEDEX.....	69
8.10.9 routerShefEncoderEDEX.....	70
8.10.10 distributeProduct.....	71
8.10.11 notificationServer.....	72
8.11 Acquire Sutron Data	73
8.11.1 User Interface: ldadScheduler.....	79
8.11.2 ldadServer	79
8.11.3 tell_co.....	80
8.11.4 listener.....	81
8.11.5 CO_serv	82
8.11.6 process_expect.....	84
8.11.7 callSite.ksh	84
8.11.8 sutron decoder	84

8.12	Decode Sutron Data	85
8.12.1	newLDADdataNotification.....	89
8.12.2	CO_serv	90
8.12.3	listener.....	90
8.12.4	preprocessSUTRON.pl	91
8.12.5	LDAD_ROUTER	92
8.12.6	DataController	93
8.12.7	routerLdadDecoder	95
8.12.8	routerStoreEDEX.....	96
8.12.9	routerShefEncoderEDEX.....	97
8.12.10	distributeProduct.....	98
8.12.11	notificationServer.....	99
8.13	Acquire and Decode Comma Separated Variable Mesonet Data	100
8.13.1	CO_serv	103
8.13.2	newLDADdataNotification.....	104
8.13.3	listener.....	105
8.13.4	preProcessLDAD.pl	106
8.13.5	preprocessmesonet.pl	106
8.13.6	LDAD_ROUTER	107
8.13.7	DataController	108
8.13.8	routerLdadDecoder	109
8.13.9	routerStoreEDEX.....	111
8.14	Acquire and Process ASOS/MicroART Data (for LDAD).....	112
8.14.1	suaReceiver	113
8.14.2	newLDADdataNotification.....	116
8.14.3	CO_serv	117
8.14.4	listener.....	118
8.14.5	preprocessSUA.pl	119
8.14.6	Reserved.....	121
8.14.7	distributeProduct.....	121
8.15	Using LDAD Scheduler	122
8.15.1	Using LDAD Scheduler to Modify Gauges with Session Files.....	122
8.15.2	Using LDAD Scheduler to Add Users.....	129
8.16	Alaska Profiler Data.....	133
8.16.1	newLDADdataNotification.....	136
8.16.2	CO_serv	137
8.16.3	listener.....	138
8.16.4	LDAD_ROUTER	139
8.16.5	DataController	140

8.16.6 routerStoreAkBlpEDEX	141
8.16.7 notificationServer.....	142
8.17 Acquire and Process Radiosonde Replacement System (RRS) Data (for LDAD).....	143
8.17.1 newLDADdataNotification.....	144
8.17.2 CO_serv	147
8.17.3 listener.....	148
8.17.4 preprocessRRS.pl.....	149
8.17.5 Reserved.....	150
8.17.6 distributeProduct.....	150
8.18 LDM Setup and Data Ingest Configuration	151
8.18.1 LDM Setup.....	152
8.18.2 LDM Data Ingest Configuration:.....	153
8.18.3 LDM Processes and Configuration Files	153
8.18.4 LDM Product-Queue	154
8.18.5 Useful LDM commands.....	155
8.19 LDAD and PX2.....	157
8.19.1 LDADinfo.txt.....	157
8.19.2 PX2 Log Files	157
8.20 LDAD Troubleshooting	159
8.20.1 LDAD Disk Removal	159
8.20.2 LDAD Server Disk Mirroring Procedure	159
8.20.3 Fax Modem troubleshooting	161

List of Exhibits

Exhibit 8.2-1. LDAD Hardware Configuration	3
Exhibit 8.3.1-1. Generic Acquire and Decode LDAD Product (Page 1 of 2)	8
Exhibit 8.3.1-1. Generic Acquire and Decode LDAD Product (Page 2 of 2)	9
Exhibit 8.3.5-1. LDM Ingest.....	12
Exhibit 8.7-1. Acquire LARC/Handar 555 Data (for LDAD)	24
Exhibit 8.8-1. Decode LARC/Handar 555 Data (for LDAD) (Page 1 of 2).....	31
Exhibit 8.8-1. Decode LARC/Handar 555 Data (for LDAD) (Page 2 of 2).....	32
Exhibit 8.9-1. Acquire Campbell Data (for LDAD)	50
Exhibit 8.10-1. Decode Campbell Data (for LDAD) (Page 1 of 2).....	59
Exhibit 8.10-1. Decode Campbell Data (for LDAD) (Page 2 of 2).....	60
Exhibit 8.11-1. Acquire Sutron Data (for LDAD).....	78
Exhibit 8.12-1. Decode Sutron Data (for LDAD) (Page 1 of 2).....	87
Exhibit 8.12-1. Decode Sutron Data (for LDAD) (Page 2 of 2).....	88
Exhibit 8.13-1. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD)	

(Page 1 of 2).....	101
Exhibit 8.13-1. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD)	
(Page 2 of 2).....	102
Exhibit 8.14-1. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 1 of 2).....	114
Exhibit 8.14-1. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 2 of 2).....	115
Exhibit 8.15.1-1. The Modify Gauges Dialog Box.....	122
Exhibit 8.15.1-2. Campbell-Specific Information	123
Exhibit 8.15.1-3. Sutron-Specific Information	124
Exhibit 8.15.1-4. The Edit Storage Area Reporting Format Dialog Box	125
Exhibit 8.15.1-5. the Choose Session File Dialog Box	126
Exhibit 8.15.1-6. The Edit Session Dialog Box with the Contents of a Session File.....	127
Exhibit 8.15.1-7. The Copy File Contents Dialog Box	128
Exhibit 8.15.2-1. The Modify Users Dialog Box	129
Exhibit 8.15.2-2. The New User Dialog Box	130
Exhibit 8.15.2-3. The Status Dialog Box.....	133
Exhibit 8.16-1. Decode Alaska Profiler Data	135
Exhibit 8.17-1. Acquire and Process RRS Data (for LDAD) (Page 1 of 2)	145
Exhibit 8.17-1. Acquire and Process RRS Data (for LDAD) (Page 2 of 2)	146

List of Tables

Table 8.2.2-1. Port Assignments.....	4
Table 8.3.1-1. LDAD Environment Variables on LDAD cluster (LS) and/or PX1, PX2	10

8.0 ***Introduction to LDAD***

The Local Data Acquisition and Dissemination (LDAD) system provides the means to acquire local data sets, perform quality control on the incoming data, and disseminate weather data to the external user community. It contains a number of components that reside on the internal AWIPS network (on the PX) and on the external LDAD component (on the LDAD server [LS] cluster). The internal and external components are separated by a security firewall. [Refer to **Appendix L** for additional information.]

The LDAD system was developed with three things in mind: the inherent site-to-site variability; site-specific information changes with time; and the need to merge older technology with current capabilities that continue to change. Thus LDAD was built using modular and generalized software component architecture. For example, all modem commands are entered as part of session files or scripts that a program reads and uses to send the appropriate commands to the modem.

The processing of the data acquisition system is shared between the local data provider and the NWS. ALERT data were previously acquired by a dedicated connection between the ALERT base-station and a computer that accepted the various weather data in the form of gauge tips for rain, voltage for temperature and pressure, etc. These values had to be converted from electronic values to meteorological values using calibrated conversions. Every time sensors were recalibrated, added, or removed by the provider, the support team had to revise and edit the appropriate sensor table. Because each provider had its own specific format, a decoder and storage module had to be developed for each data type to be acquired.

The basic LDAD concept simplifies this process for both the data providers and for the support team. LDAD uses a simple data format, ASCII Comma Separated Values Text (CSVText), which separates each data field by a comma. A set of metadata files, created and maintained by the data provider or in conjunction with site personnel, will be used by the acquisition decoder. This facilitates data processing in hydrometeorological units instead of sensor units and removes the need for conversion routines. The simplicity of the CSVText format increases the likelihood that the data provider will use this standardized format.

All LDAD acquisition data are categorized and stored into the following four classes:

- Mesonet for surface weather observations
- Hydro for rain and stream observations
- Manual for manual observations such as cooperative observers
- Upper air for multilevel observations such as profilers.

8.1 LDAD Functionality

The LDAD functionality supports the acquisition of the Integrated Flood Observing and Warning System (IFLOWS); ALERT; Mesonet; Profiler; RRS/Upper Air; Gauges (LARC, Handar, Campbell, Sutron); COOP (Co-operative Observations); and other data transported via LDM, Rsync, or other TCP/IP Protocols. The Data Acquisition function is achieved when data is transmitted to the internal (trusted) AWIPS servers (i.e., PX cluster). The data is transmitted to and from the LDAD Cluster via TCP/IP protocols or RS-232 communications. The Data Dissemination function is achieved when data is transmitted to the LDAD Cluster from the internal AWIPS system and is then distributed to External Users. The data can be acquired, stored, and displayed once fully configured.

8.2 LDAD Hardware Configuration

The LDAD hardware configuration depicted in Exhibit 8.2-1 details the interconnection of the various components that comprise the LDAD system. The LDAD System consists of two LDAD Servers (LS2/3), a LAN Switch (SMC 8024), a Terminal Server (Xyplex or Cyclades), Modems (Dial In/Out), and a LAN DMZ. The DMZ consists of two Juniper Netscreen 25 Firewalls, a Netgear 16 switch, and two Netgear 5 port hubs. The LDAD baseline processes run on the LDAD Cluster (DMZ) and the AWIPS PX Cluster (Internal). Other local applications may run on other internal clusters, such as DX cluster in the case of the LDAD Dissemination Server. Data is transmitted through the DMZ either to the Trusted (internal) AWIPS system or to the Untrusted (External) Users/Systems.

8.2.1 LAN Hub

The LDAD LAN Switch in Exhibit 8.2-1 is an SMC Networks 8024 switch with 24 1000 BaseT ports. The LAN Switch provides connectivity to external users/systems, the LDAD Terminal Server (Management/Modem RS-232), and the Untrusted side of the LDAD Firewalls (FW1/2).

8.2.2 LDAD Terminal Server

The LDAD Terminal Server is a Cyclades Alterpath ACS32, which provides an Ethernet interface for connection to the LDAD LAN Switch and 32 serial ports for connections to communication devices such as the modems in the Modem Nest, and Console Management ports such as the LS2/3 Servers. Each port can be configured to a maximum speed of 56 K. The terminal server in an average configuration is used to connect 10 dial-in/dial-out modems (including MicroART, RRS, and ASOS), four dedicated modems, a fax modem, and various console connections.

Port assignments are shown in Table 8.2.2-1 as an example.

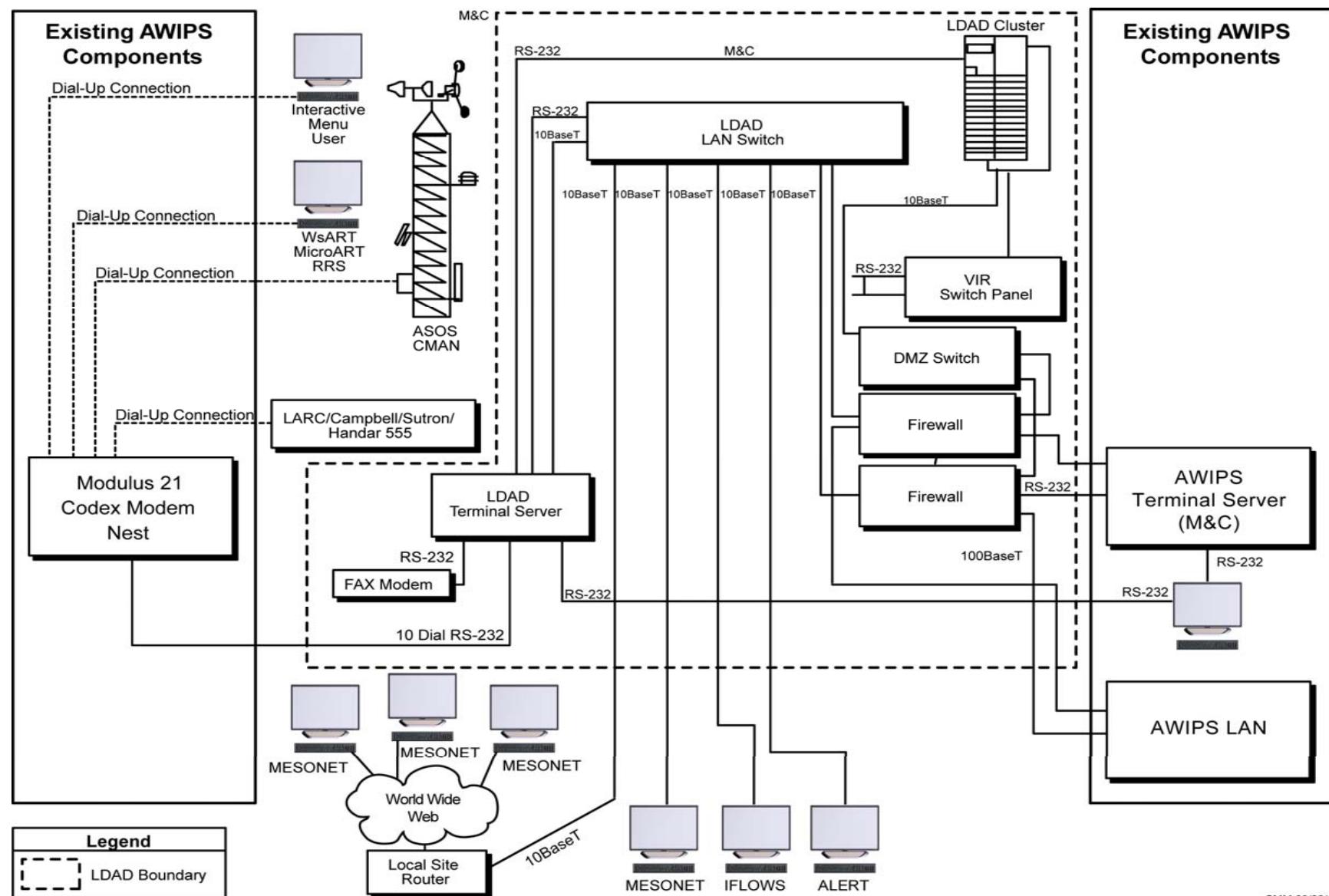


Exhibit 8.2-1. LDAD Hardware Configuration

Table 8.2.2-1. Port Assignments

Port	Function
1	Used to dial-out to devices configured for 7 bits, even parity
2	Used to dial-out to devices configured for 8 bits, no parity
3	First dial-in line, 8 bits, no parity
4	Second dial-in line, 8 bits, no parity
5	Third dial-in line, 8 bits, no parity
6	Fourth dial-in line, 8 bits, no parity
7	Fifth dial-in line, 8 bits, no parity
8	Sixth dial-in line, 8 bits, no parity
9	MicroART Modem
10	ASOS Modem
21	First Dedicated Modem
22	Second Dedicated Modem
23	Third Dedicated Modem
24	Fourth Dedicated Modem
30	Fax Modem

The LDAD Server system is configured with a block of IP Addresses assigned by the site. These Class C IP addresses were assigned to the site (non-AWIPS IP addresses) by the NWS, and generally a block of 15 IP addresses should be set aside specifically for LDAD usage. IP Addresses are required for the Terminal Server, software services (i.e., Radius) running on the Terminal Server, certain ports on the Terminal Server (dependent upon function), the LDAD Firewalls, and the NAT (Network Address Translation) Table stored on the firewalls. An additional IP address may be needed for the Web Server running on the LS.

8.2.3 **Modem Nest**

The LDAD modems are located in the Motorola Modulus 21 chassis provided for the internal AWIPS radar modems. There are four dedicated Model 3263 modem cards and five Model 3262 modem cards for LDAD in the modem nest.

8.2.4 **LDAD Firewall**

Two Juniper Netscreen25 firewalls are employed to provide network security for the LDAD and AWIPS systems. Each AWIPS site will have two firewalls controlled by central configuration management servers. The central configuration management servers are located at the NCF and the BNCF. The control over the firewall configurations is tiered with the central configuration management server having ultimate control. The regions have a client Netscreen Security manager (NSM) that connects to the NCF Central Server, which in turn connects back to the firewall. Individual AWIPS sites (forecast offices) will not have direct control over their own configurations.

The Netscreens are stateful inspection firewalls. The Netscreens use NAT to prevent AWIPS IP addresses from being advertised outside of the AWIPS network.

8.2.5 LDAD Server

The LS cluster is a pair of HP ProLiant DL320 Linux servers. The LS machines provide the focal point for all external communications between the AWIPS site and the community, functioning as a pass-through device for all incoming and outgoing data. Only one server is actively running the heartbeat package at a given time, and it will be the one reachable through the address 192.168.1.10 (“ls1”) via the LDAD LAN switch. In this document, “the active LS” refers to whichever machine is actively working as the LDAD server, listening on the address 192.168.1.10, and reachable through the AWIPS LAN via the hostname “ls1.” This hostname will reach the active LS from the entire AWIPS site LAN, no matter which of the LS machines is presently serving as the active LS.

The ls2/ls3 servers have unique interfaces (ls2-192.168.1.11, ls3-192.168.1.12) that are up at all times. The ls2/3 heartbeat is a private lan pair (ls2-172.16.0.2, ls3-172.16.0.1). The ls2/ls3 servers share an external IP address for access to the site local LAN and the Internet for data push/pull collection. This external ldad address is assigned by the site and configured by the region in the site's LDAD firewall. It is routed by the firewall using Mapped IP (MIP) to the active LS; there is no external network interface connection on the LDAD server.

The VIR switch provides the capability to switch asynchronous serial connections between LS2 and LS3.

The LS provides a number of services that allow for the acquisition, processing, and dissemination of information. Text, binary, graphics, Web, and model are common data sets that are ingested or disseminated.

8.3 LDAD Software Configuration

AWIPS II provides an interface with the existing Message Handling System (MHS). This allows products, including product reships transmitted via the LAN, to be fed to EDEX for ingest/processing. The LDAD-to-EDEX bridge is provided via three LDAD routers – routerStoreEDEX, routerShefEncoderEDEX, and routerStoreTextEDEX – which run as part of LDAD on px2f. It is important to note that AWIPS II has not changed the design and functionality of LDAD; the only change is the addition of routers to bridge the gap from LDAD to EDEX.

The flow of LDAD data to EDEX is shown in Exhibit 8.3-1.

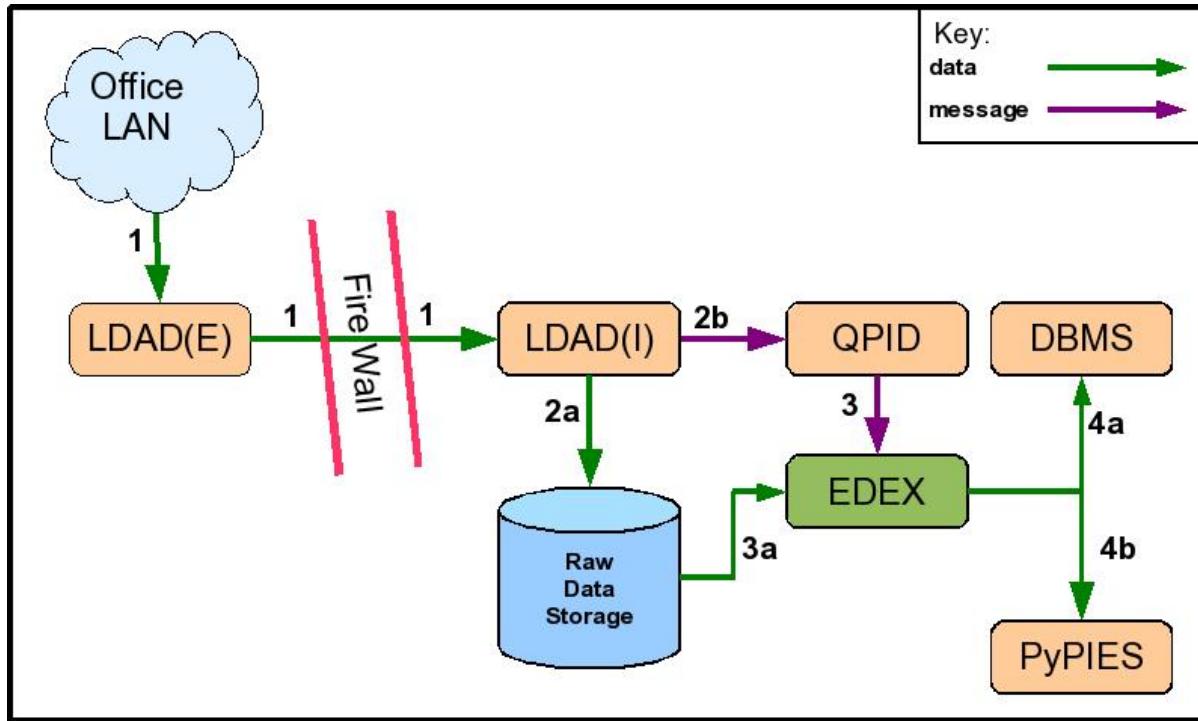


Exhibit 8.3-1. Flow of LDAD Data to EDEX

As shown in Exhibit 8.3-1:

1. Data from the office LAN is received by LDAD(E- External to the Firewall on the LS servers) and passed through the firewall LDAD(I -Internal to the Firewall on the PX servers).
- Note:** The LDAD(E) software runs on the LS servers. The LDAD(I) software runs on the PX servers.
2. The internal LDAD(I) software performs two operations on the data it receives:
 - a. LDAD(I) writes the data as a file to Raw Data Storage.
 - b. LDAD(I) posts a “data available” message to the QPID message broker.
 3. The EDEX Ingest process obtains the “data available” message from QPID and determines the data decoder to use to ingest the data.
 - a. The data decoder reads the raw data from Raw Data Storage and decodes it.
 4. Once decoded, the data is persisted for later retrieval.
 - a. The data is sent to the DBMS.
 - i. Information about the data is persisted to the AWIPS II metadata database.
 - ii. Some types of data (for example, text products) are written to tables in the AWIPS II database.

- b. Certain types of data (satellite imagery, radar imagery, GRIB data, and certain point data) are written to HDF5 files in Processed Data Storage. This is performed via the PyPIES process on DX1/2.

Note: In some cases, EDEX will automatically run scripts on arrival of the data.

Note that AWIPS II does not change the flow of data to the PX server. Normal data verification procedures may be used to follow the data to the PX servers. Once the data is passed to EDEX, the same techniques used to trace the SBN data flow from EDEX to Processed Data Storage may be used for LDAD delivered data.

8.3.1 LDAD Gateway

The LDAD Gateway is a set of software components that together make up the core data acquisition and dissemination mechanism of the AWIPS LDAD. The Gateway is distributed over the LS and the PX, on both the internal and external sides of the firewall. The LDAD Gateway software links the internal and external sides of LDAD together, controlling the transfer of information across the firewall. Exhibit 8.3.1-1 shows the generic data flow for acquiring and decoding LDAD products. Table 8.3.1-1 lists LDAD environmental variables and their paths.

Gateway components include the following:

- Scheduler
- Communications Server (CO)
- Inter-Gateway Communication (IGC)
- Preprocessors
- Decoder and Storage
- Trigger
- Quality Control (QC)
- Fax.

Config Files:

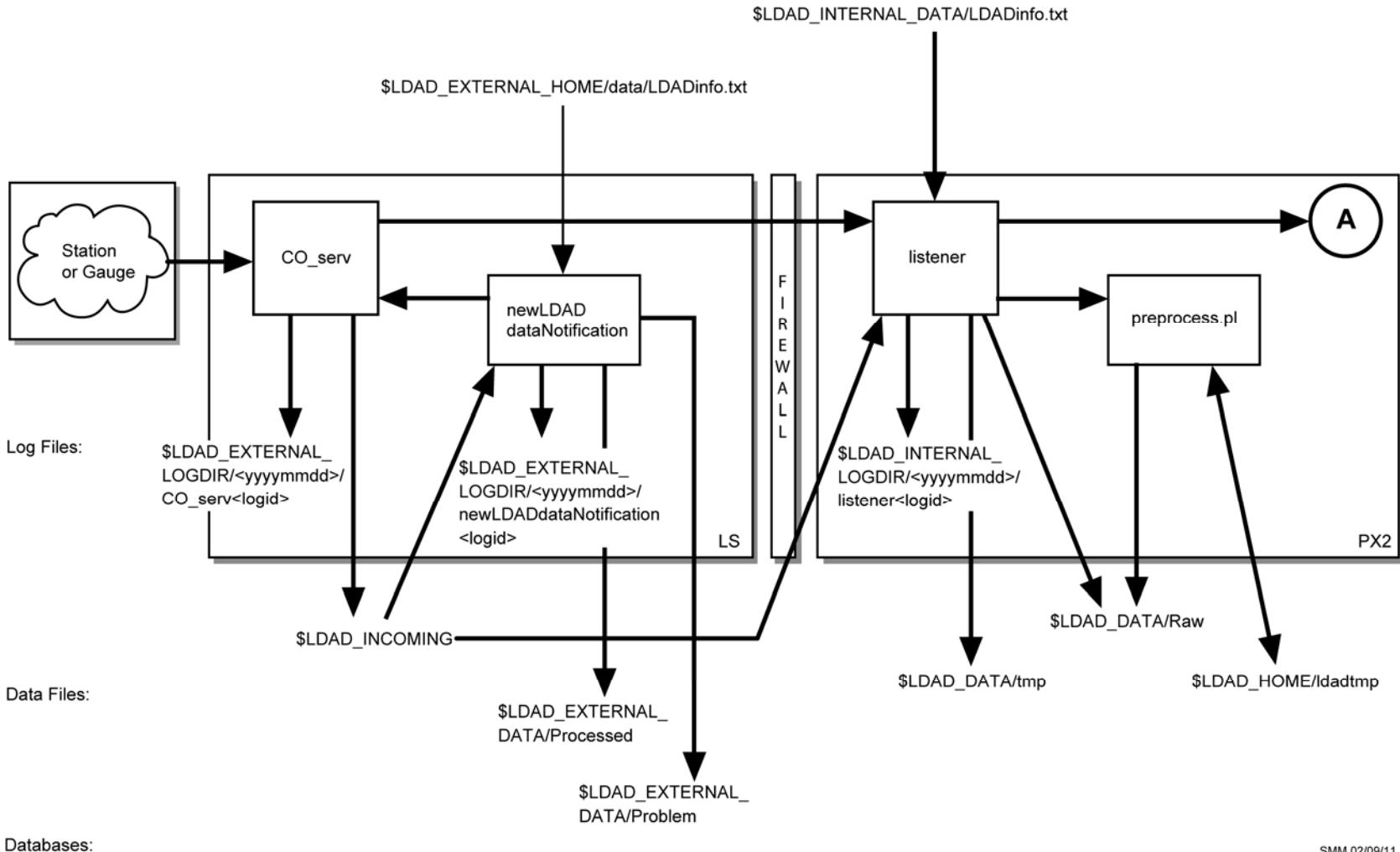


Exhibit 8.3.1-1. Generic Acquire and Decode LDAD Product (Page 1 of 2)

SMM 02/09/11

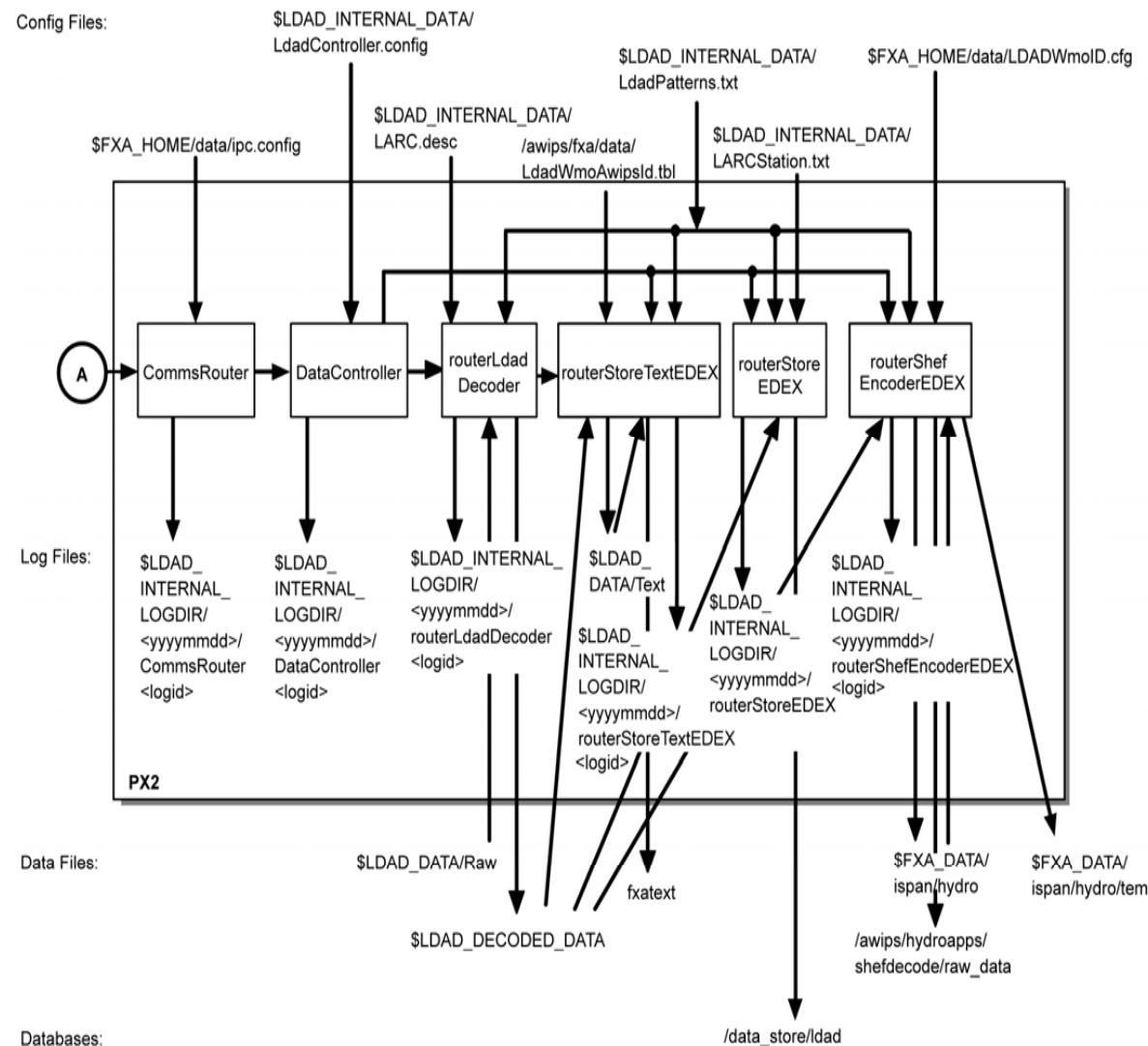


Exhibit 8.3.1-1. Generic Acquire and Decode LDAD Product (Page 2 of 2)

Table 8.3.1-1. LDAD Environment Variables on LDAD cluster (LS) and/or PX1, PX2

LDAD Environment Variable Name	LDAD Environment Variable Path (as User ldad on LS and/or PX1, PX2)	LDAD Environment Variable Path (as user fxa on PX1, PX2)
LDAD_HOME	/awips/ldad (PX1, PX2); /ldad (LS)	/awips/fxa/ldad
LDAD_INTERNAL_HOME	/awips/ldad (PX2, PX1)	/awips/ldad
LDAD_EXTERNAL_HOME	/ldad (LS) (PX2, PX1)	/ldad
LOG_DIR	/data/logs/ldad (PX2, PX1, LS)	/data/logs/fxa
LDAD_INTERNAL_LOGDIR	/awips/ldad/logs (PX2, PX1)	/awips/fxa/ldad/logs
LDAD_EXTERNAL_LOGDIR	/data/logs/ldad (PX2, PX1)	/data/logs/ldad
LDAD_DATA	/data/fxa/LDAD (PX2, PX1)	/data/fxa/LDAD
LDAD_INTERNAL_DATA	/awips/ldad/data (PX2, PX1)	/awips/fxa/ldad/data
LDAD_EXTERNAL_DATA	/data/ldad (PX2, PX1)	/data/ldad
LDAD_DECODED_DATA	/data/fxa/LDAD/decoded (PX2, PX1)	/data/fxa/LDAD/decoded
LDAD_EXTERNAL_PUBLIC	/data/ldad/public (PX2, PX1)	/data/ldad/public
LDAD_EXTERNAL_BIN	/ldad/bin (PX2, PX1)	/ldad/bin

New products coming into LDAD are placed into the **/data/Incoming** directory on the active LS machine. The **newLDADdataNotification** and **CO_serv** processes on the LS notify the **listener** process on the PX2 when a new product is available. The **listener** process transfers the file through the firewall, puts the copy on the PX2 in the **\$LDAD_DATA/tmp** directory, and notifies **CO_serv** and **newLDADdataNotification** that the transfer has been completed. Once this notification has been received, **newLDADdataNotification** moves the original product from **/data/Incoming** to **/data/ldad/Processed**. If **newLDADdataNotification** fails to receive confirmation from the **listener** process within 5 minutes, it moves the file to the **/data/ldad/Problem** directory. If the file requires preprocessing, the **listener** process copies the file into the **\$LDAD_DATA/tmp** directory and checks the **\$LDAD_DATA/data/LDADinfo.txt** file to specify the preprocessor to call for that particular product type. The file is copied to the **\$LDAD_HOME/ldadttmp** directory, where it is reformatted by the preprocessor and stored in the **\$LDAD_DATA/Raw** directory on the PX2. If the file requires no preprocessing, the **listener** moves the file directly into the **\$LDAD_DATA/Raw** directory and sends a notification to the **CommsRouter** that a product has been preprocessed. The **CommsRouter** passes the information to the **DataController**, which in turn passes the information to the **routerLdadDecoder**. The **routerLdadDecoder** decodes all files in the **\$LDAD_DATA/Raw** directory and writes them via serialized data files to the **\$LDAD_DECODED_DATA** directory. Data that is processed, but not recognized are written to **\$FXA_DATA/LDAD/Unknown**. Bad data are written to the **\$FXA_DATA/LDAD/Bad** directory. The **routerStoreEDEX** process reads the files in the **\$LDAD_DECODED_DATA** directory, converts those files that match the criteria in the **LdadPatterns.txt** file into an XML format, stores the converted data into the **/data_store/ldad** directory, and sends a notification to EDEX.

NOTE: The **\$LDAD_DATA/tmp** directory on the PX2 works much the same as **/data/Incoming** on the LS; it serves as a temporary location for the file while it is being processed. So, any given file should remain in **\$LDAD_DATA/tmp** for only the relatively short period of time that it is being processed. Once processing is complete, the file should be moved to its destination. The **\$LDAD_DATA/tmp** directory is purged once per day, so if it contains many files, the accumulated files may fill up the **/data/fxa** partition. The LDAD software was designed so that the preprocessor will either delete or move the temporary files from the **\$LDAD_DATA/tmp** directory once it completes its processing. The preprocessors that are delivered with the baselined AWIPS software remove these files. However, sites that have written their own preprocessors for specialized data types may have preprocessors that fail to clean the temporary files out of the **\$LDAD_DATA/tmp** directory when they finish.

8.3.2 Scheduler

The Scheduler's function is to perform specified data acquisition/dissemination events automatically at specified time intervals (in the background via the **IdadServer** process). The Scheduler invokes scripts to acquire/disseminate from/to remote hosts by ftp, kermit, xmodem, ymodem, or zmodem, or automatically dials selected LARC, Handar 555, Campbell, or Sutron gauges for data at specific intervals. Configuration, manipulation, and activation of the Scheduler are accomplished via the Scheduler's own edit menus.

The Scheduler also provides the forecaster access to the LDAD Gateway. Through this Tcl/Tk interface, the AWIPS user can start and stop the LDAD Gateway automatic processes, incorporate new types of data sources into the system, set up operating environments for external users, and initiate data acquisition on demand from an external source (e.g., a LARC gauge).

Using the Scheduler, the user can create or modify session files. These are simple, text-based files that the communications server (**CO_serv**) program reads and translates into the appropriate commands to execute a data transfer acquisition session with a remote source (e.g., a LARC gauge).

The Scheduler can be started from any workstation from the Cave **Obs** menu, Collection/Dissemination. Refer to the *AWIPS II CAVE-D2D User's Manual* for additional information.

8.3.3 Communications Server

The Communications Server (CO) component is used by the other components to interface with the communication hardware; that is, the terminal server and modems. The CO uses information from the Scheduler and the session files for configuring dial-out parameters, defining the data, etc. The CO program, **CO_serv**, calls the script that

performs the function. **CO_serv** is the external end of the IGC described in the next section.

8.3.4 Inter-Gateway Communication

The IGC function provides a communications link across the firewall between the internal and external sides of the Gateway. This link or Interprocess Communication (IPC) is handled by sockets, an IPC interface that allows communication across the firewall using TIS's TCP proxy. On the PX2, a process called **listener** is the point of contact for all communications between processes on the internal system (PX) and the external system (active LS), where the **CO_serv** acts as the point of contact. All communications between the PX and the LS use the **CO_serv-listener** pair.

The firewall is configured to allow socket communication to a single specified port from only the LS on the external system.

8.3.5 Local Data Management

Local Data Management (LDM) is a software package that is designed to select, capture, process, and distribute data products using client/server programs. The LDM software used for the LDAD servers is copyrighted by the University Corporation of Atmospheric Research (UCAR) in Boulder, CO. Each regional headquarters has an *LDM Server* that receives data from the Meteorological Assimilation Data Ingest System (MADIS). The data is then disseminated via the internet to the LDAD *clients* that are configured to receive LDM data. Once the data is received by LDAD, it is treated like any other LDAD product.

LDM is being used only for LDAD products that are requested from MADIS. This means that the ls2 and ls3 must be configured to ingest the products, and the px1 and px2 must be configured to process the products. Please note, for failover purposes, the ls2/ls3 must have the same LDM configuration and px1/px2 must have the same preprocessors, stations files, description files, etc. See Exhibit 8.3.5-1.

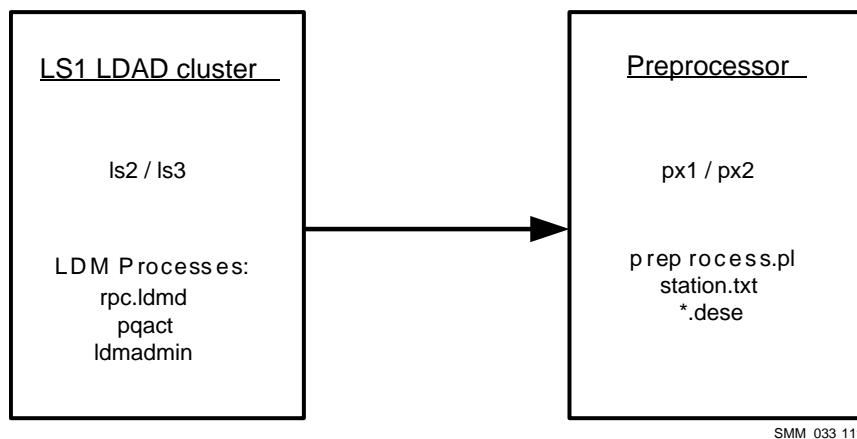


Exhibit 8.3.5-1. LDM Ingest

8.3.6 *Preprocessors*

When the **listener** on the PX2 receives a message that a new data file is available on the active LS, it immediately secure copies the file over to the **\$LDAD_DATA/tmp** directory. The **listener** then checks the **\$LDAD_DATA/data/LDADinfo.text** file to identify the preprocessor script that is required for the data file received. If any preprocessing for that data file is necessary, the appropriate preprocessor is called to reformat the file for the decoder, and is stored in **\$LDAD_DATA/Raw**.

The preprocessore are located in the **/awips/fxa/ldad/bin** directory. The preprocessors can be written in any programming or scripting language. The only requirement is that they are executable. Sample preprocessors are installed during installation. These preprocessors were generated for generic data sets and should be treated as site-configurable. There is a potential need for many preprocessors, one for every data type. The objective is to remove the need for preprocessors by having the data providers send files in the required format.

8.3.7 *Decoder and Storage*

The decoder module checks the **\$LDAD_DATA/Raw** data directory for new data sets at 1-minute intervals. If any are found, it decodes them using information from the metadata files. Using the information in the description files (***desc** files), the decoder evaluates each column of data by checking for the hydrometeorological variable, the incoming units, and the storage units. After the decoding is complete, the decoder creates a data object with all the data and calls the storage module. The storage module reads the station file (***Station.txt** file) for static station information such as latitude, longitude, and elevation. It stores the station information and data from the decoder into a netCDF and possibly a Standard Hydrometeorological Exchange Format (SHEF)-encoded file. The decoder process runs continuously.

8.4 *Rsync*

Rsync has been preconfigured on the LDAD Servers. This document details the baseline configuration of the rsync implementation on the LDAD Servers. Note that as delivered, rsync cron jobs loaded onto LS2/LS3 are syncing a few directories between the two servers. Sites may wish to alter this configuration, adding more directories to be synced or removing some that are being synced. Rsync is site configurable.

The baseline implementation of rsync consists of an rsync process initiated by root cron jobs **/var/spool/cron** and is limited to syncing directories between the two servers (LS2/3). The three **/var/spool/cron/root** rsync entries are as follows:

```
/ldad/bin/rsync_cron.sh data_ldad  
/ldad/bin/rsync_cron.sh ldm  
/ldad/bin/rsync_cron.sh home
```

The directories being synchronized between the two servers are:

- **/home** – The rsync syntax compares the /home directories of LS2/3 and saves the latest version of the files to /data/Backup directory.
- **/usr/local/ldm/data** – This synchronization is triggered by the “ldm” cron entry and synchronized the data in the /usr/local/ldm/data directory.
- **/data/ldad** – This synchronization will compare and sync the files in the /data/ldad directory.

8.4.1 Rsync with AWIPS (internal) and External (non-AWIPS) Systems

The LDAD servers use rsync to communicate with external hosts such as web farms; and receive internal rsync connections from DX1/2 (and other AWIPS servers) in support of other programs such as AHPS. The AWIPS to LDAD rsync processes are achieved by utilizing the “-ssh” switch on rsync. Sites do not have to alter this configuration in order to initiate rsync connections from AWIPS to LS2/3 when using the “-ssh” implementation. Sites may need to modify the rsync configuration files to include external server IP Addresses assuming the “-ssh” switch is NOT being used to connect to these servers. Example of using the “ssh” switch with rsync for internal to LDAD rsync communications:

```
rsync -auvv -e ssh -timeout=120 <file name> ldad@ls1:/tmp
```

8.4.2 Rsync Configuration Files

The following rsync files have been verified, modified, or added to the baseline:

./rsync_install.sh	(rsync initial setup script)
/etc/rsyncd.conf	(rsync daemon config file)
/etc/services	(rsync tcp port assignment config file)
/etc/xinetd.d/rsync	(rsync daemon control file)
/etc/sysconfig/iptables	(netfilter saved configuration file)
/ldad/bin/rsync_cron.sh	(cronjob script)
/etc/ha.d/cron.d/rsync.root.crontab	(cluster crontab file for rsync)

8.5 LDAD Linux Server Heartbeat Cron Package

The Heartbeat and the Cron files managed by the heartbeat package are configured on the LDAD Servers (LS2/LS3) in a manner similar to its implementation on the other AWIPS systems. Details of its implementation and procedures to localize the configuration for sites are presented in this section:

Key Directories:

- **/etc/ha.d/cron.d** - This directory contains two files, lscron and SITElscron. Sites should use the SITElscron file to add their local cron jobs that need to be managed by the heartbeat package.
- **/etc/ha.d/resource.d** - This directory contains the file “Crontab” which is a resource added to the /etc/ha.d/haresources file. This heartbeat resource file is responsible of starting the cron file listed in /etc/ha.d/cron.d. This file also copies the files listed in /etc/ha.d/cron.d to the /etc/cron.d directory at heartbeat startup. This script can also be run manually from the command line to check status. For example, as root on LS2, type the following from the command line:
/etc/ha.d/resource.d/Crontab <cronfile name> status
 (where *cronfile name* could be the baseline SITElscron file name).
- **/var/spool/cron** - This directory is the standard location for user cronfiles and can still be used by sites. Baseline configuration has two cron jobs running on LS2/LS3 and they consist of the following:
root: Three entries handling rsync functions
ldm: One entry running the /usr/local/ldm/bin/scour script.

Heartbeat Status

The LDAD servers are configured in a clustered pair. Only one server is actively running the heartbeat package at a given time, and it will be the one reachable through the address 192.168.1.10 (“ls1”) via the LDAD LAN switch. If the primary server loses network connectivity or had failed, the other server will take over the 192.168.1.10 ipaddress and all the LDAD processes. The **hb_stat** command can be used to determine which server is providing LDAD functionality. Notice the ipaddress configuration:

```
[root@ls2-ntcb ~]# hb_stat
Heartbeat Status Monitor                                         Mar 16 15:25:39
=====
===== M e m b e r   S t a t u s =====
Member      Status      IP address
-----
ls2-ntcb    Up         192.168.1.11
ls3-ntcb    Up         192.168.1.12
=====
===== R e s o u r c e   S t a t u s =====
Resource    Parameters          Owner      Status     Start Time
-----
IPAddr2    192.168.1.10/24/eth0  ls2-ntcb  Running   2011-01-14 19:32:05
LS1IPSRConfig  ls2-ntcb        OK        2011-01-14 19:32:05
apache      apache            ls2-ntcb  Running   2011-01-14 19:32:07
csportd     csportd          ls2-ntcb  OK        2011-01-14 19:32:07
Xinetd      wu_ftpd          ls2-ntcb  Running   2011-01-14 19:32:18
hylafax     hylafax          ls2-ntcb  OK        2011-01-14 19:32:18
ldad        ldad              ls2-ntcb  OK        2011-01-14 19:32:19
dserver     dserver           ls2-ntcb  OK        2011-01-14 19:32:51
LDM         LDM               ls2-ntcb  OK        2011-01-14 19:33:08
Crontab    SITElscron        ls2-ntcb  OK        2011-01-14 19:33:18
Crontab    lscron            ls2-ntcb  OK        2011-01-14 19:33:19
```

SITEprocesses	ls2-ntcb	OK	2011-01-14 19:33:20
HylaFAX Details: HylaFAX client-server protocol server: hfaxd (pid 3620) is running... HylaFAX queue manager process: faxq (pid 3617) is running...			

ACTIVE LDAD Processes

The active LDAD server will have processes running similar to those listed below, depending on how the server is configured

```
ls2-ntcb{ldad}49: ps -ef | grep nobody
nobody    heartbeat: FIFO reader
nobody    heartbeat: write: ucast eth1
nobody    heartbeat: read: ucast eth1
nobody    heartbeat: write: ping 192.168.1.1
nobody    heartbeat: read: ping 192.168.1.1

ls2-ntcb{ldad}50: ps -ef | grep ldad
ldad      /usr/bin/perl -w /ldad/bin/DServer start
ldad      /usr/bin/perl /ldad/bin/diss_server.pl
ldad      /ldad/bin/CO_serv
ldad      /ldad/bin/newLDADdataNotification
ldad      /bin/bash /ldad/bin/hmingestd
ldad      /usr/bin/perl /ldad/bin/MakeLDApage /ldad/data/lda.conf
ldad      /usr/bin/perl /ldad/bin/MakeLDApage /ldad/data/ldd.conf
ldad      /usr/bin/perl /ldad/bin/MakePROCpage /ldad/data/proc_external.conf
ldad      /ldad/bin/ROSA_Acq PAD /dev/roSAModem1
ldad      /ldad/bin/suaReceiver /dev/suAModem6
ldad      /ldad/bin/suaReceiver /dev/suAModem5
ldad      /ldad/bin/suaReceiver /dev/suAModem4
ldad      /ldad/bin/suaReceiver /dev/suAModem3
ldad      /bin/sh /ldad/bin/watchDogExternal.sh

ls2-ntcb{ldad}51: ps -ef | grep ldm
ldm      pqexpire
ldm      pqact
ldm      rpc.lmdm -P 388 -q /usr/local/ldm/data/ldm.pq
/usr/local/ldm/etc/lmdm.conf
ldm      rpc.lmdm -P 388 -q /usr/local/ldm/data/ldm.pq
/usr/local/ldm/etc/lmdm.conf
```

INACTIVE LDAD Processes

The inactive LDAD server will only have the heartbeat processes running, checking for connectivity to the other LDAD server. If connectivity is lost, the inactive server becomes the active server:

```
[root@ls3-ntcb ~]# ps -ef | grep nobody
nobody    heartbeat: FIFO reader
nobody    heartbeat: write: ucast eth1
nobody    heartbeat: read: ucast eth1
nobody    heartbeat: write: ping 192.168.1.1
nobody    heartbeat: read: ping 192.168.1.1

[root@ls3-ntcb ~]# ps -ef | grep ldad
root      21317 21280  0 15:32 pts/0    00:00:00 grep ldad

[root@ls3-ntcb ~]# ps -ef | grep ldm
root      21313 21280  0 15:32 pts/0    00:00:00 grep ldm
```

8.6 Quality Control and System Monitoring

This section describes the Quality Control and System Monitoring.

8.6.1 Quality Control

LDAD observations are quality controlled by the AWIPS Quality Control and Monitoring System (QCMS), which in turn relies on the MAPS Surface Analysis System (MSAS) to perform automated quality control checks. MSAS/QCMS is a multischeduled system with four main subprocesses. Each subprocess runs independently based on the following crontab entries on PXs:

- The **model ingest cycle** runs twice a day.
- The **subhourly QC cycle** runs every 5 minutes.
- The **hourly QC/analysis cycle** runs immediately after the **xx:18** subhourly run.
- The **QC summary programs** run near 00Z.

The QCMS is only a partial implementation of the overall requirements for the quality control of surface observations. The subhourly processing checks the validity, internal consistency, and temporal consistency of LDAD Mesonet observations of sea-level pressure, temperature, dewpoint temperature, wind, station pressure, altimeter setting, pressure change, relative humidity, visibility, and precipitation observations. The hourly QC process checks the validity, internal consistency, temporal consistency, and spatial consistency of LDAD Mesonet and NOAAPORT observations of sea-level pressure, temperature, wind, and dewpoint temperature. WFO personnel can override the results of the automated QC checks.

Two text files, **/data/fxa/LDAD/fslparms/reject.txt** and **accept.txt**, reside on the DX Network Attached Storage (NAS), a shared directory, to provide the capability to subjectively override the results of the automated QC checks. The reject list is a list of stations and associated input observations that will be labeled as bad, regardless of the outcome of the QC checks; the Accept list is the corresponding list of stations that will always be labeled as good. Applications reading the lists (e.g., MSAS) will reject or accept the specified stations. In both cases, observations associated with the stations in the lists can either be flagged individually, or be flagged in groups.

The QCMS station monitoring procedures and text summary files are not affected by the intervention lists. This allows WFO personnel to continue to monitor the performance of the stations contained in the reject and accept lists. For example, a user may notice that a station has wind observations that fail the QC checks a large percentage of the time, and choose to have that station added to the reject list. However, once the observation failure rate at the station falls back to near zero (possibly due to anemometer repair), the station can be deleted from the list.

QCMS reject and accept lists may be edited by hand (with any text editor), or through the LDAD Monitoring and Control System (see next section for additional information). For

each station, both station and provider names are required. Provider names are found in the **/data/fxa/LDAD/fslparms/sfchqcin.dat** file. The first five entries (SAO, MARITIME, COOP, OTHER-MTR, ASOS) are national data sets, and always appear. Any others are added dynamically by the 5-minute QC program, **qcstg1_2**, based on **dataProvider** names found in **\$FXA_DATA/LDAD/mesonet/netCDF** files (LDAD-collected data). A blank provider name is allowed, but it may result in multiple stations with the specified station name being rejected or accepted (e.g., when different data providers use the same station name).

The QCMS also provides the capability to accept or reject observations from all stations with a specified provider name. To utilize this option, fill in the provider and observation columns, but leave the **StaID** column blank.

The QCMS also calculates hourly, daily, weekly, and monthly statistics on the frequency and magnitude of the observational errors encountered for sea-level pressure, temperature, dewpoint, and surface winds. It processes both NOAAPORT and LDAD Mesonet observations.

QCMS summary files are stored in the text database. Files are named **<nnn>QC[HDWM]<LLL>**, where **<nnn>** is a three-digit number (leading zeros) corresponding to a data set's ordinal position in **/data/fxa/LDAD/fslparms/sfchqcin.dat** (e.g., NPN is 003); **H** is for hourly QC summaries, **D** for daily, **W** for weekly, and **M** for monthly; and **<LLL>** is the localization ID.

QCMS generates status messages for up to 20 providers. If more than 20 providers are found in the netCDF files, all additional providers' QC information will be lumped into **000QC[HDWM]<LLL>** files.

8.6.2 *System Monitoring*

The LDAD System Monitor and Control System is a Web-based function that allows the site to monitor the LDAD system connectivity, processes, and acquisition/dissemination status. The LDAD System Monitor checks on all LDAD processes, systems, and data to provide a visual status of LDAD performance. The LDAD Monitor Summary page is linked to the AWIPS System Monitor. The LDAD Monitor Summary page summarizes all LDAD Monitor pages and provides an interface for system administration.

The Summary Monitor application, **MakeSUMMpage**, runs on PX1 and uses the configuration file **~ldad/data/summary.conf** for various parameters, including the monitor pages. The Internal Process and System page comes from PX1, while the other three (Data Acquisition, Data Dissemination, and External Process and System) are retrieved via HTTP protocol from active LS. By default, the monitor updates every 5 minutes. If any of the pages is out of date (i.e., older than the **Run_interval** specified in the **summary.conf** file), the **MakeSUMMpage** will not generate its line on the summary.

The overall/summary state of each submonitor is displayed on the left with the standard state icons. On the right are four columns, designated R, Y, B, G for Red, Yellow, Blue, and Green, respectively. The numbers below the column represent the number of items that are in each of the states for each submonitor. This gives the site administrator some indication of the relative problem and allows for prioritization for problem solving. (If any item is in ? state [e.g., a data file is not found], it does not register in any column.)

There are two Process and System pages, Internal and External, each of which displays the state of all appropriate LDAD processes and hardware systems. These pages are intended to be used primarily by the LDAD site administrator. The following three tables are on each page:

- Processes:** Displays the state of all LDAD processes on the active LS, or PXs
- Systems:** Displays the state of all internal or external LDAD systems
- Network:** Displays the state of all LDAD network systems (Gateway, Firewall, Terminal Server, etc.)

The LDAD site administrator can start/stop processes, edit system configuration files, etc.

8.7 *Acquire LARC/Handar 555 Data*

Data collection from LARC/Handar 555 gauges is carried out by automating a normally interactive session using the **cu** communication protocol. There is a Server program (**CO_serv**) and a Client program (**tell_co**). The Server program is always running, waiting for and processing requests to collect data from a particular gauge from the Client program. The Client program can be invoked from a shell script, as a cron job, or directly from a user prompt. A feature of the Client program is that it retrieves all necessary information regarding collection and storage of data from system tables in the AWIPS database. The Client and Server programs use sockets to communicate across a TCP/IP LAN. Data from a gauge are SHEF-encoded before storage on AWIPS.

Processes

```

LS      process_expect
LS      CO_serv
PX2    listener
PX2    tell_co
PX2    ldadServer
LX      ldadScheduler

```

Environment Variables

\$LOG_DIR	/data/logs/fxa (as user fxa on the PX1, PX2) /data/logs/ldad (on the active LS or as user ldad on the PX2, PX1)
\$LDAD_INTERNAL_DATA	/awips/ldad/data as user ldad and

```

$LDAD_EXTERNAL_LOGDIR          /awips/fxa/ldad/data as user fxa
$LDAD_INTERNAL_LOGDIR          /data/logs/ldad
                                /awips/fxa/ldad/logs (as user fxa)
                                /awips/ldad/logs (as user ldad)

```

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
LARCStation.txt	(for tell_co)
userDescriptions	(for ldadScheduler)
usrpro	(for ldadScheduler)
gageinfo	(for ldadScheduler)
gaugeDescriptions	(for ldadScheduler)
userSessList	(for ldadScheduler)
gaugeSessList	(for ldadScheduler)

LDAInfo.txt

The file should contain the following entry:

```
LARC | LARC | 89 | 90 | CVS_TYPE | hydro | preProcessLDAD.pl |
```

The **preProcessLDAD.pl** script must be located in the **/awips/fxa/ldad/** directory. Once the file is installed, this line should not be modified.

LARCStation.txt

This file must be updated whenever a gauge is added to or dropped from the current LARC/Handar 555 datalogger list. To add a new LARC/Handar 555 gauge, find out the following gauge information to create a new entry in the station table format (* indicates a mandatory field):

- **Provider ID:** Data provider station ID (*)
- **AFOS(HB5) ID:** The AFOS or Handbook 5 ID (NWS assigned)
- **Station Name:** Text name of station
- **Elevation:** Station elevation (m) (*)
- **Latitude:** Station Latitude (decimal degrees, north positive) (*)
- **Longitude:** Station Longitude (decimal degrees, east positive) (*)
- **Local Time Zone:** Reporting time zone (e.g., UTC, PST8PDT) (*)
- **Location Description:** Station location/address (Text)
- **Station Type:** Station type (e.g., tower, surface, floating platform, etc.)
- **Number of Instruments:** Number of reporting instruments for the station

- **Number of Reporting Levels:** Number of data reporting levels. Level information should be provided in the instrument table
- **Maintenance/Calibration Schedule:** Frequency of maintenance/calibration
- **Site Description:** Text description of the site surroundings.

The entries are sorted alphabetically by the gauge ID.

This file must be identical on the PX2 and on the LS machines.

userDescriptions

This file is used by the **LdadScheduler** process to get the descriptions of users. When read in, blank lines and lines beginning with # are skipped. All other lines should have the following format:

```
<user ID>|<user description>
```

A blank user description is denoted by having the line end immediately following the | character.

This file should not be modified manually. It should only be written to by the **LdadScheduler** (specifically, the **LdadSchedulerServer.C** routine).

usrpro

The user file (**usrpro**) is made up of zero to n lines, each line holding the following information (note that the lines are so long that they are wrapped in the interests of readability). Columns containing “??” are not used at this time.

```
<ID>|<protocol>|<IP address>|<phone number>|<login>|<password (encrypted)>|??|<file to receive>|<file to send>|??|??|<data collection session file>|<data dissemination session file>|<local directory>|<remote directory>|??... (columns 16 through 36 have unknown meanings)...|<IP address>|
```

- The <protocol> is either “F” for FTP, “X” for Xmodem, “Y” for Ymodem, “Z” for Zmodem, or “K” for Kermit.
- The <IP address> designates the host to FTP to, if the protocol is “F,” or the terminal server. <IP address> appears in two places in the above column listing: columns 3 and 37. In reality, only one of the two columns is used. For the FTP protocol, only column 3 has the address in it, and column 37 is left blank. If any other protocol is being used, column 37 has the address in it, and column 3 is left blank.
- The <phone number> field is unused if the protocol is “F.”
- The <file to receive> and <file to send> fields are mutually exclusive. Only one may be specified, and the one that is specified also indicates whether this user is a collection user (if <file to receive> is given) or a dissemination user (if <file to send>

is given). All other columns are simply tracked when read in; when written out, the same values are placed in them as were originally found.

gageinfo

The **gageinfo** file contains a list of Handar, LARC, Campbell, and Sutron gauges. It is updated periodically as LARC gauges are added and removed with the **IdadScheduler**. Whenever a gauge is added or dropped from the current list, it should be updated here and in the following files:

```
$LDAD_DATA/data/LARCStation.txt
$LDAD_DATA/data/gaugeDescriptions
```

The following fields must be present for each LARC/Handar 555 gauge:

- **Gauge ID:** A five-character instrument ID.
- **Protocol Type:** C for data collection, D for dissemination.
- **Phone#:** The dial-out phone number can be in any format. However, if the gauge has the voice message first, several pauses are included in the phone number. Depending on the length of the voice message, add more pauses if the one listed here is not enough. The pause is entered by a comma (,) and is ended with a *9. If a phone number contains a pause extension, make sure the phone number is enclosed by single quotes (''). For example, '1-605.886.2473,*,*9'.
- **Session File:** Use HNDAR_coll_sess exactly.

The **HNDAR_coll_sess** will be one of the following:

- **HNDAR_coll_session_1** means gauge provides river stage information only.
- **HNDAR_coll_session_2** means gauge provides total rain information only.
- **HNDAR_coll_session_12** means gauge first provides river stage information then total rain information.
- **HNDAR_coll_session_21** means gauge first provides total rain information then river stage information.
- **HNDAR_coll_session_555** means gauge provides river stage information and/or total rain information.
- **SHEF FILE:** 0=No; 1=Yes.
- **Storage Type:** S.
- **Baud Rate:** Use **9600** for LARC/Handar 555 gauges.
- **Terminal Server (tty):** Use **7e1out** for LARC gauges and **8n1out** for Handar 555.

The fields are separated by vertical bars (|); empty fields are for future use. The number nine (9) in front the phone number allows the user to dial out. An example for a LARC/Handar 555 gauge follows::

```
AENGL|C| |919124365917| | | | HNDAR_coll_sess_1|1|S||9600| e | |7e1out|
```

```
SNMCI|C| |93016080977 | | | | HANDEL_coll_sess_555|S||9600| e | |8n1out|
```

NOTE: The **recvprog** field indicates the receiving program (e.g., FTP). For data collection, this field is used as the custom gauge ID if the gauge is not owned by the NWS.

gaugeDescriptions

The file is used to get the site descriptions and should be updated using the **IdadScheduler** when a new LARC/Handar 555 gauge is added. Each entry (line) should have the following format:

```
<gauge ID> | <site description>
```

For example, an entry for the BARW3 would be as follows:

```
BARW3 | Barron, WI
```

The file is sorted by state abbreviations. However, it is displayed based on the alphabetical order of the gauge IDs.

Refer to Exhibit 8.7-1 for the Acquire LARC/Handar 555 data flow diagram.

8.7.1 User Interface: *IdadScheduler*

The **IdadScheduler**'s function is to perform certain data acquisition/dissemination events on an automatic basis at specified time intervals (in the background). Access to the Scheduler's functions is via a GUI invoked by selecting **Collection/Dissemination...** from the **Surface** pull-down menu.

The **IdadScheduler** provides a window by which the user may create, view, and manipulate scheduled LDAD requests. It allows the user to create a new request and add it to the request list. The request is activated when submitted to the **IdadServer**, which uses **sendIDADnotification.pl** to create the request. If it is a one-time request (OTR), the user can monitor its progress via a status dialog.

The **IdadScheduler** registers with the **IdadServer** providing a callback routine for update notifications. The session file contents get registered first, and the status messages and ID updates so that when registering with **IdadServer**, the ID lists sent by **IdadServer** will be caught and kept. It also registers with the File Access Controller (FAC) for notifications of changes to the existing requests file, and creates a FAC lock for the file to be used for locking it for “reads” and “writes.” The existing requests get read so as to fill the tree view with the requests that have been created.

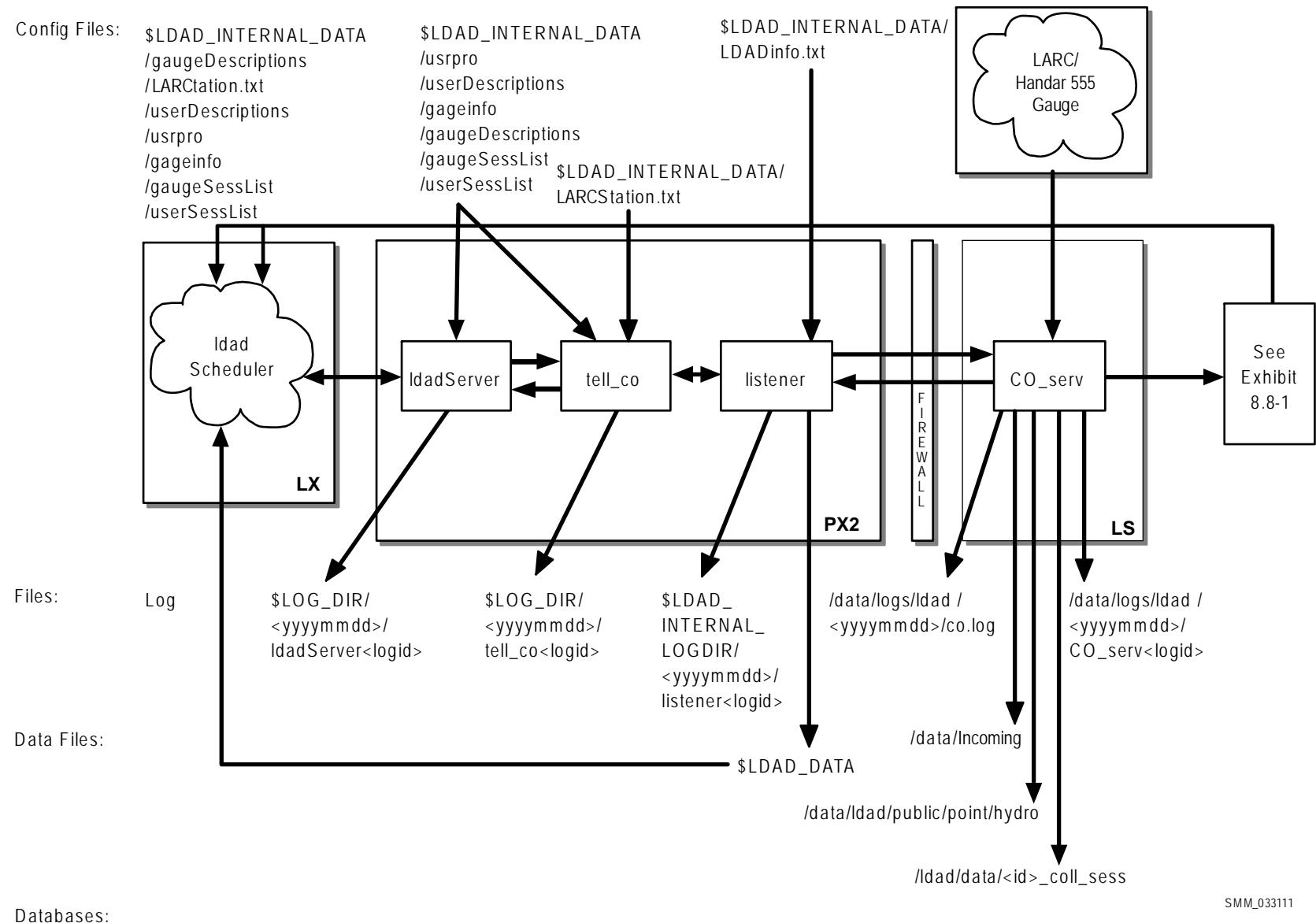


Exhibit 8.7-1. Acquire LARC/Handar 555 Data (for LDAD)

8.7.2 *IdadServer*

The **IdadServer** allows multiple clients to connect to it and submit requests with intervals and durations that are honored according to their intervals until they expire.

New client initialization is performed by sending the gauge and user lists to the newly registered client. The **IdadServer** process creates a new message with the current active list and broadcasts it to all registered clients.

To honor the specified request, the **IdadServer** creates the command to be executed.

The **IdadServer** process receives LDAD messages from clients; messages to create and delete gauges and users; and messages requesting the contents of a session file, or specifying a session file's contents.

► To Access and Read the **IdadServer** Log

The **IdadServer** log resides on the PX2 in the **\$LOG_DIR** directory, and records messages from the process. Perform the following commands as user fxa:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where <yyyymmdd> is today's date.

- TYPE:** `ls -ltr IdadServer*`
 - Displays the **IdadServer** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host px2-rnk at Jul 12 14:28:29 2010
00:18:59.602 DataSocket.C PROBLEM: Reconnect attempt to lx1-rnk/4813/10733 failed.
00:18:59.765 DataSocket.C DEBUG: Closing the socket to lx1-rnk/4813/10733
00:18:59.766 DataSocket.C DEBUG: Creating a new object to read an orphaned socket.
00:18:59.766 ParameterizedMsg.C EVENT: Send of IPC message failed; Target not available.
Target: lx1-rnk/4813/10733
Module: 35
Type: 10
00:18:59.786 ParameterizedMsg.C EVENT: Send of IPC message failed; Target not available.
Target: lx1-rnk/4813/10733
Module: 35
Type: 8
00:18:59.789 DataSocket.C DEBUG: Connection to unknown IPC address has been closed by the peer.
00:18:59.790 DataSocket.C DEBUG: Closing the socket to unknown IPC address
```

The format of the log consists of the following fields:

Time stamp	00:18:59.602
-------------------	---------------------

```

File name          DataSocket.C
Message type PROBLEM:
Message string    Reconnect attempt to lx1-rnk/4813/10733 failed.

```

Here is another example that warns of a wrong host.

```

LOG-STATUS: Log file opened on host px2-tbw3 at Mon Jul 12 14:29:48
2010
14:29:48.862 Connection.C EVENT: WARNING: this process wants to use
target LDAD_SCHEDULE_SERVER which is assigned to run on px2f-tbw3
but the current host is px2-tbw3
14:29:48.936 LdadSchedulerServer.C PROBLEM: Bad formatting in gauge
file "/awips/fxa/ldad/data/gageinfo" on line 1. Skipping a gauge.
14:29:48.936 LdadSchedulerServer.C PROBLEM: Bad formatting in gauge
file "/awips/fxa/ldad/data/gageinfo" on line 2. Skipping a gauge.
14:29:48.936 LdadSchedulerServer.C PROBLEM: Bad formatting in gauge
file "/awips/fxa/ldad/data/gageinfo" on line 3. Skipping a gauge.
14:29:48.936 LdadSchedulerServer.C PROBLEM: Bad formatting in gauge
file "/awips/fxa/ldad/data/gageinfo" on line 4. Skipping a gauge.

```

8.7.3 tell_co

The Client program (**tell_co**) retrieves all information concerning a specified gauge from the LDAD configuration files. This includes all communication details, the name of the session file to use, the location to store the data on AWIPS II, and whether SHEF-encoding is required (for LARC/Handar 555 gauges, SHEF-encoding is always required). It formats an interprocess message containing all this information, opens a socket to the **listener**, and sends a get LARC/Handar 555 Message “IPC” message to the **listener**.

► To Access and Read tell_co Log

The **tell_co** log resides on the PX2 in the **\$LOG_DIR** directory and records messages from the **tell_co** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where <yyyymmdd> is today’s date.

- TYPE:** `ls -ltr tell_co*`
 - Displays the **tell_co** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```

LOG-STATUS: Log file opened on host px2-tbdw at Wed May 12 19:45:55 2006
19:45:55.368 doAlivenessTest.c EVENT: waitForReply INTERNAL SUCCESS!!!!...
19:45:56.253 doAlivenessTest.c EVENT: waitForReply EXTERNAL SUCCESS!!!!...
19:45:57.205 tell_co.c EVENT: TELL_CO waitForReply SUCCESS!!!!...

```

The format of the log consists of the following fields:

```

Time stamp      19:45:57.205
File name       tell_co.c
Message type    EVENT:
Message string   TELL_CO waitForReply SUCCESS!!!...

```

8.7.4 *listener*

The **listener** sets up a socket connection, binds to a local address so that the Client (**CO_serv**) or **tell_co** can send to it, and waits for the connection. Upon receipt of a data collection request from **tell_co**, the **listener** forwards information received to the **CO_serv** process. The **IdadServer** process passes the notification to the **IdadScheduler**, which (in the case of an OTR) displays the predecoded contents of the data file to the forecaster. The **IdadScheduler** process also receives and displays the LARC/Handar 555 gauge dialing status information.

► **To Access and Read the listener Log**

The **listener** log resides on the PX2 in the directory **\$LOG_DIR** and records messages from the **listener** process. Perform the following commands as user **ldad**:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr listener*`
 - Displays the **listener** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```

LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 00:00:12 2006
00:00:12.616 listener.c EVENT: listener process started
18:33:06.354 listener.c EVENT: child listener:rcp completed for HANDAR_coll_sess_1
18:33:06.358 listener.c EVENT: rcp_cmd_buf=
/awips/ldad/bin/sendLDADnotification.pl V NOTHING px2 1951
18:33:06.510 listener.c PROBLEM: child listener: failed to sendLDADNotification for
HANDAR_coll_sess_1

```

The format of the log consists of the following fields:

```

Time stamp      18:33:06:354
File name       listener.c
Message type    EVENT:
Message string   child listener: rcp completed for
                  HANDAR_coll_sess_1

```

8.7.5 CO_serv

The Server program (**CO_serv**) opens up a socket and continually listens for connections from the Client program. When one arrives, a child process is spawned that reads the interprocess message, extracts the name of the “session” file (the session file is located in **/ldad/data/<id_coll_sess>**) for the gauge in question (LARC/Handar 555), and parses this session file to create two temporary files: a response file and a script file. Using the **process_expect** executable (communications protocol **cu**), **CO_serv** calls the LARC/Handar 555 gauge. **CO_serv** stores the LARC/Handar 555 data in the **/data/Incoming** directory and copies the “.eyewash” file to the **/data/ldad/public/point/hydro** directory. **CO_serv** passes the notification to the listener.

► **To Access and Read the CO_serv Log**

The **CO_serv** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **CO_serv** process. Perform the following commands as user **ldad**:

- | | |
|--------------|---|
| TYPE: | cd \$LOG_DIR/<yyyymmdd> |
| | ▪ Where <yyyymmdd> is today’s date. |
| TYPE: | ls -ltr CO_serv* |
| | ▪ Displays the current day’s CO_serv logs from earliest to latest. |
| TYPE: | tail -f <logname> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed Apr 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

When the processes have performed their duties, notifications are sent to the **notificationServer**, which it passes to the **ldadScheduler**.

NOTE: The **process_expect** executable writes its messages to the **CO_serv** log.

8.8 Decode LARC/Handar 555 Data

The **newLDADdataNotification** script in **\$FXA_HOME/ldad/bin** checks the LDAD products directory for LARC/Handar 555 files. When a file is present, **newLDADdataNotification** passes the information to the **CO_serv** which informs the **listener**. The **listener** executes the **\$FXA_HOME/ldad/bin/preProcessLDAD.pl** script and calls **routerLdadDecoder** to decode the file. The decoded file is stored and a notification is sent to the user stating that new data are available.

Processes

```
LS      newLDADdataNotification
LS      CO_serv
PX2    listener
PX2    preProcessLDAD.pl
PX2    CommsRouter LDAD_ROUTER
PX2    DataController LDAD_ROUTER LdadController.config
PX2    routerLdadDecoder
PX2    routerStoreTextEDEX
PX2    routerStoreEDEX
PX2    routerShefEncoderEDEX
PX2    distributeProduct
DX1    notificationServer
```

Configuration Files /data/fxa/LDAD/data

LDADinfo.txt	(for listener)
*Station.txt	(for routerStoreEDEX)
LdadController.config	(for DataController LDAD_ROUTER)
LdadPatterns.txt	(for routerLdadDecoder, routerStoreEDEX, routerStoreText, routerShefEncoder)
LARC.desc	(for routerLdadDecoder, routerStoreEDEX, routerShefEncoderEDEX)

Configuration Files in /awips/fxa/data

LdadWmoAwipsId.tbl	(for routerStoreTextEDEX)
LDADWmoID.cfg	(for routerShefEncoder)
edex-info.tx	(for routerStoreEDEX, routerShefEncoderEDEX)

Environment Variables

\$FXA_HOME	px1, px2: /awips/fxa
\$LDAD_EXTERNAL_HOME	ls1: /ldad
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/ldad/logs
\$LDAD_INTERNAL_DATA	px1, px2: /awips/ldad/data
\$LDAD_DECODED_DATA	px1, px2: /data/fxa/LDAD/decoded
\$LDAD_DATA	px1, px2: /data/fxa/LDAD
\$LOG_DIR	px1, px2: /data/logs/fxa
ls1:	/data/logs/ldad

Refer to Exhibit 8.8-1 for the Decode LARC/Handar 555 data flow diagram.

8.8.1 newLDADdataNotification

The **newLDADdataNotification** process uses the file's name to determine the type of data contained in the file and checks the LDAD products directory (**/data/Incoming**) periodically for LARC/Handar 555 files.

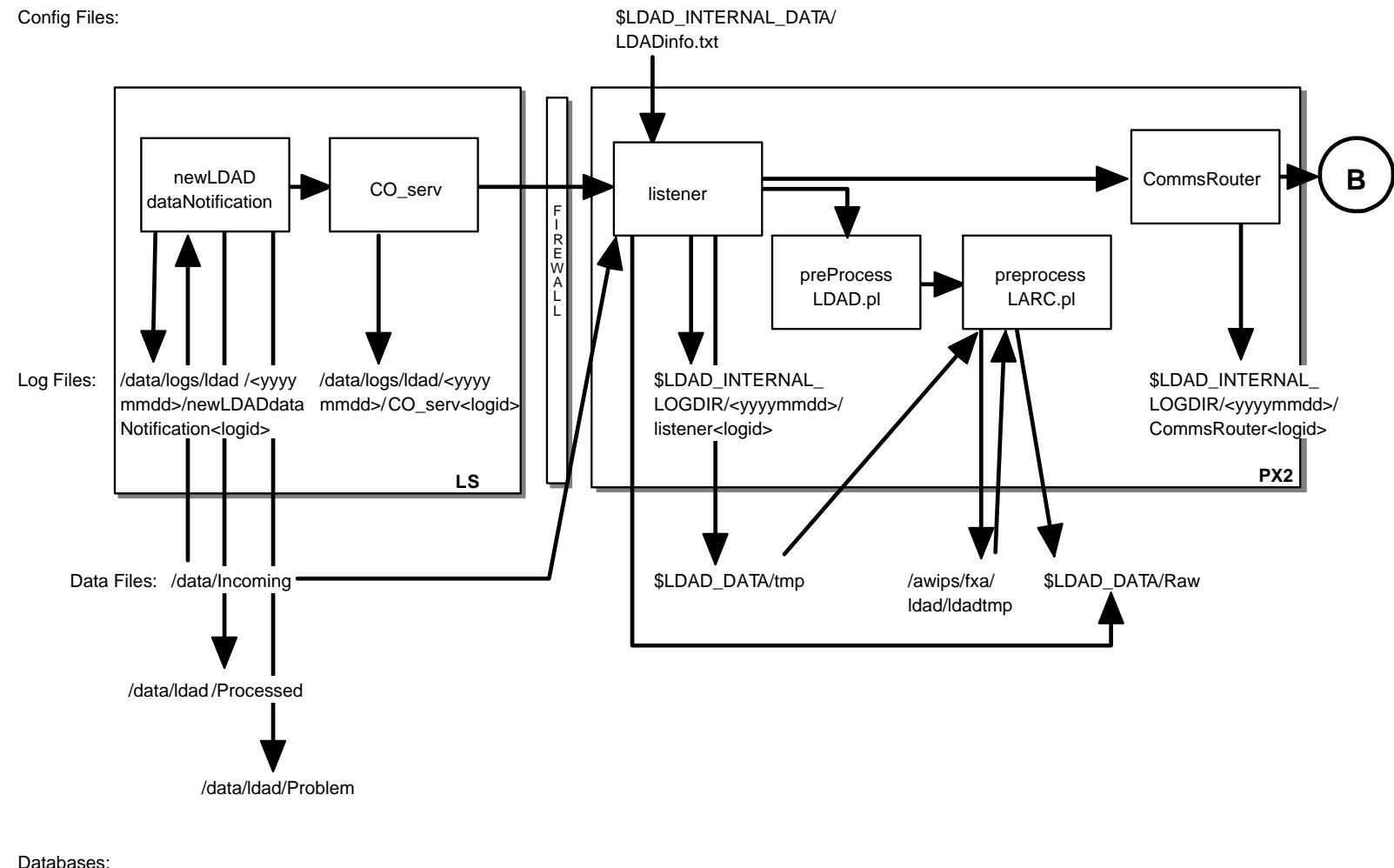
The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process using **createAndSendIPCMesssage**. The message notifies **CO_serv** that there are LARC/Handar 555 files in the **/data/Incoming** directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes or if an **fstat** on the file to transfer fails, the product gets moved to the **/data/ldad/Problem** directory using the **moveFileToProblemDir** process. Otherwise, the “processed” files are moved to the **/data/ldad/Processed** directory using the **moveFileToProcessedDir** process.

- ▶ **To Access and Read the newLDADdataNotification Log**

The **newLDADdataNotification** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user ldad:

- | | |
|--------------|---|
| TYPE: | cd \$LOG_DIR/<yyyymmdd> |
| | ▪ Where <yyyymmdd> is today's date. |
| TYPE: | ls -ltr newLDADdataNotification* |
| | ▪ Displays the current day's newLDADdataNotification logs from earliest to latest. |
| TYPE: | tail -f <logname> |
| | ▪ Displays the latest registered messages as the current log updates. |



SMM 07/13/06

Exhibit 8.8-1. Decode LARC/Handar 555 Data (for LDAD) (Page 1 of 2)

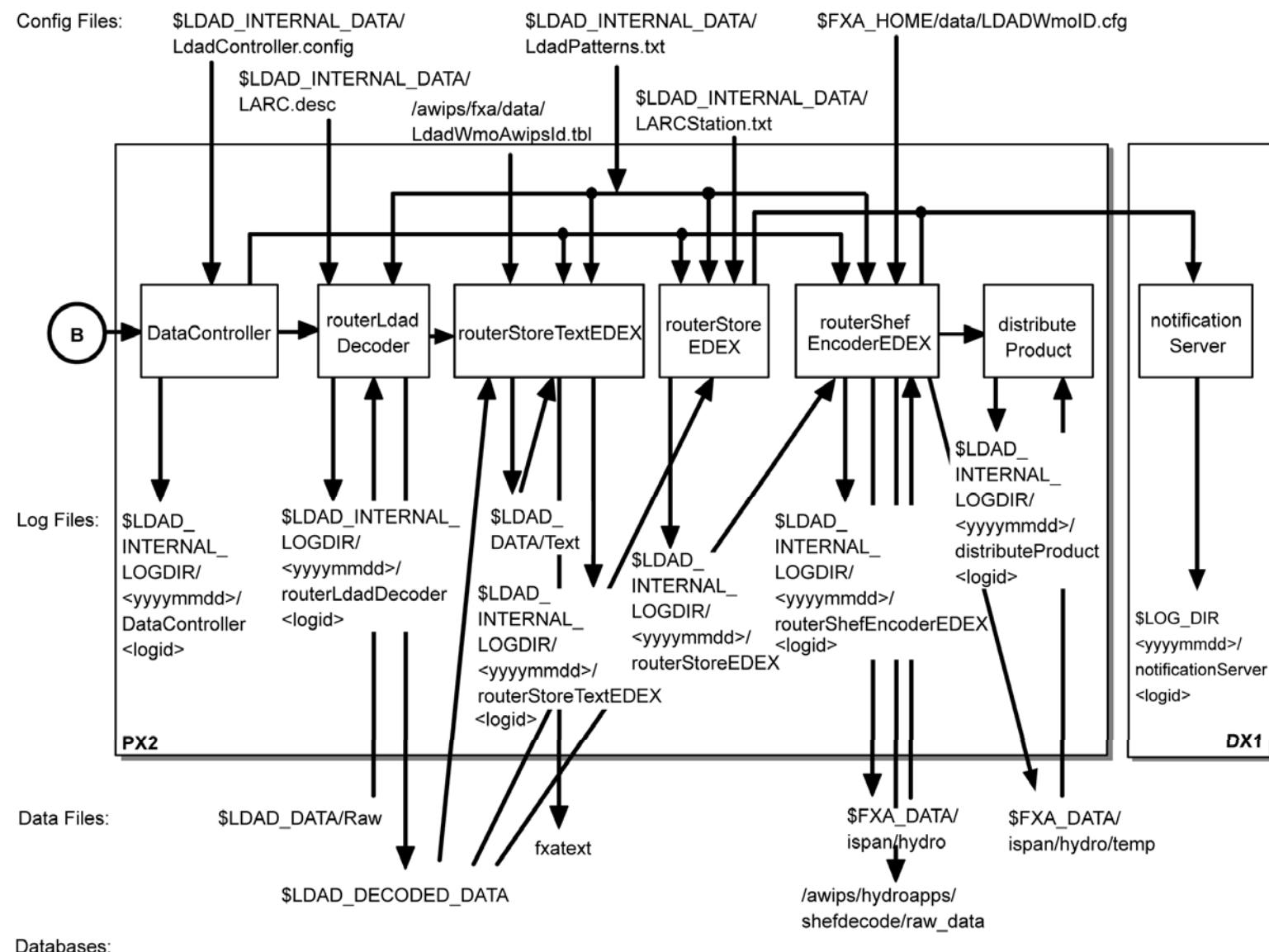


Exhibit 8.8-1. Decode LARC/Handar 555 Data (for LDAD) (Page 2 of 2)

SMM 07/13/10

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 00:00:28 2006
00:00:28.906 newLDADdataNotification.c EVENT: newLDADdataNotification process started
00:00:28.911 newLDADdataNotification.c EVENT: Reading /data/Incoming/ every 20 seconds
00:00:28.915 newLDADdataNotification.c EVENT: Processing : /data/Incoming/RAWS.dat
00:00:29.080 newLDADdataNotification.c EVENT: File more than 24hours old, removed
/data/Incoming/satxssmipw_20060412_2300.nc.gz
13:45:37.981 newLDADdataNotification.c EVENT: Processing : /data/Incoming/RAWS.dat
13:45:41.926 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/RAWS.dat
13:57:38.049 newLDADdataNotification.c EVENT: Processing :
/data/Incoming/LARCPORM2135555.dat
13:57:40.343 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/LARCPORM2135555.dat
```

The format of the log file consists of the following fields:

Time stamp	13:57:40.343
File name	newLDADdataNotification.c
Message type	EVENT:
Message string	waitForReply SUCCESS on /data/Incoming/LARCPORM2135555.dat

NOTE: Handar 555 data files are similar to “55LARCSNMC1155303.dat.”

8.8.2 CO_serv

CO_serv initially sets up a (TCP/IP) socket and waits for connections. The notification received from **newLDADdataNotification** is passed across the firewall to the **listener** process on the internal side on the PX2.

► To Access and Read the CO_serv Log

The **CO_serv** log resides on the active LS in the **\$LDAD_EXTERNAL_LOGDIR** directory and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr CO_serv*`
 - Displays the current day's **CO_serv** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the current log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls2-rnk at Wed Apr 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

8.8.3 *listener*

The **listener** reads the **\$FXA_DATA/LDAD/data/LDADinfo.txt** config file, sets up a socket, binds its local address so that the client (**CO_serv**) can send to it, and waits for the connection from the Client process. When the notification is received, the **listener** retrieves the LARC/Handar 555 file from the **/data/Incoming** directory on the active LS and copies it to the **\$LDAD_DATA/tmp** directory on the PX2. If the file needs no preprocessing, **listener** moves the data file directly to the **Raw** directory. The **listener** sends a verification when finished.

The **listener** executes the **\$FXA_HOME/lad/bin/preProcessLDAD.pl** script to preprocess the LARC/Handar 555 data files. The **listener** receives the fully qualified data file, the hostname used by notification routine, the port number of the process requiring notification upon completion of the preprocessing, and other necessary information about the LARC/Handar 555 data file format from **CO_serv**. Finally, the **listener** sends notification to the **CommsRouter LDAD_ROUTER** process that a product has been preprocessed.

► To Access and Read the **listener** Log

The **listener** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **listener** process. Perform the following commands as user **ladad**:

TYPE: `cd $LOG_DIR/<yyyymmdd>`
 ▪ Where `<yyyymmdd>` is today's date.

TYPE: `ls -ltr listener*`

- Displays the current day's **listener** logs from earliest to latest.

TYPE: tail -f <logname>

- Displays the latest registered messages as the current log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 00:00:12 2006
00:00:12.616 listener.c EVENT: listener process started
13:57:39.347 listener.c DEBUG: do_G_Msg: rcp ls1:/data/Incoming/LARCPORM2135555.dat
/data/fxa/LDAD/tmp/01LARCPORM2135555.dat.973000658
13:57:40.266 listener.c EVENT: do_G_Msg: rcp completed for
01LARCPORM2135555.dat.973000658
13:57:40.292 listener.c DEBUG: do_G_Msg: pInfo->preprocessorScript =
<preProcessLDAD.pl>
13:57:40.292 listener.c DEBUG: makePreprocessorCommandLine: rcp_cmd_buf =
</awips/ldad/bin/preProcessLDAD.pl
/data/fxa/LDAD/tmp/01LARCPORM2135555.dat.973000658 px 15009>
13:57:40.293 listener.c EVENT: do_G_Msg: Preprocessor Command Line =
</awips/ldad/bin/preProcessLDAD.pl
/data/fxa/LDAD/tmp/01LARCPORM2135555.dat.973000658 px 15009>
```

The format of the log consists of the following fields:

Time stamp	13:57:39.347
File name	listener.c
Message type	DEBUG:
Message string	do_G_Msg: rcp ls1:/data/Incoming/LARCPORM2135555.dat /data/fxa/LDAD/tmp/01LARCPORM2135555.dat.973000658
	58

NOTE: Handar 555 files are similar to "55LARCSNMC1155303.dat.1029513249."

8.8.4 *preProcessLDAD.pl*

The **\$FXA_HOME/ldad/bin/preProcessLDAD.pl** script preprocesses **UDFCD ALERT (_R5, _WL, _WX)**, **Cdot, IFLows**, and **LARC/Handar 555** data report files for the LDAD decoder. It initializes file input and output and values to the existing variables, calls the appropriate preprocessor (**preprocessLARC.pl** for LARC/Handar 555 data), and cleans up.

8.8.5 *preprocessLARC.pl*

The **\$FXA_HOME/ldad/bin/preprocessLARC.pl** script copies the file from the **\$LDAD_DATA/tmp** directory to the **/awips/fxa/ldad/ldadttmp** directory. There, it reformats the LARC/Handar 555 data file, appends the **abstime** string to the file name, and stores the preprocessed file in the **\$LDAD_DATA/Raw** directory.

8.8.6 LDAD_ROUTER

The **LDAD_ROUTER** (registered LDAD **CommsRouter**) is responsible for transporting data notifications from the data acquisition processes to the data controller processes. The main function of the **LDAD_ROUTER** is message passing; it does no data processing. The router provides a known location where the data acquisition processes can send data messages.

► **To Access and Read the CommsRouter Log**

The **CommsRouter** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user **ldad**:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ps -wef |grep ldad`
 - Displays the **ldad** processes. Notice the PID of the **CommsRouter** process is owned by user **ldad**.
- TYPE:** `ls -rtal Comms*`
 - Displays the latest logs for the **CommsRouter LDAD_ROUTER**.

NOTE: The **CommsRouter** log containing the PID of the **LDAD_ROUTER** process is the **LDAD_ROUTER's CommsRouter** log.

- TYPE:** `tail -f <logname>`
 - Displays the log as it updates.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Tue Apr 18 00:00:09 2006
00:00:09.558 CommsReceiver.C EVENT: NCF_ENTRY CRMMsg Pattern:
^[0-9]*[^m]([^s]([^a]([^s]([^_](^q)([^c])))))
.*\decoded$|(.*\.[0-9]+)|(^[0-9]*\.msas_qc\...)$|.*/Text/.*\.[0-9]+
13:57:44.861 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
/data/fxa/LDAD/Text/01LARCPORM2135555.dat.973000658 1 51
13:57:45.301 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
/data/fxa/LDAD/Raw/01LARCPORM2135555.dat.973000658 1 50
13:57:46.119 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
973000658.01LARCPORM2135555.decoded 1 58
13:57:47.720 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg: 01LARCPORM2135555.dat.973000658 1
31
14:02:44.429 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
/data/fxa/LDAD/Text/01LARCPORM2140053.dat.973000958 1 51
14:02:44.998 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
973000958.01LARCPORM2140053.decoded 1 58
```

```

14:02:45.037 CommsReceiver.C EVENT: NCF_ENTRY DSMsg:
/data/fxa/LDAD/Raw/01LARCPORM2140053.dat.973000958 1 50
14:02:47.450 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: 01LARCPORM2140053.dat.973000958 1
31

```

The log consists of the following fields:

Time stamp	14:02:47.450
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY DSMsg: 01LARCPORM2140053.dat.973000958 1 31

The **LDAD_ROUTER CommsRouter** is started automatically at system reboot time or can be started manually. The **CommsRouter** runs continuously, exiting only when killed by the restart program.

NOTE: Handar 555 files are similar to “55LARCSNMC1155303.dat.1029513249.”

8.8.7 *DataController*

The **DataController** is responsible for creating the decoder and storage processes (as child processes), restarting them if they exit, routing appropriate messages to them, and queuing incoming data messages until the decoder and storage processes are ready. As data messages are stored in the queue, the size of the processes grows.

The **DataController**’s main program creates a **DataRouting** manager object when it first starts up and invokes a member function to start the **routerLdadDecoder**, **routerStoreTextEDEX**, **routerStoreEDEX**, and **routerShefEncoderEDEX** processes by reading and executing the **LdadController.config** file. The file resides on the **\$LDAD_INTERNAL_DATA** directory and contains the names of the processes above to start/restart, a restart flag, and end of file (**eof**) designators to alert the Data Routing Manager that there are no more processes listed in the file.

The **LDAD_ROUTER** sends product received notifications to the **DataController**. When the processes first start up, they send messages containing their IPC addresses and process numbers to the **DataController**. The processes send the **DataController** a data request message and a ready-to-receive data message. In response, the **DataController** stores the processes’ ID information and data requests, and sends a message to the requesting processes (if a message is available). The **DataController** waits to receive another ready message from the processes before sending any more data messages. The **DataController** queues any messages it receives from the **LDAD_ROUTER** until the processes send another ready message.

► **To Access and Read the DataController Log**

The **DataController** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

TYPE: cd \$LOG_DIR/<yyyyymmdd>

- Where <yyyymmdd> is today's date.

TYPE: ls -rtal DataController*

- Displays the latest logs for the **DataControllers**.

TYPE: tail -f <logname>

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Tue Apr 12 00:00:09 2006
00:00:08.945 DataCaptReceiver.C EVENT: DataReqMsg: pattern =
(.*\.[0-9]+)|(^[0-9]*\.msas_qc\..*)$
00:00:09.414 DataCaptReceiver.C EVENT: DataReqMsg: pattern =
^*[0-9.]*(^m)([^s])(^a)([^s])(^_)(^q)([^c]))))
.*\decoded$
00:00:10.799 DataCaptReceiver.C EVENT: DataReqMsg: pattern = .*/Text/.*\.[0-9] +
00:00:11.756 DataCaptReceiver.C EVENT: DataReqMsg: pattern = .*\.decoded
13:57:45.102 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Text/01LARCPORM2135555.dat.973000658 1 51
13:57:45.303 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Raw/01LARCPORM2135555.dat.973000658 1 50
13:57:46.122 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
973000658.01LARCPORM2135555.decoded 1 58
13:57:47.722 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: 01LARCPORM2135555.dat.973000658 1
31
```

The log file consists of the following fields:

Time stamp	13:57:47.722
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY CDMsg: 01LARCPORM2135555.dat.973000658
	1 31

NOTE: Handar 555 files are similar to “55LARCSNMC1155303.dat.1029513249.

8.8.8 routerLdadDecoder

The **routerLdadDecoder** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerLdadDecoder** process sends a data request to the **DataController** for the LARC/Handar 555 products it wishes to receive by specifying product header patterns of interest. On receipt of a notification from the **DataController** that a product of interest has arrived, the **routerLdadDecoder** reads the directory containing the raw files, **\$LDAD_DATA/Raw**.

The **routerLdadDecoder** process reads each file and stores it via serialized data files to the **\$LDAD_DECODED_DATA** directory. The serialized file name is sent back through the **LDAD_ROUTER** to notify registered LDAD storage processes of the arrival of each LDAD decoded product.

► **To Access and Read the routerLdadDecoder Log**

The **routerLdadDecoder** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -rtal routerLdadDecoder*`
 - Displays the latest **routerLdadDecoder** logs.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-rnk at Wed Apr 12 00:08:38 2006
00:08:38.015 DataCaptReceiver.C USE: ProdLen 22
00:08:38.331 LdadRoutines.C EVENT: Processing [1/1] = raindata.dat.948931713
00:08:39.365 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(),
'$LDAD_DECODED_DATA/ 948931713.raindata.decoded', sent to LDAD_ROUTER
00:23:38.990 DataCaptReceiver.C USE: ProdLen 22
00:23:39.172 LdadRoutines.C EVENT: Processing [1/1]= raindata.dat.948932614
00:23:40.112 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(),
'$LDAD_DECODED_DATA/ 948932614.raindata.decoded', sent to LDAD_ROUTER
12:08:41.211 DataCaptReceiver.C USE: ProdLen 31
12:08:41.368 LdadRoutines.C EVENT: Processing [1/2] = 01LARCPORM1221212.dat.948974916
12:08:41.589 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(),
'$LDAD_DECODED_DATA/ 948974916.01LARCPORM2121212.decoded', sent to LDAD_ROUTER
```

The log file consists of the following fields:

Time stamp	12:08:41.368
File name	LdadRoutines.C
Message type	EVENT:
Message string	Processing [1/2] = 01LARCPORM2121212.dat.948974916

NOTE: Handar 555 files look similar to “55LARCSNMC1155303.dat.1029513249.”

8.8.9 **routerStoreTextEDEX**

The **routerStoreTextEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerStoreTextEDEX** process sends a data request to the **DataController** for the text products it wishes to receive by specifying product header patterns of interest. On receipt of a notification from the **DataController** that a product of interest has arrived (based on the pattern in **/awips/fxa/ldad/data/LdadPatterns.txt** file), the **routerStoreTextEDEX** reads the directory containing the decoded files, **\$LDAD_DECODED_DATA**.

The **routerStoreTextEDEX** process reads each file and stores it temporarily in the **\$LDAD_DATA/Text** directory. The **routerStoreTextEDEX** process reads **/awips/fxa/data/LdadWmoAwipsId.tbl** file to determine what WMO ID is associated with the product and using that ID to store the product into the **fxatext** database.

► To Access and Read the **routerStoreTextEDEX** Log

The **routerStoreTextEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -rtal routerStoreTextEDEX*`
 - Displays the latest **routerStoreTextEDEX** logs.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbw3 at Tue Jul 13 00:30:06 2010
16:09:31.033 DataCaptReceiver.C USE: ProdLen 42
16:09:31.082 routerStoreTextEDEX.C EVENT:
routerStoreTextEDEX.C, putData(/data/fxa/LDAD/Text/01LARCPORM2004319.dat.999305101)
16:09:31.084 LdadStoreTextEDEX.C EVENT: LdadStoreTextEDEX::getLdadProductType(),
found: <LARC> in </data/fxa/LDAD/Text/01LARCPORM2004319.dat.999305101>
16:15:33.314 DataCaptReceiver.C USE: ProdLen 38
16:15:33.491 routerStoreTextEDEX.C EVENT:routerStoreTextEDEX.C ,
putData(/data/fxa/LDAD/Text/RAWS.dat.991325728)
16:15:33.644 LdadStoreTextEDEX.C EVENT: LdadStoreTextEDEX::getLdadProductType(),
found: <RAWS> in </data/fxa/LDAD/Text/RAWS.dat.991325728>
```

The log file consists of the following fields:

Time stamp	16:15:33.491
File name	routerStoreTextEDEX.C
Message type	EVENT:
Message string	routerStoreTextEDEX.C putData (/data/fxa/LDAD/Text/RAWS.dat.991325728)

NOTE: Handar 555 files are similar to “55LARCSNMC1155303.dat.1029513249.”

8.8.10 **routerStoreEDEX**

The **routerStoreEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerStoreEDEX** process sends a data request to the **DataController** for serialized decoded LARC/Handar 555 files in netCDF format. When notified by the **DataController** that a product of interest has arrived, **routerStoreEDEX**

reads the directory containing the files, **\$LDAD_DECODED_DATA**. The **routerStoreEDEX** process stores the files in the **/data_store/ldad** directory in **XML format** and sends a notification to the **EDEX**.

► To Access and Read the routerStoreEDEX Log

The **routerStoreEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -rtal routerStoreEDEX*`
 - Displays the latest logs for the process. If more than one log exists, choose the log for the current **routerStoreEDEX** process by looking for the PID in the pathname.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

LOG-STATUS: Log file opened on host px2-tbw3 at Tue Jul 13 00:30:06 2010

```
14:09:47.010 LdadStorage.C EVENT: LdadStorage::separatePatterns () <[-999 ]> from
<-999>
14:09:47.472 routerStoreEDEX.C EVENT: routerStoreEDEX
/data/fxa/LDAD/decoded/973001379.alert_r5.decoded completed
14:12:47.247 DataCaptReceiver.C USE: ProdLen 58
14:12:47.300 routerStoreEDEX.C EVENT: routerStoreEDEX.C,
putData(/data/fxa/LDAD/decoded/973001559.01LARCPORM2141054.decoded)
14:12:48.293 routerStoreEDEX.C EVENT: routerStoreEDEX
/data/fxa/LDAD/decoded/973001559.01LARCPORM2141054.decoded completed
```

The log file consists of the following fields:

Time stamp	14:12:48.293
File name	routerStoreEDEX.C
Message type	EVENT:
Message string	routerStoreEDEX /data/fxa/LDAD/decoded/973001559.01LARCPORM21410 54.decoded completed

NOTE: Handar 555 files are similar to “55LARCSNMC1155303.decoded.1029513249.”

8.8.11 routerShefEncoderEDEX

The **routerShefEncoderEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerShefEncoderEDEX** process sends a data request to the **DataController** for serialized decoded files. On receipt of a notification from the **DataController** that a product of interest has arrived, the **routerShefEncoderEDEX** reads the directory containing the files, **\$LDAD_DECODED_DATA**. The files there are SHEF-encoded and moved to the **/data_store/ldad** directory. The **routerShefEncoderEDEX** process sends a notification to the **EDEX**. Once the SHEF-encoded data file is stored in the **/data_store/ldad** directory, the **routerShefEncoderEDEX** saves a copy of the file in the **/tmp** directory and calls **distributeProduct** process to send the file to the NCF over the WAN.

► **To Access and Read the routerShefEncoderEDEX Log**

The **routerShefEncoderEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -rtal routerShefEncoder*`
 - Displays the latest **routerShefEncoderEDEX** logs.
- TYPE:** `tail -f <logname>`
 - Displays the log as it is updated with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbw3 at Sun Jul 11 00:30:06 2010
00:30:06.463 routerShefEncoderEDEX.C PROBLEM: No messages in time-out interval, (30 mins). Re-
registering.
14:12:47.223 DataCaptReceiver.C USE: ProdLen 58
14:12:47.296 routerShefEncoderEDEX.C EVENT: routerShefEncoderEDX
</data/fxa/LDAD/decoded/973001559.01LARCPORM2141054.decoded>
14:12:47.706 ShefStorage.C PROBLEM: "BRKM2" not defined in LARCStation.txt file
14:12:47.707 ShefStorage.C EVENT: TZ=
14:12:48.108 checkWmoHeader.C PROBLEM: The AATTii -> SXXX90
14:12:48.108 checkWmoHeader.C PROBLEM: CCCC -> KSTO
14:12:48.109 checkWmoHeader.C PROBLEM: checkWmoHeader() : data contains a WMO header.
14:12:48.109 checkWmoHeader.C PROBLEM: Return an awipsId -> KSTORRZLDA
14:12:48.111 SHEF_format.C EVENT: SHEF_format::sendToProductWan -> data contains a WMO
header.
Creating a dummy file (zero bytes).
14:12:49.730 SHEF_format.C EVENT: SHEF_format::sendToProductWan ->
system(distributeProduct -a DEFAULTNCF
-e /data/fxa/ispan/hydro/temp/A_format.973001567 KSTORRZLDA
/data/fxa/ispan/hydro/temp/A_format.973001567);
14:12:49.731 SHEF_format.C EVENT: shef data has sent to WAN successfully!
14:12:49.979 routerShefEncoderEDEX.C EVENT: Finished
```

The log file consists of the following fields:

```
Time stamp      14:12:49.731
File name       SHEF_format.C
Message type    EVENT:
Message string   shef data has sent to WAN successfully!
```

NOTE: Handar 555 files are similar to “1029513169.55LARCSNMC 1155303.decoded.”

8.8.12 *distributeProduct*

The **distributeProduct** process creates a product message and submits it for distribution across the AWIPS WAN to the addressed sites. The **distributeProduct** process first prepares the product by creating the WAN communications header and prepending the header to a temporary copy of the product.

► **To Access and Read the distributeProduct Log**

The **distributeProduct** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ps -ef |grep ldad
 - Displays the **ldad** processes.
- TYPE:** ls -ltr distributeProduct*
 - Displays the latest logs for the **distributeProduct** process.
- TYPE:** tail -f <logname>
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log file should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 19:30:59 2006
19:30:59.690 MHSPproduct.C PROBLEM: Product
(/data/fxa/ispan/hydro/temp/A_format.973020657_msg) is empty.
19:30:59.853 MHSPproduct.C EVENT: Sending attachments
(/data/fxa/ispan/hydro/temp/A_format.973020657)
only. Attachments are assumed to contain correct communications header.
19:31:02.504 MHSPproduct.C EVENT: Product request (KSTORRZLDA) was successfully
submitted to the MHS request server for distribution.

Message Attributes:
  Request ID: TBDW-25380
  To: DEFAULTNCF
  Priority: 0
  Type: Routine
  Subject:
  Handling Action: 0
```

19:31:02.518 MHSPproduct.C EVENT: TBDW-25380

~

The log file consists of the following fields:

```

Time stamp          19:31:02.504
File name          MHSPproduct.C
Message type       EVENT:
Message string     Product request (KSTORRZLDA) was successfully
                    submitted to the MHS request server for
                    distribution.

Message Attributes:
Request ID: TBDW-25380
To: DEFAULTNCF
Priority: 0
Type: Routine
Subject:
Handling Action: 0

```

8.9 Acquire Campbell Data

Data collection from Campbell gauges is carried out by automating a normally interactive session using the **cu** communication protocol. There is a Server program (**CO_serv**) and a Client program (**tell_co**). The Server program is always running, waiting for, and processing requests to collect data from a particular gauge from the Client program. The Client program can be invoked from a shell script, as a cron job, or directly from a command prompt. A feature of the Client program is that it retrieves all necessary information regarding collection and storage of data from system tables in the AWIPS database. The Client and Server programs use sockets to communicate across a TCP/IP LAN. Data from a gauge are SHEF-encoded prior to storage on AWIPS. The **.dat** is moved into the Raw directory, while the SHEF file is stored into the text database, archived, and sent to the Office of Hydrology's database during preprocessing. The **.dat** file is forwarded to the **ldadDecoder** process to further decode the Campbell data for creation of the netCDF and SHEF-encoded files.

Processes

```

LS    callSite.ksh
LS    process_expect
LS    CO_serv
LS    campbell
PX2   listener
PX2   tell_co
PX2   ldadServer
LX    ldadScheduler
DX1   notificationServer

```

Environment Variables

```

$LDAD_DATA           px2, px1:      /data/fxa/LDAD
$LDAD_INTERNAL_DATA px2, px1:      /awips/ldad/data
$LDAD_INTERNAL_LOGDIR px2, px1:     /awips/ldad/logs
$LDAD_EXTERNAL_LOGDIR px2, px1:     /data/logs/ldad

```

```
$LOG_DIR          px2, px1: /data/logs/fxa (as your individual
                      user account or as user fxa)
                      ls1, px1, px2: /data/logs/ldad (as user ldad)
```

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
CAMPBELLStation.txt	(for tell_co , ldadScheduler)
userDescriptions	(for ldadScheduler)
gaugeSessList	(for ldadScheduler)
userSessList	(for ldadScheduler)
usrpro	(for ldadScheduler)
gageinfo	(for ldadScheduler)
gageinfoCampbell.txt	(for ldadScheduler)
gaugeDescriptions	(for ldadScheduler)
SHEFcodes.cfg	(for campbell)

LDADinfo.txt

The file should contain the following entry:

```
CAMPBELL | CAMPBELL | 89 | 90 | CVS_TYPE | hydro |
           preprocessCAMPBELL.pl |
```

Once the file is installed, this line should not be modified.

CAMPBELLStation.txt

This file must be updated whenever a gauge is added to or dropped from the current Campbell datalogger list. To add a new Campbell gauge, find out the following gauge information to create a new entry in the station table format (* indicates a mandatory field):

- **Provider ID:** Data provider station or gauge ID (*)
- **AFOS(HB5) ID:** The AFOS or Handbook 5 ID (NWS assigned)
- **Station Name:** Text name of station
- **Elevation:** Station elevation (m) (*)
- **Latitude:** Station Latitude (decimal degrees, north positive) (*)
- **Longitude:** Station Longitude (decimal degrees, east positive) (*)
- **Local Time Zone:** Reporting time zone (e.g., UTC, PST8PDT) (*) (see Note)
- **Location Description:** Station location/address (Text)
- **Station Type:** Type of station (e.g., tower, surface, floating platform, etc.)
- **Number of Instruments:** The number of reporting instruments for the station

- **Number of Reporting Levels:** Number of data reporting levels. Level information should be provided in the instrument table
- **Maintenance/Calibration Schedule:** Frequency of maintenance/calibration
- **Site Description:** A text description of the site surroundings.

The entries are sorted alphabetically by the gauge ID.

This file must be identical on the PX2 and on LS1!

NOTE: The local time zone for Campbell gauges is always GMT because the Campbell Decoder already converts the observation times into GMT times.

userDescriptions

This file is used by the **LdadScheduler** process to get the descriptions of users. When read in, blank lines and lines beginning with # are skipped. All other lines should have the following format:

```
<user ID>|<user description>
```

A blank user description is denoted by having the line end immediately following the | character (a vertical bar or “pipe”).

This file should not be modified manually. It should only be written to by the **LdadScheduler** (specifically, the **LdadSchedulerServer.C** routine).

usrpro

The user file (**usrpro**) is made up of zero to n lines, each line holding the following information (note that the lines are so long that they are wrapped in the interests of readability). Columns containing “??” are not used at this time.

```
<ID>|<protocol>|<IP address>|<phone number>|<login>|<password (encrypted)>|??|<file to receive>|<file to send>|??|??|<data collection session file>|<data dissemination session file>|<local directory>|<remote directory>|??... (columns 16 through 36 have unknown meanings)|...|<IP address>|
```

- The <protocol> is either “F” for FTP, “X” for Xmodem, “Y” for Ymodem, “Z” for Zmodem, or “K” for Kermit.
- The <IP address> designates the host to FTP to, if the protocol is “F,” or the terminal server otherwise. <IP address> appears in two places in the above column listing: columns 3 and 37. In reality, only one of the two columns is used. For the FTP protocol, only column 3 has the address in it, and column 37 is left blank. If any other protocol is being used, column 37 has the address in it, and column 3 is left blank.
- The <phone number> field is unused if the protocol is “F.”
- The <file to receive> and <file to send> fields are mutually exclusive. Only one may be specified, and which one is specified indicates also whether this user is a

collection user (if <file to receive> is given) or a dissemination user (if <file to send> is given). All other columns are tracked when read in; when written out, the same values are placed in them as were originally found.

gageinfo

The **gageinfo** file contains a list of Handbook 5 and Campbell gauges. It is updated periodically as Campbell gauges are added and removed with the **IdadScheduler**. Whenever a gauge is added or dropped from the current list, it should be updated here and in the following files:

```
$LDAD_DATA/data/gageinfoCampbell.txt  
$LDAD_DATA/data/CAMPBELLStation.txt  
$LDAD_DATA/data/gaugeDescriptions
```

The following fields must be present for each gauge (see Note):

- **Gauge ID:** A five-character instrument ID.
- **Protocol Type:** C for data collection, D for dissemination.
- **Phone#:** The dial-out phone number can be in any format. However, if the gauge has the voice message first, several pauses are included in the phone number. Depending on the length of the voice message, add more pauses if the one listed here is not enough. The pause is entered by comma (,) and is ended with a *9. If a phone number contains a pause extension, make sure the phone number is enclosed by single quotes('). Example: '1-605.886.2473,*,*9'
- Session File: Use CAMPBELL_coll_sess exactly.
- **SHEF File:** 1 = Yes; 0 = No.
- Storage Type: S.
- **Baud Rate:** Use 9600 for Campbell gauges.
- Terminal Server (tty): Use 8n1out for Campbell gauges.

The fields are separated by vertical bars (|); empty fields are for future use. A number nine (9) in front the phone number allows the user to dial out. An example follows:

```
BBCW3|C| |917158843133| | | | |CAMPBELL_coll_sess|1|S| | |9600|e|  
|8n1out|
```

NOTE: The **recvprog** field indicates the receiving program (e.g., FTP) for data collection. This field is used as the custom gauge ID if the gauge is owned by the NWS.

gageinfoCampbell.txt

This file should be updated along with the **gageinfo** file when adding/dropping Campbell gauge(s). There are at least four fields for each Campbell gauge to be entered when adding a gauge; the fields are as follows:

- **Gauge ID:** A five-character instrument ID (i.e., BRCW3).
- **Local Time Zone:** Time zone where the Campbell gauges are located, (e.g., PST, CDT, GMT, etc.).
- Data Array ID for Storage Area 1: Four digit array ID.
- **Observation Field Skip Bit Map for Array ID Number One:** This is an eight-bit field used to mark the observation fields to be ignored.
- **Bit Map for Observation Data Fields in PE Codes for Storage Area 1 in Hexadecimal Format:** This is a 32-bit code (see Note). The leftmost byte is designed to ignore collected data fields and the other three are used to map the type of data collected relevant to the PE codes listed in the **SHEFcodes.cfg** file.
- **Data Array ID for Storage Area 1:** Four digits array ID for gauge collection data and storing in Storage Area 2.
- **Bit Map for Collecting Data Fields in PE Codes for Storage Area 2:** Same format as Storage Area 1 if the gauge collects data and stores it in Storage Area 2.

NOTE: Current design can accommodate a maximum of eight data fields only for a Campbell gauge and a maximum of 32 PE codes collected by all Campbell gauges. If an individual gauge collects more than eight different data fields or if the total number of the PE codes collected by the Campbell gauges exceeds 32, these fields will have to be expanded to incorporate the changes.

gaugeDescriptions

The file is used to get the site descriptions and should be updated using the **ldadScheduler** when a new Campbell gauge is added. Each entry (line) should have the following format:

<gauge ID> | <site description>

For example, an entry for the BARW3 would be as follows:

BARW3 | Barron, WI

The file is sorted by state abbreviations. However, it is displayed based on the alphabetical order of the gauge IDs.

SHEFcodes.cfg

The file is designed specifically for Campbell gauges to enable creation of SHEF-encoded files (**.shef**). It contains the PE codes currently collected by Campbell CR10X gauges. The elements in the file are presented in alphabetical order and should be updated every time a new PE code is added to the file. When this file is modified, the LDAD system has to be shut down and restarted again.

The codes are used in constructing the 3-byte PE code bit map in the **gageinfoCampbell.txt** file. It is also used as the base for creating/updating of the **\$LDAD_DATA/data/CAMPBELL.desc** file.

Refer to Exhibit 8.9-1 for the Acquire Campbell Data data flow diagram.

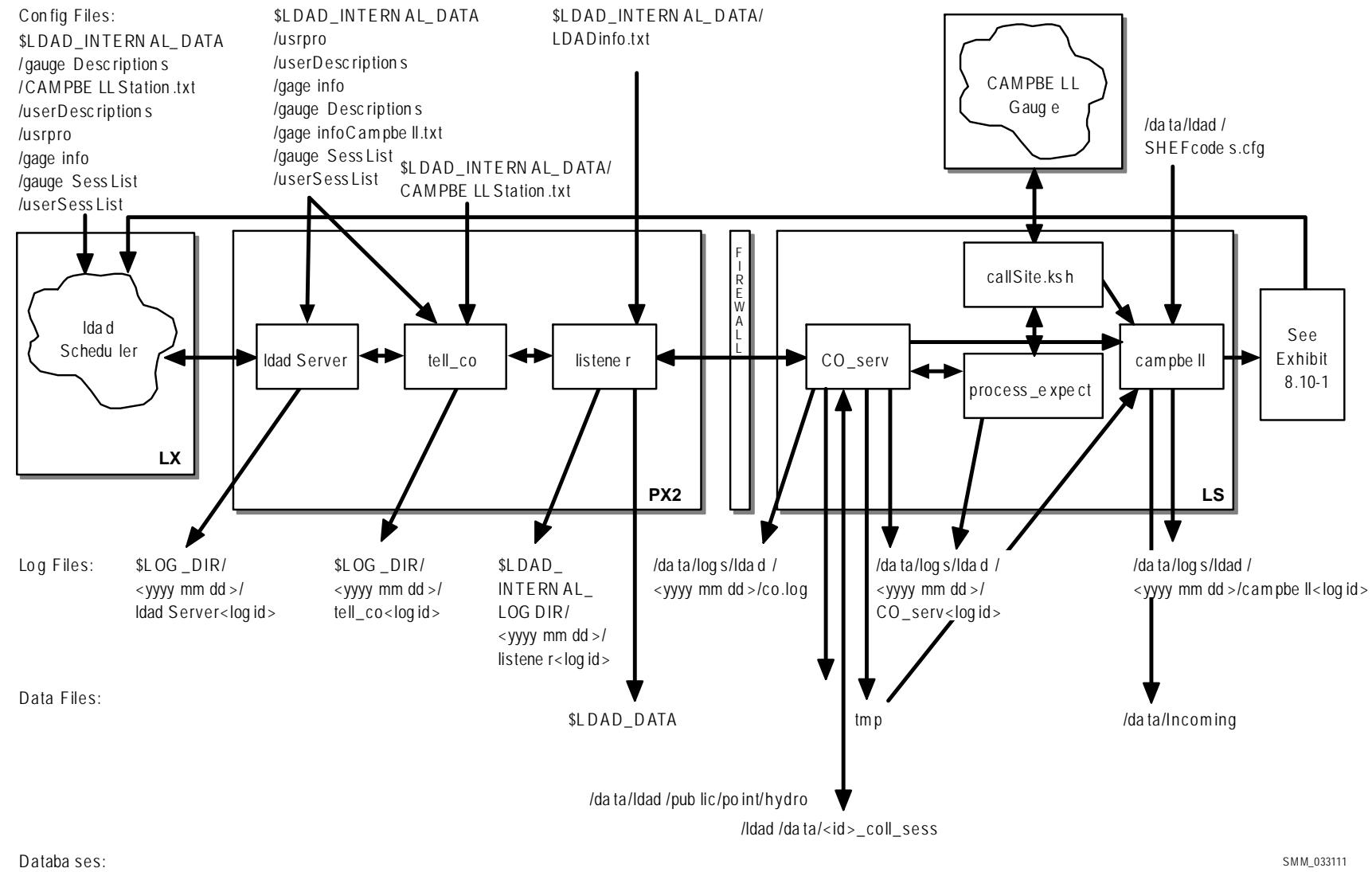


Exhibit 8.9-1. Acquire Campbell Data (for LDAD)

8.9.1 User Interface: *IdadScheduler*

The **IdadScheduler**'s function is to perform certain data acquisition/dissemination events on an automatic basis at specified time intervals (in the background). Access to the Scheduler's functions is via a GUI invoked by selecting **Collection/Dissemination...** from the **Surface** pull-down menu.

The **IdadScheduler** provides a window with which the forecaster may create, view, and manipulate scheduled LDAD requests. The Campbell data collection can be scheduled for daily, multiple, or one time request. The Scheduler allows the forecaster to create a new request and add it to the request list. The request is submitted to the **IdadServer** which uses **sendLDADnotification.pl** to create the request. If it is a one-time request, the forecaster can monitor its progress using a status dialog. If any errors are encountered during the data logging, an error message is formulated and sent to the forecaster workstation for display. In addition, Campbell gauge dialing status information is sent by the **listener** and displayed by the **IdadScheduler**.

The **IdadScheduler** registers with the **IdadServer** providing a callback routine for update notifications. The session file contents are registered first, and the status messages and ID updates so that when registering with **IdadServer**, the ID lists sent by **IdadServer** will be captured and kept.

It also registers with the FAC for notifications of changes to the existing requests file, and creates a FAC lock for the file to be used for locking it for “reads” and “writes.” The existing requests get read so as to fill the tree view with the requests that have been created.

8.9.2 *IdadServer*

The **IdadServer** allows multiple clients to connect to it and submit requests with intervals and durations that are honored according to their intervals until they expire.

New client initialization is performed by sending the gauge and user lists to the newly registered client. The **IdadServer** process creates a new message with the current active list that is broadcast all registered clients.

To honor the specified request, the **IdadServer** creates the command to be executed and sends the data collection request to the **tell_co** process. The **IdadServer** receives LDAD messages from clients; messages to create and delete gauges and users; and messages requesting the contents of a session file, or specifying a session file’s contents.

► To Access and Read the **IdadServer** Log

The **IdadServer** log resides on the PX2 in the **\$LOG_DIR** directory and records messages from the **IdadServer** process. Perform the following commands as user fxa:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr ldadServer*`
- Displays the current day's **LdadServer** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 20:11:03 2006 16:11:37.334
LdadSchedulerServer.C PROBLEM: The gauge "BBCW3" specified in
gageinfoCampbell.txt was not found in gageinfo.txt. This gauge will not be used.
16:11:37.345 LdadSchedulerServer.C PROBLEM: The gauge "BBCW3" specified in
gageinfoCampbell.txt was not found in gageinfo.txt. This gauge will not be used.
20:11:03.470 Connection.C EVENT: WARNING: this process wants to use target
LDAD_SCHEDULE_SERVER which is assigned to run on px-tbdw but the current host is
px2-tbdw
20:11:03.492 LdadSchedulerServer.C PROBLEM: The gauge "BBCW3" specified in
gageinfoCampbell.txt was not found in gageinfo.txt. This gauge will not be used.
20:12:12.926 SignalClient.C EVENT: Signal 15 (Terminate) received for clean shutdown
```

The format of the log consists of the following fields:

Time stamp	16:11:37.345
File name	LdadSchedulerServer.C
Message type	PROBLEM:
Message string	The gauge "BBCW3" specified in gageinfoCampbell.txt was not found in gageinfo.txt. This gauge will not be used.

8.9.3 tell_co

The **LdadServer** process invokes the client program **tell_co**, the main controller process providing the CAMPBELL ID. The **tell_co** function retrieves all information regarding a specified gauge from the LDAD configuration files. This includes all communication details, the name of the session file to use, as well as the location to store the data on AWIPS and whether SHEF encoding is required. It formats an interprocess message containing the aforementioned information, opens a socket to the **listener**, and sends a get CAMPBELL Message “IPC” message to the **listener**.

► To Access and Read the tell_co Log

The **tell_co** log resides on the PX2 in the **\$LOG_DIR** directory and records messages from the **tell_co** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr tell_co*`
- Displays the current day's **tell_co** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 19:45:55 2006
19:45:55.368 doAlivenessTest.c EVENT: waitForReply INTERNAL SUCCESS!!!!...
19:45:56.253 doAlivenessTest.c EVENT: waitForReply EXTERNAL SUCCESS!!!!...
19:45:57.205 tell_co.c EVENT: TELL_CO waitForReply SUCCESS!!!!...
```

The format of the log consists of the following fields:

Time stamp	19:45:57.205
File name	tell_co.c
Message type	EVENT:
Message string	TELL_CO waitForReply SUCCESS!!!!...

8.9.4 *listener*

The **listener** sets up a socket connection, binds to a local address so that the Client (**CO_serv**) or **tell_co** can send to it, and waits for the connection. Upon receipt of a data collection request from **tell_co**, the **listener** forwards information received to the **CO_serv** process. If any errors were encountered during the data logging, an error message is formulated and passed to the Scheduler for display. In addition, Campbell gauge dialing status information is sent by the **listener** and displayed by the Scheduler.

► **To Access and Read the listener Log**

The **listener** log resides on PX2 in the **\$LDAD_INTERNAL_LOGDIR** directory and records messages from the **listener** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date
- TYPE:** `ls -ltr listener*`
- Displays the current day's **listener** logs from earliest to latest

- TYPE:** tail -f <logname>
- Displays the latest registered messages as the log updates

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 00:00:12 2006
00:00:12.616 listener.c EVENT: listener process started
18:18:27.652 listener.c EVENT: child listener: rcp completed for CAMPBELL_coll_sess
18:18:27.755 listener.c EVENT: rcp_cmd_buf=
/awips/ldad/bin/sendLDADnotification.pl V NOTHING px2 1780
18:18:27.807 listener.c PROBLEM: child listener: failed to sendLDADNotification for
CAMPBELL_coll_sess
```

The format of the log file consists of the following fields:

Time stamp	18:18:27.652
File name	listener.c
Message type	EVENT:
Message string	child listener: rcp completed for CAMPBELL_coll_sess

8.9.5 CO_serv

The Server program (**CO_serv**) opens up a socket and continually listens for connections from the Client program. When one arrives, a child process is spawned that reads the interprocess message, extracts the name of the “session” file (session file located in **/ldad/data/<id_coll_sess>**) for the gauge in question (Campbell), and parses this session file to create two temporary files: a response file and a script file. **CO_serv** first calculates the starting point of the data to be retrieved and how many data intervals to retrieve from the working configuration file. Using the **process_expect**, **CO_serv** retrieves the data from the Campbell gauge and stores it in a temporary file. The data are sent to the **campbell** decoder process for decoding. If any errors were encountered during the data logging, the error messages are formulated and sent to the user’s workstation for display.

► To Access and Read the CO_serv Log

The **CO_serv** log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
- Where <yyyymmdd> is today’s date.

- TYPE:** ls -ltr CO_serv*
- Displays the current day’s **CO_serv** logs from earliest to latest.

- TYPE:** tail -f <logname>
- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed Apr 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at:
May12 04 00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at:
May12 04 00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at:
May12 04 00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:13:48.283
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv received a socket connection at: Apr12 06 00:13:48 GMT

► To Access and Read the co.log Log

The **co.log** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **CO_serv** process executing the **sendLDADnotification.pl** script. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
- Where <yyyymmdd> is today's date
- TYPE:** ls -ltr co.log*
- Displays the current day's **co.log** logs from earliest to latest
- TYPE:** tail -f <logname>
- Displays the latest registered messages as the log updates

Log Message Format

An entry at the beginning of this log looks like the following:

```
/awips/ldad/bin/sendLDADnotification.pl:94, socket ok
/awips/ldad/bin/sendLDADnotification.pl:104, bind ok
/awips/ldad/bin/sendLDADnotification.pl:117, connect ok
/awips/ldad/bin/sendLDADnotification.pl:27, Begin sendLDADnotification.pl
/awips/ldad/bin/sendLDADnotification.pl:38, S, CAMPBELL_coll_sess 4729 px, px, 15008
/awips/ldad/bin/sendLDADnotification.pl:60, opType = S, msgString = CAMPBELL_coll_sess
4729 px, host = px, port = 15008
```

8.9.6 *process_expect*

The **process_expect** executable processes the request for a data transfer. It parses the receive or send session file and invokes **do_expect** to carry out the transfer by using the script file created by the **parse_session_file** function as input. It stores the data in the appropriate place and deletes any temporary files used during this session.

► To Access and Read the CO_serv Log

process_expect writes its messages into the **CO_serv** log. The log resides on the active LS in the directory **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr CO_serv*`
 - Displays current day's logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
process_expect.c EVENT: portLockFile==> /ldad/bin/8elout
20:24:55.303 process_expect.c EVENT: Successfully read data from BBCW3
20:33:33.492 process_expect.c PROBLEM: process_expect: expect session timed out
process_expect.c EVENT: portLockFile==> /ldad/bin/8nlout
```

The format of the log file consists of the following fields:

Time stamp	20:24:55.303
File name	process_expect.c
Message type	EVENT:
Message string	Successfully read data from BBCW3

8.9.7 *callSite.ksh*

The **callSite.ksh** interrogates the datalogger and passes the raw data received from the gauge to the **campbell** decoder for the creation of the CSV and SHEF files.

8.9.8 *campbell decoder*

The **campbell** decoder decodes the data and creates a CVS (**.dat**) format file and a SHEF format file using the **SHEFcodes.cfg** configuration file. The files are put in the **/data/Incoming** directory. The number of data intervals collected and the time stamp for

the last data interval are written back into the working configuration file to be used by the next data retrieval.

► To Access and Read the campbellDecoder Log

The **campbell** decoder log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **campbell** decoder process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 ▪ Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr campbell*`
 ▪ Displays the current day's logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 ▪ Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-tbdw at Wed Apr 12 14:37:11 2006  
14:37:11.682 Campbell.C EVENT: Start decoding Campbell data for AEFW3  
14:37:12.018 Campbell.C EVENT: Successfully decoded Campbell data for AEFW3.  
~
```

The format of the log file consists of the following fields:

Time stamp	14:37:12.018
File name	Campbell.C
Message type	EVENT:
Message string	Successfully decoded Campbell data for AEFW3.

8.10 Decode Campbell Data

The **newLDADdataNotification** script checks the LDAD products directory for Campbell files. When a file is available, **newLDADdataNotification** passes the information to the **CO_serv** and informs the **listener**. The **listener** moves the file to a **tmp** directory, executes the **preprocessCAMPBELL.pl** script, and moves the preprocessed file (**.dat**) to the **Raw** directory or stores it in the text database archives, and sends it to the OH's database (SHEF). The **listener** process calls **routerLdadDecoder** to further decode the Campbell file (**.dat**) for the creation of the netCDF and SHEF-encoded files. The decoded file is stored and a notification is sent to the forecaster stating that new data are available. The SHEF-encoded file is forwarded to the NCF for distribution.

Processes

```

LS      newLDADdataNotification
LS      CO_serv
PX2    listener
PX2    preprocessCAMPBELL.pl
PX2    CommsRouter LDAD_ROUTER
PX2    DataController LDAD_ROUTER LdadController.config
PX2    routerLdadDecoder
PX2    routerStoreTextEDEX
PX2    routerStoreEDEX
PX2    routerShefEncoderEDEX
PX2    distributeProduct
DX1    notificationServer

```

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
*Station.txt	(for routerStoreEDEX)
LdadController.config	(for DataController LDAD_ROUTER)
LdadPatterns.txt	(for routerLdadDecoder, routerStoreEDEX, routerShefEncoder)
LARC.desc	(for routerLdadDecoder, routerStoreEDEX, routerShefEncoderEDEX)

Configuration Files in /awips/fxa/data

LdadWmoAwipsId.tbl	(for routerStoreTextEDEX)
LDADWmoID.cfg	(for routerShefEncoderEDEX)
edex-info.txt	(for routerStoreEDEX, routerShefEncoderEDEX)

CAMPBELL.desc

The **\$LDAD_DATA/data/CAMPBELL.desc** file requires no changes unless the Campbell data logger has been modified to collect data with PE codes that are not in the current file.

The file is directly coupled with the **SHEFcodes.cfg** file. The sequence of data group entries should be matched with the sequence of PE codes in **SHEFcodes.cfg** file.

Environment Variables

\$LDAD_DATA	px1, px2: /data/fxa/LDAD
\$LDAD_DECODED_DATA	px1, px2: /data/fxa/LDAD/decoded
\$LDAD_INTERNAL_DATA	px1, px2: /awips/fxa/ldad/data
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/fxa/ldad/logs
\$LDAD_EXTERNAL_LOGDIR	px1, px2: /data/logs/ldad
\$LDAD_EXTERNAL_HOME	primary ls: /ldad
\$FXA_DATA	px1, px2: /data/fxa
\$LDAD_EXTERNAL_DATA	px1, px2: /data/ldad

Refer to Exhibit 8.10-1 for the Decode Campbell Data diagram.

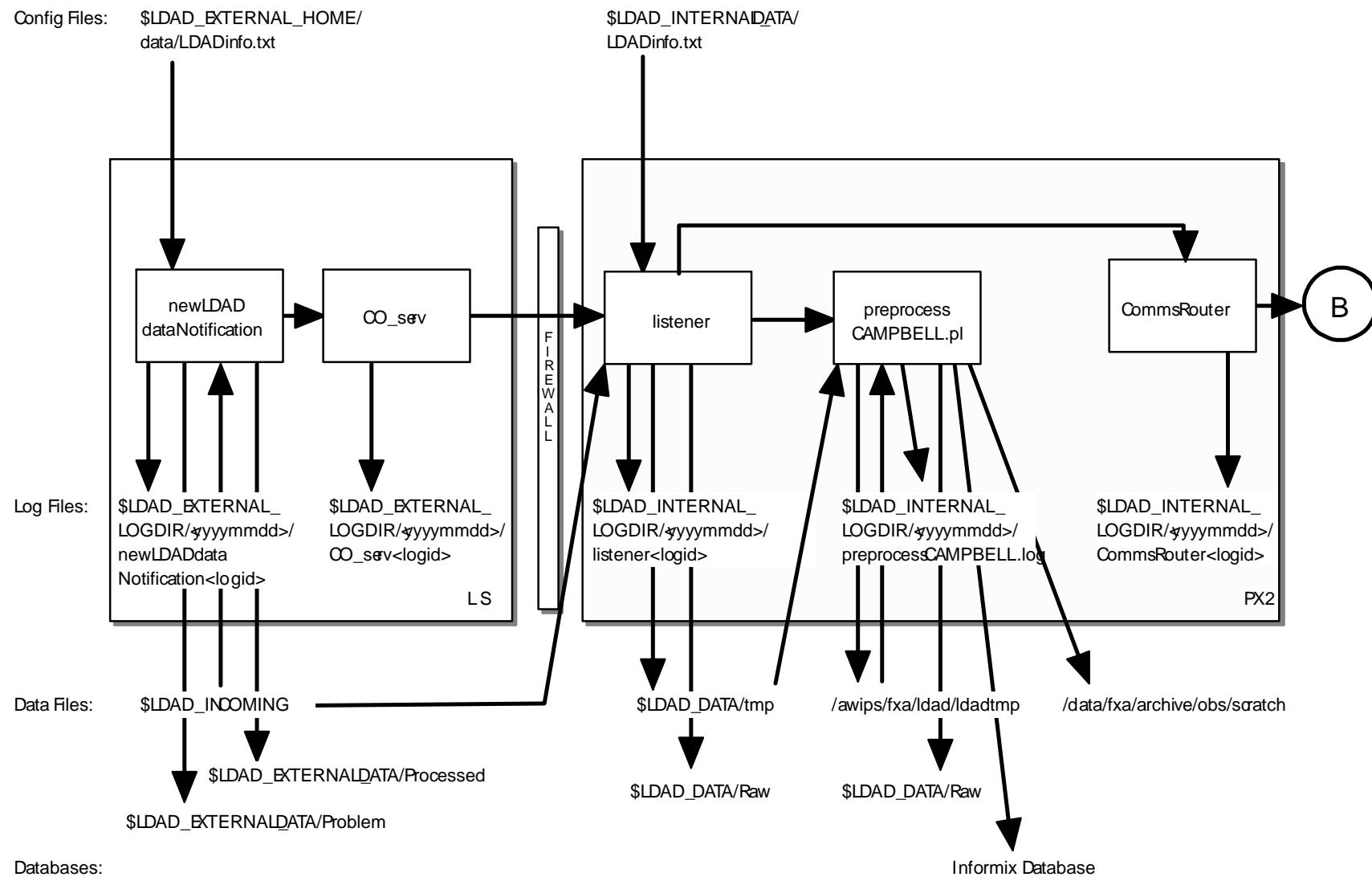


Exhibit 8.10-1. Decode Campbell Data (for LDAD) (Page 1 of 2)

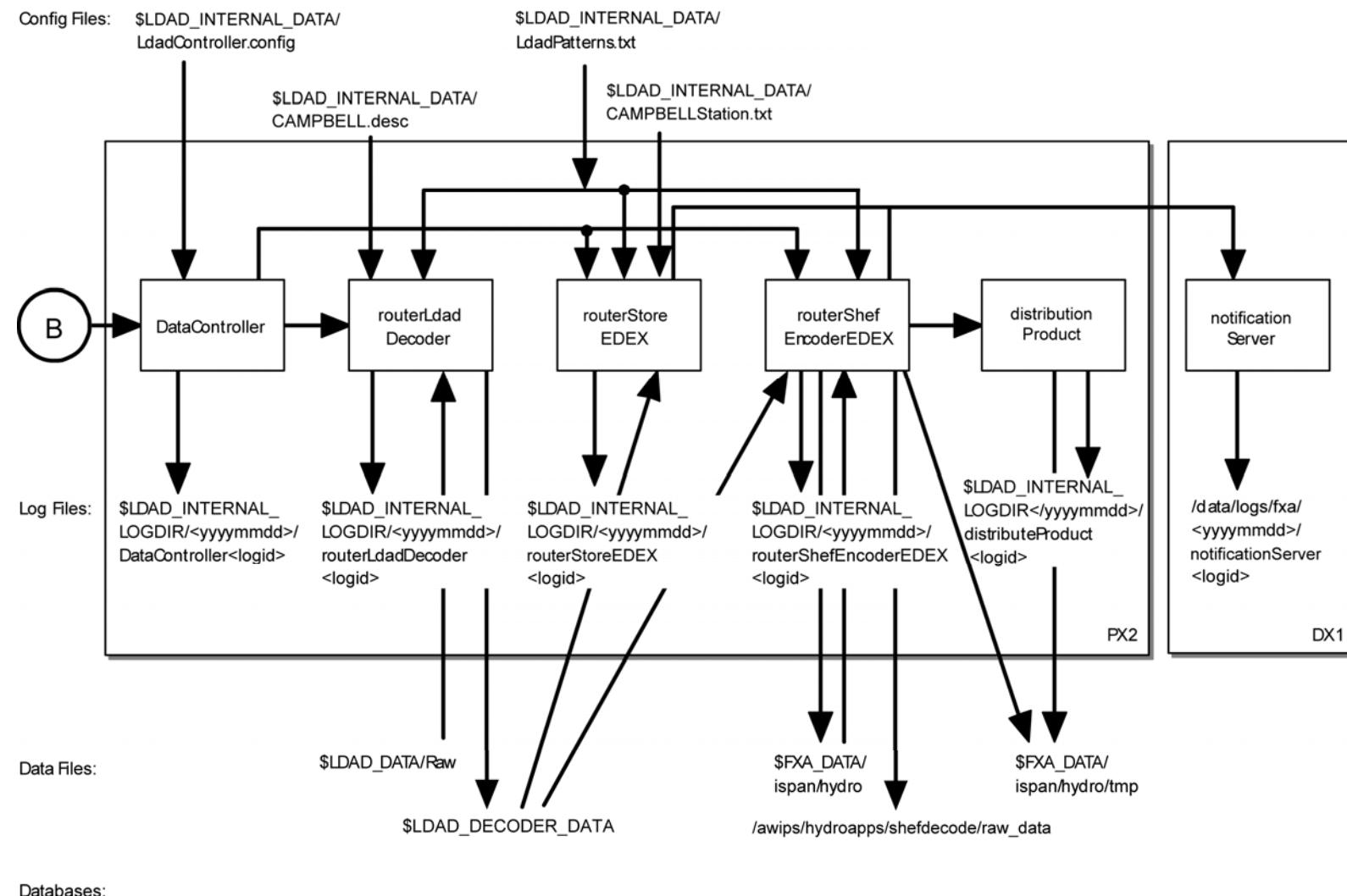


Exhibit 8.10-1. Decode Campbell Data (for LDAD) (Page 2 of 2)

SMM 02/09/11

8.10.1 newLDADdataNotification

The **newLDADdataNotification** process uses the file name and a lookup table (**LDADinfo.txt**) to determine the type of data contained in the file and checks the LDAD products directory (**/data/Incoming**) periodically for Campbell files.

The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process using **createAndSendIPCmessage**. The message notifies **CO_serv** that there are Campbell files in the **/data/Incoming** directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes, or if an **fstat** on the file to transfer fails, the product gets moved to the **/data/ldad/Problem** directory using **moveFileToProblemDir** process. Otherwise, the “processed” files get moved to the **/data/ldad/Processed** directory using the **moveFileToProcessDir** process.

► **To Access and Read the newLDADdataNotification Log**

The **newLDADdataNotification** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date
- TYPE:** `ls -ltr newLDADdataNotification*`
 - Displays the current day's **newLDADdataNotification** logs from earliest to latest
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-tbdw at Wed Apr 12 00:00:28 2006
00:00:28.906 newLDADdataNotification.c EVENT: newLDADdataNotification process started
00:00:28.911 newLDADdataNotification.c EVENT: Reading /data/Incoming/ every 20 seconds
14:36:19.861 newLDADdataNotification.c EVENT: Processing : /data/Incoming/ftp1.txt
14:36:21.053 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/ftp1.txt
14:37:39.873 newLDADdataNotification.c EVENT: Processing :
/data/Incoming/CAMPBELLAEFW3311437.dat.973003031
14:37:39.882 newLDADdataNotification.c EVENT: Processing :
/data/Incoming/CAMPBELLAEFW3311437.SHEF
14:37:41.210 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/CAMPBELLAEFW3311437.SHEF
```

The format of the log file consists of the following fields:

Time stamp	14:37:41.210
File name	newLDADdataNotification.c
Message type	EVENT:
Message string	waitForReply SUCCESS on /data/Incoming/CAMPBELLAEFW3311437.SHEF

8.10.2 CO_serv

CO_serv initially sets up a socket (TCP/IP) and waits for connections. The notification received from **newLDADdataNotification** is passed across the firewall to the **listener** process on the internal side on the PX2.

► **To Access and Read the CO_serv Log**

The **CO_serv** log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ls -ltr CO_serv*
 - Displays the current day's **CO_serv** logs from earliest to latest.
- TYPE:** tail -f <logname>
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed Apr 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06
00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

8.10.3 *listener*

The **listener** reads the **LDADinfo.txt** config file, sets up a socket, binds its local address so that the Client (**CO_serv**) can send to it, and waits for the connection from the Client process. When the notification is received, the **listener** retrieves the Campbell file from the **/data/Incoming** directory on the active LS and copies it to the **\$LDAD_DATA/tmp** directory on the PX2 inside the firewall. If the file requires no preprocessing, the **listener** moves the data file directly to the Raw directory and sends a verification when done.

The **listener** executes the **\$FXA_HOME/ldad/bin/preprocessCAMPBELL.pl** script to preprocess the Campbell data files. The **listener** receives the fully qualified data file, the hostname used by notification routine, the port number of the process requiring notification upon completion of the preprocessing, and other necessary information about the data file format from **CO_serv**. Finally, the **listener** sends notification to the **CommsRouter LDAD_ROUTER** that a product has been preprocessed.

► To Access and Read the **listener** Log

The **listener** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **listener** process. Perform the following commands as user **ldad**:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr listener*`
 - Displays the current day's **listener** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed April 12 00:00:12 2006
00:00:12.616 listener.c EVENT: listener process started
14:37:40.146 listener.c DEBUG: do_G_Msg: rcp
ls1:/data/Incoming/CAMPBELLAEFW3311437.dat.973003031
/data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.dat.973003031.973003060
14:37:41.059 listener.c EVENT: do_G_Msg: rcp completed for
CAMPBELLAEFW3311437.dat.973003031.973003060
14:37:41.146 listener.c DEBUG: do_G_Msg: pInfo->preprocessorScript=
<preprocessCAMPBELL.pl>
14:37:41.146 listener.c DEBUG: makePreprocessorCommandLine: rcp_cmd_buf=
</awips/dad/bin/preprocessCAMPBELL.pl
/data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.dat.973003031.973003060 px 15009>
14:37:41.147 listener.c EVENT: do_G_Msg: Preprocessor Command Line=
</awips/ldad/bin/preprocessCAMPBELL.pl
/data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.dat.973003031.973003060 px 15009>
```

The format of the log file consists of the following fields:

```
Time stamp      14:37:40:146
File name       listener.c
Message type    DEBUG:
Message string   do_G_Msg: rcp
ls1:/data/Incoming/CAMPBELLAEFW3311437.dat.973003031
                /data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.dat.97300
                3031.973003060
```

8.10.4 preprocessCAMPBELL.pl

The **preprocessCAMPBELL.pl** script copies the files from the **\$LDAD_DATA/tmp** directory to the **/awips/fxa/ldad/ldadtmp** directory. There, it reformats the Campbell data files, appends the **abstime** string to the file names, and stores the preprocessed file (**.dat**) in the **\$LDAD_DATA/Raw** directory and the SHEF file into the Postgres text database, archives it, and sends it to the OH database.

► To Access and Read the preprocessCAMPBELL Log

The **preprocessCAMPBELL** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **preprocessCAMPBELL.pl** process. Perform the following commands as user ldad:

TYPE: cd \$LOG_DIR/<yyyyymmdd>
 ■ Where <yyyyymmdd> is today's date.

TYPE: ls -ltr preprocessCAMPBELL*

- Displays the current day's preprocessCAMPBELL logs from earliest to latest.

TYPE: tail -f <logname>
▪ Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
<><><><><><><><><><><><><><><><><><><>
ARGV[0]: /data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.SHEF.973003060
ARGV[1]: px
ARGV[2]: 15009
getPE():
getAwipsId():
getAfosPil():
    afos ID =
storeInTextDB():
    storeCommand =
textdb -w < /data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.SHEF.973003060
        Failed to store product to text database.
getSiteCommissionStatus():
commission status = 1
Site is commissioned. No need to send observation to AFOS
archiveObs():
moveFile(): move /data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.SHEF.973003060 to
/data/fxa/archive/obs/scratch/CAMPBELLAEFW3311437.SHEF.973003060.20060412143742
moveFile(): /data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.SHEF.973003060 moved successfully.
        Archival was successful...
Script Done ...
~
```

The format of the log file consists of the following fields:

```
File name          moveFile():
Message string /data/fxa/LDAD/tmp/CAMPBELLAEFW3311437.SHEF.973003060 moved successfully
```

8.10.5 LDAD_ROUTER

The **LDAD_ROUTER** (registered **LDAD CommsRouter**) is responsible for transporting data notifications from the data acquisition processes to the **DataController** processes. The main function of the **LDAD_ROUTER** is message passing; it does no data processing. The router provides a known location where the data acquisition processes can send data messages.

► **To Access and Read the CommsRouter Log**

The **LDAD_ROUTER CommsRouter** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user **ldad**:

TYPE: cd \$LOG_DIR/<yyyymmdd>
 ▪ Where <yyyymmdd> is today's date.

TYPE: ps -wef |grep ldad
 ▪ Displays the **ldad** processes. Notice the PID of the **CommsRouter** process that is owned by user **ldad**.

TYPE: ls -ltr Comms*
 ▪ Displays the latest logs.

NOTE: The **CommsRouter** log containing the PID of the **LDAD_ROUTER** process is the **LDAD_ROUTER CommsRouter** log.

- TYPE:**
- tail -f <logname>
 - Displays the log as it updates.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host ppx2-tbdw at Wed Apr 12 00:00:09 2006
00:00:09.558 CommsReceiver.C EVENT: NCF_ENTRY CRMMsg Pattern:
^[[0-9.]*[^m]([^\s]([^\a]([^\s]([^\_]([^q]([^\c])))))))

.*\..decoded$|(.*\.[0-9]+)|(^[0-9]*\..msas_qc\..*)$|.*/Text/.*\.\.[0-9]+
14:37:42.639 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
CAMPBELLAEFW3311437.dat.973003031.973003060 1 45
14:37:42.657 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
CAMPBELLAEFW3311437.SHEF.973003060 1 36
14:37:44.912 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:
973003060.CAMPBELLAEFW3311437.decoded 1 62
```

The log consists of the following fields:

Time stamp	14:37:44.912
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY DSMMsg: 973003060.CAMPBELLAEFW3311437.decoded 1 62

The **LDAD_ROUTER CommsRouter** is started automatically at system reboot time or it can be started manually. The **CommsRouter** runs continuously, exiting only when killed by the restart program.

8.10.6 DataController

The **DataController** is responsible for creating the decoder and storage processes (as child processes), restarting them if they exit, routing appropriate messages to them, and queuing incoming data messages until the decoder and storage processes are ready. As data messages are stored in the queue, the size of the processes grows.

The **DataController**'s main program creates a **DataRouting** manager object when it first starts up and invokes a member function to start the **routerLdadDecoder**, **routerStoreNetcdf**, and **routerShefEncoder** processes by reading and executing the **LdadController.config** file. The file resides on the **\$LDAD_INTERNAL_DATA** directory and contains the names of the above processes to start/restart, a restart flag, and end of file (**eof**) designators to alert the Data Routing Manager that there are no more processes listed in the file.

The **LDAD_ROUTER** sends product-received notifications to the **DataController**. When the processes first start up, they send messages containing their IPC addresses and

process numbers to the **DataController**. The processes send the **DataController** a data request message and a ready-to-receive data message. In response, the **DataController** stores the processes' ID information and data requests, and sends a message to the requesting processes (if a message is available). The **DataController** waits to receive another ready message from the processes before sending any more data messages. The **DataController** queues any messages it receives from the **LDAD_ROUTER** until the processes send another ready message.

► To Access and Read the DataController Log

The **DataController** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr DataController*`
 - Displays the latest log for the **DataController** **LDAD_ROUTER** process.
- TYPE:** `tail -f <logname>`
 - Displays the current log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 00:00:09 2006
00:00:09.558 CommsReceiver.C EVENT: NCF_ENTRY CRMMsg Pattern:
^[[0-9.]*[^m]([^\s][^\a]([^\s][^\_](^q)(^c))))))
.*\decoded$|(.*\.[0-9]+)|(^[0-9]*\msas_qc\..*)$|.*/Text/.*\.[0-9]+
14:37:42.639 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
CAMPBELLAEFW3311437.dat.973003031.973003060 1 45
14:37:42.657 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
CAMPBELLAEFW3311437.SHEF.973003060 1 36
14:37:44.912 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
973003060.CAMPBELLAEFW3311437.decoded 1 62
```

The log file consists of the following fields:

Time stamp	14:37:44.912
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY CDMsg: 973003060.CAMPBELLAEFW3311437.decoded 1 62

8.10.7 routerLdadDecoder

The **routerLdadDecoder** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerLdadDecoder** process sends a data request to

the **DataController** for the CAMPBELL products it wishes to receive by specifying product header patterns of interest. On receipt of a notification from the **DataController** that a product of interest has arrived, the **routerLdadDecoder** reads the directory containing the raw files, **\$LDAD_DATA/Raw**.

The **routerLdadDecoder** process reads each file and stores them via serialized data files to the **\$LDAD_DECODED_DATA** directory. The serialized file name is sent back through the **LDAD_ROUTER** to notify registered LDAD storage processes of the arrival of each LDAD decoded product.

► **To Access and Read the routerLdadDecoder Log**

The **routerLdadDecoder** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
■ Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr routerLdadDecoder*`
■ Displays the latest log for the **routerLdadDecoder** process.
- TYPE:** `tail -f <logname>`
■ Displays the current log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 00:00:33 2006  
14:33:04.580 DataCaptReceiver.C USE: ProdLen 50  
14:33:04.601 DataCaptReceiver.C USE: ProdLen 58  
14:33:06.556 DataCaptReceiver.C USE: ProdLen 31  
14:36:22.029 DataCaptReceiver.C USE: ProdLen 18  
14:37:42.662 DataCaptReceiver.C USE: ProdLen 45  
14:37:42.692 LdadRoutines.C EVENT: Processing [1/1] =  
CAMPBELLAEFW3311437.dat.973003031.973003060  
14:37:44.912 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(),  
'$LDAD_DECODED_DATA/ 973003060.CAMPBELLAEFW3311437.decoded', sent to LDAD_ROUTER
```

The log file consists of the following fields:

```
Time stamp          14:37:44.912
File name          LdadRoutines.C
Message type       EVENT:
Message string    LdadRoutines::pingLdadRouter( ),
                   '$LDAD_DECODED_DATA/
                   973003060.CAMPBELLAEFW3311437.decoded', sent to
                   LDAD_ROUTER
```

8.10.8 routerStoreEDEX

The **routerStoreEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerStoreEDEX** process sends a data request to the **DataController** for serialized decoded Campbell files in netCDF format. When notified by the **DataController** that a product of interest has arrived, **routerStoreNetcdf** reads the directory containing the files, **\$LDAD_DECODED_DATA**. The **routerStoreEDEX** process stores the files in the /data_store/lad directory in the XML format and sends a notification to the **EDEX**.

► **To Access and Read the routerStoreEDEX Log**

The **routerStoreEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- Type:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- Type:** ls -ltr routerStoreEDEX*
 - Displays the latest logs for the **routerStoreEDEX** process.
- Type:** tail -f <logname>
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbw3 at Mon Jul 12
14:30:32 2010
14:30:32.542 routerStoreEDEX.C EVENT:
/awips/fxa/bin/routerStoreEDEX process started
14:30:32.556 routerStoreEDEX.C EVENT: routerStoreNetcdf.C; main(),
pattern <^[_-9.]*[^m][[^s][[^a][[^s][[^_][[^q][[^c]]]]]]].*\.\.decoded$>
14:30:42.560 EdexInfo.C EVENT: Reading /awips/fxa/data/edex-
info.txt
14:30:42.561 EdexInfo.C EVENT: Reading /awips/fxa/data/edex-
info.txt
14:30:42.561 routerStoreEDEX.C EVENT: routerStoreNetcdf.C,
eventLoop()pattern <^[_-9.]*[^m][[^s][[^a][[^s][[^_][[^q][[^c]]]]]]].*\.\.decoded$>
```

8.10.9 routerShefEncoderEDEX

The **routerShefEncoderEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerShefEncoderEDEX** process sends a data request to the **DataController** for serialized decoded files. On receipt of a notification from the **DataController** that a product of interest has arrived, the **routerShefEncoderEDEX** reads the directory containing the files, **\$LDAD_DECODED_DATA**. The files there are SHEF-encoded and moved to the **/data_store/ldad** directory. The **routerShefEncoderEDEX** process sends a notification to the **EDEX**. Once the SHEF-encoded data file is stored in the **/data_store/ldad** directory, the **routerShefEncoderEDEX** saves a copy of the file in the **/tmp** directory and calls the **distributeProduct** process to send the file to the NCF over the WAN.

► **To Access and Read the routerShefEncoderEDEX Log**

The **routerShefEncoderEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -rtal routerShefEncoderEDEX*`
 - Displays the latest logs for the **routerShefEncoderEDEX** process.
- TYPE:** `tail -f <logname>`
 - Displays the current log as it is updated with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbw3 at Mon Jul 12 14:30:32 2010
14:30:32.542 routerShefEncoderEDEX.C EVENT:
/awips/fxa/bin/routerShefEncoderEDEX process started
14:30:32.542 routerShefEncoderEDEX.C EVENT: "shef_data_dir", "shefenc_pe_table",
and "shefenc_units_table"
    must be defined in the "/awips/hydroapps/.Apps_defaults" file.
14:30:32.542 EdexInfo.C EVENT: Reading /awips/fxa/data/edex-info.txt
14:30:42.560 routerShefEncoderEDEX.C EVENT: routerShefEncoder.C, eventLoop()
pattern <.*\decoded>
15:00:42.646 routerShefEncoderEDEX.C PROBLEM: No messages in time-out interval,
(30 mins). Re-registering.
15:30:42.722 routerShefEncoderEDEX.C PROBLEM: No messages in time-out interval,
(30 mins). Re-registering.
```

8.10.10 distributeProduct

The **distributeProduct** process creates a product message and submits it for distribution across the AWIPS WAN to the addressed sites. The **distributeProduct** process first prepares the product by creating the WAN communications header and prepending the header to a temporary copy of the product. Distribution requests, enclosing the temporary copy of the product, are subsequently made through the **msg_send** utility program.

- ▶ **To Access and Read the distributeProduct Log**

The **distributeProduct** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- | | |
|--------------|--|
| TYPE: | <code>cd \$LOG_DIR/<yyyymmdd></code> |
| | ▪ Where <code><yyyymmdd></code> is today's date. |
| TYPE: | <code>ls -ltr distributeProduct*</code> |
| | ▪ Displays the latest logs for the distributeProduct process. |
| TYPE: | <code>tail -f <logname></code> |
| | ▪ View the current log as it updates with the latest messages. |

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 19:30:59 2006
19:30:59.690 MHSPproduct.C PROBLEM: Product
(/data/fxa/ispan/hydro/temp/A_format.973020657) is empty.
19:30:59.853 MHSPproduct.C EVENT: Sending attachments
(/data/fxa/ispan/hydro/temp/A_format.973020657)
only. Attachments are assumed to contain correct communications header.
19:31:02.504 MHSPproduct.C EVENT: Product request (KSTORRZLDA) was
successfully
submitted to the MHS request server for distribution.
Message Attributes:
    Request ID: TBDW-25380
    To: DEFAULTNCF
    Priority: 0
    Type: Routine
    Subject:
    Handling Action: 0
19:31:02.518 MHSPproduct.C EVENT: TBDW-25380
~
```

The log file consists of the following fields:

Time stamp	19:31:02.504
File name	MHSPproduct.C
Message type	EVENT:
Message string	Product request (KSTORRZLDA) was successfully submitted to the MHS request server for distribution.
	Message Attributes:
	Request ID: TBDW-25380

```
To: DEFAULTNCF
Priority: 0
Type: Routine
Subject:
Handling Action: 0
```

8.10.11 notificationServer

The **notificationServer** provides information to its display clients that a new version of a display product has become available. Data acquisition processes send data notification messages to the **notificationServer**, which acts as a bridge between the data acquisition and workstation display components of AWIPS.

► **To Access and Read the notificationServer Log**

The **notificationServer** log resides on the DX1 in the directory **\$LOG_DIR**. This log records messages from the **notificationServer** process. Perform the following commands as user fxa:

- | | |
|--------------|--|
| TYPE: | <code>cd \$LOG_DIR/<yyyymmdd></code> |
| | ▪ Where <code><yyyymmdd></code> is today's date. |
| TYPE: | <code>ls -ltr notificationServer*</code> |
| | ▪ Displays the current day's notificationServer logs from earliest to latest. |
| TYPE: | <code>tail -f <logname></code> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host dx1-rnk at Wed Apr 12 00:00:31 2006
00:00:31.822 NotificationServer.C DIAG: Tried to generate notifications for key: 3700
but the data notify time: 25.23 3HR does not match any times on the inventory.
00:00:35.948 GridAccessor1.C EVENT: Updating inventory info for MRF
```

```
Process ID of anonymous target: 29574
Host: lx2-rnk
Port number: 3231
NORMAL PRIORITY CONNECTION
Connection created: Apr 12 06 16:25:32 GMT. Initiated by connecting process.
Last time this connection was used: Apr 12 06 23:55:49 GMT
Sent messages since last stat: 4
Bytes per message (Avg/Min/Max): 544/540/548
No messages have been received since last stat report.
```

The format of the log file consists of the following fields:

Time stamp	00:00:31.822
File name	NotificationServer.C
Message type	DIAG:
Message string	Tried to generate notifications for key: 3700 but the data notify time: 25.23 3 hour does not match any times on the inventory.

8.11 Acquire Sutron Data

Data collection from Sutron gauges is carried out by automating a normally interactive session using the **cu** communication protocol. There is a Server program (**CO_serv**) and a Client program (**tell_co**). The Server program is always running, waiting for, and processing requests to collect data from a particular gauge from the Client program. The Client program can be invoked from a shell script, as a cron job, or directly from a command line. A feature of the Client program is that it retrieves all necessary information regarding collection and storage of data from system tables in the AWIPS database. The Client and Server programs use sockets to communicate across a TCP/IP LAN. Data from a gauge are SHEF-encoded prior to storage on AWIPS. The **.dat** file is moved into the **Raw** directory, while the SHEF file is stored into the text database, archived, and sent to the OH's database during preprocessing. The **.dat** file is forwarded to the **ldadDecoder** process to further decode the Sutron data for creation of the netCDF and SHEF-encoded files.

Processes

```

LS    callSite.ksh
LS    process_expect
LS    CO_serv
LS    sutron
PX2   listener
PX2   tell_co
PX2   ldadServer
LX    ldadScheduler
DX1   notificationServer

```

Environment Variables (as user fxa on PX1, PX2 and user ldad on the active LS)

\$LDAD_DATA	px1, px2: /data/fxa/LDAD
\$LDAD_INTERNAL_DATA	px1, px2: /awips/fxa/ldad/data
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/fxa/ldad/logs
\$LDAD_EXTERNAL_LOGDIR	px1, px2: /data/logs/ldad
\$LOG_DIR	px1, px2: /data/logs/fxa Active ls: /data/logs/ldad

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
SUTRONStation.txt	(for tell_co , ldadScheduler)
userDescriptions	(for ldadScheduler)
usrpro	(for ldadScheduler)
gageinfo	(for ldadScheduler)

gageinfoSutron.txt	(for IdadScheduler)
gaugeDescriptions	(for IdadScheduler)
SHEFcodes.cfg	(for IdadScheduler)
userSessList	(for IdadScheduler)
gaugeSessList	(for IdadScheduler)

LDAInfo.txt

The file should contain the following entry:

```
SUTRON | SUTRON | 89 | 90 | CVS_TYPE | hydro | preprocessSUTRON.pl |
```

Once the file is installed, this line should not be modified.

SUTRONStation.txt

This file must be updated whenever a gauge is added to or dropped from the current Sutron datalogger list. To add a new Sutron gauge, find out the following gauge information to create a new entry in the station table format (* indicates a mandatory field):

- **Provider ID:** Data provider station or gauge ID (*)
- **AFOS(HB5) ID:** The AFOS or Handbook 5 ID (NWS assigned)
- **Station Name:** Text name of station
- **Elevation:** Station elevation (m) (*)
- **Latitude:** Station Latitude (decimal degrees, north positive) (*)
- **Longitude:** Station Longitude (decimal degrees, east positive) (*)
- **Local Time Zone:** Reporting time zone (e.g., UTC, PST8PDT) (*). See Note.
- **Location Description:** Station location/address (Text)
- **Station Type:** Station type (e.g., tower, surface, floating platform, etc.)
- **Number of Instruments:** Number of reporting instruments for the station
- **Number of Reporting Levels:** Number of data reporting levels. Level information should be provided in the instrument table
- **Maintenance/Calibration Schedule:** Frequency of maintenance/calibration
- **Site Description:** Text description of the site surroundings

The entries are sorted alphabetically by the gauge ID.

This file must be identical on the PX2 and on LS1!

NOTE The local time zone for Sutron gauges is always GMT since the Sutron Decoder already converts the observation times into GMT times.

userDescriptions

This file is used by the **IdadScheduler** process to get the descriptions of users. When read in, blank lines and lines beginning with # are skipped. All other lines should have the following format:

```
<user ID> | <user description>
```

A blank user description is denoted by having the line end immediately following the | character (a vertical bar or “pipe”).

This file should not be modified manually. It should only be written to by the **IdadScheduler** (specifically, the **LdadSchedulerServer.C** routine).

usrpro

The user file (**usrpro**) is made up of zero to n lines, each line holding the following information (note that the lines are so long that they are wrapped in the interests of readability). Columns containing “??” are not used at this time.

```
<ID> | <protocol> | <IP address> | <phone number> | <login> | <password (encrypted)> | ?? | <file to receive> | <file to send> | ?? | ?? | <data collection session file> | <data dissemination session file> | <local directory> | <remote directory> | ??... (columns 16 through 36 have unknown meanings) ... | <IP address> |
```

- The <protocol> is either “F” for FTP, “X” for Xmodem, “Y” for Ymodem, “Z” for Zmodem, or “K” for Kermit.
- The <IP address> designates the host to FTP to, if the protocol is “F,” or the terminal server otherwise. <IP address> appears in two places in the above column listing: columns 3 and 37. In reality, only one of the two columns is used. For the FTP protocol, only column 3 has the address in it, and column 37 is left blank. If any other protocol is being used, column 37 has the address in it, and column 3 is left blank.
- The <phone number> field is unused if the protocol is “F.”
- The <file to receive> and <file to send> fields are mutually exclusive. Only one may be specified. The <file to receive> field indicates that the user is a collection user, and the <file to send> indicates that he user is a dissemination user. All other columns are tracked when read in; when written out, the same values are placed in them as were originally found.

gageinfo

The **gageinfo** file contains a list of Handbook 5 and Sutron gauges. It is updated periodically as Sutron gauges are added and removed with the **IdadScheduler**. Whenever a gauge is added or dropped from the current list, it should be updated here and in the following files :

```
$LDAD_DATA/data/gageinfoSutron.txt  
$LDAD_DATA/data/gaugeDescriptions
```

The following fields must be present for each gauge (see Note):

- **Gauge ID:** A five-character instrument ID.
- **Protocol Type:** C for data collection, D for dissemination.
- **Phone#:** The dial-out phone number can be in any format. However, if the gauge has the voice message first, several pauses are included in the phone number. Depending on the length of the voice message, add more pauses if the one listed here is not enough. The pause is entered by comma (,) and is ended with a *9. If a phone number contains a pause extension, make sure the phone number is enclosed by single quotes('). For example, ‘1-605.886.2473,,,,*9’.
- Session File: Use SUTRON_coll_sess exactly.
- **SHEF File:** 1 = Yes; 0 = No.
- Storage Type: S.
- **Baud Rate:** Use **9600** for Sutron gauges.
- Terminal Server (tty): Use 8n1out for Sutron gauges.

The fields are separated by vertical bars (|); empty fields are for future use. A number nine (9) in front the phone number allows the user to dial out. An example follows:

```
ADAM4|C| |916166763810| | | |SUTRON_coll_sess|1|S|||9600|e| |8n1out|
```

NOTE: The **recvprog** field indicates the receiving program (e.g., FTP) for data collection. This field is used as the custom gauge ID if the gauge is not owned by the NWS.

gageinfoSutron.txt

The file should be updated along with the **gageinfo** file when adding/dropping Sutron gauge(s). There are at least four fields for each Sutron gauge to be entered when adding a gauge; the fields are as follows:

- **Gauge ID:** A five-character instrument ID (i.e., ADAM4).
- **Local Time Zone:** Time zone where the Sutron gauges are located (e.g., PST, CDT, GMT, etc.)
- **Data Array ID for Storage Area 1:** Four digit array ID.
- **Observation Field Skip Bit Map for Array ID Number One:** This is an eight-bit field used to mark the observation fields to be ignored.
- **Bit Map for Observation data Fields in PE Codes for Storage Area 1 in Hexadecimal Format:** This is a 32-bit code (see Note). The leftmost byte is designed to ignore collected data fields and the other three are used to map the type of data collected relevant to the PE codes listed in the **SHEFcodes.cfg** file.

- **Data Array ID for Storage Area 1:** Four digits array ID for gauge collection data and storing in Storage Area 2.
- **Bit Map for Collecting Data Fields in PE Codes for Storage Area 2:** Same format as Storage Area 1 if the gauge collects data and stores it in Storage Area 2.

NOTE: Current design can accommodate a maximum of eight data fields only for a Sutron gauge and a maximum of 32 PE codes collected by all Sutron gauges. If an individual gauge collects more than eight different data fields or if the total number of the PE codes collected by the Sutron gauges exceeds 32, these fields will have to be expanded to incorporate the changes.

gaugeDescriptions

The file is used to get the site descriptions and should be updated using the **IdadScheduler** when a new Sutron gauge is added. Each entry (line) should have the following format:

<gauge ID> | <site description>

For example, an entry for the ARTN6 would be as follows:

ARTN6 | Watertown, NY

The file is sorted by state abbreviations. However, it is displayed based on the alphabetical order of the gauge IDs.

SHEFcodes.cfg

The file is designed specifically for Sutron gauges to enable creation of SHEF-encoded files (**.shef**). It contains the PE codes currently collected by Sutron CR10X and 8210/8200A gauges. The elements in the file are presented in alphabetical order and should be updated every time a new PE code is added to the file. When this file is modified, the LDAD system has to be shut down and restarted again.

The codes are used in constructing the 4-byte PE code bit map in the **gageinfoSutron.txt** file. It is also used as the base for creating and updating the **\$LDAD_DATA/data/SUTRON.desc** file.

Refer to Exhibit 8.11-1 for the Acquire Sutron Data data flow diagram.

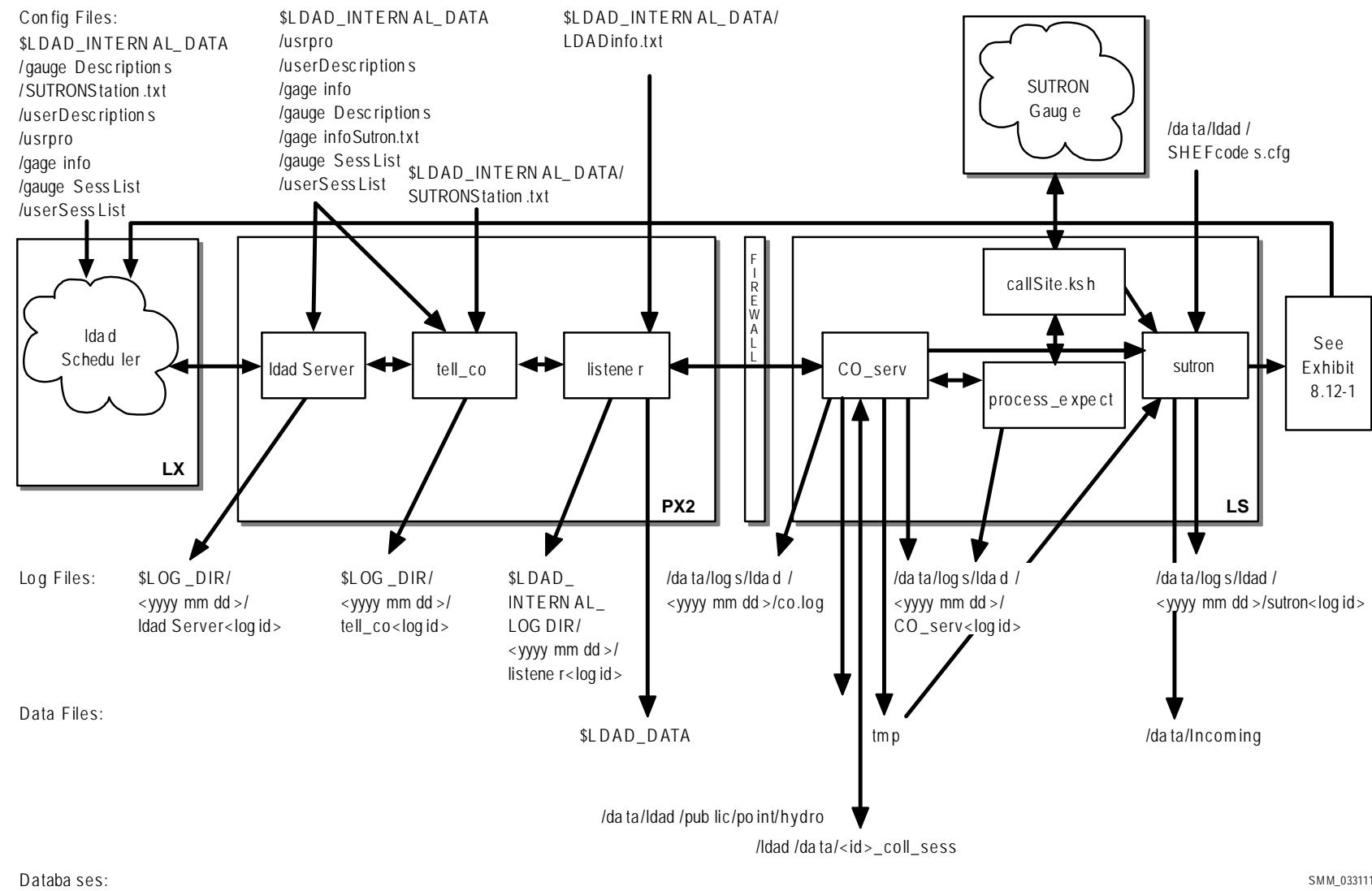


Exhibit 8.11-1. Acquire Sutron Data (for LDAD)

8.11.1 User Interface: *IdadScheduler*

The **IdadScheduler**'s function is to perform certain data acquisition/dissemination events on an automatic basis at specified time intervals (in the background). Access to the Scheduler's functions is via a GUI invoked by selecting **Collection/Dissemination...** from the **Surface** pull-down menu.

The **IdadScheduler** provides a window with which the forecaster may create, view, and manipulate scheduled LDAD requests. The Sutron data collection can be scheduled for daily, multiple, or one time request. The Scheduler allows the forecaster to create a new request and add it to the request list. The request is submitted to the **IdadServer**, which uses **sendLDADnotification.pl** to create the request. If it is a one-time request, the forecaster can monitor its progress using a status dialog. If any errors are encountered during the data logging, an error message is formulated and sent to the forecaster workstation for display. In addition, Sutron gauge dialing status information is sent by the **listener** and displayed by the **IdadScheduler**.

The **IdadScheduler** registers with the **IdadServer** providing a callback routine for update notifications. The session file contents are registered first, and the status messages and ID updates so that when registering with **IdadServer**, the ID lists sent by **IdadServer** will be captured and kept.

It also registers with the FAC for notifications of changes to the existing requests file, and creates a FAC lock for the file to be used for locking it for “reads” and “writes.” The existing requests get read so as to fill the tree view with the requests that have been created.

8.11.2 *IdadServer*

The **IdadServer** allows multiple clients to connect to it and submit requests with intervals and durations that are honored according to their intervals until they expire.

New client initialization is performed by sending the gauge and user lists to the newly registered client. The **Idadserver** process creates a new message with the current active list that is broadcast all registered clients.

To honor the specified request, the **IdadServer** creates the command to be executed and sends the data collection request to the **tell_co** process.

The **IdadServer** receives LDAD messages from clients; messages to create and delete gauges and users; and messages requesting the contents of a session file, or specifying a session file's contents.

► **To Access and Read the **ldadServer** Log**

The **ldadServer** log resides on the PX2 in the **\$LOG_DIR** directory and records messages from the **ldadServer** process. Perform the following commands as user fxa:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr ldadServer*`
 - Displays the current day's **ldadServer** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log update.

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 20:11:03 2006 16:11:37.334
LdadSchedulerServer.C PROBLEM: The gauge "ADAM4" specified in gageinfoSutron.txt was
not found in gageinfo.txt. This gauge will not be used.
16:11:37.345 LdadSchedulerServer.C PROBLEM: The gauge "ADAM4" specified in
gageinfoSutron.txt was not found in gageinfo.txt. This gauge will not be used.
20:11:03.470 Connection.C EVENT: WARNING: this process wants to use target
LDAD_SCHEDULE_SERVER which is assigned to run on px2-tbdw but the current host is
px2-tbdw
20:11:03.492 LdadSchedulerServer.C PROBLEM: The gauge "ADAM4" specified in
gageinfoSutron.txt was not found in gageinfo.txt. This gauge will not be used.
20:12:12.926 SignalClient.C EVENT: Signal 15 (Terminate) received for clean shutdown
```

The format of the log consists of the following fields:

Time stamp	16:11:37.345
File name	LdadSchedulerServer.C
Message type	PROBLEM:
Message string	The gauge "ADAM4" specified in gageinfoSutron.txt was not found in gageinfo.txt. This gauge will not be used.

8.11.3 tell_co

The **ldadServer** process invokes the Client program **tell_co**, the main controller process providing the Sutron ID. The **tell_co** function retrieves all information regarding a specified gauge from the LDAD configuration files. This includes all communication details, the name of the session file to use, as well as the location to store the data on AWIPS and whether SHEF encoding is required. It formats an interprocess message containing the aforementioned information, opens a socket to the **listener** and sends a get Sutron Message “IPC” message to the listener.

► **To Access and Read the tell_co Log**

The **tell_co** log resides on the PX2 in the **\$LOG_DIR** directory and records messages from the **tell_co** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr tell_co*`
 - Displays the current day's **tell_co** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed Apr 12 19:45:55 2006
19:45:55.368 doAlivenessTest.c EVENT: waitForReply INTERNAL SUCCESS!!!!...
19:45:56.253 doAlivenessTest.c EVENT: waitForReply EXTERNAL SUCCESS!!!!...
19:45:57.205 tell_co.c EVENT: TELL_CO waitForReply SUCCESS!!!!...
```

The format of the log consists of the following fields:

Time stamp	19:45:57.205
File name	tell_co.c
Message type	EVENT:
Message string	TELL_CO waitForReply SUCCESS!!!!...

8.11.4 listener

The **listener** sets up a socket connection, binds to a local address so that the Client (**CO_serv**) or **tell_co** can send to it, and waits for the connection. Upon receipt of data collection request from **tell_co**, the **listener** forwards information received to the **CO_serv** process. If any errors were encountered during the data logging, an error message is formulated and passed to the Scheduler for display. In addition, Sutron gauge dialing status information is sent by the **listener** and displayed by the Scheduler.

► **To Access and Read the listener Log**

The **listener** log resides on PX2 in the **\$LOG_DIR** directory and records messages from the **listener** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr listener*`

- Displays the current day's **listener** logs from earliest to latest.

TYPE: tail -f <logname>

- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
18:24:10.419 listener.c EVENT: child listener: rcp completed for SUTRON_coll_sess
18:24:10.422 listener.c EVENT: rcp_cmd_buf=
/awips/ldad/bin/sendLDADnotification.pl V NOTHING px2 1874
18:24:10.596 listener.c PROBLEM: child listener: failed to sendLDADNotification for
SUTRON_coll_sess
```

The format of the log consists of the following fields:

Time stamp	18:24:10:419
File name	listener.c
Message type	EVENT:
Message string	child listener: rcp completed for SUTRON_coll_sess

8.11.5 CO_serv

The Server program (**CO_serv**) opens up a socket and continually listens for connections from the Client program. When one arrives, a child process is spawned that reads the interprocess message, extracts the name of the “session” file (session file located in **/ldad/data/<id_coll_sess>**) for the gauge in question (Sutron), and parses this session file to create two temporary files: a response file and a script file. **CO_serv** first calculates the starting point of the data to be retrieved and how many data intervals to retrieve from the working configuration file. Using the **process_expect** executable, **CO_serv** retrieves the data from the Sutron gauge and stores it in a temporary file. The data are sent to the **sutron** decoder for decoding. If any errors were encountered during the data logging, the error messages are formulated and sent to the user’s workstation for display.

► To Access and Read the CO_serv Log

The **CO_serv** log resides on active LS in the directory **\$LOG_DIR** and records messages from the **CO_serv** process. Perform the following commands as user ldad:

TYPE: cd \$LOG_DIR/<yyyymmdd>

- Where <yyyymmdd> is today's date.

TYPE: ls -ltr CO_serv*

- Displays the current day's **CO_serv** log from earliest to latest.

- TYPE:** tail -f <logname>
- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed Apr 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:13:48.283
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv received a socket connection at: Apr12 06 00:13:48 GMT

► To Access and Read the co.log Log

The **co.log** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **CO_serv** process executing the **sendLDADnotification.pl** script. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
- Where <yyyymmdd> is today's date.
- TYPE:** ls -ltr co.log*
- Displays the current day's **co.log** logs from earliest to latest.
- TYPE:** tail -f <logname>
- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
/awips/ldad/bin/sendLDADnotification.pl:94, socket ok
/awips/ldad/bin/sendLDADnotification.pl:104, bind ok
/awips/ldad/bin/sendLDADnotification.pl:117, connect ok
/awips/ldad/bin/sendLDADnotification.pl:27, Begin sendLDADnotification.pl
/awips/ldad/bin/sendLDADnotification.pl:38, S, SUTRON_coll_sess 4986 px, px, 15008
/awips/ldad/bin/sendLDADnotification.pl:60, opType = S, msgString = SUTRON_coll_sess 4986 px,
host= px, port = 15008
```

8.11.6 process_expect

The **process_expect** executable processes the request for a data transfer. It parses the receive or send session file and invokes **do_expect** to carry out the transfer by using the script file created by **parse_session_file** function as input. It stores the data in the appropriate place and deletes any temporary files used during this session.

- ▶ **To Access and Read the CO_serv Log**

process_expect writes its messages into the **CO_serv** log. The log resides on the LS in the directory **\$LOG_DIR**. Perform the following commands as user ldad:

- | | |
|--------------|---|
| TYPE: | <code>cd \$LOG_DIR/<yyyymmdd></code> |
| | ▪ Where <code><yyyymmdd></code> is today's date. |
| TYPE: | <code>ls -ltr CO_serv*</code> |
| | ▪ Displays the current day's logs from earliest to latest. |
| TYPE: | <code>tail -f <logname></code> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of this log looks like the following:

```
process_expect.c EVENT: portLockFile==> /ldad/bin/8elout
20:24:55.303 process_expect.c EVENT: Successfully read data from ADAM4
20:33:33.492 process_expect.c PROBLEM: process_expect: expect session timed out
process_expect.c EVENT: portLockFile==> /ldad/bin/8nlout
```

The format of the log file consists of the following fields:

Time stamp	20:24:55.303
File name	process_expect.c
Message type	EVENT:
Message string	Successfully read data from ADAM4

8.11.7 callSite.ksh

The **callSite.ksh** script interrogates the datalogger and passes the raw data received from the gauge to the **sutron** decoder for the creation of the CSV and SHEF files.

8.11.8 sutron decoder

The **sutron** decoder decodes the data and creates a CVS (**.dat**) format file and a SHEF format file using the **SHEFcodes.cfg** configuration file. The files are put in the **/data/Incoming** directory. The number of data intervals collected and the time stamp for the last data interval is written back into the working configuration file to be used by the next data retrieval.

► **To Access and Read the sutron Log**

The **sutron** log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **sutron** decoder process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr sutron*`
 - Displays the current day's logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-tbdw at Wed Apr 12 20:24:54 2006
20:24:54.815 Sutron.c EVENT: Start decoding Sutron data for ADAM4
20:24:54.95 Sutron.c EVENT: Successfully decoded Sutron data for ADAM4
~
```

The format of the log file consists of the following fields:

Time stamp	20:24:54.951
File name	Sutron.c
Message type	EVENT:
Message string	Successfully decoded Sutron data for ADAM4.

8.12 Decode Sutron Data

The **newLDADdataNotification** script checks the LDAD products directory for Sutron files. When a file is available, **newLDADdataNotification** passes the information to the **CO_serv**, which informs the **listener**. The **listener** moves the file to a **tmp** directory, executes the **preprocessSUTRON.pl** script, and moves the preprocessed file to the **Raw** directory or stores it into the text database, archives, and sends it to the OH's database (SHEF). The **listener** process calls **routerLdadDecoder** to further decode the Sutron file for the creation of the netCDF and SHEF-encoded files. The decoded file is stored and a notification is sent to the forecaster stating that new data are available. The SHEF-encoded file is forwarded to the NCF for distribution.

Processes

LS	newLDADdataNotification
LS	CO_serv
PX2	listener
PX2	preprocessSUTRON.pl
PX2	CommsRouter LDAD_ROUTER
PX2	DataController LDAD_ROUTER LdadController.config

```

PX2    routerLdadDecoder
PX2    routerStoreTextEDEX
PX2    routerStoreEDEX
PX2    routerShefEncoderEDEX
PX2    distributeProduct
DX1    notificationServer
  
```

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
LdadController.config	(for DataController LDAD_ROUTER)
LdadPatterns.txt	(for routerLdadDecoder, routerStoreEDEX, routerShefEncoderEDEX)
SUTRON.desc	(for routerLdadDecoder)
SUTRONStation.txt	(for routerStoreEDEX)

SUTRON.desc

The **\$LDAD_DATA/data/SUTRON.desc** file needs no change unless the Sutron datalogger has been modified to collect data with PE codes that are not in the current file. The file is directly coupled with the **SHEFcodes.cfg** file. The sequence of data group entries should be matched with the sequence of PE codes in **SHEFcodes.cfg** file.

Environment Variables

\$LDAD_DATA	px1, px2: /data/fxa/LDAD
\$LDAD_DECODED_DATA	px1, px2: /data/fxa/LDAD/decoded
\$LDAD_INTERNAL_DATA	px1, px2: /awips/fxa/ldad/data
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/fxa/ldad/logs
\$LDAD_EXTERNAL_LOGDIR	px1, px2: /data/logs/ldad
\$LDAD_EXTERNAL_HOME	ls1, px1, px2: /ldad
\$FXA_DATA	px1, px2: /data/fxa
\$LDAD_EXTERNAL_DATA	px1, px2: /data/ldad

Refer to Exhibit 8.12-1 for the Decode Sutron Data data flow diagram.

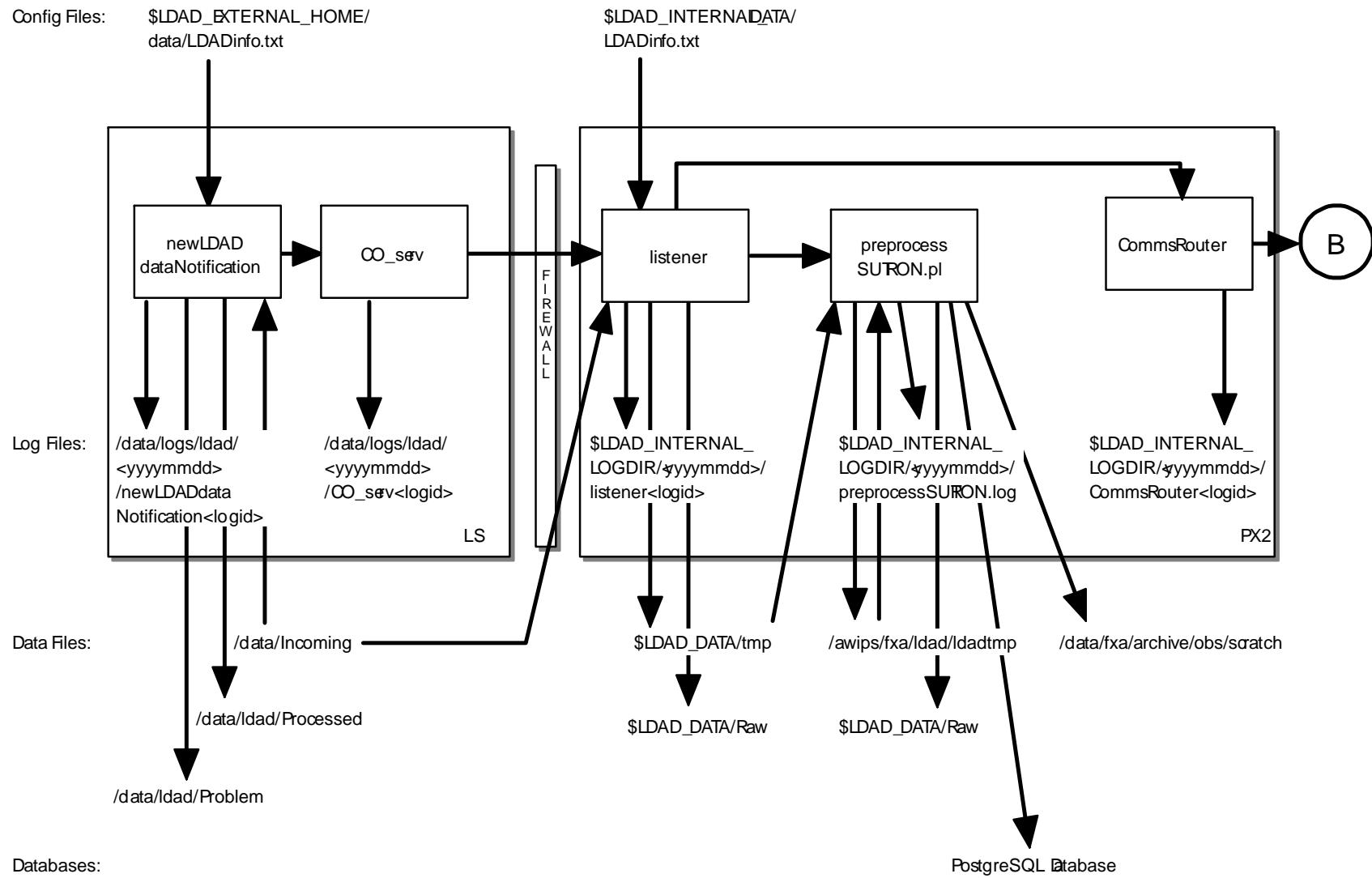


Exhibit 8.12-1. Decode Sutron Data (for LDAD) (Page 1 of 2)

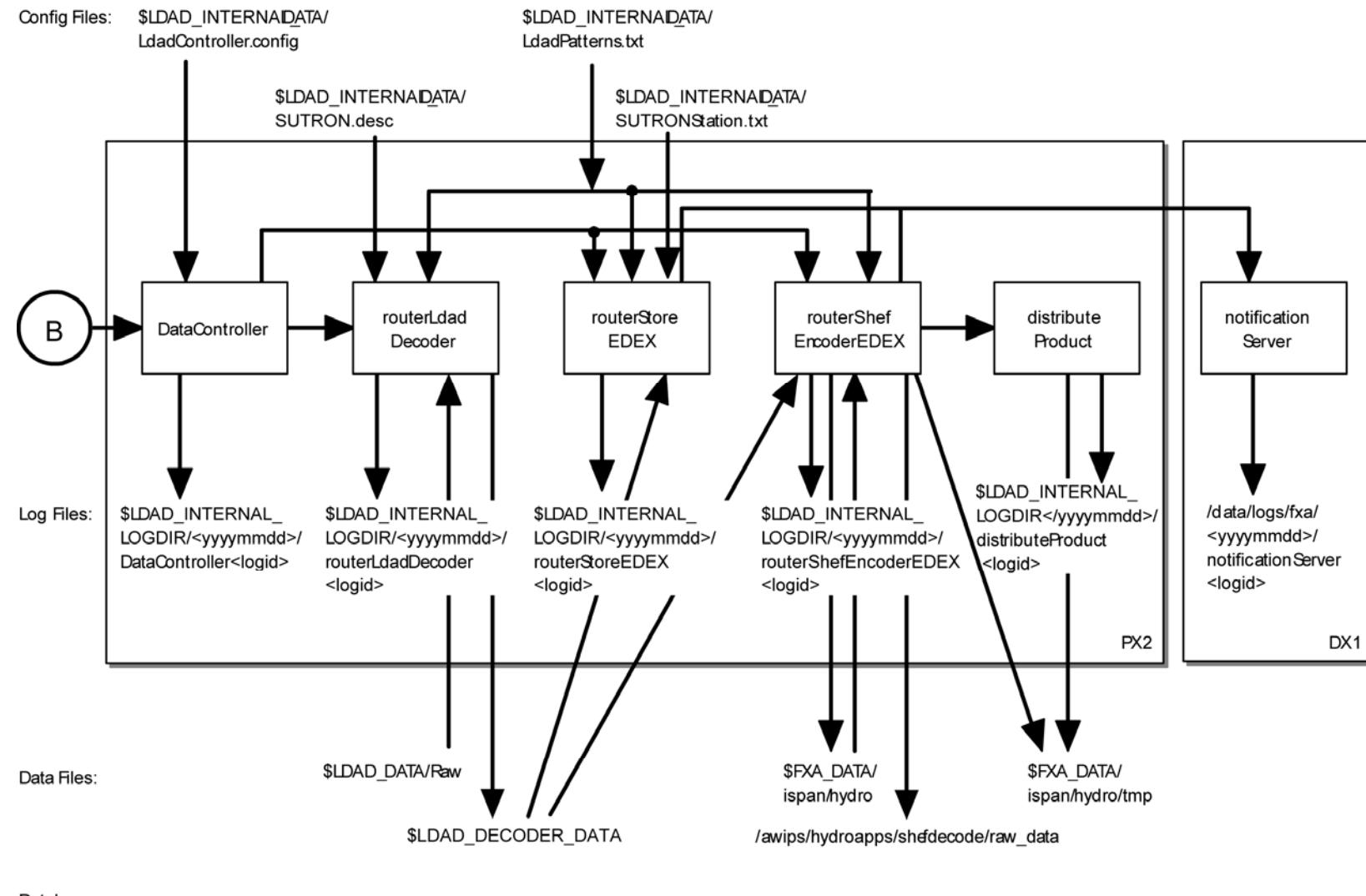


Exhibit 8.12-1. Decode Sutron Data (for LDAD) (Page 2 of 2)

SMM 07/13/10

8.12.1 newLDADdataNotification

The **newLDADdataNotification** process uses the file name and a lookup table (**LDADinfo.txt**) to determine the type of data contained in the file and checks the LDAD products directory (**/data/Incoming**) periodically for Sutron files.

The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process using **createAndSendIPCmessage**. The message notifies **CO_serv** that there are Sutron files in the **/data/Incoming** directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes, or if an **fstat** on the file to transfer fails, the product gets moved to the **/data/ldad/Problem** directory using **moveFileToProblemDir** process. Otherwise, the “processed” files get moved to the **/data/ldad/Processed** directory using the **moveFileToProcessedDir** process.

► **To Access and Read the newLDADdataNotification Log**

The **newLDADdataNotification** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user ldad:

- | | |
|--------------|---|
| TYPE: | <code>cd \$LOG_DIR/<yyyymmdd></code> |
| | ▪ Where <yyyymmdd> is today's date. |
| TYPE: | <code>ls -ltr newLDADdataNotification*</code> |
| | ▪ Displays the current day's newLDADdataNotification logs from earliest to latest. |
| TYPE: | <code>tail -f <logname></code> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of this log looks like the following:

```
20:25:24.174 newLDADdataNotification.c EVENT: Processing : /data/Incoming/SUTRONADAM4302024.dat.999203094
20:25:24.760 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/SUTRONADAM4302024.dat.999203094
```

The format of the log file consists of the following fields:

Time stamp	20:25:24.760
File name	newLDADdataNotification.c
Message type	EVENT:
Message string	waitForReply SUCCESS on /data/Incoming/SUTRONADAM4302024.dat.999203094

8.12.2 CO_serv

CO_serv initially sets up a socket (TCP/IP) and waits for connections. The notification received from **newLDADdataNotification** is passed across the firewall to the **listener** process on the internal side on the PX2.

► To Access and Read the CO_serv Log

The **CO_serv** log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr CO_serv*`
 - Displays the current day's **CO_serv** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host lsl-rmk at Wed Apr 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

8.12.3 listener

The **listener** reads the **LDADinfo.txt** config file, sets up a socket, binds its local address so that the Client (**CO_serv**) can send to it, and waits for the connection from the Client process. When the notification is received, the **listener** retrieves the Sutron file from the **/data/Incoming** directory on the LS and copies it to the **\$LDAD_DATA/tmp** directory on the PX inside the firewall. If the file requires no preprocessing, **listener** moves the data file directly to the Raw directory. The **listener** sends a verification when done.

The **listener** executes the **\$FXA_HOME/ldad/bin/preprocessSUTRON.pl** script to preprocess the Sutron data files. The **listener** receives the fully qualified data file, the hostname used by notification routine, the port number of the process requiring notification upon completion of the preprocessing, and other necessary information about the data file format from **CO_serv**. Finally, the **listener** sends notification to the **CommsRouter LDAD_ROUTER** that a product has been preprocessed.

► To Access and Read the listener Log

The **listener** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **listener** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr listener*`
 - Displays the current day's **listener** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
18:27:29.743 listener.c EVENT: do_G_Msg: rcp completed for
SUTRONADAM4181823.dat.1069179781.1069180027
18:27:29.759 listener.c EVENT: do_G_Msg: Preprocessor Command Line =
</awips/ldad/bin/preprocessSUTRON.pl
/data/fxa/LDAD/tmp/SUTRONADAM4181823.dat.1069179781.1069180027 px 15009>
```

The format of the log consists of the following fields:

Time stamp	18:27:29.743
File name	listener.c
Message type	EVENT:
Message string	do_G_Msg: rcp completed for SUTRONADAM4181823.dat.1069179781.1069180027

8.12.4 *preprocessSUTRON.pl*

The **preprocessSUTRON.pl** script copies the files from the **\$LDAD_DATA/tmp** directory to the **/awips/fxa/ldad/ldadttmp** directory. There, it reformats the Sutron data files, appends the **abstime** string to the file names, and stores the preprocessed file (**.dat**) in the **\$LDAD_DATA/Raw** directory and the SHEF file into the Postgres text database, archives it, and sends it to the OH database.

► To Access and Read the preprocessSUTRON Log

The **preprocessSUTRON** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **preprocessSUTRON.pl** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`

 - Where `<yyyymmdd>` is today's date.

TYPE: `ls -ltr preprocessSUTRON*`

 - Displays the current day's **preprocessSUTRON** logs from earliest to latest.

TYPE: `tail -f <logname>`

 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

The format of the log file consists of the following fields:

File name moveFile()
Message string /data/fxa/LDAD/tmp/SUTRONADAM4302024.dat.
999203094.999203124 to /data/fxa/LDAD/Raw/
SUTRONADAM4302024.dat.999203094.999203124

8.12.5 LDAD_ROUTER

The **LDAD_ROUTER** (registered **LDAD CommsRouter**) is responsible for transporting data notifications from the data acquisition processes to the data controller processes. The main function of the **LDAD_ROUTER** is message passing; it does no data processing. The router provides a known location where the data acquisition processes can send data messages.

► **To Access and Read the CommsRouter Log**

The **LDAD_ROUTER CommsRouter** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user **ldad**:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ps -wef |grep ldad`
 - Displays the **ldad** processes. Notice the PID of the **CommsRouter** process that is owned by user **ldad**.
- TYPE:** `ls -ltr Comms*`
 - Displays the latest logs.

NOTE: The **CommsRouter** log containing the PID of the **LDAD_ROUTER** process is the **LDAD_ROUTER CommsRouter** log.

- TYPE:** `tail -f <logname>`
 - Displays the log as it updates.

Log Message Format

An entry in the log should look like the following:

```
20:25:25.662 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: SUTRONADAM4302024.dat.999203094.999203124 1 41
20:25:25.885 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: 999203124.SUTRONADAM4302024.decoded 1 58
20:25:26.023 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: SUTRONADAM4302024.dat.999203094.999203124 1 41
```

The log file consists of the following fields:

Time stamp	20:25:25.885
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY DSMsg: 999203124.SUTRONADAM4302024.decoded 1 58

The **LDAD_ROUTER CommsRouter** is started automatically at system reboot time or can be started manually. The **CommsRouter** runs continuously, exiting only when killed by the restart program.

8.12.6 DataController

The **DataController** is responsible for creating the decoder and storage processes (as child processes), restarting them if they exit, routing appropriate messages to them, and queuing incoming data messages until the decoder and storage processes are ready. As data messages are stored in the queue, the size of the processes grows.

The **DataController**'s main program creates a **DataRouting** manager object when it first starts up and invokes a member function to start the **routerLdadDecoder**,

routerStoreEDEX, and **routerShefEncoderEDEX** processes by reading and executing the **LdadController.config** file. The file resides on the **\$LDAD_INTERNAL_DATA** directory and contains the names of the above processes to start/restart, a restart flag, and **eof** designators to alert the Data Routing Manager that there are no more processes listed in the file.

The **LDAD_ROUTER** sends product-received notifications to the **DataController**. When the processes first start up, they send messages containing their IPC addresses and process numbers to the **DataController**. The processes send the **DataController** a data request message and a ready-to-receive data message. In response, the **DataController** stores the processes' ID information and data requests, and sends a message to the requesting processes (if a message is available). The **DataController** waits to receive another ready message from the processes before sending any more data messages. The **DataController** queues any messages it receives from the **LDAD_ROUTER** until the processes send another ready message.

► To Access and Read the DataController Log

The **DataController** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr DataController*`
 - Displays the latest log for the **DataController** **LDAD_ROUTER** process.
- TYPE:** `tail -f <logname>`
 - Displays the current log as it updates with the latest messages.

Log Message Format

An entry in the log should look similar to the following:

```
20:25:25.664 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: SUTRONADAM4302024.dat.999203094.999203124 1 41
20:25:25.887 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: 999203124.SUTRONADAM4302024.decoded 1 58
20:25:26.025 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: SUTRONADAM4302024.dat.999203094.999203124 1 41
```

The log file consists of the following fields:

Time stamp	20:25:25.887
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY CDMsg: 999203124.SUTRONADAM4302024.decoded 1 58

8.12.7 routerLdadDecoder

The **routerLdadDecoder** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerLdadDecoder** process sends a data request to the **DataController** for the Sutron products it wishes to receive by specifying product header patterns of interest. On receipt of a notification from the **DataController** that a product of interest has arrived, the **routerLdadDecoder** reads the directory containing the raw files, **\$LDAD_DATA/Raw**.

The **routerLdadDecoder** process reads each file and stores them via serialized data files to the **\$LDAD_DECODED_DATA** directory. The serialized file name is sent back through the **LDAD_ROUTER** to notify registered LDAD storage processes of the arrival of each LDAD decoded product.

► **To Access and Read the routerLdadDecoder Log**

The **routerLdadDecoder** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr routerLdadDecoder*`
 - Displays the latest log for the **routerLdadDecoder** process.
- TYPE:** `tail -f <logname>`
 - Displays the current log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
20:25:25.698 LdadRoutines.C EVENT: Processing [1/1] = SUTRONADAM4302024.dat.999203094.999203124
20:25:25.884 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(), '$LDAD_DECODED_DATA/
999203124.SUTRONADAM4302024.decoded', sent to LDAD_ROUTER
```

The log file consists of the following fields:

Time stamp	20:25:25.884
File name	LdadRoutines.C
Message type	EVENT:
Message string	LdadRoutines::pingLdadRouter(), '\$LDAD_DECODED_ DATA/ 999203124.SUTRONADAM4302024.decoded', sent to LDAD_ROUTER

8.12.8 routerStoreEDEX

The **routerStoreEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerStoreEDEX** process sends a data request to the **DataController** for serialized decoded Campbell files in netCDF format. When notified by the **DataController** that a product of interest has arrived, **routerStoreNetcdf** reads the directory containing the files, **\$LDAD_DECODED_DATA**. The **routerStoreEDEX** process stores the files in the /data_store/lad directory in the XML format and sends a notification to the **EDEX**.

► **To Access and Read the routerStoreNetcdf Log:**

The **routerStoreNetcdf** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user lad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr routerStoreNetcdf*`
 - Displays the latest logs for the **routerStoreNetcdf** process.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
20:25:25.890 routerStoreNetcdf.C EVENT: routerStoreEDEX.C,
putData(/data/fxa/LDAD/decoded/999203124.SUTRONADAM4302024.decoded)
20:25:26.356 LdadEDEXStorage.C PROBLEM: var: riverFlow (float) = '2.09702'. Units conversion from ft3/s to
m3/s failed.
20:25:26.410 routerStoreEDEX.C EVENT: routerStoreEDEX
/data/fxa/LDAD/decoded/999203124.SUTRONADAM4302024.decoded completed
20:30:26.752 routerStoreEDEX.C EVENT: routerStoreEDEX.C,
putData(/data/fxa/LDAD/decoded/999203424.RAWS.decoded)
20:30:29.613 LdadStorage.C EVENT: LdadStorage::separatePatterns () <[-99., -99.00 ]> from <-99. -99.00>
20:30:31.560 routerStoreEDEX.C EVENT: routerStoreEDEX /data/fxa/LDAD/decoded/999203424.RAWS.decoded
completed
```

The log file consists of the following fields:

Time stamp	20:25:25.890
File name	routerStoreEDEX.C
Message type	EVENT:
Message string	routerStoreEDEX.C, putData(/data/fxa/LDAD/decoded/999203124.SUTRONA DAM4302024.decoded)

8.12.9 routerShefEncoderEDEX

The **routerShefEncoderEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerShefEncoderEDEX** process sends a data request to the **DataController** for serialized decoded files. On receipt of a notification from the **DataController** that a product of interest has arrived, the **routerShefEncoderEDEX** reads the directory containing the files, **\$LDAD_DECODED_DATA**. The files there are SHEF-encoded and moved to the **/data_store/ldad** directory. The **routerShefEncoderEDEX** process sends a notification to the **EDEX**. Once the SHEF-encoded data file is stored in the **/data_store/ldad** directory, the **routerShefEncoderEDEX** saves a copy of the file in the **/tmp** directory and calls **distributeProduct** process to send the file to the NCF over the WAN.

► **To Access and Read the routerShefEncoderEDEX Log**

The **routerShefEncoderEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -rtal routerShefEncoderEDEX*`
 - Displays the latest logs for the **routerShefEncoderEDEX** process.
- TYPE:** `tail -f <logname>`
 - Displays the current log as it is updated with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
20:25:25.891 routerShefEncoderEDEX.C EVENT: routerShefEncoderEDEX
</data/fxa/LDAD/decoded/999203124.SUIRONADAM4302024.decoded>
20:25:26.316 ShefStorage.C EVENT: TZ= GMT
20:25:26.396 checkWmoHeader.C EVENT: checkWmoHeader()
20:25:26.397 checkWmoHeader.C EVENT: checkWmoHeader() : data contains a WMO header.
20:25:26.397 SHEF_format.C EVENT: SHEF_format::sendToProductWan -> data contains a WMO header.
Creating a dummy file (zero bytes).
20:25:26.721 SHEF_format.C EVENT: SHEF_format::sendToProductWan -> system(distributeProduct -a
DEFAULTNCF -e /data/fxa/ispan/hydro/temp/A_format.999203126 KSTORRZLDA
/data/fxa/ispan/hydro/temp/A_format.999203126);
20:25:26.722 SHEF_format.C EVENT: shef data has sent to WAN successfully!
```

The log file consists of the following fields:

Time stamp	20:25:25.891
File name	routerShefEncoderEDEX.C
Message type	EVENT:
Message string	routerShefEncoderEDEX

```
</data/fxa/LDAD/decoded/999203124.SUTRONADAM4302024.decoded>
```

8.12.10 distributeProduct

The **distributeProduct** process creates a product message and submits it for distribution across the AWIPS WAN to the addressed sites. The **distributeProduct** process first prepares the product by creating the WAN communications header and prepending the header to a temporary copy of the product. Distribution requests, enclosing the temporary copy of the product, are subsequently made through the **msg_send** utility program.

► **To Access and Read the distributeProduct Log**

The **distributeProduct** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ls -ltr distributeProduct*
 - Displays the latest logs for the **distributeProduct** process.
- TYPE:** tail -f <logname>
 - Displays the current log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed April 12 19:30:59 2006
19:30:59.690 MHSProduct.C PROBLEM: Product
(/data/fxa/ispan/hydro/temp/A_format.973020657) is empty.
19:30:59.853 MHSProduct.C EVENT: Sending attachments
(/data/fxa/ispan/hydro/temp/A_format.973020657)
only. Attachments are assumed to contain correct communications header.
19:31:02.504 MHSProduct.C EVENT: Product request (KSTORRZLDA) was successfully
submitted to the MHS request server for distribution.

Message Attributes:
  Request ID: TBDW-25380
  To: DEFAULTNCF
  Priority: 0
  Type: Routine
  Subject:
  Handling Action: 0
19:31:02.518 MHSProduct.C EVENT: TBDW-25380
~
```

The log file consists of the following fields:

Time stamp	19:31:02.504
File name	MHSProduct.C
Message type	EVENT:

```

Message string      Product request (KSTORRZLDA) was successfully
                    submitted to the MHS request server for
                    distribution.
Message Attributes:
Request ID: TBDW-25380
To: DEFAULTNCF
Priority: 0
Type: Routine
Subject:
Handling Action: 0

```

8.12.11 notificationServer

The **notificationServer** provides information to its display clients that a new version of a display product has become available. Data acquisition processes send data notification messages to the **notificationServer**, which acts as a bridge between the data acquisition and workstation display components of AWIPS.

► **To Access and Read the notificationServer Log**

The **notificationServer** log resides on the DX1 in the directory **\$LOG_DIR**. This log records messages from the **notificationServer** process. Perform the following commands as user fxa:

- | | |
|--------------|--|
| TYPE: | cd \$LOG_DIR/<yyyymmdd> |
| | ▪ Where <yyyymmdd> is today's date. |
| TYPE: | ls -ltr notificationServer* |
| | ▪ Displays the current day's notificationServer logs from earliest to latest. |
| TYPE: | tail -f <logname> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of the log looks like the following:

```

LOG-STATUS: Log file opened on host dx1-rnk at 00:00:31 2005
00:00:31.822 NotificationServer.C DIAG: Tried to generate notifications for key: 3700
but the data notify time: 25.23 3HR does not match any times on the inventory.
00:00:35.948 GridAccessor1.C EVENT: Updating inventory info for MRF
-----
```

```

Process ID of anonymous target: 29574
Host: lx2-rnk
Port number: 3231
NORMAL PRIORITY CONNECTION
Connection created: Apr 18 06 16:25:32 GMT. Initiated by connecting process.
Last time this connection was used: Apr 17 06 23:55:49 GMT
Sent messages since last stat: 4

```

Bytes per message (Avg/Min/Max): 544/540/548
 No messages have been received since last stat report.

The format of the log file consists of the following fields:

Time stamp	00:00:31.822
File name	NotificationServer.C
Message type	DIAG:
Message string	Tried to generate notifications for key: 3700 but the data notify time: 25.23 3 hour does not match any times on the inventory.

8.13 Acquire and Decode Comma Separated Variable Mesonet Data

The **newLDADdataNotification** script checks the LDAD products directory for Mesonet files. When a file is available, it passes the information to the **CO_serv**, which informs the **listener**. The **listener** executes the **preProcessLDAD.pl** script and calls **routerLdadDecoder** to decode the file. The decoded file is stored and a notification is sent to the user stating that new data are available.

Processes

```
LS      newLDADdataNotification
LS      CO_serv
PX2    listener
PX2    preProcessLDAD.pl
PX2    preprocessmesonet.pl
PX2    CommsRouter LDAD_ROUTER
PX2    DataController LDAD_ROUTER LdadController.config
PX2    routerLdadDecoder
PX2    routerStoreEDEX
```

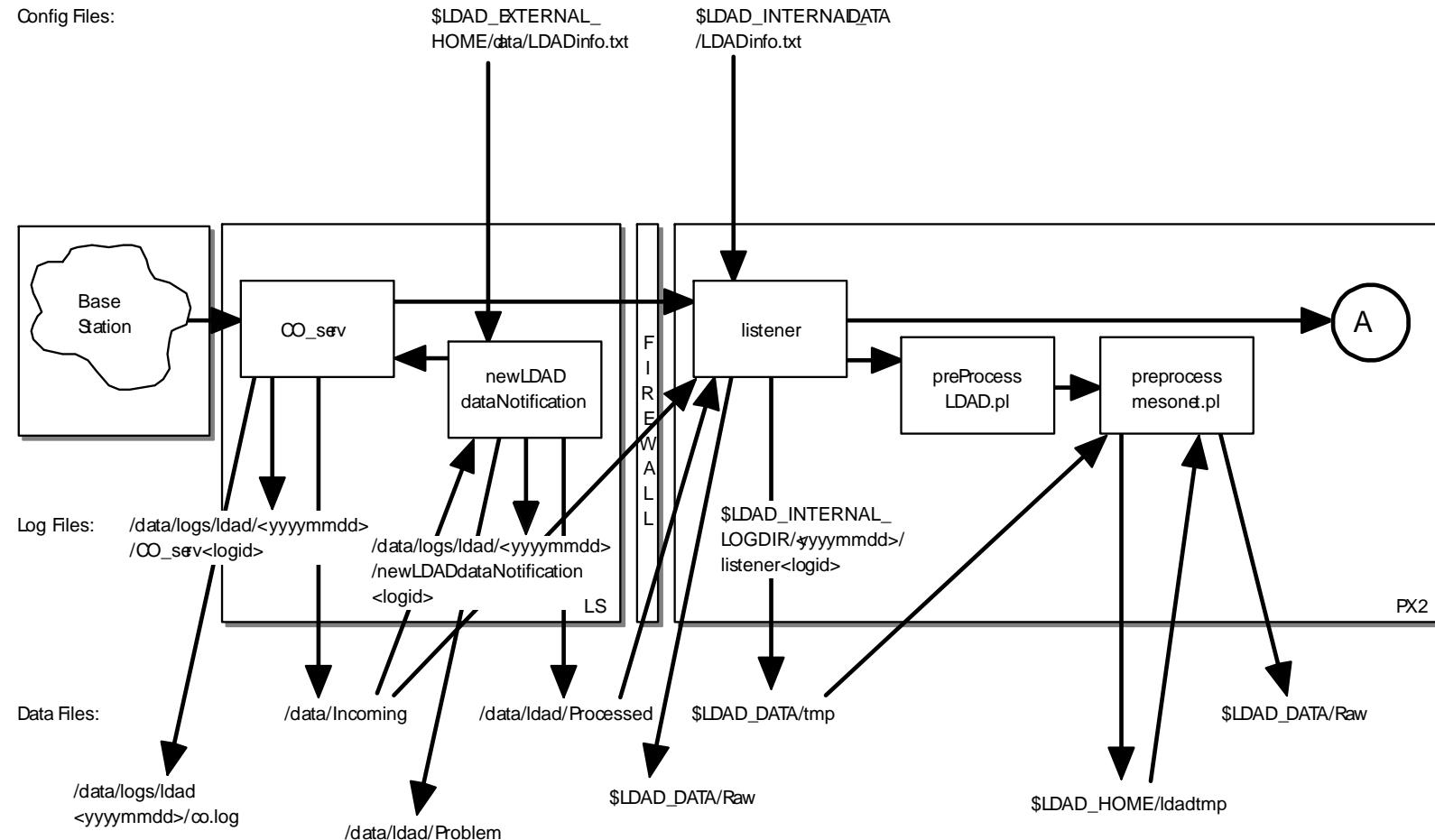
Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
*Station.txt	(files with station metadata for routerStoreEDEX)
*.desc	(files for routerLdadDecoder)
LdadController.config	(for DataController LDAD_ROUTER)
LdadPatterns.txt	(for routerLdadDecoder, routerStoreEDEX)

Environment Variables

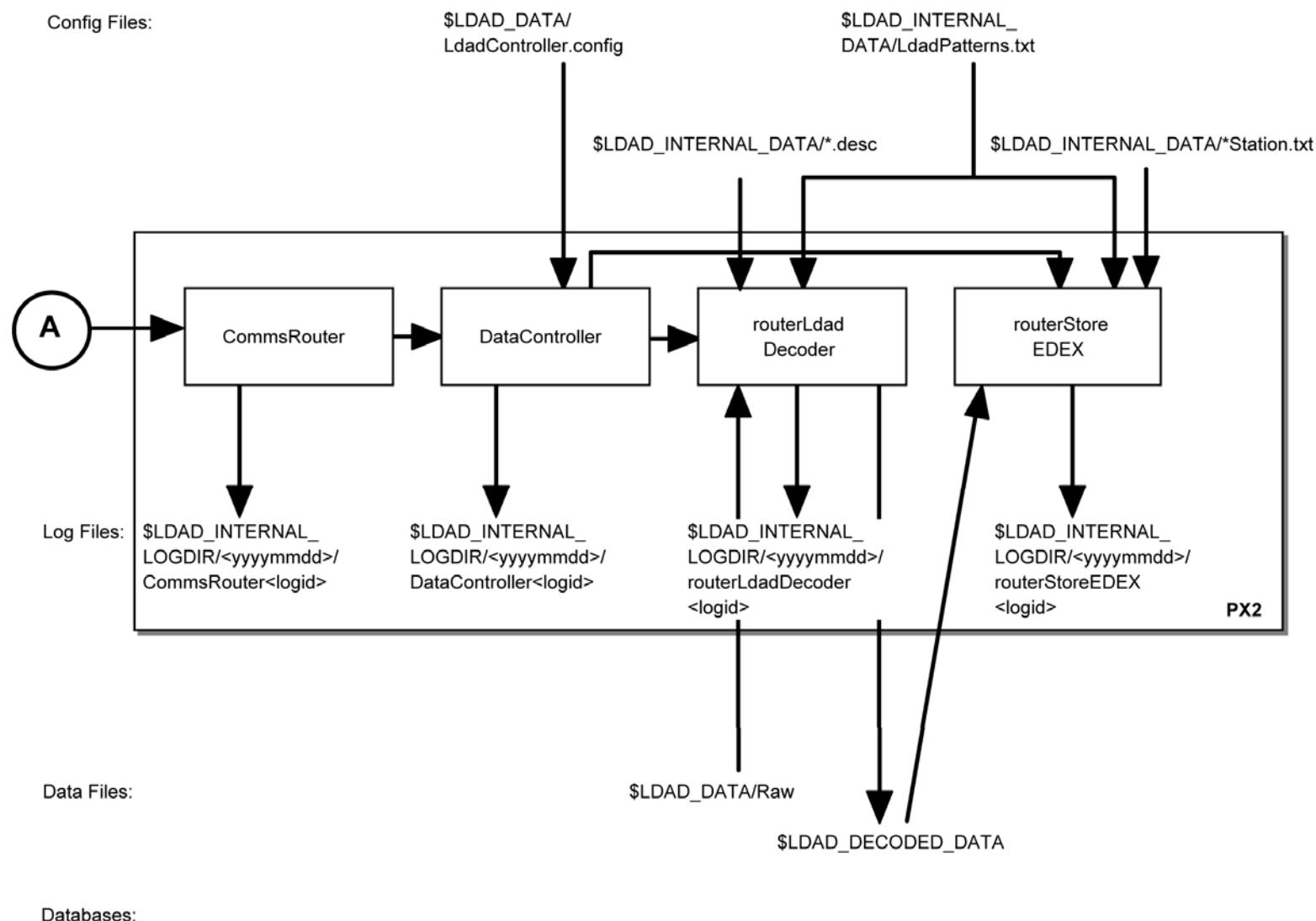
\$LDAD_HOME	px1, px2: awips/fxa/ldad
\$LDAD_EXTERNAL_HOME	primary ls1, px1, px2: /ldad
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/fxa/ldad/logs
\$LDAD_INTERNAL_DATA	px1, px2: /awips/fxa/ldad/data
\$LDAD_DECODED_DATA	px1, px2: /data/fxa/LDAD/decoded
\$LDAD_DATA	px1, px2: /data/fxa/LDAD

Refer to Exhibit 8.13-1 for the Acquire and Decode Comma Separated Variable Mesonet data flow diagram.



SMM 06/14/01

Exhibit 8.13-1. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD) (Page 1 of 2)



SMM 07/13/10

Exhibit 8.13-1. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD) (Page 2 of 2)

8.13.1 CO_serv

The **CO_serv** process calls **process_cu** to process the request for a “cu” transfer. The **process_cu** executable parses the receive session file and invokes **cu** to transfer the file. The file is stored in the **/data/Incoming** directory. The notification received from **newLDADdataNotification** is passed across the firewall to the **listener** process on the internal side on the PX.

► To Access and Read the CO_serv Log

The **CO_serv** log resides on the active LS in the **\$LOG_DIR** directory. This log records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today’s date.
- TYPE:** `ls -ltr CO_serv*`
 - Displays the current day’s **CO_serv** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed APR 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: Apr12 06 00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv....
```

The log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

► To Access and Read the co.log Log

The **co.log** log resides on PX2 in the **\$LOG_DIR** directory and records messages from the **CO_serv** process executing the **sendLDADnotification.pl** script. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- -Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr co.log*`
- Displays the current day's `co.log` logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
/awips/ldad/bin/sendLDADnotification.pl:94, socket ok
/awips/ldad/bin/sendLDADnotification.pl:104, bind ok
/awips/ldad/bin/sendLDADnotification.pl:117, connect ok
/awips/ldad/bin/sendLDADnotification.pl:27, Begin sendLDADnotification.pl
/awips/ldad/bin/sendLDADnotification.pl:38, O, 4296 px2-tbdw 4296, px, 15008
/awips/ldad/bin/sendLDADnotification.pl:60, opType = O, msgString = 4296 px2-tbdw 4296, host = px,
port = 15008
/awips/ldad/bin/sendLDADnotification.pl:94, socket ok
/awips/ldad/bin/sendLDADnotification.pl:104, bind ok
/awips/ldad/bin/sendLDADnotification.pl:117, connect ok
/awips/ldad/bin/sendLDADnotification.pl:27, Begin sendLDADnotification.pl
/awips/ldad/bin/sendLDADnotification.pl:38, S, CAMPBELL_coll_sess 4300 px, px, 15008
/awips/ldad/bin/sendLDADnotification.pl:60, opType = S, msgString = CAMPBELL_coll_sess 4300 px,
host =px, port = 15008
/awips/ldad/bin/sendLDADnotification.pl:94, socket ok
/awips/ldad/bin/sendLDADnotification.pl:104, bind ok
/awips/ldad/bin/sendLDADnotification.pl:117, connect ok
/awips/ldad/bin/sendLDADnotification.pl:27, Begin sendLDADnotification.pl
/awips/ldad/bin/sendLDADnotification.pl:38, O, 15008 px2-tbdw 4398, px, 15008
/awips/ldad/bin/sendLDADnotification.pl:60, opType = O, msgString = 15008 px2-tbdw 4398, host =
px, port = 15008
```

8.13.2 newLDADdataNotification

The **newLDADdataNotification** process uses the file's name and a lookup table (**LDADinfo.txt**) to determine the type of data contained in the file and checks the LDAD products directory (**/data/Incoming**) periodically for Mesonet files.

The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process using **createAndSendIPCMesssage**. The message notifies **CO_serv** that there are Mesonet files in the **/data/Incoming** directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes or if an **fstat** on the file to transfer fails, the product gets moved to the **/data/ldad/Problem** directory using **moveFileToProblemDir** process. Otherwise, the “processed” file is moved to the **/data/ldad/Processed** directory using the **moveFileToProcessDir** process.

► **To Access and Read the newLDADdataNotification Log**

The **newLDADdataNotification** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr newLDADdataNotification*`
 - Displays the current day's **newLDADdataNotification** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-tbdw at Wed Apr 12 00:00:56 2006
00:00:56.825 newLDADdataNotification.c EVENT: newLDADdataNotification process started
00:00:56.829 newLDADdataNotification.c EVENT: Reading /data/Incoming/ every 20 seconds
00:00:56.834 newLDADdataNotification.c EVENT: Processing : /data/Incoming/RAWS.dat
00:09:37.413 newLDADdataNotification.c EVENT: Processing : /data/Incoming/alert_wx.dat
00:09:38.155 newLDADdataNotification.c EVENT: waitForReply SUCCESS on /data/Incoming/alert_wx.dat
```

The format of the log file consists of the following fields:

Time stamp	00:09:38.155
File name	newLDADdataNotification.c
Message type	EVENT:
Message string	waitForReply SUCCESS on /data/Incoming/alert_wx.dat

8.13.3 *listener*

The **listener** reads the **LDADinfo.txt** config file, sets up a socket, binds its local address so that the Client (**CO_serv**) can send to it, and waits for the connection from the Client process. When the notification is received, the **listener** retrieves the Mesonet file from the **/data/Incoming** directory on the active LS and copies it to the **\$LDAD_DATA/tmp** directory on the PX2. If the file requires no preprocessing, **listener** moves the data file directly to the **Raw** directory. The **listener** sends verification when finished.

The **listener** executes the **preProcessLDAD.pl** script to preprocess the Mesonet data files. The **listener** receives the fully qualified data file, the hostname used by notification routine, the port number of the process requiring notification upon completion of the preprocessing, and other necessary information about the Mesonet data file format from **CO_serv**. Finally, the listener sends notification to the **LDAD CommsRouter**, **LDAD_ROUTER**, that a product has been preprocessed.

► **To Access and Read the listener Log**

The **listener** log resides on PX2 in the directory **\$LOG_DIR**. This log records messages from the **listener** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr listener*`
 - Displays the current day's **listener** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
00:09:39.213 listener.c EVENT: do_G_Msg: rcp completed for alert_wx.dat.97433378
00:09:39.263 listener.c EVENT: do_G_Msg: Preprocessor Command Line =
</awips/ldad/bin/preProcessLDAD.pl /data/fxa/LDAD/tmp/alert_wx.dat.97433378 px 15009>
```

The format of the log consists of the following fields:

Time stamp	00:09:39.263
File name	listener.c
Message type	EVENT:
Message string	do_G_Msg: Preprocessor Command Line = </awips/ldad/bin/preProcessLDAD.pl /data/fxa/LDAD/tmp/alert_wx.dat.97433378 px 15009>

8.13.4 *preProcessLDAD.pl*

The **preProcessLDAD.pl** script preprocesses UDFCD ALERT (_R5, _WL, _WX), Cdot, IFLows, and LARC data report files for the LDAD decoder. It initializes file input/output and values to the existing variables, calls the appropriate preprocessor (**preprocessmesonet.pl** for Mesonet data), and cleans up.

8.13.5 *preprocessmesonet.pl*

The **preprocessmesonet.pl** script copies the file from the **\$LDAD_DATA/tmp** directory to the **\$LDAD_HOME/ldadtmp** directory. There, it reformats the Mesonet data file, appends the **abstime** string to the file name, and stores the preprocessed file in the **\$LDAD_DATA/Raw** directory.

8.13.6 LDAD_ROUTER

The **LDAD_ROUTER** (registered **LDAD CommsRouter**) is responsible for transporting data notifications from the data acquisition processes to the data controller processes. The main function of the **LDAD_ROUTER** is message passing; it does not do any data processing. The router provides a known location where the data acquisition processes can send data messages.

► To Access and Read the CommsRouter Log

The **LDAD_ROUTER CommsRouter** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`

 - Where `<yyyymmdd>` is today's date.

TYPE: `ps -wef |grep ldad`

 - Displays the **ldad** processes. Notice the PID of the **CommsRouter** process that is owned by user **ldad**.

TYPE: `ls -ltr Comms*`

 - Displays the latest logs.

NOTE: The **CommsRouter** log containing the PID of the **LDAD_ROUTER** process is the **LDAD ROUTER CommsRouter** log.

- TYPE:** tail -f <logname>
▪ Displays the log as it updates.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed April 12 00:00:16 2006  
00:00:15.851 CommsReceiver.C EVENT: NCF_ENTRY CRMMsg Pattern:  
.*\_.decoded|^([0-9.]*[^m]([^s)([^a)([^s)([^_)([^  
q]([^c]))])).*\_.decoded$|(.*\_.[0-9+])|(^[0-9]*\..msas_qc\..*)$|.*\Text/.*\_.[0-9]+  
00:01:02.726 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:  
/data/fxa/LDAD/Raw/RAWS.dat.974332858 1 37  
00:01:02.729 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg: RAWS.dat.974332858 1 18  
00:01:05.511 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg: 974332858.RAWS.decoded 1 45  
00:03:38.783 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:  
/data/fxa/LDAD/Raw/974332800.03.msas_qc.RAWS 1 44  
00:03:39.361 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg: RAWS.974332800.03.msas_qc.decoded  
1 56  
00:09:40.979 CommsReceiver.C EVENT: NCF_ENTRY DSMMsg:  
/data/fxa/LDAD/Text/alert_wx.dat.974333378 1 42  
00:09:41.462 CommsReceiver.C EVENT: NCF ENTRY DSMSq: 974333378.alert wx.decoded 1 49
```

The log consists of the following fields:

```

Time stamp          00:09:41.462
File name          CommsReceiver.C
Message type       EVENT:
Message string     NCF_ENTRY DSMsg: 974333378.alert_wx.decoded 1 49

```

The **LDAD_ROUTER** **CommsRouter** is started automatically at system reboot time or can be started manually. The **CommsRouter** runs continuously, exiting only when killed by the restart program.

8.13.7 DataController

The **DataController** is responsible for creating the decoder and storage processes (as child processes), restarting them if they exit, routing appropriate messages to them, and queuing incoming data messages until the decoder and storage processes are ready. As data messages are stored in the queue, the size of the processes grows.

The **DataController**'s main program creates a **DataRouting** manager object when it first starts up and invokes a member function to start the **routerLdadDecoder**, and **routerStoreEDEX**, processes by reading and executing the **LdadController.config** file. The file resides on the **\$LDAD_INTERNAL_DATA** directory and contains the names of these decoders to start/restart, a restart flag, and **eof** designators to alert the Data Routing Manager that there are no more processes listed in the file.

The **LDAD_ROUTER** sends product-received notifications to the **DataController**. When the processes first start up, they send messages containing their IPC addresses and process numbers to the **DataController**. The processes send the **DataController** a data request message and a ready-to-receive data message. In response, the **DataController** stores the processes' ID information and data requests, and sends a message to the requesting processes (if a message is available). The **DataController** waits to receive another ready message from the processes before sending any more data messages. The **DataController** queues any messages it receives from the **LDAD_ROUTER** until the processes send another ready message.

► To Access and Read the DataController Log

The **DataController** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

TYPE: `cd $LOG_DIR/<yyyymmdd>`
 ▪ Where **<yyyymmdd>** is today's date

TYPE: `ps -wef |grep ldad`
 ▪ Displays the **ldad** processes. Note the PID for the **DataController**.

TYPE: `ls -rtal DataController*`
 ▪ Displays the latest logs for the **DataController**

- TYPE:**
- tail -f <logname>
 - Displays the log as it updates with the latest messages

Log Message Format

An entry in the log should look similar to the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed April 12 00:00:14 2006
00:00:13.815 DataCaptReceiver.C EVENT: DataReqMsg: pattern =
(.*\.([0-9]+)|(^[0-9]*\..msas_qc\..*)$)
00:00:14.390 DataCaptReceiver.C EVENT: DataReqMsg: pattern =
^[0-9.]*[^m]([s][^a][s][^_][^q][^c]))).*\.\decoded$
00:00:14.716 DataCaptReceiver.C EVENT: DataReqMsg: pattern = .*/Text/.*\.[0-9]+
00:00:15.701 DataCaptReceiver.C EVENT: DataReqMsg: pattern = .*\.decoded
00:01:03.102 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Text/RAWS.dat.974332858 1 38
00:01:03.120 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Raw/RAWS.dat.974332858 1 37
00:01:03.121 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: RAWS.dat.974332858 1 18
00:01:05.514 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: 974332858.RAWS.decoded 1 45
00:03:38.795 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Raw/974332800.03.msas_qc.RAWS 1 44
00:03:39.365 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: RAWS.974332800.03.msas_qc.decoded
1 56
00:09:41.086 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Text/alert_wx.dat.974333378 1 42
00:09:41.464 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: 974333378.alert_wx.decoded 1 49
00:09:41.485 CommsReceiver.C EVENT: NCF_ENTRY CDMsg:
/data/fxa/LDAD/Raw/alert_wx.dat.974333378 1 41
00:09:43.935 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: alert_wx.dat.974333378 1 22
```

The log file consists of the following fields:

Time stamp	00:09:43.935
File name	CommsReceiver.C
Message	EVENT:
Message string	NCF_ENTRY CDMsg: alert_wx.dat.974333378 1 22

8.13.8 routerLdadDecoder

The **routerLdadDecoder** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerLdadDecoder** process sends a data request to the **DataController** requesting Mesonet products it wishes to receive by specifying product header patterns of interest. On receipt of a notification from the **DataController** that a Mesonet product of interest has arrived, the **routerLdadDecoder** reads the directory containing the raw files, **\$LDAD_DATA/Raw**.

The description file (***.desc**) is read by the **routerLdadDecoder**, which uses the information to evaluate each line of data by checking for the meteorological variable, the incoming data's units of measure, and the storage units of measure.

Following is the **.desc** format:

#netcdf Var Name	data type	input units	stored units
stationId	STRING	STRING	STRING
observationTime	DATE_TIME	DATE_TIME_STRING	ABSTIME
temperature	FLOAT	F	Kelvin
dewpoint	FLOAT	F	Kelvin
precipAccum	FLOAT	mm	m
windSpeed	FLOAT	mph	m/s
windGust	FLOAT	mph	m/s
windDir	INT	degreeN	degreeN
windDirMax	FLOAT	degreeN	degreeN
visibility	FLOAT	ft	m

The **routerLdadDecoder** process reads each file and stores them via serialized data files to the **\$LDAD_DECODED_DATA** directory. The serialized file name is sent back through the **LDAD_ROUTER** to notify registered LDAD storage processes of the arrival of each LDAD decoded product.

► To Access and Read the routerLdadDecoder Log

The **routerLdadDecoder** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ls -rtal routerLdadDecoder*
 - Displays the latest logs for the **routerLdadDecoder**.
- TYPE:** tail -f <logname>
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed April 12 00:01:04 2006
00:01:03.580 DataCaptReceiver.C USE: ProdLen 3800:01:04.520 LdadRoutines.C EVENT: Processing [1/1]
= RAWs.dat.974332858
00:01:05.510 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(), '$LDAD_DECODED_DATA/
974332858.RAWS.decoded', sent to LDAD_ROUTER

00:01:05.517 DataCaptReceiver.C USE: ProdLen 37
00:01:05.537 DataCaptReceiver.C USE: ProdLen 18
00:03:38.808 DataCaptReceiver.C USE: ProdLen 44
00:03:38.836 LdadRoutines.C EVENT: Processing [1/1] = 974332800.03.msas_qc.RAWS
00:03:39.370 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(), '$LDAD_DECODED_DATA/
RAWs.974332800.03.msas_qc.decoded', sent to LDAD_ROUTER

00:03:39.374 DataCaptReceiver.C USE: ProdLen 56
00:09:41.224 DataCaptReceiver.C USE: ProdLen 42
00:09:41.267 LdadRoutines.C EVENT: Processing [1/1] = alert_wx.dat.974333378
00:09:41.467 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(), '$LDAD_DECODED_DATA/
974333378.alert_wx.decoded', sent to LDAD_ROUTER
```

The log consists of the following fields:

```

Time stamp          00:09:41.467
File name          LdadRoutines.C
Message type       EVENT:
Message string    LdadRoutines::pingLdadRouter( ),
                   '$LDAD_DECODED_DATA/
                   974333378.alert_wx.decoded,' sent to LDAD_ROUTER

```

8.13.9 routerStoreEDEX

The **routerStoreEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerStoreEDEX** process sends a data request to the **DataController** requesting serialized decoded Mesonet files. On receipt of a notification from the **DataController** that a product of interest has arrived, **routerStoreEDEX** reads the directory containing the files, **\$LDAD_DECODED_DATA**. The ***Station.txt** file is used by **routerStoreEDEX** to pull station metadata such as latitude, longitude, and elevation.

Following is the **.txt** format:

```
ProviderId|AFOS(HB5)|StationName|StationElevation|Latitude|Longitude|localTZ|LocationDesc|
StationType|NumberOfInstruments|NumberOfLevels|Maint/CalibSchedules| SiteDesc|
```

Provider ID	Data provider station ID
AFOS ID	Station AFOS (or Handbook V) ID
Station Name	Text name of station
Elevation	Elevation of station
Latitude	Latitude of station
Longitude	Longitude of station
local TZ	Local time zone (i.e., log MST7MDT)
Location Desc	Location of station (Text)
Station Type	Type of station (i.e., logtower, surface, floating platform)
Number of Instruments	The number of reporting instruments for the station
Number of Levels	Number of reporting levels for the data (level information should be provided in the instrument table.)
Maintenance/Calibration Schedules	Frequency of maintenance/calibration
Site Description	A text description of the site surrounding

The **routerStoreEDEX** process stores the files in the **SLAD_DATA/mesonet/netCDF** directory and sends a notification to the **notificationServer**.

- ▶ **To Access and Read the routerStoreEDEX Log**

The **routerStoreEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

TYPE: `cd $LOG_DIR/<yyyymmdd>`

- Where <yyyymmdd> is today's date.

TYPE:	ps -wef grep ldad
	▪ Displays the routerStoreEDEX process along with all other ldad-owned processes.
TYPE:	ls -rtal routerStoreEDEX*
	▪ Displays the latest logs for the routerStoreEDEX process.
TYPE:	tail -f <logname>
	▪ Displays the log as it updates with the latest messages.

Log Message Format

```

00:01:06.020 DataCaptReceiver.C USE: ProdLen 45
00:01:06.797 routerStoreEDEX.C EVENT: routerStoreEDEX.C,
putData(/data/fxa/LDAD/decoded/974332858.RAWS.decoded)
00:01:16.599 ldadStorage.C EVENT: LdadStorage::separatePatterns () <[-99., -99.00 ]> from <-99.
-99.00>
00:01:19.301 routerStoreEDEX.C EVENT: routerStoreEDEX
/data/fxa/LDAD/decoded/974332858.RAWS.decoded completed
00:03:39.370 DataCaptReceiver.C USE: ProdLen 5600:03:39.391 routerStoreEDEX.C EVENT:
routerStoreEDEX.C, putData(/data/fxa/LDAD/decoded/RAWS.974332800.03.msas_qc.decoded)
00:03:39.839 LdadStorage.C PROBLEM: Unable to find netCDF data key for , msas_qc.RAWS
00:03:39.922 routerStoreEDEX.C EVENT: routerStoreEDEX
/data/fxa/LDAD/decoded/RAWS.974332800.03.msas_qc.decoded completed
00:09:41.544 DataCaptReceiver.C USE: ProdLen 49
00:09:41.560 routerStoreEDEX.C EVENT: routerStoreEDEX.C,
putData(/data/fxa/LDAD/decoded/974333378.alert_wx.decoded)

```

The log consists of the following fields:

Time stamp	00:09:41.560
File name	routerStoreEDEX.C
Message type	EVENT:
Message string	routerStoreEDEX.C, putData(/data/fxa/LDAD/decoded/974333378.alert_wx.decoded)

8.14 Acquire and Process ASOS/MicroART Data (for LDAD)

The processing and data flow for the ASOS and micro-Automatic Radio theodolite System (MicroART) products are identical; therefore, their description is combined below.

The **suaReceiver** process starts the data acquisition process for the ASOS/MicroART system. Data acquisition occurs through a pseudo-terminal device configured by the Xyplex Terminal Server. The **newLDADdataNotification** script checks the LDAD directory for ASOS/MicroART files. When a file is available, the

newLDADdataNotification script passes the information to the **suaReceiver**, which informs **CO_serv**, which passes the message to the **listener**, which executes the **preprocessSUA.pl** script. The **preprocessSUA.pl** script copies the file to a tmp directory and stores it into the text database via the **textdb** command line interface. When the file

is successfully stored in the database, a notification is sent to the text **notificationServer**. Finally, the data are routed to the NCF via the WAN.

Processes

```
LS    suaReceiver
LS    newLDADdataNotification
LS    CO_serv
PX2   listener
PX2   preprocessSUA.pl
PX2   distributeProduct
```

Configuration Files (all in /data/fxa/LDAD/data)

suaCategories.txt	(for suaReceiver)
LDADinfo.txt	(for listener)
rcv_action2codes.txt	(for distributeProduct)
siteCommission.txt	(for distributeProduct)

Environment Variables

\$LDAD_EXTERNAL_HOME	ls1: /ldad
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/fxa/ldad/logs
\$LDAD_EXTERNAL_LOGDIR	px1, px2: /data/logs/ldad
\$LDAD_EXTERNAL_DATA	px1, px2: /data/ldad
\$LDAD_INTERNAL_DATA	px1, px2: /awips/fxa/ldad/data
\$LDAD_DATA	px1, px2: /data/fxa/LDAD
\$FXA_DATA	px1, px2: /data/fxa
\$FXA_HOME	px1, px2: /awips/fxa
\$LOG_DIR	px1, px2: /data/logs/fxa

Refer to Exhibit 8.14-1 for the Acquire and Process ASOS/MicroART data flow diagram.

8.14.1 *suaReceiver*

The Surface and Upper Air Receiver, **suaReceiver**, acquires observational data from the ASOS and MicroART stations. The **suaReceiver** process supports asynchronous connections from the ASOS/MicroART systems through a dial-in modem. The **suaReceiver** process initially sets up a TCP/IP socket and waits for connections. When a connection is made and a message arrives, the **suaReceiver** process parses the information contained in the message buffer. Using the parsed information, the **suaReceiver** process connects to the ASOS/MicroART station. Once a message is received and confirmed as a valid product message, the product is stored in the **/data/Incoming** directory.

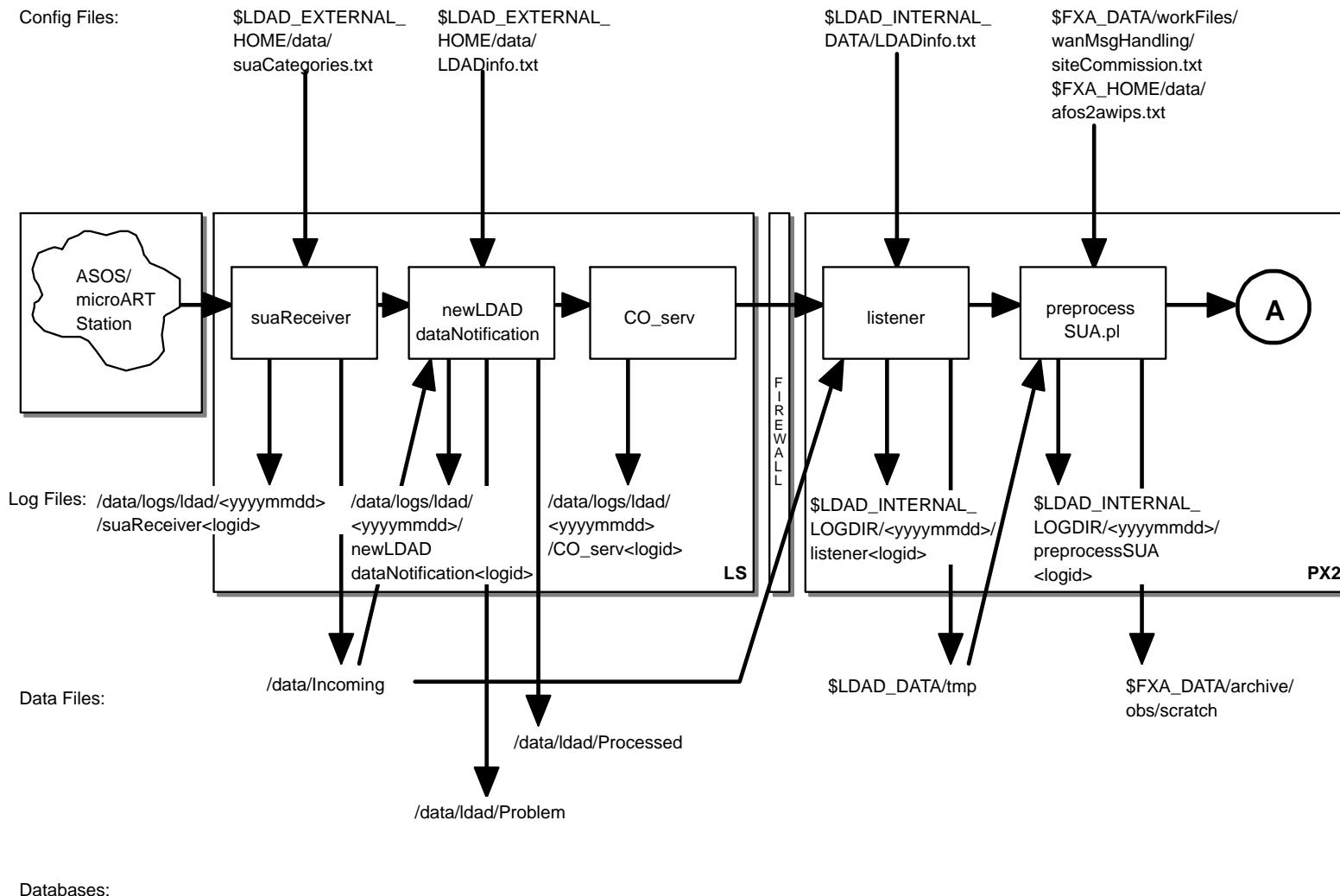


Exhibit 8.14-1. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 1 of 2)

SMM 06/14/06

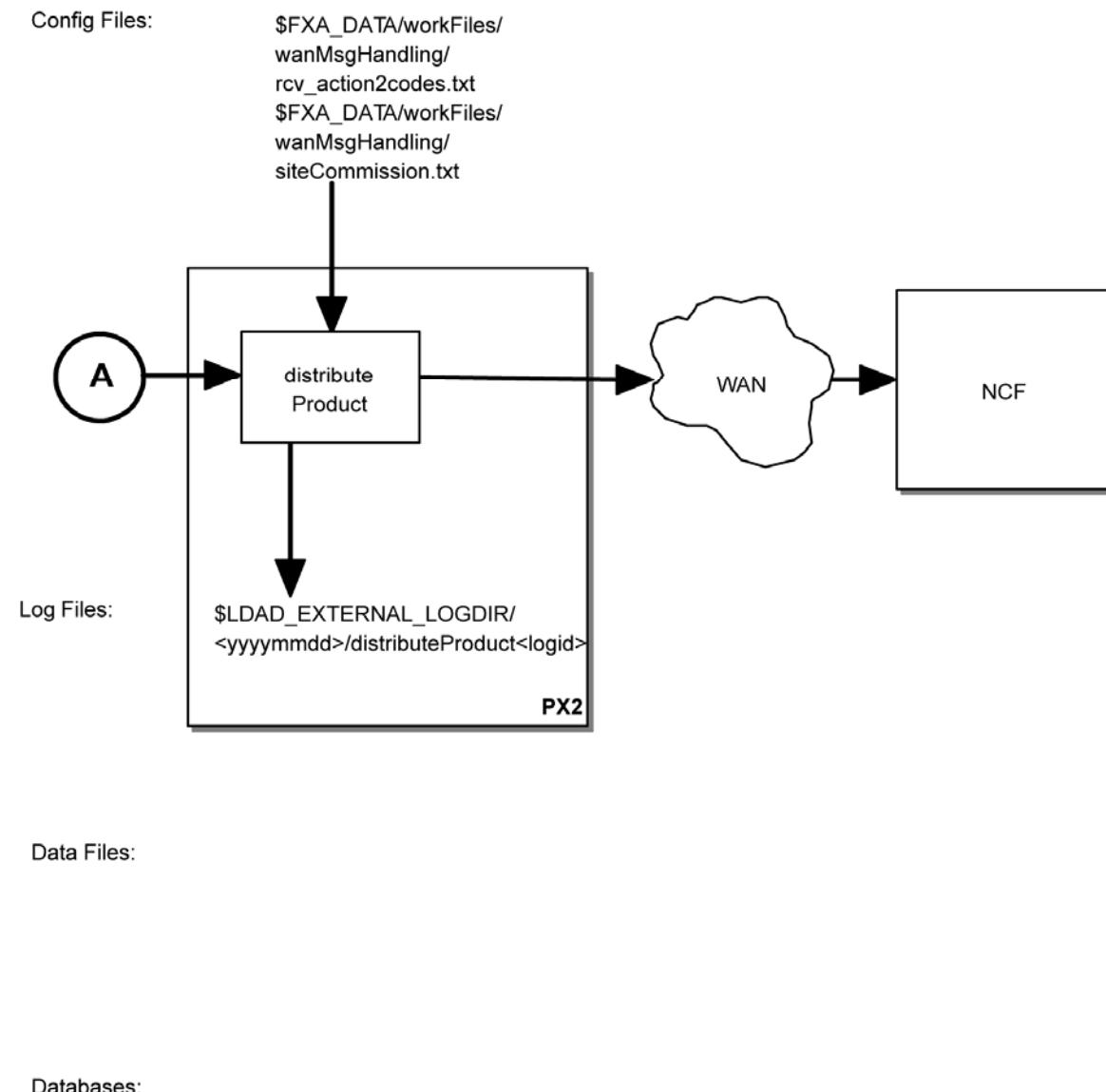


Exhibit 8.14-1. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 2 of 2)

SMM 07/13/10

► **To Access and Read the suaReceiver Log**

The **suaReceiver** log resides on the active LS in a time-stamped directory under **\$LOG_DIR**. The log file contains event messages recording product receipt and transmission, message format errors, and timeout errors in the receipt of incoming data. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ps -ef |grep suaReceiver`
 - Displays the **suaReceiver** process. Notice the PID.
- TYPE:** `ls -rtal suaReceiver*`
 - Displays the latest logs for the **suaReceiver**.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates.

NOTE: The **suaReceiver** log containing the PID of the **suaReceiver** process is the current log.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-tbw4 at Wed May 12 00:01:49 2006
00:01:49.793 suaReceiver.C EVENT: suaReceiver process started ...
00:01:52.393 suaReceiver.C EVENT: Connection established with pseudo terminal device
11:00:50.333 SignalClient.C EVENT: Signal 15 (Terminate) received for clean shutdown
LOG-STATUS: Log file opened on host ls1-tbw4 at Wed May 12 00:02:01 2006
00:02:01.046 suaReceiver.C EVENT: suaReceiver process started ...
00:02:02.077 LocalDataAcq.C PROBLEM: open() failed on terminal device file.
No such file or directory, errno = 2
Exiting...
```

The format of the log file consists of the following fields:

Time stamp	00:01:49 1999
File name	suaReceiver.C
Message Type	EVENT
Message string	Connection established with pseudo terminal device

8.14.2 newLDADdataNotification

The **newLDADdataNotification** process uses the file's name and a lookup table (**LDADinfo.txt**) to determine the type of data contained in the file and checks the LDAD products directory (**/data/Incoming**) periodically for ASOS/MicroART files.

The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process using **createAndSendIPCMesssage**. The message notifies **CO_serv** that there are ASOS/MicroART files in the **/data/Incoming** directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes or if an **fstat** on the file to transfer fails, the product gets moved to the **/data/lad/Problem** directory using **moveFileToProblemDir** process. Otherwise, the “processed” file is moved to the **/data/lad/Processed** directory.

► To Access and Read the newLDADdataNotification Log

This log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user **lad**:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today’s date.
- TYPE:** `ls -ltr newLDADdataNotification*`
 - Displays the current day’s **newLDADdataNotification** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed May 12 00:00:23 2006
00:00:23.202 newLDADdataNotification.c EVENT: newLDADdataNotification process started
00:00:23.205 newLDADdataNotification.c EVENT: Reading /data/Incoming/ every 20 seconds
00:14:03.204 newLDADdataNotification.c EVENT: Processing : /data/Incoming/SUACRWR3CIN.dat
00:14:03.880 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/SUACRWR3CIN.dat
00:29:03.223 newLDADdataNotification.c EVENT: Processing : /data/Incoming/SUACLERR7ILN.dat
00:29:03.951 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/SUACLERR7ILN.dat
00:44:03.273 newLDADdataNotification.c EVENT: Processing : /data/Incoming/raindata.dat
```

The format of the log file consists of the following fields:

Time stamp	00:00:23.202
File name	newLDADdataNotification.C
Message type	EVENT:
Message string	newLDADdataNotification process started

8.14.3 CO_serv

CO_serv initially sets up a TCP/IP socket and waits for connections. The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv**

using **createAndSendIPCmessage** routine. The message notifies **CO_serv** that there are processed files in the **/data/Incoming** directory. The notification received from **newLDADdataNotification** is passed to the **listener**.

► To Access and Read the CO_serv Log

The **CO_serv** log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.
- TYPE:** `ls -ltr CO_serv*`
 - Displays the current day's **CO_serv** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host ls1-rnk at Wed May 12 00:00:17 2006
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06 00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06 00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06 00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

8.14.4 listener

The **listener** reads the **LDADinfo.txt** config file, sets up a socket, binds its local address so that the Client (**CO_serv**) can send to it, and waits for the connection from the Client process. When the notification is received, the **listener** retrieves the ASOS/MicroART file from the **/data/Incoming** directory on the active LS and copies it to the **\$LDAD_DATA/tmp** directory on the PX. The **listener** sends a verification when it is finished.

The **listener** executes the **preprocessSUA.pl** script to preprocess the ASOS/MicroART data files. The **listener** receives the fully qualified data file, the hostname used by

notification routine, the port number of the process requiring notification upon completion of the preprocessing, and other necessary information about the ASOS/MicroART data file format from **CO_serv**.

► To Access and Read the listener Log

The **listener** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **listener** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.

- TYPE:** `ls -ltr listener*`
 - Displays the current day's **listener** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks like the following:

```
LOG-STATUS: Log file opened on host px2-rnk at Wed May 12 00:00:41 2006
00:00:41.606 listener.c EVENT: listener process started
00:01:39:002 listener.c EVENT: do_G_Msg: rcp completed for
SUAWBABVIAD.dat.1029783689
00:01:39:125 listener.c EVENT: do_G_Msg: Preprocessor Command Line=
</awips/ldad/bin/preprocessSUA.pl
/data/fxa/LDAD/tmp/SUAWBABVIAD.dat.1029783679 px
15009>
```

The format of the log file consists of the following fields:

Time stamp	00:01:39:002
File name	listener.c
Message type	EVENT:
Message string	do_G_Msg: rcp completed for SUAWBABVIAD.dat.1029783689

8.14.5 *preprocessSUA.pl*

The **preprocessSUA.pl** script preprocesses ASOS/MicroART data files containing surface observations for the LDAD text decoder. These data files are pulled across the security firewall from the external side and stored on the internal side in the **\$LDAD_DATA/tmp** directory. The file name uses the following convention: **SUA<AFOS_ID>.dat**, where SUA is a data type identifier corresponding to those listed in the **LDADinfo.txt** file and **<AFOS_ID>** is a seven- to nine-character AFOS product identifier.

The preprocessSUA.pl script enables WAN distribution of the processed files to the NCF. After the files are successfully disseminated over the WAN, the preprocessSUA.pl script moves the files from the \$LDAD_DATA/tmp directory to the \$FXA_DATA/archive/obs/scratch directory.

► To Access and Read the preprocessSUA Log

The `preprocessSUA` log resides on PX2 in a time-stamped directory under `$LOG_DIR`. Perform the following commands as user `ldad`:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`

 - Where `<yyyymmdd>` is today's date.

TYPE: `ps -ef | grep preprocessSUA`

 - Displays the **preprocessSUA** process. Notice the PID process.

TYPE: `ls -rtal preprocessSUA*`

 - Displays the latest logs for the **preprocessSUA** process.

NOTE: The `preprocessSUA` log containing the PID of the `preprocessSUA` process is the current log.

- TYPE:** tail -f <logname>
▪ Displays the log as it updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```
.974678485.200060512_000131
moveFile(): /data/fxa/LDAD/tmp/SUAPITRR7PIT.dat.974678485 moved successfully.
    Archival was successful...
Script Done ...
```

8.14.6 Reserved

8.14.7 distributeProduct

The **distributeProduct** process is a command-line interface to the **msg_send** utility program. The **distributeProduct** process supports most command line options provided by **msg_send**. The **distributeProduct** process instantiates a **MHSProduct** object that prepares the product for distribution and invokes the **msg_send** program. The subroutine **createTmpWanFile** creates and opens a temporary file. Only the product from the original ASOS/MicroART file is extracted and written into the temporary file, excluding the two-line communications header. This copy of the data is passed to the **distributeProduct** command line interface. The **distributeProduct** process prepends the appropriate communications header to the product before distribution across the WAN to the NCF.

► **To Access and Read the distributeProduct Log**

The **distributeProduct** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user **ldad**:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ps -ef |grep ldad
 - Displays the **ldad** processes.
- TYPE:** ls -ltr distributeProduct*
 - Displays the latest logs for the **distributeProduct** process.
- TYPE:** tail -f <logname>
 - Displays the log as it updates.

Log Message Format

An entry at the beginning of the log looks like the following:

```
LOG-STATUS: Log file opened on host px2-tbdw at Wed May 12 01:09:57 2006
01:09:57.219 MHSProduct.C PROBLEM: Product (/data/fxa/ispan/hydro/temp/A_format.974682596) is
empty.
01:09:57.312 MHSProduct.C EVENT: Sending attachments
(/data/fxa/ispan/hydro/temp/A_format.974682596)
only. Attachments are assumed to contain correct communications header.
01:09:58.528 MHSProduct.C EVENT: Product request (KSTORRZLDA) was successfully submitted to the
MHS request server for distribution.
Message Attributes:
```

Request ID: TBDW-32838
 To: DEFaulINCF
 Priority: 0
 Type: Routine
 Subject:
 Handling Action: 0
 01:09:58.529 MHSPProduct.C EVENT: TBDW-32838

The format of the log consists of the following fields:

Time stamp	01:09:58.528
File name	MHSPProduct.C
Message type	EVENT
Message string	Product request (KSTORRZLDA) was successfully submitted to the MHS request server for distribution

8.15 Using LDAD Scheduler

8.15.1 Using LDAD Scheduler to Modify Gauges with Session Files

Selecting the **Modify Gauges...** button in the LDAD Scheduler will cause the **Modify Gauges** dialog box to launch. Allow a few moments for it to open because it is a large file. Within this dialog box, you can create or modify gauges (see Exhibit 8.15.1-1).

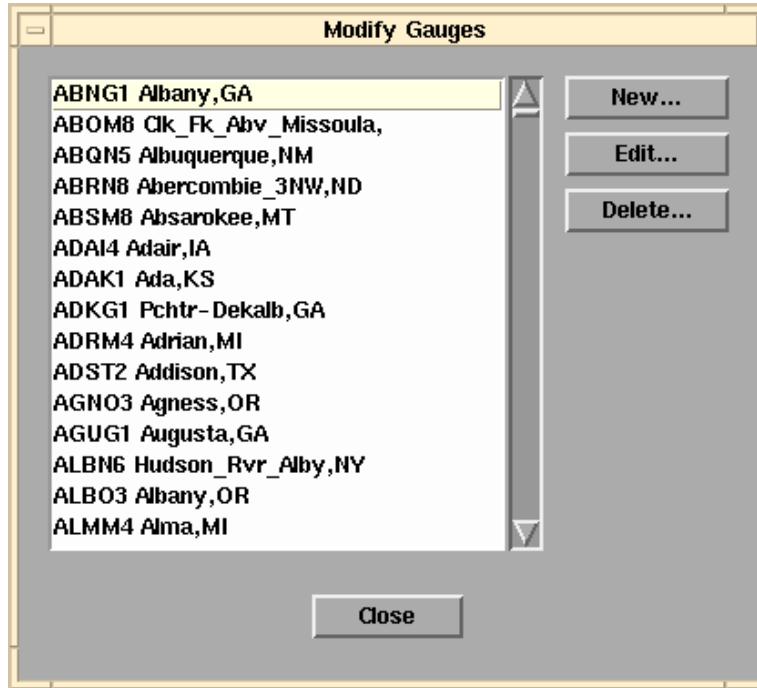


Exhibit 8.15.1-1. The Modify Gauges Dialog Box

- **Edit...:** In the **Modify Gauges** dialog box, the **Edit** button opens the **Edit Gauge** dialog box, which allows you to modify information for a selected gauge. The options are as follows:

- **ID:** The entry box is for the five-character gauge ID.
- **Non-NWS ID (if any):** The entry box is for a gauge ID that does not belong to the NWS, if it exists.
- **Description:** Gauge location or other helpful information.
- **Phone:** The dial-in phone number. You should check all gauges to verify their local or long distance number, including area codes. Be sure to include external access codes (i.e., some offices require that a 9 be dialed before an external phone number).
- **Terminal Server:** Terminal server name. The terminal server connects your machine to the modems that dial into the gauges.
- **Gauge Model:** This option menu specifies the type of gauge. Currently, the choices are “Handar,” “Campbell,” or “Sutron.” Depending on which option is selected, you may need to provide more information specific to the gauge model.
 - **Handar-Specific Information:** These elements will appear when you select “Handar” from the **Gauge Model** option menu.
 - **Collected Data:** This option menu specifies which data the gauge collects. The value is used to determine which session file is used. This option has no effect if you choose an alternate session file (the menu will display “Unspecified”). If the session file is being selected automatically, using the value “Unspecified” has the same effect as using the value “River Stage.”
 - **Campbell-Specific Information:** The element shown in Exhibit 8.15.1-2 will appear when you select “Campbell” from the **Gauge Model** option menu.
 - **Time Zone:** This option menu specifies the time zone used in data reported by the gauge.
 - **Setup...:** These menu buttons will open an **Edit Storage Area Reporting Format** dialog box.
 - **Has Second Storage Area:** Select this option if the gauge is equipped with a second storage area.

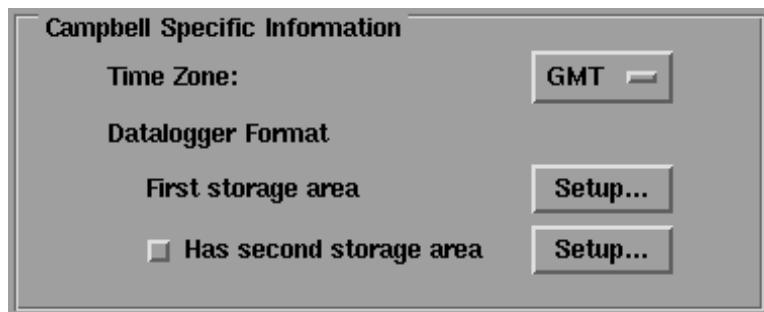


Exhibit 8.15.1-2. Campbell-Specific Information

- **Sutron-Specific Information:** The elements shown in Exhibit 8.15.1-3 will appear when you select “Sutron” from the **Gauge Model** option menu.

- **Time Zone:** This option menu specifies the time zone used in the data reported by the gauge.
- **Setup...:** This menu button will open an **Edit Storage Area Reporting Format** dialog box.

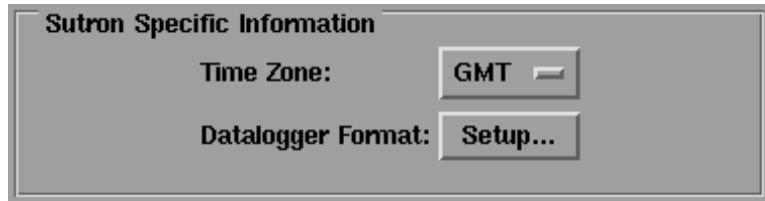


Exhibit 8.15.1-3. Sutron-Specific Information

- **Edit Storage Area Reporting Format:** This dialog box specifies the data reported by a Campbell or Sutron gauge and appears when you select the **Setup** buttons. It is shown in Exhibit 8.15.1-4 and has the following options:
 - **Array ID:** This entry box specifies the array ID associated with the storage area. This option is only present for Campbell gauges.
 - **Reported Data:** This list contains the data elements reported by the gauge. The order of elements in this list must match the order of the reported data. The list may contain up to eight elements.
 - **Add...:** This menu button will open a menu of the elements that gauges report. Select an item from the menu to add an element to the **Reported Data** list. Use the last menu item, “**(skip this field)**,” to indicate a reported element that you do not want to include in the collected data.
 - **Remove:** This menu button removes the selected element from the **Reported Data** list.
 - **Move up:** This menu button will move a selected list element one position.

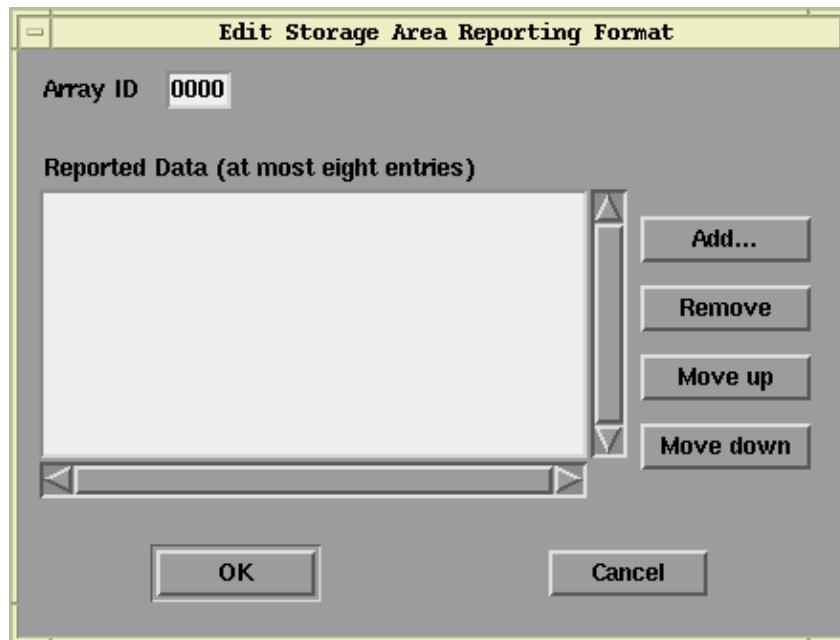


Exhibit 8.15.1-4. The Edit Storage Area Reporting Format Dialog Box

- **Move down:** This menu button will move a selected list element up or down one position.
- **OK:** This menu button acknowledges your changes and closes the dialog box.
- **Cancel:** This menu button closes the dialog box without applying any of your changes.
- **Automatically Select Session File:** If this option is selected, the Scheduler will determine which session file should be used. A session file is a text-based script that is used to collect data from an external user or disseminate data to an external user. Typically, the script is written in a UNIX scripting language.
- **Use Alternate Session File:** Selecting this option will enable the following options and allows you to choose a specific session file. There are also options for creating and modifying session files.
- **Choose...:** This menu button opens the **Choose Session File** dialog box, shown in Exhibit 8.15.1-5, and has the following options:

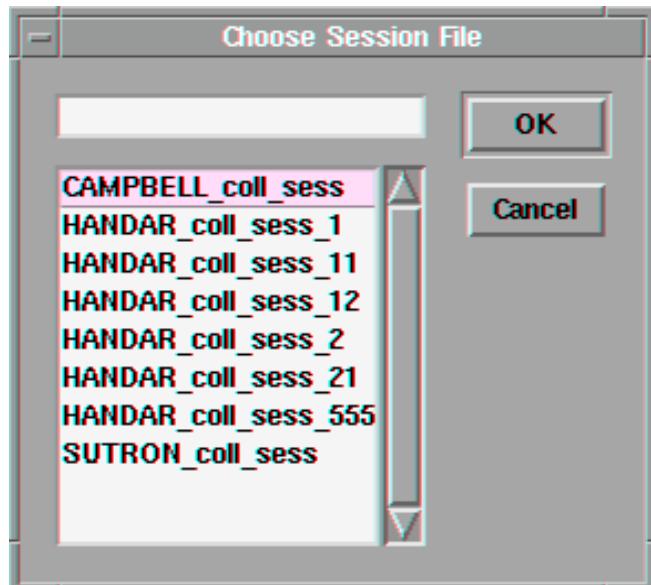


Exhibit 8.15.1-5. the Choose Session File Dialog Box

- **Entry Box:** You can enter a session file name in this entry box.
- **List of Sessions:** This is a list of session files. The list may not contain all valid session files, in which case you may simply enter the name in the Entry box.
- **OK:** Once you have selected a session file, this menu button closes the dialog box.
- **Cancel:** This menu button closes the dialog box without any changes.
- **Delete...:** In the **Modify Gauges** dialog box, this button is context sensitive. What it deletes depends on what is highlighted in the gauge list. A confirmation dialog box appears to verify your deletion.
- **Close:** This button closes the **Modify Gauges** dialog box.

► Editing Session Files

In the **Choose Session File** dialog box, you can activate editing by double-clicking on a session file name in the Session File Entry Line. It opens an **Edit Gauge** dialog box with the gauge ID, description, etc. Choosing “Use Alternate Session File” opens the **Edit Session File** dialog box, where you create or modify a session file to acquire data from a gauge (refer to Exhibit 8.15.1-6).

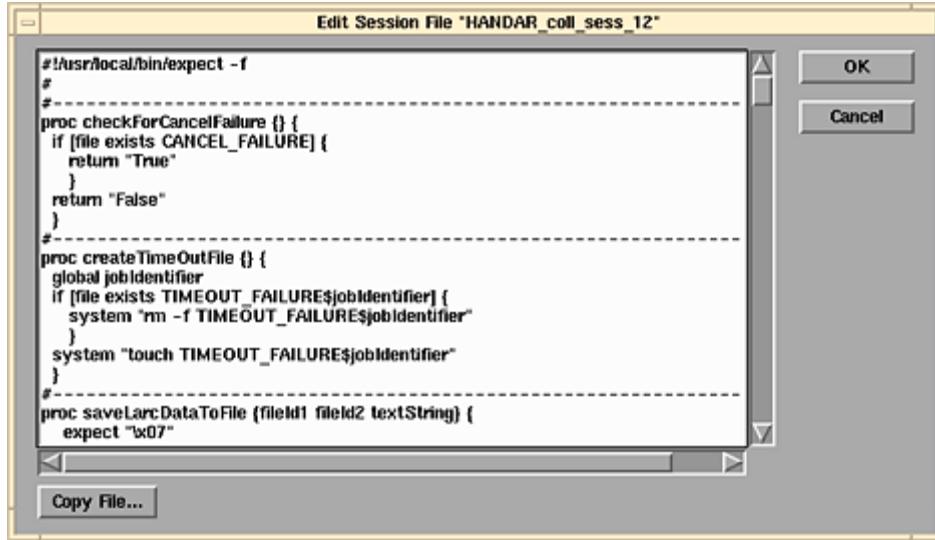


Exhibit 8.15.1-6. The Edit Session Dialog Box with the Contents of a Session File

LDAD session files are text-based files that are read by the LDAD Scheduler to acquire or disseminate data to or from a remote source. All of the gauges in the country were entered into a table prior to installation so you may only have to modify a preexisting gauge session file. To create a new gauge, refer to Chapter 9 of the AWIPS II CAVE-D2D User's Manual.

The LDAD Scheduler program executes text-based script files that run the UNIX **Expect** scripting language to acquire data from gauges. **Expect** is a Tcl-based toolkit for automating interactive programs. For data collection, the LDAD Scheduler uses the **Expect** script session file to control the commands that are sent to the gauge to look for specific responses, and to capture data when it is sent. Here is a section of an **Expect** script used to retrieve data from a gauge:

```

if { [checkForCancelFailure] == "True" } { exit }
    sleep 2
    expect {
        timeout {createTimeOutFile; exit}
        "OK" {send "atdt"}
    }
if { [checkForCancelFailure] == "True" } { exit }
    sleep 2
    expect {
        timeout {createTimeOutFile; exit}
        "BUSY" {createTimeOutFile; exit}
        "NO CARRIER" {createTimeOutFile; exit}
        "CONNECT"
    }
if { [checkForCancelFailure] == "True" } { exit }
    sleep 5
    expect {
        timeout {createTimeOutFile; exit}
        <I> {sleep 2}
    }
set fileId [open <O> w]

```

Any characters enclosed in angle braces (<>) will be replaced with values that are extracted from the **IdadScheduler** information for the particular gauge dialed.

1. <I>: When <I> (uppercase i) appears in an **Expect** clause, the name of the gauge that is being dialed is substituted for the <I> field.
2. **atdt** means “get the phone number for the gauge.” The Expect script executes the command **atdt <phone_number>** to dial the gauge.
3. <O> is replaced with the name of the temporary file to which the downloaded gauge data are stored.
4. <T> (not shown) is replaced with the Terminal Server machine name retrieved from the database.
 - **Copy File...:** In the **Edit Session File** dialog box, this button opens the **Copy File Contents** dialog box from which you can select a session file and view its contents. Refer to Exhibit 8.15.1-7.

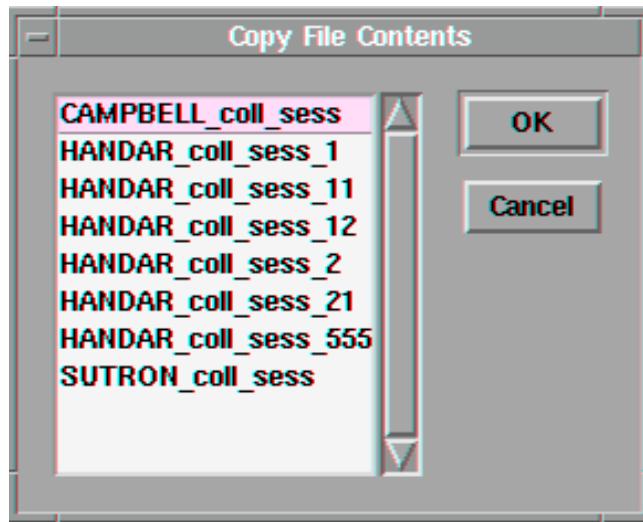


Exhibit 8.15.1-7. The Copy File Contents Dialog Box

- **OK:** Adds the selected session file and closes the **Copy File Contents** dialog box.
- **Cancel:** Closes the **Copy File Contents** dialog box without making any changes.
- **OK:** In the **Edit Session File** dialog box, this button acknowledges your modifications to the session file and closes the **Edit Session File** dialog box.
- **Cancel:** This button closes the **Edit Session File** dialog box without making any changes to a session file.

8.15.2 Using LDAD Scheduler to Add Users

The LDAD Scheduler allows system managers to add users and modify user information. Selecting the **Modify Users...** button on the LDAD Scheduler will cause a **Modify Users** window to appear (see Exhibit 8.15.2-1). This window provides options that allow you to create and/or modify database entries for external users. External users are outside persons or groups to whom you can send LDAD data and from whom you can receive LDAD data. You need to have site information for external users, such as the IP address, site login, and password, as well as relevant file names. The **Modify Users** dialog box contains all the options needed to set up an external user.

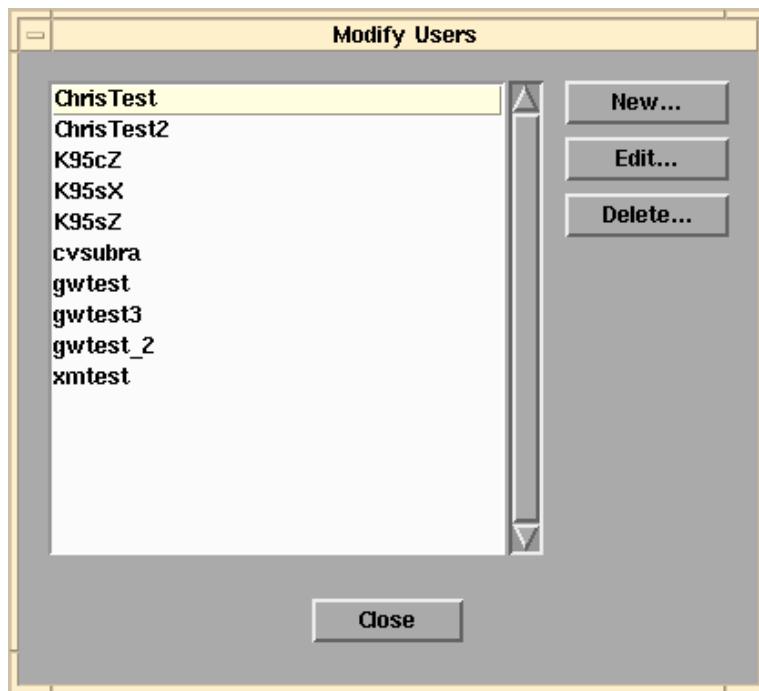


Exhibit 8.15.2-1. The Modify Users Dialog Box

► Adding a New User

Selecting the **New...** button opens the **New User** dialog box, shown in Exhibit 8.15.2-2, which contains entry lines for the necessary information needed to access a new user. The fields, which are the same ones used when modifying a user, are as follows:

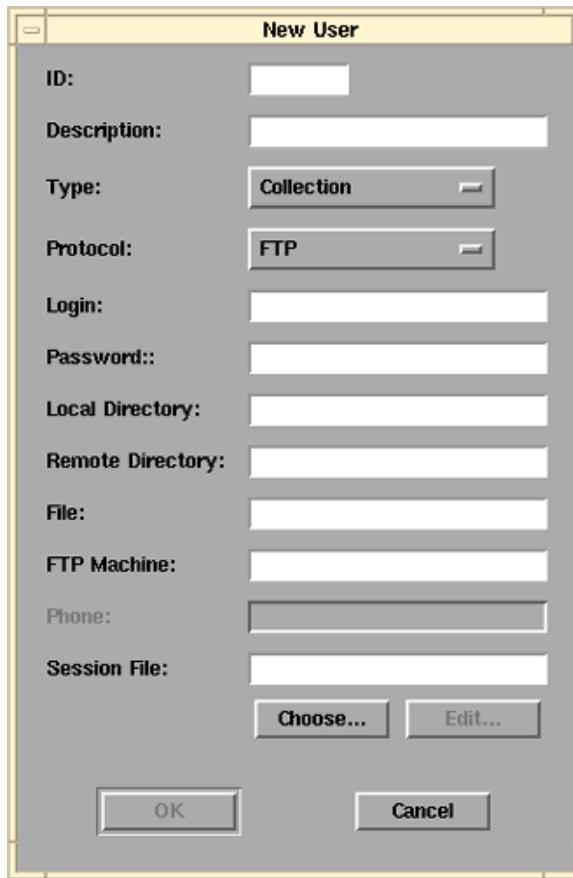


Exhibit 8.15.2-2. The New User Dialog Box

- **ID:** The name of the external user to be stored for the LDAD Scheduler.
- **Description:** Location and other useful information about the external user.
- **Type:** You must choose from this options menu whether this user is for collections or disseminations.
 - Choose **Collection** if you are gathering data from an external user.
 - Choose **Dissemination** if you are transmitting data or information to an external user.
- **Protocol:** An options menu with the list of LDAD-supported data transfer protocols (FTP, Kermit, Xmodem, Ymodem, and Zmodem). You and the external user need to both be using the same protocol.
- **Login:** If required, enter the external user's login name on his/her remote machine (to replace "<L>" in a session file).
- **Password:** If required, enter the encrypted password for the external user on his/her remote machine (to replace "<P>" in a session file).
- **Local Directory:** Enter the directory path on your system to which data files are to be stored (to replace "<D>" in a session file).

- **Remote Directory:** Enter the directory name of the external user to which you send data files (to replace “<R>” in a session file).
- **File:** Enter the file name to be collected or disseminated (to replace “<N>” in a session file).
- **File Transfer Protocol (FTP) Machine/Terminal Server:** This option is modal based on your selected protocol.
 - For FTP protocol, this option is labeled **FTP Machine**. Enter the FTP machine name or IP address of the user’s machine.
 - For Kermit, Xmodem, Ymodem, or ZModem, this option is labeled **Terminal Server**. You should enter **7e1out** for LARC gauges and **8n1out** for Campbell, Sutron, and Handar 555 gauges in this entry line.
 - This entry will replace “<A>” or “<T>” in the session file, use “<A>” for the IP address and “<T>” for the Terminal Server.
- **Phone:** This option is dimmed for FTP transfers. It is activated for Kermit, Xmodem, Ymodem, or Zmodem transfers; enter the phone number of the user’s system.
- **Session File:** You can enter a session file name in this entry box or choose one from the **Choose Session File** dialog box.

There are two buttons at the bottom of the **New User** dialog box, **Choose...** and **Edit**, but only the **Choose...** button can be selected initially.

- **Choose...:** Opens the **Choose Session File** dialog box from which you can select a session file.
 - **Entry Box:** This allows you to specify a session file name in this entry box.
 - **List of Sessions:** This is a list of existing session files.
 - **OK:** Once you have selected a session file, this menu button adds the selected session file.
 - **Cancel:** This menu button closes the **Choose Session File** dialog box without making any changes.
- **Edit...:** This menu button is activated when a session file name is entered in the **Session File Entry Line**. It opens the **Edit Session File** dialog box.

This menu option is where a user creates a session file to collect data from an external user, or disseminate data to an external user using the data transfer protocol set under the **Add New External User Basic Information** window. As mentioned previously, session files are text-based files that are read by LDAD Scheduler to acquire or disseminate data to or from a remote source. Here is an example of a typical session file for collecting data from an external user using the UNIX FTP data transfer protocol. Any characters in angle braces (<>) are replaced by the LDAD Scheduler with values that are extracted from the database for the external user for whom the session file is saved.

```
/usr/bin/ftp -i -n <A><<EOT
user <L><P>
ascii
lcd <D>
cd <R>
mget <N>
quit
EOT
```

1. <A> is replaced with the IP address of the external user's machine.
 2. <L> and <P> are replaced with the login name and password fields.
 3. <D> is the local directory on the active LS.
 4. <R> is the remote directory on the external user's machine.
 5. <N> is the name of the file that is to be sent (received) to (from) the external user.
 - a. Set the string before the <N> character to **mget** if the session file is for data collection.
 - b. Set it to **mput** if the session file is for data dissemination.
- **OK** acknowledges the entries in the **Edit User** dialog box and closes it.
 - **Cancel** closes the **Edit User** dialog box without making any changes.
 - **Close** closes the **Modify User** dialog box without making any changes.
 - **Submit** sends a highlighted request to the active LS to process your request. This button is enabled only if a request containing at least one ID is highlighted in the **Existing Requests List**. The status and results of the request appear automatically in the **Status** dialog box shown in Exhibit 8.15.2-3.
 - **Close:** The **Close** menu button closes the **LDAD Scheduler** dialog box.

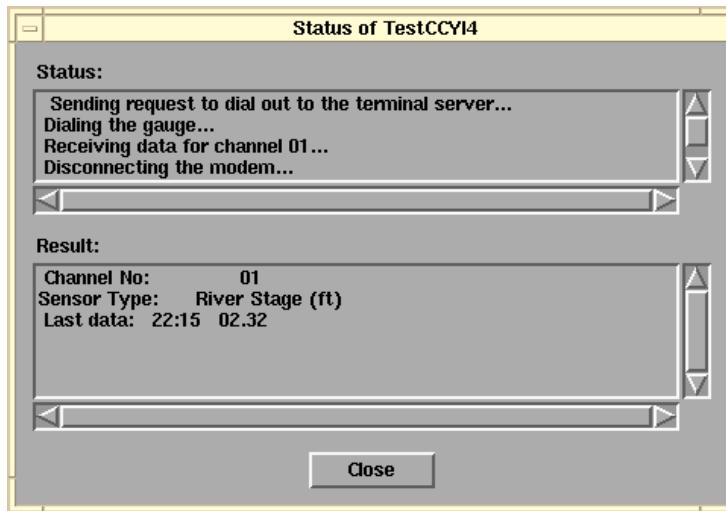


Exhibit 8.15.2-3. The Status Dialog Box

8.16 Alaska Profiler Data

The Alaska profiler application was implemented to allow the Alaska NWS forecast offices to display their local boundary layer profiler data on AWIPS by translating the data they decode and store into the netCDF format required by AWIPS.

Processes

```
LS      newLDADdataNotification
LS      CO_serv
PX2    listener
PX2    CommsRouter LDAD_ROUTER
PX2    DataController LDAD_ROUTER LdadController.config
PX2    routerStoreAkBlpEDEX
DX1    notificationServer
```

Environment Variables

\$LDAD_EXTERNAL_HOME	active ls, px1, px2: /ldad
\$LDAD_INTERNAL_LOGDIR	px1, px2: /awips/fxa/ldad/logs
\$LDAD_EXTERNAL_LOGDIR	px1, px2: /data/logs/ldad
\$LDAD_EXTERNAL_DATA	px1, px2: /data/ldad
\$LDAD_INTERNAL_DATA	px1, px2: /awips/fxa/ldad/data
\$LDAD_DECODED_DATA	px1, px2: /data/fxa/LDAD/decoded
\$LDAD_DATA	px1, px2: /data/fxa/LDAD
\$LOG_DIR	px1, px2: /data/logs/fxa
	Active ls: /data/logs/ldad

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
JNUStation.txt	(for routerStoreAkBlpEDEX)
LdadController.config	(for DataController LDAD_ROUTER)
LdadPatterns.txt	(for routerStoreAkBlpEDEX)
jnu.desc	(for routerStoreAkBlpEDEX)

Configuration File in /awips/fxa/data

edex-info.txt	(for routerStoreAkBlpEDEX)
---------------	----------------------------

LDADinfo.txt

This file should contain the following entry:

jnu	JNU	88	0	PROFILER	profiler	null	
-----	-----	----	---	----------	----------	------	--

Once the file is installed, this line should not be modified.

JNUStation.txt

The following is a sample of this file to show its format. To add a new profiler, use this format to create a new entry in the station table (* indicates a mandatory field):

sd		SDIA2		South Douglas Island AK		4		58.27725		-134.38898		GMT			1		
nd		NDIA2		North Douglas Island AK		45		58.33665		-134.56290		GMT			1		
lc		LMNA2		Lemon Creek AK		5		58.35610		-134.50810		GMT			1		

- **Provider ID:** Data provider station ID (*)
- **AFOS(HB5) ID:** The AFOS or Handbook 5 ID (NWS-assigned)
- **Station Name:** Text name of station
- **Elevation:** Station elevation (m) (*)
- **Latitude:** Station Latitude (decimal degrees, north positive) (*)
- **Longitude:** Station Longitude (decimal degrees, east positive) (*)
- **Local Time Zone:** Reporting time zone (e.g., UTC, PST8PDT) (*)
- **Location Description:** Station location/address (Text)
- **Station Type:** Station type (e.g., tower, surface, floating platform)
- **Number of Instruments:** Number of reporting instruments for the station
- **Number of Reporting Levels:** Number of data reporting levels. Level information should be provided in the instrument table
- **Maintenance/Calibration Schedule:** Frequency of maintenance/calibration
- **Site Description:** Text description of the site surroundings.

NOTE: Entries are sorted alphabetically by the gauge ID.

NOTE: This file must be identical on the PX2 and on the LS machines.

LdadController.config

This file enables the start up of LDAD- related processes. The Data Controller reads this file and executes its contents.

```

routerStoreText      true
routerShefEncoderEDEX  true
routerStoreEDEX      true
routerStoreAkBlpEDEX true
routerLdadDecoder    true
eof eof
  
```

Refer to Exhibit 8.16-1 for the Decode Alaska Profiler data flow diagram.

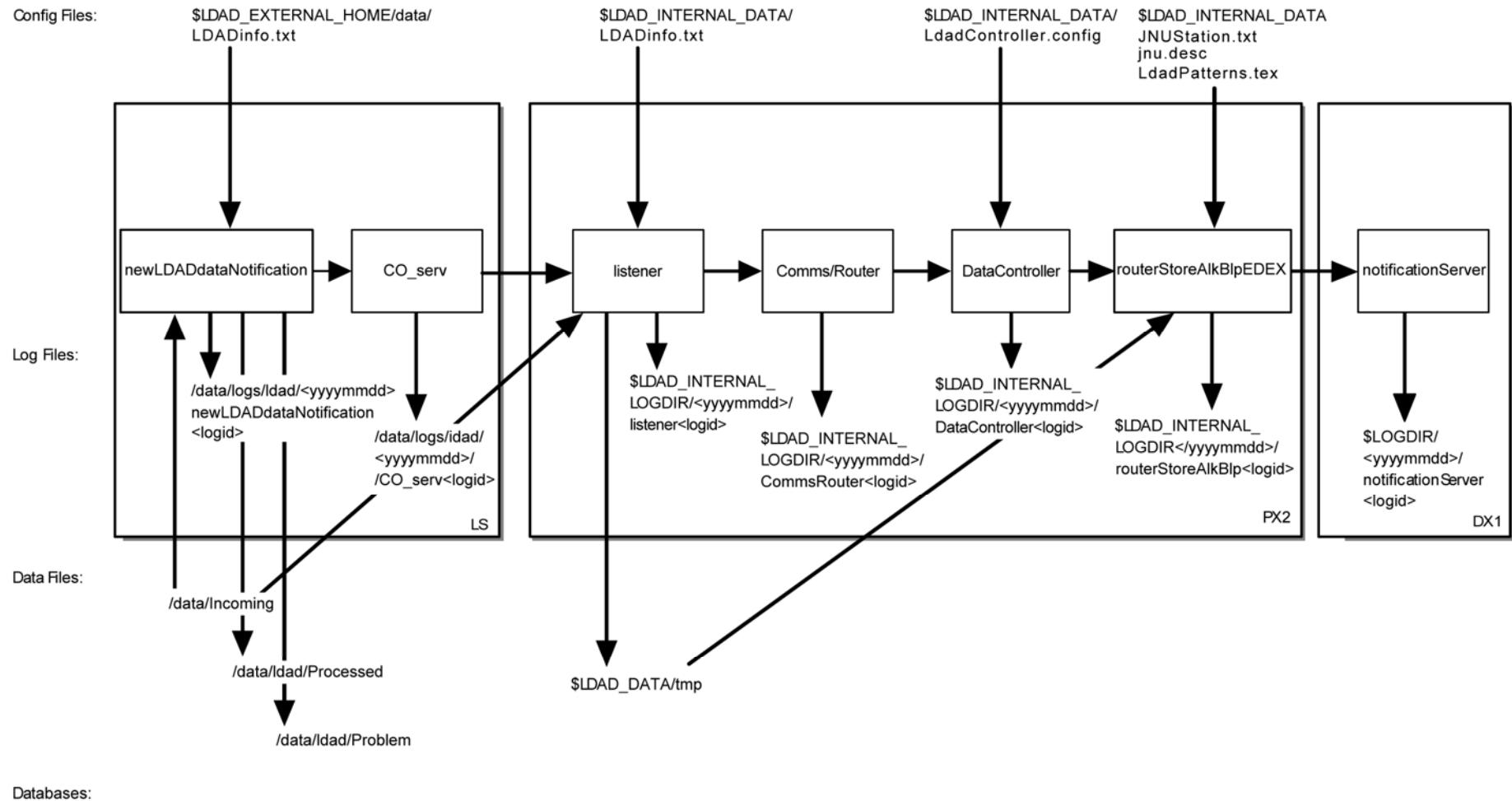


Exhibit 8.16-1. Decode Alaska Profiler Data

8.16.1 newLDADdataNotification

The **newLDADdataNotification** process uses the file's name to determine the type of data it contains and checks the LDAD products directory (**/data/Incoming**) periodically for Alaska profiler files.

The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process, using **createAndSendIPCmessage**, to notify it that there are Alaska profiler files in the **/data/Incoming** directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes, or if an **fstat** on the file to transfer fails, the product is moved to the **/data/ldad/Problem** directory using the **moveFileToProblemDir** process. Otherwise, the “processed” files are moved to the **/data/ldad/Processed** directory using the **moveFileToProcessedDir** process.

► **To Access and Read the newLDADdataNotification Log**

The **newLDADdataNotification** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.

- TYPE:** `ls -ltr newLDADdataNotification*`
 - Displays the current day's **newLDADdataNotification** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks similar to the following:

```
LOG-STATUS: Log file opened on host lsl-tbdw at Wed May 12 00:00:28 2006
00:00:28.906 newLDADdataNotification.c EVENT: newLDADdataNotification process
started
00:00:28.911 newLDADdataNotification.c EVENT: Reading /data/Incoming/ every 20
seconds
00:00:28.915 newLDADdataNotification.c EVENT: Processing :
/data/Incoming/jnundl9.dat.1040157788
13:45:41.926 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/jnundl9.dat.1040157788
```

The format of the log file consists of the following fields:

Time stamp	00:00:28.915
File name	newLDADdataNotification.c

Message type	EVENT:
Message string	Processing: /data/Incoming/jnund19.dat.1040157788

8.16.2 CO_serv

CO_serv initially sets up a TCP/IP socket and waits for connections. The notification received from **newLDAdataNotification** is passed across the firewall to the **listener** process on the internal side on the PX.

► **To Access and Read the CO_serv log**

The **CO_serv** log resides on the active LS in the **\$LOG_DIR** directory and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ls -ltr CO_serv*
 - Displays the current day's **CO_serv** logs from earliest to latest.
- TYPE:** tail -f <logname>
 - Displays the latest registered messages as the current log updates.

Log Message Format

An entry at the beginning of this log looks similar to the following:

```
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06
00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06
00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06
00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

8.16.3 *listener*

The **listener** reads the **\$FXA_DATA/LDAD/data/LDADinfo.txt** configuration file, sets up a socket, binds its local address so that the client (**CO_serv**) can send to it, and waits for the connection from the client process. When the notification is received, the **listener** retrieves the Alaska profiler file from the **/data/Incoming** directory on the active LS and copies it to the **\$LDAD_DATA/tmp** directory on the PX. The **listener** sends a verification when finished.

The **listener** executes the **\$FXA_HOME/lad/bin/null** script to preprocess the Alaska profiler data files. The **listener** receives the fully qualified data file, the hostname used by notification routine, the port number of the process to be notified when the preprocessing is completed, and other necessary information about the Alaska profiler data file format from **CO_serv**. Finally, the **listener** sends notification to the **CommsRouter LDAD_ROUTER** process that a product has been preprocessed.

► To Access and Read the **listener** Log

The **listener** log resides on PX2 in the **\$LOG_DIR** directory and records messages from the **listener** process. Perform the following commands as user **lad**:

- | | |
|--------------|--|
| TYPE: | <code>cd \$LOG_DIR/<yyyymmdd></code> |
| | ▪ Where <yyyymmdd> is today's date. |
| TYPE: | <code>ls -ltr listener*</code> |
| | ▪ Displays the current day's listener logs from earliest to latest. |
| TYPE: | <code>tail -f <logname></code> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of this log looks similar to the following:

```
00:00:12.616 listener.c EVENT: listener process started
20:43:10.068 listener.c EVENT: do_G_Msg: rcp completed for jnusd22.dat.104015778
20:43:10:136 listener.c EVENT: do_G_Msg: Preprocessor Command Line =
</awips/lad/bin/null /data/fxa/LDAD/tmp/jnusd22.dat.1040157788 px 15009>
```

The format of the log consists of the following fields:

Time stamp	20:43:10:136
File name	listener.c
Message type	EVENT:
Message string	do_G_Msg: Preprocessor Command Line = </awips/lad/bin/null /data/fxa/LDAD/tmp/jnusd22.dat.1040157788 px 15009>

8.16.4 LDAD_ROUTER

The **LDAD_ROUTER** (registered LDAD **CommsRouter**) is responsible for transporting data notifications from the data acquisition processes to the data controller processes. The main function of the **LDAD_ROUTER** is message passing; it does no data processing. The router provides a known location where the data acquisition processes can send data messages.

► **To Access and Read the CommsRouter Log**

The **CommsRouter** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user **ldad**:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - here <yyyymmdd> is today's date.
- TYPE:** ps -wef |grep ldad
 - Displays the **ldad** processes. Notice the PID of the **CommsRouter** process owned by user **ldad**.
- TYPE:** ls -rtal Comms*
 - Displays the latest logs for the **CommsRouter**.

NOTE: The **CommsRouter** log containing the PID of the **LDAD_ROUTER** process is the **LDAD_ROUTER's CommsRouter** log.

- TYPE:** tail -f <logname>
 - Displays the log as it updates.

Log Message Format

An entry in the log should look similar to the following:

```
20:42:59.742 CommsReceiver.C EVENT: NCF_ENTRY CRMMsg Pattern: ^[0-9.]*[^m]([^\s]( [^a]([^\s]([^\^q]([^\^c]))))).*\.decoded$|^jnu.*dat.[0-9]*$|(.*\.[0-9]+)|(^[0-9]*\.msas_qc\..*)$|.*/Text/.*\.[0-9]+
20:43:12.048 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: jnusd25.dat.1040157788 1 22
20:43:12.110 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: jnusd23.dat.1040157788 1 22
20:43:12.161 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: jnusd22.dat.1040157788 1 22
20:43:12.236 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: jnund19.dat.1040157788 1 22
20:43:12.370 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: jnusd24.dat.1040157788 1 22
20:43:12.841 CommsReceiver.C EVENT: NCF_ENTRY DSMsg: /data/fxa/LDAD/Text/RAWS.dat.1040157788 1 39
```

The log consists of the following fields:

Time stamp	20:43:12.048
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY DSMsg: jnusd25.dat.1040157788 1 22

The **LDAD_ROUTER CommsRouter** is started automatically at system reboot time or can be started manually. The **CommsRouter** runs continuously, exiting only when killed by the restart program.

8.16.5 DataController

The **DataController** is responsible for creating the decoder and storage processes (as child processes), restarting them if they exit, routing appropriate messages to them, and queuing incoming data messages until the decoder and storage processes are ready. As data messages are stored in the queue, the size of the processes grows.

The **DataController**'s main program creates a **DataRouting** manager object when it first starts up and invokes a member function to start the **routerStoreAkBlpEDEX** process by reading and executing the **LdadController.config** file. The file resides in **\$LDAD_INTERNAL_DATA** and contains the name of the process above (as well as the **routerLdadDecoder**, **routerStoreEDEX**, **routerStoreTextEDEX**, and **routerShefEncoderEDEX** processes) to start/restart, a restart flag, and end of file (**eof**) designator to alert the Data Routing Manager that there are no more processes listed in the file.

The **DataController** sends product-received notifications to the **DataController**. When the process first starts up, it sends messages containing its IPC address and process number to the **DataController**. The process sends the **DataController** a data request message and a ready-to-receive data message. In response, the **DataController** stores the process ID (PID) information and data requests, and sends a message to the requesting process (if a message is available). The **DataController** waits to receive another ready message from the process before sending any more data messages. The **DataController** queues any messages it receives from the **DataController** until the process sends another ready message.

► To Access and Read the DataController Log

The **DataController** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user **ldad**:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where **<yyyymmdd>** is today's date.

- TYPE:** `ps -wef |grep ldad`
 - Displays the **ldad** processes; note the PID for the **DataController** process owned by user **ldad**.

- TYPE:** `ls -rtal DataController*`
 - Displays the latest logs for the **DataControllers**. Look for the log name that contains the PID you noted above.

- TYPE:** `tail -f <logname>`

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look similar to the following:

```
20:42:47.366 ChildProcess.C EVENT: /awips/fxa/bin/routerStoreAkBlp started
20:42:59.741 getCommsData.C EVENT: Data Request message sent to LDAD_ROUTER.
20:43:12.052 CommsReceiver.C EVENT: NCF_ENTRY CDMsg: jnusd25.dat.1040157788 1 22
```

The log file consists of the following fields:

Time stamp	20:43:12.052
File name	CommsReceiver.C
Message type	EVENT:
Message string	NCF_ENTRY CDMsg: jnusd25.dat.1040157788 1 22

8.16.6 routerStoreAkBlpEDEX

The **routerStoreAkBlpEDEX** process is spawned by the **DataController** as specified in the **LdadController.config** file. The **routerStoreAkBlpEDEX** process sends a data request to the **DataController** for the Alaska profiler products it wishes to receive by specifying product header patterns of interest. When notified by the **DataController** that a product of interest has arrived, the **routerLdadDecoder** reads the files contained in the **\$LDAD_DATA/tmp** directory.

The **routerStoreAkBlpEDEX** process reads each file, decodes it and stores it in the **/data_store/ldad** directory. A notification is send to the **notificationServer**.

► To Access and Read the **routerStoreAkBlpEDEX** Log

The **routerStoreAkBlpEDEX** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date.
- TYPE:** `ps -wef |grep ldad`
- Displays the **ldad** process; note the PID of the **routerStoreAkBlpEDEX** process.
- TYPE:** `ls -rtal routerStoreAkBlpEDEX*`
- Displays the latest **routerStoreAkBlpEDEX** logs; look for the log file containing the PID noted above.
- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look similar to the following:

```
20:42:49.149 routerStoreAkBlpEDEX.C EVENT: routerStoreAkBlp.C; main(), pattern <^jnu.*dat.[0-9]*$>
20:42:59.734 routerStoreAkBlpEDEX.C EVENT: eventLoop() pattern <^jnu.*dat.[0-9]*$>
20:43:12.121 storeAkBlpEDEX.C EVENT: AK BLP File: </data/fxa/LDAD/tmp/jnundl9.dat.1040157788>
20:43:12.123 storeAkBlpEDEX.C EVENT: AK BLP File: </data/fxa/LDAD/tmp/jnusd22.dat.1040157788>
```

The log file consists of the following fields:

Time stamp	20:43:12.123
File name	storeAkBlpEDEX.C
Message type	EVENT:
Message string	AK BLP File: </data/fxa/LDAD/tmp/jnusd22.dat.1040157788>

8.16.7 notificationServer

The **notificationServer** informs its display clients that a new version of a display product has become available. Data acquisition processes send data notification messages to the **notificationServer**, and it acts as a bridge between the data acquisition and workstation display components of AWIPS.

► To Access and Read the notificationServer Log

The **notificationServer** log resides on the DX1 in the **\$LOG_DIR** directory. This log records messages from the **notificationServer** process. Perform the following commands as user fxa:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ls -ltr notificationServer*
 - Displays the current day's **notificationServer** logs from earliest to latest.
- TYPE:** tail -f <logname>
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of the log looks similar to the following:

```
00:00:31.822 NotificationServer.C DIAG: Tried to generate notifications for key: 3700
but the data notify time: 25.23 3HR does not match any times on the inventory.
00:00:35.948 GridAccessor1.C EVENT: Updating inventory info for MRF
-----
```

```
Process ID of anonymous target: 29574
Host: lx2-rnk
Port number: 3231
```

NORMAL PRIORITY CONNECTION Connection created: Jan 18 06 16:25:32 GMT. Initiated by connecting process.
 Last time this connection was used: Jan 18 06 23:55:49 GMT
 Sent messages since last stat: 4
 Bytes per message (Avg/Min/Max): 544/540/548
 No messages have been received since last stat report.

The log file consists of the following fields:

Time stamp	00:00:31.822
File name	NotificationServer.C
Message type	DIAG:
Message string	Tried to generate notifications for key: 3700 but the data notify time: 25.23 3HR does not match any times on the inventory.

8.17 Acquire and Process Radiosonde Replacement System (RRS) Data (for LDAD)

Data acquisition occurs through FTP over the local (site) LAN and by dial-in using a PPP connection to perform FTP file transfer of products. The **newLDADdataNotification** script checks the LDAD directory for RRS files. When a file is available, the **newLDADdataNotification** process passes the information to the **CO_serv** process. The **CO_serv** passes the message to the listener, which executes the **preprocessRRS.pl** script. The **preprocessRRS.pl** script copies the file to a **tmp** directory and stores it into the **fxatext** database using the **textdb** command line interface. When the file is successfully stored in the database, a notification is sent to the **textNotificationServer**. Finally, the data are routed to the NCF via the WAN.

Processes

```
LS      newLDADdataNotification
LS      CO_serv
PX      listener
PX      preprocessRRS.pl
PX      distributeProduct
```

Configuration Files (all in /data/fxa/LDAD/data)

LDADinfo.txt	(for listener)
rcv_action2codes.txt	(for distributeProduct)
siteCommission.txt	(for distributeProduct)
awips2afos.txt	(for preprocessRRS.pl)

Environment Variables

\$LDAD_EXTERNAL_HOME	active ls: /ldad
\$LDAD_INTERNAL_LOGDIR	px2: /awips/fxa/ldad/logs
\$LDAD_EXTERNAL_LOGDIR	px2: /data/logs/ldad
\$LDAD_EXTERNAL_DATA	px2: /data/ldad
\$LDAD_INTERNAL_DATA	px2: /awips/fxa/ldad/data
\$LDAD_DATA	px2: /data/fxa/LDAD
\$FXA_DATA	px2: /data/fxa
\$FXA_HOME	px2: /awips/fxa
\$LOG_DIR	px2: /data/logs/fxa

Refer to Exhibit 8.17-1 for the Acquire and Process RRS data flow diagram.

8.17.1 newLDADdataNotification

The **newLDADdataNotification** process uses the file's name and a lookup table (**LDADinfo.txt**) to determine the type of data the file contains and checks the LDAD products directory (/data/Incoming) periodically for RRS files.

The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** process using **createAndSendIPCmessage**. The message notifies **CO_serv** that there are RRS files in the /data/Incoming directory.

If **newLDADdataNotification** fails to receive confirmation from **listener** within 5 minutes or if an **fstat** on the file to transfer fails, the product is moved to the /data/lad/Problem directory using the **moveFileToProblemDir** process. Otherwise, the “processed” file is moved to the /data/lad/Processed directory.

► **To Access and Read the newLDADdataNotification Log**

This log resides on the active LS in the \$LOG_DIR directory and records messages from the **newLDADdataNotification** process. Perform the following commands as user lad:

- | | |
|--------------|---|
| TYPE: | <code>cd \$LOG_DIR/<yyyymmdd></code> |
| | ▪ Where <yyyymmdd> is today's date. |
| TYPE: | <code>ls -ltr newLDADdataNotification*</code> |
| | ▪ Displays the current day's newLDADdataNotification logs from earliest to latest. |
| TYPE: | <code>tail -f <logname></code> |
| | ▪ Displays the latest registered messages as the log updates. |

Log Message Format

An entry at the beginning of this log looks similar to the following:

```
00:00:23.202 newLDADdataNotification.c EVENT: newLDADdataNotification process started
00:00:23.205 newLDADdataNotification.c EVENT: Reading /data/Incoming/ every 20 seconds
00:14:03.204 newLDADdataNotification.c EVENT: Processing : /data/Incoming/RRSDENADRDEN0.man
00:14:03.880 newLDADdataNotification.c EVENT: waitForReply SUCCESS on
/data/Incoming/RRSDENADRDEN0.man
```

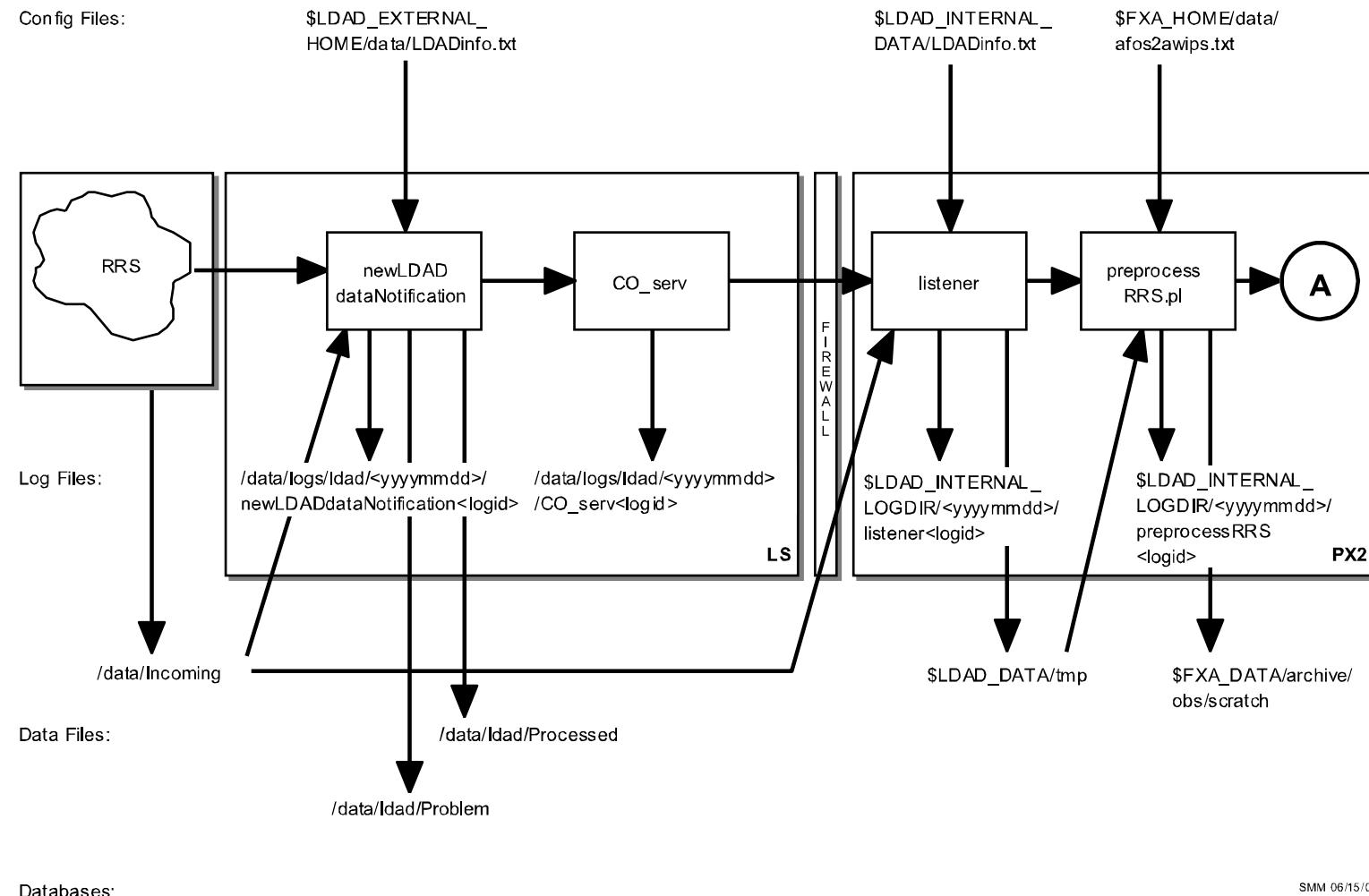


Exhibit 8.17-1. Acquire and Process RRS Data (for LDAD) (Page 1 of 2)

Config Files: \$FXA_DATA/workFiles/wanMsgHandling/recv_action2codes.txt

\$FXA_DATA/workFiles/wanMsgHandling/siteCommission.txt

Log Files:

\$LOG_DIR/
<yyyymmdd>/
distributeProduct
<logid>

PX2

Data Files:

/data/fxa/mhs/tmp

Databases:

SMM 07/13/10

Exhibit 8.17-1. Acquire and Process RRS Data (for LDAD) (Page 2 of 2)

The format of the log file consists of the following fields:

Time stamp	00:00:23.202
File name	newLDADdataNotification.c
Message type	EVENT:
Message string	newLDADdataNotification process started

8.17.2 CO_serv

CO_serv initially sets up a TCP/IP socket and waits for connections. The **newLDADdataNotification** process creates and sends an IPC message to the **CO_serv** using **createAndSendIPCMesssage** routine. The message notifies **CO_serv** that there are processed files in the **/data/Incoming** directory. The notification received from **newLDADdataNotification** is passed to the **listener**.

► **To Access and Read the CO_serv Log**

The **CO_serv** log resides on the active LS in the directory **\$LOG_DIR** and records messages from the **CO_serv** process. Perform the following commands as user ldad:

- TYPE:** cd \$LOG_DIR/<yyyymmdd>
 - Where <yyyymmdd> is today's date.
- TYPE:** ls -ltr CO_serv*
 - Displays the current day's **CO_serv** logs from earliest to late
- TYPE:** tail -f <logname>
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks similar to the following:

```
00:00:17.076 co_serv_main.c EVENT: CO_serv process started
00:05:07.791 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06 00:05:07 GMT
00:05:07.801 co_serv_main.c EVENT: R message Received by CO_serv.....
00:06:36.988 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06 00:06:36 GMT
00:06:36.995 co_serv_main.c EVENT: R message Received by CO_serv.....
00:13:48.283 co_serv_main.c EVENT: CO_serv received a socket connection at: May12 06 00:13:48 GMT
00:13:48.291 co_serv_main.c EVENT: R message Received by CO_serv.....
```

The format of the log file consists of the following fields:

Time stamp	00:00:17.076
File name	co_serv_main.c
Message type	EVENT:
Message string	CO_serv process started

8.17.3 *listener*

The **listener** reads the **LDADinfo.txt** config file, sets up a socket, binds its local address so that the Client (**CO_serv**) can send to it, and waits for the connection from the Client process. When the notification is received, the **listener** retrieves the RRS file from the **/data/Incoming** directory on the active LS, copies it to the **\$LDAD_DATA/tmp** directory on the PX, and sends a verification when it is finished.

The **listener** executes the **preprocessRRS.pl** script to preprocess the RRS data files. The **listener** receives the fully qualified data file, the hostname used by notification routine, the port number of the process requiring notification upon completion of the preprocessing, and other necessary information about the RRS data file format from **CO_serv**.

► To Access and Read the **listener** Log

The **listener** log resides on PX2 in the directory **\$LOG_DIR** and records messages from the **listener** process. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.

- TYPE:** `ls -ltr listener*`
 - Displays the current day's **listener** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry at the beginning of this log looks similar to the following:

```
00:00:41.606 listener.c EVENT: listener process started
00:01:39:002 listener.c EVENT: do_G_Msg: rcp completed for
RRSDENADRDEN0.man.1029783689
00:01:39:125 listener.c EVENT: do_G_Msg: Preprocessor Command
Line=</awips/ldad/bin/preprocessRRS.pl /data/fxa/LDAD/tmp/RRSDENADRDEN0.man.1029783689
px 15009>
```

The format of the log file consists of the following fields:

Time stamp	00:01:39.002
File name	listener.c
Message type	EVENT:
Message string	do_G_Msg: rcp completed for RRSDENADRDEN0.man.1029783689

8.17.4 *preprocessRRS.pl*

The **preprocessRRS.pl** script preprocesses RRS data files containing surface observations for the LDAD text decoder. These data files are pulled across the security firewall from the external side and are stored on the internal side in the **\$LDAD_DATA/tmp** directory. The file name uses the following convention:
RRS<station id><r><aaa><X>.<suffix>, where:

- **RRS** is a data type identifier corresponding to those listed in the **LDAInfo.txt** file
- <**station id**> is the RRS station identifier (e.g., IAD for Dulles International Airport)
- <**r**> is the release number
- <**aaa**> is the ascension number (1–9)
- <**X**> is the transmission number during flight (A–Z)
- <**suffix**> identifies the type of product and is one of the following:
 - MAN
 - SGL
 - ABV
 - FZL
 - ULG

The **preprocessRRS.pl** script calls the **textdb** command line interface to store the product into the **fxatext** database.

The script enables WAN distribution of the processed files to the NCF. After the files are successfully disseminated over the WAN, the **preprocessRRS.pl** script moves the files from the **\$LDAD_DATA/tmp** directory to the **\$FXA_DATA/archive/obs/scratch** directory.

► To Access and Read the **preprocessRRS** Log

The **preprocessRRS** log resides on DX2 in a time-stamped directory under **\$LDAD_INTERNAL_LOGDIR**. As user **fxa**,

TYPE: `cd $LDAD_INTERNAL_LOGDIR/<yyyymmdd>`
 ▪ Where <yyyymmdd> is today's date.

TYPE: `ps -ef | grep preprocessRRS`
 ▪ Note the **preprocessRRS** PID.

TYPE: `ls -rtal preprocessRRS*`
 ▪ Displays the latest **preprocessRRS** logs.

NOTE: The **preprocessRRS** log containing the PID of the **preprocessRRS** process is the current log.

- TYPE:**
- tail -f <logname>
 - Displays the log as it updates.

Log Message Format

An entry at the beginning of the log looks similar to the following:

```
getFileExt(): Name of the file is: /data/fxa/LDAD/tmp/RRSDENADRDEN0.man
first 2 letters of the file extension are: ma
ARGV[0]: /data/fxa/LDAD/tmp/RRSDENADRDEN0.man
getAfosPil(): afos ID = DENADRDEN
storeInTextDB(): storeCommand =
textdb -w DENADRDEN < /data/fxa/LDAD/tmp/RRSDENADRDEN0.man
Successful storage to text database.
RouteProductFile() called on file: /data/fxa/LDAD/tmp/RRSDENADRDEN0.man
sendWanMessage();
getAfosPil(): afos ID = DENADRDEN
getFileHeader() from: RRSDENRDEN.man
createAwipsID():
    Found match.
    awips ID = KBOUADRDEN

Preparing for WAN transmission...
AwipsId = KBOUADRDEN
wanHeader =TAA97 KBOU 111200MANGJT
createTmpWanFile(): was successful...
WMO ID = KBOU
WAN command is distributeProduct -a DEFAULTNCF KBOUADRDEN
/data/fxa/mhs/tmp/RRSDENADRDEN0.man
sendWanMessage(): successful submission...
removeTmpWanFile() was successful...
archiveobs():
moveFile(): /data/fxa/LDAD/tmp/RRSDENADRDEN0.man to
/data/fxa/archive/obs/scratch/RRSDENADRDEN0.man.20060512_133144
moveFile(): /data/fxa/LDAD/tmp/RRSDENADRDEN0.man moved successfully.
    Archival was successful...
Script Done ...
```

8.17.5 Reserved

8.17.6 distributeProduct

The **distributeProduct** process is a command-line interface to the **msg_send** utility program. The **distributeProduct** process supports most command line options provided by **msg_send**. The **distributeProduct** process instantiates a MHSProduct object that prepares the product for distribution and invokes the **msg_send** program. The **createTmpWanFile** subroutine creates and opens a temporary file. Only the product from the original RRS file is extracted and written into the temporary file, excluding the two-line communications header. This copy of the data is passed to the **distributeProduct** command line interface. The **distributeProduct** process prepends the appropriate communications header to the product before distribution across the WAN to the NCF.

► **To Access and Read the distributeProduct Log**

The **distributeProduct** log resides on PX2 in a time-stamped directory under **\$LOG_DIR**. Perform the following commands as user ldad:

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
■ Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr distributeProduct`
■ Displays the latest **distributeProduct** logs.
- TYPE:** `tail -f <logname>`
■ Displays the log as it updates.

Log Message Format

An entry at the beginning of the log looks similar to the following:

```
01:09:57.219 MHSPproduct.C PROBLEM: Product  
(/data/fxa/ispan/hydro/temp/A_format.974682596) is empty.  
01:09:57.312 MHSPproduct.C EVENT: Sending attachments  
(/data/fxa/ispan/hydro/temp/A_format.974682596)  
only. Attachments are assumed to contain correct communications header.  
01:09:58.52 MHSPproduct.C EVENT: Product request (KSTORRZLDA) was successfully  
submitted to the MHS request server for distribution.  
Message Attributes:  
Request ID: TBDW-32838  
To: DEFAULTNCF  
Priority: 0  
Type: Routine  
Subject:  
Handling Action: 0  
01:09:58.529 MHSPproduct.C EVENT: TBDW-32838
```

The format of the log consists of the following fields:

Time stamp	01:09:58.528
File name	MHSPproduct.C
Message type	EVENT:
Message string	Product request (KSTORRZLDA) was successfully submitted to the MHS request server for distribution.

8.18 LDM Setup and Data Ingest Configuration

LDM is a software package that is designed to select, capture, process, and distribute data products using client/server programs. The LDM software is copyrighted by UCAR in Boulder, CO.

The LDM Package, version 6.6.1, was preinstalled on the LDM systems. This package needs to be configured for local site usage; therefore the LDM package was installed and configured in a generic manner.

Currently, the LDM package is not supported by the AWIPS Prime Contractor. Sites that require assistance in configuring LDM will need to contact their Regional LDM/AWIPS focal point or monitor the ldad_x (or awipsinfo) listserve for further information.

Remember to COPY ALL changes made on LS2(LS3) to the other server since this cluster does not share hard drives. ALL changes made to one system must be copied to the other system. Below are the steps required to configure LDM.

8.18.1 LDM Setup

If a site needs to verify the configuration of ldm, perform the following steps:

TYPE: `ssh root@px2`
TYPE: `ssh ls2`
TYPE: `su - ldm`
TYPE: `vi /usr/local/ldm/.bashrc`

Verify that the following line exists in the file:

`umask 002`

Exit the file by typing: `esc :wq!`

Create the cron job for running the SCOUR cron. As user ldm perform the following:

TYPE: `vi /usr/local/ldm/etc/scour.conf`
Edit the file for the desired scour frequency.

TYPE: `crontab -e`
Verify the following line is in the file:
`0 0,12 * * * /usr/local/ldm/bin/scour`

Exit this file by typing: `esc :wq!`

TYPE: `vi /usr/local/ldm/etc/ldmadmin_pl.conf`
(Verify fully qualified domain name. Example: `ls1-xxx.awips.noaa.gov`)

TYPE: `ldmadmin start`

If there are no errors and LDM is running on LS2(LS3), then repeat the above steps for the second server in the Linux cluster (LS3/LS2), but do not start ingest with the `ldmadmin start` command. You can copy the modified files to the other server in order to save time. The files **ldmd.conf** and **pqact.conf** will also need to be edited to identify which data to ingest. These files are discussed later in this section.

8.18.2 LDM Data Ingest Configuration:

This is an overview of what needs to happen for successful ingest of data provided through LDM. The regional AWIPS Focal Point (AFP) should be able to provide more detailed assistance if needed.

1. The LDM software should have been setup on the LDAD servers when the new ls2 and ls3 cluster was installed. If LDM was not setup, perform the steps in the previous section.
2. Contact the Regional AWIPS Focal Point, for the IP address of the regional LDM server and its hostname. The AFP should also have information on how to get the necessary MADIS files for the desired products – through the region or from the MADIS ftp site.
3. ADD the regional LDM server IP address and hostname to the `/etc/hosts` file on both ls2 and ls3. If you don't add the IP address and hostname to the `/etc/hosts` file, you may not be able to connect to your regions LDM server.
4. Determine the LDM data types to ingest. The [MADIS](http://madis.noaa.gov) website, <http://madis.noaa.gov>, has information on what types of data is available.
5. Get the install instructions for the desired data (Instructions are available from MADIS or from your AFP) and configure the new product on the LDAD servers and the PX2 as required.
6. Make sure the new product is added to
`/data/fixa/LDAD/data/LDADinfo.txt`
7. If LDM is configured properly on the LDAD servers, and the product is also configured properly, it should be available in CAVE at this point.

8.18.3 LDM Processes and Configuration Files

ldmadmin-pl.conf

The configuration files for LDM are located in `/usr/local/ldm/etc/`. The **ldmadmin** utility is a Perl script intended for high level administration of an LDM system. This utility is site configurable by editing **ldmadmin-pl.conf**. The ldmadmin utility is an excellent tool for monitoring and troubleshooting LDM. Examples are provided in a later section.

The **ldmadmin-pl.conf** file defines the fully qualifying domain name of your LDAD. For the ls2 and ls3 cluster, ls1 is the name of the cluster pair, and must be used as the fully qualifying domain name.

```
[ldm@ls2-ntcb etc]$ more ldmadmin-pl.conf
```

```
# The fully-qualified domain-name of the computer system. If you have to set
# this manually, then do the following:
```

```

#      1) Replace "your.hostname.here" in the following commented-out statement
#         with the fully-qualified domain-name of the computer system;
#      2) Uncomment-out the same line by removing the leading hash (#) character;
#         and
#      3) Comment-out the "chop" line by inserting a leading hash (#) character.
#
# chop($hostname = `uname -n`);
$hostname = "ls1-ntcb.cr.awips.noaa.gov";

```

Ldmd.conf

The **ldmd.conf** file is a site configurable file that identifies the programs to run when LDM is started and which products to request from the regional LDM server. When configuring this file for a new LDAD product, only the *request* lines will be edited.

[ldm@ls2-ntcb etc]\$ more ldmd.conf

```

#####
# $Id: ldmd.conf,v 1.9 1998/10/07 16:51:16 rkambic Exp $
# Sample ldmd.conf for ldm5
#####
#
# Programs that share a queue with rpc.ldmd
# are started by it and are in the same process group.
#
exec  "pqexpire"
exec  "pqbinstats"
exec  "pqact"

#exec  "pqsurf"
#exec  "rtstats -h rtstats.unidata.ucar.edu"
#
# LDM5 servers request data
#
#      request      <feedset> <pattern> <hostname pattern>
#
request    FSL    ".*"    ldm.crh.noaa.gov
request    EXP    ".*"    ldm.crh.noaa.gov
request    IDS    ".*"    ldm.crh.noaa.gov

```

The main program for LDM is called **rpc.ldmd**. It establishes an internet port for incoming connections, reads the **ldmd.conf** file and; executes all programs specified in the EXEC entries; forks an asynchronous copy of itself for each REQUEST entry. The rpc.ldmd program places the new data products in the *product-queue*.

8.18.4 LDM Product-Queue

LDM uses a local data store called the product-queue, which is a memory mapped file that temporarily stores data products. The product queue typically holds about an hour's worth of data. The product queue is located in /usr/local/ldm/data/ldm.pq. Use the **pqcat** command as user ldm to view the product-queue.

The **pqact** program reads products from the *product-queue* and writes them to the **/data/Incoming** directory. The **pqact.conf** is a site configurable file for the pqact

program. The pqact.conf configuration file tells the pqact utility how to handle the data products.

```
[ldm@ls2-ntcb etc]$ more pqact.conf
```

```
#####
# $Id: pqact.conf,v 1.8 1998/09/01 23:16:18 davis Exp $
#
# This is an example pqact.conf file,
# with some example entries commented out.
#
# The entries in this file control the local disposition
# of data. There is a whole chapter in the LDM Site Manager's
# Guide devoted to this file. We suggest you read and understand that material.
# http://www.unidata.ucar.edu/packages/ldm/ldm5/LDM5-44.html#HEADING44-0

...
# HIRESW
FSL5  (eastarw.*)    FILE   -overwrite   /data/Incoming/\1
FSL5  (eastnmm.*)    FILE   -overwrite   /data/Incoming/\1
FSL5  (westarw.*)    FILE   -overwrite   /data/Incoming/\1
FSL5  (westnnm.*)    FILE   -overwrite   /data/Incoming/\1
#
FSL5  ^(.*GribF.*)
      FILE   -overwrite   -close /data/Incoming/\1
#
EXP    .*(GLERL.*)(\DAT)
      FILE   -overwrite /data/Incoming/\1.dat
```

When ldm data is received by ldad, it is temporarily stored in /data/Incoming until px2 (or px1 in failover) pulls the data into AWIPS. Once the ldm file is placed into /data/Incoming it is treated like all other LDAD data types (RRS, ASOS, River Gauge, etc...).

8.18.5 Useful LDM commands

```
[ldm@ls2-ntcb etc]$ ldmadmin restart
Flushing the LDM product-queue to disk...
Stopping the LDM server...
Waiting for the LDM to terminate
The product-queue is OK.
/usr/local/ldm/etc/pqact.conf is syntactically correct
Starting the LDM server...
[ldm@ls2-ntcb etc]$
```

```
[ldm@ls2-ntcb etc]$ ldmadmin pqactcheck
/usr/local/ldm/etc/pqact.conf is syntactically correct
[ldm@ls2-ntcb etc]$
```

```
[ldm@ls2-ntcb etc]$ ldmadmin check
LDM status report from the logs for the last 744 hours.

Currently ls2-ntcb is running 0 percent idle
load average: 0.36, 0.73, 0.82
```

```
Running version number Unknown.
LDM was restarted 1 time(s)
Last LDM restart at Jul 03 14:39:00
```

```
[ldm@ls2-ntcb etc]$ ldmadmin watch
(Type ^D when finished)
Aug 04 21:00:35 pqutil INFO: 9420 20080804210034.232 FSL5 000
LDAD.aws.AWS_dat
Aug 04 21:00:36 pqutil INFO: 3121 20080804210034.204 FSL5 000
LDAD.aws.AWS_dat
Aug 04 21:01:28 pqutil INFO: 3586 20080804210128.180 FSL5 000 LDAD.raw.dat
Aug 04 21:02:13 pqutil INFO: 1026 20080804210212.386 FSL5 000 LDAD.raw.dat
```

```
[ldm@ls2-ntcb etc]$ ldmadmin config

hostname: ls1-ntcb.cr.awips.noaa.gov
os: Linux
release: 2.6.9-55.EL
ldmhome: /usr/local/ldm
bin path: /usr/local/ldm/bin
conf file: /usr/local/ldm/etc/ldmd.conf
log file: /usr/local/ldm/logs/ldmd.log
numlogs: 7
log_rotate: 1
data path: /usr/local/ldm/data
product queue: /usr/local/ldm/data/ldm.pq
queue size: 400M bytes
queue slots: default
IP address: all
port: 388
PID file: /usr/local/ldm/ldmd.pid
LDMHOSTNAME: ls1-ntcb.cr.awips.noaa.gov
PATH:
/usr/local/ldm/bin:/bin:/usr/bin:/usr/sbin:/sbin:/usr/ucb:/usr/usb:/usr/
etc:/etc:/usr/bin:/usr/Kerberos/sbin:/usr/local/sbin/:/sbin:/bin:/usr/sb
in:/usr/bin:/usr/X11R6/bin:/root/bin:/home/ldad_student/hgalan1/bin:/lda
d/sbin
```

```
[ldm@ls2-ntcb tmp]$ ldmadmin stop
Flushing the LDM product-queue to disk...
Stopping the LDM server...
Waiting for the LDM to terminate
[ldm@ls2-ntcb tmp]$ ldmadmin queuecheck
The product-queue is OK.
[ldm@ls2-ntcb tmp]$ ldmadmin start
The product-queue is OK.
/usr/local/ldm/etc/pqact.conf is syntactically correct
Starting the LDM server...
```

```
[ldm@ls2-ntcb ~]$ ldmping ldm.crh.noaa.gov
Feb 04 23:04:46 INFO: State Elapsed Port Remote_Host
rpc_stat
Feb 04 23:04:46 INFO: Resolving ldm.crh.noaa.gov to 204.227.XXX.XXX took 0.00021
seconds
Feb 04 23:04:46 INFO: RESPONDING 0.006546 388 ldm.crh.noaa.gov
```

8.19 LDAD and PX2

As with all data that is placed in **/data/Incoming** on the LDAD server, LDM files are pulled into AWIPS by PX2 (or PX1 in failover).

- When the listener process on px2 copies the data from LDAD, it places the file into **/data/fxa/LDAD/tmp** where it will stay until processed.
- If a required preprocessor is not available or if there is no entry in either the awips2afos.txt or afos2awips.txt, the file will be moved to **/data/fxa/LDAD/Unknown**.
- If a preprocessor cannot process the file, it will be moved into the **/data/fxa/LDAD/Bad** directory.
- If the data is successfully decoded, a copy of the decoded file is placed in the **/data/fxa/LDAD/decoded** directory.

The preprocessor scripts for LDM data should be placed on the PX2 *and* PX1 according to the instructions provided by MADIS. Some data types *do not* require preprocessors.

Note: Contact your regional AWIPS Focal Point to find out how to get the install instructions and the preprocessors.

8.19.1 LDADinfo.txt

The LDADinfo.txt file specifies which preprocessor to call for a particular data type. When a new type of data is added to the ldm ingest, a preprocessor may be needed on the px2 (and on px1 for failover). The data and its preprocessor must be added to the **LDADinfo.txt** file unless otherwise stated in the MADIS documentation for that preprocessor.

```
[root@px2-ntcd ~]# cd /data/fxa/LDAD/data
```

```
[root@px2-ntcd ~]# more LDADinfo.txt
```

#data	netCDF plot	LDAD	storage	preprocess	
#type	.txt	dataKey	type	directory	script
SUA	SUA	256 257 CVS_TYPE	mesonet	preprocessSUA.pl	
RRS	RRS	256 256 CVS_TYPE		preprocessRRS.pl	
WAN_NWWS	OUP	256 257 CVS_TYPE	mesonet	preProcessWAN_NWWS.pl	
#mm5	mm5	87 86 CVS_TYPE mesonet	getAFile.csh		
#testIPRPCP	testIFLOWS 89 90 CVS_TYPE hydro		testIFLOWS.pl		
#testMESONET	testMESONET 87 86 CVS_TYPE mesonet		testMESONET.pl		

8.19.2 PX2 Log Files

The log files on PX2 (PX1 in failover) are in **/data/logs/ldad/<date>**.

```
[root@px2-ntcb ~]# cd /data/logs/ldad/(today's Date)
[root@px2-ntcb 20080128]# pwd
/data/logs/ldad/20080128
[root@px2-ntcb 20080128]# ls
CommsRouter9208px2-ntcb000004    routerLdadDecoder9240px2-ntcb003003
DataController9234px2-ntcb000004  routerShefEncoder9238px2-ntcb003006
distributeProduct                  routerStoreNetcdf9239px2-ntcb003004
listener                      routerStoreText9237px2-ntcb003005
listener8645px2-ntcb000009        watchDogInternal9269px2-ntcb000015
pollForData21712px2-ntcb000015
```

listener log file

- If a product was successfully copied from LDAD, you will see an event “rcp completed” for the data file.
- If a preprocessor was caller for the file, then a “Preprocessor Command Line” event will follow immediately after the “rcp completed” entry. Notice in the example below that the log file indicates which preprocessor was used against the data file.
- If a preprocessor is not used, there will *not* be a “Preprocessor Command Line” event. This only indicates that no preprocessor was required for the data file.

```
[root@px2-ntcb 20080128]# tail -f listener
23:06:41.752 listener.c EVENT: do_G_Msg: rcp completed for
mndotmet.dat.1201561601

23:06:41.755 listener.c EVENT: do_G_Msg: Preprocessor Command Line =
</awips/ldad/bin/preprocess_mndotmet.pl
/data/fxa/LDAD/tmp/mndotmet.dat.1201561601 px2f 15009>

...
...
23:06:42.146 listener.c EVENT: do_G_Msg: rcp completed for KYTC-
RWIS.dat.1201561601
23:06:42.156 listener.c EVENT: do_G_Msg: rcp completed for
NonFedAWOS.dat.1201561601

[root@px2-ntcb 20080128]#
```

routerLdadDecoder log file

- The routerLdadDecoder log file indicates whether or not a product was successfully decoded.
- In most cases, if the file could not be decoded, a reason will be given.

- When a file fails to be decoded, the log file indicates that it was moved into the /data/fxa/LDAD/bad directory
- When a file is successfully decoded, the log file indicates that a copy of the file was moved to /data/fxa/LDAD/decoded and the decoded file was sent to the LDAD_ROUTER

```
[root@px2-ntcb 20080229]# tail routerLdadDecoder9240px2-ntcb000053
00:45:33.107 LdadRoutines.C EVENT: Processing [1/1] = ddmst.dat.1204245932
00:45:33.108 DecodeLdad.C PROBLEM: Unable to decode LDAD product!,
</data/fxa/LDAD/Raw/ddmst.dat.1204245932>

00:45:33.108 LdadUtils.C EVENT: mv /data/fxa/LDAD/Raw/ddmst.dat.1204245932
/data/fxa/LDAD/Bad/ddmst.dat.1204245932

00:46:13.172 LdadRoutines.C EVENT: Processing [1/2] = AWS_KS.dat.1204245972
00:46:13.178 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(),
'$LDAD_DECODED_DATA/ 1204245972.AWS_KS.decoded', sent to
LDAD_ROUTER

00:46:13.178 LdadRoutines.C EVENT: Processing [2/2] = AWS_MO.dat.1204245972
00:46:13.182 LdadRoutines.C EVENT: LdadRoutines::pingLdadRouter(),
'$LDAD_DECODED_DATA/ 1204245972.AWS_MO.decoded', sent to LDAD_ROUTER
```

8.20 LDAD Troubleshooting

8.20.1 LDAD Disk Removal

Unlike other disks in AWIPS, the LDAD disks are **COLD-Swap**. Never attempt to remove a disk while the server is powered on (green light on the power button). Use the following procedure to remove a disk:

1. Login as root into the server that the disk will be removed from (LS2 or LS3).
2. Type **shutdown -h now**
3. When the server is down, power off the LS. (Either the orange light or no light on the power switch is ok.)
4. Remove the drive from the LS by pushing on the red button and pulling on the black lever.

8.20.2 LDAD Server Disk Mirroring Procedure

The LDAD Servers contain two 80GB SATA hard drives and are configured for Raid 1 (Full Mirror). The disks are mirrored via the Raid Controller, which can be accessed at boot time. If a site needs to replace one of the two disks due to a failure, perform the following steps to break the mirror, install the new disk (power down first) and create the mirror:

1. Connect an external monitor and keyboard to the back of the LS server.

2. Reboot the system. During the System boot (not O.S. but firmware booting) the “ILO” configuration displays prompting the user to press F8. WAIT until the boot process goes to the next device boot which will be the RAID controller.
3. At the RAID controller boot, the user will again be prompted to press “F8”. NOW, press **F8** to enter the RAID controller setup menu.
4. The user will now have two options to select from at this Main Menu (*HP Embedded SATA Raid Controller*):

Array Configuration Utility

Disk Utility

5. Select **Array Configuration Utility**

6. User will be presented with a new menu listing 4 Options:

Manage Arrays

Create Arrays

Add/Delete Hot Spare

Configure Drives

7. Select **Manage Arrays**.

8. The array *00 Mirror Raid1 74.3GB* will be highlighted and options will be presented in the bottom left of the screen.
9. Press **Delete**. User will be presented with a Pop-Up window (“Array Properties”) querying the user with the following:

Delete

Cancel

10. Select **Delete** and press **Enter**.

11. User will be presented with another popup window (Yes/No): Type **y** and press return.

12. User will be presented with a new window (*Deleting Information*) with the following options:

[none] [member #0] [member #1] [Both]

13. Select **None** and press **Enter**.

14. User is presented with the status message *No Arrays Present* – Press any key to continue. Press the **space bar**. The Menu seen in step 6 returns.

15. Press **Esc** to exit to the Main Menu seen in step 4.

16. Press the **Esc** key to exit the configuration utility. User will be prompted with a Yes/No box to confirm exiting. Select **Yes** to exit back to the boot-up cycle of the server.

17. The server will begin to reboot – press the **Power Off** button immediately to power down the system.
18. Remove the defective hard drive and insert the replacement hard drive.
19. Power on the system.
20. Monitor the boot sequence and Press **F8** at the Raid configuration prompt.
21. Select **Array Configuration Utility** at the Main Menu.
22. Select **Add/Delete Hotspare** at the following Menu.
23. A status window indicating the drives and their status displays. Select the drive that was replaced. Drive 00 is the drive to the far left when facing the server. Drive 01 is the drive to the right. The status window will indicate the new drive by showing detailed status and disk drive specifications.
24. Command options will be displayed in the bottom left of the screen. Press the <**INS**> key to select the drive highlighted.
25. Press **Enter** to complete the selection.
26. User will be prompted with *Do you want to create a spare? (Yes/No)*: type **y**
27. User will be returned to the previous menu as seen in step 5. Select **Manage Arrays**.
28. The highlighted array will be *00 mirror RAID1 74.3GB*. Command options will be displayed in the bottom left of the screen.
29. Press **Ctrl+R** to rebuild the array.
30. The new disk is now being populated. Time to complete is approximately 45 minutes.
31. When done, the message *Building the array is successfully completed* displays – Press any key to continue. Press the **space bar** to continue.
32. Press the **Esc** key to exit to the Main Menu.
33. Press the **Esc** key to exit the configuration utility. Select/enter **Yes** to continue exiting. The system will now reboot. Monitor the boot process. The Raid Controller should indicate that TWO physical drives are present and that ONE logical drive is present/configured. If this is the case, then the system is configured properly.

This completes the LDAD Server Disk Mirroring Procedure/Setup.

8.20.3 Fax Modem troubleshooting

As with all data that is placed in /data/Incoming on the LDAD server, LDM files are pulled into AWIPS by PX2 (or PX1 in failover).

If there seems to be a problem with the fax queue filling up with unsent faxes, run the **faxstat** command on the active LS. It's a good sign if the fax queue status is *Running and idle* or *Initializing server* or something like *Sending job 13....* However, it's likely a bad sign if the fax queue status is *Waiting for modem to come ready...*

Sometimes even in normal operation the *Waiting for modem to come ready* message appears, but if the status line does not change even after several minutes, the modem could probably use a power-cycling. Switch it off, wait about 30 seconds, then switch it back on. Then run **service heartbeat restart** on the active LS, wait a minute or so for heartbeat to reset itself, and the faxes should start running again. Running faxstat now should give one of the acceptable messages rather than "Waiting for modem to come ready."

Check the fax modem dip switch settings (MultiTech Fax Modem):

Switch: **1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16**
Position: **U U D U U U D D D U D D U U D D**

If switch settings were changed, power cycle the modem by turning the power switch off and then on.

Chapter 9

Background Applications

Chapter 9. Background Applications

Table of Contents

	<i>Page</i>
9.0 Background Applications: Introduction	1
9.1 Climatological Reports Formatters for the NOAA Weather Radio and Weather Wire Service	1
9.1.1 Configuration Files and Environment Variables	1
9.1.2 hmdb Database Tables	4
9.1.3 Processes	5
9.1.4 GUIs	16
9.1.5 Climatological Reports Formatter Setup	20
9.1.5.1 Configure Global Climate Parameters	21
9.1.5.2 Establishing the Historical Database.....	23
9.1.5.2.1 Entering Historical Data Manually	23
9.1.5.2.2 Importing the Data	32
9.1.5.3 Configuring Products	36
9.1.5.3.1 Report Type, Report Configuration, Select Stations for Product.....	38
9.1.5.3.2 Weather Elements	40
9.2 Record Climate	44
9.2.1 Configuration Files and Environment Variables	45
9.2.2 Processes	46
9.3 Hourly Weather Roundup Formatter for NWR and NWWS	57
9.3.1 Configuration Files and Environment Variables	58
9.3.2 Processes	60
9.3.3 Setting up the HWR NWWS Application	66
9.3.3.1 Identify the Products to be Produced	66
9.3.3.2 Setting Up the HWR NWWS Application	66
9.3.3.3 Creating a Station List.....	69
9.3.3.4 Updating Station PILs	72
9.3.3.5 Treatment of Missing Data.....	74
9.4 Hourly Weather Roundup Formatter for the NOAA Weather Radio	75
9.4.1 Configuration Files and Environment Variables	76
9.4.2 Processes	77
9.4.3 Setting up the HWR NWR Application.....	87
9.4.3.1 Identifying the Products to be Created	88
9.4.3.2 Selecting the HWR NWR GUI Options	88

9.4.3.3	Creating a Station List.....	91
9.4.3.4	Creating a Broadcast Format File.....	99
9.4.3.5	Creating a Default Format File.....	108
9.4.3.6	Providing Additional Variability for the NWR Broadcasts	111
9.4.3.7	Treatment of Missing Data.....	114
9.4.3.8	Cautions 115	
9.5	Aviation Forecast Preparation System.....	116
9.5.1	System Overview	116
9.5.1.1	Name and Event Server.....	117
9.5.1.2	Data Ingest Server	118
9.5.1.3	Data Request Server	119
9.5.1.4	Transmission Server	119
9.5.1.5	Client Programs.....	121
9.5.2	Configuring AvnFPS	121
9.5.2.1	Files in etc	122
9.5.2.2	TAF Configuration Files	131
9.5.2.3	TWEB Configuration Files	138
9.5.2.4	X Resources Configuration Files	139
9.5.2.5	Climatological Data.....	141
9.5.3	Starting and Stopping AvnFPS	143
9.5.3.1	Starting AvnFPS Servers.....	143
9.5.3.2	Stopping AvnFPS Servers	145
9.5.4	Avnsetup	146
9.5.4.1	Editing Monitoring Rules.....	146
9.5.4.2	Editing AvnFPS TAF Site Information.....	149
9.5.4.3	Editing AvnFPS TAF Site Templates	151
9.5.4.4	Editing AvnFPS TAF Product Definition	151
9.5.4.5	Editing TWEB Route Information using AvnFPS	153
9.5.4.6	Editing the AvnFPS TWEB Route Template	154
9.5.4.7	Editing TWEB Product Definition using AvnFPS.....	154
9.5.4.8	Creating AvnFPS Database Triggers	156
9.5.4.9	Using the AvnFPS Text Editor.....	157
9.5.5	Configuring IFPS to Send Gridded Data to AvnFPS	158
9.5.6	Logging.....	159
9.5.7	AvnFPS Troubleshooting	160
9.5.7.1	Overall AvnFPS Server Health	160
9.5.7.1.1	Diagnostic Tools	161
9.5.7.2	Log Files.....	162

9.5.7.3	Data Ingest.....	162
9.5.7.3.1	Data Ingest Troubleshooting.....	163
9.5.7.3.2	Specific Hints for Specific Data Types.....	163
9.5.7.4	Product Transmission	163
9.6	NOAA Weather Radio Editor	164
9.6.1	NWR Editor Setup and Configuration.....	164
9.6.2	NWR Editor Event Logging	166
9.6.3	The NWR Editor GUI.....	168
9.6.4	NWR Editor Application Design Overview	171

List of Exhibits

Exhibit 9.1.3-1.	Climatological Reports Formatter for NWR and NWWS (Daily).....	7
Exhibit 9.1.3-2.	Climatological Reports Formatter for NWR and NWWS (Monthly/Seasonal/Annual).....	8
Exhibit 9.2.2-1.	Record Climate Data Flow	47
Exhibit 9.3.2-1.	Hourly Weather Roundup Formatter for NOAA Weather Wire Service	61
Exhibit 9.3.3.2-1.	The Hourly Weather Roundup GUI.....	66
Exhibit 9.4.2-1.	Hourly Weather Roundup Formatter for NOAA Weather Radio.....	78
Exhibit 9.4.3.3-1.	Sample Station List for the NWR.....	92
Exhibit 9.4.3.3-2.	Symbolic Words for Use in Comment Lines	93
Exhibit 9.4.3.4-1.	Sample Broadcast Format File for NWR	100
Exhibit 9.4.3.4-2.	Symbolic Text for Use in Broadcast Format Files	101
Exhibit 9.4.3.5-1.	Sample Default Format File	108
Exhibit 9.5.1-1	Data Flow Diagram.....	117
Exhibit 9.5.4-1.	avnsetup Main GUI	146
Exhibit 9.5.4.1-1.	AvnFPS Monitoring Criteria Editor.....	147
Exhibit 9.5.4.2-1.	AvnFPS TAF Site Info Editor.....	149
Exhibit 9.5.4.4-1.	AvnFPS TAF Product Configuration Editor.....	152
Exhibit 9.5.4.5-1.	AvnFPS TWEB Route Info Editor.....	153
Exhibit 9.5.4.7-1.	TWEB Product Configuration Editor	155
Exhibit 9.5.4.8-1.	AvnFPS Trigger Editor.....	156
Exhibit 9.5.4.9-1.	AvnFPS Setup Editor	157
Exhibit 9.5.4.9-2.	AvnFPS Text Editor Dialog	158
Exhibit 9.6.2-1.	Sample NWR Editor nwrWish Log File Where debug=on.....	167
Exhibit 9.6.2-2.	Sample sendToNWR logStreamExpect Log File	168
Exhibit 9.6.3-1.	NWR Editor GUI Access.....	168
Exhibit 9.6.3-2.	The NWR EditorGUI	170

Exhibit 9.6.4-1. NWR Editor Application Structure High-Level Design Overview	172
Exhibit 9.6.4-2. NWR Editor Application Structure – System View.....	172

List of Tables

Table 9.1.1-1. Environment Variables in CLIMATE.....	1
Table 9.1.4-1. Climate GUIs and Corresponding Executables	16
Table 9.1.5.3-1. Default Annual Periods.....	38
Table 9.2.1-1. Environment Variables in Record Climate	45
Table 9.5.1.2-1. avndis Threads	118
Table 9.5.4.2-1. AvnFPS TAF Site Info Editor Fields and Descriptions	150
Table 9.5.4.5-1. AvnFPS TWEB Route Info Editor Fields and Descriptions.....	153
Table 9.6.1-1. File Format for the nwr.cfg File.....	165
Table 9.6.1-2. Environment Variables for the NWR Editor.....	165

9.0 *Background Applications: Introduction*

The AWIPS Background Applications are a set of applications that are designed to run unattended in the background after a manual initialization of data. Some of the applications can also be executed manually. Once the applications are set up, they run independently and only need to be monitored.

The AWIPS Background Applications currently consist of the following:

- Climatological Reports Formatters for the NOAA Weather Radio (NWR) and Weather Wire Service (NWWS)
- Record Climate
- Hourly Weather Roundup Formatter for NWR and NWWS
- Aviation Forecast Preparation System (AvnFPS)
- NOAA Weather Radio Editor.

The main data flow and setup of each application is described in the following sections.

9.1 *Climatological Reports Formatters for NWS and NWWS*

The morning, intermediate, and evening Climatological Reports Formatter creates daily climatological reports for AWIPS. These reports summarize one or more stations' daily weather observations, records, normals, departures from normal, and last year's values for that date. The Monthly, Seasonal, and Annual Climatological Reports Formatters are used to summarize one or more stations' monthly, seasonal, or annual weather observations, records, normals, departures from normal, and last year's value for the period. The formatters prepare tabular products to be disseminated over the NWWS and voice-ready products for NWR broadcast. The F6 formatter creates a month-to-date report containing climatological information that can be displayed on Web pages.

The Climate program provides the forecaster with the capability to set up and initialize output products; import climatology data; review and modify input observations; create, review, and modify the output values; and format the Climatological Reports.

9.1.1 *Configuration Files and Environment Variables*

Table 9.1.1-1 shows the environment variables used in discussing the Climatological Reports Formatter. Variables are defined for the **fxa** user and individual user accounts.

Table 9.1.1-1. Environment Variables in CLIMATE

Environment Variable Name	Environment Variable Path
CLIMATE_DIR	/awips/adapt/climate
FXA_DATA	/data/fxa
LOG_DIR	/data/logs/fxa

Configuration Files

Most of the following files reside in **\$CLIMATE_DIR/data**.

clibrwse.conf

This file contains the path and command to start the NWR Browser GUI, the destination directory path for the NWWS climate products, and the path and command for the script to transfer the products to the NWR Browser or the Console Replacement System (CRS).

clinwws.conf

This file contains the path and command to transfer the climate products to the NWWS and the destination directory for the NWWS climate products.

control_am/im/pm

These are the default control files used by the **do_all_climate**, **create_climate**, and **display_climate** processes. These files contain the starting and ending reporting periods for the cooling, heating, and snow seasons for the corresponding morning, intermediate, and evening reports. They also contain instructions on whether to include the various daily climatological elements (e.g., maximum temperature during month, maximum wind speed during month) and their dates of occurrence, sunrise and sunset times, and the minimum and maximum daily temperatures and records, and their dates.

control_am/im/pm/ mon/sea/ann_ <product id>

These files, which correspond to the morning, intermediate, evening, monthly, seasonal, and annual reports, contain the specific reporting periods and formatting instructions for a specific product.

control_mon/sea/ann

These are the default control files used by the **do_all_climate**, **create_climate** and **display_climate** processes. They contain the starting and ending reporting periods for the cooling, heating, and snow seasons, as well as instructions on whether to include the various monthly climatological elements (e.g., maximum temperature, average wind speed), their dates of occurrence, normals and departures from normal records, their dates of occurrence, and last year's values and dates of occurrence.

data_am/im/pm

These files contain the date, number of observation stations, and the climatological data generated by the **create_climate** and **display_climate** processes. The **display_climate** process reads and updates these files. The files are also used by the **format_climate** process.

data_mon/sea/ann	These files contain the date, number of observation stations, and the climatological data generated by create_climate . The display_climate process both reads and updates these files. They are also used by format_climate .
gif and html files	These help files discuss the setup, review and editing of input values, execution of the Climate program, and the review and editing of the output products.
global_day	This file contains the variables that affect the climate application globally: the valid times for intermediate and evening summaries; NWWS product formatting options; and threshold values for temperature, precipitation, and snowfall. It is edited by set_up_climate and used by create_climate , display_climate , format_climate , and qc_climate .
header_am/im/pm/mo n/sea/ann_<product id>	This file contains the specific dissemination and transmission instructions for a specific product.
header_default	This file contains the default header information displayed in the NWR and NWWS configuration GUIs in the set_up_climate process. This information includes the effective, expiration, and creation date and time.
history_am/im/pm	These files contain the date, number of stations, and historical data from the climate_day_norm and climate_mon_norm data tables. These files are generated by the create_climate process and used by the format_climate process.
history_mon/sea/ann	These files contain the date, the number of stations, and the historical data from the mon_climate_norm data table. These files are generated by create_climate and used by format_climate .
info_am/im/pm	These files contain the non-meteorological data generated by the create_climate process and used by the format_climate process. The files contain valid time, number of stations, and the sunrise and sunset times for each station.
output_am/im/pm/mo n/sea/ann_<product id>.nwr/nwss	These are output files associated with a specific product generated by format_climate . Files with the suffix “ nwr ” are CRS products and files with the suffix “ nwss ” are NOAA Weather Wire Service products. Each output file is associated with a unique product ID.

station_am/im/pm/mo n/sea/ann_<product id>	This file contains station information such as the station name, four-character METAR station identifier, UTC offset, and latitude and longitude. This file is used by the format_climate process and links one or more stations with a specific product.
wait_timex.txt	This file consists of two values – the data wait time and the product wait time. DATA_WAIT_TIME defines the amount of time the display_climate program will wait after notifying the user to review data before continuing. If the user acknowledges the alert, the edit_daily_climate is displayed; this provides an opportunity to review and correct the data. If the user fails to acknowledge the alert, the derived parameters are calculated and stored in the database and the execution continues. PRODUCT_WAIT_TIME defines the amount of time execution will wait after alerting the user. This provides an opportunity to review the NWR product prior to sending the output to the CRS. If the user fails to acknowledge the alert, the product is automatically sent to the CRS. If the user acknowledges the alert, the NWR browser is displayed, which enables the user to review NWR products.
9.1.2 hmdb Database Tables	
	These database tables are created or modified when Set Up Climate Runs is completed in its entirety. Refer to Section 9.1.3 for more information on initial climate setup.

cli_asos_daily	This holds the decoded values from ASOS Daily Summary Messages. The create_climate process checks this table before checking the METAR records when determining daily climate values.
cli_asos_monthly	This holds the decoded values from ASOS Monthly Summary Messages. The create_climate process checks this table before checking the METAR records when determining monthly climate values.
cli_freezedates	This holds the earliest, latest, normal, record, and last year's freeze dates. It is updated by display_climate and used by create_climate and format_climate .
cli_mon_season_yr	This table consists of monthly, seasonal, and annual climatological data for several stations. These data are created by the create_climate program and displayed by the display_climate program. Data in this table can be viewed and edited by the qc_climate program.

cli_sta_product	This holds the climate product identifier and station identifier. It is created by set_up_climate and used by create_climate and format_climate .
cli_sta_setup	This holds station information such as the database identifier, name, and latitude and longitude. This table is established by the set_up_climate program.
climate_day_config	This consists of the product identifier and time of day. These data are created by the set_up_climate program and used by the format_climate program.
climate_period	This holds the beginning and ending years of the normals and extremes climate data period of record. This table is used by the init_climate program.
climo_dates	This holds beginning and ending dates for reporting snowfall and precipitation. It is created by set_up_climate and used by create_climate and format_climate .
daily_climate	This table consists of daily climatological data for each station. These data are created by the create_climate program and displayed by the display_climate program. Data in this table can be viewed and edited by the qc_climate program.
day_climate_norm	This holds daily historical climatology such as temperature, precipitation, snow, and heating/cooling degree day data. This table is established by the init_climate program and used by the create_climate program.
fss_report	This contains identifying information on decoded METAR and SCD reports that is used by the create_climate program.
mon_climate_norm	This holds monthly climatology such as temperature, precipitation, snow, and heating/cooling degree day normals, means, and extremes. It is established by the init_climate program and used by the create_climate program.
rpt	The MetarDecoder decodes these hourly observational records. They are used as input to the create_climate program.
station_location	This holds information about the climatological station (e.g., station identifier, elevation, name). It is installed at site start-up and used by the set_up_climate program.

9.1.3 Processes

When the Climate applications are initiated from the GUI, all processes run on the workstation.

```
LX do_all_climate
LX set_up_climate
LX init_climate
LX qc_climate
LX build_f6
PX1 ASOS_smDecoder
LX create_climate
LX display_climate
LX format_climate
```

Refer to Exhibits 9.1.3-1 and 9.1.3-2 for the Climatological Reports Formatter for NWR and NWWS data flow diagrams for Daily, Monthly, Seasonal, and Annual. Refer to Section 9.1.4 for more details on any mentioned GUIs.

The following processes are located at thisg path: \$CLIMATE_DIR/bin/Linux.

do_all_climate	The do_all_climate process launches the Climate Master Menu. The forecaster may elect to initiate programs to configure climate parameters, set up/edit climate products, execute the climatological formatters, create the F6 product, and initialize and “quality control” the climate database tables from the Climate Master Menu. The do_all_climate program launches the scripts that initiate the forecaster-selected programs.
set_up_climate	The set_up_climate process controls configuration of the Climate program and its execution. This process enables the forecaster to choose and update the stations for which climatological summaries are produced, and to configure the output products for the morning, intermediate, and evening climate summaries. Configuring the output products includes setting or selecting the product identifiers and parameters that control the dissemination of NWR and NWWS products (e.g., periodicity, effective and expiration time, and listening area codes), the stations to be included in an individual product, and the content summary’s format and content.

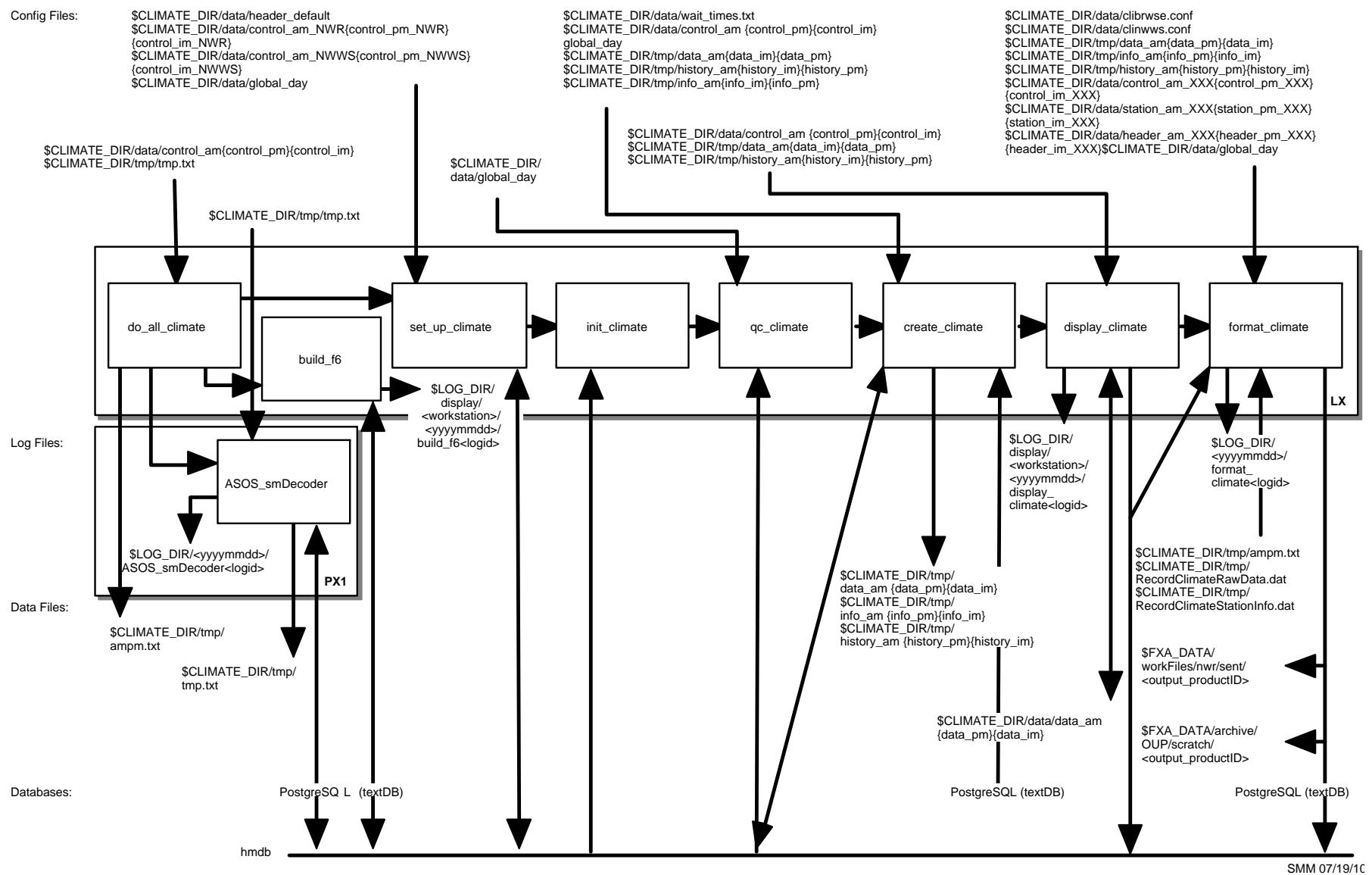


Exhibit 9.1.3-1. Climatological Reports Formatter for NWR and NWWS (Daily)

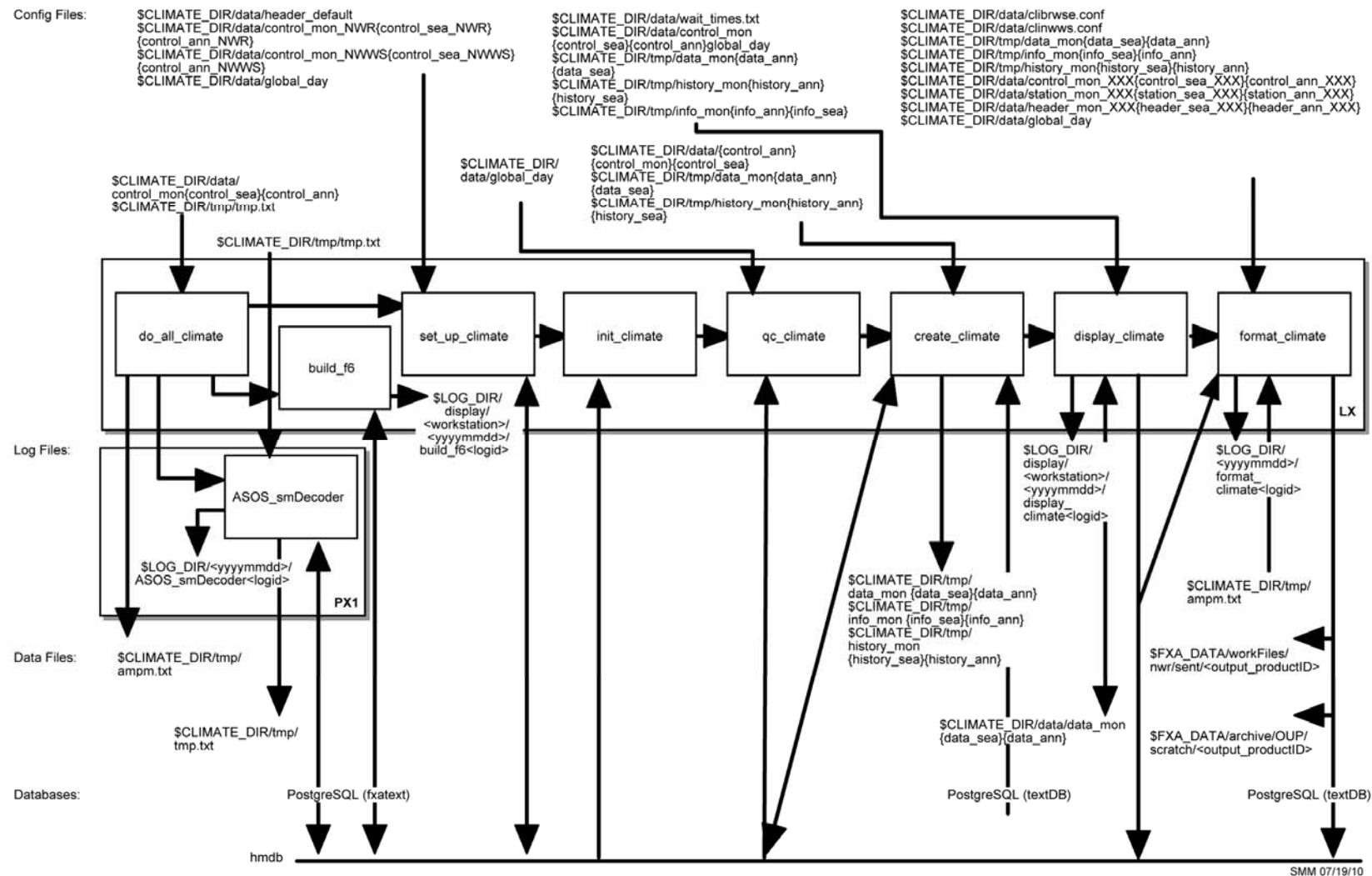


Exhibit 9.1.3-2. Climatological Reports Formatter for NWR and NWWS (Monthly/Seasonal/Annual)

init_climate

This program establishes, edits, and updates the historical climate database contained in the tables **day_climate_norm** and **mon_climate_norm** in the **hmdb** database. The **init_climate** process can also be used to view the historical data after the data have been entered. The historical climate database consists of daily, monthly, seasonal, and annual normals, extreme values, and the years in which extreme values were observed. These data can be manually entered using the five GUIs: Climatology Normals, Means, Extremes; the Daily Normals, Means, Extremes; the Monthly Normals, Means, Extremes; Seasonal Normals, Means, Extremes; and Annual Normals, Means, Extremes.

The morning climate program automatically updates the database when new records have been set.

qc_climate

The **qc_climate** process enables the forecaster to review and modify stored observations in the tables **daily_climate** and **cli_mon_season_yr** in the **hmdb** database. One GUI is provided for this purpose: the **Edit Climatological Data GUI** (refer to Section 9.1.4 for GUI information). The forecaster can also use the **qc_climate** process to fill in holes in the climate database.

build_f6

This program produces F6 products containing the climatological data for all stations for any requested month provided data are present in the daily climate database. The product includes the daily temperature, humidity, and wind extremes as well as the accumulated totals of precipitation, snow, and degree days.

The **create_f6_product** script generates the F6 products for the Climate program. It sets the paths to the given directories, changes the working directory to the temporary climate directory, executes the **build_f6** process, copies the **output_f6** files into the **data** directory, and removes all temporary files from the **tmp** directory.

The **build_f6** process controls the building of the daily F6 report. It gets the stations from the climate station table and the current local execution date, and it builds the report through the day before.

► **To View the Current Day's build_f6 Log**

As user fxa or your individual user account on any workstation,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date and `<display>` is the current display variable (e.g., lx3-tbdw:0).
- TYPE:** `ls -ltr build_f6*`
- Displays the current day's `build_f6` logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the latest registered messages as the log updates.

Log Message Format

An entry in the log should look like the following:

```
build_f6 6387 974842165.042823 21:29:25.042 EVENT:
build element: missing value returned for SUM(snow)
for station 17890 period start 2006-05-01 period end 2006-05-11
database return code 0
build_f6 6387 974842165.074418 21:29:25.074 EVENT:
build element: missing value returned for SUM(snow)
for station 17890 period start 2006-05-01 period end 2006-05-11
database return code 0
build_f6 6387 974842165.115442 21:29:25.115 EVENT:
return multiple rows: missing value returned for max_wind_spd number 3
for station 17890 period start 2006-05-01 period end 2006-05-11
database return code 100
build_f6 6387 974842165.141399 21:29:25.141 EVENT:
return multiple rows: missing value returned for max_gust_spd number 2
for station 17890 period start 2006-05-01 period end 2006-05-11
database return code 100
build_f6 6387 974842165.141945 21:29:25.141 EVENT:
return multiple rows: missing value returned for max_gust_spd number 3
for station 17890 period start 2006-05-01 period end 2006-05-11
database return code 100
build_f6 6387 974842165.181658 21:29:25.181 EVENT:
return element dates: missing value returned for max_temp date 1
for station 17890 period start 2006-05-01 period end 2006-05-11
database return code 100
```

The log consists of the following fields:

Time stamp	21:29:25.181
Module name	build_f6 6387 974842165.181658
Message type	EVENT:
Message string	return element dates: missing value returned for max_temp date 1 for station 17890 period start 2006-05-01 period end 2006-05-11 database return code 100

ASOS_smDecoder

The **ASOS_smDecoder.sh** script executes the **ASOS_smDecoder** process, which decodes the ASOS daily or monthly summary messages for climate data. The **ASOS_smDecoder** uses the **ASOS_SumMsg** routine to parse

the raw ASOS summary message into individual tokens and move them into the text database. The **ASOS_smDecoder** uses the **ASOS_DSMDecoder** and **ASOS_MSMDecoder** routines to decode the tokens accordingly and uses the **transfer_2db** routine to transfer the decoded summary pages into the **hmdb** database where they can be used by the Climate program. Two lines of code must be contained in **\$FXA_HOME/data/localization/nationalData/adaptTrigger.template** for the ASOS Daily Summary Message (DSM) and the ASOS Month Summary Message (MSM) to be decoded.

The first line of code triggers the decoding of the DSM. It is:

```
wwwDSMXXX | | | /awips/adapt/climate/bin/Linux/ASOS_smDecoder.sh  
|
```

The second line triggers the decoding of the MSM. It is:

```
wwwMSMXXX | | | /awips/adapt/climate/bin/Linux/ASOS_smDecoder.sh  
|
```

► To View the Current Day's ASOS_smDecoder Log

On PX1, as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr ASOS_smDecoder*`
 - Displays the current day's **ASOS_smDecoder** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the latest registered messages as the log updates.

Log Message Format

An entry in the log should look like the following:

```
08:14:06.686 ASOS_smDecoder.C PROBLEM:  
ASOS DSM Decoder could not parse the product SFODSMEKA  
Check product in the database
```

The log consists of the following fields:

Time stamp	08:14:06.686
File name	ASOS_smDecoder.C
Message type	PROBLEM:
Message string	ASOS DSM Decoder could not parse the product SFODSMEKA Check product in the database

create_climate

The **create_climate** process stores observations for the stations selected by the forecaster in the **set_up_climate** process. The observations are derived from the Daily Summary Message (DSM) data contained in the **cli_asos_daily** table, METAR data contained in the **rpt** table in the **hmdb** database, and from the Supplementary Climate Data (SCD) stored in the **fss_report** table. Parameters that are derived from observed variables, such as heating and cooling degree days, precipitation and snowfall to date for the month, season and year, are calculated by the **display_climate** process after the forecaster has had the opportunity to review and edit the data as necessary.

- The **create_climate** process obtains inputs as follows:
- The type of report to be formatted via the **control_am/im/pm** and **global_day** files (for daily report) and **control_mon/sea/ann** and **global_day** files for monthly/seasonal/annual reports
- The setup information from the **cli_sta_setup** table
- The daily climate normals from the **day_climate_norm**
- The monthly/seasonal/annual climate normals from the **mon_climate_norm**.

The **create_climate** process composes one listing, (**data_am/im/pm** file for daily and **data_mon/sea/ann** file for monthly/seasonal/annual), containing each station's name and all of the element names for which the day's observations and climatological information will be inserted and another for yesterday's data (i.e., history file). The **create_climate** process also creates a file **info_am/im/pm** (for daily) and **info_mon/sea/ann** (for monthly/seasonal/annual) with sunrise and sunset times for each station (i.e., **info_file**).

► **To View the Current Day's create_climate Log**

On PX1 as user fxa or your individual user account,

TYPE: `cd $LOG_DIR/<yyyymmdd>`
 ▪ Where <yyyymmdd> is today's date.

TYPE: `ls -ltr create_climate*`
 ▪ Displays the current day's **create_climate** logs from earliest to latest.

TYPE: `tail -f <logname>`
 ▪ Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
12:25:54.286 get_all_hourly_gusts.c EVENT: get_all_hourly_gusts
For station id 11300, the hourly wind gust weather element is missing for the hour
2006-05-11 05. STATUS_FAILURE returned by the database.

12:25:54.572 get_hourly_peak_winds.c EVENT: get_hourly_peak_winds
For station id 11300, the peak wind weather element is missing for hour 2006-05-11 06.
STATUS_FAILURE returned by the database.

12:25:54.973 get_hourly_peak_winds.c EVENT: get_hourly_peak_winds
For station id 11300, the peak wind direction weather element is missing for hour
2006-05-11 06. STATUS_FAILURE returned by the database.

12:25:55.028 get_hourly_peak_winds.c EVENT: get_hourly_peak_winds
For station id 11300, the peak wind direction weather element is missing for this
particular hour. STATUS_FAILURE returned by the database.

12:25:55.175 get_all_hourly_gusts.c EVENT: get_all_hourly_gusts
For station id 11300, the hourly wind gust weather element is missing for the hour
2006-05-11 06. STATUS_FAILURE returned by the database.

12:25:57.103 get_sky_cover.ec EVENT:
Bug in g: For station id 11300 at time 2006-05-10 19 the sky cover was not reported
the fss_cloud_layer table.
```

The log consists of the following fields:

Time stamp	12:25:54.973
File name	get_hourly_peak_winds.c
Message type	EVENT:
Message string	get_hourly_peak_winds For station id 11300, the peak wind direction weather element is missing for hour 2006-05-11 06. STATUS_FAILURE returned by the database.

display_climate

The **display_climate** process obtains daily climate values from the **data_am/im/pm** file, and monthly/seasonal/annual climate values from the **data_mon/sea/ann** file. A GUI displays the daily climate values for forecaster review and editing. After the forecaster has verified the accuracy, values for heating and cooling degree days, mean relative humidity, and accumulated precipitation and snowfall are calculated. This program displays the climate data generated by the **create_climate** process. The forecaster can edit the data as necessary. The **display_climate** process will calculate all derived fields and store them in the **daily_climate** table in the **hmdb** database (for daily) and **cli_mon_season_yr** table for the monthly/seasonal/annual.

► To View the Current Day's **display_climate** Log

On any workstation as user fxa or your individual user account,

TYPE: **cd \$LOG_DIR/display/<display>/<yyyymmdd>**

- Where <yyyymmdd> is today's date and <display> is the current display variable (e.g., lx2-tbdw:0).

TYPE: `ls -ltr display_climate*`

- Displays the current day's **display_climate** logs from earliest to latest.

TYPE: `tail -f <logname>`

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host lx2-rmk at Wed May 12 16:09:05 2004 display_climate 19870
949507745.583942 16:09:05.583 PROBLEM: const char
ERROR: ERROR, SQLSTATE = 2300
display_climate 19870 949507745.759790 16:09:05.759 PROBLEM: Unique constraint
(informix.ul78_228) violated.
display_climate: 19870 949507745.583942 16:09:05.802 PROBLEM: const char
ERROR: ERROR, SQLSTATE = 2300
display_climate 19870 949507745.803177 16:09:05.803 PROBLEM: Unique constraint
(informix.ul78_228) violated.
display_climate 19870 949507745.826989 16:09:05.826 PROBLEM: const char
ERROR: ERROR, SQLSTATE = 2300
display_climate 19870 949507745.827594 16:09:05.827 PROBLEM: Unique constraint
(informix.ul78_228) violated.
```

The log consists of the following fields:

Time stamp	16:09:05.583
Module name	display_climate
Message type	PROBLEM:
Message string	const char ERROR: ERROR, SQLSTATE = 23000

format_climate

The **format_climate** process obtains the type of report to be formatted, station information, forecaster-reviewed daily observations and climatological data, and header information from the forecaster configuration. The **format_climate** process converts numerical values to ASCII text, builds phrases, adds instructions for the CRS, and creates tabular products for the NWWS. When a record has been established, information is piped to the **RecordClimateRawData.dat** and **RecordClimateStationInfo.dat** files, which are used by the **recordClimate** process.

The NWR output product is stored temporarily and the forecaster is notified of its completion. Occasionally, the NWR product may need to be edited before it is sent to the CRS. The forecaster can change the NWR product using the **NWRBrowser**. The forecaster can send the product directly to the CRS once it has been edited and reviewed. If the forecaster

does not send the product manually to the CRS via the **NWRBrowser**, it will be sent automatically after a user-specified or configuration-specified period of time. The default time is 20 minutes.

Before the NWWS product is distributed for broadcast over the WAN, it is displayed for the forecaster to view, edit, or delete in the **Review Climate GUI**. The **handleOUP.pl** script automatically sends the completed files for NWWS distribution. The NWWS product will always be automatically sent. Storing the NWWS product in the text database provides the forecaster with an opportunity to view the product without having to wait for it to arrive over the SBN.

NOTE: If the Climate program runs but you do not receive any alarms (“eyeglasses” icon and/or beeping) on the workstation, it may be that the **hmMonitorServer** process is down and needs to be restarted. The Climate program should notify you when the **hmMonitorServer** is down. Refer to Section 9.4.2 for more information on the **hmMonitorServer**, including how to restart it.

► **To View the Current Day's format_climate Log**

On PX1, as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
■ Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr format_climate*`
■ Displays the current day's **format_climate** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
■ Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
12:45:15.015 c_format_climate.c EVENT: Running recordClimate from within format_climate...
12:45:15.198 c_format_climate.c EVENT: Recordclimate returned with code 0
12:45:30.290 c_format_climate.c PROBLEM: /data/logs/fxa/
12:45:30.291 c_format_climate.c PROBLEM: debug log: /data/logs/fxa/20060614/transferNWWS.log
12:45:30.290 c_format_climate.c PROBLEM: AFOSID = BOSCLIBOS
12:45:30.291 c_format_climate.c PROBLEM: logDIR: /data/logs/fxa/20060614/handleOUP.log
```

9.1.4 GUIs

Each GUI is associated with a particular program. Table 9.1.4-1 lists each GUI with its corresponding executable.

Table 9.1.4-1. Climate GUIs and Corresponding Executables

GUI	Executable Program
Climate Master	set_up_climate do_all_climate init_climate build_f6 qc_climate create_climate
Climate Preferences	set_up_climate
Edit Station List	set_up_climate
View/Edit Annual Periods	set_up_climate
View/Edit Reporting Periods	set_up_climate
Report Format	set_up_climate
Edit User Defined Values	set_up_climate
Current Products	set_up_climate
Climatology Normals, Means, Extremes	init_climate
Import Climate	init_climate
Choose File to Be Imported	init_climate
Import Daily or Monthly Climatology Data	init_climate
Column Placement	init_climate
Daily Normals, Means, Extremes	init_climate
Monthly Normals and Extremes	init_climate
Seasonal Normals and Extremes	init_climate
Annual Normals and Extremes	init_climate
Edit Climatological Data	qc_climate
Select Climate Run Date	create_climate
Display Station Climate Values	display_climate
Review Climate Product	format_climate
F6 Product Date	build_f6
Climate is Running	display_climate
Climate Error	display_climate

Climate Master GUI

This GUI is used to execute the following programs and scripts:

- set_up_climate (set_up_climate_runs and set_up_climate_stations)**
- do_all_climate**
- init_climate**
- build_f6**
- qc_climate**
- **create_climate**

Climate Preferences GUI	This GUI, launched by pressing the Configure Climate Parameters pushbutton on the Climate Master GUI , is used to set the parameters that affect all products created by the climate application. These global variables include valid times for intermediate and evening reports, configuration of the station list, setting the season or alternate annual begin dates, setting the temperature, precipitation, and snowfall threshold values for monthly, seasonal, and annual stations. These global variables also establish some product format selections format for NWWS output products.
Edit Station List GUI	This GUI can be used to edit the Climate's station list. It is launched by pressing the Set Up Climate Station pushbutton on the Climate Preference GUI or by pressing the Edit Station List button on the Report Format GUI . The Edit Station List GUI has three functions: add/delete stations; edit station names; and identify stations that observe standard time year round.
View/Edit Annual Periods GUI	This GUI is launched by the Edit Alternate Annual Periods pushbutton on the Climate Preference GUI or by pressing the Edit Annual Periods pushbutton on the Report Format GUI . This View/EditAnnual Periods GUI is used to define alternate annual or seasonal start dates for summing precipitation and snow observations.
View/Edit Reporting Periods GUI	This GUI is launched by pressing the Edit Reporting Periods pushbutton on the Report Format GUI and is used to determine when heating degree days, cooling degree days, and snow appear in the climate output. These data are displayed in the report only during the period specified by the user even though these statistics are always being calculated by the Climate program.
Report Format GUI	This GUI, launched by pressing the Set Up/Edit Climate Products pushbutton on the Climate Master GUI , is Climate's hub for creating, editing and deleting products. The type of output (i.e., NWR or NWWS, daily morning, intermediate, evening, monthly, seasonal, or annual), the stations to be included, configuration parameters (i.e., effective and expiration times for NWR output), and weather elements to be included in the product are all selected in this GUI.

**Edit User-Defined
Values GUI**

This GUI is launched by the **Edit User-Defined Thresholds** pushbutton on the **Climate Preference GUI** or by pressing the **Change Threshold Values** button on the **Report Format GUI**. This **Edit User-Defined Values GUI** is used to set the threshold values for maximum and minimum temperature, precipitation, and snowfall. The values that are entered will be displayed in the monthly, seasonal, or annual report.

NOTE: The Morning Climate product summarizes the climate data from midnight to midnight local standard time (LST) of the previous day. It is determined from station data entered into the daily climate database. Evening climate summaries produce reports for the current day for the period from midnight through either a valid time or the time that the climate program is executed, depending on the user's preference. Data from evening climate summaries are not written to the database. Intermediate climate summaries are similar to evening runs and provide a third time of day for reporting climate information. Report Format is initiated by selecting **Set Up/Edit Climate Products** from the **Climate Master GUI**.

**Current Products
GUI**

This GUI is launched from the **Option** pull-down menu in the **Report Format GUI**. It provides a list of climate products that have been created.

**Climatology Normals,
Means, Extremes GUI**

This GUI is displayed by the **init_climate** program when **Initialize Climate Database** is selected from the **Climate Master GUI**. It is used to select the period during which the normals were calculated, records period, and the climatological input type (i.e., daily, monthly, seasonal, or annual) for one or more reporting stations. The forecaster may enter the climatological data in the **DAILY NORMALS MEANS EXTREMES GUI**, **MONTHLY NORMALS AND EXTREMES GUI**, **SEASONAL NORMALS AND EXTREMES GUI**, and the **ANNUAL NORMALS AND EXTREMES GUI**.

Import Climate GUI

This GUI is created by the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI** that is run by the **init_climate** program. It is activated by selecting the **File** menu on the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI** and selecting **Import Data Window**. This GUI allows the forecaster to import daily, monthly, seasonal, or annual data files into the database.

NOTE: Some formats cannot be imported. Under these

circumstances the forecaster must manually enter the data.

Choose File To Be Imported GUI

This GUI is created by the **Import Climate GUI** by pressing the **Get New Data File Name** pushbutton. It allows the forecaster to browse the directories for the import file.

Import Daily or Monthly Climatology Data GUI

This GUI is displayed when the user selects **Arrange Order of Data** from the **Import Climate GUI**. It allows the forecaster to arrange specific variables according to the format of the Weather Forecast Office's (WFO) existing climatology file so it may be correctly entered into the climatology database.

Column Placement GUI

This GUI is created when the **Place** button is activated in the **Import Daily or Monthly Climatology Data GUI**. This GUI allows the forecaster to move the selected variable from **Climatology Data Options** to a specific column number under **Order of Data in File**.

DAILY NORMALS, MEANS, EXTREMES GUI

This GUI is displayed by the **init_climate** program simultaneously with the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI** when **Initialize Climate Database** is selected from the **Climate Master GUI**. It allows the forecaster to enter and modify a station's daily climatological data. This capability will be most useful at the site startup time to establish the climatological information in the **hmdb** database.

MONTHLY NORMALS AND EXTREMES GUI

This GUI is created by the **init_climate** program. It becomes visible when the forecaster selects **Monthly** on the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. This GUI is used to enter and modify monthly climatological data for a station. This capability will be most useful at the site start-up time to establish the climatological information in the **hmdb** database.

SEASONAL NORMALS AND EXTREMES GUI

This GUI is created by the **init_climate** program. It becomes visible when the forecaster selects **Seasonal** on the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. This GUI is used to enter and modify seasonal climatological data for a station. This capability will be most useful at the site start-up time to establish the climatological information in the **hmdb** database.

ANNUAL NORMALS AND EXTREMES GUI

This GUI is created by the **init_climate** program. It becomes visible when the forecaster selects **Annual** on the **CLIMATOLOGY NORMALS, MEANS, EXTREMES**

GUI. This GUI is used to enter and modify annual climatological data for a station. This capability will be most useful at the site start-up time to establish the climatological information in the **hmdb** database.

Edit Climatological Data GUI

The **qc_climate** program displays this GUI once the forecaster selects **Quality Control Climate Database** from the **Climate Master GUI**. The forecaster can review and edit the daily, monthly, seasonal, or annual weather parameters in the GUI.

Select Climate Run Date GUI

This GUI is displayed once the forecaster executes a Climate run. The forecaster can default to the most recent time period for the climate product or choose a specific date for any given day, month, season, or year. When the forecaster executes an Intermediate or Evening Daily Climate Report, the only available option is to run the latest intermediate or latest evening climate.

Display Station Climate Values GUI

This GUI is used to review, edit, and accept the observation values prior to formatting. Modifications to a station's data must be saved before going on to the next station; if not, the changes will be lost. This GUI is a part of the **display_climate** program.

F6 Product Date and Stations GUI

When the user selects **Create F6 Products** on the **Climate Master GUI**, this GUI is used to request an F6 product for any station in the station list for the current month up to the day prior to execution or for a chosen prior month. There is an additional selection for a printout of the output.

Climate is Running GUI

This GUI is used to notify the user that Climate processes are running. When Climate is running and the GUIs disappear, this button shows the user that Climate is running and has not terminated.

Climate Error GUI

This GUI is used to notify the user that the Climate application encountered an error and has terminated. It allows the user to either view the log file or close the GUI.

9.1.5 *Climatological Reports Formatter Setup*

There are three main steps to configure the Climate program:

- **Configure the global climate parameters.** Set product valid times, create the station list, set season dates, set the threshold values, and format the NWWS output.

- **Establish a historical database for each station.** Enter data manually or import data files through the import data option.
- **Configure climate products.** A product is a single output from the climate program, i.e., a means of dissemination (NWR or NWWS). The stations selected as well as the chosen variables and elements are included in the output.

To run Climate, the forecaster left clicks on the workspace window (menu), selects **AWIPS** and selects **Climate Reports** from the **Background WFO Apps** submenu in the **Workspace** menu. This will bring up the main **Climate Master GUI**.

9.1.5.1 Configure Global Climate Parameters

The Climate Formatter relies on several parameters that affect all output the application generates. These consist of the valid times for the intermediate and evening summaries, the stations in the product station list, the starting dates for seasonal climate summaries, the threshold values for temperature, precipitation and snowfall, and format options for the NWWS products. Selecting **Configure Climate Parameters** from the **Climate Master GUI** displays the **Climate Preferences GUI** used to set the parameters.

Valid Time

The forecaster has two options for setting the valid time of the intermediate and evening climate summaries: a specific time, or execution time of the Climate Formatter. To set the valid time to a specific time, select that option and type in a two-digit hour in local time. Select **AM** or **PM** from the option box next to the hour.

Station List

To set up the station list for the stations of interest, the forecaster must first select **Set Up Climate Stations** from the **Climate Preferences GUI**. The **Edit Station List GUI** is displayed and the forecaster can add stations to or delete stations from the station list using the following options:

Adding a Station: In the blank **Station ID** field, the forecaster types the four-character International Civil Aviation Organization (ICAO) identifier of the stations for which the WFO has responsibility. The ICAO identifiers must be typed in uppercase letters. The name of the station appears in the corresponding **Name** field. To edit the names, simply select the desired **Name** field and edit the text.

NOTE: You must use uppercase letters for station identifiers or there will not be a match between your choice and the data in the master stations table.

Deleting a Station: Simply remove the four-letter ID from the appropriate **Station ID** field, and the associated station name

is automatically erased.

NOTE: The information about stations is included in the **cli_sta_setup** table (**hmdb** database).

Standard Time

Selecting the **Std Time All Year** box beside the station name indicates that the station does not switch to Daylight Savings Time for part of the year. This is important so the Climate Formatter can correctly adjust between local time and UTC.

NOTE: Choosing the **Save Stations** button saves any changes made to the list.

Annual Periods

Another global parameter is the alternate annual periods defining the start of the seasonal sums for precipitation and snow. Selecting the **Edit Alternate Annual Periods** button displays the **View/Edit Annual Periods GUI**. The seasonal sums can be set to either **Current 3 Month Season** or an entire year beginning with a forecaster-defined date.

Threshold Values

The threshold values for temperature, precipitation, and snowfall can be set by selecting the **Edit User-Defined Thresholds** button. The **Edit User-Defined Values GUI** pops up and the threshold values are entered into the fields in which they apply. After the threshold values are entered, choose **Save** to save the changes and close the GUI.

Formatting Options

Several options are available to the forecaster for formatting the NWWS products produced by the Climate Formatter. For example, depending on the options the forecaster selects: Output text can be all uppercase or it can contain lowercase letters; negative values can be indicated with either a dash (-) or an upper case “M”; colons may or may not be used to separate phrases such as “Climate Normal Period” and “Climate Record Period” from the dates comprising the periods; and record values can be identified with an asterisk “*” or an “R.”

NOTE: Selecting the **Save** button saves any changes made via **Climate Preferences GUI**.

9.1.5.2 Establishing the Historical Database

Establishing the Historical Database is initiated when the forecaster selects **Initialize Climate Database** from the **Climate Master GUI**. The **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI** and the **DAILY NORMALS, MEANS, EXTREMES GUI** are displayed. At this point, the forecaster has the option of entering the historical, daily, monthly, seasonal, and annual data manually or importing the data.

9.1.5.2.1 Entering Historical Data Manually

The forecaster may enter the historical data manually using the **Climatology Normals, Means, Extremes GUI** and one of the four resulting GUIs:

- **DAILY NORMALS, MEANS, AND EXTREMES**
- **MONTHLY NORMALS AND EXTREMES**
- **SEASONAL NORMALS AND EXTREMES**
- **ANNUAL NORMALS AND EXTREMES.**

First, the forecaster must select the station name. The **Station** field provides the forecaster with the option to select the climatological station name for which data are to be immediately displayed in any of the above GUIs depending on what **Climatology Input Type** is selected. The station name must be double clicked for the second GUI to respond. The forecaster enters the **Start** and **Ending** year for the **Normals and Records Periods** in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**.

Climatological Input Type	This field provides the option to select the climatological reports input data type template that will be displayed in the second GUI. The choices listed are as follows: <ul style="list-style-type: none">• Daily• Monthly• Seasonally• Annual
----------------------------------	---

Daily Climatology Files If the historical data are of daily climatology, the **Daily** button should be selected. Next, in the **DAILY NORMALS, MEANS, EXTREMES GUI** select the **Month** and **Day** corresponding to the file and enter the appropriate values in each field. The observation month and day can be entered in these two fields by two methods. The forecaster can either make a selection from the pull-down menus or increment these fields using the up and down arrows. After the new values for that day are entered, select **Modify Record** to go on to another day or **Add Record** if this is an original entry.

Station. This field displays the station name selected by the forecaster.

Month and Day. The observation month and day can be entered in these two fields by two methods. The forecaster can either make a selection from the pull-down menus or increment these fields using the up and down arrows.

First. This option displays the first record in the database that contains data for the selected station.

Add Record. This button saves the changes to the database only if the record has been modified for the first time.

Modify Record. This button saves the changes to the database only if changes have been made to a record that previously contained data.

Delete Record. The displayed day's data are deleted from the **hmdb** database when this field is selected. The forecaster is prompted to confirm the deletion.

Last. This option displays the last record in the database that contains data for the selected station. The purpose of this button is to permit the forecaster to find the last data entry point when resuming a manual data entry session.

Temperature. Various climatological temperature data can be entered in the 11 GUI temperature fields:

- The **Mean Maximum Temperature** is a field for the day's normal high temperature.
- The **Record Maximum Temperature** is a field for the highest temperature for the calendar day over the Records Period.
- The most recent year in which the record for the day occurred can be entered in the **Year 1 Record Maximum**

Temperature Observed field.

- When the record temperature for the day has occurred in additional years, the second most recent year and the third most recent year can be entered in the **Year 2 Record Maximum Temperature Observed** and the **Year 3 Record Maximum Temperature Observed** fields, respectively.
- The **Mean Minimum Temperature** is a field for the day's normal minimum temperature.
- The **Record Minimum Temperature** is a field for the lowest temperature for the calendar day, over the Records Period.
- The most recent year in which the record for the day occurred can be entered in the **Year 1 Record Minimum Temperature Observed** field.
- When the record temperature for the day has occurred in additional years, the second most recent year and the third most recent year can be entered in the **Year 2 Record Minimum Temperature Observed** and the **Year 3 Record Minimum Temperature Observed** fields, respectively.
- The **Normal Mean Temperature** is a field for the day's normal mean temperature.

NOTES:

1. If the **Year 1 Record Maximum Temperature Observed** is missing DO NOT enter any years for **Year 2 or Year 3**.
2. If the **Year 1 Record Minimum Temperature Observed** is missing DO NOT enter any years for **Year 2 or Year 3**.

Heating/Cooling Degree Days. These fields are for the normal heating degree days and cooling degree days for the day. Missing values are indicated by **-9999**, since it is possible to have values up to 25000.

Precipitation. Various climatological precipitation data can be entered in the five GUI precipitation fields.

- The **Average Precipitation** is a field for that day's normal precipitation amount.
- The **Record Maximum Precipitation** is a field for the greatest precipitation for that calendar day over the

Records Period. For all of these fields, trace amounts are represented as T.

- The most recent year in which a record occurred can be entered into the **Year 1 Record Maximum Precipitation Observed** field.
- When the record maximum precipitation for the day has occurred in additional years, the second most recent year and the third most recent year can be entered in the **Year 2 Record Maximum Precipitation Observed** and the **Year 3 Record Maximum Precipitation Observed** fields, respectively.

NOTE: If the **Year 1 Record Maximum Precipitation Observed** is missing, do not enter any years for **Year 2** or **Year 3**.

Snowfall. The first five fields are analogous to the Precipitation fields. The sixth field, **Daily Snow on Ground (inches)**, is the snow depth for that day. For all of these fields, trace amounts are represented as T.

After the new values for that day are entered, select **Modify Record** to go on to another day or **Add Record** if this an original entry.

Monthly Climatology Files

If the historical data are of monthly climatology, the **Monthly** button should be selected. Next, in the **MONTHLY NORMALS AND EXTREMES GUI** select the Month corresponding to the file and enter the appropriate values in each field.

Station. This field displays the station name that was selected by the forecaster using the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**.

Month. The observation month can be entered in this field by two methods. The forecaster can either make a selection from the pull-down menus or increment the field using the up and down arrows.

First. This GUI option displays the data for the first day entered.

Add Record. This field adds data to the **hmdb** database for a day which never had any data entered before.

Modify Record. This GUI option provides the capability to

modify the data currently displayed for any field in the GUI and sequentially saves the data to the **hmdb** database.

Delete Record. The displayed day's data are deleted from the **hmdb** database when this field is selected. The forecaster is prompted to confirm the deletion.

Last. When this GUI option is selected, the last day's data entered are displayed. The purpose of this button is to permit the forecaster to find the last entry point when resuming a manual data entry session.

Temperature. The temperature fields are divided into a **Normals** and a **Records** section.

- The normal maximum monthly temperature can be entered into the first field, the **Maximum Temperature (°F)** field. This value represents the average of the highest monthly temperature in each year of the Normals Period.
- The normal average maximum monthly temperature can be entered into the **Average Maximum Temperature (°F)** field.
- The normal number of days per month when daily maximum temperatures are greater than or equal to 90 degrees Fahrenheit can be entered into the **Days with Maximum Temperature GE 90°F** field.
- The normal number of days per month when daily maximum temperatures are less than or equal to 32 degrees Fahrenheit can be entered into the **Days with Maximum Temperature LE 32°F** field.
- The normal minimum monthly temperature can be entered into the **Minimum Temperature (°F)** field. This value represents the average of the lowest monthly temperature in each year of the Normals period.
- The normal average minimum monthly temperature can be entered into the **Average Minimum Temperature (°F)** field.
- The normal number of days per month when daily minimum temperatures are less than or equal to 32 degrees Fahrenheit can be entered into the **Days with Minimum Temperature LE 32°F** field.
- The normal number of days per month when daily minimum temperatures are less than or equal to 0 degrees Fahrenheit can be entered into the **Days with Minimum**

Temperature LE 0°F field.

- The normal monthly mean temperature can be entered into the **Mean Temperature (°F)** field.

Additional climatological temperature data are calculated by the Climate program from the daily database. The following GUI Records section temperature fields can be viewed but not edited:

- The first temperature field in the Records section is the **Maximum Temperature (°F)** field which is for the record highest temperature in that month.
- The **Date 1 Maximum Temperature Observed** field is for the most recent day and year in which the record maximum temperature was observed.
- If the record was tied in additional years, the second most recent day and year can be entered into the **Date 2 Maximum Temperature Observed** field, and the third most recent day and year can be entered into the **Date 3 Maximum Temperature Observed** field.
- The next temperature field in the Records section is the **Minimum Temperature (°F)** field in which the record minimum temperature in that month can be entered.
- The most recent year in which the record minimum temperature was observed can be entered into the **Date 1 Minimum Temperature Observed** field.
- If the record was tied in additional years, the second most recent year can be entered into the **Date 2 Minimum Temperature Observed** field, and the third most recent year can be entered into the **Date 3 Minimum Temperature Observed** field.

Precipitation. The Precipitation fields are divided into a **Normals** section and a **Records** section.

In the **Normals** section:

The first field is the **Total Precipitation (inches)** field in which the normal total monthly precipitation can be entered.

The normal average amount of precipitation for a day in that month can be entered into the **Daily Average Precipitation (inches)** field.

The normal number of days in the month with precipitation greater than or equal to 0.01 inches can be

entered into the **Days with Precipitation GE 0.01 Inches** field.

The normal number of days in the month with precipitation greater than or equal to 0.10 inches can be entered into the **Days with Precipitation GE 0.10 Inches** field.

The normal number of days in the month with precipitation greater than or equal to 0.50 inches can be entered into the **Days with Precipitation GE 0.50 Inches** field.

The normal number of days in the month with precipitation greater than or equal to 1.00 inch can be entered into the **Days with Precipitation GE 1.00 Inch** field.

In the **Records** section:

The first precipitation field is the **Maximum Total Precipitation (inches)** field in which the record maximum monthly precipitation amount can be entered.

The most recent year in which the record maximum monthly precipitation was observed can be entered into the **Date 1 Maximum Precipitation Observed** field.

When the record has occurred in additional years, the second most recent year can be entered into the **Date 2 Maximum Precipitation Observed** field, and the third most recent can be entered into the **Date 3 Maximum Precipitation Observed** field.

The next precipitation field is the **Minimum Total Precipitation (inches)** field in which the record minimum monthly precipitation amount can be entered.

The most recent year in which the record minimum monthly precipitation was observed can be entered into the **Date 1 Minimum Precipitation Observed** field.

When the record has occurred in additional years, the second most recent year can be entered into the **Date 2 Minimum Precipitation Observed** field, and the third most recent can be entered in **Date 3 Minimum Precipitation Observed** field.

Snow. The snow fields are also divided into a **Normals** section and a **Records** section.

In the **Normals** section:

The first field is the **Total Snowfall (inches)** field in

which the normal total monthly snowfall can be entered.

The water equivalent of the normal total monthly snow that falls can be entered into the **Total Water Equivalent (inches)** field.

The normal amount of snow on the ground for any day in the month can be entered into the **Snow Depth (inches)** field.

The normal number of days on which snow occurs in the month can be entered into the **Days with Any Snowfall** field.

The normal number of days on which snowfall is equal to or greater than 1 inch can be entered into the **Days with Snowfall GE 1.0 inch**.

In the **Records** section:

The first field is the **Total Snowfall (inches)** field in which the record maximum total amount of snow that has ever fallen during that month can be entered.

The most recent year in which this record occurred can be entered into the **Date 1 Total Snowfall Observed** field.

When this record has occurred in additional years, the second most recent year and third most recent year can be entered into the **Date 2 Total Snowfall Observed** and the **Date 3 Total Snowfall Observed** fields, respectively.

The record maximum 24-hour snowfall can be entered into the **Total 24-Hour Snowfall (inches)** field.

The beginning day and month of the 24-hour record snowfall event can be entered into the **Date 1: Begin Date** field and the ending day, month, and year of the event can be entered into the **End Date and Year** fields.

When the record total 24-hour snowfall has occurred in additional years, the second most recent year's and the third most recent year's event dates can be entered into the **Date 2:** and the **Date 3:** fields, respectively.

The record snow depth at any time during the month can be entered into the **Snow Depth (inches)** field.

The date of the most recent event can be entered into the **Date 1 Snow Depth Observed** field.

When the record snow depth has occurred in additional years, the second most recent year's and the third most

recent year's event dates can be entered into the **Date 2 Snow Depth Observed** and the **Date 3 Snow Depth Observed** fields, respectively.

After the new values for the selected month are entered, select **Modify Record** and go on to another month, or **Add Record** if this is an original entry.

Degree Days. The degree days fields are divided into the Degree Days Normals, Freeze Dates Normals, and Records sections. The first field in the Degree Days Normals section is **Heating Degree Days** in which the normal number heating degree days for the month can be entered. The last field in this section is the **Cooling Degree Days** in which the normal number of cooling degree days for the month can be entered.

The first field in the Freeze Dates Normals section is the **Early Freeze Date**. The normal date of the earliest freeze can be entered in this field. The last field in this section is the **Late Freeze Date**. The normal date of the latest freeze can be entered into this field.

The first field in the Records section is the **Early Freeze Date**. The date of the record earliest freeze can be entered into this field. The last field is the **Late Freeze Date**. The date of the record latest freeze can be entered into this field.

Seasonal Climatology Files

If the historical data are for seasonal climatology, the **Seasonal** button should be selected in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. Next, in the **SEASONAL NORMALS AND EXTREMES GUI** use the **Month** button to select the 3-month season (DJF = December, January, February) corresponding to the file and enter the appropriate values in each field. After the new values for the selected month are entered, select **Modify Record** and go on to another season, or **Add Record** if this is an original entry. Fields are similar to the monthly ones.

Annual Climatology Files

If the historical data are of annual climatology, the **Annual** button should be selected in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. Next, select the **Start Year** and **Ending Year** corresponding to the file and enter the appropriate values in each field in the **ANNUAL NORMALS AND EXTREMES GUI**. After the new values for the selected month are entered, select **Modify Record**, or **Add Record** if this is an original entry. Fields are similar to the monthly ones.

When all the data are entered, select **Close** in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**.

NOTE: For all of the Climatology Files, the changes will be lost if **Modify Record** or **Add Record** is not selected before going on to another day, month, season, or year.

9.1.5.2.2 Importing the Data

The forecaster may import the historical data by selecting **Import Data Window** within the **File** menu in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. The **Import Climate GUI** launches and the forecaster may begin the process of importing files.

Station Name	This field displays the stations currently in the climate database.
Station Name(s) in Header(s)	This button allows the forecaster to specify that the station name(s) appears in the header(s) of the import file. This is useful when the file contains more than one station's data separated by headers.
Station Name(s) in Data	This button allows the forecaster to specify that the station name(s) appears in the data of the import file.
Enter Data Delimiters	This field allows the forecaster to insert any delimiter that appears in the imported climatology file. The delimiter defaults are “*,” “space,” and “/.” If any other delimiter is used, the forecaster must enter the appropriate character(s) into the field. There is no specific format for this; if entering more than one delimiter, neither spaces nor commas are needed.

File Name	This field displays the name of the import file. The file name will only appear after the forecaster goes through the process of Getting a New Data File Name . This button launches the Choose File To Be Imported GUI which allows the forecaster to browse the directories for the import file.
Data Type	The Daily button and the Monthly button specify whether the import file is daily climatology or monthly climatology.
Date Format	This field lists the months of January through December and allows the forecaster to select what month(s) to which the file(s) pertains.
Month Name(s) in Header(s)	This button allows the forecaster to specify if the month name(s) appears in the header(s). This is useful when a file contains more than one month's data separated by headers. The program searches for a match using the first three letters of the month. Consequently, abbreviations will be accepted.
Month Located in Date Field	This button allows the forecaster to specify whether the month name is located in the data field. If so, the forecaster must select Month First if the format for the date places the month first, Day First if the format for the date places the day first, Julian Days if the date is recorded in Julian days, or Julian Days (Feb29=60) if the date is recorded in Julian days and the 29th of February is denoted as the 60th day. If you use Julian Days , the date field for the first 9 days of the year must be in the 01–09 format for the data to be successfully imported.
Arrange Order of Data	This button allows the forecaster to specify the format of each data file. Once activated, this button will bring up the Import Daily or Monthly Climatology Data GUI where the forecaster arranges the climatology data according to the order of the data in the import file. NOTE: The format must be arranged before the file can be imported.
Add File to List	This button adds the specified file to the pending list on the right. The specific file name, station, data type, data format and delimiter values become visible.
Save New Values for File	This button saves any format changes made to the highlighted file located in the pending list.
Delete From List	This button deletes the highlighted file from the import list.

Import Data from File(s)

This button imports the data from all of the files contained in the import list.

NOTE: To view the imported data the forecaster must double-click on the **Station ID** in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. The data will appear in the appropriate fields within the **DAILY/MONTHLY NORMALS, MEANS, EXTREMES GUIs**.

Cancel

The **Cancel** button closes the **Import Climate GUI** without saving any changes. The same effect is achieved by toggling off the **Import Climate Window** option in the **File** menu of the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**.

The file formats supported by the **Import** function are described in Appendix M. Appendix M also describes the import procedure in more detail.

NOTE: It is helpful to have the file you are importing open in a separate window when you do this.

Retrieving Files

To get the file, the forecaster must select **Get New Data File Name**, which brings up the **Choose File To Be Imported GUI** and allows the forecaster to browse for the import file. Once a file name is found and selected, the **OK** button should be clicked and the file name will appear in the field below **File Name**.

File Type The forecaster must either select the **Daily** button if the data file is of daily climatology or the **Monthly** button if the data file is of monthly climatology. The forecaster must select the station(s) that is (are) included in the file and select **Station Name(s) in Header(s)**. If the Station Name(s) appear in the data, the corresponding button should be selected. The Station Names do not need to be manually selected for this option. If the import file contains delimiters other than the indicated defaults, they need to be entered in the field provided; otherwise, the field may be left blank. The next step is to select the month(s) included in the file and select **Month Name(s) in Header(s)**. If the Month is located in the data field the forecaster should select **Month(s) located in data field** specify how the month appears in the file.

NOTE: If the month(s) are located in the data field, the months do not need to be manually selected for this option.

Configuring the File

Next, the forecaster should select **Arrange Order of Data** which brings up the **Import Daily or Monthly Climatology Data GUI** described as follows:

Climatology Data Options	Includes a list of variables that may be contained in the WFO's daily or monthly climatology, dependent upon the format chosen for the file (daily or monthly). The file must contain a column with the Date, although the date may be "month/day," "day/month," or Julian date.
Order of Data in File	Once a data element is selected in the Climatology Data Options list, it is displayed with its associated column number in this field. An element may be selected by double-clicking the left mouse button or by highlighting the element and single-clicking the Append button.
Append	Moves selected element from Climatology Data Options to Order of Data in File . Append can also be activated by double-clicking the left mouse button.
Place	Opens the Column Placement GUI and allows the forecaster to move the selected element from Climatology Data Options to a specific column number in the Order of Data in File field. This is helpful if the forecaster leaves an element out in the initial configuration, because that element can be added without starting over. The element placed will not remove any other elements, but will push the remaining list down one column.
Append All	Moves all of the remaining elements in Climatology Data Options to the Order of Data in File field. The elements will keep the order in which they appear under Climatology Data Options . "Other data not listed" will not move unless directly selected and appended.
Remove	Takes the selected element in the Order of Data in File and places it back in the Climatology Data Options field shifting the list up one place. If no element is selected, the element listed in column 1 is the default and will be removed. Remove can also be activated by double-clicking the left mouse button.
Remove All	Selects all of the elements in the Order of Data in File field and places them in the Climatology Data Options field.
Accept	Saves the changes and returns the forecaster to the Import Climate GUI .

Cancel	Closes the GUI without saving the values and returns forecaster to the Import Climate GUI .
---------------	--

Listing the File Name

To list the file that was configured, select **Add File to List** and the file name will appear in the pending list to the right. If additional files need to be imported, the forecaster may do so at this time by repeating the procedures above.

Once all the files in the pending list are ready to be imported, the forecaster needs to select **Import Data from File(s)**. The **Import Climate GUI** will close and return the forecaster to the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI** and the **DAILY NORMALS, MEANS, EXTREMES GUI**. Selecting **Close** will return the user to the **Climate Master GUI**.

Notes:

1. After you have imported the data, double-click on the station name in the **CLIMATOLOGY NORMALS, MEANS, EXTREMES GUI**. This fetches the data you have just imported from the database and allows you to review the results.
2. When new records are set, they are automatically updated in the database.

9.1.5.3 Configuring Products

To configure Climate products, choose **Set Up/Edit Climate Products** from the **Climate Master GUI**. (NOTE: If **Set Up/Edit Climate Products** does not execute on the text workstation, try using the graphics workstation.) The **Report Format GUI** is displayed. It is divided into four sections for product manipulation:

- Report Type
- Report Configuration
- Select Stations for Product
- Weather Elements

► **To Create a New Product**

Select: **File** from the top-line menu

Select: **New Product** from the pull-down menu

- Initializes the fields on the **Report Format GUI** to default values.

► **To View Existing Products**

Select: **File** from the top-line menu

- Select:** **Open Existing Product**
- Submenus allow selection of any existing products by time period (Daily [morning, intermediate, evening]; Monthly, Seasonal, Annual).

The other top-line menu items either provide the means to display additional information or choices other than the buttons.

The top-line menu option **Edit** provides another means of editing the **Reporting Periods**, **Annual Periods**, **Threshold Values**, and **Station** list.

Also in this menu are **Select All Elements** and **Deselect All Elements** which select and deselect all of the weather elements, respectively.

Under **Options**, choosing **Current Products Window** causes a small window to appear which lists the products that have already been created and what type of report they produce. Double clicking the product ID will display that product's information in the **Report Format GUI**.

Selecting the buttons performs many of the same functions as the menu options.

Saving a product, deleting a product, and closing **Report Format** can all be done via the buttons.

Also, buttons are provided for editing the annual periods, the station list (refer to Section 9.1.5.1), and the reporting periods.

When the **Edit Reporting Periods** button is selected, the **View/Edit Reporting Periods GUI** is displayed. Reporting periods control when the heating and cooling degree days and snow sections appear in the Climate output.

When the **Edit Annual Periods** button is pressed, the **View/Edit Alternate Annual Periods** is displayed. The forecaster can use defaults or change the annual reporting period for snow and liquid precipitation.

Reporting Periods

These three fields are for the entry of the snow, heating degree days (HDD), and cooling degree days (CDD) reporting periods. The month can be selected by clicking on the **Month** field and choosing from the pull-down menu. The forecaster can either directly type the **Day** or can increment/decrement using the up and down arrows to select the day.

Reporting Periods define the time period in which snow, heating degree days, and cooling degree days are reported.

Alternate Annual Period (Season)

These two fields are for the entry of the beginning month and day of the seasonal periods. The month can be selected by clicking on the Month field and choosing from the pull-

down menu. The forecaster can either directly type the Day or can increment/decrement the day using the up and down arrows. This will create an alternate annual period. Choosing the “Current 3 Month Season” results in a 3-month summary for the season to date total.

Definition of Annual Periods

Fixed. These parameters cannot be changed and will always be the dates for the ‘year to date’ (YTD).

HDD	1 July - 30 June
CDD	1 January - 31 December
Snow	1 July - 30 June

Default. These parameters can be changed and will be seen in the **Alternate Annual Period** box.

Precip	1 January - 31 December
Snow	1 July - 30 June

The forecaster can create alternate annual periods for snow and precipitation using the **Alternate Annual Periods** box. These changes will appear in the NWWS products and are controlled by the **Season to Date** (STD) flag. The output header line will contain the words “Since 1 Aug” where 1 August is the start of the alternate year defined by the user.

If the forecaster creates an alternate annual period, it will be used in place of the normal seasonal values. That is to say, the “STD” flags will control the output of the alternate annual period. The “starting” date of the alternate annual period will be included in the NWWS output to make it clearer to the users.

If the forecaster does not change the default annual periods, the seasonal output for these variables will be for seasons defined in Table 9.1.5.3-1.

Table 9.1.5.3-1. Default Annual Periods

Season	Months
Winter	Dec, Jan, Feb
Spring	Mar, Apr, May
Summer	Jun, Jul, Aug
Fall	Sep, Oct, Nov

NOTE: The forecaster cannot change this field; it is for information purposes only.

9.1.5.3.1 Report Type, Report Configuration, Select Stations for Product

NOTE: Morning reports produce climatology for the previous day. Intermediate and

evening reports produce climatology for the current day.

► **To Configure NWR**

In the **Report Type** area, select the **NWR** button.

In the **Report Configuration**, enter a three-character **Product ID**, usually the station's three-character METAR ID.

NOTE: The product ID must be unique amongst morning or evening products. The same product ID can be used for a morning and an evening product. For example, DCA can be chosen for an NWR morning product and an NWR evening product; however, DCA cannot be chosen for both NWR morning and NWWS morning products.

Enter the following information:

Periodicity: The number of minutes in between broadcasts of the Daily Climatological Report

Effective Time: The earliest allowable broadcast time of the Daily Climatological Report

Expiration Time: The latest allowable broadcast time of the Daily Climatological Report

Listening Area Code (LAC): Notice that the LAC should be terminated by a “c.” The program will inform you if you miss it.

NOTE: For the time fields, the forecaster can either directly type in the time or can increment/decrement using the up and down arrows to reach the desired value.

In the Report Type area, select the NWWS button. Select a corresponding button for Daily Morning, Daily Intermediate, Daily Evening, Monthly, Seasonal, or Annual.

In the Report Configuration, enter a three-character Product ID. The product ID can be any three characters. However, for this product ID to be transmitted, it must be a valid ID and recognized by the WAN.

NOTE: The product ID must be unique amongst morning or evening products. The same product ID can be used for a morning and an evening product. For example, DCA can be chosen for an NWR morning product and an NWR evening product; however, DCA cannot be chosen for both NWR morning and NWWS morning products.

The **Address** field is for the dissemination of the product. It may be stored locally (000), sent to another addressee, or sent to all addressees (**ALL**).

Once the **Report Type** and **Report Configuration** have been determined, move to the **Select Stations for Product** area. Use the mouse and click on the station codes to select stations for the climate product.

9.1.5.3.2 Weather Elements

The remainder of the **Report Format GUI** allows the forecaster to configure the climatology summary by toggling the weather element buttons on and off.

This section is further subdivided into two parts, the **Categories** list and the **Subcategories** field. The **Categories** list contains 10 general categories of elements available for the output product. Upon selecting an element from the list, available options for the variable appear in the **Subcategories** portion of the interface. For example, temperature is further divided into the maximum, minimum, and mean values. Also under **Categories**, toggle buttons are provided as shortcuts to either **Include All** or **None** of the subcategories within a given element. If **Include All** is chosen for temperature, for example, all temperature data will be included in the output product. Conversely, **Include None** results in no temperature data.

In the **Subcategories** section, the first item in the option lists is always the measured value for yesterday or today depending on the type of report chosen. The measured value has to be chosen before any other options such as the time of occurrence, record, record date, normal, departure, and previous year's value can be chosen. If the measured value is not chosen, the list of options beneath it will disappear.

Available Subcategories

- Maximum Temperature
- Minimum Temperature
- Mean Temperature
- Total Precipitation
- Total Snowfall
- Snow Depth
- Heating Degree Days
- Cooling Degree Days

- Maximum Wind
- Maximum Wind Gust
- Resultant Wind (NWWS only)
- Average Wind Speed
- Maximum Relative Humidity (not available for mon/sea/ann NWR)
- Minimum Relative Humidity (not available for mon/sea/ann NWR)
- Mean Relative Humidity (not available for mon/sea/ann NWR)
- Possible Sunshine (NWWS only) (percent of possible sunshine for day based on total minutes of sun and total minutes of sun possible)
- Sky Cover (NWWS only) (average for the day)
- Weather Types (NWWS only) (observed weather for the day)

Also available are temperature normals and extremes and sunrise and sunset for the day following the observation day.

The subcategories are further divided into options which are described below. Some of the options are common to several subcategories while a few are only available to certain subcategories.

Common Options

- **Time/Date of Occurrence.** The forecaster can specify to include the weather elements observation time via this option.

NOTE: For wind and wind gust, time/date in the maximum column will be selectable for the NWR Daily Report, but not for the NWWS Daily Report.

- **Normal.** This option is for the inclusion of daily normal/mean values.
- **Departure.** This option is to include the observed weather element's departure from normal.
- **Record.** The extreme/record for the day can be included via this option.
- **Date/Year.** This option is for the inclusion of the year(s) in which record events occurred. Up to 3 years are stored in the database.
- **Last Year's.** Last year's value for the chosen element.

NOTE: For Daily NWR products, normal values cannot be included without the departure from normal value.

Other Options

- **Include Temp in deg C?** Select this option to add the temperature in degrees Celsius to the Daily Climatological Report. This will only appear when configuring an NWR report; it is not available for NWWS reports.

NOTE: This only displays temperature in degrees Celsius in the CRS output and does not affect the NWWS output.

- **Month to Date (MTD).** This option is available for precipitation, snowfall, and degree days and includes the total amount of the chosen element during the month up to and including the observation day.
- **Season to Date (STD).** This option is available for precipitation, snowfall, and degree days and includes the total amount of the chosen element for the current season. Remember that the precipitation season can be defined as an alternate annual period, such as 1 September through 31 August.
- **Year to Date (YTD).** This option is available for precipitation, snowfall, and degree days and includes the total amount of the chosen element for the current year. Notice that this option appears as “Since July 1” for heating degree days and “Since January 1” for cooling degree days.

NOTE: The toggle buttons **Normal**, **Departure**, and **Last Year’s** control the normal, departure, and the previous year’s reports for MTD, STD, and YTD sums in addition to the measured values. For instance, choosing the MTD sum as well as the departure will result in the MTD sum and departure from normal of the sum both being included.

Additional Options

You can choose from several additional options when setting up the monthly, seasonal, and annual climate product. They include Temperature, Precipitation, Snowfall, and Degree Days options.

Temperature Options

- **Avg. Daily Max.** Include the average daily maximum temperature for the mon/sea/ann.
- **Avg. Daily Min.** Include the average daily minimum temperature for the mon/sea/ann.
- **Days Max GE 90° F.** Include the number of days where the temperature was greater than or equal to 90 degrees Fahrenheit. This value is a set value within Climate.
- **Days Max LE 32° F.** Include the number of days where the temperature was less than or equal to 32 degrees Fahrenheit. This is a set value within Climate.
- **Days GE <forecaster-defined_value>° F.** Include the number of days the maximum temperature was greater than or equal to a forecaster-defined value. The value can be

set by accessing the **Edit User-Defined Values GUI** from the **Climate Parameters GUI** or the **Report Format GUI**.

- **Day LE <forecaster-defined_value> $^{\circ}$ F.** Include the number of days the maximum temperature was less than or equal to a forecaster-defined value. The value can be set by accessing the **Edit User-Defined Values GUI** from the **Climate Parameters GUI** or the **Report Format GUI**.
- **Days Min LE 32 $^{\circ}$ F.** Include the number of days where the minimum temperature was less than or equal to 32 degrees Fahrenheit. This value is a set value within Climate.
- **Days Min LE 0 $^{\circ}$ F.** Include the number of days where the minimum temperature was less than or equal to 0 degrees Fahrenheit. This value is a set value within Climate.
- **Days GE <forecaster-defined_value> F.** Include the number of days the minimum temperature was greater than or equal to a forecaster-defined value. The value can be set by accessing the **Edit User-Defined Values GUI** from the **Climate Parameters GUI** or the **Report Format GUI**.
- **Days LE <forecaster-defined value> F.** Include the number of days the minimum temperature was greater than or equal to a forecaster-defined value. The value can be set by accessing the **Edit User-Defined Values GUI** from the **Climate Parameters GUI** or the **Report Format GUI**.

Precipitation Options

- **Average Daily.** Include the average daily amount of precipitation.
- **Storm Max.** Include the storm maximum amount of precipitation.
- **24 Hour Max.** Include the 24-hour maximum amount of precipitation.
- **Days GE 0.01 in.** Include the number of days where the amount of liquid precipitation was greater than or equal to 0.01 inches.
- **Days GE 0.10 in.** Include the number of days where the amount of liquid precipitation was greater than or equal to 0.10 inches.
- **Days GE 0.50 in.** Include the number of days where the amount of liquid precipitation was greater than or equal to 0.50 inches.
- **Days GE 1.00 in.** Include the number of days where the amount of liquid precipitation was greater than or equal to 1.00 inch.
- **Days GE <forecaster-defined_value> F.** Include the number of days where the amount of liquid precipitation was greater than or equal to a forecaster-defined value (in inches). The value can be set by accessing the **Edit User-Defined Values GUI** from the **Climate Parameters GUI** or the **Report Format GUI**.

Snowfall Options

- **Depth Average.** Include the average snow depth during the mon/sea/ann.

- **Tot Since Jul 1.** Include the total snowfall since 1 July.
- **Depth Maximum.** Include the deepest snow depth during the mon/sea/ann.
- **Days Any Snow.** Include the number of days with snowfall greater than a trace.
- **Days GE 1.0 in.** Include the number of days the snowfall was greater than or equal to 1.0 inch. This is a set value within Climate.
- **Days GE <forecaster-defined_value>F.** Include the number of days the snowfall was greater than or equal to a forecaster-defined value (in inches) of liquid precipitation. The value can be set by accessing the **Edit User-Defined Values GUI** from the **Climate Parameters GUI** or the **Report Format GUI**.
- **Water Equiv.** Include the water equivalent amount of snowfall.
- **WE Since Jul 1.** Include the water equivalent amount of snowfall since 1 July.
- **Storm Max.** Include the storm maximum amount of snowfall.
- **24 Hour Max.** Include the 24-hour maximum amount of snowfall.

Degree Days Options

- **Freeze Dates.** Include the earliest and latest freeze dates for the mon/sea/ann.
- **Average Sky Cover.** Include the average sky cover for the mon/sea/ann.

Creating Products

All toggle buttons can be turned on and off to achieve the desired set of elements for the product being created. When editing an existing product, simply toggle the elements which need to be changed.

Once all parameters for the product have been entered or chosen, select the **Save Product** button to accept parameters.

If a product is no longer needed, choose **Delete Product** to remove it from the database.

Selecting **Close** will return the forecaster to the **Climate Master GUI**.

9.2 Record Climate

The **recordClimate** process performs the basic “record report” (RER) functionality required by AWIPS. **recordClimate** is an extension to the current **Climate** functionality. If a Record is set in the **Climate** process, **recordClimate** will recognize this and produce a formatted RER and store it in the **fxatext** database. A forecaster can then retrieve this product from the database via the **Text WS** or **nwrEditor** for data verification and subsequent offsite dissemination.

The **recordClimate** process performs three basic operations:

1. Formats of Record Climate Reports

2. Stores Record Climate Reports in the **fxatext** database (CCCRERXXX)
3. Notifies forecaster (local/System) that a record has been set.

NOTE: Distribution and verification of products from the AWIPS **fxatext** database are accomplished manually via the **TextWS (WAN)** and **nwrEditor (CRS)**.

9.2.1 Configuration Files and Environment Variables

Table 9.2.1-1 shows the environment variables used in discussing the Climatological Reports Formatter. These variables are defined for user fxa and individual user accounts.

Table 9.2.1-1. Environment Variables in Record Climate

Environment Variable Name	Environment Variable Path
CLIMATE_DIR	/awips/adapt/climate
FXA_DATA	/data/fxa
FXA_HOME	/awips/fxa
LOG_DIR	/data/logs/fxa
CLIMATE_BIN_DIR	/awips/adapt/climate/bin/Linux

The following files are used by the **recordClimate** process.

recordClimate.cfg

This file is located in the **\$CLIMATE_DIR/data** directory and is used for forecaster notification configuration settings on initial startup. The configuration file consists of the following data:

<Display Type>
 <Importance>
 <Audio Alert File>

Each is on a line by itself as shown in this example:

```
SYSTEM
URGENT
/awips/fxa/data/sounds/beep.au
```

RecordClimateRawData.dat

This file will be created in the **\$CLIMATE_DIR/tmp** directory. It is used to pass data from **Climate** to **recordClimate** when a climatic record event occurs. The file will not be created if no records are broken, and it will be deleted after **recordClimate** has read it.

RecordClimateStationInfo.dat

This file will be created in the **\$CLIMATE_DIR/tmp** directory. It is used to pass data from **Climate** to **recordClimate** when a climatic record event occurs. The file will not be

created if no records are broken. Upon completion of **recordClimate**, the file will be deleted.

```
afos2awips.txt
awipsPriorities.txt
NWWS_exclude_XXX.txt
nwr.cfg
nwssDeviceName.txt
rcv_handler.tbl
textNotificationServerClientList.txt
NWWSchedulerHost.txt
```

9.2.2 Processes

LX	Climate
LX	recordClimate
PX1	textNotificationServer
LX	fxaAnnounce
LX	textWish
PX1	MhsServer
PX1	NWWSProduct
PX1	NWWSchedule
LX	nwrEditorWish
LX	transferNWR
PX1	nwrTrans.pl
PX1	sentoNWR

Refer to Exhibit 9.2.2-1 for the Record Climate data flow diagram.

Climate Exhibit 9.1.3-1, Climatological Reports Formatter for NWR and NWWS (Daily), shows the **Climate** process. When a record is set in the **Climate** process, the information necessary to form Record Reports is written to the two data files, **RecordClimateRawData.dat** and **RecordClimateStationInfo.dat**.

recordClimate The **recordClimate** process is launched during each climate run. It will check for existence of two files, **RecordClimateRawData.dat** and **RecordClimateStationInfo.dat**, created by **create_climate**. Upon encountering these two files, **recordClimate** will create and store a record report (RER) product in the **fxatext** database and notify the forecaster that a record report exists.

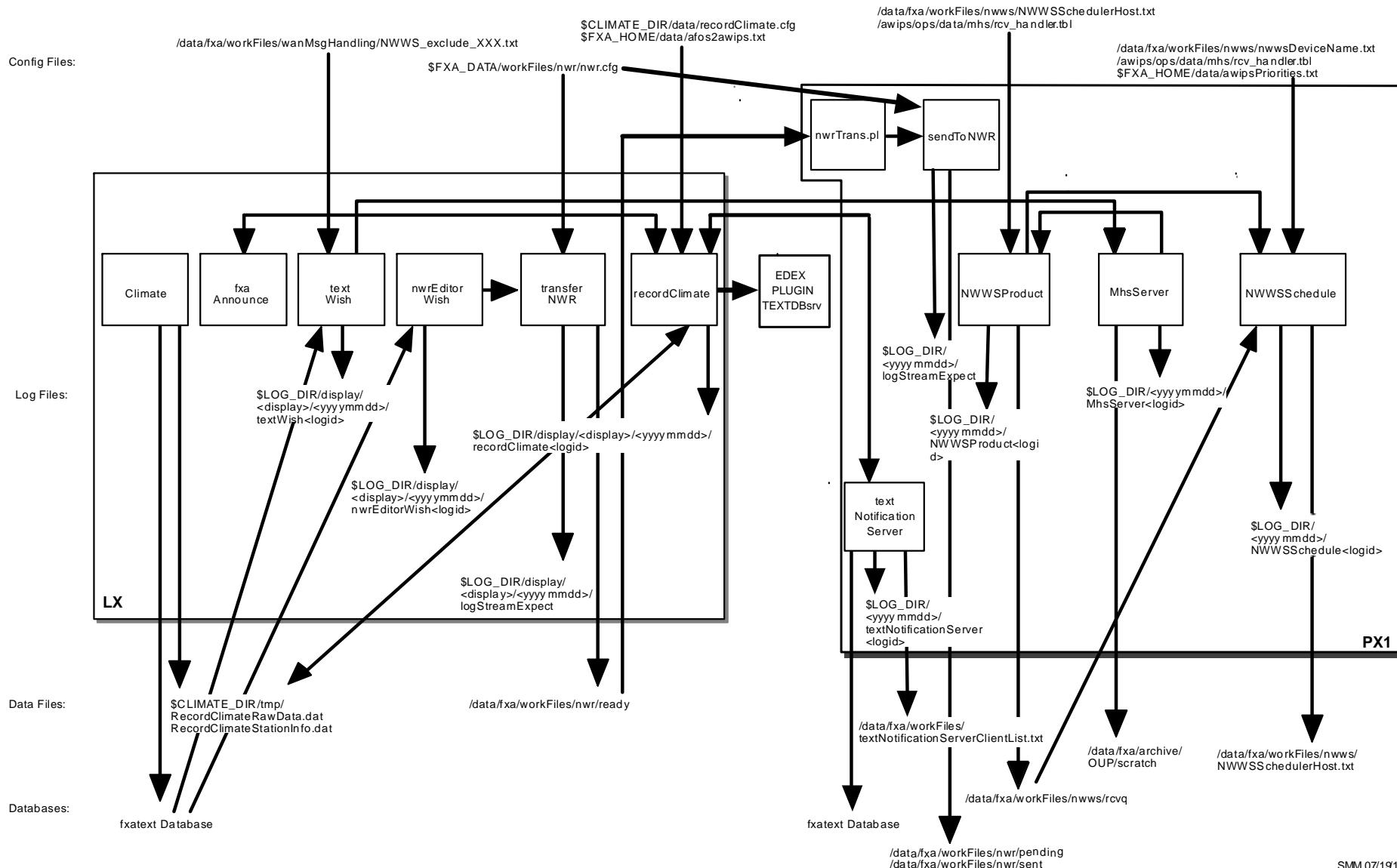


Exhibit 9.2.2-1. Record Climate Data Flow

► **To View the Current Day's recordClimate Log**

On LX1 as user fxa,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date and `<display>` is the current display variable (e.g., lx1-tbdw:0).
- TYPE:** `ls -ltr recordClimate*`
- Displays the current day's **recordClimate** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host lx1-tbdw3 at Mon Aug 29 12:28:55 2006
12:28:55:824 recordClimate.C EVENT: Checking to see if records are broken...
```

```
12:28:55:834 recordClimate.C EVENT: Checking for
/awips/adapt/climate/tmp/RecordClimateRawData.dat and
/awips/adapt/climate/tmp/RecordClimateStationInfo.dat
12:28:55:835 recordClimate.C EVENT: missing
/awips/adapt/climate/tmp/RecordClimateRawData.dat OR
12:28:55:836 recordClimate.C EVENT:
awips/adapt/climate/tmp/RecordClimateStationInfo.dat
12:28:55:837 recordClimate.C EVENT: No need to run recordClimate...Skipping...
~
```

The log consists of the following fields:

Time stamp	12:28:55:837
File name	recordClimate.C
Message type	EVENT:
Message string	No need to run recordClimate...Skipping...

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

textNotificationServer

The **textNotificationServer** process runs on PX1 and sends out notification messages to each of its registered clients for every text product written to the text database. The notification message identifies each product received by its nine-letter product ID. The process creates a data file, **textNotificationServerClientList.txt**, which identifies the processes registered with the **textNotificationServer**. When a product of interest is stored in the text database, it notifies **recordClimate**.

► **To View the Current Day's textNotificationServer Log**

On PX1 as user fxa,

TYPE: `cd $LOG_DIR/<yyyymmdd>`

- Where <yyyymmdd> is today's date.

TYPE: `ls -ltr textNotificationServer*`

- Displays the current day's **textNotificationServer** logs from earliest to latest.

TYPE: `tail -f <logname>`

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
18:42:47.480 TextNotificationServer.C EVENT: SFORERSFO notif rcvd
```

The log consists of the following fields:

Time stamp	18:42:47.480
File name	TextNotificationServer.C
Message type	EVENT:
Message string	SFORERSFO notif rcvd

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

fxaAnnounce

The **fxaAnnounce** process produces the text that displays on the appropriate fxa status line according to the “displayer” (LOCAL, SYSTEM, RADAR) and “importance” (SIGNIFICANT, ROUTINE, URGENT) characteristics.

TextDB_Server

The **recordClimate** process makes a request to the EDEX plug-in called TextDBSrv. It runs in the EDEX Request. The log messages can be found on edex-request.log.

textWish

The **textWish** process uses **textWindow.tcl** to create a text window so the forecaster can retrieve the record report product from the database. Upon verification of the product, it calls **MhsServer** to disseminate the report to the WAN.

- **To View the Current Day's textWish Log**
On the workstation, in a Terminal window,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
- Where `<yyyymmdd>` is today's date and `<display>` is the current display variable (e.g., `lx1-tbdw:0`).
- TYPE:** `ls -ltr textWish*`
- Displays the current day's **textWish** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
textWish 8803 1030732899.962823 18:41:39.962 EVENT: textWish 8803 app initialized
textWish 8803 1030732965.365089 18:42:45.365 EVENT: Reading
/data/fxa/workFiles/wanMsgHandling/NWWS_exclude_STO.txt
textWish 8803 1030732965.400578 18:42:45.400 EVENT: SXUS99 KSFO 121842 [SF0RSFO] sent to
DEFAULTINCF,NWWSUP via MhsServer
textWish 8803 1030732967.515203 18:42:47.515 EVENT: SXUS99 KSFO 121842 [SF0RSFO] written to db
textWish 8803 1030734019.668409 19:00:19.668 PROBLEM: textWish encountered XIO error 32: Broken
pipe on display aprfc:22.0
textWish 8803 1030734019.730314 19:00:19.730 PROBLEM: after 7923 requests, with 7872 processed, 0
remaining.
textWish 8803 1030734019.730754 19:00:19.730 EVENT: textWish interpreter 8803 exiting.
```

The log consists of the following fields:

Time stamp	18:42:45.365
File name	textWish
Message type	EVENT:
Message string	Reading /data/fxa/workFiles/ wanMsgHandling/NWWS_exclude_STO.txt

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

MhsServer

The **MhsServer** process on PX1 registers a call-back function that will handle products sent from the text workstation, declares an IPC address, and enters a dispatch loop waiting for messages. A notification is sent to the **MhsServer** process consisting of the WMO header and the file name slated for distribution. Module **MhsWfoProduct** sends the product to the WAN, NWWSUP while it archives the file in the **/data/fxa/archive/OUP/scratch** directory.

► **To View the Current Day's MhsServer Log**

On the PX1 as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr MhsServer*`
- Displays the current day's **MhsServer** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
18:42:46.231 MhsWfoProduct.C EVENT: SXUS99 KSFO 121842 [SFORERSFO] sent to DEFAULTINCF: msg id =
TBDW-153708
18:42:46.559 MhsWfoProduct.C EVENT: SXUS99 KSFO 121842 [SFORERSFO] sent to NWWSUP
18:42:46.660 MhsWfoProduct.C EVENT:/data/fxa/archive/OUP/scratch/KSFORERSFO.wan 20060512_184245
successfully archived
19:00:19.755 DataSocket.C DEBUG: Connection to lx1-tbdw/2573/8803 has been closed by the peer.
19:00:19.774 DataSocket.C DEBUG: Closing the socket to lx1-tbdw/2573/8803
```

The log consists of the following fields:

Time stamp	18:42:46.660
File name	MhsWfoProduct.C
Message type	EVENT:
Message string	/data/fxa/archive/OUP/scratch/KSFORERSFO.wan 20060512_184245 successfully archived

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

NWWSPproduct

The process stores the record report it received from **MhsServer** in the **/data/fxa/workFiles/nwws/recvq** directory and opens a socket to **NWWSSchedule** to transfer the message.

► **To View the Current Day's NWWSPproduct Log**

On PX1 as user fxa,

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
- Where <yyyymmdd> is today's date
- TYPE:** `ls -ltr NWWSPproduct*`

- Displays the current day's **NWWSPProduct** logs from earliest to latest

TYPE: `tail -f <logname>`

- Displays the log as it updates with the latest messages

Log Message Format

An entry in the log should look like the following:

```
18:42:52.580 nwpsProduct.C EVENT: Received message: 0056 SFORERSFO /data/fxa/workFiles  
/nwps/rcvq/TBDW-153708.001
```

```
18:42:52.867 nwpsProduct.C EVENT: Product sent to NWWSSchedule via socket
```

The log consists of the following fields:

Time stamp	18:42:52.867
File name	nwpsProduct.C
Message type	EVENT:
Message string	Product sent to NWWSSchedule via socket

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

NWWSSchedule

The **NWWSSchedule** process creates a socket to communicate and receive products with **NWWSPProduct**, validates product ID, maintains product queues, disseminates the products by forking **NWWSTransmit** and cleans up product files upon successful transmission.

► To View the Current Day's NWWSSchedule Log

On PX1 as user fxa,

TYPE: `cd $LOG_DIR/<yyyymmdd>`

- Where `<yyyymmdd>` is today's date.

TYPE: `ls -ltr NWWSSchedule*`

- Displays the current day's **NWWSSchedule** logs from earliest to latest.

TYPE: `tail -f <logname>`

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
18:42:52.906 nwpsScheduler.C EVENT: message receive: 0056 SFORERSFO  
/data/fxa/workFiles/nwps/rcvq/TBDW-153708.001
```

```

18:42:52.936 nwwsScheduler.C EVENT: RER is not found in nwwsProductPriority table.
Default priority is used
18:42:52.937 nwwsScheduler.C EVENT: Start transmitting product in queue
18:42:54.267 nwwsScheduler.C EVENT: SFORERSFO
/data/fxa/workFiles/nwws/rcvq/TBDW-153709.001 has been successfully transmitted

```

The log consists of the following fields:

Time stamp	18:42:54.267
File name	nwwsScheduler.C
Message type	EVENT:
Message string	SFORERSFO /data/fxa/workFiles/nwws/rcvq/TBDW-153709.001 has been successfully transmitted

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

nwrEditorWish

The **nwrEditorWish** process has been extended to include NWR application-specific commands and executes the **nwrEditor** script to provide the GUI access. The forecaster is allowed to remotely control NWR from an AWIPS workstation to monitor product transfer from AWIPS to NWR. The **nwrEditorWish** process provides a last-minute edit capability for products which are to be sent to the NWR from AWIPS.

► **To View the Current Day's nwrEditorWish Log**

On the LX,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date and `<display>` is the current display variable (e.g., lx2-tbdw:0).
- TYPE:** `ls -ltr nwrEditorWish*`
 - Displays the current day's **nwrEditorWish** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```

LOG-STATUS: Log file opened on host lx2-tbdw at Wed May 12 18:49:26 2006
nwrEditorWish 9100 1030733366.848139 18:49:26.848 PROBLEM: unable to send voice ready product to
crs _sendToCrs failed
nwrEditorWish 9100 1030733366.851436 18:49:26.851 PROBLEM: could not send voice ready product to
crs
nwrEditorWish 9100 1030733366.851809 18:49:26.851 PROBLEM: voice ready product NOT SENT to crs
nwrEditorWish 9100 1030733989.540121 18:59:49.540 EVENT: textWish interpreter 9100 exiting.

```

The log consists of the following fields:

```

Time stamp      18:49:26.848
File name       nwrEditorWish
Message type    PROBLEM:
Message string   unable to send voice-ready product to crs
                  _sendToCrs failed

```

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

transferNWR

The **transferNWR** script is responsible for transferring voice-ready products to a holding area where they will be picked up and sent to NWR. The **transferNWR** script is a command-line interface, which provides the forecaster with three options:

- | | |
|-------------------------------------|--|
| transferNWR -a
[filename] | This option will automatically transfer the file from the source directory to the /data/fxa/workFiles/nwr/ready directory. The full pathname of the file must be given so that the file can first be copied into the source directory. The transferNWR script then monitors the \$FXA_DATA/workFiles/nwr/pending directory to verify that the product has been successfully sent to CRS by the sendToNWR script. |
| transferNWR -d
[filename] | This option will also ensure that the file is copied into the source directory, but the file will not be transferred. This option is for cases where the forecaster would first like to inspect or edit the product before it is sent. |
| transferNWR -n | This option sends a warning message to the local workstation that there has been a problem in transmitting the file. This message is sent at the forecaster's discretion, based upon the return and exit values issued by this script. |

The **transferNWR** script is forked by a parent process, **NWRBrowser**. The **transferNWR** script returns one of two values to the parent process. The values are as follows:

Value = 0 indicates all was successful

Value = 1 indicates that the transfer may have failed

Log files can be viewed from the **NWRBrowser**. The most current log is listed last. Logs can also be viewed by other text editors, such as the **vi** editor.

- ▶ **To View the Current Day's transferNWR Log**

On the workstation,

TYPE: **cd \$LOG_DIR/display/<display>/<yyyymmdd>**

- Where <yyyymmdd> is today's date and <display> is the current display variable (e.g., lx1-tbw4:0).

- TYPE:** `ls -ltr logStreamExpect*`
- Displays the current day's **transferNWR** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host lx1-tbw4 at Wed May 12 18:19:05 2006
18:19:05.358 TclLogStream.C EVENT: File /data/fxa/workFiles/nwr/pending/PITHWRNWL will be
automatically transferred
18:19:05.359 TclLogStream.C EVENT: /data/fxa/workFiles/nwr/pending/PITHWRNWL has been copied to
data/fxa/workFiles/nwr/ready/PITHWRNWL for processing by sendToNWR.
```

NOTE: Check the logStreamExpect log on PX for information about the transfer of **data/fxa/workFiles/nwr/pending/PITHWRNWL** to CRS.

The log consists of the following fields:

Time stamp	18:19:05.358
File name	TclLogStream.C
Message type	EVENT:
Message string	File /data/fxa/workFiles/nwr/pending/PITHWRNWL will be automatically transferred

The scour script purges the logs after 2 days, and the empty directories are removed by the **master.purge** script.

nwrTrans.pl

The **nwrTrans.pl** (on PX1) Perl script is a persistent script that looks in **/data/fxa/workFiles/nwr/ready** every couple of seconds to find files that have been placed there by either the **NWRBrowser** or **nwrEditor** GUIs when a user requests to send a product to the CRS for broadcast on the NOAA Weather Radio. This script then calls **transferNWR** for any files that were found. Previously, **transferNWR** was called directly from the **NWRBrowser** or **nwrEditorWish**.

sendToNWR

Voice-ready text is transmitted from AWIPS to the NWR by the **sendToNWR Expect** script. In addition to transferring the product, copies can be kept in one of two directories:

```
$FXA_DATA/workFiles/nwr/pending
$FXA_DATA/workFiles/nwr/sent
```

The **sendToNWR** script is called from the **nwrTrans.pl** script, which is a persistent **fxa** process that checks the **/data/fxa/workFiles/nwr/ready** directory every 2 seconds for products placed there by the **transferNWR** script. When **nwrTrans.pl** finds a file, or files, in this directory, it calls **sendToNWR** for each file.

The **sendToNWR** script is responsible for transferring voice-ready products from AWIPS to the NWR. The **sendToNWR** script is a command-line interface that provides the forecaster with three options:

sendToNWR -a [filename]	This option will automatically transfer the file from the source directory on AWIPS to the destination directory on the CRS. The full pathname of the file must be given so that the file can first be copied into the source directory.
sendToNWR -d [filename]	This option will also ensure that the file is copied into the source directory, but the file will not be transferred. This option is for cases in which the forecaster would first like to inspect or edit the product before it is sent.
sendToNWR -n	This option sends a warning message to the local workstation that there has been a problem in transmitting the file. This message is sent at the forecaster's discretion, based upon the return and exit values issued by this script.

NOTE: The **transferNWR** script also may continue to be used for the **-d** and **-n** options.

When **sendToNWR** is invoked, the product is automatically copied to the **pending** directory. If successfully sent, the product is moved to the **sent** directory. The contents of each directory can be viewed in the windowpane dedicated to that directory. Products not successfully transmitted will remain in the **pending** directory.

► **To View the Current Day's sendToNWR Log**

On PX1, as user fxa,

TYPE: `cd $LOG_DIR/<yyyymmdd>`

- Where `<yyyymmdd>` is today's date.

TYPE: `ls -ltr logStreamExpect`

- Displays the current day's **sendToNWR** log.

- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
18:19:05.358 TclLogStream.C EVENT: File /data/fxa/workFiles/nwr/pending/PITHWRNWL will be
automatically transferred
18:19:06.012 TclLogStream.C EVENT: Successful ping to 0MP
18:19:06.368 TclLogStream.C EVENT: Successful ping to 5MP
18:19:09.802 TclLogStream.C EVENT: Master processor is 0MP
18:19:11.746 TclLogStream.C EVENT: transfer complete to 0MP
18:19:11.899 TclLogStream.C EVENT: Successful transfer of
/data/fxa/workFiles/nwr/pending/PITHWRNWL to 0MP
```

The log consists of the following fields:

Time stamp	18:19:05.358
File name	TclLogStream.C
Message type	EVENT:
Message string	File /data/fxa/workFiles/nwr/pending/PITHWRNWL will be automatically transferred

The scour script purges the logs after 2 days and the empty directories are removed by the **master.purge** script.

9.3 *Hourly Weather Roundup Formatter for the NOAA Weather Wire Service (NWWS)*

The HWR is a summary of the current weather observations for locations in and around the local area including marine observations for those WFOs with coastal responsibilities.

The HWR NWWS formatter application prepares tabular products for the NWWS. The formatted products are automatically sent to the NWWS.

The HWR uses:

- METAR observations
- Marine observations
- SCD
- Satellite Cloud Product (SCP).

The HWR NWWS application (**hwrnwws**) performs calculations on hourly weather data, both land and marine, constructs the product, and stores the resultant text files into a temporary target directory. From the temporary directory, the product is automatically sent to the NWWS. The **transferNWWS.pl** script sends the completed files over the WAN to the site's NWWS uplink site for distribution to the NWWS via the uplink site's NWWS asynchronous interface port.

NOTE: The forecaster-entered **METARINT** value in the **nwws.config** file specifies the number of minutes before the hour at which to start including the METAR observations in the HWR. The HWR considers any observations from H-METARINT up to but not including H+(60-METARINT) as an observation for the nominal hour. For example, if the METARINT value is 15, observations at 0845Z are considered 0900Z observations, but observations at 0840Z are considered 0800Z observations. So, if an observation comes in at H+0:40, then at the top of the hour HWR will consider that observation to be from last hour and reject it.

The **NWWS** selection in the **Product Setup** section of the HWR main GUI permits the forecaster to create a station listing and make configuration and threshold selections.

9.3.1 Configuration Files and Environment Variables

Environment Variables

The following environment variables are referenced in this chapter for user **fxa** and individual user accounts; their full paths are provided as follows:

\$LOG_DIR	/data/logs/fxa
\$FXA_HOME	/awips/fxa
\$FXA_DATA	/data/fxa

Configuration Files

nwws.config

The **nwws.config** configuration file contains the list of products to be produced for the NWWS. It resides in the **/awips/adapt/hwr/etc/nwws** directory. An example of an **nwws.config** file is shown in Exhibit 9.3.1-1.

```
SCRIPT /awips/fxa/bin/transferNWWS.pl
DESTDIR /data/fxa/workFiles/nwws
# product list. The following product will be generated:
METARINT 15 # minutes before the hour at which to start using METAR's in HWR
PRODUCT PITSWRPA
PRODUCT PITSWRPA1
PRODUCT PITSWRPA2
```

Exhibit 9.3.1-1. Example nwws.config File

awipsPriorities.txt

The **awipsPriorities.txt** configuration file contains a table with AFOS product categories (NNN) and corresponding priorities. The values in the first column are the product categories; those in the second column are the priorities. The file resides in the **\$FXA_HOME/data** directory. An example of an **awipsPriorities.txt** file follows:

ACR 1

AWG 2
AWU 1
AWW 2
BOT 1
CEM 2
CWA 1
FFA 1
FLW 2

afos2awips.txt

The **afos2awips.txt** configuration file is used to convert the AFOS site ID into the AWIPS site ID. The first column contains the AFOS ID. The second column contains the World Meteorological Organization (WMO) header ID. The third column contains the AWIPS site ID. The file resides in the **\$FXA_HOME/data** directory. An excerpt of this file follows:

```
ABNNPWAPN WWUS45 KAPN
ABNNSWAPN WWUS46 KAPN
ABQADAABQ NOUS45 KABQ
ABQADACAO NOUS45 KABQ
ABQADAROW NOUS45 KROW
ABQADAZAB NOUS45 KZAB
ABQADMABQ NOUS45 KABQ
```

siteCommission.txt

This configuration file contains the AWIPS site's commissioning status and is a holdover from the precommissioned phase. The file contains a **1** if the site is commissioned and a **0** if it is not yet commissioned. All operational sites should have a **1** in this file.

wmoSiteId.txt

This configuration file is located in **/awips/fxa/data/localizationDataSets/LLL** (where **LLL** is the localization ID, usually the same as the site ID) and identifies the site's four letter AWIPS site ID.

NWWS_exclude_XXX.txt

This configuration file provides a list with NWWS products that will not be sent to the NWWS.

siteCommission.txt

This configuration file contains the AWIPS site's commissioning status and is a holdover from the precommissioned phase. The file contains a **1** if the site is commissioned and a **0** if it is not yet commissioned. All operational sites should have a **1** in this file.

wmoSiteId.txt

This configuration file is located in

/awips/fxa/data/localizationDataSets/LLL (where **LLL** is the localization ID, usually the same as the site ID) and identifies the site's four letter AWIPS site ID.

NWWS_exclude_XXX.txt This configuration file provides a list with NWWS products that will not be sent to the NWWS.

9.3.2 Processes

PX1	hwrnwws
LX	hwrgui
LX	transferNWWS.pl
LX	handleOUP.pl
LX	distributeProduct

Exhibit 9.3.2-1 diagrams the Hourly Weather Roundup Formatter for NWWS data flow.

hwrnwws

The **hwrnwws** process requires the following input:

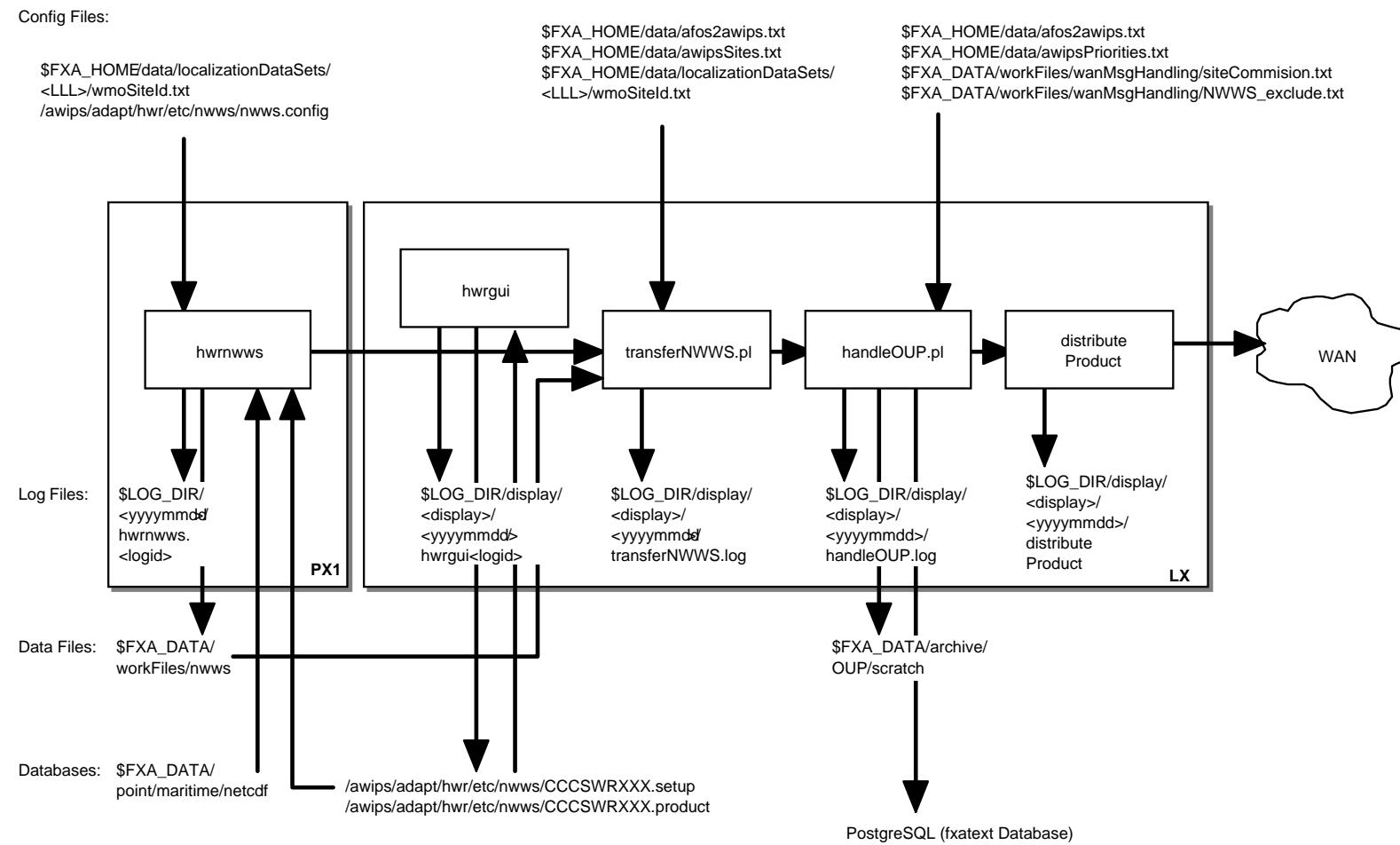
- Decoded marine observations from netCDF files
- Decoded METAR observations from the text database (**fxatext**)
- SCD and SCP data from the text database (**fxatext**)
- Setup data, which includes the station lists and marine selections from the **CCCSWRXXX.setup**, and **CCCSWRXXX.product** files
- Configuration information from the **nwws.config** file.

The **hwrnwws** process performs calculations on both land and marine hourly weather data, constructs the product, and stores the resultant text files in a temporary target directory. The **transferNWWS.pl** script sends the completed files to all sites across the AWIPS WAN via the NCF which distributes them to the NWWS primary and backup sites where it is uplinked.

► **To View the Current Day's hwrnwws Log**

On PX1, as user fxa or your individual user account,

- TYPE:** **cd \$LOG_DIR/<yyyymmdd>**
- Where <yyyymmdd> is today's date.
- TYPE:** **ls -ltr hwrnwws***
- Displays the current day's **hwrnwws** logs from earliest to latest.
- TYPE:** **tail -f <logname>**
- Displays the log as it updates with the latest messages.



SMM 8/30/05

Exhibit 9.3.2-1. Hourly Weather Roundup Formatter for NOAA Weather Wire Service

Log Message Format

An entry in the log should look like the following:

```
Traceback (most recent call last):
File "/awips/adapt/hwr/py/hyrnwws.py", line 52, in ?
    wxRoundup.GetFiles('nwws', names)
File "/awips/adapt/hwr/py/wxRoundup.py", line 100, in getFiles
    pils = Pils.restorePils()
File "/awips/adapt/hwr/py/Pils.py", line 18, in restorePils
    return cPickle.load(open(PILFile))
IOError: [Errno 2] No such file or directory: 'etc/pil.data'
~
~
```

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

hwrgui

The **hwrnwws** process enables the forecaster to enter required/allowed configuration and threshold information through a graphical user interface (GUI) controlled by processes launched by the **hwrgui** process. Forecaster selections are validated and stored in the **CCCSWRXXX.setup** file.

The **NWWS** product setup process uses the station format editor to create the station list for each output product. Each list contains the METAR and SCD station identifier, the SCP station identifier, a symbol to indicate how to treat missing data, and the station name.

The product IDs and the station lists are stored in the **CCCSWRXXX.product** file.

- ▶ **To View the Current Day's hwrgui Log**

On the workstation as user fxa or your individual user account,

- | | |
|--------------|--|
| TYPE: | <code>cd \$LOG_DIR/display/<display>/<yyyymmdd></code> |
| ▪ | Where <display> is the current display variable (e.g., lx1-tbw4:0) and <yyyymmdd> is today's date. |
| TYPE: | <code>ls -ltr hwrgui*</code> |
| ▪ | Displays current day's hwrgui logs from earliest to latest. |
| TYPE: | <code>tail -f <logname></code> |
| ▪ | Displays the log as it updates with the latest messages. |

Log Message Format

An entry in the log should look like the following:

```
hwrgui 21509 924279088.572954 16:11:28.572 EVENT: HWRNWWSSetup::update() succeeded
~
```

The log consists of the following fields:

```

Time stamp      16:11:28.572
Module name    hwrgui
Message type   EVENT:
Message string HWRNWWSSetup::update() succeeded

```

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

transferNWWs.pl

The **transferNWWs.pl** script prepares a given product for WAN distribution by removing the one line communications header. The **\$FXA_HOME/data/afos2awips.txt** file is read and used to convert the AFOS product identifier, extracted from the product contents, to an equivalent AWIPS identifier. The **transferNWWs.pl** script invokes the **handleOUP.pl** script.

► **To View the Current Day's transferNWWs Log**

On the workstation as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
 - Where <display> is the current display variable (e.g., lx1-tbw4:0) and <yyyymmdd> is today's date.

- TYPE:** `ls -ltr transferNWWs*`
 - Displays the current day's **transferNWWs.pl** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```

product = /data/fxa/workFiles/nwws/SFOSWRCA
AFOS ID = SFOSWRCA
AFOS routing node = DEF
-- Handling OUP
mapToAwipsID():
    Found match.
    awips ID = KSFOSWRCA
wan Command =
    handleOUP.pl -r DEF KSFOSWRCA /data/fxa/workFiles/nwws/SFOSWRCA
Handling of OUP was successful.
Script done...

```

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

handleOUP.pl

The **handleOUP.pl** script performs tasks associated with the handling of an Official User Product, including distribution across the WAN, transmission over the NWWs uplink, local storage, and archiving. The **handleOUP.pl** script submits the message for WAN distribution via the **distributeProduct** command line interface. Once the product is disseminated, the **handleOUP.pl** script locally stores the product in the text database.

► To View the Current Day's handleOUP.pl Log

On the workstation as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`

 - Where `<display>` is the current display variable (e.g., `lx1-tbw4:0`) and `<yyyymmdd>` is today's date.

- TYPE:** `ls -ltr handleOUP*`

 - Displays the current day's **handleOUP.pl** logs from earliest to latest.

- TYPE:** `tail -f <logname>`

 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```

Message to NWWSUP successfully submitted.
createAwipsWANHeader():
    awips wan header =
ASUS46 KSFO 121210
SWRCA
createTargetFile():
    target product pathname = /tmp/SFOSWRCA
storeInTextDB():
    storeCommand =
    textdb -w SFOSWRCA < /tmp/SFOSWRCA
    Successful storage to text database.
archiveOUP():
moveFile(): /tmp/SFOSWRCA to /data/fxa/archive/OUP/scratch/SFOSWRCA.20060512_121047
    /tmp/SFOSWRCA moved successfully...
    Successfully archived product
/data/fxa/archive/OUP/scratch/SFOSWRCA.20060512_121047
Script done....

```

distributeProduct

The **distributeProduct** process creates a product message and submits it for distribution across the AWIPS WAN to the addressed sites. The **distributeProduct** process first prepares the product by creating the WAN communications header and prepending the header to a temporary copy of the product. Distribution requests, enclosing the temporary copy of the product, are subsequently made to the X.400 Message Handling System through the **msg_send** utility program.

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
 - Where **<display>** is the current display variable (e.g., lx1-tbw4:0) and **<yyyymmdd>** is today's date.

- TYPE:** `ls -ltr distributeProduct*`
 - Displays the current day's **distributeProduct** logs from earliest to latest.

- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```

12:10:42.004 MHSPproduct.C EVENT: Product request (KSFOSWRCA) was successfully
submitted to the MHS request server for distribution.
    Message Attributes:
        Request ID: TBDW-35537
        To: NWWSUP
        Priority: 0
        Type: Routine
        Subject: SFOSWRCA
        Handling Action: 131
12:10:42.050 MHSPproduct.C EVENT: TBDW-35537
~
```

9.3.3 Setting up the HWR NWWS Application

Before it can be used, the HWR NWWS application has to be set up (localized) for your site. There are two steps involved in setting up this application:

1. Specify the HWR NWWS Setup Product options.
2. Create a Station List.

NOTE: Setting up the HWR NWWS application only needs to be done for the initial application installation and when creating new product identifiers.

9.3.3.1 Identify the Products to be Produced

To identify the products to be produced, press the **NWWS** button in the **Product Setup** section of the hwr GUI. Either select an existing product and press **Load** or create a new product by typing the new product ID in the **Product Actions** section and press **Add**.

9.3.3.2 Setting Up the HWR NWWS Application

To access the HWR Editor for NWWS from the System Control Menu, select **Background WFO Apps, Hourly Weather Roundup (HWR)** from the cascading menu. This will display the **Hourly Weather Roundup** GUI shown in Exhibit 9.3.3.2-1.



Exhibit 9.3.3.2-1. The Hourly Weather Roundup GUI

- Select:** The NWWS under the Product Setup on the HWR GUI.
- The **Hourly Weather Roundup** Editor for NOAA Weather Wire Service Product Setup shown in Exhibit 9.3.3.2-2 will display.

Once the HWR Editor for NWWS has opened you will see the following setup options.

Products. This scrolled list displays the list of products that may be converted to output products. Each product must contain a Station List file (editable via the Station Editor). Select a product and press **Load**. New products may also be created, as discussed in **Product Actions** below.



Exhibit 9.3.3.2-2. The Hourly Weather Roundup for NOAA Weather Wire Service Product Setup

Editors	Station. This editor pushbutton displays the Station List for review and edit.
Product Actions	<p>New/Add. Create a new product by typing the product ID in this field and pressing Add.</p> <p>Verify. After you have created a new product, select Verify to check that the required files exist for the product.</p> <p>Save. This selection saves all the setup and product data from the GUI.</p> <p>Delete. You may delete a product by selecting the product ID from the scrolled list and hitting Delete.</p> <p>Help. This selection displays general information about the various sections in the GUI.</p> <p>Close. Closes the GUI.</p>
Addressee	This is a three-letter identifier for the product routing address.
Window for Marine Obs(hours):	By default, if observations are more than 1 hour old, they are considered invalid and are not used in the roundup. However, since C-MAN, buoy, and ship observations are not necessarily reported every hour, an option to use older observations is included in the GUI. Marine observations, up to the number of hours entered in this window, will be considered valid and used by the HWR NWWs application.
Include temperature in deg C?:	This option is used to output the temperature, in degrees Celsius, in the Remarks field. However, just because this field is selected it does not mean the temperature in degrees Celsius will always be output. The Remarks section can contain a maximum of two weather elements based on a fixed priority order, with the temperature in degrees Celsius having the lowest priority.
Express sky conditions when SCP missing?:	Since ASOS METAR cloud observations do not exceed 12,000 feet, the sky/weather phrase may not be generated accurately when there is no significant weather and the ASOS cloud observation is not cloudy. Satellite cloud observations are used to supplement the ASOS observations under these conditions. If this option is selected, and the SCP is missing while the ASOS observation is clear or partly cloudy, the phrase “FAIR” will be expressed. Otherwise, when the SCP is missing, the sky/weather will be output as missing.
Time Zone:	The forecaster can specify the time zone to be used in the product via this option.

Std time all year?:	This Standard Time All Year option must be selected for those areas that do not switch to Daylight Savings Time.
Thresholds	Heat Index. The forecaster can specify the minimum heat index value at or above which a heat index phrase is to be output. Wind Chill Index. For the wind chill index to be calculated, the observed temperature must be at or below the value entered in Max Temp(deg F) and the observed wind speed must be at or above the value entered in Min Wind Speed(mph) . Also, the calculated wind chill index must be at or below the value entered in Max WCI for a wind chill index to be output.
Marine Fields	To determine the HWR NWWS data line length, you must select either 69 or 80 , representing the number of characters to be formatted per line. Select the marine fields to be included in the HWR NWWS product (from Field selection). The Station ID field will always be automatically selected; it is a necessary field for this product. You may select from one up to all of the rest of the fields provided in the GUI. The GUI provides a running total, named Field size , of the number of characters comprising the marine fields you selected, which includes the blank spaces that will be inserted between each marine field. When the Field size exceeds the Line length , the resulting output product will contain marine fields that are wrapped on to a second line for stations reporting those fields.

9.3.3.3 *Creating a Station List*

The Station Format Editor is used to create the Station List. An example of an HWR NWWS Station List is shown in Exhibit 9.3.3.3-1.

The software delivery includes a template (product ID CCCSWRXX) that you may cut, paste, and edit to match your requirements. The station list begins with the AFOS PIL, WMO Header, and the Mass Media Header followed by comment lines. The comment lines are followed by universal generic code with expiration date/time. Another comment follows to identify the part(s) of the state in which the succeeding group of stations, called a segment, are located. Next, the stations in the group are listed.

Comment Lines

Any line in the Station List that begins with a tilde “~” is interpreted as information which will appear verbatim in the HWR NWWS output product. Symbolic words, converted into data observations (refer to Exhibit 9.3.3.3-2), can be inserted into these comment lines. Any line starting with the pound symbol (#) is interpreted as being an internal Station List comment and is not included in the HWR NWWS output product.

```

# Product 1
~Missouri State Weather Roundup... Test product
~National Weather Service Central Region HQ
~%HEADDT%
~
~Note: "fair" indicates few or no clouds below 12,000 feet with no
~significant weather and/or obstructions to visibility.
~
~!MOZ005>007-011>016-020-021-028-029-037-043-%DDHHMM%
~...West Central and Northwest Missouri...
!!!!FF_STATIONS
/KMCI//+KC INTL APT
/KMKC/KMCI/+KC DOWNTOWN
/KSTJ//+ST JOSEPH
~$$
~
#
~!MOZ079>081-088-090>094-101-102-%DDHHMM%
~...Southwest Missouri...
!!!!FF_STATIONS
/KSGF//+SPRINGFIELD
/KJLN//+JOPLIN
~$$
~
#
~!MOZ038>042-044>050-056>058-069>072-082-083-%DDHHMM%
~...East Coast...
!!!!MAR_STATIONS
/MISML//+MATINICUS ISLE
/MDRM1//+MT DESERT ROCK
/SAUF1//+ST. AUGUSTINE
~$$
~
~!MOZ008>010-017-018-061-063>065-%DDHHMM%
~...West Coast...
!!!!MAR_STATIONS
/POTA2//+POTATO POINT
/FFIA2//+FIVE FINGER LH
/BLIA2//+%LATLON%
/TTIW1//+TATOOSH ISLAND
~$$
~
#

```

Exhibit 9.3.3.3-1. Sample Station List for the NWWS

%DATE%	-	the current date (e.g., August 6).
%DAY%	-	the current day of the week (e.g., Thursday).
%TIME%	-	the current hour (e.g., 9 AM).
%TIMEZ%	-	the current nominal hour and time zone (e.g., 9AM Pacific Daylight Time).
%TIMEW%	-	the product creation time in numerical format (e.g., 251908, which means 25th day of the month, 19th hour, 8th min).
%HEADDT%	-	the NWWS header date/time (e.g., 900 AM PACIFIC DAYLIGHT TIME THURSDAY AUGUST 6, 1998).
%DDHHMM%	-	the current date of the month, nominal hour, and minute of the observation (e.g., 251900, which means 25th day of the month, 19th hour, 0th min).

Exhibit 9.3.3.2. Symbolic Words

Fixed Phrase Stations

Enter **!!!!FF_STATIONS** to identify that fixed phrase land stations follow in the station list. Fixed phrase land stations are identified by their four-character ICAO identifiers (e.g., KCRW) and are listed in the order they are to be output, one station per line.

Place a slash “/” on each side of the surface station (METAR or marine observation) identifier.

Next, place another four-character ICAO identifier for the representative SCP station followed by a slash, unless the station identifier is identical to the surface station identifier. In such cases, it is not necessary to repeat the surface station identifier. Instead, place another slash after the previous one.

Next, place the missing station flag which is either the plus sign “+,” minus sign “-,” the equal sign “=,” or the ampersand “&.”

The “+” indicates that the corresponding station will always be output, even if the weather elements are missing (i.e., “NOT AVBL”).

The “-” indicates that the station will be ignored if all the weather elements for the station are missing.

The “=” indicates that the corresponding land station will always be output, even if all weather elements are missing. This symbol also indicates that additive data are to be appended immediately below the station’s hourly data.

The “&” indicates that the corresponding land station will be dropped if all weather elements are missing. This symbol also indicates that additive data are to be appended immediately below the station’s hourly data.

Enter the fixed phrase station name after the missing station flag. As many as 14 characters may be used for land station names. Sample fixed phrase station lines follow:

```
/KCGI//=CAPE GIRARDEAU
/KMKC/KMCI/-KC DOWNTOWN
WS/ -tbw4
/tmp
```

Land stations are grouped together in segments consisting of up to 10 stations. Each segment ends with ~\$\$ as shown in the following example.

```
!!!!FF_STATIONS
/KMCI//+KC INTL APT
/KMKC/KMCI/+KC DOWNTOWN
/KGVW//+GRANDVIEW
/KSTJ//+ST JOSEPH
/KP35//+SPCKARD
~$$
#
~!MOZ079>081-088-090>094-101-102%DDHHMM%
~...Southwest Missouri...
1111FF_STATIONS
/KSGF//+SPRINGFIELD
```

```
/KJLN// -JOPLIN
~$$
```

Marine Observations

Enter **!!!!MAR_STATIONS** to identify that marine stations follow in the station list. Marine stations are identified by their alphanumeric identifier (e.g., WECB, MISM1, 41002). They are listed in the order they are to be output, one station per line.

Place one slash “/” before the identifier and two slashes after it.

After the second slash, place either the plus sign “+” or minus sign “-” missing station flags as described under the Fixed Phrase Stations. Enter the marine station name after the missing station flag. As many as 18 characters may be used for the station name.

Use the keyword **LATLON** surrounded by percent signs (%) in place of the marine station name to output the station latitude and longitude instead of its name.

Marine stations are grouped together in segments of up to 10 stations. Each segment ends with **~\$\$** as shown in the following example.

```
~!MOZ038>042-044>050-056>058-069>072-082-083-%DDHHMM%
~...East Coast...
!!!!MAR_STATIONS
/MISM1// -MATINICUS ISLE
/MDRM1// +MT DESERT ROCK
/SAUF1// -ST. AUGUSTINE
~$$
~!MOZ008>010-017-018-061-063>065-%DDHHMM%
~...West Coast...
!!!!MAR_STATIONS
/POTA2// -POTATO POINT
/FFIA2// +FIVE FINGER LH
/BLIA2// +%LATLON%
/TTIW1// +TATOOSH ISLAND
/41002// +%LATLON%
~$$
```

9.3.3.4 Updating Station PILs

Hourly Weather Roundup PILs Editor

The **Hourly Weather Roundup PILs Editor** is the interface that reads the **/awips/adapt/hwr/etc/pil.data** file and creates a listing of NWR and NWWS stations where each station mapped to their respective AFOS site ID and SCD ID.

The **/awips/adapt/hwr/etc/pil.data** configuration file contains a list of AWIPS station IDs, AFOS METAR IDs, and SCD IDs derived from the **\$FXA_HOME/data/localization/nationalData/afosMasterPIL.txt** configuration file. It is used to allow data retrieval from the text database by providing the full AFOS IDs for METAR and SCD reports for each AWIPS site ID listed. The values in the first column are AWIPS site IDs. The values in the second column are AFOS METAR IDs. The

values in the third column are SCD site IDs. If no AFOS or SCD site ID is available, the value of ‘XXXXXXXXXX’ may be added its respective columns.

The **pil.data** file should be updated every time a new product is added or a station is added or deleted from a product. Also, the **pil.data** file should only be updated through the **HWR PILs Editor** GUI. Saving changes writes to the **/awips/adapt/hwr/etc/pil.data** file. The **afosMasterPIL.txt** file is not affected.

To access the HWR PILs Editor from the System Control Menu, select **Background WFO Apps, Hourly Weather Roundup (HWR)** from the cascading menu. This will display the **Hourly Weather Roundup** GUI shown in Exhibit 9.3.3.2-1.

- Select:** **PILs** pushbutton
 ■ The PILs Editor shown in Exhibit 9.3.3.4-1 will appear.

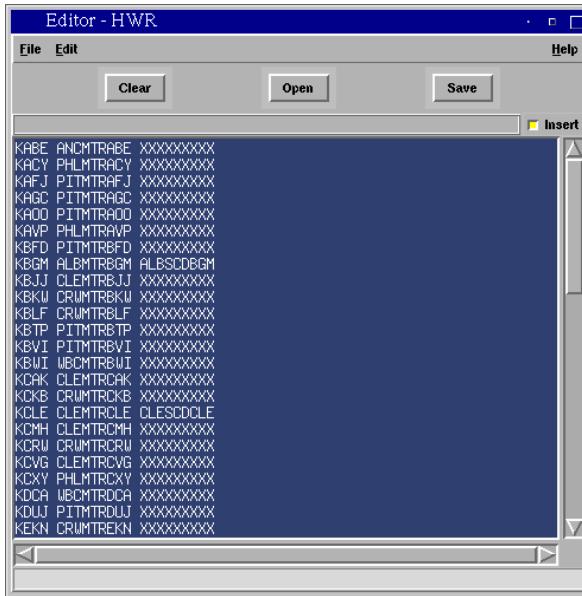


Exhibit 9.3.3.4-1. PILs Editor

Once the PILs Editor has opened, you have the following options:

Menu Options

File

- Print:** Invokes the print dialog.
Update: Updates AFOS site IDs for all NWR and NWWS products based on the **\$FXA_HOME/data/localization/nationalData/afosMasterPIL.txt** file. Update will search the **afosMasterPIL.txt** file for CCCMTRXXX and CCCSCDXXX entries where XXX is the AWIPS site ID. If a match is not found, the AFOS site ID is displayed as XXXXXXXXXX (and the retrieval of METAR/SCD report is not attempted). If a station entry is listed in the text widget, the METAR and SCD IDs are not updated.

Replace: Replaces the entire list based on the **/data/fxa/nationalData/afosMasterPIL.txt** file. All entries listed in the text widget are replaced.

Close: Exits from the PILs Editor GUI.

Edit

Cut: Removes highlighted text from the widget and saves to a buffer.

Copy: Makes a copy of highlighted text from the widget to a buffer.

Paste: Copies text from the buffer to the widget.

Find: Search and replace utility for finding text within the widget list.

Button Options

Clear Clears all text from the widget.

Open Loads PILs data from **/awips/adapt/hwr/etc/pil.data** file.

Save Saves content of the text window to the **/awips/adapt/hwr/etc/pil.data** file.

Insert Toggles on and off text insert mode.

9.3.3.5 Treatment of Missing Data

The HWR NWWS application treats missing data as described below.

If the entire observation for the station is missing and the station is marked with a “+” or “=” symbol in the station list, the station is output as “NOT AVBL.”

If the entire report for a station is missing and the station is marked with a “-” or “&” symbol in the station list, the station is not output.

If wind speed is missing, “MISG” is output in the wind field. If sky/weather, temperature in degrees Fahrenheit, dew point, relative humidity, or pressure is missing, “N/A” is output in the respective field. Up to two weather elements may be output as remarks in a fixed priority order. Thus, if one element is missing, the weather element with the next highest priority is output. If only one of the remark field’s weather elements is available, only that element will be output. If none of the remark’s section weather elements are available, this field is left blank. If none of the 6-hour, additive data, weather elements are available, these fields will be skipped.

Low-level, cloud cover observations are supplemented with satellite-derived middle and upper-level cloud cover observations which result in the handling of missing data as follows:

- If the ASOS cloud cover observation is missing, but the SCP product, which contains information on only middle and high level cloud cover is available, the cloud cover is considered missing.

- If the ASOS observation shows overcast conditions, the SCP product is not needed, since the sky conditions will be reported as cloudy.
- If the ASOS observation shows broken clouds, the SCP product will be accessed to determine if the sky is overcast. If the SCP product is missing, the sky conditions will be reported as **PARTLY SUNNY** or **MOSTLY CLOUDY**, depending on the time of day.

9.4 Hourly Weather Roundup Formatter for the NOAA Weather Radio

The HWR is a summary of the current weather observations for locations in and around the local area including marine observations for those WFOs with coastal responsibilities.

The HWR NWR formatter application prepares voice-ready products for NWR broadcast. The products are automatically sent to the NWR across the AWIPS LAN to the CRS LAN or via a computer-to-computer link to a site-provided PC running Bubble and Airwave, which will transfer the products to the CRS, but the forecaster is given the opportunity to review and edit them.

The Hourly Weather Roundup uses

- METAR observations
- Marine observations
- SCD
- SCP.

The HWR NWR application (**hwrnwr**) uses METAR and marine observations, the SCP, and SCD to perform required calculations; build phrases; and add instructions for the CRS. The output product is stored temporarily and the WFO is notified of its completion.

NOTE: The forecaster-entered **METARINT** value in the **nwr.config** file specifies the number of minutes before the hour at which to start including the METAR observations in the HWR. The HWR considers any observations from H-METARINT up to but not including H+(60-METARINT) as an observation for the nominal hour. For example, if the METARINT value is 15, observations at 0845Z are considered 0900Z observations but observations at 0840Z are considered 0800Z observations. So, if an observation comes in at H+0:40, HWR will consider that observation to be from last hour and reject it.

At this point, the forecaster uses the NWR Browser to:

- View the list of products that are available for viewing and editing but have not yet been sent to the CRS.
- View the list of products that have been sent to the CRS.

- Select a product from the **Delayed** or **Sent lists** and **View** (not edit) in a separate window.
- Select a product from the **Delayed** or **Sent lists** and **Edit** the product in the **NWR** editor.
- Send the selected product to the CRS.
- Refresh the **Delayed** and **Sent** lists.
- Display a list of log files. When the **Log File** list is displayed, the **View Logs** button becomes a **Refresh Log Window** button.

9.4.1 Configuration Files and Environment Variables

Environment Variables

The following environment variables are referenced in this chapter for user **fxa** and individual user accounts and their full paths are provided below.

<code>\$LOG_DIR</code>	/data/logs/fxa
<code>\$FXA_HOME</code>	/awips/fxa
<code>\$FXA_DATA</code>	/data/fxa

Configuration Files

nwr.config

The **nwr.config** configuration file contains:

- The list of products to be produced for the NWR
- The paths to the **NWRBrowser**, **transferNWR** script, and destination directory
- The allotted forecaster review period before the product is sent to the CRS
- The number of minutes before the hour at which to start including METAR observations in the HWR.

The file resides in the **/awips/adapt/hwr/etc/nwr** directory. An example of a **nwr.config** file follows.

```
# nwr.config
# configuration file for hwrnwr
#
GUI      /awips/fxa/bin/NWRBrowser
SCRIPT   /awips/fxa/bin/transferNWR -a
DESTDIR /data/fxa/workFiles/nwr/pending
REVIEW   7
METARINT 15 # minutes before the hour at which to
start using METARs in HWR
#
TEMP_PHRASE 0 # 1 = Descriptive phrasing; 0 =
Specific numbers
# Flags associated with PRODUCT ID below should only
```

```
rarely be changed. # See users' manual
# Product list. The following products will be
generated:
PRODUCT HFOHWRNW1      AD_      0
PRODUCT HFOHWRNW2      AD_      1
PRODUCT HFOHWRNW3      AD_      0
```

~

nwr.cfg

The **nwr.cfg** file is a dedicated configuration file that holds the username, a line of dummy text as a placeholder (this will be the NWRCRS password until CRS Build 10 is released) and the password for Telnet and FTP and the connectivity type (PC or LAN). The information must be kept exactly in the previously mentioned order. The file resides in the **\$FXA_DATA/workFiles/nwr** directory.

9.4.2 Processes

```
PX1    hwrnwr
LX    hwrgui
LX    hmMonitor.tcl
LX    hmMonitorWish
PX1    hmMonitorServer
LX    NWRBrowser
LX    transferNWR
PX1    nwrTrans.pl
PX1    sendToNWR
```

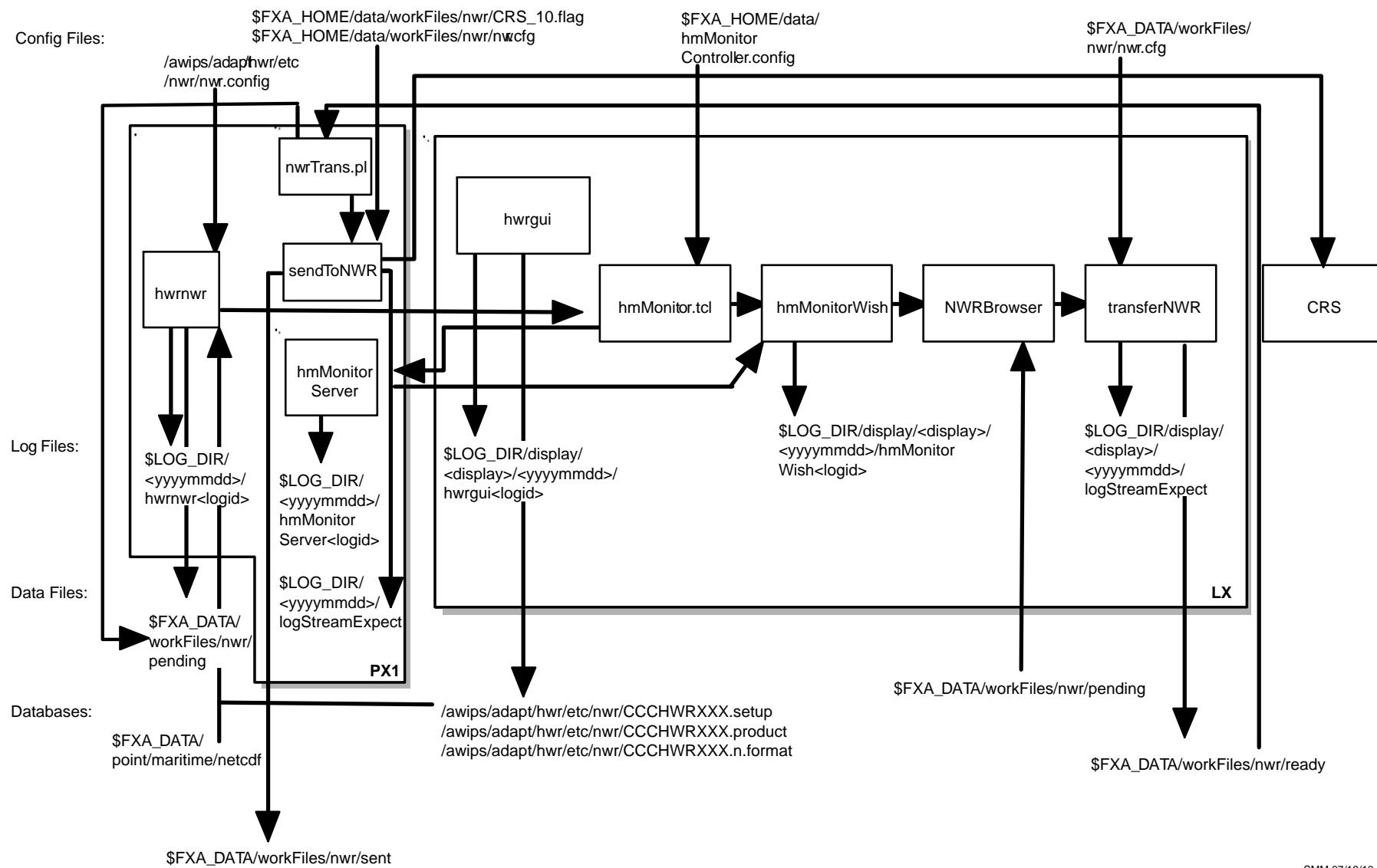
Refer to Exhibit 9.4.2-1 for the HWR Formatter for NWR data flow diagram.

hwrnwr

The **hwrnwr** process requires the following input:

- Decoded marine observations from netCDF files
- Decoded METAR observations from the text database (fxatext)
- SCD and SCP data from the text database (fxatext)
- Setup data, which includes the station lists, broadcast records, and defaults records from the **CCCHWRXXX.setup** and **CCCHWRXXX.product** files
- Configuration information and threshold selections from the **nwr.config** file.

The **hwrnwr** process performs required calculations on land and marine hourly weather data and surface and satellite, builds phrases, and adds instructions for the CRS. The output product is stored temporarily and the forecaster is notified of its completion. The forecaster may change the text product using the NWRBrowser before the product is sent to the CRS. The product must be sent to the CRS using a pushbutton (NWREditor) on the browser which invokes the **transferNWR** script. If the forecaster does not view, edit, and send the product manually to the CRS via the browser, **hwrnwr** will, after a forecaster-specified period of time, send the product automatically to the CRS.



SMM 07/19/10

► **To View the Current Day's hwrnwr Log**

On PX1 as user fxa or your individual user account,

TYPE: `cd $LOG_DIR/<yyyymmdd>`

- Where `<yyyymmdd>` is today's date.

TYPE: `ls -ltr hwrnwr*`

- Displays the current day's **hwrnwr** logs from earliest to latest.

TYPE: `tail -f <logname>`

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px1-tbw4 at Wed May 12 04:10:38 2006
04:10:37.770 C_hmHMU_logError.C PROBLEM:
WARNING message from function/subroutine "get_METARS":No reports were retrieved by
get_report.

04:10:45.578 C_hmHMU_logError.C PROBLEM:
WARNING message from function/subroutine "get_METARS":
No reports were retrieved by get_report.
```

The log consists of the following fields:

Time stamp	04:10:45.578
File name	C_hmHMU_logError.C
Message type	PROBLEM:
Message string	WARNING message from function/subroutine "get_METARS": No reports were retrieved by get_report.

hwrgui

For **hwrnwr** to require/allow configuration and threshold information from the forecaster, it enables the forecaster to make selections using the GUI controlled by processes launched by the **hwrgui** process. The forecaster selections are validated and stored in the **CCCHWRXXX.setup** file.

The **hwrgui** process uses the station format editor to create the station list for each output product. Each list contains the METAR and SCD station identifier, the SCP station identifier, a symbol to indicate how to treat missing data, and the station name. The product IDs and the station lists are stored in the **CCCHWRXXX.product** file. The **hwrgui** process stores the broadcast and default broadcast records in the **CCCHWRXXX.n.format** table.

► **To View the Current Day's hwrgui Log**

On the workstation, as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/display/<display>/<yyyymmdd>`
- Where `<display>` is the current display variable (e.g., `lx1-tbw4:0`) and `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr hwrgui*`
- Displays the current day's `hwrgui` logs from earliest to latest.
- TYPE:** `tail -f <logname>`
- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
hwrgui 3611 975425655.214865 15:34:15.214 PROBLEM:  
WARNING message from function/subroutine "get_METARS":  
No reports were retrieved by get_report.  
hwrnwr 3611 975425659.125953 15:34:19.125 PROBLEM:  
WARNING message from function/subroutine "get_METARS":  
No reports were retrieved by get_report.
```

The log consists of the following fields:

Time stamp	15:34:19.125
Module name	hwrnwr
Message type	PROBLEM:
Message string	WARNING message from function/subroutine "get_METARS": No reports were retrieved by get_report

hmMonitor.tcl

The Monitoring Controller process is the GUI by which a user is alerted to the receipt of a notification message sent by the **hmMonitorServer**. The **hmMonitor.tcl** script executes **hmMonitorWish** to create the **hmMonitor GUI**. The product ready notification is passed to the GUI by the **hmMonitorServer**. When the **HWR** button is pressed in the **Monitoring Controller GUI**, the CRS editor containing the HWR message is started and a message is sent to the Monitoring Controller to delete the notification message from other monitoring controllers. The **hmMonitor GUI** notifies the **hmMonitorServer** when new notifications arrive.

Restart Monitor Controller Window

The Monitoring Controller Window that is displayed on the text workstation is used to monitor HWR and Climate applications. In the event that this window is closed, it can be restarted by executing the following command on the workstation as user **fxa** or your individual user account:

TYPE: `setenv DISPLAY xt<#>-<siteID>:0.0`

- Where <#> is the text workstation number and <**siteID**> is the site ID (e.g., xt2-hgx).

TYPE: `./awips/fxa/bin/hmMonitor.tcl`

hmMonitorWish

The **hmMonitorWish** process is the main process for the **Monitoring Controller GUI** and also is responsible for all necessary initializations.

► **To View the Current Day's hmMonitorWish Log**

On the workstation, as user fxa or your individual user account,

TYPE: `cd $LOG_DIR/display/<display>/<yyyymmdd>`

- Where <**display**> is the current display variable (e.g., lx1-mrx:0) and <**yyyymmdd**> is today's date.

TYPE: `ls -ltr hmMonitorWish*`

- Displays the current day's **hmMonitorWish** logs from earliest to latest.

TYPE: `tail -f <logname>`

- Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
hmMonitorWish 10489 978998717.685357 00:05:17.685 PROBLEM:  
ERROR, severity level MINOR,  
in function/subroutine "hmPED_StnId":  
  
Invalid/Missing Station ID  
SPECI.  
hmMonitorWish 10489 978998717.688864 00:05:17.688 PROBLEM:  
ERROR, severity level MINOR,  
in function/subroutine "hmPED_StnId":  
  
Invalid/Missing Station ID  
METAR.  
  
hmMonitorWish 10489 979035320.151528 10:15:20.151 BUG: Call to UpdateTextWindow failed:can't read "w": no such  
variable  
LOG-STATUS: Recent traceback from same location in file suppressed.  
  
hmMonitorWish 10489 979035409.064146 10:16:49.064 PROBLEM: Unable to retrieve METARS for Wed 12 May 2006 10:16 UTC  
hmMonitorWish 10489 979037923.611689 10:58:43.611 BUG: Call to UpdateTextWindow failed:can't read "w": no such  
variable  
LOG-STATUS: Recent traceback from same location in file suppressed.  
hmMonitorWish 10489 979037926.356198 10:58:46.356 PROBLEM: Unable to retrieve METARS for @bM-`  
hmMonitorWish 10489 979041527.857008 11:58:47.857 PROBLEM: Unable to retrieve METARS for Wed 12 May 2006 06:58 EST  
hmMonitorWish 10489 979048744.818430 13:59:04.818 PROBLEM:  
ERROR, severity level MINOR,  
in function/subroutine "hmPED_StnId":
```

The log consists of the following fields:

Time stamp	01:01:52.600
Module name	hmMonitorWish

```

Message type      BUG:
Message string    Call to UpdateTextWindow failed: can't read
                  "w": no such variable

```

hmMonitorServer

The Monitoring Controller process is the GUI by which a forecaster is alerted to the receipt of a notification message sent by the **hmMonitorServer**.

If the value of **reviewPeriod** in the **/awips/adapt/hwr/etc/nwr/nwr.config** configuration file is defined as greater than zero, **hwrnwr** sends a message to **hmMonitorServer**, which in turn notifies **hmMonitor GUI**. When the forecaster is notified and selects the **HWR** button, the NWR browser will appear. The product may be viewed, edited, and transmitted as the user wishes.

Under normal operations, the **hmMonitorServer** should start as part of the site startup process. If the **hmMonitorServer** dies, the Climate program will notify users and it may be restarted manually.

► **To Restart the hmMonitorServer Process**

On PX1, as user **fxa**,

- | | |
|--------------|--|
| TYPE: | cd /awips/fxa/bin |
| ▪ | Changes to the directory where the hmMonitorServer resides. |
| TYPE: | hmMonitorServer & |
| ▪ | Starts the hmMonitorServer as a background process. |

To verify the process is running:

- | | |
|--------------|---|
| TYPE: | ps -ef grep hmMon |
| ▪ | Displays the hmMonitorServer process, as shown in the following example: |

```
fxa 29894      1  1 May  7 ?          24:42 /awips/fxa/bin/hmMonitorServer
```

NOTE: Unless the **hmMonitorServer** process is started on PX1 by user **fxa**, there will be no communications with the clients.

If the **hmMonitorServer** shuts down, the server maintains a list of its current clients in the file **hmMonitorServerClientList.txt** located in **\$FXA_DATA/workFiles**. When the server is restarted, it rereads this file to re-register any previous clients. If those clients are still running, they will continue to receive notifications once the **hmMonitorServer** process has restarted. If those clients are no longer running, they will be removed from the client list once the first attempt to send a message to that client fails.

► **To View the Current Day's hmMonitorServer Log**

On PX1 as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where `<yyyymmdd>` is today's date.
- TYPE:** `ls -ltr hmMonitorServer*`
 - Displays the current day's **hmMonitorServer** logs from earliest to latest.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages.

Log Message Format

An entry in the log should look like the following:

```
16:04:19.919 METAR_TextProduct.C PROBLEM: METAR decoding error on product PITMIRLBE
16:04:19.920 HmMonitorTextNotifReceiver.C EVENT: METAR product PITMIRLBE FAILED decoding!
16:08:05.094 DataSocket.C DEBUG: Connection to lx1-tbw4/3037/18692 has been closed by the peer.
16:08:05.142 DataSocket.C DEBUG: Closing the socket to lx1-tbw4/3037/18692
16:11:56.534 HmMonitorServer.C EVENT: Registering client px1-tbw4/4635/25150
16:11:56.586 HmMonitorServer.C EVENT: Saving client state...
16:11:56.643 HmMonitorServer.C EVENT: Received client notification message from px1-tbw4/4635/25150
16:11:56.648 ParameterizedMsg.C EVENT: Send of IPC message failed; Target not available.
Target: lx1-tbw4/3037/18692
Module: 26
Type: 0
16:11:56.668 HmMonitorServer.C EVENT: Try again later -- unable to send update notification to client
lx1-tbw4/3037/18692
```

The log consists of the following fields:

Time stamp	16:08:05:142
File name	DataSocket.C
Message type	DEBUG:
Message string	Closing the socket to lx1-tbw4/3037/18692

NWRBrowser

The **NWRBrowser** is a GUI with a threefold purpose:

1. It allows the forecaster to remotely control the NWR from an AWIPS workstation.
2. It allows the forecaster to monitor product transfer from AWIPS to the NWR.
3. It provides last-minute edit capability for products that are to be sent to the NWR from AWIPS.

The **sendToNWR** Expectscript transmits voice-ready text from AWIPS to the NWR. In addition to transferring the product, copies can be kept in one of two directories:

\$FXA_DATA/workFiles/nwr/pending
\$FXA_DATA/workFiles/nwr/sent

When **sendToNWR** is invoked, the product is automatically copied to the **pending** directory. If successfully sent, the product is moved to the **sent** directory. The contents of each directory can be viewed in the window pane dedicated to that directory. Products not successfully transmitted will remain in the **pending** directory.

transferNWR

The **transferNWR** script is responsible for transferring voice-ready products to a holding area where they will be picked up and sent to NWR. The **transferNWR** script is a command-line interface that provides the forecaster with three options:

**transferNWR -a
[filename]**

This option will automatically transfer the file from the source directory to the **/data/fxa/workFiles/nwr/ready** directory. The full pathname of the file must be given so that the file can first be copied into the source directory. The **transferNWR** script then monitors the **\$FXA_DATA/workFiles/nwr/pending** directory to verify that the product has been successfully sent to CRS by the **sendToNWR** script.

**transferNWR -d
[filename]**

This option will also ensure that the file is copied into the source directory, but the file will not be transferred. This option is for cases where the forecaster would first like to inspect or edit the product before it is sent.

transferNWR -n

This option sends a warning message to the local workstation that there has been a problem in transmitting the file. This message is sent at the forecaster's discretion, based upon the return and exit values issued by this script.

The **transferNWR** script is forked by a parent process, **NWRBrowser**. The **transferNWR** script returns one of the following two values to the parent process:

Value = 0 indicates all was successful

Value = 1 indicates that the transfer may have failed

Log files can be viewed from the **NWRBrowser**. The most current log is listed last. Logs can also be viewed by other text editors, such as the **vi** editor.

► **To View the Current Day's transferNWR Log**

On the workstation, as user fxa or your individual user account,

TYPE: **cd \$LOG_DIR/display/<display>/<yyyymmdd>**
 ▪ Where **<yyyymmdd>** is today's date and **<display>** is the current display variable (e.g., lx1-mrx:0).

TYPE: **ls -ltr logStreamExpect***

- Displays the current day's **transferNWR** logs from earliest to latest.

TYPE: **tail -f <logname>**

- Displays the log as it updates with the latest messages **Log Message Format**.

An entry in the log should look like the following:

```
LOG-STATUS: Log file opened on host px1-tbw4 at Wed May 12 18:19:05 2006
18:19:05.358 TclLogStream.C EVENT: File /data/fxa/workFiles/nwr/pending/PITHWRNW1 will be
automatically transferred
18:19:05.359 TclLogStream.C EVENT: /data/fxa/workFiles/nwr/pending/PITHWRNW1 has been copied to
data/fxa/workFiles/nwr/ready/PITHWRNW1 for processing by sendToNWR.
```

NOTE: Check the **logStreamExpect** log on PX for information about transfer of
data/fxa/workFiles/nwr/pending/PITHWRNW1 to CRS.

The log consists of the following fields:

Time stamp	18:19:05.358
File name	TclLogStream.C
Message type	EVENT:
Message string	File /data/fxa/workFiles/nwr/pending/PITHWRNW1 will be automatically transferred

nwrTrans.pl

The **nwrTrans.pl** Perl script is a persistent script that looks in **/data/fxa/workFiles/nwr/ready** every couple of seconds to find files that have been placed there by either the **NWRBrowser** or **nwrEditor** GUIs when a user requests to send a product to the CRS for broadcast on the NOAA Weather Radio. This script then calls **transferNWR** for any files that were found. Previously, **transferNWR** was called directly from the **NWRBrowser** or **nwrEditorWish**. **transferNWR** is always run as user **fxa** to ease maintenance of the NWRCRS's authorized keys file on the CRS. This change was required by the move to secure shell (**ssh**) and individual user accounts.

sendToNWR

Voice-ready text is transmitted from AWIPS to the NWR by the **sendToNWR** Expect script. In addition to transferring the product, copies can be kept in one of two directories:

\$FXA_DATA/workFiles/nwr/pending
\$FXA_DATA/workFiles/nwr/sent

The **sendToNWR** script is called from the **nwrTrans.pl** script, which is a persistent **fxa** process that checks the **/data/fxa/workFiles/nwr/ready** directory every 2 seconds for products placed there by the **transferNWR** script. When **nwrTrans.pl** finds a file, or files, in this directory, it calls **sendToNWR** for each file.

The **sendToNWR** script is responsible for transferring voice-ready products from AWIPS to the NWR. The **sendToNWR** script is a command-line interface that provides the forecaster with three options:

sendToNWR -a [filename]	This option will automatically transfer the file from the source directory on AWIPS to the destination directory on the CRS. The full pathname of the file must be given so that the file can first be copied into the source directory.
sendToNWR -d [filename]	This option will also ensure that the file is copied into the source directory, but the file will not be transferred. This option is for cases where the forecaster would first like to inspect or edit the product before it is sent.
sendToNWR -n	This option sends a warning message to the local workstation that there has been a problem in transmitting the file. This message is sent at the forecaster's discretion, based upon the return and exit values issued by this script.

NOTE: The **transferNWR** script also may continue to be used for the **-d** and **-n** options.

When **sendToNWR** is invoked, the product is automatically copied to the **pending** directory. If successfully sent, the product is moved to the **sent** directory. The contents of each directory can be viewed in the windowpane dedicated to that directory. Products not successfully transmitted will remain in the **pending** directory.

► To View the Current Day's sendToNWR Log

On PX1, as user fxa or your individual user account,

- TYPE:** `cd $LOG_DIR/<yyyymmdd>`
 - Where <yyyymmdd> is today's date.
- TYPE:** `ls -ltr logStreamExpect`
 - Displays the current day's log.
- TYPE:** `tail -f <logname>`
 - Displays the log as it updates with the latest messages **Log Message Format**.

An entry in the log should look similar to the following:

```
00:12:10.531 TclLogStream.C EVENT: telnet and ftp will be used to transfer BOSHWRN2
00:12:10.543 TclLogStream.C EVENT: File /data/fxa/workFiles/nwr/pending/BOSHWRN2 will be
automatically transferred
00:12:10.798 TclLogStream.C EVENT: Successful ping to 0MP
00:12:10.994 TclLogStream.C EVENT: Successful ping to 5MP
00:12:42.004 TclLogStream.C EVENT: Master processor is 0MP
00:12:42.008 TclLogStream.C EVENT: 7 ss_ms processes running on 0MP currently
```

```

00:12:42.016 TclLogStream.C EVENT: file BOSHWRNW2 will be transmitted to CRS as BOSHWRNW2.AW
00:12:46.278 TclLogStream.C EVENT: transfer complete to 0MP
00:12:46.396 TclLogStream.C EVENT: Successful transfer of BOSHWRNW2 to 0MP
.
.
.
12:13:21.696 TclLogStream.C EVENT: transfer complete to 0MP
12:13:21.748 TclLogStream.C EVENT: Successful transfer of BOSHWRNW3 to 0MP
12:28:49.517 TclLogStream.C EVENT: File output_am_MRN.nwr will be automatically transferred
12:28:49.597 TclLogStream.C EVENT: output_am_MRN.nwr has been copied to
/data/fxa/workFiles/nwr/ready/output_am_MRN.nwr for processing by sendToNWR. Check logStreamExpect
log on PX for information about transfer of output_am_MRN.nwr to CRS
12:28:51.559 TclLogStream.C EVENT: telnet and ftp will be used to transfer output_am_MRN.nwr
12:28:51.570 TclLogStream.C EVENT: File /data/fxa/workFiles/nwr/pending/output_am_MRN.nwr will be
automatically
transferred
12:28:51.789 TclLogStream.C EVENT: Successful ping to 0MP
12:28:51.942 TclLogStream.C EVENT: Successful ping to 5MP
12:29:22.502 TclLogStream.C EVENT: Master processor is 0MP
12:29:22.504 TclLogStream.C EVENT: 7 ss_ms processes running on 0MP currently
12:29:22.545 TclLogStream.C EVENT: file output_am_MRN.nwr will be transmitted to CRS as
output_am_MRNnwr.AW

```

The log consists of the following fields:

Time stamp	00:12:10.543
File name	TclLogStream.C
Message type	EVENT:
Message string	File /data/fxa/workFiles/nwr/pending/BOSHWRNW2 will be automatically transferred

The logs are purged by the **scour** script after 2 days and the empty directories are removed by the **master.purge** script.

9.4.3 Setting up the HWR NWR Application

Before it can be used, the HWR NWR application has to be set up (localized) for your site.

Specify options and thresholds using the HWR NWR Setup Product options:

- Create a Station List
- Create a Broadcast Format
- Create a Default Format
- Update the Station PILs list

NOTE: Setting up the HWR NWR application only needs to be done upon the initial application installation and when creating a new product identifier.

9.4.3.1 Identifying the Products to be Created

To identify the products to be produced, press the **NWR** button in the **Product Setup** section of the HWR GUI. Either select an existing product and press **Load**, or create a new product by typing in the **Product Actions** section and press **Add**.

9.4.3.2 Selecting the HWR NWR GUI Options

To access the HWR Editor for NWWS from the root or **applauncher** menu, select **Background WFO Apps, Hourly Weather Roundup (HWR)** from the cascading menu. This will display the **Hourly Weather Roundup** GUI shown in Exhibit 9.4.3.2-1.

Select: **NWR** pushbutton in the **Product Setup** section.

- The Hourly Weather Roundup Editor for the NOAA Weather Radio shown in Exhibit 9.4.3.2-1 will appear.

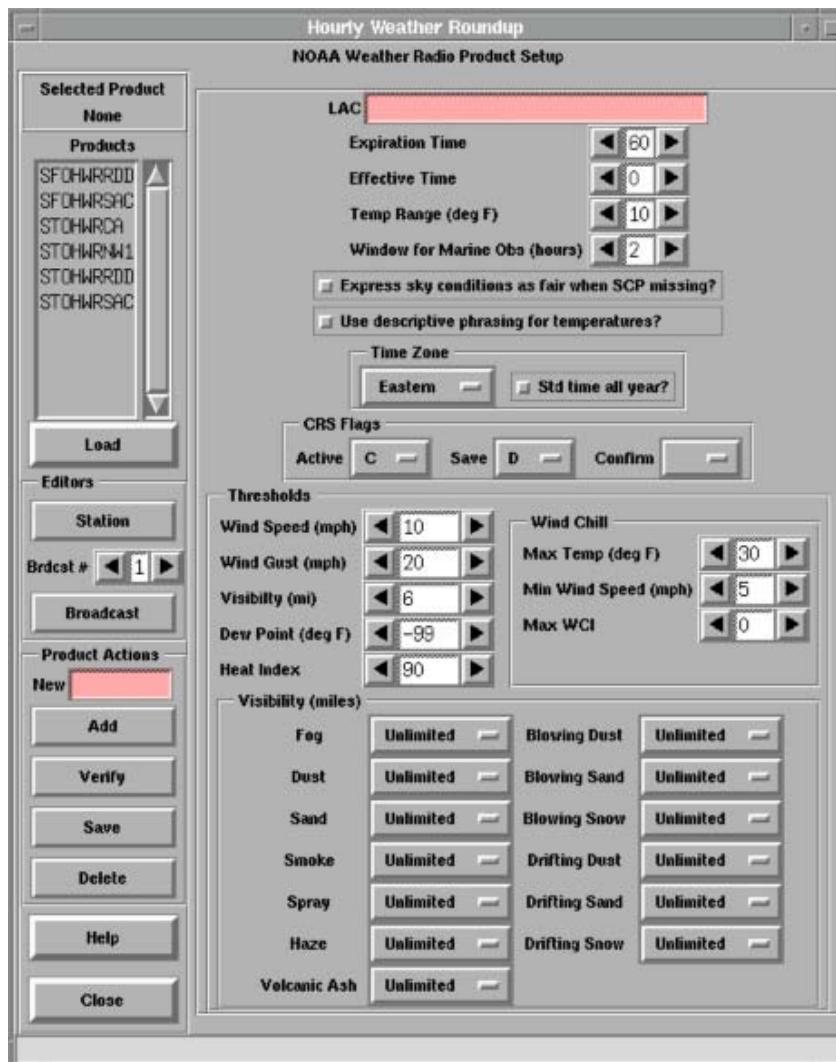


Exhibit 9.4.3.2-1. The Hourly Weather Roundup Editor for the NOAA Weather Radio

Once the editor for NWR has opened, you will see the following setup options:

Products. This pushbutton displays the list of products that may be converted to output products. Each product must contain a Station List file (via the Station Editor), at least one Broadcast and one Default Format file. New products may also be created, as discussed in the Products Actions below.

Editors

- Station** This editor pushbutton displays the Station List for review and edit.
- Broadcast** A Product may have multiple Broadcast Formats. The Broadcast Format files are numbered zero through nine. The numbered pushbutton displays the Broadcast Format file numbers for selection by the forecaster. The Editor pushbutton displays the selected Broadcast Format file for review and edit. Note that Broadcast file zero is the default format, which is accessed whenever one or more of the weather element requested in the associated station file is missing.

Product Actions

- Add** Create a new product by typing the product ID in this field and pressing **Add**.
- Verify** After you have created a new product, select **Verify** to check that the required files exist for the product.
- Save** This selection saves all the setup and product data from the GUI.
- Delete** You may delete a product by selecting the product ID from the scrolled list and hitting **Delete**.
- Help** This selection displays general information about the various sections in the GUI.
- Close** Closes the GUI.

LAC. This is the Listening Area Code (LAC) field. Enter the zones for which the product must be transmitted. The CRS maps these zones to the correct transmitter.

NOTE: It is beyond the scope of this document to describe how the CRS maps the LAC text to the correct transmitters.

Expiration Time. The number of minutes entered into this field will be added to the nominal hour to determine the expiration time of the product.

Effective Time. The number of minutes entered into this field will be added to the nominal hour to determine the effective time of the product.

Temp Range (deg F). The number entered into this field determines the range of temperatures at or below that the temperatures for a group of stations in summary format will be summarized.

Window for Marine Obs (hours). By default, observations that are more than 1 hour old are considered invalid and are not used by the HWR application when preparing products. However, since many C-MAN, buoy, and ship observations are not reported every hour, you may specify a longer valid period for the Marine Observations. Marine observations, up to the number of hours entered in this window, will be considered valid and used in the product.

Express sky conditions as fair when SCP missing? Since ASOS METAR cloud observations do not exceed 12,000 feet, the sky/weather phrase may not be generated accurately when there is no significant weather and the ASOS cloud observation is not cloudy. Satellite cloud observations (the SCP) are used to supplement the ASOS observations under these conditions. If this option is selected, and the SCP is missing while the ASOS observation is clear or partly cloudy, the phrase "FAIR" will be expressed. Otherwise, when the SCP is missing, the sky/weather will be output as missing in the product.

Use descriptive phrasing for temperatures? In summary format, you can describe the temperature for a group of stations descriptively (e.g., mid 60's) numerically (63 to 65).

Time Zone. Specify the time zone to be used in the product.

Std Time All Yr? The Standard time all year option must be selected for those areas that do not switch to Daylight Savings Time.

CRS Flag. There are three flags used by the CRS that are user-selectable. The first flag was originally designed to permit the users to send a product to the CRS and either activate (A) its broadcast or store it (I). The C flag is used to indicate that the product is meant for the nearest version of console hardware . The second flag indicates whether the product should be deleted (D) after it expires , or saved (S). The last flag indicates whether the CRS should confirm (C) receipt of the product or not (blank).

Thresholds. The following threshold fields are used in conjunction with the Broadcast Format file for each product:

- **Wind Speed.** Specify the minimum wind speed at or above which a wind speed phrase is to be output.
- **Wind Gust.** Specify the minimum wind gust speed at or above which a wind gust phrase is to be output.
- **Visibility(mi).** Specify the maximum visibility at or below which a visibility phrase is to be output.
- **Dew Point.** Specify the maximum dew point at or above which a dew point phrase is to be output.
- **Heat Index.** Specify the minimum heat index value at or above which a heat index phrase is to be output.
- **Wind Chill Index.** For the wind chill index to be calculated, the observed temperature must be at or below the value entered in **Max Temp(deg F)** and the observed wind speed must be at or above the value entered in **Min**

Wind Speed (mph). The calculated wind chill index must be at or below the value entered in **Max WCI** for a wind chill index phrase is to be output.

Visibility Thresholds. Click on the selection box next to an obscuration in order to set the visibility threshold value for that obscuration. This results in that obscuration (e.g., fog) being output in the HWR product when the visibility is at or below the selected value. A selection of Unlimited results in the obscuration always being output no matter what the visibility is.

9.4.3.3 *Creating a Station List*

The Station List is created using the Station Format Editor. You must create a Station List for each product. The Station List specifies the stations that are included in the product. A station may appear in multiple Station Lists.

► **To Create a Station List**

Access: The HWR for NOAA Weather Radio Product Setup

Select: A Product

Select: The Station Editor button from the Editor's section.

- Displays the default HWR NWR text editor for you to type the Station List for the selected product.

An example of a Station List is shown in Exhibit 9.4.3.3-1.

The contents and format of a Station List are described below. The software delivery contains a template under the CCCHWRXXX product ID that will help you create Station Lists for your site's products.

Comment Lines

The NWR HWR application interprets any line in the Station List that begins with a tilde (~) as information which will appear verbatim in the broadcast message. Such lines may appear anywhere in the Station List. Symbolic words (shown in Exhibit 9.4.3.3-2) which the HWR NWR application converts into text (according to the list discussed below), can be inserted into these lines. A comment line may contain references to two time zones. This is useful for WFOs that span two time zones. It is also useful for sites within the same time zone when one of the sites is in Arizona or Indiana, which are always on standard time. Place brackets around words that are to be output only during Daylight Savings Time to alleviate repetitive phrasing of the time zones during Standard Time.

```
# Product TDLHWRNW1
#Broadcast Format Frequency Section (optional)
!!!!!BRDCST_FREQ
100
#
# Fixed Format Station section
!!!!FF_STATIONS
~These are the %TIME% observations for the local area, on
~%DAY%, %DATE%.
/KDCA/KDCA/+Reagan National Airport
/KDAA// -Fort Belvoir
/KBWI// *B W I Airport;/KADW/+Andrews Air Force Base
/KDCA// &Reagan National Airport
#
# Summary Format
~Here are some observations outside the metro area.
!!!!WX_CONDS
SW TF TC
!!!!SUM_STATIONS
@Throughout the region,
/KHGR// *Hagerstown; /KNHK/+Patuxent River
/KMRB// +Martinsburg
/KSBY// +Salisbury
/KNHK// -Dover
/KCHO// -Charlottesville
/KADW// +Andrews Air Force Base
/KRIC// +Salisbury
#
# Marine Format
~Here are some CMAN reports.
!!!!MAR_STATIONS
/BLIA2// -Bligh Reef
/TTIW1// +Tatoosh Island
/MISM1// -Matinicus Isle
#
~Here are some buoy reports.
!!!!MAR_STATIONS
/46006// +Buoy 46006
/44014// -Buoy 44014
/42019// -Buoy 42019
```

Exhibit 9.4.3.3-1. Sample Station List for the NWR

%DATE%	-	the current date (e.g., August 6).
%DAY%	-	the current day of the week (e.g., Thursday).
%TIME%	-	the current hour (e.g., 9 AM).
%TIMEZ%	-	the current nominal hour and time zone (e.g., 9AM Pacific Daylight Time).
%TIMEW%	-	the product creation time in numerical format (e.g., 251908, which means 25th day of the month, 19th hour, 8th min).
%HEADDT%	-	the NWWS header date/time (e.g., 900 AM PACIFIC DAYLIGHT TIME THURSDAY AUGUST 6, 1998).
%DDHHMM%	-	the current date of the month, nominal hour, and minute of the observation (e.g., 251900, which means 25th day of the month, 19th hour, 0th min).
%EST%	-	the current nominal hour and the Eastern Standard Time zone (e.g., 9 AM Eastern Standard Time).
%MST%	-	the current nominal hour and the Mountain Standard Time zone (e.g., 9 AM Mountain Standard Time).
%EST5EDT%	-	the current nominal hour and the Eastern Time zones (e.g., 9 AM Eastern Standard Time or 10 AM Eastern Daylight Time).
%CST6CDT%	-	the current nominal hour and the Central Time zones (e.g., 8 AM Central Standard Time or 9 AM Central Daylight Time).
%MST7MDT%	-	the current nominal hour and the Mountain Standard Time zone (e.g., 7 AM Mountain Standard Time or 8 AM Mountain Daylight Time).
%PST8PDT%	-	the current nominal hour and the Pacific Time zone (e.g., 6 AM Pacific Standard Time or 7 AM Pacific Daylight Time).
%AST9ADT%	-	the current nominal hour and the Alaska Time zone (e.g., 5 AM Alaska Standard Time or 6 AM Alaska Daylight Time).

Exhibit 9.4.3.3-2. Symbolic Words for Use in Comment Lines

Any line starting with the pound symbol “#” is interpreted as being an internal Station List comment and is not included in the HWR NWR output product.

Each Station List may contain several different sections:

- A Fixed Station Format Section identified by the **!!!!FF_STATIONS** line.
- A Marine Format section identified by the **!!!!MAR_STATIONS** line.
- A Summary Format section identified by the **!!!!SUM_STATIONS** line.
- A Broadcast Frequency section identified by the **!!!!BRDCST_FREQ** line.

The “@” may be used instead of the “~” at the beginning of the Fixed Format Station section, Marine Observations section, and Station Summary Group section of a station list. The “@” may also be used inside the Station Summary Group section of the HWR NWR as is discussed in the Station Summary Group section of this document. However, a maximum of 15 comment lines starting with either “@” or “~” may be used in a station list. When all stations are marked with a “-,” the “@” is used for all comments associated with a section, and all of the stations in the section are missing, nothing will be broadcast for this section, not even the comment line.

Fixed Format Stations

1. Each Fixed Format Station section begins with **!!!!FF_STATIONS**. Fixed format stations are identified by their four-character ICAO identifier (e.g., KCRW) in the order they are to be broadcast, one station per line.

2. Place a slash “/” on each side of the surface station METAR identifier.
 3. Next, place the four-character ICAO identifier for the most representative SCP station followed by a slash, unless the SCP station ID is identical to the surface station ID. In such cases, it is not necessary to repeat the ID. Instead, place another “/” after the previous one.
 4. Next, place the missing station flag which is either the plus sign “+” or the minus sign “-.”
- The “+” indicates that the corresponding station will always be broadcast, even if the weather elements are missing (e.g., “The report from Missoula was not available”).
- The “-” indicates that the station will be ignored if all the weather elements for the station are missing.
5. Enter the fixed phrase station name after the missing station flag. As many as 30 characters may be used for the station name.

A sample Fixed Format Station section follows:

```
# Fixed Format Station section
!!!!!FF_STATIONS
~These are the %TIMEZ% observations for the local area, on
~%DAY%, %DATE%.
/KDCA/KDCA/*Reagan National Airport;/KADW/+Andrews Air Force Base
/KDAA//Fort Belvoir
/KBWI//B W I Airport
/KADW/KDCA/+Andrews Air Force Base
/KAKQ/KRIC/+Wakefield
```

NOTE: A Fixed Format Station section may contain a maximum of 20 station lines; however, you may have multiple Fixed Format Station sections.

Station Substitution

If all of a station’s observations are missing, another station may be used as a substitute. To specify a station substitution in the station list, place an asterisk after the first station identifier, a semicolon between the stations, and the missing station flag after the second station identifier. The “+” after the second station indicates that the first station will be output as missing if both stations are missing. A “-” after the second station indicates that both stations will be ignored if both stations are missing. For example,

```
/KDCA/*Reagan National Airport;/KADW/+ANDREWS AIR FORCE BASE
```

In the example, Reagan National Airport will normally be broadcast. If its observations are missing, the observation from Andrews Air Force Base will be broadcast. If both stations are missing, the output will state that the report from Reagan National Airport is not available.

Marine Observations

1. Enter **!!!!MAR_STATIONS** to identify that marine stations follow in the Station List. Marine stations are identified by their alphanumeric identifiers, which may be more than four characters (e.g., WECB, MISM1, 41002). They are listed in the order they are to be broadcast, one station per line.
2. Place one slash “/” before the identifier and two slashes after it.
3. After the second slash, place the missing station flag which is either the plus sign “+” or the minus sign “-.” For a discussion of the missing station flags, see the Fixed Format Stations subsection above.
4. Enter the marine station name after the missing station flag. As many as 30 characters may be used for the station name.

An example Marine Observations Section follows.

```
# Marine Format
~Here are some CMAN reports.
!!!!MAR_STATIONS
/BLIA2// -Bligh Reef
/TTIW1// +Tatoosh Island
/MISI1// -Matinicus Isle
/SAUF1// -St. Augustine
#
~Here are some buoy reports.
!!!!MAR_STATIONS
/46006// +Buoy 46006
/44014// -Buoy 44014
/42019// -Buoy 42019
/51003// +Buoy 51003
```

NOTE: A maximum of 10 stations is permitted in each **!!!!MAR_STATIONS** section; however, you may have multiple sections.

Station Summary Groups

Insert a tilde “~” and a comment line. This comment line will always be broadcast even if all data are missing or weather conditions are not similar and summary phrases are not created. Use the “@” instead of “~” to indicate to the program that the comment should be ignored if all stations within the summary group are missing.

1. Enter **!!!!WX_CONDS** to identify a Station Summary group.
2. On the second line, list the weather elements to be summarized. The following weather elements may be summarized: sky/weather (element identifier SW), temperature in degrees Fahrenheit (element identifier TF), and temperatures in degrees Celsius (element identifier TC).
3. On the third line, enter **!!!!SUM_STATIONS** to identify that the stations that follow it are to be summarized. List at least 3 but no more than 10 station identifiers, one

station per line, identified by their four-character ICAO identifier. Place a slash “/” on each side of the station identifier.

4. Next, place another four-character ICAO identifier for the closest SCP station followed by a slash, unless the station is the same as the first one on the line. In such cases, do not insert the ICAO identifier again, just place the second slash.
5. After the second slash, place the missing station flag which is either the plus sign “+” or the minus sign “-.”

The “+” indicates that the corresponding station will always be broadcast, even if the weather elements are missing. An example of the output in such cases is “**The report from Baton Rouge was not available.**”

The “-” indicates that the station will be ignored if all the weather elements for the station are missing. When using the “@” at the beginning of the comment line outside of the summary group, also use the minus sign “-” for the missing station flags for each station.

6. Enter the station name after the missing station flag. As many as 30 characters may be used for the station name.

Inside the summary group, the “@” symbol is used to indicate that a comment follows. Comments may be placed anywhere in the summary phrase group. These comments within the summary group are only broadcast when similarities of weather conditions force the creation of a summary phrase. For example,

```
# Summary Format
~Here are some observations outside the metro area.
!!!!!WX_CONDS
SW TF TC
!!!!!SUM_STATIONS
@Throughout the region,
/KHGR// *Hagerstown; /KNHK/+Patuxent River
/KMRB// +Martinsburg
/KSBY// +Salisbury
/KNHK// -Dover
/KCHO// -Charlottesville
/KADW// +Andrews Air Force Base
/KRIC// +Richmond
```

In this example, there’s a comment line identified by the tilde “~” outside of the summary group and a comment line inside the summary group identified by the “@.” The comment outside the group is always broadcast, whereas the comment inside the group is broadcast only when similarities of weather conditions force the creation of a summary phrase. Because the only weather elements eligible for summarizing, in this example and in this program, are sky/weather (SW), temperature in degrees Fahrenheit (TF), and temperatures in degrees Celsius (TC), there are four possible outcomes:

1. If both temperature and sky/weather conditions are uniform, the output will read one of two ways.

The first option is for the output to read as follows:

"Here are some observations outside the metro area. Throughout the region, skies ranged from cloudy to mostly cloudy, and temperatures were in the mid and upper 30s."

In this example, the temperatures are phrased as a range rather than specific values. The forecaster is provided with a temperature phrasing option in the GUI. These criteria are that the temperature range is less than 5 degrees Fahrenheit and all of the temperatures are higher than 13 degrees Fahrenheit and lower than 99 degrees Fahrenheit.

The second option is for the output to read as follows:

"Here are some observations outside the metro area. Throughout the region, skies ranged from cloudy to mostly cloudy, and temperatures were between 34 and 39 degrees."

In this example, the temperatures are phrased as being bounded by the specific lowest observed temperature and the specific highest observed temperature.

2. If the sky/weather conditions are uniform (sky conditions do not differ by more than one category) across the region but not the temperatures, the output will read as follows:

"Here are some observations outside the metro area. Throughout the region, skies ranged from sunny to mostly sunny. It was 45 in Hagerstown, 58 in Martinsburg, 49 in Salisbury, and 53 in Dover. Charlottesville reported 51 degrees, Andrews Air Force Base 57, and Richmond 49."

NOTE: The HWR NWR application arranges only three to five stations in a sentence.

3. If the temperatures are uniform (within the range specified in the HWR Editor for NWS) but not the sky/weather conditions, the output will read in one of two ways.

The first option is for the output to read as follows:

"Here are some observations outside the metro area. Throughout the region, temperatures were between 84 and 88 degrees. It was sunny at Hagerstown, Salisbury, and Andrews Air Force Base. It was mostly sunny at Martinsburg and Richmond. At Dover, it was partly sunny. At Charlottesville, it was cloudy."

In this example, the temperatures are worded as being bounded by the specific lowest observed temperature and the specific highest observed temperature. The forecaster is provided with a temperature phrasing option in the GUI.

The second option is for the output to read as follows:

"Here are some observations outside the metro area. Throughout the region, temperatures were in the middle and upper 80s. It was sunny at Hagerstown, Salisbury, and Andrews Air Force Base. It was mostly sunny at Martinsburg and Richmond. At Dover, it was partly sunny. At Charlottesville, it was cloudy."

In this example, the temperatures are phrased as a range (e.g., temperatures were in the middle and upper 80s) rather than the specific values.

4. If neither temperatures nor sky/weather conditions are uniform, the output will read as follows:

"Here are some observations outside the metro area. It was sunny, with a temperature of 34 at Hagerstown, 28 at Dover, and 26 at Richmond. Under mostly sunny skies, Martinsburg reported 22 degrees, and Charlottesville 35. At Salisbury, it was partly sunny, with a temperature of 36. At Andrews Air Force Base, it was cloudy with a temperature of 34."

NOTE: In the last example, the phrase “Throughout the region” was not part of the broadcast statement as that phrase is only included when there are similarities in the weather conditions.

Broadcast Frequency Section

There is also a way to obtain additional variability from hour to hour for Fixed Phrase Format stations. Multiple broadcast records for each station list record may be created, each with a different fixed format for each station. Consequently, the probability with which each file is to be accessed must be provided in the station record. The program will randomly access the files according to the specified probability distribution. The total of the frequencies MUST be 100 (representing 100 percent). If only one broadcast record for a transmitter is needed, either omit the frequency from the station list record, or enter “100.” In the example below, the “10, 40, 50” values indicate that there are three broadcast records associated with this station list record. For example, assume this record is named CCCHWRNW5 (indicating that this is the file associated with the fifth output product). Also, assume the **hwrnwr** program is aware of three broadcast records, one of which will be selected this hour for product 5. **hwrnwr** will randomly generate a number to choose one of the three files. Thus, after multiple executions of the program, one would expect that broadcast record CCCHWRNW5.1 would be selected 10 percent of the time, while record CCCHWRNW5.2 would be selected 40 percent, and record CCCHWRNW5.3 would be selected 50 percent of the time. For example,

```
!!!!!BRDCST_FREQ
10 40 50
# Fixed Station Format section
!!!!!FF_STATIONS
~These are the %TIME% observations for the local area, on %DAY%, %DATE%.
/KDCA/KDCA/+Reagan National Airport
/KDAA//+Fort Belvoir
/KBWI//+B W I Airport;/KADW/+Andrews
/KADW/KDCA/+Andrews
/KAKQ/KRIC/+Wakefield
#
# Summary Format
~Here are some observations outside the metro area.
!!!!!WX_CONDS
SW TF
!!!!!SUM_STATIONS
```

```
@Throughout the region,  
/KMRB//+Martinsburg  
/KHGR//*Hagerstown; /CDEV/+Dover  
/KNHK//+Patuxent River  
/KING//+Wilmington  
/KSBY//+Salisbury  
#  
# Marine Format  
~Here are some CMAN reports.  
!!!!!MAR_STATIONS  
/BLIA2//+Bligh Reef  
/TTIW1//+Tatoosh Island  
/MISML//+Matinicus Isle  
/SAUF1//+St. Augustine  
~Here are some buoy reports.  
#  
!!!!!MAR_STATIONS  
/46006//+Buoy 46006  
/44014//+Buoy 44014  
/42019//+Buoy 42019  
/51003//+Buoy 51003
```

9.4.3.4 Creating a Broadcast Format File

A Broadcast Format file (Exhibit 9.4.3.4-1) is created using the HWR NWR Broadcast Editor. Broadcast Format files contain Broadcast Format paragraphs that are used to create the broadcast text that is sent to the CRS. Broadcast Format paragraphs begin with the Station ID (enclosed in “/ /”) and end with “\$\$.” Broadcast Format paragraphs consist of verbatim text (i.e., to be broadcast verbatim) and symbolic text (i.e., to be replaced with data observations). The verbatim and symbolic text may be mixed in any manner that produces coherent broadcast text. Exhibit 9.4.3.4-2 shows the symbolic text that may be used.

You must have at least one Broadcast Format paragraph for each station (Fixed Format and Marine) in the associated Station List. Do not include Broadcast Format paragraphs for station summary groups. You will get an error message when the application runs, if the Broadcast Format file does not contain a Broadcast Format paragraph for a fixed format and Marine station in the associated Station List. Extra Broadcast Format paragraphs (that is, the station is not in the Station List, but is in the Broadcast Format file) are ignored.

NOTE: Broadcast Format files may contain a second Broadcast Format paragraph for some stations, refer to Section 9.4.3.6, *Providing Additional Variability for the NWR Broadcasts*.

```
##### format TDLHWRNW1
!!!!!FF_STATIONS
/KDCA/At %ID%,{ %SW% was falling; %SW% was reported; it was %SW%; %SW% were
reported}
([V.V.], reducing the visibility to %V.V.%U).
The temperature was %TF%U, the DEWPOINT %DF%, and the relative humidity %RR%
percent([HF], producing a heat index of %HF%).
([FF]The wind was %DD% at %FF%U([GG], gusting to %GG%)([WF], producing a wind
chill of %WF%). )
The pressure was %PP%U and %PT%.%%
#
/KDAA/At %ID%,{ %SW% was falling; %SW% was reported; it was %SW%; %SW% were
reported}
([V.V.], reducing the visibility to %V.V.%U).
The temperature was %TF%U, the dewpoint %DF%, and the relative humidity %RR%
percent([HF], producing a heat index of %HF%).
([FF]The wind was %DD% at %FF%U([GG], gusting to %GG%)([WF], producing a wind
chill of %WF%). )
The pressure was %PP%U and %PT%.%%
#
/KBWI/At %ID%,{ %SW% was falling; %SW% was reported; it was %SW%; %SW% were
reported}
([V.V.], reducing the visibility to %V.V.%U).
The temperature was %TF%U, the dewpoint %DF%, and the relative humidity %RR%
percent([HF], producing a heat index of %HF%).
([FF]The wind was %DD% at %FF%U([GG], gusting to %GG%)([WF], producing a wind
chill of %WF%). )
The pressure was %PP%U and %PT%.%%
/
/KDCA/Once again, at %ID% it was %TF%U {with %SW%,with %SW%;
under %SW% skies;with %SW%}.%%
#
!!!!!MAR_STATIONS
/BLIA2/%ID% recorded winds from the %DD% at %FK%U. Sea temperature %SF%U. Air
temperature %TF%. Wave height %HW%U. Wave period %PW%U.%%
#
/TTIW1/%ID% reported a water temperature of %SF%. Air temperature %TF%. Wave
height %HW%U. Wave period %PW%U.%%
#
/MISM1/The water temperature at %ID% was %SF%U. The air temperature %TF%. The
wave height %HW%U, and wave period %PW%U.%%
#
!!!!!MAR_STATIONS
/46006/%ID% recorded winds from the %DD% at %FK%U. Swell height %HS%U. Swell
period %SP%.%%
#
/44014/%ID% recorded a swell height of %HS%U from the %SD%.%%
#
/42019/%ID% reported swell heights of %HS%U from the %SD%.%%
```

Exhibit 9.4.3.4-1. Sample Broadcast Format File for NWR

%ID%	- Station name.
%SW%	- Sky/weather conditions.
%V.V.%	- Visibility, if threshold specified in the GUI is met.
%TF%	- Temperature (Fahrenheit).
%TC%	- Temperature (Celsius).
%DF%	- Dew point (Fahrenheit).
%DC%	- Dew point (Celsius).
%RR%	- Relative humidity.
%HF%	- Heat index (Fahrenheit), if threshold specified in the GUI is met.
%HC%	- Heat index (Celsius), if the threshold specified in the GUI is met.
%DD%	- Wind direction (degrees)
%FF%	- Wind speed (mph).
%FK%	- Wind speed (kt).
%GG%	- Wind gusts (mph).
%GK%	- Wind gusts (kt).
%WF%	- Wind chill index (Fahrenheit), if the threshold specified in the GUI is met.
%WC%	- Wind chill index (Celsius), if the threshold specified in the GUI is met.
%PP%	- Pressure (inches).
%PB%	- Pressure (mb).
%PT%	- Pressure tendency, if previous hour's pressure is available.
%SF%	- Sea surface temperature (Fahrenheit).
%SC%	- Sea surface temperature (Celsius).
%PW%	- Wave period (s).
%HW%	- Wave height (ft).
%SD%	- Swell direction (degrees).
%HS%	- Swell height (ft).
%SP%	- Swell period (s).
%P1%	- One hour precipitation amount (hundredths of an inch).
%P6%	- Six hour precipitation amount (hundredths of an inch).

Exhibit 9.4.3.4-2. Symbolic Text for Use in Broadcast Format Files

It is very helpful to view the Station List file while editing the Broadcast Format file. This way you can easily view both files simultaneously.

For each product, multiple Broadcast Format files (1 through 9) may be created, each containing different Broadcast Format paragraphs for a given station. In this manner, when the HWR application selects different Broadcast Format files from hour to hour, there will be broadcast variation for the same station.

When initially installed, Product ID CCCHWRXXX contains a Broadcast Format template that may be used to create additional Broadcast Formats. Cut and paste as needed from the template.

► **To Create a Broadcast Format File**

Select: A Product

Select: The Broadcast Format File number (1–9)

Select: **Broadcast** editor button

- The default HWR NWR text editor appears displaying the Broadcast Format File for the selected Product and Broadcast Format File number. If no file exists, a pop-up will ask if you want to create one and will open a blank file in the text editor if you select Yes.

The following approach explains how to create Broadcast Format paragraphs from scratch.

► **To Create a Sample Hourly Weather Roundup Report**

1. Write out a sample of an Hourly Weather Roundup station report for all land and marine stations which will have a fixed format. With the land observations, start with the assumption that rain was observed, and no thresholds were met. Sentences don't need to be entirely grammatically correct, since they may be somewhat abbreviated in the normal broadcast fashion. However, commas must be inserted where a pause is required. For example,

"At Reagan National Airport, rain was falling. The temperature was 57 degrees, the dew point 56, and the relative humidity 97 percent. The pressure, 29.92 inches and falling.

The temperature was 56 degrees with rain at B W I Airport. The dew point 55, and the relative humidity 97 percent. The pressure, 29.97 inches and falling.

Rain was observed at Dulles Airport. The temperature 56 degrees, the dew point 56, and the relative humidity 100 percent. The pressure, 29.89 inches and steady.

Middle Nomad Buoy located 60 miles southeast of Norfolk recorded a south wind of 22 knots, swells 6 feet, air temperature 71 degrees, and water temperature 77 degrees.

Ship Discovery located at 38 degrees north latitude and 73 degrees west longitude recorded southeast winds at 15 knots, air temperature 59 degrees, water temperature 63 degrees, with 5 foot waves."

2. Open the desired Broadcast Format file and enter the text for the statements. Start each Broadcast Format Paragraph with the Station ID and end it with \$\$.
See the example below.

```
/KDCA/At Reagan National Airport, rain was falling. The temperature was  
57 degrees, the dew point 56, and the relative humidity 97 percent. The  
pressure, 29.92 inches and falling.$$  
#  
/KBWI/The temperature was 56 degrees with rain at B W I Airport. The dew  
point 55, and the relative humidity 97 percent. The pressure, 29.97  
inches and falling.$$  
#
```

/KIAD/Rain was observed at Dulles Airport. The temperature 56 degrees, the dew point 56, and the relative humidity 100 percent. The pressure, 29.89 inches and steady. \$\$
#

/BLIA2/Middle Nomad Buoy located 60 miles southeast of Norfolk recorded a south wind 22 knots, swells 6 feet, air temperature 71 degrees, and water temperature 77 degrees. \$\$
#

/WEBC/Ship Discovery located at 38 degrees north latitude and 73 degrees west longitude recorded southeast winds at 15 knots, air temperature 59 degrees, water temperature 63 degrees, with 5 foot waves. \$\$

This is a good time to compare the Station List with the Broadcast Format. You must have at least one Broadcast Format Paragraph for each Station (Fixed Format and Marine) in the Station List.

► **Create Phrasing for Sky/Weather Conditions**

The phrasing for the sky/weather conditions is the most complicated task. You must create four phrases that produce a coherent description of the sky/weather conditions. The HWR NWR application selects the correct format based upon the current sky/weather conditions.

1. Substitute, in turn, each of the following weather conditions in place of rain in the above examples, ensuring that the sentences still sound acceptable: sleet, snow, hail, drizzle, light snow, light rain, heavy snow, and heavy rain. If necessary, change any phrase so that all of these weather conditions, including rain, sound correct.
2. Place curly braces ({{}}) around the phrases with rain in the examples. Inside the curly braces, place a semicolon after the phrase with rain, followed by a phrase for the weather, assuming fog was reported instead of rain. For example,

/KDCA/At Reagan National Airport, {rain was falling; fog was reported}.
The temperature...

/KBWI/The temperature was 56 degrees {with rain; with fog} at B W I
airport...

/KIAD/{Rain was observed; Fog was observed} at Dulles Airport. The
temperature ..."

3. Substitute each of the following weather conditions in place of fog in the above examples, ensuring that the sentences still sound acceptable: thunder, volcanic ash, dust, sand, haze, smoke, spray, a dust devil, a squall, a thunderstorm, a thundershower, blowing snow, blowing dust, blowing sand, and blowing spray. If necessary, change the phrase so that it sounds correct with any of these weather elements. When substituting thunder for fog, you might not like the phrase, "thunder was observed" for the Dulles report. If not,

change the phrase to something acceptable for all of the weather elements in this category, such as “thunder was reported.”

4. Place another semicolon after the phrase with fog. Create a phrase for sunny sky conditions. The CFS pauses for both periods and commas, thus the incomplete sentence in the following example will sound correct, because it connects well with the phrase that follows it. For example,

/KDCA/At Reagan National Airport, {rain was falling; fog was reported; **under sunny skies**}. The temperature ...

/KBWI/The temperature was 56 degrees {with rain; with fog; **with sunny skies**} at B W I Airport...

/KIAD/{Rain was observed; Fog **was reported**; It **was sunny**} at Dulles Airport. The temperature ...”

5. Substitute each of the following sky conditions in place of sunny in the above examples to ensure that the sentences still sound acceptable: cloudy, mostly cloudy, partly cloudy, clear, partly sunny, mostly sunny, and fair. If necessary, change any phrase so that all of these sky conditions, including “sunny,” sound correct.
6. Place another semicolon after the phrase with sunny sky conditions. Create a phrase for weather conditions stated in plural form (e.g., snow showers), or for multiple weather conditions (e.g., drizzle and fog). To make the file easier to read, you may place carriage returns anywhere. However, don’t drop the necessary spaces and punctuation marks. For example,

/KDCA/At Reagan National Airport, {rain was falling; fog was reported; under sunny skies; **snow showers were reported**}.

The temperature was 57 degrees, the dew point 56, and the relative humidity 97 percent.

The pressure 29.92 inches and falling.\$\$

#

/KBWI/ The temperature was 56 degrees
{with rain; with fog; with sunny skies; **with snow showers**} at B W I airport.

The dew point 55, and the relative humidity 97 percent.

The pressure 29.97 inches and falling.\$\$

#

/KIAD/{Rain was observed; Fog was reported; It was sunny; **Snow showers were observed**} at Dulles Airport.

The temperature 56 degrees, the dew point 56, and the relative humidity 100 percent.

The pressure 29.89 inches and steady.\$\$

#

/BLIA2/Middle Nomad Buoy located 60 miles southeast of Norfolk recorded a south wind 22 knots, swells 6 feet, air temperature 71 degrees, and water temperature 77 degrees.\$\$

#

/WEBC/Ship Discovery located at 38 degrees north latitude and 74 degrees west longitude recorded southeast winds at 15 knots, air temperature 59 degrees, water temperature 63 degrees, with 5 foot waves. \$\$

7. Substitute each of the following weather conditions in place of snow showers in the above examples, ensuring that the sentences still sound acceptable: sleet showers, rain showers, and snow flurries. If necessary, change any phrase so that all of these weather conditions, including snow showers, sound correct. Also, try some combinations of multiple weather conditions to ensure that these combinations also sound acceptable (e.g., “snow and blowing snow were observed”).

► To Add Threshold Phrases

1. Decide which weather elements should be broadcast only if their threshold values have been met (e.g., Wind Speed, Wind Gust, Visibility, Heat Index, and Wind Chill Index).
2. Place in parentheses the phrases describing all the threshold-dependent weather elements which you are requesting, in the correct locations in the paragraph for each station. Be certain to determine if the punctuation marks and spaces belong inside or outside of the parentheses. It's also possible to embed parentheses within parentheses. This is necessary because the entire sentence may be dependent on the threshold of a particular weather element, and if that threshold is met, another weather element may control the broadcast of a phrase within the sentence. For example,

/KDCA/At Reagan National Airport,
 {rain was falling; fog was reported; under sunny skies; snow showers
 were reported}
 (, which reduced the visibility to 3/4 of a mile).
 The temperature was 57 degrees,
 (, the dew point 56,)
 and the relative humidity 97 percent
 (, producing a heat index of 104 degrees).
 (The wind northeast at 12 miles an hour [, gusting to 27])
 [, producing a wind chill of 8 degrees].)
 The pressure 29.92 inches and falling. \$\$
 #
 /KBWI/The temperature was 56 degrees,
 {with rain; with fog; with sunny skies; with snow showers}
 (, and a visibility of ½ mile) at B W I Airport. The dew point 55, and
 the relative humidity 97 percent
 (, yielding a heat index of 98).
 (The wind [, east at 14 miles an hour], with gusts to 29 [, which makes
 the temperature feel like 17 degrees].)
 The pressure 29.97 inches and falling. \$\$
 #
 /KIAD/{Rain was observed; Fog was reported; It was sunny; Snow showers
 were observed}
 (, which reduced the visibility to 1/4 of a mile) at Dulles Airport.
 The temperature 56 degrees

(, the dew point 56,)
and the relative humidity 100 percent.
(The combination of temperature and humidity feels like 97 degrees.)
(Strong winds from the north [, at 11 miles an hour] [, gusting to 22], are producing a wind chill of 23 degrees.)
The pressure 29.89 inches and steady. \$\$

/BLIA2/Middle Nomad Buoy located 60 miles southeast of Norfolk recorded a south wind 22 knots, swells 6 feet, air temperature 71 degrees, and water temperature 77 degrees. \$\$

/WEBC/Ship Discovery located at 38 degrees north latitude and 74 degrees west longitude recorded southeast winds at 15 knots, air temperature 59 degrees, water temperature 63 degrees, with 5 foot waves. \$\$

► To Add Symbolic Weather Elements

Replace values with symbolic words, using the key in Exhibit 9.4.3.4-2. Place a **U** (for units) after the symbolic word to indicate that both the value and the units are to be output where desired. For example, if the temperature was 53 degrees, **%TF%U** would result in **53 degrees**. On the other hand, **%TF%** would only be replaced with 53. Sky/weather, wind direction, heat index, wind chill index, swell direction, and pressure tendency have no units and should not be used with the **U** character. Also, the plural form of the unit is used whenever the value is not **1 or -1**.

► To Add Substitute Stations

Create paragraphs for stations which substitute for another station, even if the format is identical. In our example, Andrews Air Force Base is a substitute station for Reagan National Airport.

/KDCA/At Reagan National Airport,
{**%SW%** was falling; **%SW%** was reported; under **%SW%** skies; **%SW%** were reported}
(, which reduced the visibility to **%V.V.%U**).
The temperature was **%TF%U**(, the dew point **%DF%**), and the relative humidity **%RR%U**
(, producing a heat index of **%HF%**).
(The wind **%DD%** at **%FF%U**(, gusting to **%GG%**)(), producing a wind chill of **%WF%**).)
The pressure **%PP%U** and **%PT%.** \$\$

/KADW/At Andrews Air Force Base,
{**%SW%** was falling; **%SW%** was reported; under **%SW%** skies; **%SW%** were reported}
(, which reduced the visibility to **%V.V.%U**).

The temperature was **%TF%U**(, the dew point **%DF%**), and the relative humidity
%RR%U
(, producing a heat index of **%HF%U**).

(The wind **%DD%** at **%FF%U**[, gusting to **%GG%**] [, producing a wind chill of
%WF%U].)
The pressure **%PP%U** and **%PT%.** \$\$
/KBWI/The temperature was **%TF%U**{ with **%SW%**; with **%SW%**; with **%SW%** skies; with
%SW%}

(, and a visibility of %V.V.%U) at B W I Airport. The dew point %DF%, and the relative humidity %RR%U(, yielding a heat index of %HF%).
 (The wind %DD%(at %FF%U), with gusts to %GG%(, which makes the temperature feel like %WF%).)
 The pressure %PP%U and %PT%.\$\$
 #
 /KIAD/{%SW% was observed; %SW% was reported; it was %SW%; %SW% were observed}
 (, which reduced the visibility to %V.V.%U) at Dulles Airport.
 The temperature %TF%U(, the dew point %DF%), and the relative humidity %RR%U.
 (The combination of temperature and humidity feels like %HF%U.) (Strong winds from the %DD%(at %FF%U)(, gusting to %GG%), are producing a wind chill of %WF%U.)
 The pressure %PP%U and %PT%.\$\$
 #
 /BLIA2/Middle Nomad Buoy located 60 miles southeast of Norfolk recorded %DD% winds %FK%U, swells %HS%U, air temperature %TF%U, and water temperature %SF%U.\$\$
 #
 /WEB/Ship Discovery located at 38 degrees north latitude and 74 degrees west longitude recorded %DD% winds at %FK%U, air temperature %TF%U, water temperature %SF%U, with %HW% foot waves.\$\$

► To Choose Weather Elements to Control Threshold Phrases

At the beginning of each threshold phrase, indicate by placing into brackets, the weather element which controls the reporting of the phrase. This is necessary, because some phrases contain two elements for which there are thresholds. For example,

/KDCA/At Reagan National Airport,
 { %SW% was falling; %SW% was reported; under %SW% skies; %SW% were reported}
 ([V.V.], which reduced the visibility to %V.V.%U).
 The temperature was %TF%U([DF], the dew point %DF%), and the relative humidity %RR%U
 ([HF], producing a heat index of %HF%U).
 ([FF] The wind %DD% at %FF%U([GG], gusting to %GG%)
 ([WF], producing a wind chill of %WF%U).)
 The pressure %PP%U and %PT%.\$\$
 #
 /KADW/At Andrews Air Force Base,
 { %SW% was falling; %SW% was reported; under %SW% skies; %SW% were reported}
 ([V.V.], which reduced the visibility to %V.V.%U).
 The temperature was %TF%U([DF], the dew point %DF%), and the relative humidity %RR%U
 ([HF], producing a heat index of %HF%U).
 ([FF] The wind %DD% at %FF%U([GG], gusting to %GG%)
 ([WF], producing a wind chill of %WF%U).)
 The pressure %PP%U and %PT%.\$\$
 #
 /KBWI/The temperature was %TF%U{ with %SW%; with %SW%; with %SW% skies; with %SW%}
 ([V.V.], and a visibility of %V.V.%U) at B W I Airport. The dew point %DF%, and the relative humidity %RR%U
 ([HF], yielding a heat index of %HF%).
 ([GG] The wind %DD% ([FF]at %FF%U), with gusts to %GG%

```
([WF], which makes the temperature feel like %WF%). )
The pressure %PP%U and %PT%.$$
#
/KIAD/{%SW% was observed; %SW% was reported; it was %SW%; %SW% were observed}
([V.V.], which reduced the visibility to %V.V.%U) at Dulles Airport. The
temperature was %TF%U([DF], the dew point %DF%), and the relative humidity
%RR%U.
([HF] The combination of temperature and humidity feels like %HF%U.)
([WF]strong winds from the %DD%
([FF]at %FF%U)([GG], gusting to %GG%), are producing a wind chill of %WF%U. )
The pressure %PP%U and %PT%.$$
#
/BLIA2/Middle Nomad Buoy located 60 miles southeast of Norfolk recorded %DD%
winds %FK%U, swells %HS%U, air temperature %TF%U, and water temperature
%SF%U.$$
#
/WEBC/Ship Discovery located at 38 degrees north latitude and 74 degrees west
longitude recorded %DD% winds at %FK%U, air temperature %TF%U, water
temperature %SF%U, with %HW% foot waves.$$
```

9.4.3.5 Creating a Default Format File

For each product, you must also create a **Default Format** file. This file appears as Brdst#0 in the NWR GUI. The Default Format is output only when one or more weather elements are missing from a decoded station. The Default Format is needed since the Broadcast Format permits the forecaster to compose output in an almost unlimited manner, and the HWR NWR application will not necessarily be able to coherently drop missing weather elements.

Consequently, the Default Format MUST conform to more rigid standards. Whereas the Broadcast Format File requires an entry for each station, the Default Format requires only one Broadcast Format Paragraph for land stations and one for marine stations. An example of a Default Format file is shown in Exhibit 9.4.3.5-1.

```
# format CCCNNNNXXX
#
!!!!!FF_STATIONS
At %ID%, { %SW% was falling; %SW% was reported; it was %SW%; %SW% were reported}. The
visibility was %V.V.%U.
The temperature was %TF%U, and the dewpoint %DF%.
The wind was %DD%, at %FF%.
The pressure was %PP%U, and %PT%.$$
#
!!!!!MAR_STATIONS
At %ID%, winds were %DD%, at %FK%U. Sea temperature %SF%U.
Air temperature %TF%U. Wave height %HW%U. Wave period %PW%U.
Swell direction %SD%, swell height %HS%, and swell period %SP%.$$
```

Exhibit 9.4.3.5-1. Sample Default Format File

The initial installation of the HWR NWR included a template for the default format. You may edit this template to match your requirements, or you may wish to follow the steps described below.

► **To Create a Default Format File**

Select: A Product

Select: The **Broadcast Editor** button, Brdcst #0

- The default HWR NWR text editor appears so that you can type in the Default Format file for the selected Product

► **To Create Sample Default Phrases for Land and Marine Observations**

1. Write out a sample HWR for a land station and one for a marine station. Make sure that the HWR is constructed so that a punctuation mark follows the expression of each weather element. For example,

“At Reagan National Airport, rain was reported. The temperature was 57 degrees, the dewpoint 56, and the relative humidity 97 percent. The pressure 29.92 inches, and falling.

Middle Nomad Buoy recorded, a south wind, 22 knots, swells 6 feet, air temperature 59 degrees, water temperature 63 degrees, with wave height 5 feet.”

In the above example, notice that if any of the weather elements are missing, the program can skip to the next punctuation mark, and the sentence is still readable, although it may not be grammatically correct. For example, if the temperature is missing at Reagan National Airport, the following phrase will be broadcast:

“At Reagan National Airport, rain was reported. The dewpoint 56. The pressure 29.92 inches, and falling.”

If the pressure is missing, the entire sentence is skipped, because the next punctuation mark is the end of the sentence.

NOTE: The program cannot calculate the relative humidity without the temperature or a pressure tendency without a current or previous pressure.

2. Via the Default Format Editor, enter the text to match the HWR in Step 1. Wherever the sky/weather conditions are requested, substitute phrases for obstructions to vision, sky conditions, and multiple sky/weather conditions, in an identical manner to the technique described in Section 9.3.3.4. For example,

At Reagan National Airport,
{ rain was falling; fog was reported; under sunny skies; snow showers were reported}.

The temperature was 57 degrees(, the dewpoint 56,) and the relative humidity 97 percent.

The pressure was 29.92 inches and falling.

Middle Nomad Buoy recorded a south wind, 22 knots, swells 6 feet, air temperature 59 degrees, water temperature 63 degrees, with wave height 5 feet.

3. Threshold values may be added, but be careful that the sentence will make sense if any weather element is missing.

At Reagan National Airport,
 { rain was falling; fog was reported; under sunny skies; snow showers were reported}.

The temperature was 57 degrees, the dewpoint 56, and the relative humidity 97 percent (, producing a heat index of 104 degrees).

The pressure was 29.92 inches and falling.

Middle Nomad Buoy recorded, a south wind, 22 knots, swells 6 feet, air temperature 59 degrees Fahrenheit, water temperature 63 degrees Fahrenheit, with wave height 5 feet.

4. Insert symbolic words, using the key in Exhibit 9.4.3.4-2, where observation values are to be placed. Indicate the weather element that controls the reporting of the threshold phrase. Examples are as follows:

At %ID%,
 { %SW% was falling; %SW% was reported; under %SW% skies; %SW% were reported}.

The temperature was %TF%U([DF], the dewpoint %DF%), and the relative humidity %RR%U
 ([HF], producing a heat index of %HF% degrees).

The pressure was %PP%U and %PT%.
 %ID% recorded, a %DD% wind, %FK%U, swells %HS%U, air temperature %TF%U, water temperature %SF%U, with wave height %HW%U.

5. Finally, add the section identifiers and end markers \$\$. You may also add additional comments as needed.

```
# This is the Default Format File for CCCHWRNWL
#
#Fixed Format Station Section
!!!!!FF_STATIONS
At %ID%,

{ %SW% was falling; %SW% was reported; under %SW% skies; %SW% were reported}.

The temperature was %TF%U([DF], the dewpoint %DF%), and the relative humidity %RR%U

([HF], producing a heat index of %HF% degrees).

The pressure was %PP%U and %PT%.$$

#Marine Station Section
!!!!!MAR_STATIONS
%ID% recorded, a %DD% wind, %FK%U, swells %HS%U, air temperature %TF%U, water temperature %SF%U, with wave height %HW%U.$$
```

9.4.3.6 Providing Additional Variability for the NWR Broadcasts

The capability is also provided to modify the output in three additional ways:

1. By producing variability in the phrases for a station from hour to hour;
2. By including a station in both the fixed phrase and summary group stations; and
3. By recapping the weather conditions for one or more stations.

► **To Create Hour to Hour Variability**

There is also a way to obtain additional variability from hour to hour for the Fixed Phrase Format stations. Multiple Broadcast Format files, each with a different fixed phrase format for the stations in the Station List, may be created. To create different Broadcast Format files for a product, specify a different number before selecting the **Broadcast Format Editor** button.

When multiple **Broadcast Format** files are provided for a product, the probability with which each file is to be accessed must be provided in the Station List. To create broadcast variability, create a frequency section at the beginning of the Station List.

The first line in the section contains the frequency section indicator, **!!!!!BRDCST_FREQ**.

The next line contains the values that determine the frequency of use. The total of the frequencies MUST be 100 (representing 100 percent). If only one broadcast record for a transmitter is needed, either omit the frequency section from the station list record, or enter “100.”

In the example below, the “10, 40, 50” values indicate that there are three broadcast records associated with this Station List. The HWR NWR application randomly generates a number to choose one of the three files. Assuming that this is the beginning of the Station List for Product CCCWRNW5, you would expect, after multiple executions of the application that

- Broadcast Format File CCCHWRNW5.1 would be selected 10 percent of the time.
- Broadcast Format File CCCHWRNW5.2 would be selected 40 percent of the time.
- Broadcast Format File CCCHWRNW5.3 would be selected 50 percent of the time.

For example,

```
!!!!!BRDCST_FREQ  
10 40 50  
# Fixed Station Format section
```

```
!!!!FF_STATIONS
~These are the %TIMEZ% observations for the local area, on %DAY%,
%DATE%.
/KDCA/KDCA/+Reagan National Airport
...
...
```

► **To Add Stations to Both Fixed Phrase and Summary Groups**

Sometimes, when the geography warrants, it may be desirable to place a station into the fixed format section, and also to include it in a summary group. In this manner, a summary which encompasses the region in which the fixed phrase format station is a part will be more accurate. For example, if the Baltimore Washington International Airport (BWI) is in a fixed phrase broadcast format, a group of stations which constitutes Maryland would not be entirely complete without its observations. Thus, BWI should appear twice in the station list record, once as a Fixed Phrase Format station, and once within the group that comprises Maryland. Therefore, temperature and sky/weather conditions specifically for BWI will be broadcast twice when the sky/weather or temperature in degrees Fahrenheit are within the summary group thresholds. For example,

```
!!!!BRDCST_FREQ
10 40 50
# Fixed Format Station section
!!!!FF_STATIONS
~These are the %TIMEZ% observations for the local area, on
~%DAY%, %DATE%.
/KDCA/KDCA/+Reagan National Airport
/KDAA//Fort Belvoir
/KBWI//*B W I Airport; /KADW/+Andrews
/KADW/KDCA/+Andrews
/KAKQ/KRIC/+Wakefield
#
# Summary Format
~Here are some observations for Maryland.
!!!!WX_CONDS
SW TF
!!!!SUM_STATIONS
@Throughout the region,
/KBWI//+Baltimore Washington International Airport
/KHGR//+Hagerstown
/KNHK//+Patuxent River
/KSBY//+Salisbury
#
# Marine Format
~Here are some CMAN reports.
!!!!MAR_STATIONS
/BLIA2//Bligh Reef
/TTIW1//+Tatoosh Island
~Here are some buoy reports.
#
!!!!MAR_STATIONS
/46006//+Buoy 46006
/44014//+Buoy 44014
#
```

► **To Recap the Weather Conditions**

At many WFOs, it is a common practice to repeat the temperature and weather for a major city or cities at the end of a roundup. To set this up in the Broadcast Format file, enter a second Broadcast Format paragraph for these stations using the Format guidelines described previously. In the associated Station List, re-enter the stations at the end of the list, this time using a station flag of “&.” This instructs the program to search for that station’s second Broadcast Paragraph in the Broadcast Format file. If the observation is missing, that station will be treated as a “-” station and ignored. For example,

```
!!!!!BRDCST_FREQ
10 40 50
# Fixed Station Format section
!!!!!FF_STATIONS
/KDCA/KDCA/+Reagan National Airport
/KADW/KDCA/-Andrews Air Force Base
/KBWI//+B W I Airport
/KIAD//+Dulles
/KDCA//&Reagan National Airport
```

The corresponding Broadcast Format file needs to be modified to incorporate the second entry for this station. For example,

```
/KDCA/At Reagan National Airport,
{ %SW% was falling; %SW% was reported; under %SW% skies; %SW% were reported}
([V.V.], which reduced the visibility to %V.V.%U).
The temperature was %TF%U([DF]), the dew point %DF%), and the relative humidity
%RR%U
([HF], producing a heat index of %HF%U).
([FF]The wind %DD% at %FF%U([GG], gusting to %GG%)
([WF], producing a wind chill of %WF%U). )
The pressure %PP%U and %PT%.$$

/KADW/At Andrews Air Force Base,{ %SW% was falling; %SW% was reported; under
%SW% skies; %SW% were reported}
([V.V.], which reduced the visibility to %V.V.%U).
The temperature was %TF%U([DF]), the dew point %DF%), and the relative humidity
%RR%U
([HF], producing a heat index of %HF%U).
([FF]THE wind %DD% at %FF%U([GG], gusting to %GG%)
([WF], producing a wind chill of %WF%U). )
The pressure %PP%U and %PT%.$$

/KBWI/The temperature was %TF%U{ with %SW%; with %SW%; with %SW% skies; with
%SW%}
([V.V.], and a visibility of %V.V.%U) at B W I Airport. The dew point %DF%, and
the relative humidity %RR%U
([HF], yielding a heat index of %HF%).
([GG]The wind %DD% ([FF]at %FF%U)
with gusts to %GG%
([WF], which makes the temperature feel like %WF%). )
The pressure %PP%U and %PT%.$$

/KIAD/{%SW% was observed; %SW% was reported; It was %SW%; %SW% were observed}
([V.V.], which reduced the visibility to %V.V.%U) at Dulles Airport. The
temperature was %TF%U([DF]), the dew point %DF%), and the relative humidity
%RR%U.
([HF]The combination of temperature and humidity feels like %HF%U.)
```

([WF]Strong winds from the %DD%
([FF]at %FF%U)([GG], gusting to %GG%), are producing a wind chill of %WF%U.)
The pressure %PP%U and %PT%..\$\$

/KDCA/Once again, at Reagan National Airport it was %TF%U {with %SW%;with
%SW%;under %SW% skies;with %SW%}.

9.4.3.7 *Treatment of Missing Data*

The HWR NWR application treats missing data in the various ways described below.

For Fixed Format Station Observations

If the entire station is missing and the station is marked in the station list record with a “+” symbol, the site is broadcast as “**not available**.”

If the entire station is missing and the station is marked with a “-” symbol, the site is dropped from the broadcast.

If the entire station is missing and the station is marked with a “*” symbol, the second station substitutes for the first. If the second station is also missing, the FIRST station is broadcast as “**not available**,” or not broadcast at all, depending on the symbol with the second station.

If one or more non-threshold weather elements are missing, the fixed format established, in the Broadcast Format file, for that station are ignored, and the program reverts to the default format. One or more missing weather elements can be handled in conjunction with the default format. A default format is necessary because there is virtually an unlimited number of phrases that can be established by the users, and the HWR NWR application cannot realistically be programmed to structure a new sentence required by the absence of the missing weather elements.

For Summary Group Stations

Any station marked with a “+” whose observations are missing is reported as “**not available**,” and the observations for the remaining stations are grouped but not summarized.

A station marked with a “-” whose observations are missing is dropped from the broadcast, and the summary for the remaining stations is grouped, but not summarized.

If the observations for a station are missing and the station is marked with a “*” symbol, the second station is substituted for the first. If both stations are missing, the FIRST station is reported as “**not available**” or not reported at all, depending on the symbol associated with the second station. The observations for the remaining stations are grouped but not summarized.

If only one of the two (sky/weather and temperature) weather elements is missing for any station, the missing element is not summarized for the remaining stations, but the available weather element remains eligible for summarizing.

When all stations are marked with a “-,” the “@” is used for all comment lines associated with the summary phrase, and all of the stations in the summary group are missing, nothing will be broadcast for this summary phrase, not even the comment line.

For ASOS Stations

For ASOS stations, all of the above rules hold. However, there is an additional consideration, because low-level cloud cover observations are supplemented with satellite-derived middle- and upper-level cloud cover observations. The additional considerations are as follows:

If the ASOS cloud cover observation is missing but the SCP product, which contains information on only middle and high level cloud cover is available, the cloud cover is considered **missing**.

If the ASOS observation shows overcast conditions, the SCP product is not needed, since the sky conditions will be reported as **cloudy**.

If the ASOS observation shows broken clouds, the SCP product will be accessed to determine if the sky is overcast. If the SCP product is missing, the sky conditions will be reported as “**PARTLY SUNNY**” or “**MOSTLY CLOUDY**,” depending on the time of day.

If the ASOS observation shows clear skies or scattered clouds, the SCP product will be accessed to determine if the higher level sky conditions are cloudier. If the SCP product is missing, the sky conditions will either be considered missing, or reported as “**FAIR**,” depending on the forecaster’s preformat selection.

9.4.3.8 *Cautions*

Some important points that should be considered while setting up the HWR NWR application follow.

1. Punctuation is very important, since the voice synthesizer will be confused by spaces preceding commas and periods. Therefore, be sure to check the printout when initially setting up and testing your files.
2. When it is desirable to repeat an observation for a station within the **same** fixed format group, be sure that the first entry contains a station flag of “+” or “-,” and that only the second entry in the station list record contains the “&” station flag.
3. There must be **four** sky/weather condition phrases for each fixed format station, even if two or more of the four sky/weather types are to be broadcast identically.
4. One or more missing or erroneous weather elements from a fixed format station’s observation cause the application to revert to a default format. This is necessary because the program is otherwise incapable of patching together the remaining phrases to form a coherent report. Check the station’s reported observation first whenever an unexpected output is encountered.

5. A maximum of 15 comment lines starting with either “@” or “~” may be used in a station list. When all stations are marked with a “-,” the “@” instead of a “~” is used at the beginning of a section, and all of the stations in the section are missing, nothing will be broadcast for this section, not even the comment line.

9.5 Aviation Forecast Preparation System

See www.nws.noaa.gov/mdl/pgb/AvnFPS/3.2/html/index.html.

9.5.1 System Overview

AvnFPS is implemented with a series of server and client processes that communicate via TCP sockets. The servers run on hosts where the data are readily available. Clients run on workstations which do not need direct access to the data. The client may be located on a non-AWIPS system and does not have to be within the same network segment. Data request servers (**avndrs**) are responsible for delivering data to clients. Data ingest servers (**avndis**) monitor data received by AWIPS and store them in a modified format in the AvnFPS database. A notification system (**avnserver**) is responsible for alerting the clients when new data are received. The AvnFPS database can be distributed among several hosts.

AvnFPS is written mostly in the Python programming language. Remote communication features are implemented with the help of Python Remote Objects (PYRO). PYRO is an advanced and powerful Distributed Object Technology system, written entirely in Python, which resembles Java's Remote Method Invocation (RMI). TAF and METAR decoders utilize Toy Parser Generator (TPG), also a Python module. Graphical interfaces are written in Tkinter. The AvnFPS distribution comes with its own version of the above tools, and is independent of AWIPS COTS.

Network Attached Storage eliminates the need for a distributed server configuration, as all the data are visible from a single host. The standard configuration is shown in Exhibit 9.5.1-1.

NOTE: The data flow diagram shows servers running on PX2, however, any Red Hat™ host on an AWIPS network would do. The standard installation puts the servers on PX2.

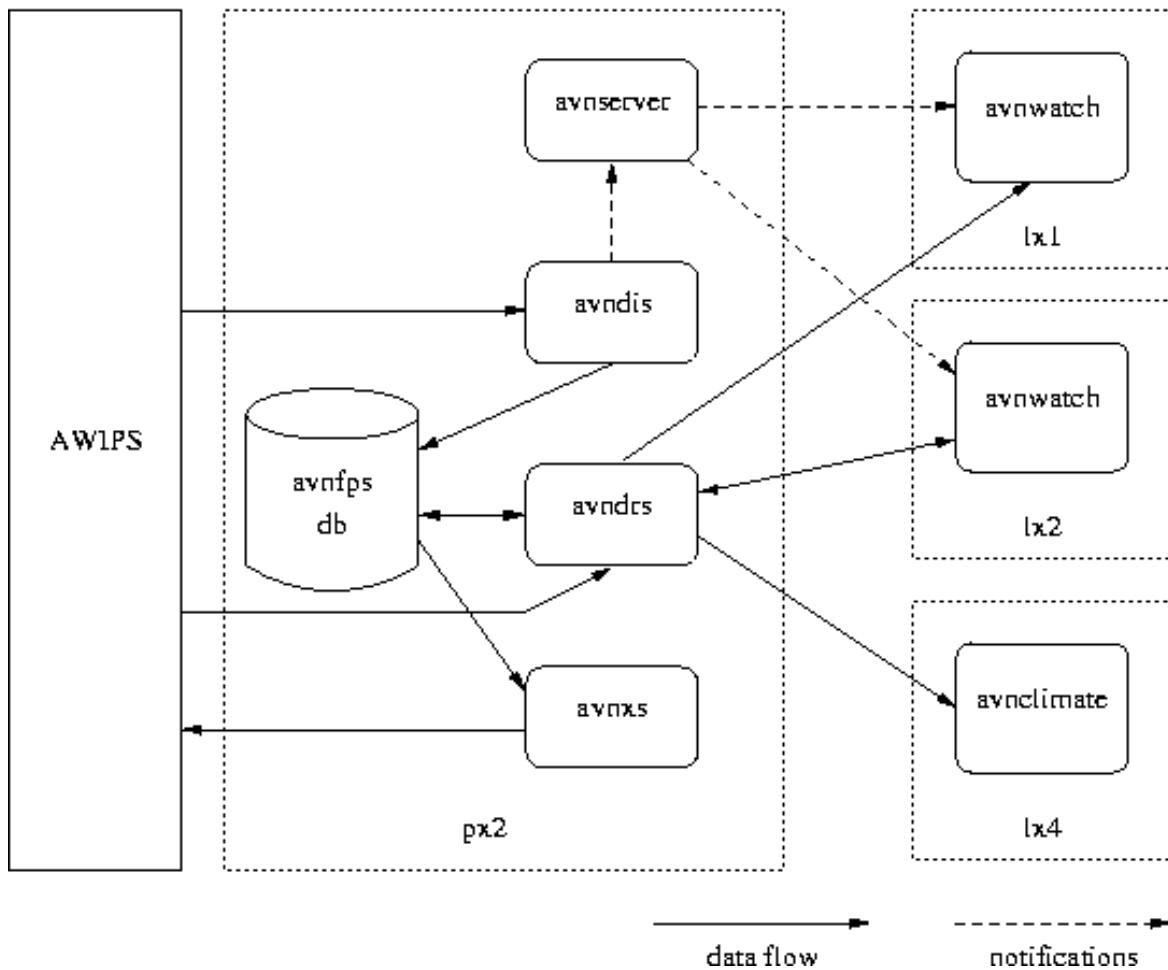


Exhibit 9.5.1-1 Data Flow Diagram

9.5.1.1 Name and Event Server

The **avnserver** process stores the names and locations of all objects used by AvnFPS servers, and it provides these names and locations to all other AvnFPS processes. Additionally, **avnserver** other task is to provide a notification mechanism between servers and clients. Thus, **avnserver** combines PYRO's name and event servers. One and only one instance of **avnserver** should run within a WFO cluster. A client first connects to **avnserver** to get information about the locations of data request servers and to subscribe for notifications. Client processes do not have to run on hosts at the same WFO as the data servers although this feature is generally not used. An access list of valid hosts, maintained in a configuration file, is used to provide host based access control. **avnserver** must be running before any other AvnFPS servers or clients can be successfully started.

The application **avninit** is used to launch AvnFPS servers and in a certain order. Users typically do not have to be concerned about the servers. It is **avninit**'s job to ensure that all servers are running and restart them if they fail. However, command argument details

for each server are provided here for their usefulness in troubleshooting, should it be necessary to start them by hand.

The **avnserver** program accepts the following command line arguments:

- TYPE:** `avnserver [-d] -n host`
- where **host** is the host name where the process will run. Obviously, this value could be retrieved from the operating system. This argument, however, is needed to properly handle failover situations. The optional flag **-d** tells the program to not detach itself from the terminal session, in other words, to run in the foreground.

9.5.1.2 Data Ingest Server

An instance of **avndis** monitors AWIPS data directories via **gamin** [Gamin]. **avndis** is a threaded application: for each data source, there is a dedicated thread that processes the data. Which server instance processes which data is determined by the server configuration file etc/server.cfg. **avndis** receives a notification from the **gamin** server when a file in a monitored directory is created or modified. The server, or parent process, then passes the file name to the appropriate thread. The thread processes the file's content, writes data to AvnFPS database and returns information back to the parent process. The parent process then sends notification to **avnserver**. A client that subscribed to the server will then receive this notification. The threads that are currently implemented are listed in Table 9.5.1.2-1.

Table 9.5.1.2-1. avndis Threads

Thread	Function
text	Processes text products: TAFs, METARS, TWEBS and CCFPs.
ltg	Processes lightning data.
rltg	Processes regression-based lightning forecasts data.
llws	Calculates Low Level Wind Shear value. The data sources are radar data (VWP) and METAR observations.
file	Monitors files written by an external program in a format that can be processed directly by AvnFPS clients. Currently used to process IFPS grids.
guid	Monitors directories where guidance sources arrive over the AWIPS WAN. Typically, BUFR MOS and raw model output from NCEP.

Every 30 seconds, **avndis** sends an **ALIVE** message that is used by clients to monitor the state of AvnFPS servers and to alert users when something goes wrong.

The program accepts the following arguments:

- TYPE:** `avndis [-d] -n host`
- where **host** is the host name where the process will run. The optional flag **-d** tells the program to not detach itself from the terminal session (i.e., to run in the foreground).

See Section 9.5.3.1, “Starting AvnFPS Server,” for an example of a **ps** listing.

9.5.1.3 Data Request Server

avndrs is mainly responsible for providing data to AvnFPS clients. The data source is the AvnFPS database, however, it can also directly access AWIPS files such as **netCDF** data in the `/data/fxa` tree. The other function of **avndrs** is to write forecasts prepared by the clients to a queue where they are then processed by the transmission server **avnxs**. Each instance of **avndrs** is capable of processing all data sources.

Every 30 seconds, **avndrs** sends an **ALIVE** message that is used by clients to monitor the state of the AvnFPS servers and alert users when something is wrong.

The program accepts the following arguments:

- TYPE:** **avndrs [-d] -n host**
- where **host** is the host name where the process will run.
The optional flag **-d** tells the program to not detach itself from the terminal session (i.e., to run in the foreground).
See Section 9.5.3.1, “Starting AvnFPS Server,” for an example of a **ps** listing.

9.5.1.4 Transmission Server

The transmission server, **avnxs**, provides a bridge between AvnFPS and the AWIPS transmission system. **avnxs** supports delayed transmissions, i.e., issuing forecasts that have been prepared by the forecaster before the transmission window opens.

Forecasts prepared by the AvnFPS forecast editor are written to the directory `xmit/pending` as text files with a particular naming convention. The filename is then used to determine the disposition of the product. Files in the `xmit/pending` directory are named as follows:

- TYPE:** **fid-ccccnnnxxx-wmoid-wfoid-yymmddhhmm-typ-tttttttt**
- where
 - **fid** - Forecaster ID Number
 - **ccccnnnxxx** - AWIPS id, argument to handleOUP.pl
 - **wmoid** - WMO Header
 - **wfoid** - WMO ID if the WFO issuing the product
 - **yymmddhhmm** - Full Timestamp, as year (modulo 100), month (Jan=1), day of the month, UTC hour and minute
 - **typ** - Forecast Type and Version, one of the following

—	Routine Forecast
RR _x	Delayed Forecast
AAx	Amendment
CCx	Correction

where **x** is the version: A through Z.

- **ttttttttt** - Earliest transmission time, in Unix seconds. For routine forecasts this is the start of the transmission window or an arbitrary time set by the forecaster. For other forecasts this is the time the forecaster presses the Send button.

avnxS monitors files in the `xmit/pending` directory to the current system clock. The requested transmission time, T_{xmit} , and the creation time, T_{post} , are retrieved from the filename and from the OS, respectively. If the current time T_{cur} is within range: $T_{xmit} < T_{cur} < T_{post} + n$ hours, **avnxS** will call an AWIPS program (currently **handleOUP.pl**) to send the forecast out to the WAN. n , the number of hours before a pending file is considered 'old', is now a configurable item in `etc/xmit.cfg` file. If the forecast file is too old, it will be moved to `xmit/bad` directory. The value of n (usually 3 hours) is set in transmission server configuration file. Files that do not match transmission file format are discarded. **avnxS** checks for the return code from **handleOUP.pl**. The status is written to a file `xmit/DOW`, where *DOW* is a 3-letter abbreviation for the Day Of the Week. Here is a sample entry from `xmit/DOW`:

```
SUCCESS002-KPBZIWB072-FRUS41-KPBZ-0410270100-__-1098840000
```

The first word is either SUCCESS or FAILnnn, and nnn is the error code returned by **handleOUP.pl**. If **handleOUP.pl** fails to transmit the forecast, the file will be moved to `xmit/bad`. The transmission status will be announced via **avnserver** to all client GUIs, see Section 5, "Forecast Transmission".

The program accepts the following arguments:

- TYPE:** **avnxS [-d] -n host**
- where **host** is the host name where the process will run. The optional flag **-d** tells the program to not detach itself from the terminal session (i.e., to run in the foreground). See Section 9.5.3.1, "Starting AvnFPS Server," for an example of a **ps** listing.

The transmission server also collects information on forecasts sent by the office for verification purposes. A special product is send periodically to the Verification Branch at NWS Headquarters that contains information that identifies which forecaster is responsible for which forecast. A configuration file `etc/xmit.cfg` specifies WMO and AWIPS headers and the frequency of transmission.

9.5.1.5 Client Programs

AvnWatch is the main client application. It provides forecast preparation and monitoring functionality. **Avnclimate** is a set of GUIs accessing archived climatological data. Current functionality provides display of historical data and statistics that can help by producing a short-term forecast based on current weather conditions.

9.5.2 Configuring AvnFPS

This section describes directory layout, configuration files used by AvnFPS and steps needed to download climatological data. Generally, this section will only be used as an aid in troubleshooting problems with the configuration of AvnFPS. While it is possible to configure AvnFPS by editing these files directly, most people will find it much easier to use the Graphical User Interfaces (GUI) described in Section 9.5.4, “Avnsetup”.

After successful installation of AvnFPS 3.2, the top level directory /awips/adapt/avnfps should be as follows:

```
lx2-wfo: /bin/ls -la
drwxrwxr-x 9 fxa    fxalpha 4096 Feb 21 15:04 3.1
drwxrwxr-x 9 fxa    fxalpha 4096 Mar  1 13:03 3.2
lrwxrwxrwx 1 root   root      7 Mar  1 13:33 bin -> 3.2/bin
lrwxrwxrwx 1 root   root      8 Mar  1 13:33 data -> 3.2/data
lrwxrwxrwx 1 root   root      7 Mar  1 13:33 etc -> 3.2/etc
drwxrwxr-x 6 fxa    fxalpha 4096 Mar  1 19:27 freetype-2.1.10
drwxrwxr-x 5 fxa    fxalpha 4096 Mar  1 16:10 gamin-0.1.7
drwxrwxr-x 6 fxa    fxalpha 4096 Mar  1 20:27 hdf5-1.6.4
lrwxrwxrwx 1 root   root      8 Mar  1 13:33 logs -> 3.2/logs
drwxrwxr-x 7 fxa    fxalpha 4096 Jul  1 2005 Python-2.4.1
drwxrwxr-x 6 fxa    fxalpha 4096 Jul  1 2005 tcltk8.4.5
```

The installation process does attempt to remove versions of the software older than 3.1. It is up to you to remove any remaining cruft that might be in this directory.

All configuration files are located in the directory /awips/adapt/avnfps/3.2/etc and its subdirectories. Most of the files (those with an extension .cfg) are in Windows™ ini format:

```
[section]
keyword=argument(s)
```

Lines starting with # are comments.

Files containing specifications for graphical user interfaces (GUI) follow a X11 standard:

```
*pattern: value
```

where pattern is a hierarchy of one or more widget classes/names, separated by * or a .. Comment lines start with !. See [welch], Chapter 25. These files are located in the subdirectory app-resources.

The file etc/forecasters contains forecaster IDs and names in plain ASCII text format.

9.5.2.1 Files in etc

etc/forecasters. Contains list of forecaster ids and names/initials. The numbers must be in the range 1 through 999. Lines starting with # are comments. Blank lines are allowed in the file. The format is the same as in previous releases. An example:

```
# etc/forecasters
# List of forecasters
# Format:
# number name
1 Amanda
2 Bailing
3 Belinda
```

etc/logging.cfg. This file configures the logging behavior of all AvnFPS programs. You should not need to modify it. Not changed since AvnFPS 3.0.

```
# logging.cfg
# configuration file for Python logging utility

[loggers]
keys=root

[handlers]
keys=hdl

[formatters]
keys=fmt

[logger_root]1
level=NOTSET
handlers=hdl

[handler_hdl]2
class=WeeklyFileHandler
args=('%s/logs' % os.environ['TOP_DIR'],
      os.path.basename(sys.argv[0]).split('.')[0])
formatter=fmt

[formatter_fmt]3
format=%(asctime)s %(levelname)-5s [%process)5d:(%thread)6d] %(module)s:
%(message)s
```

NOTES:

1. Log level is set in the section **[logger_root]**. Available values in decreasing order of information output are: DEBUG or NOTSET (these two are equivalent), INFO, WARNING, ERROR, CRITICAL.
2. **[handler_hdl]** specifies output directory and file name. The class WeeklyFileHandler appends an abbreviated day of the week to file name.
3. **[formatter_fmt]** specifies format of a line written to the log file. Refer to Python Documentation for details.

etc/server.cfg. This file specifies values used by the data ingest servers.

```

# etc/server.cfg
# server configuration file for OB7
# last update: 03/01/06

# Name servers
# Either local or ip address. Local means that broadcast is used to locate
# the server, which means the server must be on the same subnet
# The list of tafs is displayed in the startup (menu) GUI

# Data ingest servers
[dis]1
tags=text2,ltg,rltg,file,llws,guid

#[dis_text]2
#name=text
#source=/data/fxa/point/avnfps/raw
#module=TextThread
#nhours=24

[dis_text]3
name=text
source=/awips/adapt/avnfps/data/text
module=TriggerThread
nhours=24

[dis_ltg]4
name=ltg
source=/data/fxa/point/binLightning/netcdf
module=LtgThread
# distance in miles, age in minutes
distance=20
age=15

[dis_rltg]5
name=rltg
source=/data/fxa/img/SBN/netCDF/LATLON/3hr/LTG
module=RadLtgThread

[dis_llws]6
name=llws
radar=/data/fxa/radar
profiler=/data/fxa/point/profiler/netcdf
module=LLWSThread

[dis_file]7
tag=pxl
name=file
source=/awips/adapt/avnfps/data/grids,
module=FileThread

[dis_guid]8
name=guid
ngmmos=/data/fxa/point/mos/NGM/netcdf
avnmos=/data/fxa/point/mos/AVN/netcdf
gfsmos=/data/fxa/point/mos/GFS/netcdf
etamos=/data/fxa/point/mos/ETA/netcdf
eta=/data/fxa/point/model/ETA/netcdf
module=GuidanceThread

```

```

nhours=24

# access control
# hosts allowed to access data
[valid]9
hosts=XXX.XXX.58.*
```

NOTES:

1. Section [**dis**] specifies which ingest threads should run. For each item tag on the list there is a corresponding [**dis_tag**] section which defines the thread. Each section comprises several items listed below. There are two ways of accessing text products. TextThread reads data files written by **acqserver**. However, the AWIPS ingest system has to be changed from baseline configuration in order to use this thread. Thus, it is commented out and TriggerThread is used in AWIPS instead.
 - name is one of predefined data sources which is specific to each module. Do not modify this value.
 - source is the directory where AWIPS data files reside. This directory is monitored by **gamin** server daemon, **gam_server**. In this case, this is the directory where **avntrigger.sh** writes files extracted from text database. A special case is LLWSThread which relies on radar and profiler data. The relevant directories are specified by keywords **radar** and **profiler**.
 - module specifies Python source code file. Do not change.
 - nhours is a module specific parameter, in this case it is the number of hours of data that should be preserved in AvnFPS database.
2. Section [**dis_text**] defines an experimental setup that bypasses AWIPS decoders and databases. TAFs, TWEBS and METARs are retrieved from files dumped by **acqserver** into a directory. This configuration is not recommended for novices.
3. Item [**dis_text**] defines thread processing reports retrieved from Postgres fxatext by **avntrigger.sh** via the trigger mechanism. This is delivered as the default technique to get text products.
4. [**dis_ltg**] tag controls the processing of lightning observations. The tag distance defines an area of interest. Only lightning strikes within a square centered at the TAF site of size twice the provided value (in miles) will be extracted from AWIPS data files.
5. [**dis_rltg**] tag is for the radar-based 3 hour cloud-to-ground lightning probability forecast which is currently available in the lower 48 states. OCONUS sites may safely remove this tag from the list in the [**dis**]section.
6. [**dis_llws**] controls Low Level Wind Shear setup. The directories are the base radar file location (the site id and product type VWP will be appended by the thread). The profiler tag can be a comma-delimited list of directories. This allows LDAD directories as well as AWIPS ones to be listed.

7. The [**dis_file**] describes a thread that reads the content of files in the directories listed on the source line. The base directory of each file is passed to the client, which can thus determine the data type. Currently this thread reads files produced by a GFE text formatter.
8. The [**dis_guid**], specifies guidance data: MOS and high-resolution point NAM-WRF model data. You may comment out some lines if a particular data is not available in your area. For instance, NGM MOS isn't available in Alaska and Pacific Regions, so ngmmos tag can be removed.
9. The access control section [**valid**] restricts access to AvnFPS server to hosts with IP addresses matching those on the hosts line. A shell type match characters can be used: * matches any string, ? matches single character

etc/px2finit.cfg. This file specifies which servers should be started by avnint and their startup order and should not be changed.

```
# px2finit.cfg

[avnserver]1
name=avnserver
order=0
wait=5

[avndrs]
name=avndrs
order=1
wait=3

[avndis]
name=avndis
order=2
wait=1

[avnxs]
name=avnxs
order=3
```

NOTE:

For each server there is a separate section. The tag must be unique. A section consists of 2-4 items:

- name specifies server name
- order determines server startup sequence. Servers with lower order start first.
- wait is a wait time in seconds after a particular server is started (forked), before starting the next server on the list.

etc/gui.cfg. This file has been changed in 3.2. Specifies values used by graphical user interfaces (GUI) shared by all users.

```
# etc/gui.cfg
# specifies available monitor options for avnwatch
```

```

# Name servers
# Either local or ip address. Local means that broadcast is used to locate
# the server, which means the server must be on the same subnet
# The list of tafs is displayed in the startup (menu) GUI
[ns]
tags=local,

# colors in main GUI: 7 items
[colors]1
tags=green3,grey,pale green,yellow,orange,red,purple

# editor tags
[editor_tags]
fatal=red
error=orange
warning=forest green

# miscellaneous features
[features]
tafeditor=1
twbeditor=1

# viewers: taf and metar must be present, taf must be first on the list
[viewers]2
tags=taf,metar,gfsmos,etamos,ngmmos,etabuf,grids

[viewer_taf]3
module=TafViewer

[viewer_metar]
module=MetarViewer
label=Metars

[viewer_gfsmos]
module=MosViewer
label=GFS-MOS
model=gfsmos

[viewer_gfslamp]
module=MosViewer
label=GFSLAMP
model=gfslamp

[viewer_ngmmos]
module=MosViewer
label=NGM-MOS
model=ngmmos

[viewer_etamos]
module=MosViewer
label=ETA-MOS
model=etamos

[viewer_etabuf]
module=EtaViewer
label=NAM-WRF-profile

[viewer_grids]
module=GridViewer
label=Grids

```

```
[viewer_avnmos]
module=MosViewer
label=AVN-MOS
model=avnmos

[menus]4
number=7

[menu_0]5
items=metar

[menu_1]
items=persistence_1hr,persistence_2hr,persistence_3hr

[menu_2]
items=ltg

[menu_3]
items=rltg

[menu_4]
items=ccfp

[menu_5]
items=grids

[menu_6]
items=llws

[monitor_metar]6
menu=METAR
module=MetarMonitor
items=tempo,vsby,wind,wx,sky
labels=tpo,vis,wnd,wx,cig

[monitor_persistence_1hr]
menu=persistence 1hr
module=PersistMonitor
nhours=17
items=vsby,wind,wx,sky
labels=vis,wnd,wx,cig

[monitor_persistence_2hr]
menu=persistence 2hr
module=PersistMonitor
nhours=2
items=vsby,wind,wx,sky
labels=vis,wnd,wx,cig

[monitor_persistence_3hr]
menu=persistence 3hr
module=PersistMonitor
nhours=3
items=vsby,wind,wx,sky
labels=vis,wnd,wx,cig

[monitor_ltg]
menu=ltg
module=LtgMonitor
items=wx
```

```
labels=ts

[monitor_rltg]
menu=rltg
module=RadLtgMonitor
items=wx
labels=ts

[monitor_ccfp]
menu=ccfp
module=CCFPMonitor
items=wx
labels=ts

[monitor_grids]
menu=grid
module=GridMonitor
from=28
to=6
items=vsby,wind,wx,sky
labels=vis,wnd,wx,sky

[monitor_llws]
menu=llws
module=LLWSMonitor
items=wind
labels=ws
```

NOTES:

1. Section [colors] lists colors used to indicate discrepancies between forecasts and observations/guidance, in increasing order of severity.
2. Section [viewers] lists data viewers available in the TAF Editor window. For each tag listed, there must be a [viewer_tag] section.
3. Each viewer requires certain parameters. Module specifies a Python source code file, label defines text displayed in the window's tab. Some modules require additional values. You should not modify any of those values, with the exception of the labels.
4. Section [menus] defines data areas in the main monitoring GUI. For each area there must be a section [menu_] listing items that will be monitored. Count starts from 0.
5. Items is a list of comma separated tags, each of the tags must have a corresponding [monitor_item] section. If the list consists of one item, it must be terminated by a comma. If 2 or more items are on the list, the user can select what is monitored.
6. Each monitor requires certain parameters. module specifies a Python source code file, menu defines text displayed when the popup menu is invoked. items is a list of monitored weather elements, labels determine displayed text. To keep the GUI nicely aligned, keep label names 2 or 3 characters long.
7. nhours is the number of hours ahead assumed the weather does not change.

8. from, to define interval of time the grids are monitored against the forecast

etc/wxplot.cfg. This is a configuration file for the weather plot GUI.

```
# wxplot.cfg

[print]1
cmd=convert - tmp/%s.jpg

[hours]2
back=24
forward=24

[vsby]3
bot=0.125
top=10.0

[cig]
bot=100
top=8000

[viewers]4
tags=taf,metar,gfsmos,etamos,ngmmos,eta

[selected]5
tags=taf,metar

[viewer_taf]6
module=TafPlot
label=TAF
color=blue

[viewer_metar]
module=MetarPlot
label=METARS
color=red

[viewer_gfsmos]
module=MosPlot
label=GFS-MOS
color=forest green
model=avn

[viewer_etamos]
module=MosPlot
label=ETA-MOS
color=green
model=gfs

[viewer_ngmmos]
module=MosPlot
label=NGM-MOS
color=dark green
model=ngm

[viewer_eta]
module=EtaPlot
label=NAM-WRF
color=brown
```

NOTES:

1. Command to be executed when the Print is pressed. A window dump file (xwd format) is passed via standard input stream.
2. Number of hours of data to display, counted from the current hour.
3. Ceiling and visibility plot limits.
4. This section lists data viewers available in the Weather Plot window. For each tag listed, there must be a [viewer_tag] section.
5. Data viewer toggles selected by default.
6. Each viewer requires certain parameters. 'module' tag specifies a Python source code file, 'label' tag defines text displayed as a toggle button name. Some modules require additional values. You should not modify any of those values, with the exception of the labels.

etc/xmit.cfg

This configuration files is used by **avnxss** which sends forecast and verification products out for dissemination.

```
# etc/xmit.cfg

[verification]1
wmo = NXUS98 KPIT
awips = KPBZVFTPBZ
fcstid = 0
period = 6

[transmission]2
# how often checks for new files (seconds)
frequency = 15
# reject older than (hours)
old = 3
```

NOTES:

1. This section defines parameters used by the program to transmit the NXUS98 verification product to NWS headquarters. wmo and awips are the WMO and AWIPS headers. These headers must exist in the file /awips/fxa/data/afos2awips.txt. The transmission file name contains (reserved) forecaster id 0. This should not be changed. The verification product is transmitted every 6 hours.
2. You may want to adjust the old value. It defines the cutoff time for early transmission.

etc/triggerTemplate. Made by **avnsetup.** This file is processed during trigger localization on the data server. **avnsetup** also creates a file **etc/triggerTemplate.good** while updating Postgres triggers directly. The latter is not used by the localization script.

9.5.2.2 TAF Configuration Files

The TAF configuration files reside in directory etc/tafs. For each TAF site CCCC there is a subdirectory etc/tafs/CCCC containing template files, one per each forecast period and site info data etc/tafs/CCCC/info.cfg.

Site Info File. This file is normally created by the Taf Site Editor GUI, normally invoked from avnsetup.

```
# etc/tafs/KPIT/info.cfg

[headers]
wmo = FTUS41 KLWX
afos = WBCTAFAIAD

[thresholds]1
cig = 200,600,1000,2000,3100
vsby = 0.5,1.0,2.0,3.0,6.0
radar_cutoff = 600,0
profiler_cutoff =

[sites]2
metar = KIAD
eta = KIAD
avnmos = KIAD
ngmmos = KIAD
gfsmos = KIAD
gfslamp = KIAD
radars = KLWX,KDOX
profilers =

[geography]3
lat = 38.96
runway = 60,90,
lon = -77.45
elev = 98
```

NOTES:

1. Section [thresholds] defines ceiling and visibility categories used by the monitoring system. A new feature of AvnFPS 3.2 is the cutoff thresholds for the VWP sources. Cutoff values correspond to heights in meters below which data will be ignored. As in the example above, for the KLWX radar, any VWP data below 600 meters will be ignored. However, all VWP data from the surface up to 2000 feet from the KDOX radar will be used. This feature is useful if your VWP source(s) is (are) routinely contaminated by non-meteorological phenomenon near the site.

2. Section [sites] defines IDs used by other data sources. Some TAF sites may have more than one associated observation. In that case, separate the ids by a comma.
3. Section [geography] provides location of the airport. elev is in meters, runway directions in degrees true north are used to calculate cross winds.

Monitoring Rules. The default configuration files for all monitors are located in the directory etc/tafs/XXXX. Currently these are: grids.cfg, ltg.cfg, mtrs.cfg, rltg.cfg, ccfp.cfg. All can be edited with the "Monitoring Rules" GUI via avnsetup. Here is an example of rule definition file for monitoring of METARS:

```
# etc/tafs/XXXX/mtrs.cfg

[rule_11]1
severity = 5
msg = Visibility difference of 3 or more categories
unique =
type = vsby
method = VsbyCatDelta
ncat = 3
.....
[rules]2
active = 0,1,2,3,4,5,6,7,8,9,10,11
.....
[rule_1]
severity = 3
msg = Freezing precipitation in TAF and not in obs
unique = 0
type = wx
method = WxTafDelta
wx = FZRA,FZDZ,PL
```

NOTES:

1. Each [rule_N] provides arguments to the monitoring function, specified by the method keyword. The following tags must exist for each rule:
 - severity: a number in the range 1 through 5 corresponding to colors defined in gui.cfg, see 1.
 - msg: message displayed by the monitoring GUI.
 - type: one of wind, vsby, wx, sky
 - unique: 0 or 1.

Each function may accept additional arguments, such as ncat. In this case ncat is the number of categories the visibilities in a TAF/METAR pair must differ for the rule to activate. Thus you may specify the same method with different arguments, ncat=2 in our case.

2. Section [rules] defines the list of rules to monitor. For each number there must be a corresponding [rule_N] section.

If you want to have rules dependent on the TAF site, copy the relevant file to the TAF site directory and modify it there. The monitoring program first tries to find the files in the site directory, if it can't find it there, uses the one from etc/tafs/XXXX.

Important! There are no default hardcoded rules. The files in etc/tafs/XXXX must exist.

Impact QC Definition File. Impact QC is a new feature in AvnFPS3.2. The forecaster can be alerted when a prepared TAF has a significant impact on airport operations. This file is optional. Currently this file cannot be modified with avnsetup, you must use a text editor instead. Shown below is a configuration file with additional rules added that are specific to Pittsburgh International Airport, etc/tafs/KPIT/impact.cfg:

```
# impact.cfg

[conditions]1
items=cond_1,cond_2,cond_3,cond_4,cond_5

[cond_1]2
tag=FC
level=1
text=Impact: Fuel-Alternate vsby<3 or cig<2000
expr=vsby<2.95 or cig<2000

[cond_2]
tag=FC
level=2
text=Impact: LIFR conditions vsby<1 or cig<500
expr=vsby<0.95 or cig<500

[cond_3]
tag=ws
level=1
text=Wind shift vs previous group resulting in >6kt change along PIT runway
28R/10L, may affect runway config
expr=wind[0].shift and wind[0].runway>6

[cond_4]
tag=xw
level=1
text=Cross wind component >14KT on PIT runway 28R/10L
expr=wind[0].cross>14

[cond_5]
tag=xw
level=2
text=Cross wind component >24KT on PIT runway 28R/10L
expr=wind[0].cross>24
```

NOTES:

1. Section [conditions] defines the list of conditions to check. For each tag [cond_N] there must be a corresponding section.
2. Each [cond_N] provides arguments to the impact check function. The check is done for each TAF period. The following tags must exist for each rule:
 - **expr:** A Python expression to be evaluated. This expression can contain following variables: vsby, cig and wind. vsby is in miles, ceiling in feet. wind is an array that has length equal to the number of runways. Each element of this array contains 3 values: runway, cross and shift. The wind

vector is represented in a Cartesian coordinates along and perpendicular to the runway. The absolute values of these components are wind[N].runway and wind[N].cross, where N is runway number, counted from 0, as listed in the site configuration file, see section: : “Site Info File”. wind[N].shift is a Boolean value, indicating that the runway component changed sign from one TAF period to another.

- **text:** Message to be displayed when the expression evaluates to True.
- **level:** Highlight background color, 1 - green, 2 - orange.
- **tag:** Used to group messages, so only the message with the highest level is displayed. In this example, if visibility is 1/2SM, only the LIFR message is shown in a popup window of the TAF Editor.

Climate QC Definition File. The file etc/tafs/XXXX/climqc.cfg is used to define category thresholds used while creating climate QC count files. Currently this file cannot be modified with **avnsetup**, you must use a text editor. An example:

```
#etc/tafs/XXXX/climqc.cfg

[args]1
alpha=0.3
showdetails=0

[thresholds]2
vsby=0.27,1.1,2.9,6.1
cig=205,605,1005,3105,40000
ff=4.1,10.1,20.1
dd=22.5,67.5,112.5,157.5,202.5,247.5,292.5,337.5
```

NOTES:

1. The parameter alpha is used to determine likelihood of occurrence of a combination of weather elements in the forecast based on conditional probabilities. Alpha should be a positive number, less than one. The showdetails flag (0=no;1=yes) turns detailed statistics display, generally disliked by forecasters.
2. The thresholds determine category ranges. Each of arguments is a list of values $v_1 < v_2 < \dots < v_n$, with implicit $v_1 = 0$ and $v_{n+1} = \infty$. Category k consists of all values v such that $v_k \leq v < v_{k+1}$.

The value 40 000 ft on the ceiling list serves to distinguish between limited and unlimited ceiling, which is coded as 99 998 ft.

If you want to have thresholds dependent on the TAF site, copy the file to the TAF site directory and modify it there. The program avnqestats which creates the count files first tries to find the file in the site directory, if it can't find it there, uses the one from etc/tafs/XXXX.

TAF Product Definition Files. Located in etc/tafs. Normally created by the Taf Product GUI invoked from avnsetup. An example file:

```
# etc/tafs/PBZ_TAFC.cfg

# list of TAF sites
[sites]
workpil = PITWRKTAFC
idents=KPIT,KAGC,KBVI,KLBE,KHLG,KMGW,KZZV,KFKL,KDUJ
```

Default Product File. The optional DEFAULT file contains name of the configuration file, sans the .cfg extension. That should be loaded on startup of the monitoring GUI. If not present, the first one in alphabetical order is used.

TAF Formatter Configuration Files. The TAF Formatter requires three configuration files. These files are located in the directory etc/tafs/XXXX. With AvnFPS3.2, flt_cat.cfg and grp_taf.cfg files can now be customized for each TAF site and moved to its respective etc/taf/CCCC directory.

File flt_cat.cfg contains the threshold values of visibility and ceiling height that are used to determine aviation flight categories. The default values are identical to those provided in Directive 10-813. The thresholds can be changed to site-specific values.

```
#etc/tafs/XXXX/flt_cat.cfg
[cig]
thresholds=200,500,1000,3000,3500,4000,5000,8000,10000,12000,15000,18000,20000
[vis]
thresholds=0.5,1,3,51
```

NOTE:

1. These thresholds divide the spectrum of ceiling and visibility into categories with an implied 0 at the beginning and 'infinity' at the end of each list. Thus as defined here, ceiling category 1 corresponds to cloud heights from 0 to 200 feet, category 2 from 200 to 500 feet, etc. Similarly for visibility, with category 1 corresponding to visibilities LTE to 1/2 mile. Category 5 corresponds to visibility greater than 5 miles.

File grp_taf.cfg contains the configurable threshold values that are used to form concise TAFs. Detailed description for each category has been provided inside the file.

```
#
# This file contains thresholds that control the algorithm that converts
# numerical/tabular guidance into 'guidance' TAFs.
#
# Probabilities (POT and POP06) above which precipitation and/or
# thunderstorms will be included in the prevailing group.
#
[prev]
pop=80
tstm=80
#
# Probabilities (POT and POP06) above which the tempo group is formed
```

```

# containing precipitation and/or thunderstorms.
#
[tempo]
tstm=36
pop=36
#
# Boolean (yes/no) if PROB30 groups are wanted in guidance TAFs
[prob30]
value=yes
#
# The longest time span in hours that makes this group combinable with
# a longer, adjacent (in time) group. If the duration of a group is longer
# than this value, this group stays alone in the TAF.
#
[short_dt]
value=11
#
# The shortest time span in hours that allows its shorter duration
# neighbor to be combined with it.
#
[long_dt]2
value=15
#
# Maximum category difference between the long and the short duration groups.
If the
# difference in flight category between the two groups is greater than this
value,
# they are not combined.
#
# Categories are treated separately for visibility and ceilings.
#
# To see the breakpoints for the ceiling and visibility categories, see
# etc/tafs/XXXX/flt_cat.cfg (flight category) configuration file.
#
# First the visibility
#
[dc_vis]3
value=1
#
# Lowest visibility category to which the combining algorithm is applied
#
[low_c_vis]4
value=5
#
# Highest visibility category to which the combining algorithm is applied
#
[high_c_vis]5
value=5
#
# Now, the ceiling . . .
#
[dc_cig]6
value=1
#
# The lowest ceiling category to which the combining is applied
#
[low_c_cig]7
value=13
#
# Highest ceiling category to which the combining is applied
[high_c_cig]8
```

```

value=14
#
# Earliest forecast time in hrs to which the combining algorithm can be applied
[low_p]9
value=12
#
# Maximum allowable ceiling height in hundreds of feet when thunderstorms
# are forecasted
#
[cb_hi]
value=50
#
# Maximum speed which is considered to be not a calm wind.
[wind]
calmwd=5
#
# Wind speed and direction change in wind speed above which combining will not
be applied.
value=10
delta=410

```

NOTES:

Items 1 through 9 control how two dissimilar (in visibility and/or ceiling) groups, one 'short', the other 'long', can be further combined.

1. The maximum duration of the smaller group that can be combined with the larger, dissimilar one. When combined, the larger group values are not adjusted by the smaller group's values.
2. The minimum length of time to be considered the 'large' group candidate for combining with smaller ones.
3. The largest visibility category difference allowed between TAF groups and still be able to combine.
4. The lowest visibility category allowed to be considered for combining. This value is related to the values assigned to the vis thresholds in flt_cat.cfg file.
5. The highest visibility category allowed to be considered for combining. This value is related to the values assigned to the vis thresholds in flt_cat.cfg file. Usually set to the number of visibility 'breakpoints' in vis thresholds.
6. The largest ceiling category difference allowed between TAF groups and still be able to combine.
7. The lowest ceiling category allowed to be considered for combining. This value is related to the values assigned to the cig thresholds in flt_cat.cfg file.
8. The highest ceiling category allowed to be considered for combining. This value is related to the values assigned to the cig thresholds in flt_cat.cfg file. Usually set to the number of ceiling 'breakpoints' in cig thresholds.
9. Number of hours when the combining algorithm will be applied to groups valid beyond the TAF's beginning valid time.

10. Maximum allowable difference in speed (knots) and direction (tens of degrees) between groups allowed to be combined.

Finally, grid_probs.cfg contains configuration data on how the probability attributes on IFPS grids are translated into numerical probability values that will be used to form TAFs. Remember that precipitation is only included in the TAFs when certain probability threshold is exceeded. This file cannot be customized to individual TAF sites.

```
#tables used to convert prob symbols in grids to a pop value
[before9hr]
S=30
IS=30
WS=30

SC=50
O=50
C=50

D=70
WP=70
NM=70
L=70

[after9hr]
S=20
IS=20
WS=20

SC=30
O=30
C=30

D=50
WP=50
NM=50
L=50
```

9.5.2.3 TWEB Configuration Files

The TWEB configuration files reside in etc/twbs.

Route Configuration Files

For each TWEB route or synopsis there is a subdirectory etc/twbs/NNN containing template file route/synopsis info data etc/twbs/NNN/info.cfg. This file is normally created by the setup program avnsetup. An example file:

```
# etc/twbs/073/info.cfg
[headers]
wmo = FRUS41 KPBZ
afos = PITIWB073

[sites]
metars = KCLE,KYNG,KPIT,KLBE,KJST,KAO0,KMDT,KMRB,KDCA
tafs = KCLE,KYNG,KPIT,KLBE,KJST,KAO0,KMDT,KMRB,KDCA
```

Section [sites] lists TAFs and METARs that should be displayed in the TWEB Editor window.

TWEB Product Configuration Files. These files are located in etc/twbs. They are normally created by avnsetup. An example file:

```
# etc/twbs/PIT_TWBS.cfg

[sites]
workpil = PITWRKTWB
idents = 072,073
```

Default Product File. The optional DEFAULT file contains name of the product that should appear selected in the product loader in the TWEB Editor window. If not present, the first product in alphabetical order is chosen.

9.5.2.4 X Resources Configuration Files

The default and individual resource files are located in the directory etc/app-resources. To edit the default file etc/app-resources/X you can use any text editor. Individual files have naming convention X.N, where N is the forecaster number from etc/forecasters. These files are created by a graphical editor available from the AvnWatch GUI menu.

Here is the listing of the default file etc/app-resources/X.

```
!! default X resources configuration file
!! last modified July 10, 2005
!! user editable options
!! default font
!! change 100 to 140 if you want bigger default font
*font:                               -adobe-helvetica-bold-r-normal-*-*-100-*-*-p-*/
iso8859-9
!! default colors
*background:                         grey70
*foreground:                          black
!! text window font
*Text.font:                           7x14
!! text window colors
*Text.background:                    #2f3f6f
*Text.foreground:                   #ffffff
!! other text window specific options
*Text.width:                          74
*Text.height:                         24
*Text.cursor:                        hand1
!! forecast editor font - may want bigger
*textEditor.font:                     8x16
!! forecast editor colors - may want different
*textEditor.background:              #1f2f6f
*textEditor.foreground:              white
*textEditor.width:                   70
*textEditor.height:                  12
!! cursor width and color
*textEditor.cursor:                  arrow
*textEditor.insertWidth:             5
*insertBackground:                  yellow
```

```

!! text viewer window options
*textViewer.width:           74
*textViewer.height:          12
!! forecast editor orientation: horizontal or vertical
*orientation:                vertical
!! listbox font
*Listbox.font:               7x14
!! entry font
*Entry.font:                 7x14
!! entry window colors
*Entry.background:           white
*MessageBar*Entry.background: grey85
!! balloon message (popup) font
*Balloon.Label.font:         7x14
!! modifies behavior of dialogs
*transientDialogs:           1
!! confirmation on closing editor
*confirmClose:               0
!! confirmation on sending amendments/corrections
*confirmSend:                1
!! alert options: use colors for the first level that should result in
!! notification - pale green, yellow, orange, red, purple or none
*notifyDeiconify:             yellow
*notifyRaise:                  red
*notifyPlay:                  pale green
!! not implemented
!!*notifyTalk:                 none
*playFile:                    /awips/fxa/data/sounds/asterisk.au
!! blink on new notification
*blink:                       1
!! warning/error level to disallow send:
!! 'always', 'warning', 'error', 'fatal'
*disallowSend:                error
!! forecast editor options
!! use template, one of: template, merge, latest
*loadOrder:                   merge
!! ask for transmission time when sending routine forecasts
*asktime:                      1
!! periodically save bulletins in a backup file
*autosave:                     1
!! update issue and valid times on QC
*updatetimes:                  1
!! print forecasts on send
*autoprint:                    0
!! Insert/Overwrite
*insert:                        1
!! Word-wrap long lines: either none or word
*wrap:                          word
!! Amd, Rtd, Cor buttons on the right
*amdbuttons:                   1
!! number of TAFs to display
*numTafs:                      1
!! number of hours of METARS to display
*numHours:                     6
!! show bulletin headers in the text window
*showHeaders:                  1
!! show decoded METARS
*showDecoded:                  1
!! show category probabilities for MOS
*showProbs:                     1
!! Format of MOS and Grids reports: raw, long or short

```

```

*showFormatted:           short
  !! flight category highlights
*highlightFlightCat:      0
*lifrColor:                #6c1916
*ifrColor:                 #5b3c2c
*mvfrColor:                #2c484c
*vfrColor:                  #112346
!!
  !! editable by knowledgeable people only
!!
  !! send forecasts in a collective
*collective:                  0
  !! prevents line wrap in message boxes
*wrapLength:                   0

```

NOTES:

1. Lines starting with "!!" are comments. Resource names begin with a "*" and end with ":". Anything after a ":" is a resource value. Many of the allowable values are not well documented, or cryptic. For example, valid values for cursor shape in a text window

*Text.cursor: hand1

are defined in file /usr/include/X11/cursorfont.h. You have to know that the leading XC_ in the following line:

#define XC_hand1 58

must be stripped and 58 ignored. Valid color names are in /usr/lib/X11/rgb.txt, but if you don't find one you like, a hexadecimal number can be used instead, such as the following:

*lifrColor: #6c1916

We suggest that you use the graphical resource editor available from in **avnsetup** before making changes to this file.

2. Climate applications introduced in AvnFPS 3.2 have their own resource files: XWindRose, XCigVisTrend and XCVMonthly. These are not user-specific.

9.5.2.5 *Climatological Data*

AvnFPS 3.2 introduces a new set of climatological GUIs requiring updated climatological files. The GUIs require fast, efficient access to voluminous amounts (often 30 years) of data. The existing NetCDF, delivered with AvnFPS 3.1 was determined too slow and inefficient when GUI response times needed to be in seconds. HDF5 is a file format that emphasizes storage and I/O efficiency to meet performance requirements. The AvnFPS team decided to use this format for its new climatology GUIs.

The climatological data files for all locations where the NWS prepares TAFs have been posted to a web page that is available to the World Wide Web. The Universal Resource Locator (URL) for the directory where they are posted is

<http://www.mdl.nws.noaa.gov/~avnfps/data/hdf5>. File names are of the form CCCC.hd5, where CCCC is the location identifier where the data were observed. The files are rather

large but HDF5 already stores the data in compressed format, so there is no post-processing step after downloading it. The files are ready to be used at this point by the new climatological GUIs.

Some WFOs may find this hosting solution somewhat awkward. It seemed, however, to be the safest way to protect the AWIPS Wide Area Network (WAN) from the impacts of large data transfers.

The following procedures can be used to download the data files and make them available to AvnFPS:

► **To Download From an Internet Browser**

1. On a host that can access the WWW, launch a browser application and direct it to <http://www.mdl.nws.noaa.gov/~avnfps/data/hdf5>. You will see a page that lists available stations along with file modification times and sizes. The link for each station points to a binary file.
2. Find the station whose data you want to download.
3. Use the appropriate features of the browser to download the file for the station your site needs. On most browsers, this involves performing a right click on the station name and a feature such as **Save Link Target As...** or **Save Link As.**
4. Move this file to AvnFPS climate directory /data/adapt/avnfps/climate. Files can be moved physically via removable media, transferred through the AWIPSPUB firewall, or transferred via LDAD.
5. Once the save process is completed you may proceed for other stations using the same procedure.

► **To download using wget command on a Linux host**

1. Identify the URLs for each file you will download. They are of the form <http://www.mdl.nws.noaa.gov/~avnfps/data/hdf5/CCCC.hd5>, where CCCC is the Station ID.
2. Identify a directory on your local system where the files can reside temporarily.
3. Use the wget to download each file.

```
wget --passive-ftp -nv dataURL -o output_dir/CCCC.hd5
```

- where dataURL is the URL from the previous step, CCCC is the site id you and output_dir is the directory where you want to save the files.

4. Move these files to AvnFPS data directory /data/adapt/avnfps/climate. This directory is visible from all hosts. Files can be moved physically via removable media, transferred through the AWIPSPUB firewall, or transferred via LDAD.

9.5.3 Starting and Stopping AvnFPS

All AvnFPS processes, servers, clients and utilities are started by the **avnstart.sh** shell script. This script is responsible for setting the appropriate environmental variables required by AvnFPS. The variables are actually set in the file **bin/avnenv.sh** which is sourced by **avnstart.sh**. The first argument is process name (a Python script residing in the directory **/awips/adapt/avnfps/3.1/py** without the extension **.py**). Remaining arguments, if any, are passed to the process without modification.

- ▶ **To start avnsetup from the command line, from your individual user account:**

TYPE: `/awips/adapt/avnfps/bin/avnstart.sh avnsetup`

- ▶ **To start avnmenu from the command line, enter:**

TYPE: `/awips/adapt/avnfps/bin/avnstart.sh avnmenu`

9.5.3.1 Starting AvnFPS Servers

AvnFPS requires four servers. They are:

avnserver Which helps client processes find the services they need (name service) and notifies clients when data are available (event service).

avndis The Data Ingest Server, copies data from various AWIPS sources into the AvnFPS directory tree, reformatting as needed.

avndrs The Data Request Server, answers requests for data from client processes.

avnxs The Forecast Transmission Server, manages transmit queues and the interface to the AWIPS software that transmits products.

The way these servers work together requires some rules.

- The order in which the servers start is important; **avnserver** must be started first.
- There can be only one instance of **avnserver** within WFO subnet; running it on both PX1 and PX2 will lead to unexpected results.
- The **avndis** depends on **avndrs** to process Low Level Wind Shear data.
- The simplest way to avoid these problems is to not launch these servers directly. The application **avninit** searches for active instances of all four AvnFPS servers and

launches the ones that are not running. This application is modeled on the UNIX SYSV **init** and the AWIPS DataControllers. Like **init** and the DataControllers, **avninit** is a persistent process.

NOTES:

avninit will attempt to restart a failed server only 10 times within an hour. When the number of restarts exceeds 10 attempts, then **avninit** must be manually restarted.

avninit is invoked by the AWIPS startup scripts **px2apps** and **px2apps** together with other AWIPS applications. If you have to start the servers afterwards, use the **remoteServers.sh** shell script. This script accepts the following command line arguments:

```
/awips/adapt/avnfps/bin/remoteServers.sh [start|stop|restart]
```

This script has to be run as user **fxa**. It uses **ssh** to start/stop **avninit** on **PX2**. Therefore it can be run from any workstation. It is located in the directory **/awips/adapt/avnfps/bin**.

Example usage:

TYPE: `/awips/adapt/avnfps/bin/remoteServers.sh start`

► To list **avnfps** processes use the **ps** command. As your individual user:

TYPE: `ps -efw | grep avnpython`

- Using PX2 as an example, you should see output similar to the following:

fxa	11280	1	11280	0	1	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avninit.py px2f
fxa	11498	11280	11498	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11500	11280	11500	0	4	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avndrs.py -d -n px2f
fxa	11508	11280	11508	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
fxa	11509	11280	11509	0	1	Mar	01	?	00:00:10	avnpython /awips/adapt/avnfps/3.2/py/avnxo.py -d -n px2f

► To see all the threads in hierarchical format, add **-L** option to **ps**. Using **PX2** as an example, as your individual user:

TYPE: `ps -efL | grep avnpython`

- Using PX2 as an example, you should see output similar to the following:

fxa	11280	1	11280	0	1	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avninit.py px2f
fxa	11498	11280	11498	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11499	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11501	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11502	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11507	0	10	Mar	01	?	00:00:03	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11515	0	10	Mar	01	?	00:00:04	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11518	0	10	Mar	01	?	00:00:10	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11519	0	10	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11521	0	10	Mar	01	?	00:00:40	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11498	11280	11523	0	10	Mar	01	?	00:00:18	avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa	11500	11280	11500	0	4	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avndrs.py -d -n px2f
fxa	11500	11280	11504	0	4	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avndrs.py -d -n px2f
fxa	11500	11280	11505	0	4	Mar	01	?	00:00:00	avnpython /awips/adapt/avnfps/3.2/py/avndrs.py -d -n px2f
fxa	11500	11280	11524	0	4	Mar	01	?	00:00:01	avnpython /awips/adapt/avnfps/3.2/py/avndrs.py -d -n px2f

```

fxa    11508 11280 11508  0  10 Mar 01 ?
fxa    11508 11280 11511  0  10 Mar 01 ?
fxa    11508 11280 11512  0  10 Mar 01 ?
fxa    11508 11280 11513  0  10 Mar 01 ?
fxa    11508 11280 11516  0  10 Mar 01 ?
fxa    11508 11280 11517  0  10 Mar 01 ?
fxa    11508 11280 11520  0  10 Mar 01 ?
fxa    11508 11280 11526  0  10 Mar 01 ?
fxa    11508 11280 11527  0  10 Mar 01 ?
fxa    11508 11280 11532  0  10 Mar 01 ?
fxa    11509 11280 11509  0   1 Mar 01 ?

00:00:00 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:13 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:15 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:01:41 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:02 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:01 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:00 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:11 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:43 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:15 avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
00:00:10 avnpython /awips/adapt/avnfps/3.2/py/avnxs.py -d -n px2f

```

NOTE: Red Hat Enterprise 4™ threads are listed differently by **ps**. The **-H** (process hierarchy) option cannot be used with the thread (m, L or T) request.

9.5.3.2 Stopping AvnFPS Servers

- ▶ To stop the AvnFPS servers, as user **fxa**, run the following command from your workstation:

TYPE: **/awips/adapt/avnfps/bin/remoteServers.sh stop**

As an alternative option for stopping the AvnFPS servers, you can log on to the host(s) where the AvnFPS servers run and use the **avnkill** command located in **/awips/adapt/avnfps/bin**. The **avnkill** command first issues a **SIGTERM** signal and then waits 30 seconds for all threads to terminate gracefully. If the threads do not exit, **avnkill** issues a **SIGKILL** signal to those processes that continue to run.

Yet another option is to send a **SIGTERM** signal to **avninit**. For the sample listing above, as user **fxa** on PX2, the command would be: **kill 30926**

This should stop all the servers since **avninit** sends **SIGTERM** to all its child processes before quitting.

NOTE: When **avninit** starts, all the existing AvnFPS server processes are stopped.

Under special circumstances, (e.g., a hung server), you may want to stop and start a single AvnFPS server. Since **avninit** monitors them and starts those which are not running, you only need to kill the hung process. Bear in mind that the AvnFPS servers are threaded and only the top-level thread accepts signals.

For the **ps** listing above, the hierarchy is represented by order. For instance:

- ▶ To restart the **avndrs** server, find the first occurrence of **avndrs** in the output above, and type:

TYPE: **kill 11500**

- Result: Process 11500 and its threads are terminated. Once the **avndrs** server exits, **avninit** will try to start a new **avndrs** server instance.

9.5.4 Avnsetup

The **avnsetup** is a graphical user interface (GUI) that can be used to configure most of the features of AvnFPS. Exhibit 9.5.4-1 shows the **avnsetup** main GUI.



Exhibit 9.5.4-1. **avnsetup** Main GUI

This section describes tasks that can be accomplished with this program.

Important! The AvnWatch GUI is required to be restarted for changes made using the following setup GUIs, except the Trigger Editor, to take affect. The reason for this is that the underlying files are read once into memory on startup.

9.5.4.1 Editing Monitoring Rules

From the **avnsetup** main GUI, select the **Monitoring Rules** button to launch the Monitoring Criteria Editor (Exhibit 9.5.4.1-1).

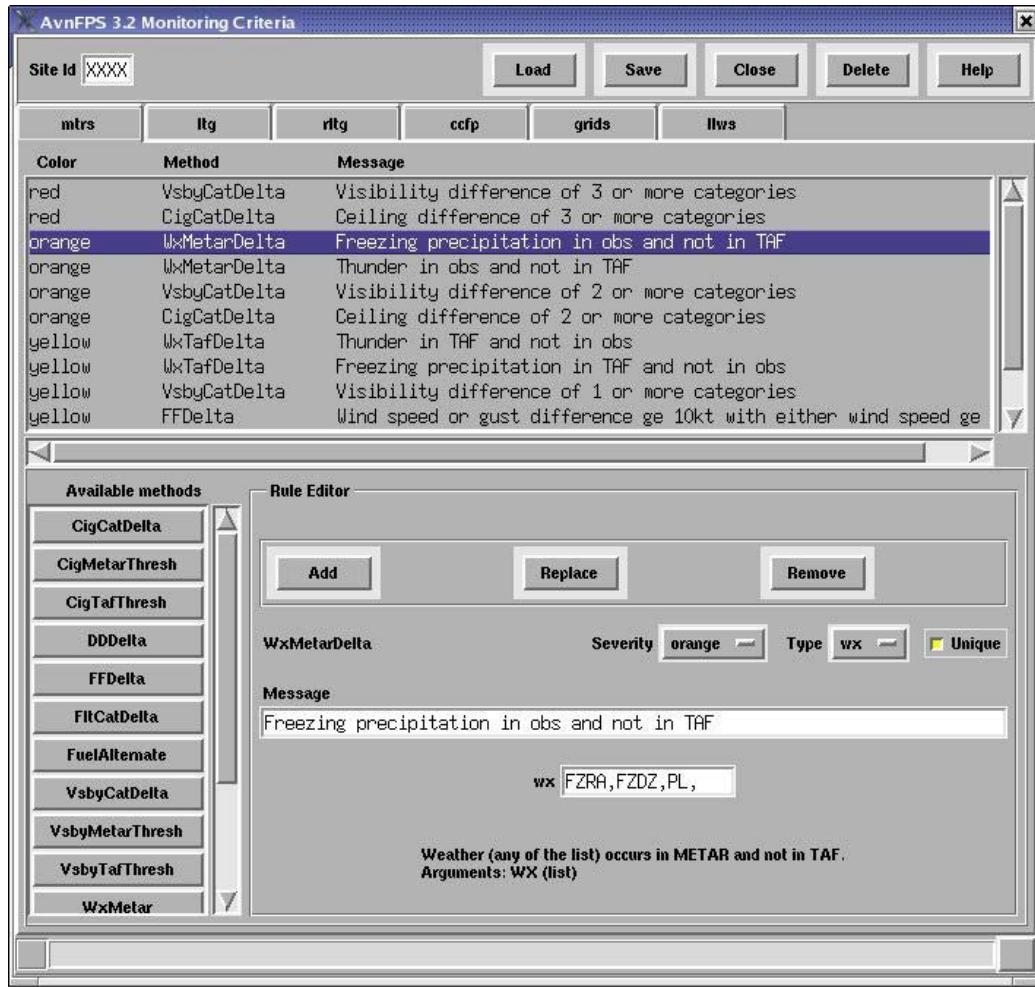


Exhibit 9.5.4.1-1. AvnFPS Monitoring Criteria Editor

The Monitoring Criteria Editor contains several pages, one for each monitored data source. Pages are selected via “recipe tabs” near the top of the menu. The tab labels refer to the following data sources:

- Rules for monitoring METAR observations (**mtrs**)
- Rules for monitoring lightning observations (**ltg**)
- Rules for monitoring lightning nowcasts (**rltg**)
- Rules for monitoring Collaborative Convective Forecast Product (**ccfp**)
- Rules for monitoring forecast grids (**grids**)
- Rules for monitoring low level wind shear (**llws**).

Each page has an identical layout. The top part lists currently defined rules, the bottom part contains a list of all available methods and the area where you can view, modify, add or delete a rule.

AvnFPS supports site-specific monitoring rules as well as a set of default rules. When the rule editor is started, the default rules are loaded. This is indicated by XXXX in the **Site Id** entry field.

- ▶ **To load the default set of rules**
 1. Enter ‘XXXX’ into the box labeled **Site Id**.
 2. Press **Enter** or select the **Load** button.
- ▶ **To load the specific rules for a site**
 1. Enter the Station ID into the box labeled **Site Id**.
 2. Press **Enter** or select the **Load** button.
- ▶ **To create a new set of site-specific rules**
 1. Modify the rules using the instructions below.
 2. Enter the applicable Station ID into the box labeled **Site Id**.
 3. Select the **Save** button.
- ▶ **To remove site-specific rules**
 1. Enter the Station ID into the box labeled **Site Id**.
 2. Select the “recipe tab” for the data source for which you want to remove the rules.
 3. Select the **Delete** button.

The lower half of the Monitoring Criteria Editor allows you to view and modify each of the monitoring rules. The current set of rules is listed by color and message in a selectable list. The **Rule Editor** at the bottom of the menu shows details of the rule that is currently selected. To the left to the Rule Editor is a list of **Available methods**. These methods are software techniques that compare the current forecast to the latest values received from the data source. Each method has its own set of arguments that configure its behavior.

- ▶ **To view the details of an existing rule**
 1. Select the rule from the list.
- ▶ **To modify an existing rule**
 1. Select the rule you want to modify from the list.
 2. Use the **Rule Editor** to make the necessary changes.
 3. Select **Replace**.
 4. Select **Save** to write changes to the configuration file.

► **To remove a rule**

1. Select the rule you want to remove from the list.
2. Select **Remove**.
3. Select **Save** to write changes to the configuration file.

► **To add a new rule**

1. Select a method from the “Available Methods” list. The **Rule Editor** will update with the appropriate fields. You can see method details by pointing the cursor to the respective button on the list.
2. Use the **Rule Editor** to **Modify** arguments as needed. You must enter a message.
3. Select **Add**.
4. Select **Save** to write changes to the configuration file.

NOTE: Changes made in the Monitoring Criteria Editor will not affect the TAF Monitor until it is restarted.

9.5.4.2 *Editing AvnFPS TAF Site Information*

From the **avnsetup** main GUI, select the **TAF SiteInfo** button to display the TAF Site Info Editor, as shown in Exhibit 9.5.4.2-1.

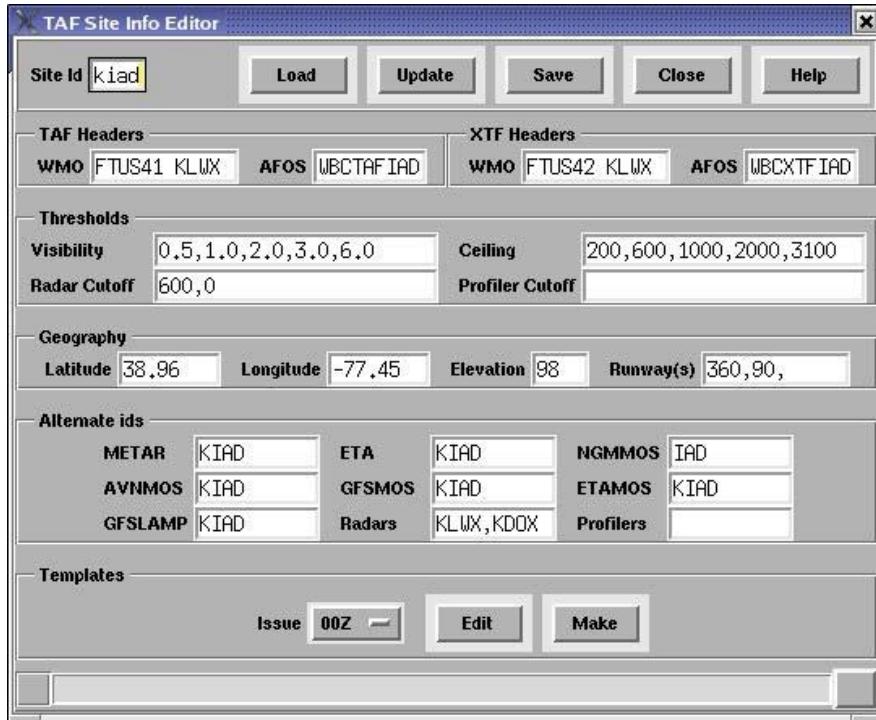


Exhibit 9.5.4.2-1. AvnFPS TAF Site Info Editor

The fields in the editor are described in Table 9.5.4.2-1.

Table 9.5.4.2-1. AvnFPS TAF Site Info Editor Fields and Descriptions

Site Id	TAF Site ID
TAF WMO	WMO header used to transmit forecast
TAF AFOS	PIL used during transmission
XTF WMO	WMO header used to transmit extended forecast (experimental)
XTF AFOS	PIL used during transmission
Visibility	A comma-separated list of visibilities in miles that define the categories used by the monitoring modules. Given the list $0 < V_1 < V_2 < \dots < V_n$, the category k consists of visibilities V such that $V_{k-1} \leq V < V_k$, $k = 1, \dots, n+1$ and $V_0 = 0$, $V_{n+1} = \infty$
Ceiling	A comma-separated list of ceilings, in feet, defining the categories used by the monitoring modules. These categories are defined in the same way as visibilities, shown above.
Radar Cutoff	A comma separated list of heights in meters defining lowest height to be used in computing LLWS using this radar. The length of the cutoff list must be equal to the number of radars listed in the 'Radar' text field below.
Profiler Cutoff	A comma separated list of heights in meters defining lowest height to be used in computing LLWS using this profiler. The length of list must be equal to the number of profilers listed in the 'Profiler' text field below.
Latitude	Site latitude, in degrees north
Longitude	Site longitude, in degrees east
Elevation	Site elevation, in meters
Runway(s)	A comma-separated list of runway directions in degrees. Used to calculate crosswind.
METAR	The METAR site ID associated with the TAF, most likely the same as TAF. If more than one site is needed, separate entries by a comma.
ETA	The closest site ID found in ETA BUFR message associated with the TAF.
NGMMOS	The closest site ID found in NGM MOS message associated with the TAF.
AVNMOS	The closest site ID found in AVN MOS message associated with the TAF.
ETAMOS	The closest site id found in ETA MOS message associated with the TAF.
GFSLAMP	The closest site id found in LAMP message associated with the TAF. This list is not yet available.
Radars	A comma-separated list of radars associated with the TAF. This list can be empty.
Profilers	A comma-separated list of profilers associated with the TAF. This list can be empty.

► **To add TAF site data**

1. Enter the Station ID into the box labeled **Site Id**.
2. Select the **Update** button. Most of the fields will be filled in. Headers are read from the **afos2awips.txt** file. Latitude, longitude and elevation come from the **metarStationInfo.txt** file. Other values are built-in defaults.
3. Modify displayed entries as needed. Only the **METAR** entry is mandatory, all of the others are optional. A simple validation test is performed when you type. The program will not allow you to enter obviously incorrect values. Incomplete values are indicated by a pink background.

4. Select the **Save** button.
5. Create templates as described in the next section.

► **To modify TAF site data**

1. Enter the Station ID into the box labeled **Site Id**.
2. Select the **Load** button.
3. Modify the displayed entries as needed.
4. Select the **Save** button.

9.5.4.3 Editing AvnFPS TAF Site Templates

The bottom part of TAF Site Editor provides tools to create and edit template files that can be used to initialize forecasts. There is a separate template for each forecast issue time to allow users to enter issue specific phrases such as AMD NOT SKED AFT....

► **To create TAF templates**

1. Enter the Station ID into the box labeled **Site Id**.
2. Select the **Make** button. This will create all four templates containing Station ID, issue and valid times. For example, a 06Z template for KPIT would be KPIT DD0520Z DD0606 =

► **To modify TAF template**

1. Enter the Station ID into the box labeled **Site Id**.
2. Select issue time from **Issue** menu and press the **Edit** to invoke a text editor.
Do not press the **Make** button, as this will overwrite your current templates.

9.5.4.4 Editing AvnFPS TAF Product Definition

From the **avnsetup** main GUI, select **TAF Products** button. TAF Product Configuration Editor will display (see Exhibit 9.5.4.4-1).

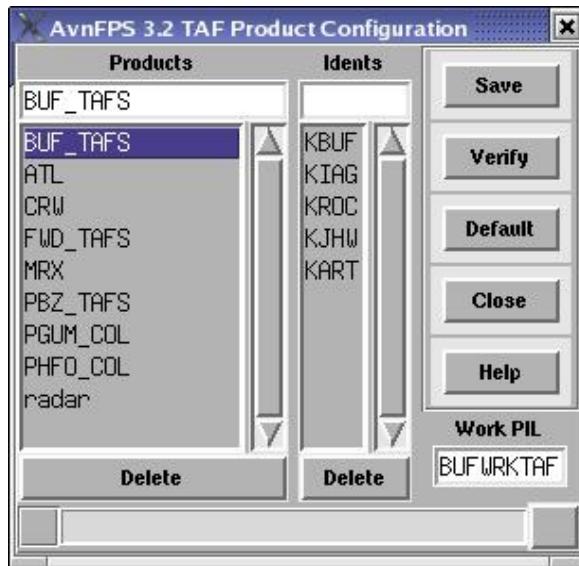


Exhibit 9.5.4.4-1. AvnFPS TAF Product Configuration Editor

The existing products will be displayed in alphabetical order, with the default (if defined) on the top of the list. The **Idents** window displays list of all TAF sites in the product.

► **To add a product**

1. Type the product name in the text window under the **Products** label and press **Enter**. An error message will be displayed that the product cannot be loaded, this is OK.
2. Enter Site ID in the window under the **Idents** label. Hit **Enter** after each site.
3. When finished, press **Save**. A new product definition file will be created.
4. Select the **Verify** button to check whether all necessary files exist. Site info and templates must exist for all Site IDs listed in the product definition.

► **To modify an existing product**

1. Select the product on the **Products** list.
2. To add a new TAF site, type the ID in the window under the **Idents** label and hit **Enter**.
3. To delete a site, select it on the **Idents** list and press the **Delete** button.
4. Press **Save** to update product definition file.

► **To delete a product**

1. Select the product on the **Products** list.
2. Press **Delete**. A confirmation dialog will be displayed. Select **OK**; this will delete product definition file. TAF site files (info and templates) will not be removed.

- **To mark a product as the default**
 1. Select the product on the **Products** list.
 2. Press the **Default**. This will designate the selected product as default product.

9.5.4.5 Editing TWEB Route Information using AvnFPS

From the **avnsetup** main GUI, select **TWEB Route Info** button. An empty **TWEB Route Info Editor** will display (see Exhibit 9.5.4.5-1).

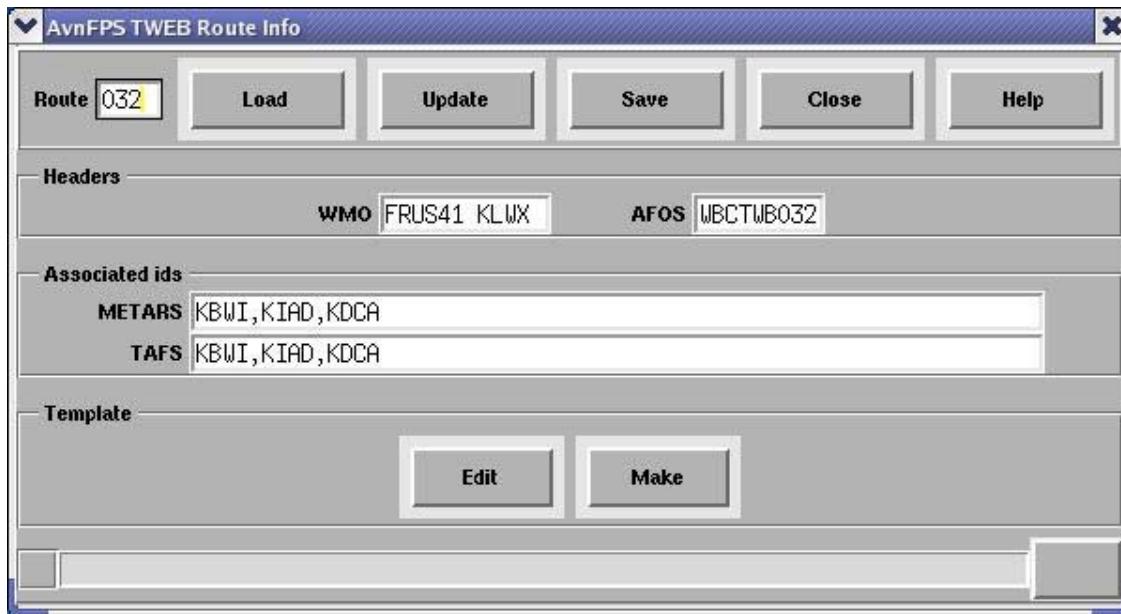


Exhibit 9.5.4.5-1. AvnFPS TWEB Route Info Editor

The TWEB Route Info Editor is an entry form for data specific for a particular route or synopsis. You must enter data for all routes before creating a product definition (that is, a “collective”). See Table 9.5.4.5-1.

Table 9.5.4.5-1. AvnFPS TWEB Route Info Editor Fields and Descriptions

Route	TWEB Route Number
WMO	WMO header used to transmit forecast
AFOS	The PIL used during transmission
METARS	A comma-separated list of METAR site IDs that should be displayed in the viewer window of the TWEB Editor.
TAFS	A comma-separated list of TAF site IDs that should be displayed in the viewer window of the TWEB Editor.

- **To add TWEB route data**
 1. Enter the route number into the **Route** box.

2. Select the **Update** to initialize WMO and AFOS headers from the **afos2awips.txt** file.
3. Enter the METAR and TAF site IDs you want to see in the TWEB Editor in the **Associated ids** area. If you prepare TWEB products comprising more than one route, assure that the values you enter in those two fields are the same for each route listed in the product.
4. Press **Save**.
5. Select the **Make** button in the **Templates** area to create the basic template file.
6. If you want to customize the template, select **Edit** to invoke a text editor.

► **To modify TWEB route data**

1. Enter the Route Number into the box labeled **Route**.
2. Modify displayed entries as needed.
3. Select the **Save** button.

9.5.4.6 Editing the AvnFPS TWEB Route Template

The bottom part of TAF Site Editor provides tools to create and edit template files that can be used to initialize forecasts.

► **To create a TWEB template using AvnFPS**

1. Enter the Route Number into the box labeled **Route**.
2. Select the **Make** button to create a template file containing phrase:

NNN TWEB DDHHMM . ALL HGTS AGL EXC TOPS.
— Where NNN is the route number.

► **To modify TWEB template**

1. Enter the Route Number into the box labeled **Route**.
2. Select **Edit** to invoke a text editor. *Do not* press the **Make** button, as this will overwrite your current template.

9.5.4.7 Editing TWEB Product Definition using AvnFPS

From the **avnsetup** main GUI, select **TWEB Products** button to launch the TWEB Product Configuration Editor (Exhibit 9.5.4.7-1).

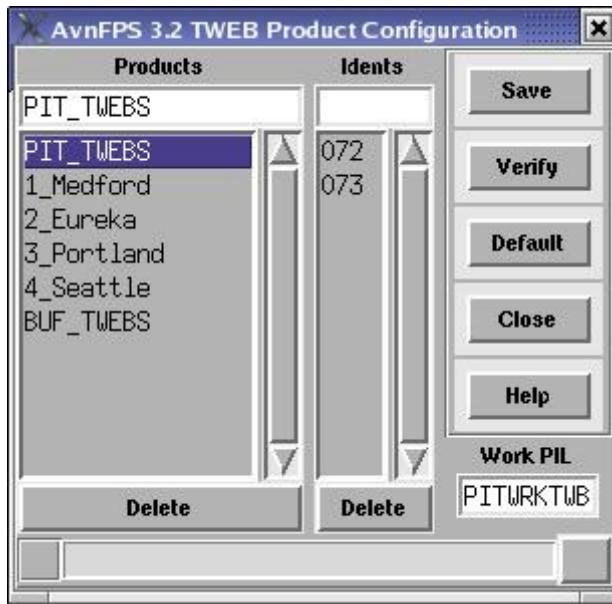


Exhibit 9.5.4.7-1. TWEB Product Configuration Editor

Existing products are displayed in the alphabetical order, with the default (if defined) on the top of the list. The **Idents** window displays list of all TWEB routes in the product.

► **To add a product**

1. Type the product name in the text window under the **Products** label and hit **Enter**. An error message will be displayed that the product cannot be loaded, this is ok.
2. Enter the site ID in the window under the **Idents** label. Hit **Enter** after each site.
3. When finished, press **Save**. A new product definition file will be created.
4. Select the **Verify** button to check whether all necessary files exist. Route info and the template must exist for all routes listed in the product definition.

► **To modify an existing product**

1. Select the product on the **Products** list.
2. Select the product on the list. To add a new TWEB route, type the route number in the window under the **Idents** label and hit **Enter**.
3. To delete a route, select it on the **Idents** list and select **Delete**.
4. Select **Save** to update product definition file.

► **To delete a product**

1. Select the product on the **Products** list.
2. Press **Delete**. A confirmation dialog will be displayed.

3. Select **OK**; this will delete the product definition file. The TWEB route files (info and template) will not be removed.

► **To mark a product as the default**

1. Select the product on the **Products** list.
2. Select **Default**. This will designate the selected product as default product.

9.5.4.8 Creating AvnFPS Database Triggers

AvnFPS obtains TAFs, TWEBS, and METAR observations from the **fxatext** database. As new versions of these products arrive, **fxatext** (actually, the underlying relational database engine, Postgres) can trigger the launch of an application program. AvnFPS uses this trigger feature to retrieve TAF, TWEB and METAR products for monitoring as soon as they arrive in the database. The Trigger Editor manages the configuration of the **textdb** triggers needed to support AvnFPS. The current version creates the trigger template to be processed by localization and simultaneously updates the **watchwarn** table in the **fxatext** database holding the Postgres trigger scripts. So you do not have to rerun localization after creating the template file. However the file is still necessary, as the localization process drops **watchwarn** and re-creates it from templates.

► **To start the Trigger Editor, select the Triggers button. The Trigger Editor will display (see Exhibit 9.5.4.8-1).**

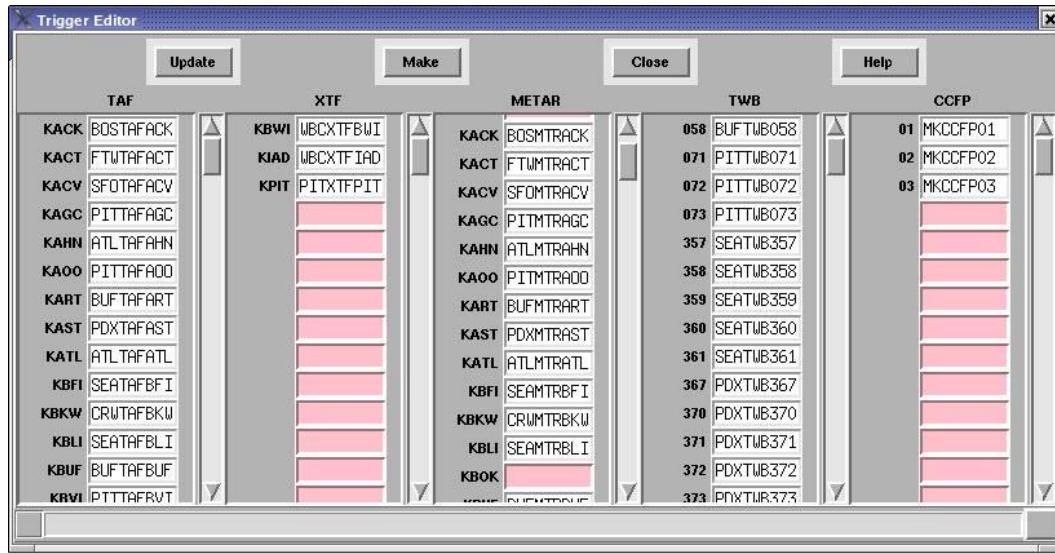


Exhibit 9.5.4.8-1. AvnFPS Trigger Editor

On startup, the Trigger Editor searches the AvnFPS configuration files for all TAF sites, METAR sites, and TWEB routes that have been configured for the AWIPS site. (These are files stored in the etc/tafs, etc/mtrs, and etc/twbs directories.) The three columns in the Trigger Editor, TAF, METAR and TWB, list those sites and routes. If there is a template file, etc/triggerTemplate, its entries are used to fill the corresponding PIL boxes.

If the trigger template does not have an entry for an ID, then the relevant box will remain blank with a pink background. The column XTF contains entries for extended (30 hour) TAFs. Unless your office issues such forecasts, it will be empty. Column CCFP should always have entries as shown above. Those text products are not site-specific.

► **To create AvnFPS triggers**

1. Select the **Update**. The program will try to determine missing PILs for TAFs and TWEBS from the file **afos2awips.txt**. METAR PILs are created from corresponding TAF PILs by replacing TAF by MTR.

NOTE: The existing values will not be overwritten.

2. Correct the entries and fill in empty fields.
3. Press **Make** when finished. Empty (pink) entries will be skipped. If you have an invalid entry, an error message will display.

9.5.4.9 Using the AvnFPS Text Editor

Use the text editor in AvnFPS to edit the remaining configuration files: **forecasters**, **logging.cfg**, **server.cfg**, **gui.cfg**, **ids.cfg**, **flt_cat.cfg**, and **grp_tag.cfg**. It is invoked by selecting **Text Edit**.

► **To edit configuration files using the AvnFPS Setup Editor**

1. From the avnsetup Main GUI, select Text Editor. The Setup Editor will display. (See Exhibit 9.5.4.9-1.)

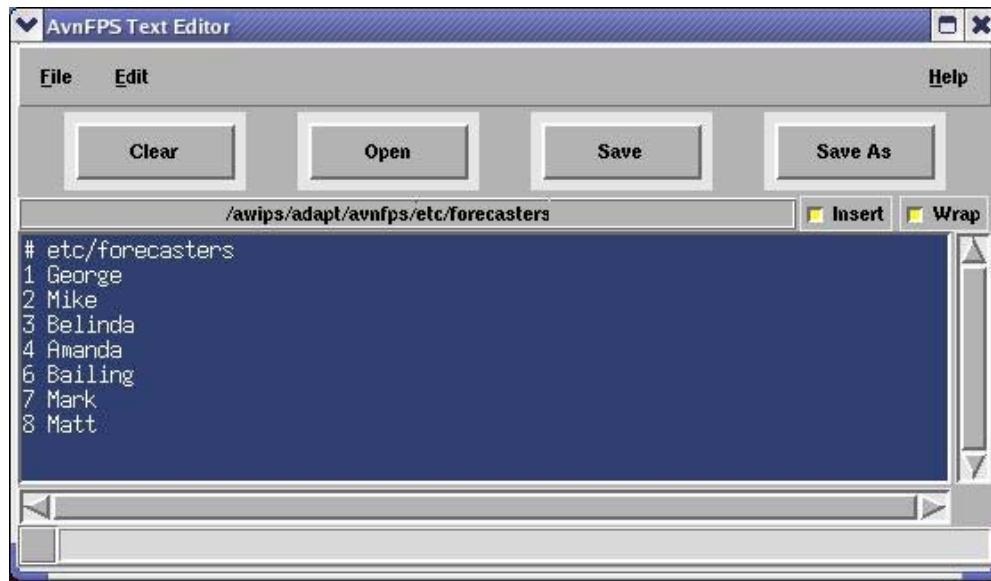


Exhibit 9.5.4.9-1. AvnFPS Setup Editor

2. Select **Open**. A file selection dialog listing the contents of directory /etc will display. (See Exhibit 9.5.4.9-2.)

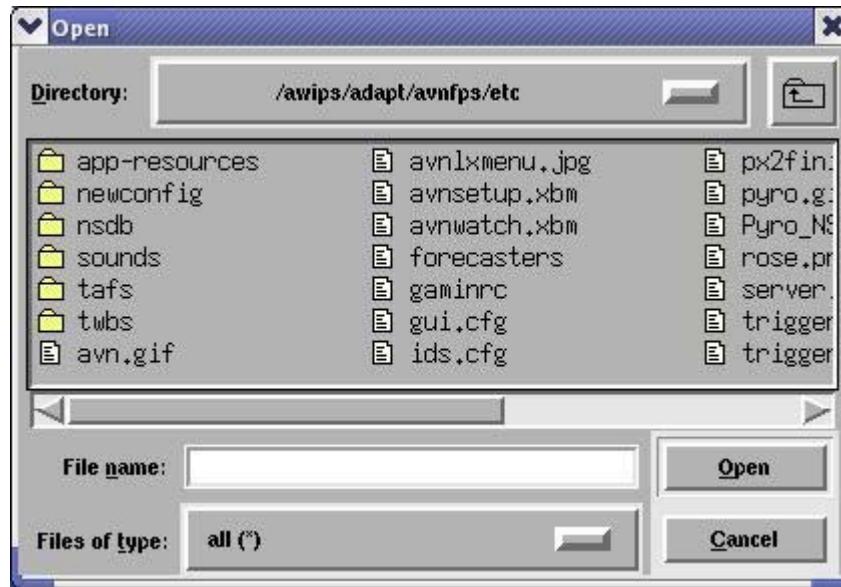


Exhibit 9.5.4.9-2. AvnFPS Text Editor Dialog

3. In this dialog, select a file to edit, then select **Open**.
4. Select **Save** when finished. If you want to create a file, simply type in its content in the text window, then select **Save As**.

You can also use the text editor to edit X resource configuration file. However it is suggested that you only modify the system-wide file that is used as an initial selection when a forecaster modifies his own resources through the graphical editor available in **AvnWatch**. Proceed as above, in the file selection dialog select first, directory **app-resources**, then the file **X**. You may edit files for individual forecasters (those with names **X.N**), however any comments you enter will be stripped by the graphical editor each time the forecaster modifies the resources from **AvnWatch**.

NOTE: Font and color names may be cryptic. You may want to use the graphical editor in **AvnWatch** first to display color codes and available fonts.

9.5.5 Configuring IFPS to Send Gridded Data to AvnFPS

The GFE text formatter (IFPS2AvnFPS.py) was created to do the job of accessing IFPS gridded database and writing the information to the **/data/adapter/avnfps/grids** directory. **IFPS2AvnFPS.py** is run at 10 times an hour via cron on the px2f machine.

NOTE: The only requirement for the new text formatter to run is that all TAFs must have a GFE edit area defined in the ifpServer database. We are working to remove this restriction in a later build. Fortunately, offices that have configured IFPS to send gridded data to AvnFPS most likely have already satisfied this requirement, so no additional work is required.

9.5.6 Logging

AvnFPS has an extensive logging system; it is similar to collective logging in AWIPS. The amount of information written to log files and its format are configurable.

Each program has its own log file, one for each day of the week. File naming uses the scheme **progname_DayOfWeek**, so **avndis** will produce files named **avndis_Mon** through **avndis_Sun**. Files are broken (old ones are closed and new ones are opened) at the first write attempt of each new day.

The file **etc/logging.cfg** controls the location, format and log level for the log files. The format and log level is the same for all programs.

NOTE: The log directory is local to each server/workstation. The **/awips/adapt/avnfps/3.2/logs** directory points to **/data/logs/adapt/avnfps**, which resides on the local partition. This is consistent with the AWIPS standard.

For example:

TYPE: **11 /awips/adapt/avnfps/3.2/logs**
 ■ Your output should look similar to the following:

```
lrwxrwxrwx 1 fxa      fxalpha      23 Oct  8 16:41 /awips/adapt/avnfps/3.2/logs -> /data/logs/adapt/avnfps
```

Here is an example listing of a log file for **avndis**:

```
Log rollover at 00:00:01
2006-03-01 00:00:01,280 DEBUG [10517:126217136] TriggerThread: Processing PHLMIRMDT
2006-03-01 00:00:01,647 INFO  [10517:126217136] TextThreadP: Processed KMDT from SAUS70 KMDT 080000
2006-03-01 00:00:01,647 DEBUG [10517:126217136] TriggerThread: Done PHLMIRMDT
2006-03-01 00:00:01,649 DEBUG [10517:126217136] TriggerThread: Processing PITMIRDUU
2006-03-01 00:00:01,656 DEBUG [10517:27261872] DataIngestServ: Msg: {'src': 'mtrs', 'ident': 'KMDT'}
2006-03-01 00:00:01,754 INFO  [10517:126217136] TextThreadP: Processed KDUU from SAUS70 KDUU 080000
2006-03-01 00:00:01,755 DEBUG [10517:126217136] TriggerThread: Done PITMIRDUU
2006-03-01 00:00:01,756 DEBUG [10517:126217136] TriggerThread: Processing BUFMIRART
2006-03-01 00:00:01,981 DEBUG [10517:27261872] DataIngestServ: Msg: {'src': 'mtrs', 'ident': 'KDUU'}
2006-03-01 00:00:01,989 INFO  [10517:126217136] TextThreadP: Processed KART from SAUS70 KART 080000
2006-03-01 00:00:01,990 DEBUG [10517:126217136] TriggerThread: Done BUFMIRART
2006-03-01 00:00:01,993 DEBUG [10517:27261872] DataIngestServ: Msg: {'src': 'mtrs', 'ident': 'KART'}
2006-03-01 00:00:05,289 DEBUG [10517:126217136] TriggerThread: Processing HFOMIRHNY
2006-03-01 00:00:05,576 INFO  [10517:101030832] ItgThread: Processing file
/data/fxa/point/binLightning/netcdf/20060228_2300
2006-03-01 00:00:05,629 INFO  [10517:126217136] TextThreadP: Processed PHNY from SAUS80 PHNY 080000
2006-03-01 00:00:05,631 DEBUG [10517:126217136] TriggerThread: Done HFOMIRHNY
2006-03-01 00:00:05,633 DEBUG [10517:126217136] TriggerThread: Processing BUFMIRROC
2006-03-01 00:00:06,020 DEBUG [10517:27261872] DataIngestServ: Msg: {'src': 'mtrs', 'ident': 'PHNY'}
```

Each line contains the following fields:

- Date and time of the event
- Severity level (in caps)
- Process and thread number (in square brackets)
- Python module name which generated the message
- Actual message content.

Some typical errors may include:

```

2005-07-08 02:00:48,843 INFO [10517:84941744] MosData: Retrieved ngm data for BUF
2005-07-08 02:00:48,851 ERROR [10517:84941744] MosData: BVI not in /data/fxa/point/mos/NGM/netcdf/20050708_0000*
2005-07-08 02:00:48,882 INFO [10517:84941744] MosData: Retrieved ngm data for CHA

2005-07-08 05:32:52,556 DEBUG [10517:126217136] TriggerThread: Done MEMTAFIRI
2005-07-08 05:32:52,558 WARNING [10517:74451888] util: Daemon ** Exception during processing of request from
TCPConnection with ('xxx.xxx.xxx.xxx', 45051)
connected=1 type thread.error**
--- traceback of this exception follows:
-----
<thread.error> RAISED : can't start new thread

Extended Stacktrace follows (most recent call last)

File "/awips/adapt/avnfps/Python-2.4.1/lib/python2.4/site-packages/Pyro/protocol.py", line (922), in
Daemon::connectionHandler
Source code:
    self.handleInvocation(conn)
File "/awips/adapt/avnfps/Python-2.4.1/lib/python2.4/site-packages/Pyro/core.py", line (695), in
Daemon::handleInvocation
Source code:

* This message indicates problem with TAF Site Info configuration file: data for KBVI is not
distributed for NGM MOS product. This does not cause any harm, but one can either select
another site which is close enough, or leave the NGM MOS site id empty.
** Some messages provide detailed traceback to point out to the exact location of the code
where the error occurred. In this case, the error comes from Pyro code and it is relatively
serious. The data ingest server hit the threshold of allowable memory consumption. avndis
has this threshold set programmatically to avoid clogging the whole operating system. In a
situation like this one should restart avndis to avoid data loss. If the problem reoccurs,
further investigation is required. (Note: This example is contrived; the threshold was set too
low during development.)
```

9.5.7 AvnFPS Troubleshooting

Techniques for troubleshooting various aspects of AvnFPS are addressed in the Government AvnFPS system manager's manual. This section covers some of the more likely fault scenarios and troubleshooting techniques.

9.5.7.1 Overall AvnFPS Server Health

A number of server processes keep AvnFPS running. A series of status lights on the TAF Monitor GUI reports the status of most of these processes. "Keep Alive" messages are sent among the servers every 30 seconds to set the colors of these status lights. Section 9.5.1, "System Overview" contains a detailed description of each server and the host on which it should be running. Server hosting can vary between AWIPS releases.

9.5.7.1.1 Diagnostic Tools

- ▶ **If all the server status lights are red, check for**
 - A failed name/event server (**avnserver**)
 - A network failure.
- ▶ **To list the AvnFPS server processes**

The command ps command is used to list server processes and any component threads. In the example below, the process is run on PX2 and the operating system is Red Hat Enterprise 4. The indented text in the rightmost column indicates hierarchy.

TYPE: `ps -efwH | grep avnpython`

- Your output should be similar to the following:

```

fxa    18615      1  0 Mar06 ?          00:00:00  avnpython /awips/adapt/avnfps/3.2/py/avninit.py px2f
fxa    18713 18615  0 Mar06 ?          00:00:33  avnpython /awips/adapt/avnfps/3.2/py/avnserver.py -d -n px2f
fxa    18718 18615  0 Mar06 ?          00:00:01  avnpython /awips/adapt/avnfps/3.2/py/avndrs.py -d -n px2f
fxa    18730 18615  0 Mar06 ?          00:01:08  avnpython /awips/adapt/avnfps/3.2/py/avndis.py -d -n px2f
fxa    18735 18615  0 Mar06 ?          00:00:14  avnpython /awips/adapt/avnfps/3.2/py/avnxs.py -d -n px2f

ncfuser:853$
```

- ▶ **To list the threads spawned by AvnFPS server processes**

TYPE: `ps -efL | grep avnpython`

NOTES: Some comments follow:

PID	Comments	“Kill”-able?
18615	avninit daemon	Yes
18713	avnserver process	Yes
18718	Data Request Server (avndrs) process	Yes
18730	Data Ingest (avndis) process	Yes
18735	Transmit Server (avnxs) process	Yes

Threads of a process will not accept signals from a kill command. You must identify the process that owns the thread and kill that top-level process. Once a parent process terminates, all of its threads will terminate as well.

- ▶ **To diagnose connections among various AvnFPS servers**

The command netstat -a | grep 9090 can be used to diagnose connections among the various AvnFPS servers. The name/event server uses port 9090 to disseminate information about the various servers that are up and running.

On PX2

TYPE: `netstat -a | grep 9090`

- Your output should be similar to the following:

tcp	0	0	px2f-wfo:9090	px2f-wfo:55812	ESTABLISHED
tcp	0	0	px2f-wfo:9090	px2f-wfo:55819	ESTABLISHED
tcp	0	0	px2f-wfo:55819	px2f-wfo:9090	ESTABLISHED
tcp	0	0	px2f-wfo:55812	px2f-wfo:9090	ESTABLISHED
tcp	0	0	px2f-wfo:9090	lx3-wfo:40638	ESTABLISHED

NOTES:

1. The columns are Protocol, Receive Queue, Send Queue, Local Address, Foreign Address, and State.
2. Six connections to and from the name/event server can be seen in the px2 listing.
 - The first four established connections show connections between the servers on px2 and the name/event server.
 - There is an additional connection to a process on lx3. Most likely, this is an instance of the AvnWatch GUI.

9.5.7.2 Log Files

Log files for AvnFPS3.2 server processes are stored in the directory tree **/data/logs/adapt/avnfps**, local to the host computer. The names of the logs files are formed by the name of the application and the current day of the week (e. g., avnmenu_Thu and avndis_Fri). All applications use collective logging which means that log file entries from different instances of an application can be found, interleaved, in a single log file. The following screen capture shows sample directory listings:

GUI logs on a workstation

```
avnclimate_Fri  avnmenu_Mon  avnmenu_Thu  avnqstats_Tue  avnsetup_Thu  avnwatch_Mon  avnwatch_Thu
avnclimate_Wed  avnmenu_Sat  avnmenu_Tue  avnsetup_Mon  avnsetup_Tue  avnwatch_Sat  avnwatch_Tue
avnmenu_Fri    avnmenu_Sun  avnmenu_Wed  avnsetup_Sun  avnwatch_Fri  avnwatch_Sun  avnwatch_Wed
```

Server logs on px1/px2 ...

```
avndrs_Fri  avndrs_Sun  avndrs_Wed  avninit_Sun  avninit_Wed  avnserver_Sat  avnserver_Tue
avndrs_Mon  avndrs_Thu  avninit_Fri  avninit_Thu  avnserver_Fri  avnserver_Sun  avnserver_Wed
avndrs_Sat  avndrs_Tue  avninit_Sat  avninit_Tue  avnserver_Mon  avnserver_Thu
```

It is possible for certain unexpected errors to go undetected in log files. One way to test against this possibility is to launch a GUI process from the command line and watch the standard error and standard output streams.

► **To launch the AvnFPS startup menu from the command line**

TYPE: `/awips/adapt/avnfps/bin/avnstart.sh avnmenu`

9.5.7.3 Data Ingest

The AvnFPS Data Ingest Servers (instances of **avndis**) monitor events in AWIPS and decode various data as they become available. For some data types, the term “decode”

means little more than copying a file. Once **avndis** has put the data into the AvnFPS directory tree, the AvnFPS Data Request Servers (instances of **avndrs**) serve the data to the various GUIs.

9.5.7.3.1 Data Ingest Troubleshooting

The log files for **avndrs** show data being delivered to GUIs as well as data access problems. See if the GUIs are connecting to **avndrs** successfully and receiving data.

Log files for **avndis** show data arriving and being decoded. Errors are rather easy to spot in these files.

9.5.7.3.2 Specific Hints for Specific Data Types

Text (TAFs, METAR observations)	AvnFPS database triggers deliver products to the /awips/adapt/avnfps/data/text directory. As an alternative to triggers, the AWIPS acquisition server can be configured to copy arriving text products into /awips/adapt/avnfps/data/raw which can be processed by avndis .
Text (TAFs, METAR observations)	As an alternative to triggers, the AWIPS acquisition server can be configured to copy arriving text products into /data/fxa/point/avnfps/raw which can be processed by avndis .
Lightning Observations	The /data/fxa/point/binLightning/netcdf directory is monitored for new and updated files.
Lightning Probability:	The /data/fxa/img/SBN/netCDF/LATLON/3hr/LTG directory is monitored for new and updated files.
Low-Level Wind Shear	The following directories are monitored for new files: /data/fxa/point/profiler/netcdf /data/fxa/LDAD/profiler/netCDF , /data/fxa/radar/CCCC/VWP , where CCCC is the radar ID
IFPS Grids	IFPS controls the process that exports the data to /awips/adapt/avnfps/data/grids where it is monitored.

9.5.7.4 Product Transmission

Product transmission is covered in depth in Section 9.5.1.4, Transmission Server.” Check the log file for **avnxss**. If a forecast prepared by AvnFPS was written to the **pending** queue, **/awips/adapt/avnfps/3.2/xmit/pending**, and the transmission server attempted to access the file, then there should be a corresponding entry, starting with the

word SUCCESS or FAILNNN, where NNN is the code returned by the system call to **handleOUP.pl**.

If **avnx\$** indicates there was a **handleOUP.pl** failure, then investigate the **handleOUP** log file, **/data/logs/fxa/<yyyymmdd>/handleOUP**.

9.6 NOAA Weather Radio Editor

The NOAA Weather Radio (NWR) Editor (NWRE) provides the manual Voice-Ready Product (VRP) creation and dissemination functionality on AWIPS. It consists of four basic operations:

- VRP creation from values stored in the AWIPS **fxatext** and **ifps_<xxx>** databases, where <xxx> is the AWIPS site ID, all in lowercase (e.g., **sto**)
- VRP creation from a previously stored/distributed VRP stored on disk
- Creation/management of VRP default message attributes stored in the **ifps_<xxx>** database
- Dissemination of a properly formatted VRP from AWIPS to the NWR Console Replacement System (CRS).

NOTE: Knowledge of proper VRP message attribute/synopsis creation and use is assumed at this point. This chapter is not meant to serve as a tutorial on proper Voice-Ready Product creation/use.

9.6.1 NWR Editor Setup and Configuration

In order to accomplish the NWRE's four basic tasks, the **FXA_TEXT** and **DB_ICWF** system environment variables must be set at the sites.

Also, one configuration data file must exist for the NWRE to execute correctly. This file is used by the **transferNWR** process to determine the proper line configuration and **CRS login** needed for successful VRP dissemination. This file must exist on each workstation used for manual VRP creation and dissemination, along with the **transferNWR** script, the **nwrEditor** script, and the **nwrEditorWish** (TclTk interpreter); the **sendToNWR** process must exist on the Data Server.

Configuration Files

The NWRE requires that prior to startup the following configuration files exist on each workstation that will run the NWRE. All of the files reside on the workstations in **/awips/fxa/bin** unless otherwise noted.

- **nwrEditor.** A TclTk script providing GUI access to a library of NWR-specific functionality.

- **nwrEditorWish.** A TclTk interpreter that has been extended to include NWR application-specific commands.
- **transferNWR.** An Expect script used to move voice ready products to the **/data/fxa/workFiles/nwr/ready** directory.
- **nwr.cfg.** A configuration file containing AWIPS/NWRCRS line configuration, NWRCRS login, and a line of dummy text as placeholder (this will be the NWRCRS password until CRS Build 10 is released).

The **nwr.cfg** file is located in the **\$FXA_DATA/workFiles/nwr** directory. It is needed by the **transferNWR** and **sendToNWR** processes, and therefore the NWRE will be installed with sample entries. The system administrator will need to populate the file with site-specific line configuration, CRS login, and placeholder text. Table 9.6.1-1 shows the file format.

Table 9.6.1-1. File Format for the nwr.cfg File

File Name	File Line #	File Format	BNF
nwr.cfg	1. CRS login2. “placeholder text” 3. AWIPS--CRS line	0mp' \n' XXXXLAN' \n' AWIPS--CRS line	CRS_LOGIN><new line character><PLACEHOLDER>[new_line_character >EOF> <LINE_CONFIG><new line character>

NOTE: If the file contains any information besides that shown above, the results will be undefined.

Environment Variables

The environment variables used in discussing the NWRE are shown in Table 9.6.1-2.

Table 9.6.1-2. Environment Variables for the NWR Editor

Environment Variable Name	Environment Variable Definition
FXA_TEXT	The fxatext database
DISPLAY	Your workstation display (e.g., xt1-sto:0.0)
DB_ICWF	AWIPS site ID (e.g., sto)
LOG_PREF	/awips/fxa/data/ingestLogPref

Use the **echo** command to verify that the environment variables were set correctly during installation:

TYPE: echo \$FXA_TEXT

TYPE: echo \$DISPLAY

TYPE: echo \$DB_ICWF

NOTE: The installation process should set these variables to the proper values for each workstation.

9.6.2 NWR Editor Event Logging

NWRE log files are generated and maintained in a log file directory on each workstation. Users can inspect pertinent log files for errors. On a workstation, log data are written to the **/data/logs/fxa/display/\$DISPLAY/<yyyymmdd>** file, where **<yyyymmdd>** is the current date in year-month-day format and **\$DISPLAY** is the display environment variable, as previously defined.

NOTE: Remember that the workstation logs are local to the machine from which NWRE is being run. For example, if you log in from lx5-sto to lx2-sto and set **\$DISPLAY** to lx5-sto:0.0, you will find a directory on lx2-sto named **/data/logs/fxa/lx5-sto:0.0/<yyyymmdd>** (where **<yyyymmdd>** is the current date) if you use the NWRE to send a VRP to the CRS.

NOTE: The full display variable is also used for the X-terms (e.g., xt1-sto:0.0) for **\$DISPLAY** and the log file pathname when the NWRE is run on an X-term. However, if you run the NWRE on a workstation, the path to the logs would be **/data/logs/fxa/display/:0/<yyyymmdd>** or **/data/logs/fxa/display/:0.0/<yyyymmdd>**.

All NWRE logs have the following naming convention:

`nwrEditorWish<processId><server><hhmmss>`

Example: `nwrEditorWish186909lx2-nhda171016`

NWRE log files contain minimal logging when the process runs successfully; normally only problems are logged. To see all logging from process startup to process shutdown, the **\$LOG_PREF** file must contain an entry for the **nwrEditorWish** with debug turned on. Use of logStream's **logPreferences** configuration file is outside the scope of this discussion. The standard FSL-developed "logStream" logging mechanism is used and the formats for the logs are as documented by the logStream foundation class.

Exhibit 9.6.2-1 shows a sample NWR Editor **nwrEditorWish** log file with **\$LOG_PREF debug=on** for the NWRE process, which would constitute normal process startup.

```

LOG-STATUS: Log file opened on host bd1-napo at Wed May 12 17:10:17 2006
17:10:16.962 VRPMessageAttributes.C DEBUG: default VRPMessageAttributes constructor called
default VRPMessageAttributes set
17:10:17.029 VRPSynopsis.C DEBUG: default constructor VRPSynopsis() called
17:10:17.029 VRPSynopsis.C DEBUG: default _vrpSynopsis = "SYNOPSISTEST"
17:10:17.030 VoiceReadyProduct.C DEBUG: VoiceReadyProduct default constructor called
17:10:17.030 VoiceReadyProduct.C DEBUG: preparing to get voice ready product in four part
structure
17:10:17.030 VRPMessageAttributes.C DEBUG: getting vrp message attributes
17:10:17.041 VRPMessageAttributes.C DEBUG: moving everything toupper() except eolac
17:10:17.042 VRPMessageAttributes.C DEBUG: returning vrp message attributes...
T_ENGCCNNXXX04051217100004261710      AD c0405121710
17:10:17.042 VoiceReadyProduct.C DEBUG: esca/msg attributes/ newline:
[aT_ENGCCNNXXX04051217100405121710      AD c0405121710
17:10:17.043 VRPSynopsis.C DEBUG: returning vrp synopsis:
SYNOPSISTEST
17:10:17.043 VoiceReadyProduct.C DEBUG: synopsis/newline/escb/endl:
SYNOPSISTEST
[b
17:10:17.044 VoiceReadyProduct.C DEBUG: successfully retrieved Voice Ready Product in four
part structure
17:10:17.044 VoiceReadyProduct.C DEBUG: vrp data is: [aT_ENGCCNNXXX04051217100405121710
AD c0405121710
SYNOPSISTEST
[b

```

Exhibit 9.6.2-1. Sample NWR Editor nwrWish Log File Where debug=on

As previously noted, the default is for the NWRE log file to record only problems with the NWRE process. In addition, a unique log file for each call to **transferNWR** can be found in the same logging directory as the NWRE process in a file given a name with the following format:

logStreamExpect

Example: logStreamExpect

A more detailed log of the actual VRP transfer from AWIPS to the CRS via **sendToNWR** can be found on the PX1 in **\$LOG_DIR/<yyyymmdd>** in a file given a name with the following format:

logStreamFexpect

During one NWRE session, a user will have:

- One log file **nwrEditorwish<processid><server><hhmmss>**,
- One **sendToNWR logStreamExpect** log file, and
- Perhaps many **transferNWR logStreamExpect** log files.

This ratio depends on the number of “send to CRS” sessions invoked by the user from the NWRE. Exhibit 9.6.2-2 displays a sample **sendToNWR logStreamExpect** log file.

```

LOG-STATUS: Log file opened on host px1-nhda at Wed May 12 18:48:06 2006
18:48:06.177 TclLogStream.C EVENT: File CCCNNNXXX will be automatically transferred
18:48:06.586 TclLogStream.C EVENT: Successful ping to 0MP
18:48:06.809 TclLogStream.C EVENT: Successful ping to 5MP
18:48:09.265 TclLogStream.C EVENT: Master processor is 0MP
18:48:09.266 TclLogStream.C EVENT: 7 ss_ms processes running on 0MP currently
18:48:11.012 TclLogStream.C EVENT: transfer complete to 0MP
18:48:11.228 TclLogStream.C EVENT: Successful transfer of CCCNNNXXX to 0MP

```

Exhibit 9.6.2-2. Sample sendToNWR logStreamExpect Log File

9.6.3 *The NWR Editor GUI*

There are three ways that the NWRE process can be started:

- By selecting it from the AWIPS D2D System Control (root) menu
- The NWR Browser **Edit** button
- The Text Workstation Text Window Display **NWR Editor** button.

The Government-furnished Exhibit 9.6.3-1 shows these three ways. The NWRE is shut down by using the **File -> Close** menu selections on the **NWR Editor GUI**.

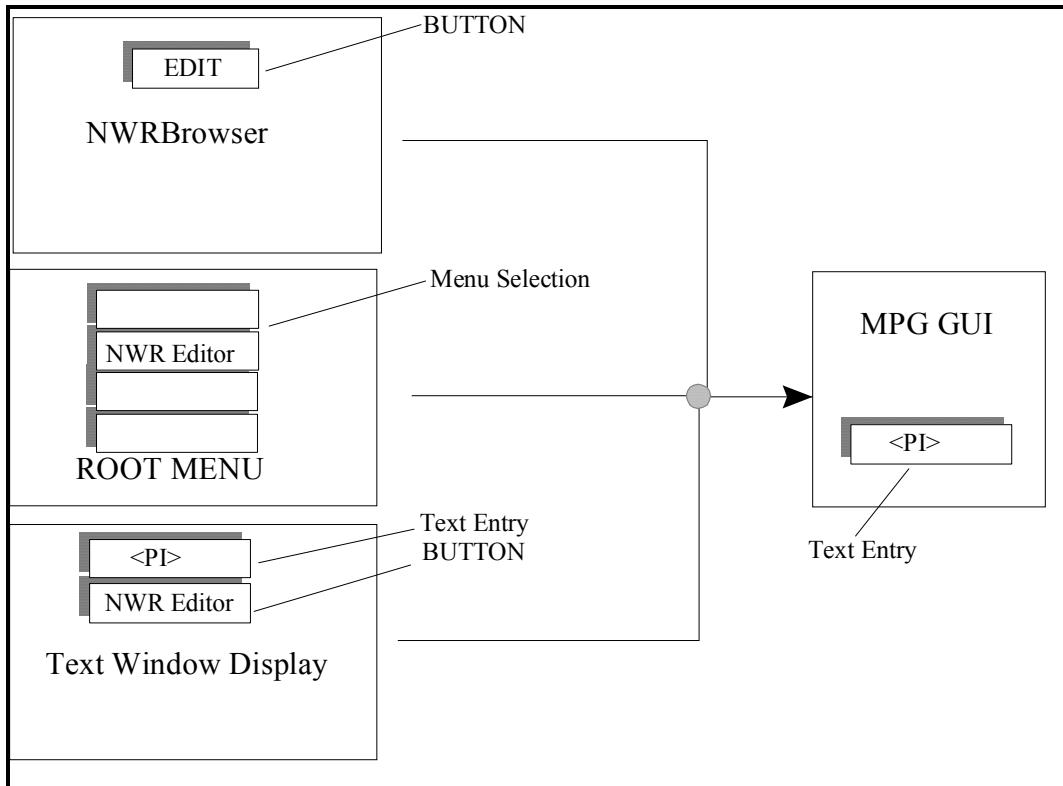


Exhibit 9.6.3-1. NWR Editor GUI Access

The **NWRE GUI** allows users to communicate with the **ifps_<xxx>** database to create and manage default message attributes. Using previously stored values in the **ifps_<xxx>** and **fxatext** databases, or by supplying the proper values, users can manually create a

properly formatted VRP for public dissemination over the NWR Console Replacement System (NWRCRS).

The **NWRE GUI** was designed to emulate basic NWRCRS functionality and to include some additional features. Current NWRCRS capabilities rely on speech synthesis, tower transmission, and other features that are not present within the **NWRE GUI**. The NWRE is not meant to replace NWRCRS functionality; instead it is meant to allow an AWIPS user to access to specific NWRCRS functionality in an easy to understand and accessible manner.

To a large extent, users familiar with the NWRCRS can readily apply their working knowledge to navigate and interact with the NWRE. It is recommended that users who are unfamiliar with basic VRP generation and dissemination read the NWRCRS user's manual section dealing with a VRP's four-part structure, paying special attention to the creation of listening area codes and message reference descriptors. There are certain restrictions on the information that may be put into the NWRE's text fields. For further information on the legal values for these fields, please refer to Government NWRCRS manuals.

The **NWRE GUI** provides access to VRP generation via three routes:

- The concatenation of default message attributes stored in the **ifps_<xxx>** database and the synopsis created from text products stored in the **fxatext** database
- The retrieval of a previously formatted and disk-stored (flat file) VRP
- The provision of required values (message attributes and synopsis) for a new VRP.

The **NWRE GUI** provides the user with the following options:

- Default message attribute creation/management
- VRP dissemination
- VRP request from stored values
- Disk/database storage of part or whole VRPs.

The **NWRE GUI** is displayed in Exhibit 9.6.3-2.

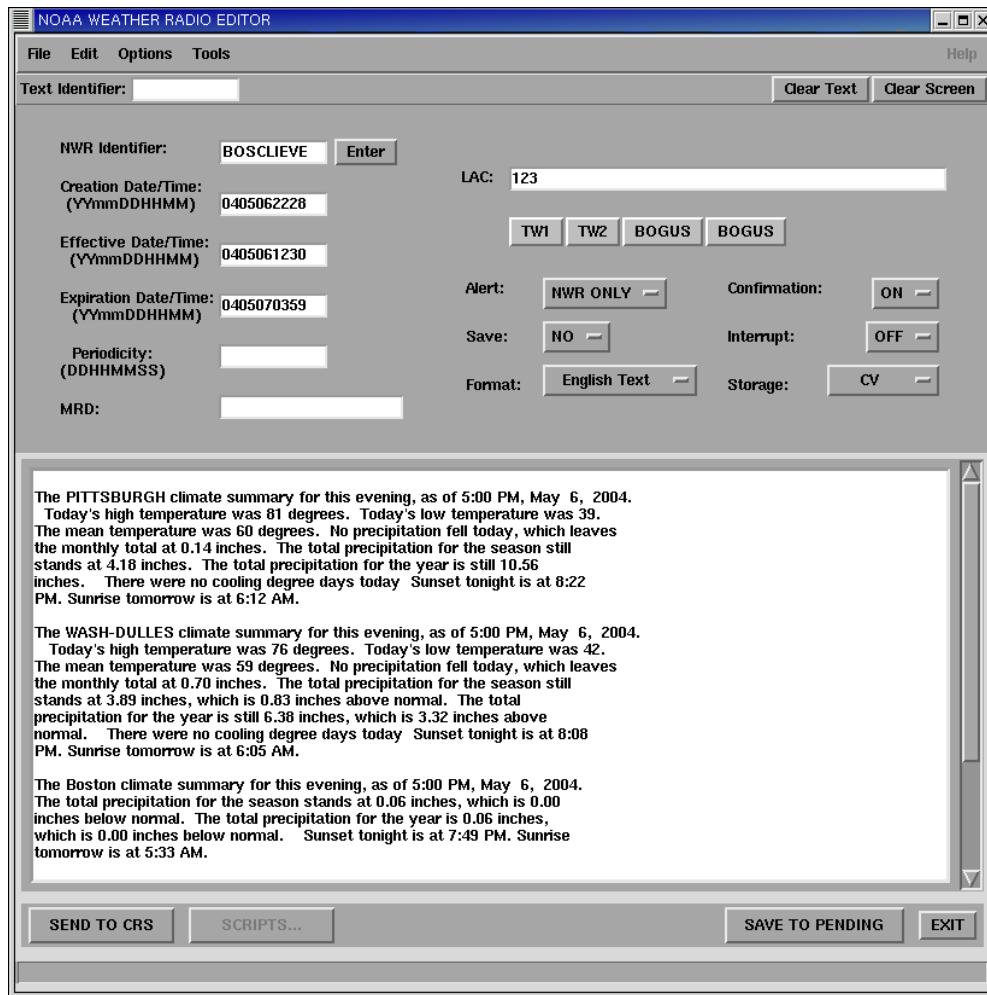


Exhibit 9.6.3-2. The NWR EditorGUI

The upper-half of the GUI is used to configure the following message attributes:

- Text identifier - Loads a product from the database into the Editor
- NWR identifier - AFOS ID (CCCNNNXXX), where

 CCC is the AFOS node origination site.

 NNN is the AFOS-based product category.

 X ([X] | [XX]) is the AFOS-based specific product category.

Creation date and time

Effective date and time

Expiration date and time

Periodicity

Listening area codes (LAC)

Message reference descriptor (MRD)

- Alert
- Save
- Format
- Confirmation
- Interrupt
- Storage

The lower half of the **NWRE GUI** is concerned with the configuration of the message contents, also known as the **Synopsis**, and is a free text area.

The very bottom of the **NWRE GUI** displays quick buttons for product dissemination and saving to disk and a status bar to keep the user informed.

9.6.4 NWR Editor Application Design Overview

The **NWRE GUI** layer is a thin layer that sits on **nwrEditorWish**, a TclTk interpreter that has been extended to incorporate NWR application-specific commands. The GUI is a facade to the underlying NWR functionality. This was accomplished by decoupling the GUI from the interpreter. By creating an NWR-specific interpreter, applications needing application-specific commands are easily and efficiently expanded using the underlying C++ classes. This allows for the overhead incurred from scripts to be minimized to the small amount needed for display of the graphical user interface. The GUI is responsible for sending events to the interpreter where, upon notification from the event handler, the interpreter processes the GUI's request.

All requests to the underlying functionality are broken into two types of events, **Get()** and **Set()**, based on the facade and command patterns.

Exhibit 9.6.4-1 presents a Government-furnished high-level design with the NWR Editor (Tcl script) layer on top of the VRP Generator. C/C++ function calls are shown as thin arrows and Tcl command calls are shown as thick arrows.

- The Tcl C library implements the interpreter and the core Tcl commands such as **set**, **while**, **proc**, **open**, and **socket**.
- Application-specific Tcl commands are implemented in C++ and registered as commands in the interpreter.
- The interface to all Tcl commands is the same.
- The interpreter calls these command procedures when the script uses a Tcl command.
- The application-specific command procedures are thin layers over existing functionality in extensions that implement suites of Tcl commands in the compiled code.

- In the exhibit, the large arrow represents calls from the VRP Generator back to the **MPG GUI** script layer. The application can call out to the script layer at any point, even inside command procedures.

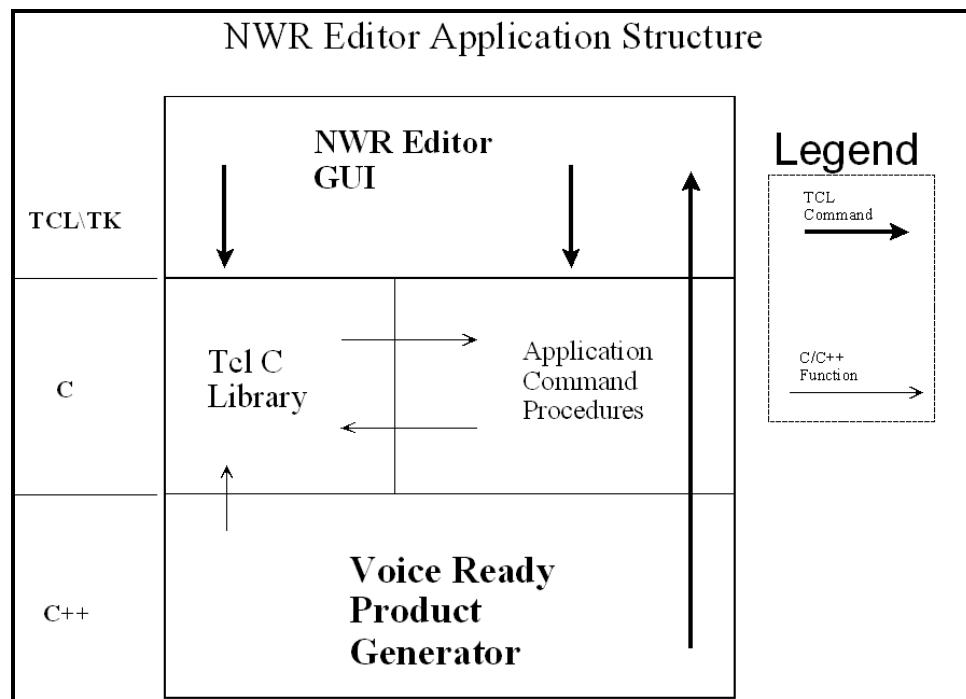


Exhibit 9.6.4-1. NWR Editor Application Structure High-Level Design Overview

Exhibit 9.6.4-2 presents a Government-furnished system-level view of the application.

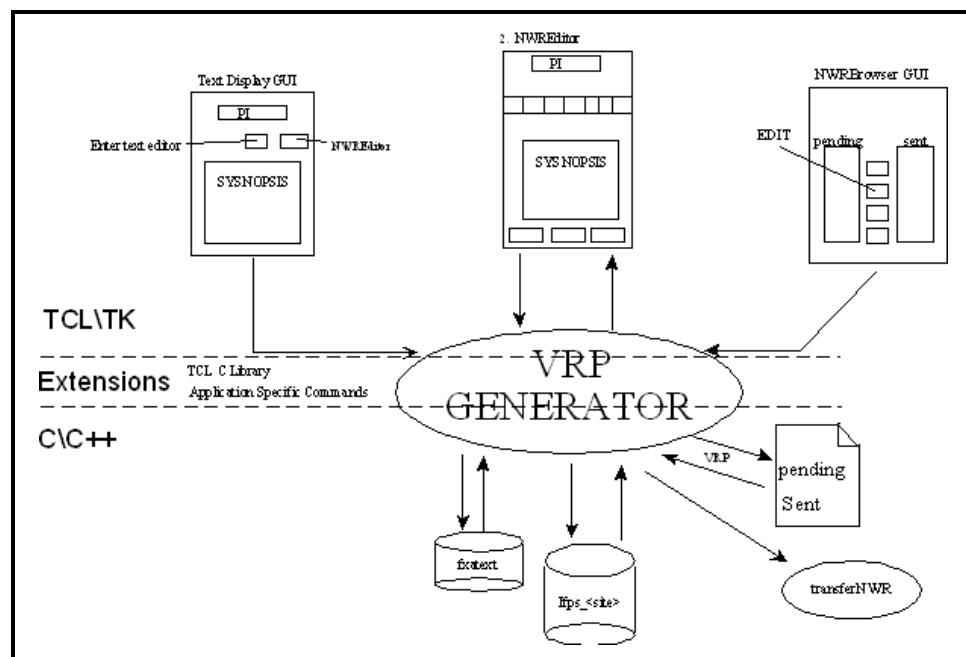


Exhibit 9.6.4-2. NWR Editor Application Structure – System View

Chapter 10

Asynchronous Product Scheduler

Chapter 10. Asynchronous Product Scheduler

Table of Contents

10.0	Asynchronous Product Scheduler: Overview	1
10.1	Configuration Files and Environment Variables	2
10.2	Processes	3
10.3	Additional Notes	6

List of Exhibits

Exhibit 10.2-1. Acquire and Ingest of Asynchronous Products	4
---	---

10.0 Asynchronous Product Scheduler: Overview

The Asynchronous Product Scheduler (APS) product distribution allows text products to be routed to/from external PCs configured on an AWIPS communications port. APS supports text product dissemination from the PC to the Console Replacement System (CRS) and the NOAA Weather Wire Service (NWWs) as well as storage of text products to the AWIPS text database.

APS runs on Linux pre-processors. It consists of eight executables that run together as a daemon to:

- Receive newly arrived text database products in real time
- Receive newly arrived text products in real time
- Ingest locally generated text products into AWIPS
- Send requests for text products
- Send requests for text database products.

The executables are located in `/awips/fxa/bin`, and are described as follows.

- The *asyncScheduler* spawns *asyncLine*, one per *aps_line.tbl* entry and *asyncExec* to route incoming products.
- The *asyncLine* is a persistent process that is spawned by *asyncScheduler* to handle serial port I/O.
- The *asyncExec* is spawned by *asyncScheduler* to route incoming products (to the Network Control Facility (NCF) and NWWs and/or CRS, depending on the product's entry in *aps_pil.tbl*).
- The *asyncPilMsgServer* is a persistent process. It receives the notification messages from *asyncPilNotify* process.
- The *asyncPilNotify* is called by the *asyncPollData.pl* persistent process when a user-subscribed product arrives.
- The *asyncPollData.pl* is a persistent process. It constantly scouts the products arriving at the `${EDEX_FXA_HOME}/workFiles/asyncScheduler/incoming` directory.
- The *asyncWatchDog.sh* is a persistent cron process. It monitors the existence of the *asyncPollData.pl* process every second. If it does not exist, it automatically starts it up.
- The *asyncPilTrigger.sh* is a process invoked by the *asyncScheduler* process to subscribe the user-defined products to the metadata database during *asyncScheduler* startup. It also instructs the EDEX textdb server where to deposit the incoming product.

10.1 Configuration Files and Environment Variables

Configuration Files

Three configuration files tell the APS what products to process and how to process them. These files are located in `$FXA_DATA/workFiles/asyncProdScheduler`, which is NFS-mounted from the NAS.

- **aps_line.tbl.** This file is the comms line configuration file for **asyncScheduler**, which provides line configuration settings on initial startup. It has the following format:

0	test1	1	/dev/ttyn1a	9600	8		NONE	1			
0	test2	1	/dev/ttyn1b	9600	8		NONE	1			
# 0	fema	1	/dev/ttyn1b	9600	7		EVEN	1			
# 3	ttynlc	1	/dev/ttyn1c	9600	8		NONE	1			NONE
# 4	ttynld	1	/dev/ttyn1d	9600	8		NONE	1			SW
# 5	ttynle	1	/dev/ttyn1e	1200	8		NONE	1			HW
# 6	ttynlf	1	/dev/ttyn1f	9600	8		NONE	1			
# 7	ttynlg	1	/dev/ttyn1g	9600	8		NONE	1			
# 8				R E S E R V E D	F O R	N W W S					

. first line ignored for backwards compatibility

. delimit fields with '|'

. spaces and tabs are ignored

- A child process is spawned for each line entry.
- *Line Name:* The string of characters in the second field.
- *Status:* Legal values are "0" (not activated) and "1"(activated).
- *Device Name:* Use the full path. or the 8-port board from Digi, it will look something like /dev/ttyn1a
- *Baud:* Device speed, in bps. Use only well known values (2400, 4800, 9600, etc.).
- *Data Bits:* Character size. It must be 5, 6, 7, or 8.
- *Parity:* Must be "NONE", "ODD", or "EVEN"
- *Stop Bits:* 1 or 2
- *Flow Control:* Optional. Use "SW", "HW", or "NONE" (the default).

SW = xon/xoff

HW = rts/cts

This file provides a data field to specify a device file associated with a port. Great care must be taken to ensure that the device file specified for each line is correct; otherwise, the results are undefined.

- **aps_pil.tbl.** This file is the *asyncScheduler*'s routing table. The *asyncScheduler* routes products in two directions:
 - From the text database to one or more async mux ports.
 - From one or more async mux ports to the text database. Additionally, products received in this way (i.e., from **commsLine** clients via the mux) are routed to the NCF, and may also be routed to either or both CRS and NWWS. CRS/NWWS routing is controlled by the 4th field, "Routing."

Example:

PID		Line #		Priority		Routing
AAABBBCCC		0		2		CRS, NWWS
AAABABCCC		0		3		

Note: ID, Line #, and Priority fields are required. The Routing field is optional.

- Line # should have a corresponding entry in *aps_line.tbl*. This is enforced at runtime.
- Priority can be 1 (highest), 2, or 3 (lowest)
- Legal Routing field entries are "CRS" and "NWWS"
 - When product AAABBBCCC enters the text database, it will be retrieved by the *asyncScheduler* and sent to line 0 (defined in **aps_line.tbl**) with priority 2.
 - When product AAABABCCC enters the text database, it will be retrieved by the *asyncScheduler* and sent to line 0 with priority 3.
 - When product AAABBBCCC is received from the **commsLine** client connected to line 0, it is written to the text database, sent to the NCF, and then sent to CRS and NWWS.
 - When product AAABABCCC is received from the **commsLine** client connected to line 0, it is written to the text database and sent to the NCF. It is not sent to CRS or to NWWS because the fourth field is blank.
- **aps_route.tbl.** This file lists valid APS routing keywords (e.g., NWWS, CRS).

10.2 Processes

Exhibit 10.2-1 describes the Asynchronous Product Scheduler data flow

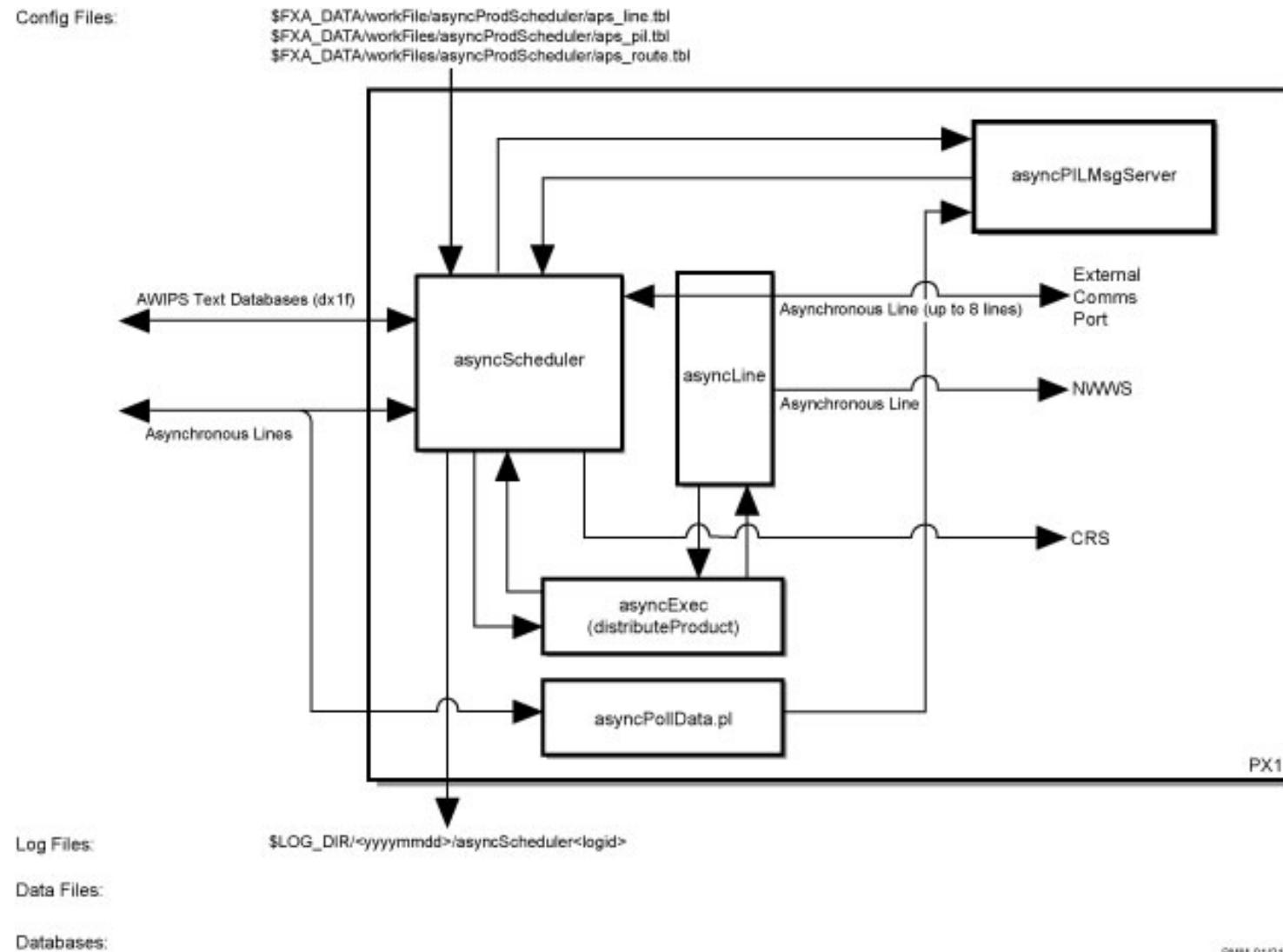


Exhibit 10.2-1. Acquire and Ingest of Asynchronous Products

AsyncScheduler is the parent process, responsible for transferring products from the text database to **commsLine** clients, and from **commsLine** clients to the text database, the NCF, and possibly CRS and/or NWWS (depending on the product entry’s “route” field in **aps_pil.tbl**). At startup, it subscribes user-defined products in **aps_pil.tbl** to the subscription table in the metadata database during system startup. In the meantime, it spawns one persistent port-controlling child process for each entry in **aps_line.tbl**. It then waits for input notification from either the **asyncPilMsgServer** or any one of up to eight child processes (one per **aps_line.tbl** entry). Each notification is checked against the list of PILs in **aps_pil.tbl** (**aps_pil.tbl** entries are sorted in an Standard Template Library (STL) map, keyed by PIL for quick searches). With each match, a command line **textdb** call to **EDEX textdb server** is made for the product, which is then appropriately formatted and sent to the child **commsLine**-controlling process of each matched line.

When a product matches a user-subscribed product, the EDEX trigger will call **asyncPilTrigger.sh** to copy the incoming product PIL into `${FXA_DATA}/workFiles/asyncProdScheduler/incoming` directory.

When the **asyncPollData.pl** detects a product’s PIL has arrived at `${FXA_DATA}/workFiles/asyncProdScheduler/incoming`, it invokes the **asyncPilNotify** process to send the PIL to **asyncPilMsgServer**.

The **asyncPilMsgServer** sends the PIL to **APSPilMsgClient**, which then sends the PIL to **asyncScheduler**.

AsyncScheduler uses the ‘textdb -r’ command line to read the product from the fxatext database and routes the data to the user via AsyncScheduler’s CommsLines/ports.

When a user sends a text product, via AsyncScheduler’s CommsLines/ports, from an application to the AsyncScheduler for storage to the text database, AsyncScheduler writes the text products into a temporary filename in PIL_timeStamp format to `${EDEX_FXA_HOME}/workFiles/asyncProdScheduler` directory and calls ‘textdb -w’ command line to store it into the fxatext database. AsyncScheduler removes the temporary file after successful storage to the fxatext database.

The **asyncLine** is the **commsLine** controlling process, spawned by *asyncScheduler*. There will be one process running for each entry in **aps_line.tbl**. The **asyncLine** is responsible for passing products from *asyncScheduler* to the comms port, and from the comms port to *asyncScheduler*.

Note: Even though this executable’s name is *asyncLine*, it is spawned by *asyncScheduler* with its **argv[0]** set to the second (“Line Name”) field of its entry in **aps_line.tbl**. For example, if **aps_line.tbl** contained the single entry

```
#Line #|Line Name|Status|Device Name|Baud|DataBits|Parity|StopBits|FlowControl
#-----
 1 |bubble   |1      |/dev/ttyn1a|1200|8          |NONE   |1           |HW
```

The *asyncScheduler* would spawn one child *asyncLine* process and name it “bubble.” The child would log to the file **bubble<pid><hostname><hhmmss>**.

Products from **commsLine** clients (i.e., products received from the serial port) are truncated precisely on the “ZCZC”/”NNN” boundary before being sent to the parent (the parent only sees the complete products from *asyncLine*). Products received from the parent are put into a priority queue, as specified by that product’s priority setting in **aps_pil.tbl**. Products in the queue are then written out to the port as the port becomes available, highest priority first. Each line currently maintains 3 priority queues, “1”–“3”, “1” being the highest priority. An **aps_pil.tbl** entry with an out-of-range value set to “0” will be assigned the highest priority. All other out-of-range values will be reassigned the lowest priority, “3.” Each line enforces a maximum queue size, currently set to 1,000 products. If a product is received from the parent (*asyncScheduler*) when there are already 1,000 products queued, it will be dropped. No special attempt is made to re-order the queue according to priority (i.e., a newly received Priority One product does not bump a Priority Three product from a full queue—the Priority One product is dropped).

The **asyncExec** spawns **distributeProduct** for products received from **commsLine** clients. It is not persistent (i.e., it returns with **distributeProduct**’s return value).

10.3 Additional Notes

- AWIPS II AsyncScheduler still assumes the 'textdb' executable is placed under the \$FXA_HOME/bin directory (it is wrapped to CLI/bin directory).
- The AsyncScheduler trigger log file is placed in the \$EDEX_HOME/logs/apsPilTrigger.log on the primary EDEX server.
- The AsyncScheduler trigger script, asyncPilTrigger.sh, is placed in the \$EDEX_HOME/bin.
- The current AsyncScheduler subscription command is implemented as: textdb -ldad -a <pil> \$EDEX_HOME/bin/asyncPilTrigger.sh.
- Legacy logging for the asyncScheduler still exists; therefore, the logs for the process itself will go to /data/logs/fxa/YYYYMMDD on px1.
- The legacy startIngest.px1 changes the modifications of the device files for the dgnc. Because this is not run under AWIPS II at this time, ensure that the /dev/ttyn* are 666 modifications to allow proper functionality.

Chapter 11

Crons and Purging

Chapter 11. Crons and Purging

Table of Contents

	<i>Page</i>
11.0 Crons, Quartz and Purging	1
11.1 Crons	1
11.1.1 Site Local Crons	1
11.1.1.1 How to Modify Site Standard Crons	2
11.1.1.2 How to Modify Site HA Crons.....	4
11.1.2 Workstation Crons.....	7
11.1.3 DX Crons.....	10
11.1.3.1 WFO DX standard crons	10
11.1.3.2 WFO dx1f HA Crons.....	12
11.1.3.3 WFO dx2f HA crons	13
11.1.4 PX Crons	14
11.1.4.1 WFO PX Standard crons	14
11.1.4.2 WFO px1f HA crons	15
11.1.4.3 WFO px2f HA crons	18
11.1.5 WFO LS Crons	19
11.1.5.1 WFO LS Standard crons.....	19
11.1.5.2 WFO LS HA crons	19
11.1.6 WFO CSPBN crons	20
11.1.7 WFO AX crons.....	20
11.2 quartz	22
11.3 AWIPS II DATA PURGING	24
11.3.1 Purging Processed Data Storage.....	24
11.3.2 Purging Raw Data Storage	26
11.4 EDEX Log File Purging	27

List of Tables

Table 11.1.1-1. Site Standard crons.....	2
Table 11.1.1-2. Site HA crons	2
Table 11.1.1.1-1. Modifying Site Standard crons.....	3
Table 11.1.2-1. WFO Workstation crons.....	8
Table 11.1.3.1-1. WFO DX Standard crons.....	10
Table 11.1.3.2-1. WFO dx1f HA crons	12

Table 11.1.3.3-1. WFO dx2f HA crons	14
Table 11.1.4.1-1. WFO PX Standard crons	14
Table 11.1.4.2-1. WFO px1f HA crons	16
Table 11.1.4.3-1. WFO px2f HA crons	18
Table 11.1.5.1-1. WFO LS Standard crons.....	19
Table 11.1.5.2.1. WFO LS HA crons	19
Table 11.1.6-1. WFO CPSBN crons	20
Table 11.1.7-1. WFO AX crons.....	20
Table 11.2-1. Crons Jobs and Associated Schedules for AWIPS II	23

11.0 Crons, Quartz and Purging

11.1 Crons

Each hardware device (server, processor, and workstation) contains baseline crons that perform system checks, purges, and backups. Sites are also provided cron files for local use.

AWIPS crons are maintained and executed in one of 3 ways:

- **Standard Linux Cron.** These crons are updated and executed according to **man 8 cron**, **man 1 crontab**, and **man 5 crontab**. Both workstations and servers have standard crons running.
- **Linux High Availability (HA) Crons.** These crons are part of the failover heartbeat and are maintained in the /etc/ha.d/cron.d/ directories on the px1/px2, dx1/dx2 and ls2/ls3 HA clusters. Editing the copied version in /etc/cron.d/ without copying the changes to /etc/ha.d/cron.d/ will result in the loss of your changes the next time the cron is activated from its maintained location.
- **Quartz.** These time based jobs are compiled into EDEX running on dx3/dx4. Quartz jobs can execute outside of cron or they can be loaded into cron with a java call.

Note: AWIPS II makes minimal use of Linux cron jobs for data processing. Instead, operations such as data purging, SmartInit, and other periodic data processing operations are triggered using quartz timer events. The quartz timer is a time-based event generator that is part of the Camel SOA infrastructure underlying the EDEX processes. The quartz timer mechanism allows EDEX services to run at specified times. At the present time, the EDEX quartz timer events are configured internally to EDEX and are not configurable in the field.

AWIPS II uses heartbeat-managed cron jobs on the PX1/2 cluster and the DX1/2 cluster. The crons are staged in /etc/ha.d/cron.d and are installed into /etc/cron.d when activated. The file names of the AWIPS II crons begin with “a2” – a2px1cron, a2px2cron, a2dx1cron, and a2dx2cron.

11.1.1 Site Local Crons

Sites can configure local crons in two ways:

- Standard crons on a workstation or sever
- HA crons on a failover pair

Sites should be careful to avoid conflicts between local crons and existing baseline crons. Sites should not modify baseline cron files as this may have a negative impact on

system performance, and baseline files may be overwritten with the next software upgrade.

Table 11.1.1-1 identifies site standard crons; Table 11.1.1-2 identifies HA crons.

Table 11.1.1-1. Site Standard crons

Directory
/var/spool/cron/<username>
/etc/cron.d/
/etc/cron.hourly/
/etc/cron.daily/
/etc/cron.weekly/
/etc/cron.monthly/

Table 11.1.1-2. Site HA crons

Server	Site cron File	Directory
dx1f	a2SITEDx1cron	/etc/ha.d/cron.d (and /etc.cron.d on the active server)
dx2f	a2SITEDx2cron	
px1f	a2SITEpx1cron	
px2f	a2SITEpx2cron	
ls	SITElscron	

Sites that configure HA crons must keep the crons in sync across servers and between the /etc/cron.d and /etc/ha.d/cron.d directories on the active server.

NOTE: ALL cron files in the /etc/cron.d directory are active. Do not place ANY backup files (e.g., SITEpx1cron.bak) in the /etc/cron.d directory because crond does not discriminate and will run every job in every file in the directory. Save them in a directory reserved for SITE use that will not be overwritten by a software upgrade (e.g., /awips/dev/SITE_crons, /home/SAlocal/SITE_crons).

NOTE: Standard BOIVerify crons have been delivered as part of the local site a2SITEpx2cron. Sites should modify the existing a2SITEpx2cron for their BOIVerify and other related local app needs.

11.1.1.1 How to Modify Site Standard Crons

Sites can create cron files in directories managed by crond. These crons will be available when the machine is up; they are not part of the HA failover crons.

The cron daemon checks the /etc/crontab file, the /etc/cron.d/ directory, and the /var/spool/cron/ directory every minute for changes. Any changes found are loaded into memory. crontab does not need to be restarted. See Table 11.1.1-1.

Table 11.1.1-1. Modifying Site Standard crons

Directory	Format														
/var/spool/cron/<username>	Cron files here have names that match usernames in /etc/passwd. These files are executed using the permissions of the username. Users can create files here as their account name using crontab -e, if permission is granted in /etc/cron.allow and/or /etc/cron.deny. Entries are similar to /etc/crontab: minute hour day month dayofweek command <table style="margin-left: 20px;"> <tr><th>field</th><th>allowed values</th></tr> <tr><td>-----</td><td>-----</td></tr> <tr><td>minute</td><td>0-59</td></tr> <tr><td>hour</td><td>0-23</td></tr> <tr><td>day of month</td><td>1-31</td></tr> <tr><td>month</td><td>1-12</td></tr> <tr><td>day of week</td><td>0-7 (0 or 7 is Sun)</td></tr> </table>	field	allowed values	-----	-----	minute	0-59	hour	0-23	day of month	1-31	month	1-12	day of week	0-7 (0 or 7 is Sun)
field	allowed values														
-----	-----														
minute	0-59														
hour	0-23														
day of month	1-31														
month	1-12														
day of week	0-7 (0 or 7 is Sun)														
/etc/cron.d/	The files in these directories are in the same format as /etc/crontab.														
/etc/cron.hourly/ /etc/cron.daily/ /etc/cron.weekly/ /etc/cron.monthly/	The files in these directories are shell scripts executed by the run-parts script entries in /etc/crontab.														

The following example shows a user created cron in /var/spool/cron that runs with the permissions of the user. **Note:** Output files are created with permissions of the user, this is a consideration when using these type of crons operationally.

```
lx4-ntcd{rschup}118: crontab -e
* * * * * echo "test" > ~rschup/test_cron

:wq
"/tmp/crontab.XXXXQ1St1T" 1L, 42C written
crontab: installing new crontab

lx4-ntcd{rschup}111: crontab -l
* * * * * echo "test" > ~rschup/test_cron

lx4-ntcd{rschup}114: date
Mon Mar 14 18:36:20 GMT 2011

lx4-ntcd{rschup}115: date
Mon Mar 14 18:37:10 GMT 2011

lx4-ntcd{rschup}117: ls -l test_cron
-rw-r--r-- 1 rschup fxalpha 5 Mar 14 18:37 test_cron

lx4-ntcd{rschup}118: crontab -r
```

```
lx4-ntcd{rschup}119: crontab -l
no crontab for rschup
```

11.1.1.2 How to Modify Site HA Crons

Modification and activation of site HA crons requires the following steps:

1. Login to the active server for the HA package
2. Modify /etc/ha.d/cron.d/a2SITE<host>cron with local changes
3. Copy /etc/ha.d/cron.d/a2SITE<host>cron to the failover pair
4. Copy /etc/ha.d/cron.d/a2SITE<host>cron to the active server /etc/cron.d/

NOTE: Do not leave backup files in /etc/ha.d/cron.d. They could affect the swap process. Ensure that /etc/ha.d/cron.d contains only the files that are expected to be there.

Modifying DX a2SITE crons

In the following example, the hb_stat command shows the dx1f package is running on dx1 and the HA cronfiles are a2dx1cron, a2SITEDx1cron. The local site a2SITEDx1cron will be copied from the site created backup directory /home/SAlocal/d.CRONS/ into the /etc/ha.d/cron.d/ directory on each failover pair and into /etc/cron.d/ on the active dx1f server. The crond daemon checks /etc/cron.d/ for changes every minute, so the running crond does not have to be restarted. The output from the cron is checked in /awips/dev/, then the test is removed from the system. Modifying the dx2f cron a2SITEDx2cron follows the same procedure.

```
[root@lx1-ntcb ~]# ssh dx1f
root@dx1f's password:
```

```
[root@dx1-ntcb ~]# hb_stat
```

Heartbeat Status Monitor	Mar 29 16:44:03
--------------------------	-----------------

```
===== M e m b e r S t a t u s =====
```

Member	Status	IP address
dx1-ntcb	Up	165.92.107.131
dx2-ntcb	Up	165.92.107.132

```
===== S e r v i c e S t a t u s =====
```

Service	IPAddr	Cronfile	Owner	Start Time
a2dx1apps	165.92.107.195	a2dx1cron,a2SIT	dx1-ntcb	2011-03-23 21:32:03
a2dx2apps	165.92.107.196	a2dx2cron,a2SIT	dx2-ntcb	2011-03-14 16:11:12

```
[root@dx1-ntcb cron.d]# cd /etc/ha.d/cron.d
[root@dx1-ntcb cron.d]# ls -l a2SITE*
-rw-r--r-- 1 root root 0 Mar 14 19:14 a2SITEdx1cron
-rw-r--r-- 1 root root 0 Mar 14 16:01 a2SITEdx2cron

[root@dx1-ntcb cron.d]# cat /home/SAlocal/d.CRONS/a2SITEdx1cron
* * * * * fxa echo "test" > /awips/dev/test_cron

[root@dx1-ntcb cron.d]# cp /home/SAlocal/d.CRONS/a2SITEdx1cron .
cp: overwrite `./a2SITEdx1cron'? y

[root@dx1-ntcb cron.d]# ls -l a2SITE*
-rw-r--r-- 1 root root 50 Mar 29 16:55 a2SITEdx1cron
-rw-r--r-- 1 root root 0 Mar 14 16:01 a2SITEdx2cron

[root@dx1-ntcb cron.d]# scp -p a2SITEdx1cron dx2:/etc/ha.d/cron.d/
a2SITEdx1cron
100% 50 0.1KB/s 00:00

[root@dx1-ntcb cron.d]# cp a2SITEdx1cron /etc/cron.d
cp: overwrite `/etc/cron.d/a2SITEdx1cron'? y

[root@dx1-ntcb cron.d]# ls -l /awips/dev/test_cron
-rw-r--r-- 1 fxa fxalpha 5 Mar 29 18:33 /awips/dev/test_cron

[root@dx1-ntcb cron.d]# cat /dev/null > a2SITEdx1cron

[root@dx1-ntcb cron.d]# ls -l a2SITEdx1cron
-rw-r--r-- 1 root root 0 Mar 29 18:36 a2SITEdx1cron

[root@dx1-ntcb cron.d]# scp a2SITEdx1cron dx2:/etc/ha.d/cron.d/
a2SITEdx1cron 100% 0 0.0KB/s 00:00

[root@dx1-ntcb cron.d]# cp a2SITEdx1cron /etc/cron.d/
cp: overwrite `/etc/cron.d/a2SITEdx1cron'? Y

[root@dx1-ntcb cron.d]# rm /awips/dev/test_cron
rm: remove regular file `/awips/dev/test_cron'? y
```

Modifying PX a2SITE crons

The following example shows the normal px1f/px2f configuration. Site crons are synchronized across px1/px2 and /etc/ha.d/cron.d. Modifying px1f/px2f a2SITE crons follows the same procedure as described for dx1f/dx2f

```
[root@px1-ntcb ~]# hb_stat
```

Heartbeat Status Monitor Mar 14 15:35:21

===== Member Status =====

Member	Status	IP address
px1-ntcb	Up	165.92.107.137
px2-ntcb	Up	165.92.107.138

===== Service Status =====

Service	IPAddr	Cronfile	Owner	Start Time
a2px1apps	165.92.107.193	a2px1cron,a2SIT	px1-ntcb	2011-02-22 19:44:12
a2px2apps	165.92.107.194	a2px2cron,a2SIT	px2-ntcb	2011-03-01 21:38:50

```
[root@px1-ntcb ~]# ls -l /etc/cron.d/a2SITE*
-rw-r--r-- 1 root root 256 Feb 22 19:44 /etc/cron.d/a2SITEpx1cron
```

```
[root@px1-ntcb ~]# ls -l /etc/ha.d/cron.d/a2SITE*
-rw-r--r-- 1 root root 256 Feb 22 19:41 /etc/ha.d/cron.d/a2SITEpx1cron
-rw-r--r-- 1 root root 0 Feb 22 19:41 /etc/ha.d/cron.d/a2SITEpx2cron
```

```
[root@px1-ntcb ~]# ssh px2 "ls -l /etc/cron.d/a2SITE*"
-rw-r--r-- 1 root root 0 Mar 1 21:38 /etc/cron.d/a2SITEpx2cron
```

```
[root@dx1-ntcb cron.d]# ls -ld /etc/cron.d
drwxr-xr-x 2 root root 4096 Mar 23 21:32 /etc/cron.d
```

```
[root@dx1-ntcb cron.d]# touch /etc/cron.d
```

```
[root@dx1-ntcb cron.d]# ls -ld /etc/cron.d
drwxr-xr-x 2 root root 4096 Mar 29 17:05 /etc/cron.d
```

```
[root@px1-ntcb ~]# ssh px2 "ls -l /etc/ha.d/cron.d/a2SITE*"
-rw-r--r-- 1 root root 256 Feb 22 19:41 /etc/ha.d/cron.d/a2SITEpx1cron
-rw-r--r-- 1 root root 0 Feb 22 19:41 /etc/ha.d/cron.d/a2SITEpx2cron
```

Modifying LS SITEls cron

The following example shows the normal LS configuration. Because there is only one LS active at any time, there is only one site cron, “SITEElscron.” The SITEElscron is synchronized between ls2/ls3 /etc/ha.d/cron.d/. The cron is copied to /etc/cron.d on the active server.

```
[root@ls2-ntcb ~]# hb_stat
```

```

Heartbeat Status Monitor                               Mar 14 15:49:33
=====
===== M e m b e r   S t a t u s =====
Member      Status    IP address
-----
ls2-ntcb    Up       192.168.1.11
ls3-ntcb    Up       192.168.1.12
=====
===== R e s o u r c e   S t a t u s =====
Resource    Parameters          Owner   Status     Start Time
-----
IPAddr2     192.168.1.10/24/eth0 ls2-ntcb  Running OK  2011-01-14 19:32:05
LS1IPSRCAaddr                      ls2-ntcb  OK       2011-01-14 19:32:05
apache                                ls2-ntcb  Running OK  2011-01-14 19:32:07
csportd                               ls2-ntcb  CSPORTD   2011-01-14 19:32:17
Xinetd      wu_ftpd                ls2-ntcb  Running OK  2011-01-14 19:32:18
hylafax                                ls2-ntcb  OK       2011-01-14 19:32:18
ldad                                    ls2-ntcb  Starting  2011-01-14 19:32:19
dserver                                 ls2-ntcb  OK       2011-01-14 19:32:51
LDM                                     ls2-ntcb  OK       2011-01-14 19:33:08
Crontab      SITEElscron           ls2-ntcb  OK       2011-01-14 19:33:18
Crontab      lscron                ls2-ntcb  OK       2011-01-14 19:33:19
SITEprocesses                           ls2-ntcb  OK       2011-01-14 19:33:20

```

HylaFAX Details:

HylaFAX client-server protocol server: hfaxd (pid 3620) is running...
HylaFAX queue manager process: faxq (pid 3617) is running...

```

[root@ls2-ntcb ~]# ls -l /etc/ha.d/cron.d/SITE*
-rw----- 1 root root 330 Nov  9  2007 /etc/ha.d/cron.d/SITEElscron

[root@ls2-ntcb ~]# ls -l /etc/cron.d/SITE*
-rw----- 1 root root 330 Nov  9  2007 /etc/cron.d/SITEElscron

[root@ls2-ntcb ~]# ssh ls3 "ls -l /etc/ha.d/cron.d/SITE*"
-rw----- 1 root root 330 Nov  9  2007 /etc/ha.d/cron.d/SITEElscron
-rwxr-xr-x 1 root root 330 Nov  9  2007 /etc/ha.d/cron.d/SITEElscron.200801221903

```

11.1.2 Workstation Crons

AWIPS LX and XT workstations run standard linux crons from /var/spool/cron/ and /etc/. See **man 8 cron**, **man 1 crontab** and **man 5 crontab** for more information. Crons in /etc/daily, /etc/hourly, /etc/weekly and /etc/monthly are identical on all AWIPS Linux workstations and servers. The /var/spool/cron/root crontab is identical across all AWIPS workstations and servers. See Table 11.1.2-1.

Table 11.1.2-1. WFO Workstation cron

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/fxa	startCtrlCpu.sh	Starts CPU monitor if it is not running	Every 10 minutes	0,10,20,30,40,50 * * *
	diskUsage.pl	Creates a data page on disk usage for the FX Data Monitor	Every 10 minutes	0,10,20,30,40,50 * * *
	cd \${LOG_DIR}/display; find . -mtime +1	Cleans out any display logs more than one day old twice a day at 0047Z and 1247Z every day.	2 times/day 00:47 12:47	47 0,12 * * *
	breakLogDisplay	Breaks display logs daily	1 time/day 00:00	0 0 * * *
	breakLogCtrlCpu	Breaks ctrlCpu log daily	1 time/day 00:00	0 0 * * *
/var/spool/cron/ifps	clean_up.sh	Removes old IFPS logfiles and diagnostic output from programs	1 time/day 00:16	16 00 * * *
/var/spool/cron/root	logAndRemoveCoreFile.ksh	Removes core files	1 time/day 10:00	0 10 * * *
	/usr/bin/find /tmp \(! -path '/tmp/lost+found/*'\) -xdev -type f \(! -mtime +30 -o -ctime +30 !\)-exec rm {} \;	Does cleanup – first day of the month	1 time/month 1 st day of the month 05:01	01 5 1 * *
	/usr/bin/find /var/tmp -xdev -type f \(! -mtime +30 -o -ctime +30 !\)-exec rm {} \;	Does cleanup – first day of the month	1 time/month 1 st day of the month 05:02	02 5 1 * *
	/usr/bin/find /var/tmp -xdev -type f -group fxalpha -mtime +1 xargs rm -f	Cleans up /var/tmp	1 time/day 07:20	20 7 * * *
	/usr/bin/find /tmp -xdev -type f -name "FXA*" -mtime +1 xargs rm -f	Cleans up /tmp FXA.* bundles	1 time/day 07:10	10 7 * * *
	/usr/bin/find /tmp -xdev -type f -name "*.PNG" -mtime +1 xargs rm -f	Cleans up /tmp *.PNG files	1 time/day 07:15	15 7 * * *
	boxktp	Gathers performance and system metrics	1 time/day 23:59	59 23 * * *
	boxstats_cleanlogs	Cleans up data logs created from boxstats performance gathering scripts	1 time/day 00:00	00 0 * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
	boxallstats	Generates sar and top statistics	1 time/day 00:01	01 0 * * *
	reset-faillog.sh		Every minute	* * * * *
/etc/cron.d/sysstat	root /usr/lib/sa/sa1 1 1	Runs system activity accounting tool	every 10 minutes	*/10 * * * *
	root /usr/lib/sa/sa2 -A	Provides daily summary of process accounting	1 time/day 23:53	53 23 * * *
/etc/cron.daily (run from entry in /etc/crontab)	0logwatch	Parses system logs and creates output in /var/log	1 time/day 04:20	02 4 * * *
	logrotate	Rotates log files /var/log/wtmp /var/log/btmp	1 time/day 04:20	02 4 * * *
	makewhatis.cron	Reads all man pages and updates the whatis database	1 time/day 04:20	02 4 * * *
	mlocate.cron	Creates or updates a database of file names used by the locate command	1 time/day 04:20	02 4 * * *
	prelink	Modifies ELF shared libraries and ELF dynamically linked binaries to reduce the time needed for the dynamic linker to perform relocations at startup	1 time/day 04:20	02 4 * * *
	rpm	Creates list of rpm packages in /var/log/rpmpkgs	1 time/day 04:20	02 4 * * *
	Tmpwatch	Recursively removes files which haven't been accessed for a given number of hours.	1 time/day 04:20	02 4 * * *
/etc/cron.weekly (run from entry in /etc/crontab)	makewhatis.cron	Reads all man pages and writes a line in the whatis database 1 time/day 04:20 consisting of the name of the man page and a short description	1 time/week on Sunday at 04:22	22 4 * * 0

11.1.3 DX Cron

The DX servers run standard crons on all servers but only dx1 and dx2 run HA crons. The dx3 and dx4 are edex clusters (not failover clusters) that use quartz to run time based jobs compiled into edex.

11.1.3.1 WFO DX standard crons

The DX standard crons run when the machine is up and are not part of the HA failover packages or the EDEX cluster quartz schedule. The dx1 is the NIS master and runs ypmake 2 times an hour to keep the /etc/passwd file on dx1 in synch with the NIS password file. This is the only entry in dx1 /var/spool/cron/root that is different from the AWIPS workstations and servers. See Table 11.1.3.1-1.

Table 11.1.3.1-1. WFO DX Standard crons

Cron File	Cron Entry	What It Does	Frequency (Ztime)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/root (DX1 only)	/var/yp/ypmake	Remakes NIS maps if needed and push to NIS client servers	2 times/day 08:00, 20:00	0 8,20 * * *
	/bin/cp -f /var/yp/ypmake.log /var/yp/ypmake.log.old; /bin/cp -f /dev/null /var/yp/ypmake.log	Copies current ypmake.log to ypmake.old then zero out current ypmake.log	1 time/day 07:00	0 7 * * *
/var/spool/cron/root (DX1 & DX2)	logAndRemoveCoreFile.k sh	Removes core files	1 time/day 10:00	0 10 * * *
	/usr/bin/find /tmp \(! -path '/tmp/lost+found/*' \) -xdev -type f \(-mtime +30 -o -ctime +30 \) -exec rm {} \;	Does cleanup – first day of the month	1 time/month 1 st day of the month 05:01	01 5 1 * *
	/usr/bin/find /var/tmp -xdev -type f \(-mtime +30 -o -ctime +30 \) -exec rm {} \;	Does cleanup – first day of the month	1 time/month 1 st day of the month 05:02	02 5 1 * *
	/usr/bin/find /var/tmp -xdev -type f -group fxalpha -mtime +1 xargs rm -f	Cleans up /var/tmp	1 time/day 07:20	20 7 * * *
	/usr/bin/find /tmp -xdev -type f -name "FXA*" -mtime +1 xargs rm -f	Cleans up /tmp FXA.* bundles	1 time/day 07:10	10 7 * * *

Cron File	Cron Entry	What It Does	Frequency (Ztime)	Cron Time (min, hour, day of month, month, day of week)
	/usr/bin/find /tmp -xdev -type f -name "*.PNG" -mtime +1 xargs rm -f	Cleans up /tmp *.PNG files	1 time/day 07:15	15 7 * * *
	boxktp	Gathers performance and system metrics	1 time/day 23:59	59 23 * * *
	boxstats_cleanlogs	Cleans up data logs created from boxstats performance gathering scripts	1 time/day 00:00	00 0 * * *
	boxallstats	Generates sar and top statistics	1 time/day 00:01	01 0 * * *
	reset-faillog.sh		Every minute	* * * * *
/etc/cron.d/sysstat	root /usr/lib/sa/sa1 1 1	Runs system activity accounting tool	every 10 minutes	*/10 * * * *
	root /usr/lib/sa/sa2 -A	Generates daily summary of process accounting	1 time/day 23:53	53 23 * * *
/etc/cron.daily (run from entry in /etc/crontab)	0logwatch	Parses system logs and creates output in /var/log	1 time/day 04:20	02 4 * * *
	logrotate	Rotates log files /var/log/wtmp /var/log/btmp	1 time/day 04:20	02 4 * * *
	makewhatis.cron	Reads all man pages and updates the whatis database	1 time/day 04:20	02 4 * * *
	mlocate.cron	Creates or updates a database of file names used by the locate command	1 time/day 04:20	02 4 * * *
	prelink	Modifies ELF shared libraries and ELF dynamically linked binaries to reduce the time needed for the dynamic linker to perform relocations at startup	1 time/day 04:20	02 4 * * *
	rpm	Creates list of rpm packages in /var/log/rpmpkgs	1 time/day 04:20	02 4 * * *
	tmpwatch	Recursively removes files which haven't been accessed for a given number of hours.	1 time/day 04:20	02 4 * * *

Cron File	Cron Entry	What It Does	Frequency (Ztime)	Cron Time (min, hour, day of month, month, day of week)
/etc/cron.weekly (run from entry in /etc/crontab)	makewhatis.cron	Reads all man pages and writes a line in the whatis database1 time/day 04:20 consisting of the name of the man page and a short description	1 time/week on Sunday at 04:22	22 4 * * 0

11.1.3.2 WFO dxIf HA Crons

There are 2 cronfiles that are active in /etc/cron.d/ when the dx2f a2dx2apps package is running; a2SITEDx2cron is for site specific crons, a2dx2cron is the baseline delivered crons. See Table 11.1.3.2-1.

Table 11.1.3.2-1. WFO dx1f HA crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
a2SITEDx1cron	Site specific	Site specific		
a2dx1cron (root entries)	backup_pgdb_a2 -a	Performs daily pg_dump backup of databases	1 time/day 22:50	05 22 * * *
	backup_pgdb_a2 -d metadata	More frequent backups of metadata	Every 4 hours, skipping 22z	10 1,5,9,13,17 * * *
	nas_backup_daily	Makes full tar backups of certain files/directories	1 time/day 02:10	10 2 * * *
	/usr/bin/find /home/*.gnome -type f -name ".gnome-smproxy*" -mtime +30 -exec rm -f {} \;	Removes user gnome files older than 30 days every Sunday	1 time/week Every Sunday at 02:35	35 2 * * 0
	/usr/bin/find /home/*.sawfish/sessions -type f -mtime +30 -exec rm -f {} \;	Removes user sawfish files older than 30 days every Sunday	1 time/week Every Sunday at 02:40	40 2 * * 0
	msg_cleanup	Performs MHS Purge/Cleanup	1 time/day 07:20	2 7 * * *
	arch_cleanup_mhs	Cleans up archive MHS files	Every 30 minutes	30 * * * *
	purge_old_files	Purges old files from /var/spool/mqueue	Every 30 minutes	30 * * * *
(fxa entries)	NWWSSKeepAliveMsg	Tests uplink status	4 times/hour :13, :28, :43, :58	13,28,43,58 * * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
	startScour	Scours daily to clean up log files and a few items not hit by master.purge	1 time/day 00:30	30 0 * * *
	breakLogIngest	Breaks ingest logs daily	1 time/day 00:00	0 0 * * *
	nwrWatchDog.sh	Restarts nwrTrans.pl if necessary	Every minute	* * * * *
	NWRWAVESpurge.sh	Cleans DEBUG LOGS OUTPUT INPUT and TEST Directories	1 time/day 00:45	45 0 * * *
	removeExpiredNWR.sh	Removes any expired or corrupt files from pending and sent side of NWRWAVESBrowser	2 times/hour :20, :40	20,40 * * * *
	updateSUMMARY.csh	Updates the summary message four times an hour	4 times/hour :00, :15 :30, :45	00,15,30,45 * * * *
	pendingDirCheck	Checks for old messages in the pending directory every ten minutes	Every 10 minutes	00,10,20,30,40,50 * * * *
	legalArchiver.sh	Archives Observations and Official User Products text files; also purges any obs product files older than 7 days, and any OUP files older than 31 days	1 time/hour :55	55 * * * *
(oper entries)	run_hg_history	Generates XML file containing crests, low-water events, and impacts	1 time/day 01:01	1 1 * * *
	run_hg_genXML	Creates XML hydrograph data files for use by web applications	1 time/hour :09	9 * * * *

11.1.3.3 WFO dx2f HA crons

There are 2 cronfiles that are active in /etc/cron.d/ when the dx2f a2dx2apps package is running; a2SITEdx2cron is for site specific crons, a2dx2cron is the baseline delivered crons. See Table 11.1.3.3-1.

Table 11.1.3.3-1. WFO dx2f HA crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
a2SITEDx1cron	Site specific	Site specific		
a2dx2cron (ldm entries)	ldmadmin newlog	Rotates log file	1 time/day 00:00	0 0 * * *
	ldmadmin scour	Scours data directories	Every 3 hours at :00	0 */3 * * *

11.1.4 PX Crons

The PX servers run crons for both standard Linux and for HA clusters. The px1f and px2f crons are maintained in /etc/ha.d/cron.d on both px1 and px2. When the HA packages start up, the appropriate crons are copied to /etc/cron.d and activated.

11.1.4.1 WFO PX Standard crons

The PX standard crons run when the machine is up and are not part of the HA failover packages. The PX standard crons are different from the workstations and the DX. See Table 11.1.4.1-1.

Table 11.1.4.1-1. WFO PX Standard crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/root	logAndRemoveCoreFile.ksh	Removes core files	1 time/day 10:00	0 10 * * *
	boxktp	Gathers performance and system metrics	1 time/day 23:59	59 23 * * *
	boxstats_cleanlogs	Cleans up data logs created from boxstats performance gathering scripts	1 time/day 00:00	00 0 * * *
	boxallstats	Generates sar and top statistics	1 time/day 00:01	1 0 * * *
/etc/cron.d/sysstat	root /usr/lib/sa/sa1 1 1	Runs system activity accounting tool	Every 10 minutes	*/10 * * * *
	root /usr/lib/sa/sa2 -A	Provides daily summary of process accounting	1 time/day 23:53	53 23 * * *
/etc/cron.daily (run from entry in /etc/crontab)	0logwatch	Parses system logs and creates output in /var/log	1 time/day 04:20	02 4 * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
	logrotate	Rotates log files /var/log/wtmp /var/log/btmp	1 time/day 04:20	02 4 * * *
	makewhatis.cron	Reads all man pages and updates the whatis database	1 time/day 04:20	02 4 * * *
	mlocate.cron	Creates or updates a database of file names used by the locate command	1 time/day 04:20	02 4 * * *
	prelink	Modifies ELF shared libraries and ELF dynamically linked binaries to reduce the time needed for the dynamic linker to perform relocations at startup	1 time/day 04:20	02 4 * * *
	rpm	Creates list of rpm packages in /var/log/rpmpkgs	1 time/day 04:20	02 4 * * *
	tmpwatch	Recursively removes files which haven't been accessed for a given number of hours	1 time/day 04:20	02 4 * * *
/etc/cron.weekly (run from entry in /etc/crontab)	makewhatis.cron	Reads all man pages and writes a line in the whatis database 1 time/day 04:20 consisting of the name of the man page and a short description	1 time/week on Sunday at 04:22	22 4 * * 0

11.1.4.2 WFO px1f HA crons

There are 2 cronfiles that are active in /etc/cron.d/ when the px1f a2px1apps package is running; a2SITEpx1cron is for site specific crons, a2px1cron is the baseline delivered crons. See Table 11.1.4.2-1.

Table 11.1.4.2-1. WFO px1f HA crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
a2SITEpx1cron	Site specific	Site specific		
a2px1cron (fxa entries)	breakLogIngest	Breaks ingest logs daily	1 time/day 00:00	0 0 * * *
	breakAnnouncementFiles	Breaks announcer files daily	1 time/day 00:00	0 0 * * *
	master.purge	Performs master purger daily, to clean out old log directories	1 time/day 01:30	30 1 * * *
	startScour	Scours daily to clean up log files and a few items not hit by master.purge	1 time/day 00:30	30 0 * * *
	climate.sh auto am	Morning Climate (MDL)	1 time/day 12:25	25 12 * * *
	climate.sh auto pm	Evening Climate (MDL)	1 time/day 22:25	25 22 * * *
	launch_AEV.csh Mtr_scd_dvr	Controls the MTR decoder feeding Climate (MDL)	Every hour at :07	7 * * * *
	clean_FSS_tables.sh	Purges the MTR decoder tables about once a week (MDL)	1 time/week every week at 03:40	40 3 1,8,15,22 * *
	hwrnwr -t	NOAA Weather Radio HWR	Every hour at :10	10 * * * *
	hwrnwws -t	NWWS HWR	Every hour at :10	10 * * * *
	awips2_radarIngest.pl	LAPS Ingest radar	Roughly every 5 minutes	05,10,15,19,25,30,35 ,40,45,50,55 * * * *
	awips2_satIngest.pl	LAPS Ingest satellite	Every 15 minutes	12,17,42,57 * * * *
	awips2_dataMgmt.pl	LAPS Ingest metar, maritime and GRID236/RUC2 data hourly	Every hour at :15	15 * * * *
	sched.pl	LAPS – runs LAPS analyses	Every hour at :20	20 * * * *
	startPurgeProcess	Keeps purgeProcess running	Every 10 minutes	*/10 * * * *
	WFOA_MSAS_Sfcnmc.run	MSAS Ingest the NCEP surface grids every 6 hours	Every 6 hours at :35	35 5,11,17,23 * *
	WFOA_MSAS_Surface.run	MSAS Run the surface	4 times/hour at	11,26,41,56 * * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
		cycle 4 times an hour	:11, :26, :41, :56	
	WFOA_MSAS_Abos.run	MSAS Compile the daily surface QC stats	1 time/day 00:05	5 0 * * *
	WFOA_MSAS_QCstage1_2.run	QCMS stage 1 & 2 QC on current hour's data	12 times/hour	1,6,11,16,21,26,31,36,41,46,51,56 * * * *
	WFOA_MSAS_QCstage1_2_late.run	QCMS stage 1 & 2 QC on previous hour's data	12 times/hour	1,6,11,16,21,26,31,36,41,46,51,56 * * * *
	WFOA_MSAS_QCday.run	QCMS yesterday's QC stage 1, 2 & 3 daily summaries	1 time/day at 01:15	15 1 * * *
(oper entries)	purge_files	Purges WHFS UNIX files	Every 4 hours at :01	01 1,5,9,13,17,21 * * *
	purge_mpe_files	Purges WHFS mpe files	1 time/day at 12:01	01 12 * * *
	run_floodseq	Updates flood history for hydro database	1 time/day at 06:30	30 6 * * *
	run_mpe_whfs	Set of programs that completes mpe analysis	1 time/hour at :24	24 * * * *
	process_qpe_mosaic	WFOs only - grib encodes the RFC QPE mosaics and sends them to awips for display	4 times/hour at :05, :20, :35, :50	05,20,35,50 * * * *
	purge_hpe_files	Purges HPE files according to retention period	Every 30 minutes	8,38 * * * *
	run_SSHP_HPN_preprocess	SSHP HPN Preprocessor	1 time/hour at :06	06 * * * *
	run_SSHP_var	Variational Data Assimilation for SAC-SMA model in SSHP NOTE: Uncomment this cron entry line if your office is using VAR within SSHP.	1 time/hour at :30 (if uncommented)	#30 * * * *
	run_SSHP_SAC_state_update	Runs SSHP in background for RiverMonitor's SSHP fcst columns.	1 time/hour at :36 (if uncommented)	#36 * * * *
(root entries)	VIRtest	Performs VIR test 3 times/day	3 times/day 02:15, 10:15, 18:15	15 2,10,18 * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
	startPurgeProcess	Starts purgeProcess if it is not running	Every 10 min	*/10 * * * *
	diskMon.sh	Updates disk monitor portion of AWIPS II System Monitor	Every 120 min	*/20 * * * *
	ldad_diskMon.sh	Updates disk monitor portion of AWIPS II System Monitor	Every 20 min	*/20 * * * *
	cpuMon.sh	Updates CPU monitor portion of AWIPS II System Monitor	Every 20 min	*/20 * * * *

11.1.4.3 WFO px2f HA crons

There are 2 cronfiles that are active in /etc/cron.d/ when the px2f a2px2apps package is running; a2SITEpx2cron is for site specific crons, a2px2cron is the baseline delivered crons. See Table 11.1.4.3-1.

Table 11.1.4.3-1. WFO px2f HA crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
a2SITEpx2cron	BOIVerify and Site specific	BOIVerify and Site specific		
a2px2cron (fxa entries)	startScour	Scours daily to clean up log files and a few items not hit by master.purge	1 time/day 00:30	30 0 * * *
	breakLogIngest	Breaks ingest logs daily	1 time/day 00:00	0 0 * * *
(ldad entry)	breakLogLDAD.px2	Breaks ingest and decoder logs daily at 00Z	1 time/day 00:00	0 0 * * *
(root entries)	gatherLogs.pl	Collects system log files from several hosts	1 time/day 07:23	23 7 * * *
	/usr/local/bin/scp -q ls1:/home/securityLogs/* /home/securityLogs	Copies the Security Logs from ls1 to px2	1 time/day 07:34	34 7 * * *
	logAndRemoveCoreFile.ksh	Removes core file from /home on an hourly basis at 10 past the hour	Every 10 minutes	10 * * * *

11.1.5 WFO LS Crons

The LS servers run crons for both standard Linux and for the LS HA cluster. The LS crons are maintained in /etc/ha.d/cron.d on both ls2 and ls3. When the HA package is up, the appropriate crons are copied to /etc/cron.d and activated.

11.1.5.1 WFO LS Standard crons

The LS standard crons run when the machine is up and are not part of the HA failover package. See Table 11.1.5.1-1.

Table 11.1.5.1-1. WFO LS Standard crons

Cron file	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/root	No entries			
/var/spool/cron/ldad	startScour.sh	Runs scour daily to clean up log files	1 time/day 00:30	30 0 * * *
/var/spool/cron/lsm	scour	Recursively deletes files older than a specified number of days from a # specified set of directories	2 times/day 00:00, 12:00	0 0,12 * * *
/etc/cron.d/sysstat	root /usr/lib/sa/sa1 1 1	Runs system activity accounting tool	Every 10 minutes	*/10 * * * *
	root /usr/lib/sa/sa2 -A	Runs daily summary of process accounting	1 time/day 23:53	53 23 * * *

11.1.5.2 WFO LS HA crons

There are two cronfiles that are active when the LS HA package is running: SITElscron is for site-specific crons; lscron is the baseline delivered crons. See Table 11.1.5.2-1.

Table 11.1.5.2.1. WFO LS HA crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
SITElscron	Site specific	Site specific		
lscron (ldad entry)	breakLogLDAD.ls	Breaks LDAD logs daily at 00Z	1 time/day 00:00	0 0 * * *
(root entries)	rsync_cron.sh data_ldad	sync /data/ldad directory	1 time/hour at :10	10 * * * *
	rsync_cron.sh ldm	sync /usr/local/ldm/data/ directory	2 times/day 06:20, 12:20	20 6,12 * * *
	rsync_cron.sh home	sync /home directory	1 time/day 23:01	01 23 * * *

11.1.6 WFO CPSBN crons

The CPSBN servers run standard crons. See Table 11.1.6-1.

Table 11.1.6-1. WFO CPSBN crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/root	removeArchives	Removes old monitor and control archives	1 time/day 00:09	9 0 * * *
/etc/cron.d/sysstat	root /usr/lib/sa/sa1 1 1	Runs system activity accounting tool	Every 10 minutes	*/10 * * * *
	root /usr/lib/sa/sa2 -A	Runs a daily summary of process accounting	1 time/day 23:53	53 23 * * *

11.1.7 WFO AX crons

The AX server runs standard crons. See Table 11.1.7-1.

Table 11.1.7-1. WFO AX crons

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/root	logAndRemoveCoreFile.ksh	Removes core files	1 time/day 10:00	0 10 * * *
	boxktp	Gathers performance and system metrics	1 time/day 23:59	59 23 * * *
	boxstats_cleanlogs	Cleans up data logs created from boxstats performance gathering scripts	1 time/day 00:00	00 0 * * *
	boxallstats	Generates sar and top statistics	1 time/day 00:01	1 0 * * *
	nas_backup_weekly	Backs up all volumes on the NAS on a weekly basis	1 time/week Every Monday at 03:10	10 3 * * 1
/var/spool/cron/fxa	diskUsage.pl	Creates a data page on disk usage for the FX Data Monitor	Every 10 minutes	0,10,20,30,40,50 * * *
	startCtrlCpu.sh	Starts CPU monitor if it is not running	Every 10 minutes	0,10,20,30,40,50 * * *
	startScour	Runs scour daily to clean up log files and a few items not hit by other purgers	1 time/day 00:30	30 0 * * *
	breakLogCtrlCpu	Breaks ctrlCpu log daily	1 time/day 00:00	0 0 * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
/var/spool/cron/archiver	RdrArc.tcl	Keeps five days of archived radar data; checks and limits size of archive	Every 2 hours at :00	0 2,4,6,8,10,12,14,16,18,20,22 * * *
	RdrArc.tcl	Keeps five days of archived radar data; checks and limits size of archive	1 time/day 23:58	58 23 * * *
	SatArc.tcl	Keeps five days of archived satellite data; checks and limits size of archive	4 times/day 23:30, 02:30, 09:30, 17:30	30 23,2,9,17 * * *
	NetArc.tcl	Keeps five days of archived point data; checks and limits size of archive	4 times/day 23:15, 02:15 09:15, 17:15	15 23,2,9,17 * * *
	MdlArc.tcl	Keeps five days of archived model data; checks and limits size of archive	2 times/day 11:00, 22:00	0 11,22 * * *
	UsrArc.tcl	Keeps five days of archived user data; checks and limits size of archive	2 times/day 11:00, 22:00	0 11,22 * * *
	LdadArc.tcl	Keeps five days of archived ldad data; checks and limits size of archive	4 times/day 21:17, 03:17 09:17, 15:17	17 21,3,9,15 * * *
	find \$ARCH_ROOT/logs -mtime +30 -exec rm {} \;	Purges old log files	1 time/day 18:32	32 18 * * *
	logfile= `date +\%Y\%m\%d\%H.diskUsage.log` ; du -sk /data/archiver/7dayRollover/* > \$ARCH_ROOT/logs/\$logfile ; df /data/archiver >> \$ARCH_ROOT/logs/\$logfile	Records size of the temporary directories. Log file name is yyyyymmddhh.diskUsage.log	4 times/day 02:29, 08:29 14:29, 20:29	29 2,8,14,20 * * *
/etc/cron.d/sysstat	root /usr/lib/sa/sa1 1 1	Runs system activity accounting tool	Every 10 minutes	*/10 * * * *
	root /usr/lib/sa/sa2	Runs daily summary of	1 time/day	53 23 * * *

Cron File	Cron Entry	What It Does	Frequency (Z time)	Cron Time (min, hour, day of month, month, day of week)
	-A	process accounting	23:53	

11.2 quartz

EDEX essentially consists of a collection of components that execute in response to events. One type of event that is available in EDEX is a "quartz"-driven event. quartz provides a cron-like facility inside EDEX:

- quartz is part of EDEX. It is only used as part of EDEX. That means, (a) quartz is only used on DX3/4, and (b) quartz controlled jobs execute only while EDEX is running.
- EDEX does coordinate between DX3 and DX4, however. This means quartz controlled jobs will run as long as EDEX is running on at least one of DX3 and DX4.
- quartz does not log to /var/log/cron. quartz errors will log to the appropriate EDEX process log. Jobs controlled by quartz may provide their own logging.
- quartz entries are compiled into EDEX, sites will not be able to modify or view quartz entries

Quartz jobs are scheduled to run when a given Trigger occurs. Triggers can be created with nearly any combination of the following directives:

- At a certain time of day (to the millisecond)
- On certain days of the week
- On certain days of the month
- On certain days of the year
- Not on certain days listed within a registered Calendar (such as business holidays)
- Repeated a specific number of times
- Repeated until a specific time/date
- Repeated indefinitely
- Repeated with a delay interval

When quartz “fires,” an event is sent to the EDEX component. A quartz event can be configured to fire using the same basic expression as cron.

For example, EDEX uses a quartz trigger to run a periodic data purge. In the descriptor for the purge service, the uri for the event source is

"quartz://purge/purgeScheduled/?cron=0+15+*+*+*?".

This is equivalent to a cron expression of `15 * * * *` — that is, quartz fires 15 minutes after every hour. AWIPS II EDEX contains a number of quartz event components that must perform periodic tasks like this.

As a result, many of the crons that are used in AWIPS I have become quartz event-driven EDEX components in AWIPS II.

A list of cron jobs and associated schedules for AWIPS II is provided in Table 11.2-1.

Table 11.2-1. Crons Jobs and Associated Schedules for AWIPS II

Plug-In	Cron	Fires	Configuration	Comment
com.raytheon.edex.autobldsrv	<code>0+*+*+*+*?</code>	every minute	subscription table in DB	runs cron based script runner
com.raytheon.edex.plugin.gfe	<code>0+15+*+*+*?</code>	at 15 minutes after each hour	normal localization	
com.raytheon.edex.plugin.gfe	<code>0+10+*+*+*?</code>	10 minutes after each hour	normal install/localization	part of service backup
com.raytheon.edex.rpgenvdata	<code>0+0+*+*+*?</code>	on the hour, every hour	normal localization	
com.raytheon.edex.rpgenvdata	<code>0+26,46+*+*+*?</code>	26 and 46 minutes after each hour	normal localization	
com.raytheon.uf.edex.distribution	<code>0/5+*+*+*+*?</code>	Every 5 seconds	distribution files	refreshes data distribution rules
com.raytheon.uf.edex.metartohmdbsrv	<code>0+14+*+*+*?</code>	at 14 minutes after each hour	non configurable	runs the HMDB purge
com.raytheon.uf.edex.ohd	<code>0+7,17,27,37,47,57+*+*+*?</code>	7, 17, 27, 37, 47, and 57 minutes after each hour	normal localization	runs the WHFS alarms service
com.raytheon.uf.edex.ohd	<code>0+20+0,6,12,18+*+*?</code>	at 0:20, 6:20, 12:20 18:20 daily	normal localization	runs DQC pre processor
com.raytheon.uf.edex.ohd	<code>0+30+6+*+*?</code>	at 6:30 each day	normal localization	runs flood sequence service
com.raytheon.uf.edex.ohd	<code>0+45+7+*+*?</code>	at 7:45 each day	normal localization	runs the IHFS database purge
com.raytheon.uf.edex.ohd	<code>0+1+1,5,9,13,17,21+*+*?</code>	at 1:01, 5:01, 9:01, 13:01, 17:01, 21:01 daily	normal localization	runs scheduled log file purger
com.raytheon.uf.edex.ohd	<code>0+25+*+*+*?</code>	25 minutes after each hour	normal localization	runs the hourly MPE
com.raytheon.uf.edex.ohd	<code>0+1+12+*+*?</code>	at 12:01 daily	normal localization	runs the HPE file purger
com.raytheon.uf.edex.ohd	<code>0+2,17,32,47+*+*+*?</code>	2, 17, 32, and 47 minutes after each hour	normal localization	runs the WHFS services
com.raytheon.uf.edex.plugin.acarsounding	<code>0+10,30,50+*+*+*?</code>	10, 30, and 50 minutes after	normal localization	runs acars sound

Plug-In	Cron	Fires	Configuration	Comment
com.raytheon.uf.edex.purgesrv	0+15+*+*+*+?	every hour at 15 minutes after each hour	purge times in DB	processing runs the basic data store purge

11.3 AWIPS II DATA PURGING

11.3.1 Purgung Processed Data Storage

Purgung of data from Processed Data Storage is performed by an EDEX Ingest process running on the DX3/4 cluster. The purge is triggered by a quartz timer event that fires at 30 minutes after each hour.

EDEX logs Data Purge events into a separate log; the purge log is named *edex-ingest-purge-yyyymmdd.log* where yyyyymmdd is the date stamp of the log. For example, the name of the purge log for June 10, 2011 is *edex-ingest-purge-20110610.log*. Among the purge events logged are the start and end of the purge. Since the EDEX Ingest process manages the purge, purge events may also log to the EDEX Ingest log.

EDEX uses a cluster locking mechanism that prevents both EDEX Ingest processes from performing the purge, although the purge may occur on either EDEX server. As a result, the EDEX Ingest logs on both DX3 and DX4 must be examined to verify purging and/or to identify purging problems.

Data purging is performed according to purging strategies defined for each data decoder in EDEX. A default, time-based purge strategy is provided for decoders that do not provide a purging strategy. Time-based purging is based on the reference time of the data. Determination of the reference time is decoder based. In the default purge strategy, all data more than 24 hours old at the time of the purge is deleted.

Purgung rules are defined in XML files in the Localization Store on DX3/4. The purge rule files are located in the /awips2/edex/data/utility/edex_static file tree and follow the base/site localization pattern. The base purge rule files are located in base/purge under edex_static; the site purge rule files are located in site/XXX/purge under edex_static, where XXX is the site identifier, e.g., OAX.

The order of precedence for the purge rules is site – base – default; that is, site rules override base rules, which override default rules. When modifying a purge rule, the correct process is to copy the base file to the site purge rules folder and modify that copy.

Note that the purge rules folder is shared between DX3 and DX4 so the modification is performed on either DX3 or DX4 – not both. Note also that changes to the purge rules are only picked up by the EDEX Ingest process as it starts; when changes are made you will need to restart the EDEX Ingest process to update the rules.

Finally, when the EDEX Ingest process starts, it reads the purge rule files and updates the *purge_rules* table in the AWIPS II metadata database. This table can be queried to provide a quick look at the purge rules for any data decoder plug-in.

To see a list of the data plug-ins that have purge rules, perform the following:

1. Log into the AWIPS II database.

Enter: **psql -h dx1f -U awips -d metadata**

2. Query to determine the plug-ins in the *purge_rules* table.

Enter: **select distinct pluginname from purge_rules;**

To see a list of default purge rules, perform the following:

1. Log into the AWIPS II database.

Enter: **psql -h dx1f -U awips -d metadata**

2. Query to determine the default purge rules.

Enter: **select * from purge_rules where key='default';**

Note that the output in each row is rather long; a more readable list may be generated by replacing the “*” in the SQL *select* statement with *key,pluginname,delta,logonly,modtime,versionstokeep*.

To see a list of purge rules for a specific data decoder, e.g., satellite, perform the following:

1. Log into the AWIPS II database.

Enter: **psql -h dx1f -U awips -d metadata**

2. Query to determine the purge rules for the data decoder.

Enter: **select * from purge_rules where key='satellite';**

Again, the output in each row is rather long; a more readable list may be generated by replacing the “*” in the SQL *select* statement with *key,pluginname,delta,logonly,modtime,versionstokeep*.

To query for other data decoders, replace *satellite* in the SQL *select* statement with the desired data decoder plug-in name.

To verify the data purge, you need to look at the size of two directory structures on dx1f: the hdf5 data structure in /awips2/edex/data/hdf5; and the PostgreSQL table spaces in /awips2/data. One strategy for doing this is to set up a cron job to determine the space used in these two directory trees and write the results to a log file. This file can be examined periodically and should show generally stable disk usage over time. A simple script to perform this function follows.

```
#!/bin/bash
SPACE_DB=$(du /awips2/data -sh)
SPACE_HDF=$(du /awips2/edex/data/hdf5 -sh)
TIME_NOW=$(date "+%D %T")
echo "{$TIME_NOW} DB: ${SPACE_DB} HDF5: ${SPACE_HDF}" >>
```

```
/tmp/space_usage.log
```

This script can be run approximately every 10 minutes to provide a good picture of disk space usage for Processed Data Storage. Note that it must be run by the *awips* user on the server running the a2dx1apps high-availability package.

11.3.2 Purging Raw Data Storage

Purging of data from Raw Data Storage is performed using the *scour* process, which is part of LDM(D). The Raw Data Purge is controlled by a cron job that is part of the a2dx2apps high-availability package. (This cron job is defined in the a2dx2cron, which is staged in /etc/ha.d/cron.d on DX1 and DX2 and can be found in /etc/cron.d on the server running a2dx2apps.) The cron job is executed as the *ldm* user. The directories and retention times for Raw Data Storage are controlled by *scour.conf*, which is located in the etc subdirectory of the *ldm* user home directory dx2f.

Each row in *scour.conf* contains either two or three entries. The first entry is the directory to manage; the second entry is the retention time of the directory contents in days. When present, the third entry specifies a file name pattern that is used to determine which files to delete; if no pattern is specified, all visible files are deleted. Files are deleted from the specified directory and all subdirectories. Note that *scour* may retain files that are older than the configured retention times. This will occur when the directory containing the files has not been modified (by writing a new file to the directory or its subdirectories) since the last execution of *scour*.

To determine/verify the Raw Data Storage purge schedule, log into dx2f as *root*, switch user to the *ldm* user, and list the cron table. Perform the following:

1. Log into dx2f as *root*.
Enter: **ssh root@dx2f**
2. Change directory to the cron table directory (/etc/cron.d).
Enter: **cd /etc/cron.d**
3. List the cron table file (a2dx2cron).
Enter: **cat a2dx2cron**

Look for a cron table entry containing *ldmadmin scour*.

To determine the directories being managed by *scour*, log into dx2f as *root*, switch user to the *ldm* user and list the *scour.conf* file. Perform the following:

1. Log into dx2f as *root*.
Enter: **ssh root@dx2f**
2. Switch user to the *ldm* user.
Enter: **su - ldm**
3. Change directory into ~/etc.
Enter: **cd etc**

4. List the *scour.conf* file.

Enter: **cat scour.conf**

11.4 EDEX Log File Purging

Log purging is designed to reduce the space required for EDEX logs. In operation it will:

- Zip any log files that are more than 7 days old into a date stamped log file.
 - Only files that match the “standard” log naming pattern are zipped.
 - File name pattern is “^(.*)(\d{4}\d{2}\d{2})(.*).log\$”.
 - Name contains an 8 digit number and ends in “.log”.
 - Although not required, the 8 digits represent YYYYMMDD.
 - The files that have been zipped are removed from the logs directory.
- Remove any zip files that are more than one month old.
 - File name pattern is “^(\d{4}\d{2}\d{2}).zip\$”.
 - Name is 8 digit followed by “.zip”.
 - Although not required, the 8 digits represent YYYYMMDD.

Purge timing:

The log purge fires at 00:30 each day.

Configuration:

The log purge can be rescheduled by modifying its *quartz* timer trigger value in *project.properties*. *project.properties* is located in */awips2/edex/conf/spring*. The token value to change is “*purge.logs.cron*”. The default setting for this token is

purge.logs.cron=0+30+0+*+*+?

This specifies that the log purge will fire at 00:30 every day.

Event logging:

Log purging events are logged to both the EDEX Ingest and EDEX Ingest Purge logs.

Purge events:

```
PurgeLogger: EDEX: EDEX - -----START LOG PURGE-----
PurgeLogger: EDEX: EDEX - Removed 0 old files
PurgeLogger: EDEX: EDEX - Archived 0 files
PurgeLogger: EDEX: EDEX - Skipped processing 0 files
PurgeLogger: EDEX: EDEX - -----END LOG PURGE-----
```

Comments:

This is a somewhat generic zipper/purger and can handle logs other than the standard EDEX logs. The main catch is that the log name must contain an embedded 8-digit number and end “.log”. Files not matching this pattern are simply ignored.

The caveat: File name patterns and retention times are coded in and cannot be changed.

Chapter 12

Database Management

Chapter 12. Database Management

Table of Contents

12.0	Database Management: Introduction.....	1
12.1	AWIPS II Database Management	1
12.1.1	Rehosted Databases	2
12.2	Text DB Overview	2
12.3	Other PostgreSQL Databases	5
12.4	PostgreSQL Database Environment Variables.....	5
12.5	PostgreSQL Database Archiving.....	6
12.6	PostgreSQL Database Sparing	7
12.7	PostgreSQL Logs	7
12.8	Checking System Processes	7
12.9	Monitoring PostgreSQL-Dependent Applications	7
12.10	PostgreSQL Cron	8
12.11	Stopping/Starting Database Engine Dependent Applications	9
12.12	PostgreSQL vacuum operations.	9
12.13	Verifying AWIPS II Data Purging	10
12.13.1	Verify Purging of Data from the AWIPS II Raw Data Store	10
12.13.2	Verify Execution of the EDEX Purge Service on DX3 and DX4	13
12.13.3	Verify Purging of Data from the AWIPS II Metadata Database	16
12.13.4	Verify purging of data from the AWIPS II HDF5 Processed Data Store.....	17

List of Tables

Table 12.1.1-1.	Databases reused from AWIPS I.....	2
Table 12.4-1.	PostgreSQL Environmental Variables	6
Table 12.9-1.	WFO/RFC PostgreSQL-Dependent Databases	7
Table 12.9-2.	Linux Commands for Monitoring Processes that Impact the PostgreSQL Database	8

12.0 Database Management: Introduction

PostgreSQL is the official database for AWIPS. For AWIPS II, the PostgreSQL database is hosted on the database cluster (DX 1/2). AWIPS II utilizes several of the existing AWIPS databases, although they are re-hosted into a new PostgreSQL instance. AWIPS II also adds additional databases to support the new ingest and display paradigms used by AWIPS II.

12.1 AWIPS II Database Management

AWIPS II also uses PostgreSQL to host data. The current install of AWIPS II creates a completely new database after completely removing the previous one. This allows the database tables to change with minimum fuss in a development environment. At this point, no attempt is being made to preserve the data during the install; everything is re-created from scratch.

NOTE: The results are not yet in place and some data from the AWIPS II database is being saved and restored following the install. This is done using scripts that are on the AWIPS II install media. The two scripts are **dump-ihfs.sh** and **restore-ihfs.sh**.

AWIPS II currently uses the Dam Catalog (DAMCAT), Text (FXATEXT), hydrology (HYDRO), and climatology (HMDB) databases from AWIPS I. FXATEXT has some changes, the most visible change being that it is not using the watchwarn table. (Triggers have been moved into the subscription.subscriptions table in the metadata database.)

NOTE: Details on the AWIPS II method of handling watch/warn triggers are included in Chapter 15, Localization.

AWIPS II has introduced two new databases to the mix: *maps* and *metadata*. *maps* contains definitions of shapes for the various maps used in CAVE and is generally static. *metadata* contains all other AWIPS II-specific data used by CAVE and EDEX. This data is generally dynamic, but some tables are static. In *metadata*, the *subscription* schema replaces the watchwarn table in the FXA TEXT database. The *awips* schema includes tables containing product metadata, some of which are static. It also includes the VTEC active table and the practice active table, which are used by WarnGen and GFE. Both of these schemas and their tables are created when the database is installed.

AWIPS II does not currently have a mechanism to persist data in the metadata database between installs; that is the subject of TTR-generated tickets and is being worked. Generally, these tables are generated the first time EDEX starts following the installation; they are also the tables undergoing the most change during development. Because these tables are prone to change every time during an install, no attempt has been made to preserve this data over installs. This only applies to the tables in the metadata database and does not apply to other databases (Hydro, Text, DamCat, etc.).

AWIPS II handles database (and data store) purges via a quartz-triggered component of EDEX; as a result, there are no cron jobs related to AWIPS II data purging.

AWIPS II does not have any data backup related to the database.

In AWIPS II, PostgreSQL is started and stopped using a script called **edex_postgres**, which is located in /etc/init.d on the database server.

12.1.1 Rehosted Databases

AWIPS II reuses several of the databases from AWIPS I. The reused databases are listed in Table 12.1.1-1.

Table 12.1.1-1. Databases reused from AWIPS I

Table	Comment
hd_ob92xxx	hydrology database, replace xxx with site ID
dc_ob7xxx	Dam Catalog, replace xxx with site ID
hmdb	historical meteorological database
lsrdata	LSR data
ob7_histdata	(RFC only) Historical river data

All databases that AWIPS II reuses are imported into the AWIPS II database at initial system installation.

AWIPS II uses a modified version of the Text database (fxatext). See section 12.2 for additional details on the fxatext database.

12.2 Text DB Overview

Decoded text products are stored in a PostgreSQL database on the Direct Attached Storage (DAS). The partition where the database resides is mounted to dx1f. The database works on a circular buffer basis storing the newest version of each product over the oldest. The number of versions of each product or category of products is specified in the **versionstokeep** field of the **textproductinfo** table.

The **fxatext** database consists of seven tables:

1. afoslookup
2. afos_to_awips
3. autofaxrecord
4. statematch
5. stdtextproducts
6. practicestdtextproducts
7. textproductinfo
8. watchwarn

afoslookup

This table contains a mapping of AFOS CCC codes to WMO sites. It has two columns: **ccc** and **origin**. An example follows.

<u>ccc</u>	<u>origin</u>
WBC	K7VM
BHM	KAAF
PHL	KABE
LBB	KABI
ABQ	KABQ
FSD	KABR
ABQ	KABX
FIW	KACT
PHL	KACY
ARB	KADG

afos_to_awips

This table stores the WMO identifier and WMO ttaaii code for each AFOS PIL (afosid). It has three columns: **afosid**, **wmocccc**, and **wmottaaii**. An example follows.

<u>afosid</u>	<u>wmocccc</u>	<u>wmottaaii</u>
ABQABVABQ	KABQ	UFUS45
ABQADAABQ	KABQ	NOUS75
ABQADMABQ	KABQ	NOUS75
ABQADMZAB	KABQ	NOUS75
ABQADRABQ	KABQ	NOUS45
ABQADRABQ	KABQ	WOUS45
ABQADRNM	KABQ	WOUS45
ABQAFDABQ	KABQ	FXUS65
ABQAFMABQ	KABQ	FOUS55
ABQAFPABQ	KABQ	FLUS45

statematch

This table contains a listing of all **xxx** and **ccc** ID combinations for a state. It has three columns: **state**, **xxx**, and **ccc**. An example follows.

<u>state</u>	<u>ccc</u>	<u>xxx</u>
MO	UNO	STL
MO	VIH	STL
MS	137	JAN
MS	138	JAN
MS	139	JAN
MS	140	JAN
MS	BIX	JAN
MS	BKS	JAN
MS	CBM	JAN
MS	GLH	JAN
MS	GPT	JAN
MS	GTR	JAN

MS	GWO	JAN
MS	HBG	JAN

stdtextproducts

This table stores standard text products such as TAFs and METAR observations. It includes information on the version and creation time for standard products stored in the database. The product is also displayed. The table has 10 columns: **cccid**, **datacrc**, **hdrtime**, **nnnid**, **site**, **wmoid**, **xxxid**, **bbbid**, **createtime**, and **product**. Two examples follow.

```

Cccid      FTW
Datacrc   3901128814
Hdrtime   050800
Nnnid     MIR
Site       KPRX
Wmoid     SAUS70
Xxxid     PRX
Bbbid     RRN
Createtime 1280994984898
Product
SAUS70 KPRX 050800 RRN
KPRX 050755Z 22005KT 10SM CLR 27/23 A2989 RMK 01

Cccid      CHI
Datacrc   1130462633
Hdrtime   051157
Nnnid     RR2
Site       KDVN
Wmoid     SRUS53
Xxxid     DVN
Bbbid
Createtime 1281009462718
Product
SRUS53 KDVN 051157
RR2DVN
IVROCS
.A MTCI2 0805 C DH0745/TX 84/TN 64/TA 70/PP 0.02/AD 01/
.A DNNI4 0805 C DH07/TX 87/TN 70/TA 70/PP T/AD 09/

```

practicestdtxtproducts

This table stores text products such as TAFs and METAR observations issued when CAVE/Text WS is in practice mode. It has the same structure as the stdtextproducts table.

textproductinfo

This table stores version information for each product in the database. It has four columns: **cccid**, **nnnid**, **xxxid**, and **versionstokeep**. An example follows.

<u>Cccid</u>	<u>Nnnid</u>	<u>Xxxid</u>	<u>versionstokeep</u>
WSR	UAM	BBX	2
LBB	MTR	ELP	6
MSP	RR2	MSR	2
NYC	MTR	JFK	6
PHL	MTR	ABE	6
PWM	MTR	MWN	6
BIS	RRZ	LDA	2
BOI	MTR	SNT	26
PWM	MTR	CON	6
PWM	MTR	PWM	6
NCF	WTS	NCF	2
ARB	MTR	P58	6
MKE	MTR	MKE	6
BOS	MTR	PVD	6

watchwarn

The watchwarn table is no longer in use and should be empty. It has been replaced by the tables in the subscription schema of the metadata database.

12.3 Other PostgreSQL Databases

The PostgreSQL database engine is also utilized by hydrology applications and interactive forecast applications. Descriptions of their PostgreSQL use may be found in the Government's application-specific documentation.

12.4 PostgreSQL Database Environment Variables

The PostgreSQL database engine runs on the Linux data server where the dx1f floating heartbeat address resides (either DX1 or DX2). The following chart lists the environment variables set for DX1 and DX2. These variables (DXs) need to be established (using the **setenv** or **export** commands) before executing the PostgreSQL commands listed on the following pages. Table 12.4-1 lists the environment variables.

NOTE: AWIPS II uses a different paradigm for setting the runtime environment required by AWIPS II applications. In this paradigm, the environment is set in the application startup script. As a result, these environment variables are not required for running AWIPS II applications. They are retained here for compatibility with AWIPS I scripts.

Table 12.4-1. PostgreSQL Environmental Variables

Environment Variables	Description	DX1 and DX2
PGDATA	Directory (or partition) for cluster data and default data base data	/data/db/pgdata
PGDATA_IHFS	Partition for IHFS and DAMCREST	/data/db/ihfs
PGDATA_FXATEXT	Partition for FXATEXT	/data/db/fxatext
PGDATA_HMDB	Partition for HMDB	/data/db/hmdb
PGDATA_IFPS	Partition for IFPS and WWA	/data/db/ifps
PGHOST	PostgreSQL host device	dx1f
PG_INSTALL	Installation directory	/usr
PGDATA_TOP	Top of the data directory tree	/data/db
PGPORT	Port definition	5432
PGUSER	Non-administrative user	postgres
PATH	Path to PostgreSQL	Includes /usr/include/pgsql
TERM	Terminal setting	vt100
PGDATA_LOCAL	Partition for local RFC databases	/data/db/dblocalrfc

Note: For the PXs and LXs, \$PGDATA is defined as /var/lib/pgsql/data.

12.5 PostgreSQL Database Archiving

The entire PostgreSQL database is backed up daily at about 2205Z by running a cron that executes a backup of each individual database. The log files created from this backup are stored using the following naming convention:

backup_<db>_<date>

Where <db> is the database - in AWIPS it is **pgdb** (PostgreSQL database), and <date> is the month and day in MMDD format.

Example for 27 Oct 2011: **backup_pgdb_1027**. This file is located in /data/logs/fxa on dx1.

An example of the backup file for **backup_pgdb_1027** is as follows:

```
Oct 27 01:10:02 BEGIN pg_dump metadata
Oct 27 01:14:51 END pg_dump metadata EXIT_CODE=0
Oct 27 05:10:01 BEGIN pg_dump metadata
Oct 27 05:14:33 END pg_dump metadata EXIT_CODE=0
Oct 27 09:10:01 BEGIN pg_dump metadata
Oct 27 09:14:48 END pg_dump metadata EXIT_CODE=0
Oct 27 13:10:02 BEGIN pg_dump metadata
Oct 27 13:15:25 END pg_dump metadata EXIT_CODE=0
```

Note: For manual backup, the cron entry is
05 22 * * * root /awips/ops/bin/backup_pgdb_a2 -
The log file is /data/logs/fxa/backup_pgdb_<MMDD>

Note: The database backups are in /data/fxa/DAILY_BACKUP/postgres/<Day>
dc_ob70ax, fxatext, globals, hd_ob830ax, hd_ob92eax, hb_ob92ntc, hmdb, ifps_eax,
lsrdata, maps, metadata, postgres

12.6 PostgreSQL Database Sparing

If the primary Linux Data Server (DX1) fails, PostgreSQL operations move to the DX2. The database itself is on the Network Appliance (NetApp) FAS2020C DAS, attached to the DX so it is not affected if the DX1 fails.

12.7 PostgreSQL Logs

PostgreSQL logs its actions in **/awips2/data/pg_log**. PostgreSQL also has logs for its database backups (described in section 12.5) and vacuum operations (see section 12.12 for more information on vacuum). These logs reside in the **/data/logs/fxa** directory on nas1-<siteID>.

12.8 Checking System Processes

To check the system processes on the PostgreSQL Database:

- TYPE:**
- **ps -wef | grep postgres**
 - You should see output similar to the following:

postgres 19792 1	0 Mar21 ?	00:00:15 /usr/bin/postgres -D /data/db/pgdata
postgres 20002 19792	0 Mar21 ?	00:00:18 postgres: writer process
postgres 20003 19792	0 Mar21 ?	00:00:00 postgres: stats collector process
postgres 20308 19792	0 Mar21 ?	00:00:25 postgres: pguser fxatext 165.92.29.195(36485) idle
postgres 20318 19792	1 Mar21 ?	01:31:21 postgres: pguser fxatext 165.92.29.195(36492) idle
postgres 23407 19792	0 Mar21 ?	00:00:09 postgres: pguser hd_ob83sto 165.92.29.195(36740) idle
postgres 30667 19792	0 Mar25 ?	00:01:09 postgres: pguser hmdb 165.92.29.133(39860) idle

12.9 Monitoring PostgreSQL-Dependent Applications

AWIPS II PostgreSQL-dependent databases are listed in Table 12.9-1.

Table 12.9-1. WFO/RFC PostgreSQL-Dependent Databases

WFO	RFC
fxatext dc_obx<site> hd_obx<site> ifps_<site> wwa_<site> hmdb lsrdata	fxatext hd_obx<site> dc_obx<site>

NOTE: The ifps_<site>, wwa_<site> and lsrdata are not used by AWIPS II software.

► **To Check Processes Executing on the Active DX**

The following process must be executing at all times on the active Linux data server:

- postgres <database> as root or postgres

To check the processes executing on the active data server, use the **grep** command for the process you want to monitor (see Table 12.9-2).

Table 12.9-2. Linux Commands for Monitoring Processes that Impact the PostgreSQL Database

Use	UNIX Command	User
Monitor whether PostgreSQL is running	ps -wef grep postgres	root or postgres

► **To Check Interaction between the PostgreSQL Database and the TextDB Server**

Log in remotely to either server in the EDEX cluster (DX3 or DX4). As user **fxa** or your individual user account, execute any of the following commands for checking the **fxatext** database:

NOTE: AFOS commands are case sensitive.

TYPE: **textdb -r <AFOS_PIL>**

- Performs a standard AFOS read, for example
textdb -r PITAFDPIT

TYPE: **textdb -w <productID> or <AFOS_PIL>**

- Writes the product to the database, for example
textdb -w PITAFDPIT

TYPE: **textdb -t <productID> or <AFOS_PIL>**

- Retrieves create time for products, for example
textdb -t PITAFDPIT

TYPE: **textdb -A <productID> or <AFOS_PIL>**

- Retrieves all times for a product, for example
textdb -A BOSMTRBOS

12.10 PostgreSQL Cron

The PostgreSQL *vacuum/analyze* cron executes frequently to maintain a fairly level steady-state usage of disk space. PostgreSQL's *vacuum* command must be run on a regular basis for several reasons:

- To recover disk space occupied by updated or deleted rows. This disk space must

be reclaimed for reuse by new rows to avoid infinite growth of disk space requirements.

- To update data statistics used by the PostgreSQL query planner to run better database queries. This information is gathered via the *analyze* command, which can be run as an option by *vacuum* and is set up to run as part of the cron.
- To protect against the loss of very old data due to transaction ID wraparounds that can occur if more than two billion database transactions occur before the *vacuum* command is run for that database.

12.11 Stopping/Starting Database Engine Dependent Applications

If the PostgreSQL database engine must be stopped and restarted manually, the **EDEX processes on DX3 and DX4** must also be stopped and restarted manually in a specific sequence.

As user **root** on both DX3 and DX4, perform the following steps.

1. On DX3, stop the EDEX processes

TYPE: `service edex_camel stop`

2. On DX4, stop the EDEX processes

TYPE: `service edex_camel stop`

3. On DX3, verify these processes have all stopped. As any user

TYPE: `service edex_camel status`

4. On DX4, verify these processes have all stopped. As any user

TYPE: `service edex_camel status`

When the database engine is backed up, you will need to restart all of these processes. First, verify that they are down by rerunning the status command (steps 3 and 4 above), and then restart the processes if they are down.

As user **root** on DX3, restart the **EDEX processes**.

TYPE: `service edex_camel start`

Still as user **root**, but on DX4, restart the **EDEX processes**

TYPE: `service edex_camel start`

12.12 PostgreSQL vacuum operations.

PostgreSQL **vacuum** operations occur every 4 hours for the **hdob<version><site>** database, twice a day for **hmdb** and **fxatext**, and once a day for the other databases. The log files created from this operation are located in `/data/logs/fxa/`.

Database logging for AWIPS applications continues as previously. Log files for some AWIPS applications are still found in the **/data/logs/fxa** directory (e.g., **ingProcMon.log**) and the logs for the other AWIPS applications still reside in the **/data/logs/fxa/<YYYYMMDD>** directory (e.g., **/data/logs/fxa/20111017** for 17 October 2011).

12.13 Verifying AWIPS II Data Purging

Data purging is the process of deleting outdated data from the data storage systems. In AWIPS II, data purging involves several areas: purging the AWIPS II Raw Data Store; verifying the execution of the EDEX purge service on DX3 and DX4; purging the AWIPS II Metadata database; and purging the AWIPS II Processed Data Store.

Validation of purging will be somewhat different for each area, but a general strategy is available:

1. Determine the retention strategy used for the purge.
2. Verify that the purge is scheduled.
3. Examine the appropriate process logs to determine if the purge has taken place.
4. Examine the data to verify that the purge has taken place.

The strategy for verifying that data has been purged is somewhat different for a database than for a file system, but, essentially, you compare a count of “all” data against the count of “old” data. The count of old data should be zero or significantly less than the count of all data. Note that counting data by age can be rather time consuming.

The AWIPS II Processed Data Storage purge is managed by the EDEX Ingest processes running on the DX3/4 cluster. Purge events are logged to the **edex-ingest-purge-yyyyymmdd.log** file in **/awips2/edex/logs**. This file is located on both DX3 and DX4, although EDEX uses a locking mechanism between DX3 and DX4 to ensure that only one purge executes at any one time. The purge log lists the number of items purged for each purge rule every time a purge is run. Because the log is maintained on both EDEX servers, both servers need to be checked to verify purge execution.

Descriptions of the four areas of AWIPS II data purging identified in this section follow.

12.13.1 Verify Purging of Data from the AWIPS II Raw Data Store

Purging of the AWIPS II Raw Data Store is managed by a cron job on the server running the **a2dx2apps** high-availability package. This cron job is owned by the **ldm** user and uses **ldmadmin** to perform a **scour** process. cron triggering is logged to **/var/log/cron**. The Raw Data Store is purged using a time-based retention strategy that is configured in the LDM **scour.conf** file. Note that **scour** will sometimes retain files older than the configured retention time. This occurs when a directory containing outdated files has not been modified since the last **scour** operation.

The steps follow.

- a. Open a terminal window on your workstation.
- b. Log into the server running the a2dx2apps high-availability package using the *root* login.

Enter: **ssh root@dx2f**

- c. Change directory to the system cron directory.

Enter: **cd /etc/cron.d**

- d. Verify the LDM cron.

Enter: **grep ldm a2dx2cron**

```
0 0 * * * ldm ~/bin/ldmadmin newlog
0 */3 * * * ldm ~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;
```

- e. Change directory to the system log directory.

Enter: **cd /var/log**

- f. Verify that the *scour* cron job is firing.

Enter: **grep "(ldm)" cron**

```
Oct 23 06:00:01 dx2-tbdw crond[18289]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)

Oct 23 09:00:01 dx2-tbdw crond[12889]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)

Oct 23 12:00:01 dx2-tbdw crond[26019]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)

Oct 23 15:00:01 dx2-tbdw crond[7826]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)

Oct 23 18:00:01 dx2-tbdw crond[22028]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)

Oct 23 21:00:01 dx2-tbdw crond[10977]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)

Oct 24 00:00:01 dx2-tbdw crond[25148]: (ldm) CMD
(~/bin/ldmadmin scour >& ~/logs/scour.log && find
/data_store -depth -type d -empty -exec rmdir {} \;)
```

- g. Change to the *ldm* user.
Enter: **su - ldm**
- h. Change directory to the LDM configuration (etc) directory.
Enter: **cd etc**
- i. Examine the *scour.conf* file to determine data retention times.
Enter: **cat scour.conf**

Note that the baseline version of *scour.conf* deletes all files more than one day old, which is determined from the line that starts with */data_store*.

```
# Configuration file for "scour" utility, to delete all files
# older than a
# specified number of days from specified directories and all
# their
# subdirectories. Scour should be invoked periodically by
# cron(8).
#
# Each line consists of a directory, a retention time (in days),
# and
# (optionally) a shell filename pattern for files to be deleted.
# If no
# filename pattern is specified, "*" representing all files not
# beginning
# with "." is assumed.
#
# A hash in column one indicates a comment line.

# Directory           Days-old      Optional-
filename-pattern

#~ldm/data/dir1      2
#~ldm/data/dir2      2          *.foo
~ldm/logs            2          *.stats
~/data_store         1
```

- j. Change directory to the AWIPS II Raw Data Store.

Enter: **cd /data_store**

- k. Check the number of files in Raw Data Storage.

Enter: **find . -type f | wc -l**

Note that this command may take several minutes to complete.

1936889

- l. Check the number of files older than the configured retention time.

Enter: **find . -mtime +X -type f | wc -l**

Replace X with the largest number of days configured in *scour.conf*; note that this command may take several minutes to complete.

11

- m. Check for the number of files that are more than one day older than the specified configured time.

Enter: **find . -mtime +Y -type f | wc -l,**

Replace Y with one more than the largest number of days configured in *scour.conf*; note that this command may take several minutes to complete.

11

- n. Exit the *ldm* user (and return to the *root* user).

Enter: **exit**

- o. Log off dx2f.

Enter: **exit**

Expected results: If the purge of the Raw Data Store is set up and executing, you should see a decrease in the number of files reported in steps (k) – (m), although you will likely not see zero files in any of these steps.

- p. Error results: If you are unable to log in using the dx2f floating server name, the DX2 high-availability package is not running. If the *scour* cron job does not show up in the system cron log, the purge has not been configured correctly.

12.13.2 Verify Execution of the EDEX Purge Service on DX3 and DX4

The EDEX purge service runs as part of the EDEX Ingest process on DX3 and DX4. Purge events are logged to the Ingest Purge log, *edex-ingest-purge-yyyymmdd.log*, located in /awips2/edex/logs on both DX3 and DX4. In normal operation, you should see a “START PURGE” message at 30 minutes after each hour on either DX3 or DX4. Problems with the purge will also be in this log file.

The steps follow.

- a. Open a terminal window on your workstation.
- b. Log into DX3 as the *root* user.

Enter: **ssh root@dx3**

- c. Switch to the bash shell.

Enter: **bash**

- d. Change directory to the EDEX log directory.

Enter: `cd /awips2/edex/logs`

- e. List the current purge log.

Enter: `ls edex-ingest-purge-$(date +%Y%m%d).log`

Note: Since the purge can occur on either DX3 or DX4, it is possible that there will be no purge log on DX3. In that case, you may skip the next step.

`edex-ingest-purge-20111026.log`

- f. Display “START PURGE” and “END PURGE” events.

Enter: `egrep -A2 "(START|END) PURGE" edex-ingest-purge-$(date +%Y%m%d).log`

Note: Since the purge can occur on either DX3 or DX4, it is possible that no purge events will be logged on DX3.

- g. Terminate the bash shell.

Enter: `exit`

- h. Log off DX3.

Enter: `exit`

- i. Log into DX4 as the *root* user.

Enter: `ssh root@dx4`

- j. Switch to the bash shell.

Enter: `bash`

- k. Change directory to the EDEX log directory.

Enter: `cd /awips2/edex/logs`

- l. List the current purge log.

Enter: `ls edex-ingest-purge-$(date +%Y%m%d).log`

Note: Since the purge can occur on either DX3 or DX4, it is possible that there will be no purge log on DX4. In that case, you may skip the next step.

`edex-ingest-purge-20111026.log`

- m. Display “START PURGE” and “END PURGE” events.

Enter: `egrep -A2 "(START|END) PURGE" edex-ingest-purge-$(date +%Y%m%d).log`

Note: Since the purge can occur on either DX3 or DX4, it is possible that no purge events will be logged on DX4.

```
INFO 2011-10-26 22:30:00,003
[DefaultQuartzScheduler_Worker-10] PurgeLogger: EDEX:
EDEX - PURGE::Purge Expired Data Started at: Wed Oct 26
22:30:00 GMT 2011

INFO 2011-10-26 22:59:40,348
[DefaultQuartzScheduler_Worker-10] PurgeLogger: EDEX:
EDEX - PURGE::-----END PURGE-----

INFO 2011-10-26 22:59:53,017 [textPurge] PurgeLogger:
EDEX: EDEX - TEXT::Incremental purge: Purged 0 rows in 0
ms

INFO 2011-10-26 23:00:53,030 [textPurge] PurgeLogger:
EDEX: EDEX - TEXT::Incremental purge: Purged 0 rows in 0
ms

-- 

INFO 2011-10-26 23:30:00,004
[DefaultQuartzScheduler_Worker-2] PurgeLogger: EDEX:
EDEX - PURGE::-----START PURGE-----

INFO 2011-10-26 23:30:00,004
[DefaultQuartzScheduler_Worker-2] PurgeLogger: EDEX:
EDEX - PURGE::Purge Message Received: PURGE_CRON

INFO 2011-10-26 23:30:00,004
[DefaultQuartzScheduler_Worker-2] PurgeLogger: EDEX:
EDEX - PURGE::Purge Expired Data Started at: Wed Oct 26
23:30:00 GMT 2011

-- 

INFO 2011-10-26 23:50:01,543
[DefaultQuartzScheduler_Worker-2] PurgeLogger: EDEX:
EDEX - PURGE::-----END PURGE-----

INFO 2011-10-26 23:50:53,731 [textPurge] PurgeLogger:
EDEX: EDEX - TEXT::Incremental purge: Purged 0 rows in 0
ms

INFO 2011-10-26 23:51:53,745 [textPurge] PurgeLogger:
EDEX: EDEX - TEXT::Incremental purge: Purged 0 rows in 0
ms
```

- n. Terminate the bash shell.

Enter: **exit**

- o. Log off DX4.

Enter: **exit**

- p. Expected results: If the EDEX Purge service is firing correctly, you should see paired “START PURGE” and “END PURGE” events at about 30 minutes after each hour. **Note:** If this procedure is executed shortly after 30 minutes after the hour, the final “START PURGE” event will not have a paired “END PURGE” event. Compare the results of the *egrep* commands in steps (f) and (m); there should be log entries covering all hours of the current day.
- q. Error results: Any missing “START PURGE” messages should be investigated. EDEX uses a database table (*awips.cluster_task* in the *metadata* database) to manage process locking between DX3 and DX4. As a result, any database-related errors in the purge log should be investigated.

12.13.3 Verify Purging of Data from the AWIPS II Metadata Database

There is no quick way to determine if data is being purged from the metadata database. The basic concept is to query the database from the purge rules for a specific data type and then perform a query to verify specific purge rules. Note that the purge runs once an hour so there may be slightly more data than indicated by the purge rule. This basic approach will be illustrated using the baseline purge rules for satellite data, specifically the West CONUS Visible data.

The steps follow.

- a. Open a terminal window on your workstation.
- b. Log into DX3 as the *root* user.

Enter: `ssh root@dx3`

- c. Determine the database connection information.

Enter: `cd /awips2/edex/bin`

Enter: `grep "export DB_" setup.env`

```
export DB_ADDR=dx1f
export DB_PORT=5432
```

- d. Connect to the AWIPS II Metadata database.

Enter: `psql -h <host> -p <port> -d metadata -U awips`

Note: Use the host and port from step (c); enter the *awips* database password if prompted.

- e. Determine the data count for the selected data type.

Enter: `select count(*) from satellite where sectorid='West CONUS' and physicalElement='Imager Visible';`

```
count
-----

```

58 (1 row)

- f. Quit *psql*.

Enter: `\q`

- g. Expected results: If the purge of the metadata database is set up and executing, the terminal session will be similar to that shown in steps (e) and (f). Generally, the actual number of products should be no more than slightly bigger than the value identified in step (f).

12.13.4 Verify purging of data from the AWIPS II HDF5 Processed Data Store.

The HDF5 Data Store is located in /awips2/edex/data/hdf5 on dx1f. A “quick and dirty” method of determining data purge is to count the number of files of specific ages in this directory structure. Unlike the LDM-managed AWIPS II Raw Data Store, the AWIPS II HDF5 Processed Data Store is managed primarily via version-based purging. That is, the number of products of a specific data type, rather than the age of the data, is the primary purge mechanism. As a result, there is no way to determine the age of the oldest HDF5 file that we should expect to find. As a quick check, we can find the number of files of various ages; that count should decrease as the age increased.

The steps follow.

- a. Open a terminal window on your workstation.

- b. Log into dx1f as the *root* user.

Enter: `ssh root@dx1f`

- c. Change directory to the AWIPS II HDF5 Data Store.

Enter: `cd /awips2/edex/data/hdf5`

- d. Determine the number of files in the AWIPS II HDF5 Data Store.

Enter: `find . -type f | wc -l`

Note that this command may take several minutes to execute.

14867

- e. Determine the number of files in the AWIPS II HDF5 Data Store that are more than one, two, three, and four days old.

Enter: `find . -mtime +1 -type f | wc -l`

14820

Enter: `find . -mtime +2 -type f | wc -l`

13493

Enter: **find . -mtime +3 -type f | wc -l**

8825

Enter: **find . -mtime +4 -type f | wc -l**

6979

Note: Each command may take several minutes to execute.

- f. Log off dx1f.

Enter: **exit**

- g. Expected results: If the purge of the AWIPS II HDF5 Data Store is set up and executing, each **find | wc -l** command should show fewer files.

Chapter 13

Event Notification

Chapter 13. Event Notification

Table of Contents

	<i>Page</i>
13.0 Event Notification:	1
13.1 Description of Text Alarm/Alert Capability	1

List of Exhibits

Exhibit 13.0-1. Text Workstation User Interface.....	1
Exhibit 13.1-1. default.xml Alarm/Alert and Proximity Alarm Products GUI	2
Exhibit 13.1-2. default.xml Alarm/Alert and Proximity Alarm Product GUI Error Message.....	4

13.0 Event Notification

The text workstation can be configured to monitor the **fxatext** database for arrival of certain products, for specific content of selected products, or for products whose valid area intersects a defined area of interest. The Text Alarm/Alert capability is accessed through the text workstation user interface, as shown in Exhibit 13.0-1 (refer to Chapter 5 of the AWIPS CAVE-D2D User's Manual).



Exhibit 13.0-1. Text Workstation User Interface

The Text Alarm/Alert capability allows the user to select text products to be alarmed (sound) or alerted (no sound). A flashing bell at the upper left corner of the screen appears when a product of interest is received, optionally accompanied by a sound. A click on the bell silences the alarm (if on) and opens a dialog containing the product name(s). The user can display the product by clicking on it with the mouse.

13.1 Description of Text Alarm/Alert Capability

The list of text products to monitor is built from four files; two of them are controlled by the system manager and the other two can be defined and edited by any AWIPS user. In each case, one file is for the Alarm/Alert function, and the other is for the new Proximity Alarm capability. The list of Text Alarm/Alert products and Proximity Alarm products is presented to the user in a combined user interface (UI), as shown in Exhibit 13.1-1.

To display the Alarm/Alert and Proximity Alarm Products GUI, as shown in Exhibit 13.1-1:

1. Click on the Alarm Alert button in the Text Workstation GUI.
2. Click on the Product List button in the Current Alarm Queue GUI.

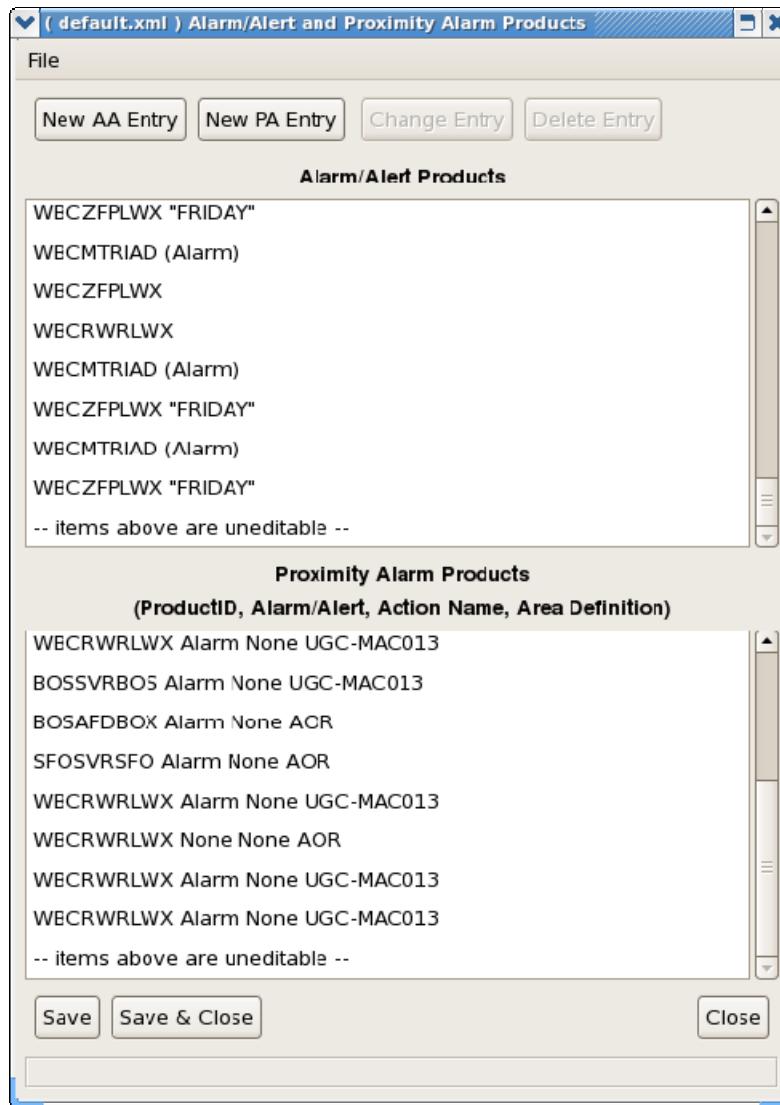


Exhibit 13.1-1. default.xml Alarm/Alert and Proximity Alarm Products GUI

- In Exhibit 13.1-1, the products available in the **default.xml** window (the upper window of the UI), above the line that reads “*--items above are uneditable--*,” are defined by the system manager and cannot be modified. This product list is set by the file **/awips2/edex/data/utility/common_static/base/alarms/DefaultSiteAlarms.xml**. This file is maintained on the EDEX cluster (DX 3/4).
- If any products *are listed* in the **default.xml** window of the UI below the line that reads “*--items above are uneditable--*,” these products are user-defined and user-editable using the Text Alarm/Alert UI. This product list resides in the **/awips2/edex/data/utility/common_static/user/<uname>/alarms/default.xml** file, where **<uname>** is the user’s login name. Note that the file is maintained on the EDEX cluster (DX 3/4) and is copied to **/home/<uname>/common/user/<uname>/alarms**.
- In Exhibit 13.1-1, the products available in the **Alarm/Alert and Proximity Alarm Products** window displayed (the lower window of the UI) above the line that reads “-

--items above are uneditable--," are defined by the system manager and cannot be modified via the Text Alarm/Alert UI. This product list is set by the file `/awips2/edex/data/utility/common_static/base/alarms/DefaultSiteAlarms.xml` file (where `<LLL>` is the localization ID usually the same as the site's AWIPS ID). These items cannot be modified via the Text Alarm/Alert UI.

- If any products are listed in the **Proximity Alarm Products** window of the UI below the line that reads "*--items above are uneditable--*," these products are user-defined and user-editable using the Text Alarm/Alert UI. This product list resides in the `/awips2/edex/data/utility/common_static/user/<uname>/alarms/default.xml` file, where `<uname>` is the user's login name. Note that the file is maintained on the EDEX cluster (DX 3/4) and is copied to `/home/<uname>/common/user/<uname>/alarms`

If the user attempts to select any of the entries in the system manager-controlled list, an error message stating that it is not allowed is displayed at the bottom of the window, as shown in Exhibit 13.1-2.

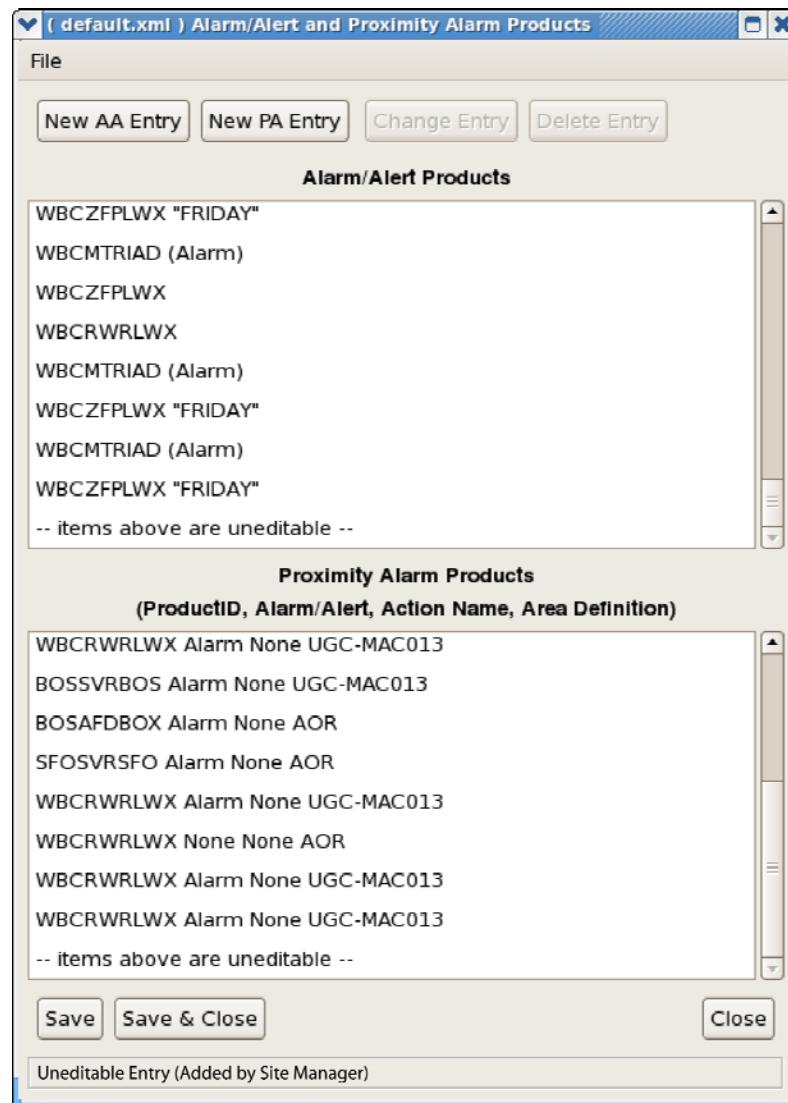


Exhibit 13.1-2. default.xml Alarm/Alert and Proximity Alarm Product GUI Error Message

Users can elect to save their list of user-controlled Alarm/Alert products for later recall; the file is saved on the EDEX cluster in **\$EDEX_HOME/data/utility/common_static/user/<uname>/alarms/default.xml**. The user-defined file name will appear in the window title bar (i.e., referring to Exhibits 13.1-1 and 13.1-2); “init” in the window title bar would be replaced by the user-defined file name, if any. This way, users and system managers know what file is controlling the alarm/alert function.

Note: The 12.3.1 release will feature steps to instruct the system managers to use the Localization Perspective, instead of command line, to make these changes.

Chapter 14

Message Handling System

Chapter 14. Message Handling System

Table of Contents

	<i>Page</i>
14.0 Message Handling System: Overview	1
14.1 SBN Retransmission	1
14.2 Administrative Message Handling System.....	2
14.2.1 MHS Environment Variables, Directories, and Configuration Files.....	2
14.2.2 NCF Administrative Messages	5
14.2.2.1 Troubleshooting and Monitoring Commands	6
14.2.2.1.1 Troubleshooting.....	6
14.2.2.1.2 Monitoring Commands.....	7
14.3 Site Level Illustration.....	7

List of Exhibits

Exhibit 14.3-1. Receive Distributed Product and Send Acknowledgment.....	8
Exhibit 14.3-2. Distribute Product and Receive Acknowledgement	10

14.0 Message Handling System: Overview

The deployment of an SMTP protocol enables users to distribute text, grid, and radar imagery products efficiently and accurately among the AWIPS sites, via the terrestrial WAN.

To verify that the SMTP Message Handling System (MHS) processes are running, on DX1:

TYPE: `ps -wef |grep smtp`

- You should see output similar to the following:

```
root      29944      1  0 Jul11 ?          00:00:06 mdp_daemon -k 7789 -f
/awips/ops/data/mhs/mdp-smtp.cfg

awipsmhs 29945 29944  0 Jul11 ?          00:18:26 smtp_send -eb -cz -k7789
-n0 -p/tmp/smtp0_send_fifo

awipsmhs 29971      1  0 Jul11 ?          00:00:10 smtp_recv -n0 -m0 -
o/data/mhs/smtp_recv/output - b/var/spool/mail/awipsmhs
```

14.1 SBN Retransmission

SBN Retransmission provides the capability for a site to automatically request retransmission of missed NWS Telecommunications Gateway (NWSTG) products from the Network Control Facility (NCF). Retransmission is intended to handle short-term data loss situations; it is not intended to provide data replenishment for long-term outages.

SBN Retransmission is enabled by default. In addition, CPSBN reboots re-enable retransmission.

When the site's CPSBN1 determines that an interruption in NWSTG product receipt has occurred, a retransmission request is automatically transmitted over the WAN to the NCF. The CPSBN determines if an interruption has occurred by detecting gaps in the NCF-assigned product sequence numbers. For example, if product number 870 follows 865, a retransmission request for products 866, 867, 868, and 869 is automatically issued.

Once the NCF receives the retransmission request, the requested range of missing NWSTG data will be retransmitted over the SBN to every site. The site responsible for the retransmission request ingests the products as "RETRANS." Sites that already have these products will discard them as duplicates. There will be occasions, however, when products will arrive at a nonrequesting site and be processed as first-time products. This duplicate processing may occur if a communications processor (CP) has recently been restored or spared over. To avoid excessive WAN traffic, retransmission requests from a single site are sent at a minimum interval of 30 seconds.

The number of products retransmitted by the NCF depends on two items: the number of products requested; and the number of product requests already in the site's outstanding

product retransmit request table. Currently, the default is 10,000 products for a single request and at most 15,000 products queued for a site. As requested products are retransmitted, the associated outstanding product request is deleted from the request table. This default configuration can be increased manually to accommodate increased product volumes during the anticipated 15- to 20-minute solar outage periods (i.e., 20,000 products for a single request and at most 20,000 products queued). Site requests that exceed these maximum values are normally logged at the NCF but discarded. An alarm is generated to notify NCF operators that site replenishment may be required.

NOTE: Data collected thus far indicate that sites typically request fewer than 2,000 products, so large requests (over 5,000 products) do not occur frequently. Retransmission requests are not issued for problems such as power failures or reboots.

14.2 Administrative Message Handling System

The AWIPS WAN provides the full connectivity AWIPS sites required to exchange data.

Use of the text workstation to produce, send, and display received administrative messages is described in the AWIPS CAVE-D2D User's Manual.

All products sent to the default NCF address may be disseminated over the Satellite Broadcast Network (SBN), the National Digital Forecast Database (NDFD), NWSTG, the National Weather Wire Service (NWWS), ALL (via WAN), and/or the Radar Multicast, depending on the product. The default address table at the NCF determines what products are forwarded where, based on the WMO header. Currently, all warning products from the NWSTG are transmitted on both the SBN and the WAN.

In the event of an SBN failure, a selected set of products, defined by NWS Headquarters, will be transmitted via the WAN until the SBN is back up. The current set of products is provided in Appendix H.

14.2.1 MHS Environment Variables, Directories, and Configuration Files

The MHS data are configured and installed as part of the AWIPS install (or upgrade) procedure.

MHS Environment Variables and Values (on all DX1 as user fxa)

Variable	Value
\$PROJECT	/awips/ops
\$PATH	/awips/ops/bin:\$PATH
\$SHLIB_PATH	/awips/ops/sharedlib
\$FXA_DATA	/data/fxa

MHS Administrative Directories

\$FXA_DATA/mhs
\$FXA_DATA/mhs/enclosures/outfiles

The **outfiles** directory is the only directory actively used and is the location for user-created attachments (enclosures) for outgoing administrative messages. Users may either create attachments or copy existing attachments here in this directory.

The **enclosures** directory is scoured once a day by the fxa crontab removing products that are more than 30 days old.

MHS Configuration Files

- **awipsSites.txt**

This configuration file is located in **\$FXA_HOME/data** and contains individual site address information to translate between the addresses entered in the Text Header Block and the Message Transfer Agent (MTA) IDs needed by the message handling software. The file contains a complete list of valid addresses, so the text workstation can warn users if an invalid address is used. The file consists of four sections:

1. The first section contains the list of individual AWIPS sites with a three-character AWIPS site ID. Each line in this section contains the three-letter site ID followed by its associated MTA ID. Old AFOS IDs are also included with the corresponding MTA ID, which is usually the same as the new AWIPS site ID. Sample entries follow:

ABQ ABQ
ABR ABR
ACR ACR
NEW LIX
NYC OKX
OKX OKX

2. The second section contains the list of individual AWIPS site IDs but uses each site's four-letter WMO ID (e.g., KBOX, PHFO, and TJSJ) followed by the site's associated MTA ID. Old AFOS IDs are not included in this list. Sample entries follow:

KABQ ABQ
KABR ABR
KOKX OKX
PGUM GUM
PHFO HFO
TJSJ SJU

3. The third section contains the list of individual AWIPS sites with four-character AWIPS site IDs (e.g., ANCF, COMT, NHCW, and NTCA). Each line in this section contains the site's ID followed by its associated MTA ID. Sample entries follow:

```

ADSM ADM
COMT COMT
FSLC FSLC
NHCW NHCW

```

4. The fourth section contains entries for translating between the group address that a user enters in the text workstation and the corresponding MTA ID. Column 1 represents the group name and column 2 represents the distribution list. Sample entries follow:

```

ALL DEFAULTNCF
DEF DEFAULTNCF

```

- **siteDistList.txt**

This configuration file is located in **\$FXA_DATA/workFiles/** and is used for translating between group addresses that the user enters on the text workstation and corresponding lists of site addresses. The group name must be uppercase and no more than four characters in length. Be sure to use unique group names. Do not use a group name that is used in the **awipsSites.txt** file (e.g., DEF) because doing so will override the entry in the **awipsSites.txt** file. Addressees in the site address list can be either uppercase or lowercase, but must be comma-separated. Sample entries follow:

```
GRP2 acr,afc,afg,ajk,vrh
```

- **AWIPS2-rcv_handler.tbl**

This configuration file is located in **\$PROJECT/data/mhs** and contains message handling information required by MHS receive processes. **\$PROJECT** is **/awips/ops** and points to the directory containing AWIPS foundation executables and scripts, shared libraries, and data. Each line in the file contains a message code number, an absolute path to the directory where the received message is stored or queued, a flag indicating the type of handling routine to use, and the command or list of commands to be executed.

- **versions_lookup_table.dat**

This configuration file is located in **\$FXA_HOME/data/localizationDataSets/ <LLL>**. The file is used to determine how many versions of a particular product to store in the text database. Because there is no entry in the file for administrative messages, the default number of versions (two) is used. While logged in as the fxa user, edit the file and run the **mainScript f_text** to store multiple versions of a particular product.

► **To Edit the versions_lookup_table.dat File**

TYPE: `vi versions_lookup_table.dat`

Add **CCCADDRXXX 20** to the bottom of the file to store 20 versions of the ADR administrative message.

TYPE: `:wq!`

- **default_addr.data**

This configuration file is located in **\$PROJECT/data/mhs** and contains the product IDs and the list of default addressees. If a message is addressed to **DEFAULT**, the product ID being sent is looked up in this file and the corresponding addressees are added to the recipient list. Each line in the file contains a product ID separated with a pipe | from a comma-delimited list of sites. Wildcard characters (such as * and ?) may be used in the product ID field. In the case of overlapping match sets, the union of all matches is used. To exclude an addressee from the default address list, the ! character may be placed in front of the addressee name (e.g., **!TBDR**). All exclusions are performed on the union of all inclusions, and order does not matter.

Products sent to **DEFAULTNCF** may be forwarded for distribution to the SBN, NDFD, NWSTG, NWWS, ALL (via the WAN), and/or the Radar Multicast, depending on the product. The default address table at the NCF determines what products are forwarded where, based on the WMO header.

14.2.2 NCF Administrative Messages

The NCF sends administrative messages to notify sites about outages, late model runs, or other important information. Sites should have at least one workstation alarmed for these messages. AWIPS administrative messages may be sent as either urgent messages or routine messages. Messages may be set to alarm using the old AFOS PIL.

- ADA: URGENT administrative messages have the following WMO header and message ID:
 - WMO header: NOUS71 KNCF
 - Message ID for Alarm: NCFADANCF
- ADM: Routine administrative messages have the following WMO header and message ID:
 - WMO header: NOUS72 KNCF
 - Message ID for Alarm: NCFADMNCF

Whenever possible, the NCF will advise all or specific sites, NWSTG, and NCEP in advance of activities that might affect service or communications. When the NCF becomes aware of problems that could have an adverse impact on data receipt or site operations, it will transmit advisories to affected sites, including NWS NRS sites, as well as commercial and private entities that have NRS-like capability.

The NCF may send an AWIPS administrative message for outages like the following:

- Circuits to or from the NCF
- MGS
- GINI
- NWSTG

- NCEP model execution
- Point-to-Point network
- Specific NCF functions
- GOES Eclipse periods
- GOES Maneuver

14.2.2.1 Troubleshooting and Monitoring Commands

14.2.2.1.1 Troubleshooting

Log files are generally the first things to check when you want to see if the system is functioning properly. The log files are useful for two reasons:

- You can tell if the MHS processes are currently sending and receiving messages. The processes all write information to their log files about the messages they handle. If the log files have been updated recently, then you know that the system is still running.
- You can tell if any of the processes are having problems, because the MHS processes will write error messages to their log files.

Please check the *msgreq_svr.log* (*located at awips/ops/logs/dx1-<site>/msgreq_svr.log*) and the *msgrcv_svr.log* (*located at awips/ops/logs/dx1-<site>/msgrcv_svr.log*) with the new transactions and the MhsServerRequest log located in */data/logs/fxa/<current day>* folder for updates. E.g.: MhsRequestServer2032dx1-tbw3000509

Examples for the above log files follow.

msgrcv_svr.log

```
TBW3-5026: NTXX98 KTBW 221013 (/data/mhs/smtp_recv/output/m000006.doc)
Wed Sep 22 12:28:54 2010 <msgrcv_svr: 9658> Discard OK
TBW3-5024: Routine to=TBW3, from=TBW3, pri=0 code=42 enc=1 len=69 dly=(0+9952+0)s
TBW3-5024: NTXX98 KTBW 220943 (/data/mhs/smtp_recv/output/m000007.doc)
Wed Sep 22 12:28:54 2010 <msgrcv_svr: 9658> Discard OK
TBW3-5023: Routine to=TBW3, from=TBW3, pri=0 code=42 enc=1 len=69 dly=(0+10853+0)s
```

msgreq_svr.log

```
Wed Sep 22 03:43:02 2010 <msgreq_svr:11236> OK request
TBW3-4992: Routine to=TBW3, from=TBW3, pri=0 code=42 enc=1 len=69
TBW3-4992: NTXX98 KTBW 220343 (/data/mhs/msgtbl/TBW3-4992.msg)
Wed Sep 22 03:52:18 2010 <msgreq_svr:11253> OK request
TBW3-4993: Retransmit Request to=RETRANS, from=TBW3, pri=0 code=0 enc=1 len=373
TBW3-4993: <no_prodid> (/data/mhs/msgtbl/TBW3-4993.msg)
```

14.2.2.1.2 Monitoring Commands

- **msg_stats**

TYPE: cd /awips/ops/bin

TYPE: msg_stats

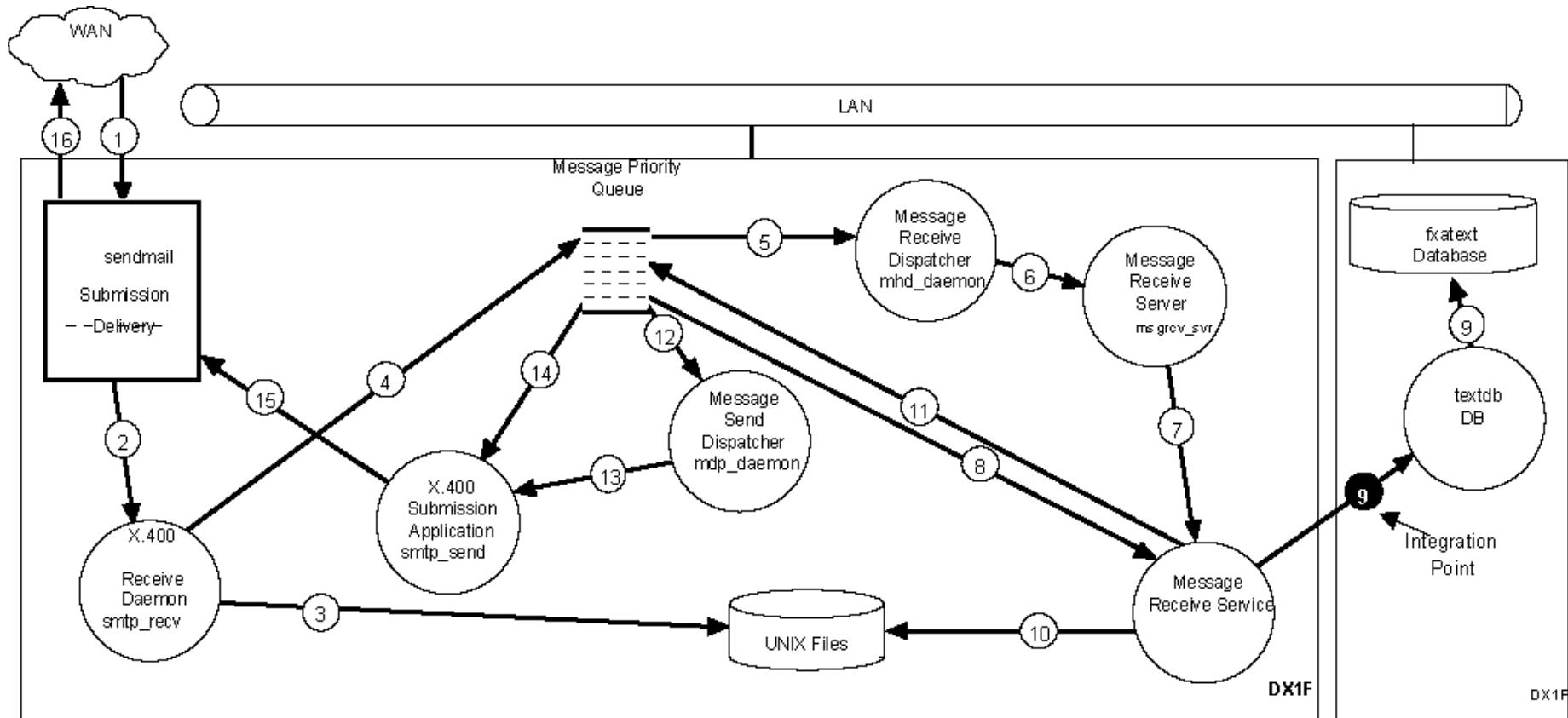
This program displays general information on the status of the processes, and updates the display every few seconds.

The display is divided into three sections: Message Item Information; Process Information; and detailed information on the first and last messages in each of the three queues.

```
MHS Process PID QLen State Last MsgID Count Start_Up Last_Msg
msgreq_svr: 11233 0 WAIT MSG TBW3-5063 332 21 12:42 17:58:02
mdp_daemon: 11229 0 I WAIT MSG TBW3-5063 332 21 12:42 17:58:02
smtp_send: 11230 0 I WAIT MSG TBW3-5063 332 21 12:42 17:58:02
sendmail: : 19581 -1 I UP 21 12:55
=====
=====Process Statistics (Incoming Messages)=====
MHS Process PID QLen State Last MsgID Count Start_Up Last_Msg
exited : -1 -1 I UNKNOWN --:--:--
smtp_recv: 11260 0 I WAIT MSG ANCF3-446304 1165 21 12:42 18:08:53
mhd_daemon: 11256 0 I WAIT MSG ANCF3-446304 1165 21 12:42 18:08:53
msgrcv_svr: 11248 0 WAIT MSG ANCF3-446304 1074 21 12:42 18:08:53
=====
0)
mtd_daemon: 11262 0 I SLEEP 0 21 12:42 --:--:--
=====
=====Throughput Statistics=====
msg/sec (B/sec) current average maximum cum. total=
outgoing: 0 ( 0) 0.0 ( 0) 0 ( 0) 0 ( 0)
incoming: 0 ( 0) 0.0 ( 0) 0 ( 0) 0 ( 0)
processed: 0 ( 0) 0.0 ( 0) 0 ( 0) 0 ( 0)
=====
=====Ack/Nack Statistics=====
submissns msg ack-req retries responses acks nacks ndrs tmout
sent 332 0 0 rcvd 0 0 1 0
rcvd 1073 0 sent 0 0
```

14.3 Site Level Illustration

Site Level data flow diagrams for MHS products are presented in Exhibits 14.3-1 and 14.3-2. Descriptions of the various steps in the flows follow each exhibit.



SMM_07_18_11

Exhibit 14.3-1. Receive Distributed Product and Send Acknowledgment

As shown in Exhibit 14.3-1,

1. An SMTP session completes between *sendmail* instances at a remote location and the local site. A mail message is written to the *awipsmhs* mailbox file in /var/spool/mail.
2. The SMTP Receive Daemon (*smtp_recv*) retrieves the message from the *awipsmhs* mailbox, strips off the SMTP envelope, and extracts the message.
3. The SMTP Receive Daemon stores the message to the local disk.
4. The SMTP Receive Daemon places the message handle and type of message in the Message Priority Queue Shared Memory.
5. The Message Receive Dispatcher (*mhd_daemon*) retrieves the message handle and message type from the Message Priority Queue Shared Memory.
6. The Message Receive Dispatcher determines that it is a product message and sends a transaction to the Message Receive Server (*msgrcv_svr*) to process the product message.
7. The Message Receive Server creates a Message Receive Service to handle the message.
8. The Message Receive Service reads the message header information from the Message Priority Queue Share Memory to determine the message type, filename(s), sending site, and whether an acknowledgment is required.
9. The Message Receive Service performs the action specified in the receive handler table (*rcv_handler.tbl*) by the message code.
10. If requested by the sender, the Message Receive Service queues an acknowledgment to the Message Priority Queue Shared Memory for processing.
11. The Message Send Dispatcher (*mdp_daemon*) dequeues a message handle from the Message Priority Queue Shared Memory for processing.
12. The Message Send Dispatcher sends the message handle to the SMTP Submission Application (*smtp_send*).
13. The SMTP Submission Application uses the message handle to access the message header information in the Message Priority Queue Shared Memory.
14. The SMTP Submission Application submits the SMTP message to *sendmail*.
15. The *sendmail* application establishes an SMTP session with all required remote mail servers and transmits the message across the WAN.

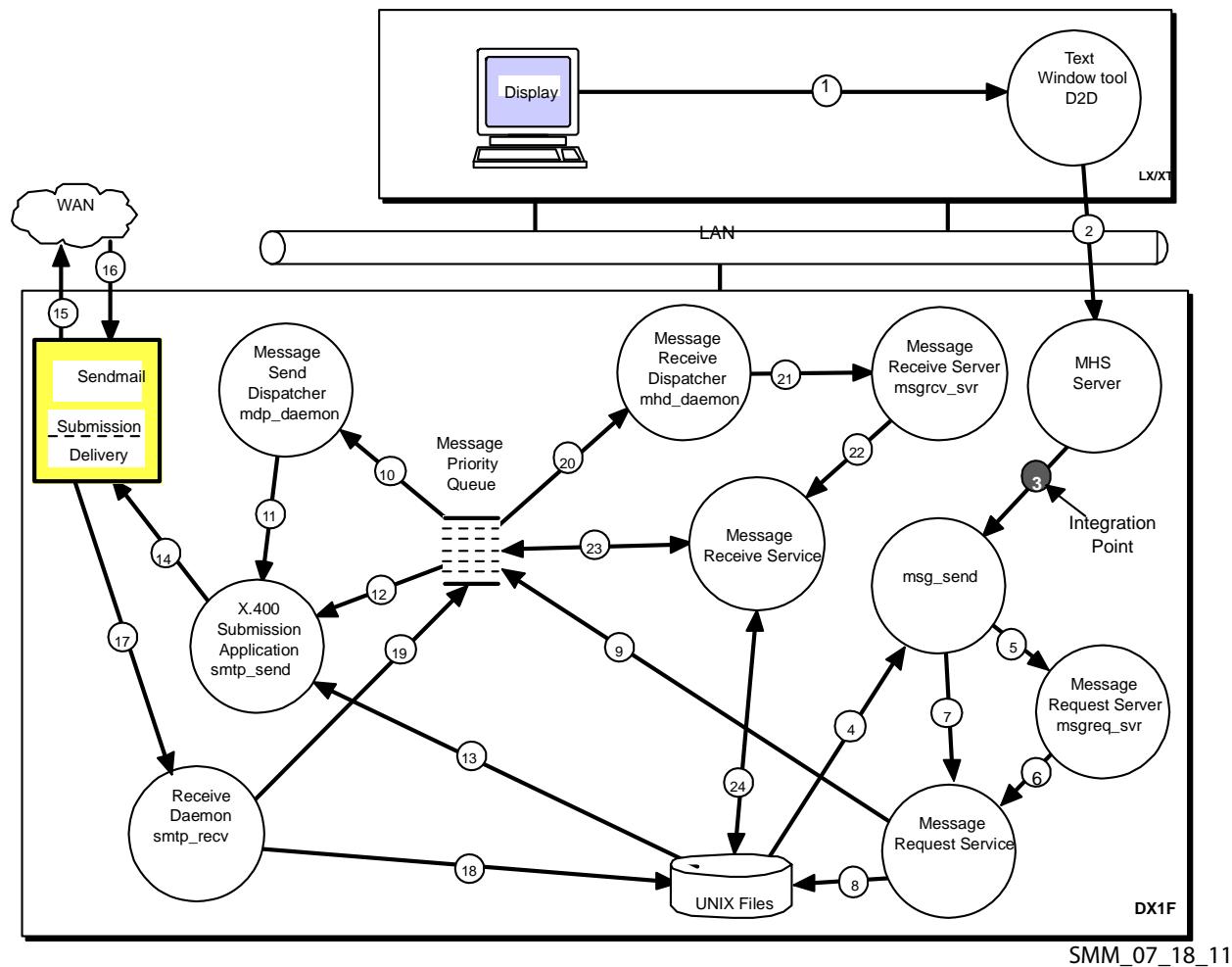


Exhibit 14.3-2. Distribute Product and Receive Acknowledgement

As shown in Exhibit 14.3-2,

1. The user selects a message to be sent over MHS via D2D through the Text Window Tool user interface from an XT or LX workstation.
2. The Text Window Tool queues the message for the MHS Server (*MhsServer*).
3. The MHS Server forks and executes a *msg_send* command with all required parameters to queue the message for MHS.
4. The *msg_send* application retrieves the product data from any specified disk files.
5. The *msg_send* application accepts the product distribution request parameters from the user and sends them to the Message Request Server (*msgreq_svr*) as a transaction.
6. The Message Request Server creates a Message Request Service to handle the request.
7. The *msg_send* application writes the product data across the socket to the Message Request Service.
8. The Message Request Service stores the message data into disk files in a predefine

- directory.
9. The Message Request Service writes the request handle to the Message Priority Queue Shared Memory, along with message header information such as the message type.
 10. The Message Send Dispatcher (*mdp_daemon*) determines the message handle of the next message to be dispatched from the Message Priority Queue Shared Memory.
 11. The Message Send Dispatcher sends the message handle to the SMTP submission application (*smtp_send*).
 12. The SMTP Submission Application uses the message handle to obtain the message header information from the Message Priority Queue Shared Memory.
 13. The SMTP Submission Application retrieves the message data contained in the local disk files and builds an SMTP mail message.
 14. The SMTP Submission Application submits the SMTP message to sendmail.
 15. The local sendmail application establishes remote SMTP sessions to route the message across the WAN.
 16. When the SMTP message is successfully delivered to the remote site, an SMTP message containing the acknowledgment is returned to the local *sendmail* and is written to the *awipsmhs* user's mailbox in */var/spool/mail*.
 17. The SMTP Receive Daemon (*smtp_recv*) reads the message from the *awipsmhs* mailbox, strips off the envelope, and extracts the acknowledgment message.
 18. The SMTP Receive Daemon stores the acknowledgment message to disk.
 19. The SMTP Receive Daemon places the message request handle and its type in the Message Priority Queue Shared Memory.
 20. The Message Receive Dispatcher (*mhd_daemon*) retrieves the message request handle and message type of the next incoming message to be processed from the Message Priority Queue Shared Memory.
 21. The Message Receive Dispatcher sends a transaction to the Message Receive Server (*msgrcv_svr*) to process the newly arrived message.
 22. The Message Receive Server creates a Message Receive Service to handle the message.
 23. The Message Receive Service reads the message header information from the Message Priority Queue Shared Memory to determine which message is being acknowledged. The message being acknowledged is marked as having been acknowledged by the site that sent the acknowledgment. If all sites required to acknowledge the message have acknowledged, then the message entry is deleted from the Message Priority Queue Shared Memory.

24. The Message Receive Service moves the message files to the acknowledgment message inbox directory. If an acknowledgment for the message has been received, the message data files that were written by the Message Receive Service are removed.

Chapter 15

Localization

Chapter 15. Localization

Table of Contents

	<i>Page</i>
15.0 Overview	1
15.1 Conventions Applied to This Chapter	2
15.1.1 General Conventions.....	2
15.1.2 Variable Conventions.....	3
15.2 AWIPS II Site Data Configuration.....	4
15.2.1 Database Configuration.....	4
15.2.2 Configuring the PostgreSQL Database Engine.....	5
15.2.3 Create and Import Database Files	6
15.2.3.1 hmdb Database [WFO only]	6
15.2.3.2 IHFS Database	7
15.2.3.3 DamCrest Database.....	7
15.2.3.4 lsrdata Database [WFO Only].....	8
15.2.3.5 Additional Databases [RFC Only]	8
15.2.4 Update Shape Files Including FFMP	9
15.2.5 Update afos_2_awips With Local Changes	11
15.3 SBN Ingest Configuration	12
15.3.1 Ingest Filter Configuration	12
15.3.2 Plug-in Ingest Filters	16
15.3.3 Distribution Filters	21
15.4 Hydrology.....	22
15.4.1 Create / Copy Common Hydrology Files Into Place.....	22
15.4.2 Create / Edit Site Apps_defaults File	23
15.5 Create Radar, NCEP/Hydro and UpperAir Menu Files	25
15.5.1 Create/Edit radarsInUse.txt File.....	25
15.5.2 Create/Edit the eavConfigTable.txt.....	28
15.5.3 Create/Edit raobSitesInUse.txt File For Upper Air Menus	28
15.6 CAVE	30
15.6.1 Create/Edit CAVE Map Displays	30
15.6.2 Create/Edit CAVE Station/Location Plot Information File(s)	31
15.7 Create / Edit Other CAVE Menus	32
15.7.1 Create / Edit Satellite Menu	32
15.7.2 Configure Local and Regional Warnings Display Menu	33

List of Exhibits

Exhibit 15.0-1. Localization in AWIPS II	2
Exhibit 15.3.2-1. Plug-in Filter Used to Filter Output from a Process	17
Exhibit 15.3.2-2 Plug-in Filter Used to Filter the Input of a Process	17

List of Tables

Table 15.1.2-1. Document Variable Conventions	3
Table 15.2.1-1. AWIPS II Baseline Database Listing	4
Table 15.2.4-1. AWIPS II Shape File To Table Mapping	9
Table 15.3.1-1. LDM Feedtypes	12
Table 15.3.1-2. LDM Action Options.....	14
Table 15.3.1-3. Hydrology Patterns.....	15
Table 15.3.1-4. Radar Patterns.....	15
Table 15.3.2-1. Plug-in Filter Filtering Elements	18
Table 15.3.2-2. List of Base Plug-in Filters.....	19
Table 15.3.2-3. Plug-ins That Support Filtering	19
Table 15.3.2-4. Fields for Use Within a Plug-in Filter XML File	19
Table 15.5-1. radarsInUse.txt title Lines and Descriptions	26
Table 15.6.1-1. Delivered AWIPS II Base Scale XML Files	30
Table 15.7.1-1. Satellite Sector Names.....	33

15.0 Overview

Note: This chapter will be updated for the 12.3.1 Release. The update will include steps necessary to maintain a site's localization in AWIPS II, and will make the AWIPS II Site Data Configuration Step by Step Manual obsolete.

Localization adapts (i.e., configures) the AWIPS national baseline software to the unique data and display requirements of the site. AWIPS II performs localization dynamically at system startup using data from the localization data environment.

This chapter serves as a guide to changing specific files in the localization environment to configure an EDEX installation to a specific site, and as a guide to adding localization files needed for launching and running client applications such as CAVE and AlertViz. It focuses on a SERVER-CLIENT localization paradigm, much like that which exists on AWIPS I. The steps taken should be sufficient to guide a person familiar with AWIPS I systems through the creation of a usable AWIPS II localization for an EDEX and CAVE instance.

Localization in AWIPS II is done by the EDEX process itself, as opposed to a script (mainScript.csh) from AWIPS I. Based on specific configuration files, the EDEX process produces output files, which are transferred, or downloaded, to the CAVE client when CAVE starts and whenever a change to a file has been detected. Exhibit 15.0-1 describes the flow of configuration on the left, the localization engine (EDEX) in yellow (center), the output of that localization in orange (top right), and the usage of those localization files via download to a user's caveData directory on a workstation in red (bottom right).

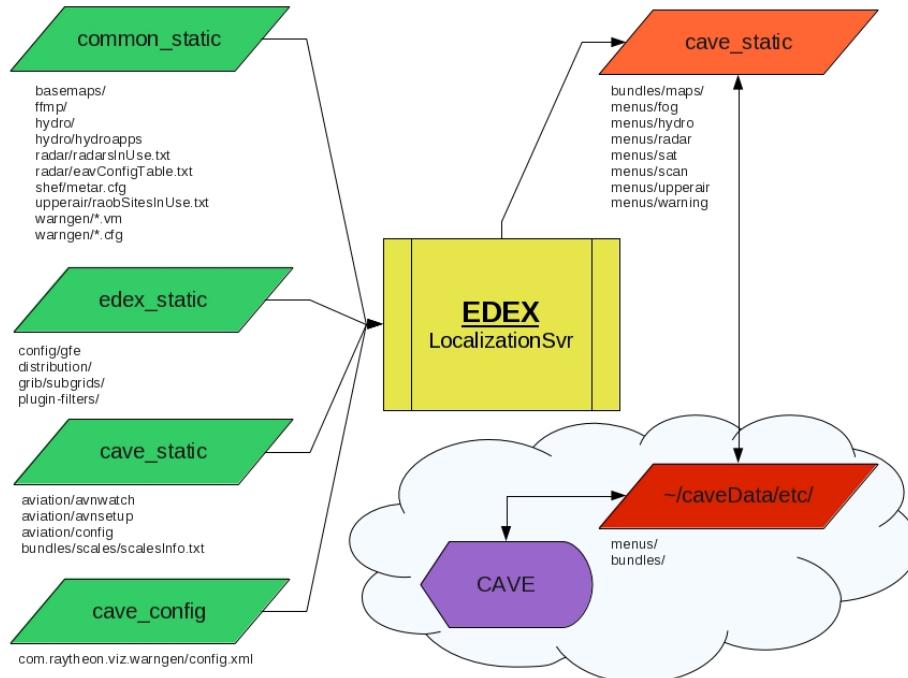


Exhibit 15.0-1. Localization in AWIPS II

This chapter focuses on creating the configuration files necessary for EDEX to correctly create the output files needed for proper baseline operations.

General Note: You should never edit files that are in a base directory tree. Although there are a few exceptions as of the date of this document's creation, anything beneath a directory named base in the configuration tree should never be edited. This is analogous to the nationalData directory in AWIPS I.

Assistance Note: A tool developed under Task Order 0013 is available for all sites that have installed an ADAM (AWIPS II Data and Application Migration) platform to help collect the files referenced in this chapter for moving to a platform that normally may not have access to those files. The script is collect_files.sh and would be located in the /data/fxa/INSTALL/ADAM directory. For more information on this script, see the document titled "AWIPS II Site Data Configuration Automation Tool" (AWP.DOC.TOSCAT.AUTO-01.00).

15.1 Conventions Applied to This Chapter

15.1.1 General Conventions

When specific commands are being displayed to type, the following will be used as the convention. The user should type on the screen everything following the # symbol. For example:

```
# ssh dx1
```

This indicates the user should secure shell into dx1 (*ssh dx1*).

At points in this chapter, it is necessary to reference a command that could be used for multiple iterations to achieve the same effect. The double bracket will enclose a description of what the user is to input in place of the notated reference. For example:

For example:

```
[[ database name ]]
```

This indicates the user should run the command for as many iterations of database name as needed to complete the desired configuration.

When a substitution needs to be made in a command that is to be interpreted by the user, the following syntax will be used:

```
<< Site ID >>
```

This indicates that the user should interpret the correct site identifier to put into the command.

When specific paths are shown, they will be given a background shade as below:

/awips2/edex

15.1.2 Variable Conventions

Table 15.1.2-1 defines a list of variables referenced in this chapter, provides a description of each variable, and identifies the current location of each variable as of the date of this publication. Wherever a variable occurs in this chapter, the actual value should be substituted when typing the commands on an AWIPS system. *These are not environment variables at this point in time, so manual substitution should be made when typing commands that contain references to these variables.*

Table 15.1.2-1. Document Variable Conventions

Environment Variable	Description	Default Location
\$CAVE	The hostname of a CAVE workstation	lx1, lx2, lx3, etc....
\$DB_SERVER	The hostname of the server running the Postgres database engine	dx1f
\$EDEX1	The primary EDEX servers	dx3
\$EDEX_CONFIG	The location in which the configuration files on the EDEX servers reside	/awips2/edex/data/utility
\$EDEX_DB_HOME	The location in which the database files reside that control the functionality of the PostgreSQL engine, as well as the physical storage for the data held within the tables	/awips2/data [DX1 and DX2]
\$EDEX_HOME	The home location for the EDEX JVM.	/awips2/edex
\$LDM_DOWNSTREAM	The hostname of the server running the downstream LDM client	dx2f
\$LDM_HOST	The hostname of the server running the upstream/feeders LDM host	cpsbn1/cpsbn2
\$RCM_INSTALL_DIR	The location in which the AWIPS II RadarServer is installed	/awips2/rcm
\$RCM_SERVER	The hostname of the server running the AWIPS II RadarServer	dx1f

Note: As of the date this chapter was produced, there is no plan to have these be system environment variables on an AWIPS or ADAM system. The location should be known to the user following the steps outlined here. Normally the value under the expected location is that to which an AWIPS site or ADAM platform would adhere, with the exception of the server and cave platforms. Those, for an ADAM platform only, would all be adam1.

15.2 AWIPS II Site Data Configuration

The following steps will allow a user to configure the AWIPS II software in such a way that it will be tailored for the specific area defined by current WFO or RFC boundaries.

15.2.1 Database Configuration

An integral part of each system setup is the database, which continues to be housed within a PostgreSQL Database Engine (www.postgresql.org). Table 15.2.1-1 lists the functional database tables, and notes whether they are WFO centric, RFC centric, or both. It also identifies the method to be used to create each table.

Table 15.2.1-1. AWIPS II Baseline Database Listing

Database Name	WFO / RFC / Both	Creation Method
dc_ob7xxx*	Both	Post installation from backup
fxatext	Both	On first start of EDEX
hd_ob92xxx*	Both	Post installation from backup
hmdb	WFO	Post installation from backup
lsrdata	WFO	Post installation from backup
maps	Both	During installation
metadata	Both	On first start of EDEX
ob7_histdata	RFC	Post installation from backup
postgres	Both	N/A (Systems Database)
template0	Both	N/A (Systems Database)
template1	Both	N/A (Systems Database)

* Sites will not see xxx in their output; ‘xxx’ shown here will be replaced by the 3-letter AWIPS Site ID.

Those databases not created or populated during software installation or during software startup should be restored from the latest backup file.

Note: The need to import databases exists if configuration is being performed in order for EDEX to run as a site other than OAX. If configuration is being done merely to run CAVE in order to back up an adjacent WFO, there is no need to acquire and import the databases for that site.

In order to proceed, the EDEX server must not be running.

- Stop the EDEX server, first by logging into all EDEX servers issuing the stop command.

```
# ssh $EDEX1
# service edex_camel stop
```

- Repeat the previous step for all EDEX client machines.

15.2.2 Configuring the PostgreSQL Database Engine

Due to the dynamic names of the hydrology (hd_) and damcrest (dc_) databases, as well as the ability of RFCs to create local databases in the dblocalrfc tablespace, the PostgreSQL database engine needs to be configured to allow access to these tables. The file that controls access is `$EDEX_DB_HOME/pg_hba.conf`. For each database, two lines must be present in this file: one for local access and one for remote access through tcp protocol. The lines resemble the following example:

```
local   fxaext    all      trust
host    fxaext    all      165.92.XXX.0/24      trust
```

In the above example, XXX would be substituted for the site's AWIPS LAN third octet. To configure the database to allow access from all of a site's CAVE clients, a line for each database matching the above should be entered.

Note: If a CWSU is hooked to your system, and has an IP outside the local site's LAN, additional entries will be necessary to allow connections from these workstations.

Follow these steps to configure the PostgreSQL access for an AWIPS site:

- Log into the database server as user *root* and change to the `$EDEX_DB_HOME` directory:
`# cd $EDEX_DB_HOME`
- Use a text editor (suggested: vi) to edit the `pg_hba.conf` file and input the lines that will allow clients on the AWIPS site to access the databases:
`# vi pg_hba.conf`
- Using table 15.2.1-1 to determine which databases you will have installed, insert the lines, or modify the existing lines to reflect your site's subnet of the AWIPS WAN, in the `pg_hba.conf` file. See the following example, which includes all necessary edits for configuring site LWX:

local	hd_ob921wx	all	trust	
local	dc_ob71wx	all	trust	
local	lsrdata	all	trust	
host	hd_ob921wx	all	165.92.52.0/24	trust
host	dc_ob71wx	all	165.92.52.0/24	trust
host	lsrdata	all	165.92.52.0/24	trust

RFC Note: Because a River Forecast Center has the capability now to create local databases, you will need to reflect each of these local databases in the AWIPS II `pg_hba.conf` file as well, following the example above.

- Once you are finished, save and quit:

```
# :wq!
```

- If the database was not currently running while these changes were being made, it should be restarted at this point. If the engine was running, then a control command can be sent to the postmaster process to force it to reload its configuration files.

```
# ps aux | grep postgres
```

If a postmaster process returns, then reload the configuration data:

```
# su awips -lc "pg_ctl reload -D $EDEX_DB_HOME"
```

Otherwise, start the database server:

```
# service edex_postgres start
```

15.2.3 Create and Import Database Files

Once the database has been configured to allow connections from your site's AWIPS LAN, any databases that are not delivered should be created and populated (if they have not been already). Find a list of databases currently loaded on the AWIPS system by logging into an AWIPS machine with the AWIPS II software and environment successfully installed and follow these steps:

- Open a terminal window, if one is not already open.
- Issue the following command to get a list of currently loaded databases:

```
# psql -U awips -h $DB_SERVER -l
```

Note: If prompted for a password, the database user password is “awips”.

- Compare this list to [Table 15.2.1-1. AWIPS II Database Listing](#).
- Log into the AWIPS II Database Server.

```
# ssh -l root $DB_SERVER      Logs into the database server as user root
```

15.2.3.1 hmdb Database [WFO only]

Because the database already exists, it must first be dropped before it can be imported from a backup with the following command:

```
# dropdb -h $DB_SERVER -U awips hmdb
```

*** Only run this if the database already exists ***

NOTE: If prompted for a password, the database user password is ‘awips’

```
# createdb -h $DB_SERVER -U awips hmdb
```

Runs the createdb command giving ownership to database user awips for each database needed.

NOTE: If prompted for a password, the database user password is ‘awips’

- Import the most current backups for the databases. AWIPS backup_pgdb cron runs daily at 0522 GMT and puts a backup for each database into `/data/fxa/DAILY_BACKUP/postgres/<day_of_week>`. These files can be used to import into the newly created databases:

```
# pg_restore -h $DB_SERVER -U awips -d hmdb -Fc
/data/fxa/DAILY_BACKUP/postgres/<> Day Of Week>>/hmdb
```

NOTE: The above command is all on one line, and not on two lines.

15.2.3.2 IHFS Database

- Create the `hd_ob92xxx` database by issuing the following commands [substituting the AWIPS Site ID of the desired site, in lowercase letters, for `xxx` in the database name]:

```
# createdb -h $DB_SERVER -E SQL_ASCII -U awips hd_ob92xxx
```

Runs the createdb command giving ownership to database user awips for each database needed.

NOTE: If prompted for a password, the database user password is ‘awips’

- Import the most current backups for the databases. AWIPS backup_pgdb cron runs daily at 0522 GMT and puts a backup for each database into `/data/fxa/DAILY_BACKUP/postgres/<day_of_week>`. These files can be used to import into the newly created databases:

```
# pg_restore -h $DB_SERVER -U awips -d hd_ob92xxx -Fc
/data/fxa/DAILY_BACKUP/postgres/<> Day Of Week>>/hd_ob92xxx
```

15.2.3.3 DamCrest Database

- Create the `dc_ob7xxx` database by issuing the following commands [substituting the AWIPS Site ID of the desired site, in lowercase letters, for `xxx` in the database name]:

```
# createdb -h $DB_SERVER -U awips dc_ob7xxx
```

Runs the createdb command giving ownership to database user awips for each database needed.

NOTE: If prompted for a password, the database user password is ‘awips’

- Import the most current backups for the databases. AWIPS backup_pgdb cron runs daily at 0522 GMT and puts a backup for each database into `/data/fxa/DAILY_BACKUP/postgres/<day_of_week>`. These files can be used to import into the newly created databases:

```
# pg_restore -h $DB_SERVER -U awips -d dc_ob7xxx -Fc
/data/fxa/DAILY_BACKUP/postgres/<> Day Of Week>>/dc_ob7xxx
```

NOTE: The above command is all on one line, and not on two lines.

15.2.3.4 *lsrdata Database [WFO Only]*

- Create the lsrdata database by issuing the following commands:

```
# createdb -h $DB_SERVER -U awips lsrdata
```

Runs the createdb command giving ownership to database user awips for each database needed.

NOTE: If prompted for a password, the database user password is ‘awips’

- Import the most current backups for the databases. AWIPS backup_pgdb cron runs daily at 0522 GMT and puts a backup for each database into `/data/fxa/DAILY_BACKUP/postgres/<day_of_week>`. These files can be used to import into the newly created databases:

```
# pg_restore -h $DB_SERVER -U awips -d lsrdata -Fc
/data/fxa/DAILY_BACKUP/postgres/<< Day Of Week>>/lsrdata
```

NOTE: The above command is all on one line, and not on two lines.

15.2.3.5 *Additional Databases [RFC Only]*

River Forecast Centers have the ability to create local databases for use with RFC applications. These databases will need to be imported into the AWIPS II database engine. To retrieve the names of these databases, on the AWIPS I database server (dx1f) issue the following command:

```
# psql -l | grep -vE
"(fxatext|dc_ob7|hd_ob|hmdb|ob7_his|postgres|template)"
```

If the AWIPS I database engine has already been shut down, issue this command on dx1 to find those files that were backed up by the nightly cron (all on one line):

```
# find /data/fxa/DAILY_BACKUP/postgres/ -regextype posix-egrep
-mtime -1 -type f ! -regex
'/.*(fxatext|dc_ob7...|hd_ob.....|hmdb|ob7_histdata|postgres|template[01])'
```

The following example shows one possible output:

```
[root@dx1-krf ~]# find /data/fxa/DAILY_BACKUP/postgres/ -regextype posix-egrep -
mtime -1 -type f ! -regex
'/.*(fxatext|dc_ob7...|hd_ob.....|hmdb|ob7_histdata|postgres|globals|template[01])'
/data/fxa/DAILY_BACKUP/postgres/Thursday/fastetc
/data/fxa/DAILY_BACKUP/postgres/Thursday/gisrs
```

/data/fxa/DAILY_BACKUP/postgres/Thursday/hdkrf_testdb

Note the databases below:

For each database returned, run the createdb and pg_restore commands when the AWIPS II database engine is installed and running:

```
# createdb -h $DB_SERVER -U awips [[ dbname ]]
# pg_restore -h $DB_SERVER -U awips -d [[ dbname ]] -Fc
/data/fxa/DAILY_BACKUP/postgres/<< Day Of Week>>/[[ dbname ]]
```

15.2.4 Update Shape Files Including FFMP

In AWIPS II, the FFMP shape files reside within a PostgreSQL database named *maps*. A utility named importShapeFiles.sh is provided to help import the files into the database. Table 15.2.4-1 (taken from mapdata.map_version) lists those shape files imported into the database on installation along with their AWIPS I equivalent file names. Use this table when updating shape files.

Table 15.2.4-1. AWIPS II Shape File To Table Mapping

Table Name	Filename	Table Name	Filename
basins	ba23de09.shp	highway	rd30ap08.shp
cwa	w_15jl09.shp	canada	province.shp
offshore	oz02jn09.shp	specialuse	sua.shp
zone	z_11my10.shp	lowaltitude	vAirways.shp
timezones	tz04nv07.shp	navaid	navaid.shp
firewxao	cf17jl07.shp	artcc	artcc.shp
latlon10	LatLon10_Ocean.shp	airport	airport.shp
majorrivers	rs14fe02.shp	highaltitude	jAirways.shp
allrivers	rv14fe02.shp	fix	fix.shp
lake	lk24ap09.shp	rfc	rf12ja05.shp
world	world_adm0.shp	isc	cm28fe06.shp
states	s_01au07.shp	marinezones	mz01jn10.shp
customlocations	customlocations.shp	mexico	st_mx.shp
highsea	hz30mr09.shp	firewxzones	fz01my10.shp
interstate	in30ap08.shp	city	ci16ap10.shp
railroad	railrdl020.shp	marinesites	MarineInfo_OB9.2.txt
county	c_15jl09.shp	ffmp_basins	FFMP_aggr_basins.shp
hsa	hs07my09.shp	ffmp_streams	FFMP_ref_sl.shp

The FFMP streams and basins shape files must be localized at a WFO for each site using the created shapefiles in /data/fxa/nationalData. WFOS only update these files as follows:

- Log into the server hosting the AWIPS II database (DX1 in normal operations) as user root

- ```
ssh -q $DB_SERVER -l root
```
- Unzip the gzipped versions of the FFMP shape files
 

```
cd /data/fxa/nationalData
gunzip FFMP_*.shp.gz
```
  - Switch user to *awips*

```
su - awips
```
  - Change directories to the directory containing the importShapeFile.sh script
 

```
cd /awips2/static/database.maps (For OB11.4 & OB11.5)
cd /awips2/database/sqlScripts/share/sql/maps/
(For OB11.6 & OB11.7)
```
  - Update the ffmp\_basins shape files using the site-specific version
 

```
./importShapeFile.sh
/data/fxa/nationalData/FFMP_aggr_basins.shp mapdata
ffmp_basins 0.064,0.016,0.004,0.001 awips
```

**NOTE:** If prompted for a password, the database user password is ‘awips’.

The following example shows typical output from this script:

**Example**

```
Importing FFMP_aggr_basins.shp into mapdata.ffmp_basins ...
Shapefile type: Polygon
Postgis type: MULTIPOLYGON[2]
psql:<stdin>:29: NOTICE: CREATE TABLE will create implicit
sequence "ffmp_basins_gid_seq" for serial column "ffmp_basins.gid"
psql:<stdin>:29: NOTICE: CREATE TABLE / PRIMARY KEY will create
implicit index "ffmp_basins_pkey" for table "ffmp_basins"
 addgeometrycolumn

mapdata.ffmp_basins.the_geom SRID:4326 TYPE:MULTIPOLYGON
DIMS:2

(1 row)

Creating simplification levels 0.064,0.016,0.004,0.001...
Creating simplified geometry level 0.064 ...
Creating simplified geometry level 0.016 ...
Creating simplified geometry level 0.004 ...
Creating simplified geometry level 0.001 ...
```

- Update the ffmp\_streams shape files using the site-specific version

```
./importShapeFile.sh
/data/fxa/nationalData/FFMP_ref_s1.shp mapdata ffmp_streams
0.064,0.016,0.004,0.001 awips
```

**NOTE:** If prompted for a password, the database user password is ‘awips’.

The following example shows typical output from this script:

**Example**

```
Importing FFMP_ref_sl.shp into mapdata.ffmp_streams ...
Shapefile type: Arc
Postgis type: MULTILINESTRING[2]
psql:<stdin>:27: NOTICE: CREATE TABLE will create implicit sequence
"ffmp_streams_gid_seq" for serial column "ffmp_streams.gid"
psql:<stdin>:27: NOTICE: CREATE TABLE / PRIMARY KEY will create implicit index
"ffmp_streams_pkey" for table "ffmp_streams"
 addgeometrycolumn

mapdata.ffmp_streams.the_geom SRID:4326 TYPE:MULTILINESTRING DIMS:2
(1 row)

Creating simplification levels 0.064,0.016,0.004,0.001...
Creating simplified geometry level 0.064 ...
Creating simplified geometry level 0.016 ...
Creating simplified geometry level 0.004 ...
Creating simplified geometry level 0.001 ...
```

- Exit the user *awips* shell back to root.  
`# exit`
- GZIP the FFMP Shape files which were unzipped before  
`# cd /data/fxa/nationalData`  
`# gzip FFMP_*.shp`

### 15.2.5 Update afos\_2\_awips With Local Changes

If local changes have been made to the site’s afos2awips.txt file, they should be imported into the AWIPS II system. The functionality of this file has now been moved into the fxafile database (into a table named afos\_to\_awips). To make it easy to import a site’s localized version of this file easily, the site should make edits to the same file it maintained in AWIPS I. When completed, the file is placed in a national data management directory within the EDEX installation tree. From there EDEX uses the file to update its database automatically when there are changes. These steps should be completed for all sites performing an initial site data configuration.

- Log into the server hosting the AWIPS II EDEX (DX3 in normal operations) as user root  
`# ssh -q $EDEX1 -l root`
- Switch to user *awips*  
`# su - awips`
- Copy the file into the ndm directory of the EDEX installation tree:  
`# cp /awips/fxa/data/afos2awips.txt $EDEX_HOME/data/ndm/`

- Ensure the proper ownership and permission  

```
chown awips:fxalpha $EDEX_HOME/data/ndm/afos2awips.txt
```
- Exit from the system user *awips* shell, and from the ssh connection  

```
exit
```

```
exit
```

### **15.3 SBN Ingest Configuration**

AWIPS II introduces the Unidata Local Data Manager (LDM) as the ingest tool for SBN data. It replaces the legacy acq\_send / acqServer processes from AWIPS I.

The upstream LDM host runs on the CPSBN machines, and listens directly to the SBN stream from the DVB receivers.

The downstream LDM host runs in conjunction with the dx2f package, and requests specific products from the upstream host. This is where the ingest filtering would take place.

#### **15.3.1 Ingest Filter Configuration**

Ingest filtering is controlled through the **pqact.conf** file, which resides in **/usr/local/lmd/etc** directory. The general syntax of an entry in the file is as follows:

```
feedtype TAB Regex Pattern
TAB action TAB [arg]
```

Where TAB is an actual TAB. Lines can, and are, split between newlines at a TAB.

Table 15.3.1-1 is a list of feedtypes that can be used (reference <http://www.unidata.ucar.edu/software/lmd/lmd-6.7.1/basics/feedtypes/index.html> ).

**Table 15.3.1-1. LDM Feedtypes**

| Primary Name | Alternate Names | Description                                                                 |
|--------------|-----------------|-----------------------------------------------------------------------------|
| PPS          | FT0             | Public Products Service                                                     |
| DDS          | FT1, DOMESTIC   | Domestic Data Service                                                       |
| HDS          | FT2, HRS        | High resolution Data Service                                                |
| IDS          | FT3, INTNL      | International Data Service                                                  |
| SPARE        | FT4             | Reserved for IDD use                                                        |
| UNIWISC      | FT5, MCIDAS     | Satellite imagery and derived products from the Unidata/Wisconsin Broadcast |
| PCWS         | FT6, ACARS      | ACARS data from commercial aircraft                                         |
| FSL2         | FT7, PROFILER   | Wind profiler data                                                          |
| FSL3         | FT8             | Reserved for NOAA/GSD use                                                   |
| FSL4         | FT9             | Reserved for NOAA/GSD use                                                   |

| Primary Name | Alternate Names                  | Description                                                                |
|--------------|----------------------------------|----------------------------------------------------------------------------|
| FSL5         | FT10                             | Reserved for NOAA/GSD use                                                  |
| GPSSRC       | FT11, NMC1, AFOS                 | SuomiNet GPS data gathering                                                |
| CONDUIT      | FT12, NMC2, NCEPH                | NCEP high-resolution model output                                          |
| NEXRAD       | FT13, NMC3                       | NEXRAD Level-III composites                                                |
| LIGHTNING    | FT14, NLDN                       | Lightning data                                                             |
| WSI          | FT15                             | NEXRAD Level-III (NIDS) radar products and composites from WSI Corporation |
| DIFAX        | FT16                             | Unidata community-generated replacement for defunct DIFAX feed             |
| FAA604       | FT17, FAA, 604                   | FAA604 products for NWS use (private network), but available for IDD use   |
| GPS          | FT18                             | SuomiNet GPS data                                                          |
| FNMOC        | FT19, SEISMIC, NOGAPS            | NOGAPS and COAMP model output from FNMOC                                   |
| GEM          | FT20, CMC                        | Canadian Meteorological Center GEM model output                            |
| NIMAGE       | FT21, IMAGE                      | NOAAport satellite imagery                                                 |
| NTEXT        | FT22, TEXT                       | NOAAport textual products (for future use)                                 |
| NGRID        | FT23, GRID                       | NOAAport high-resolution model output                                      |
| NPOINT       | FT24, POINT, NBUFR, BUFR         | NOAAport point products (for future use)                                   |
| NGRAPH       | FT25, GRAPH                      | NOAAport Redbook Graphics (for future use)                                 |
| NOTHER       | FT26, OTHER                      | NOAAport miscellaneous products (for future use)                           |
| NEXRAD3      | FT27, NNEXRAD, NEXRAD            | NEXRAD Level-III products                                                  |
| NEXRAD2      | FT28, CRAFT, NEXRD2              | NEXRAD Level-II radar data                                                 |
| NXRDSRC      | FT29                             | NCDC NEXRAD Level-II data archiving                                        |
| EXP          | FT30                             | For experiments, testing, etc.                                             |
| ANY          | FT0   FT1   FT2   ...   FT31     | Predefined feed set name for any feed type                                 |
| NONE         | -                                | Predefined feed set name for no feed types (will not match anything)       |
| DDPLUS       | FT0   FT1                        | Predefined feed set name for PPS or DDS                                    |
| WMO          | FT0   FT1   FT2   FT3            | Predefined feed set name for PPS, DDS, HDS, or IDS                         |
| UNIDATA      | FT0   FT1   FT2   FT3   FT5      | Predefined feed set name for PPS, DDS, HDS, IDS, or UNIWISC                |
| FSL          | FT6   FT7   FT8   FT9   FT10     | Predefined feed set name for PCWS, FSL2, FSL3, FSL4, or FSL5               |
| NMC          | FT11   FT12   FT13               | Predefined feed set name for AFOS, NMC2, or NMC3                           |
| NPORT        | FT22   FT23   FT24   FT25   FT26 | Predefined feed set name for NTEXT, NGRID, NPOINT, NGRAPH, or NOTHER       |

*Regex Pattern* is a regular expression used in pattern matching the LDM stream for ingest.

**Note:** The feedtypes are standard NOAAPORT feeds coming in over the SBN. All sites have a full SBN feed so all should have access to each feedtype.

*Action* is the action to take on the product once it arrives. Table 15.3.1-2 describes the possibilities for action and can be found on LDM's webpage here:

<http://www.unidata.ucar.edu/software/Ldm/lmd-current/basics/pqact.conf.html>

**Table 15.3.1-2. LDM Action Options**

| Action    | Description                                                  |
|-----------|--------------------------------------------------------------|
| NOOP      | Don't do anything with the product                           |
| FILE      | Write the data product to a file using the write() function  |
| STDIOFILE | Write the data product to a file using the fwrite() function |
| DBFILE    | Write the data product to a database                         |
| EXEC      | Execute a program                                            |
| PIPE      | Write the product to a program's standard input              |

*Arg* provides optional arguments for the *Action*. In general, the syntax for the ARG portion of the line in the pqact.conf file is as seen below.

```
-overwrite -close -log -edex <tab> /store/path
```

Where:

<tab> indicates hitting the tab key on the keyboard  
 /store/path is the path the file should be written to disk.  
 -overwrite indicates overwrite the file (if exists)  
 -close indicates to close the file after fwrite() function  
 -log indicates log the product to the ldmd.log  
 -edex indicates the sending of data over edexBridge for processing

In order to determine the correct FEEDTYPE above, the following command can be run from a downstream LDM host.

```
./notifyme -h $LDM_HOST -v -l- -p '$REGEX'
```

Where \$REGEX is a regular expression that will match against the type of data which is of interest. Once a match is found, it is displayed on the screen as seen in the following example.

#### *Example*

```
Dec 21 15:52:21 notifyme[32196] INFO: 1522 20101221155220.618
IDS|DDPLUS 11247393 SOAK45 KWBC 211549
Dec 21 15:52:21 notifyme[32196] INFO: 408 20101221155220.618
HDS 11247394 SFUS41 KWBC 211545
```

AWIPS I customizes only specific patterns based on the localized site. Tables 15.3.1-3 and 15.3.1-4 depict information on each, and where to find the corresponding information.

**Table 15.3.1-3. Hydrology Patterns**

| AWIPS I Pattern                | Information Location                                                                 | AWIPS II LDM Pattern                           |
|--------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------|
| <b>^SRU[EMSW][1-9]..(Wxxx)</b> | <b>Wxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | IDS DDPLUS ^(^SRU[EMSW][1-9].) ( <b>Wxxx</b> ) |
| <b>SRUSRegCode.KWBC</b>        | <b>RegCode</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX | IDS DDPLUS (^SRUSRegCode) ( <b>KWBC</b> )      |
| <b>FOUS...(Rxxx)</b>           | <b>Rxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | IDS DDPLUS ^(^FOUS..) ( <b>Rxxx</b> )          |
| <b>FGUS[57]..(Rxxx)</b>        | <b>Rxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | IDS DDPLUS ^(^FGUS[567].) ( <b>Rxxx</b> )      |
| <b>[AF][BS]US...(Wxxx)</b>     | <b>Wxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | IDS DDPLUS ^(^([AF][BS]US..) ( <b>Wxxx</b> ))  |
| <b>AGUS5..(Rxxx)</b>           | <b>Rxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | IDS DDPLUS ^(^AGUS5.) ( <b>Rxxx</b> )          |
| <b>AGUS4..(Wxxx)</b>           | <b>Wxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | IDS DDPLUS ^(^AGUS4.) ( <b>Wxxx</b> )          |
| <b>[YZ]EI.98.(Rxxx)</b>        | <b>Rxxx</b> from XXX-hydroSiteConfig.txt file in /awips/fxa/data/localization/XXX    | ANY ^(^([YZ]EI.98) ( <b>Rxxx</b> ))            |

**Note:** An example of the first row in the pqact.conf would look like this:

```
IDS|DDPLUS ^(^SRU[EMSW][1-9].) (Wxxx)(..)(..)
FILE -overwrite -close -edex /data_store/shef\4\1\2\3\4\5_(seq).txt
```

Remember that there are TABs between the different sections of the entry and that **Wxxx** would be substituted based on the rules above.

**Table 15.3.1-4. Radar Patterns**

| AWIPS I Pattern             | Information Reference                                                                                                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| CODE 17 INCLUDE SDUS2??KZZZ | Substitute KZZZ for the reporting site for each radar listed in: /awips/fxa/data/localizationDataSets/XXX/dialRadars.txt         |
| CODE 17 INCLUDE SDUS3??KZZZ |                                                                                                                                  |
| CODE 17 INCLUDE SDUS4??KZZZ | Reporting sites can be found by issuing the following command: grep -i xxx /awips/fxa/data/wmoSiteInfo.txt                       |
| CODE 17 INCLUDE SDUS5??KZZZ | Where xxx is the radar ID without the preceding K, P or T.                                                                       |
| CODE 17 INCLUDE SDUS7??KZZZ | The following file on DX1 also contains the information needed: /awips/fxa/data/localizationDataSets/XXX/acq_wmo_parms.sbn.radar |
| CODE 17 INCLUDE SDUS8??KZZZ |                                                                                                                                  |
| CODE 17 INCLUDE NXUS6??KZZZ |                                                                                                                                  |

AWIPS II has only one pattern in the pqact.conf file, which lists all KXXX:

```
NNEXRAD ^(^SDUS[234578].|NXUS6.) (K|P|T)(XXX|XXX|XXX|XXX|XXX)
```

Change the XXX to match each of the reporting sites for the radars listed in dialRadars.txt file. An example of a full NNEXRAD localized line for site LWX follows. Please note there are only two lines, so word wrap applies.

```
NNEXRAD ^(^SDUS[234578].|NXUS6.)
(K|P|T)(LWX|BGM|CHS|RLX|ILN|CLE|AKQ|JKL|CTP|MHX|MRX|OKX|PHI) (.) (.) (.)
/p(.) (.)
FILE -overwrite -close -log -edex
/data_store/radar\2\8\7\5\6_2\8\7_(seq).rad
```

Additional patterns can also be found in the acqPatternsAddOn.txt file which can reside in /awips/fxa/data/localization/XXX or /data/fxa/customFiles. These patterns should also be added to the pqact.conf.xxx file in the proper syntax (where xxx is your site ID).

Delivered with the AWIPS II LDM rpm is a baselined pqact.conf.template file that should be used as a basis for the active pqact.conf file. It should not be edited; rather, it should be copied into the active pqact.conf file. From there, custom patterns can be concatenated onto the active file.

The FEEDTYPE is in bold type in the table.

To edit or add a new filter rule manually, follow these steps:

- Log into the downstream LDM client host (dx2f) as user *root*:

```
ssh root@$LDM_DOWNSTREAM
```

- Change directories to the pqact.conf location on the server

```
cd /usr/local/ldm/etc
```

- Edit the pqact.conf using a text editor (shown here is vi)

```
vi pqact.conf.xxx
```

Once you are finished making changes, save the file and exit the editor:

```
:wq!
```

Check to ensure that the edited file still has the proper syntax using the *ldmadmin* command:

```
su ldm -lc "ldmadmin pqactcheck -f /usr/local/ldm/etc/pqact.conf.xxx"
```

Expect the phrase “syntactically correct” for each file you have configured in ldmadmin-pl.conf

Concatenate this file with the pqact.conf.template file to create the active pqact.conf file:

```
cat pqact.conf.template pqact.conf.xxx > pqact.conf
```

Ensure the proper ownership and permissions:

```
chown ldm:falpha /usr/local/ldm/etc/pqact.conf
```

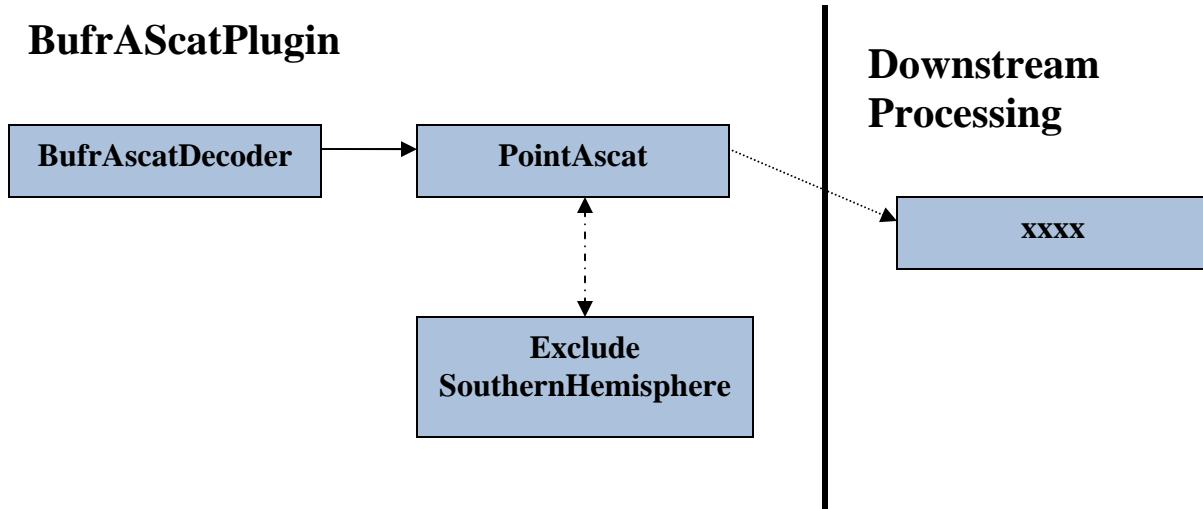
Signal the LDM server to reread the configuration files:

```
su ldm -lc "ldmadmin pqactHUP"
```

### 15.3.2 Plug-in Ingest Filters

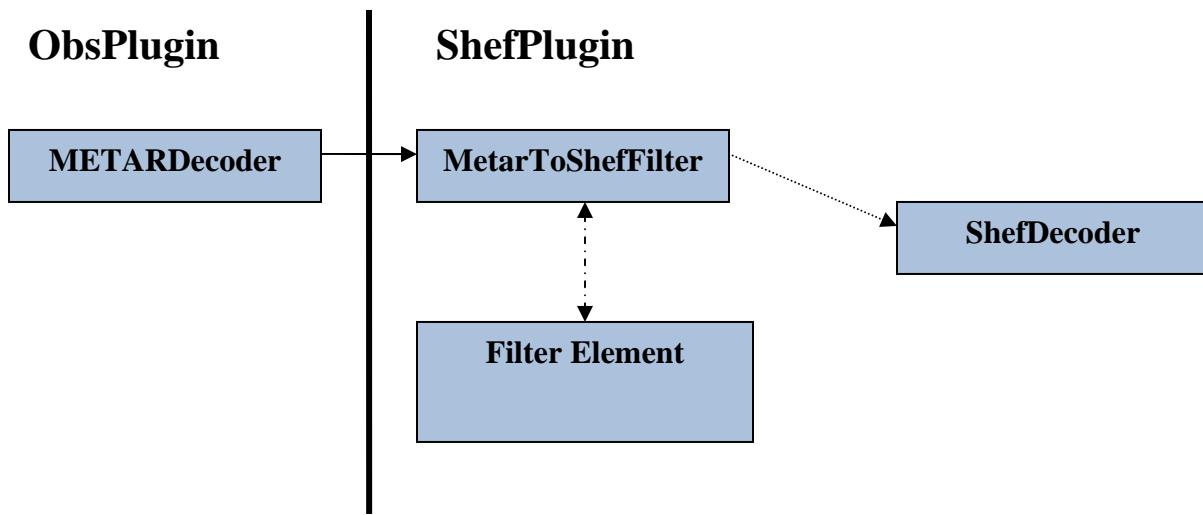
The purpose of plugin filters is to provide a data filtering capability that is base or site configurable without recompiling baseline code. This allows a subset of a national data set to be filtered based upon an area of interest, for example, filtering out the products that are put through shef decoding to only those in the local CWA of interest.

Plug-in filters may be used to filter output from a process as shown in Exhibit 15.3.2-1.



**Exhibit 15.3.2-1. Plug-in Filter Used to Filter Output from a Process**

Plug-in filters may also be used to filter the input of a process, as shown in Exhibit 15.3.2-2.



**Exhibit 15.3.2-2 Plug-in Filter Used to Filter the Input of a Process**

Filtering can be done through EXCLUSION of data, INCLUSION of data, or a combination of both.

When using INCLUSIVE filtering, the output of the filtering operation returns those records which match the filtering criteria. The following shows an INCLUSIVE filter which will pass only those observations within a geographical rectangle that encompasses the OAX CWA:

```

<pluginDataObjectFilter>
 <filterElements xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:type="rectFilterElement">
 <filterElementName>OAX.WFO</filterElementName>
 <!-- Filter that includes all observations within the
Omaha Valley WFO -->
 <filterType>INCLUDE</filterType>
 <upperLeftLat>44</upperLeftLat>
 <upperLeftLon>-100</upperLeftLon>
 <lowerRightLat>40.0</lowerRightLat>
 <lowerRightLon>-94.90</lowerRightLon>
 </filterElements>
 <filterName>OAX.MetarToShef</filterName>
</pluginDataObjectFilter>

```

When using EXCLUSIVE filtering, the output of the filtering operation returns those records which are not matched by the filtering criteria. The following example shows an EXCLUSIVE filter which will stop all southern hemisphere data from being processed by the QuikScat plug-in:

```

<pluginDataObjectFilter>
 <filterElements xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:type="rectFilterElement">
 <!-- Exclude all southern hemisphere data. -->
 <filterElementName>Exclude
SouthernHemisphere</filterElementName>
 <filterType>EXCLUDE</filterType>
 <upperLeftLat>-0.1</upperLeftLat>
 <upperLeftLon>-180.0</upperLeftLon>
 <lowerRightLat>-90.0</lowerRightLat>
 <lowerRightLon>180.0</lowerRightLon>
 </filterElements>
 <filterName>Point.QuikScat</filterName>
</pluginDataObjectFilter>

```

Table 15.3.2-1 describes filtering elements that can be used as a filter element type on this document (the xsi: type=).

**Table 15.3.2-1. Plug-in Filter Filtering Elements**

| Filter Element         | Description                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------|
| RectFilterElement      | Select based upon reports contained within a rectangular bounding                                   |
| RadiusFilterElement    | Select based upon reports within a specified distance from a given latitude/longitude               |
| StationIdFilterElement | Select based upon reports matching a specified station identifier. Regular expressions may be used. |

Table 15.3.2-2 describes a list of present files in the **base** plug-in-filters directory that filter out all Southern Hemisphere data. Finer grain filtering may be done within a site-specific plug-in-filters directory.

**Table 15.3.2-2. List of Base Plug-in Filters**

| Plug-in Name  | File Name                 | Description                                                      |
|---------------|---------------------------|------------------------------------------------------------------|
| bufrascat     | ascat_filters.xml         | Allows only northern hemisphere ASCAT data to be stored          |
| modelsounding | modelsounding_filters.xml | Allows only northern hemisphere model sounding data to be stored |
| bufrssmi      | pointssmi_filters.xml     | Allows only northern hemisphere SSMI data to be stored           |
| bufrquikscat  | quikscat_filters.xml      | Allows only northern hemisphere QUIKSCAT data to be stored       |

Table 15.3.2-3 describes a list of plug-ins which, as of the date on this document, support plug-in filtering.

**Table 15.3.2-3. Plug-ins That Support Filtering**

| Plug-in Name  | Plug-in Filter File Name  | Description                                                                                                                                         |
|---------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| mesowest      | mesowest_filters.xml      | As delivered in the OAX localization, this filters out all data except that within the site's CWA for the mesowest plug-in by latitude / longitude. |
| shef          | metarToShefFilter.xml     | As delivered in the OAX localization, filters out all data except that within the site's CWA by latitude/longitude.                                 |
| modelsounding | modelSounding_filters.xml |                                                                                                                                                     |
| shef          | synopticMetarToShef.xml   | As delivered in the OAX localization, filters out all data except that within the site's CWA by latitude/longitude.                                 |

Table 15.3.2-4 describes a list of fields that can be used within a plug-in filter xml file

**Table 15.3.2-4. Fields for Use Within a Plug-in Filter XML File**

| Filter Tag        | Tag Effect             | Description                                                                                          |
|-------------------|------------------------|------------------------------------------------------------------------------------------------------|
| filterElementName | Global                 | For information purposes only. Appears in EDEX log for tracing loading and functionality of filters. |
| filterName        | Global                 | For information purposes only. Appears in EDEX log for tracing loading and functionality of filters. |
| filterType        | Global                 | INCLUDE or EXCLUDE                                                                                   |
| upperLeftLat      | RectFilterElement      | Latitude measure for upper left corner point for filter area.                                        |
| upperLeftLon      | RectFilterElement      | Longitude measure for upper left corner point for filter area.                                       |
| lowerRightLat     | RectFilterElement      | Latitude measure for lower right corner point for filter area.                                       |
| lowerRightLon     | RectFilterElement      | Longitude measure for lower right corner point for filter area.                                      |
| pointLat          | RadiusFilterElement    | Latitude of center point for radius filtering                                                        |
| pointLon          | RadiusFilterElement    | Longitude of center point for radius filtering                                                       |
| radius            | RadiusFilterElement    | Radius around center point to either include or exclude data.                                        |
| patterns          | StationIdFilterElement | Station ID or regular expression to glob multiple station IDs into station ID filtering element.     |

**NOTE:** Latitude values may range from -90 degrees (south) to 90 degrees (north); longitude values may range from -180 degrees (west) to 180 degrees (east). If a box must cross the date line (180), two filter boxes must be created to handle the filtering.

To create, or edit, a plug-in filter xml, follow these steps:

- Log into an EDEX server, if not already logged in:  
`# ssh root@${EDEX1}`
- If the directory does not exist, create the site level plug-in-filters edex static configuration directory:  
`# mkdir -p ${EDEX_CONFIG}/edex_static/site/<XXX>/plugin-filters`  
`# cd ${EDEX_CONFIG}/edex_static/site/<XXX>/plugin-filters`

Copy the file from the OAX directory and edit using the vi editor:

```
cp -a ../../OAX/plugin-filters/[[filter file]].xml .
vi [[filter file]].xml
```

**NOTE:** The name of the file must be one of those listed in Table 15.5-5.

- Enter / edit the fields ensuring the file looks like the example shown earlier in this section.

A general rule of thumb is to define the area of responsibility for the desired site starting with its center point. To retrieve a site's center point, issue the following command:

**For WFO sites:**

```
psql -h $DB_SERVER -U awips -d maps -c "select lat,long from mapdata.cwa where wfo='SITEID';"
```

**RFC sites should issue the same command, using their colocated WFO to substitute for \$SITEID.**

Use the center point, and add and subtract 3 degrees from the latitude to get the upper and lower latitude. Add and subtract 4 degrees to get the west and east longitude. Adjust as necessary.

- When you have finished editing, save and quit  
`# :wq!`
- Ensure proper ownership and permissions:

```
chown -R awips:awips
${EDEX_CONFIG}/edex_static/site/<XXX>/plugin-filters
```

---

```
chmod -R 755 ${EDEX_CONFIG}/edex_static/site/<XXX>/plugin-
filters
```

### 15.3.3 Distribution Filters

AWIPS II introduces another layer of ingest filtering. Before processing a piece of data, EDEX will determine by its WMO header passed via JMS from QPID whether it should process the data. It uses regular expressions to match the patterns in the distribution XML files against the WMO header.

Base distribution XML Location: \$EDEX\_CONFIG/edex\_static/distribution/

Site distribution XML Location: EDEX\_CONFIG/edex\_static/site/XXX/distribution

**Note:** Base distribution files should never be edited.

To localize as any site, a distribution xml must be created in the site localization for the following:

shef.xml

Follow these steps to copy the base file into a site directory, and then edit to match the LDM pqact pattern for hydro data set up earlier:

**Log into an EDEX server, if not already logged in:**

```
ssh root@$EDEX1
```

If the directory does not exist, create the site-level plugin-filters edex static configuration directory:

```
mkdir -p ${EDEX_CONFIG}/edex_static/site/<XXX>/distribution
```

Change directories into the edex\_static localization tree and copy the base file into the site-level directory:

```
cd ${EDEX_CONFIG}/edex_static
cp -a base/distribution/shef.xml site/XXX/distribution
```

Edit/create a file using vi:

```
vi shef.xml
```

Change the patterns to match the changes you made based on the hydro patterns in section 2.1; then save the file and quit the editor:

```
:wq!
```

Ensure proper ownership and permissions:

```
chown -R awips:awips
${EDEX_CONFIG}/edex_static/site/<XXX>/distribution
chmod -R 755
${EDEX_CONFIG}/edex_static/site/<XXX>/distribution
```

## 15.4 Hydrology

AWIPS II has wrapped current hydrology applications so they will run within the Common AWIPS Visualization Environment. The applications which are wrapped have localization files in the AWIPS II EDEX configuration tree.

### 15.4.1 Create / Copy Common Hydrology Files Into Place

The use of previously created hydrology files is necessary for certain parts of the AWIPS II software. Copy these files from their respective AWIPS I locations:

- First, log into an EDEX server and change to the common utility configuration directory for the desired site:

```
ssh root@${EDEX1}
cd ${EDEX_CONFIG}/common_static/site/<XXX>
```

Where XXX is the AWIPS ID for the site for which configuration is being performed.

- Save and exit the vi editor.

```
:wq!
```

- Create the directory structure necessary for, and then copy the AWIPS I host ascii and binary file(s) into the new directory with the new file name syntax:

**If configuring for a WFO, use these commands:**

```
mkdir -p hydro/hydroapps/geo_data/host
#cp -r /awips/hydroapps/geo_data/host/ascii
hydro/hydroapps/geo_data/host/
cp -r /awips/hydroapps/geo_data/host/binary
hydro/hydroapps/geo_data/host/
```

**If configuring for an RFC, use this command:**

```
mkdir -p hydro/hydroapps/geo_data/xxxxxx
cp -r /awips/hydroapps/geo_data/xxxxxx/ascii
hydro/hydroapps/geo_data/xxxxxx/
cp -r /awips/hydroapps/geo_data/host/binary
hydro/hydroapps/geo_data/xxxxxx/
```

Where xxxxxx is your 5-letter RFC identifier. For example, RHA is "marfc"

- If the directory does not exist, create the site-level hydro common configuration directory for geo data:

```
mkdir -p hydro/hydroapps/whfs/local/data/geo
```

- Copy the AWIPS I local geo data into the new directory with the new file name syntax:  

```
cp -ar /awips/hydroapps/whfs/local/data/geo/*
hydro/hydroapps/local/data/geo/
```
- Copy the AWIPS I local MPE-related files into the new directory with the new file name syntax:  

```
mkdir -p hydro/hydroapps/precip_proc/local/data/app/mpe
cp -r /awips/hydroapps/precip_proc/local/data/app/mpe/prism
hydro/hydroapps/precip_proc/local/data/app/mpe/
cp -r /awips/hydroapps/precip_proc/local/data/app/mpe/misbin
hydro/hydroapps/precip_proc/local/data/app/mpe/
cp -r
/awips/hydroapps/precip_proc/local/data/app/mpe/utiltriangles
hydro/hydroapps/precip_proc/local/data/app/mpe/
```
- Copy in XDAT related files [RFC Only]:  

```
mkdir -p hydro/hydroapps/rfc/xdat/parameters/groups
cp -r /awips/hydroapps/rfc/xdat/parameters/groups/*
hydro/hydroapps/rfc/xdat/parameters/groups
```
- Copy the AWIPS I group\_definition.cfg file into place for the Time Series application:  

```
cp
/awips/hydroapps/whfs/local/data/app/timeseries/group_definition.cfg hydro/
```
- Ensure proper ownership and permission of the common hydro configuration directory tree:  

```
chown -R awips:fxalpha hydro
chmod -R 775 hydro
```
- Copy the AWIPS I metar.cfg file into the new directory with the new file name syntax:  

```
cp /awips/hydroapps/whfs/local/data/app/metar2shef/metar.cfg
shef/
```
- Ensure proper ownership and permission of the common shef configuration directory tree:  

```
chown -R awips:fxalpha shef
chmod -R 775 shef
```

#### *15.4.2 Create / Edit Site Apps\_defaults File*

A site can use its existing AWIPS I .Apps\_defaults\_site file for use in the AWIPS II environment. However, not all of the tokens from the AWIPS I file are necessary for

AWIPS II. As of the date on this document, the following tokens are required for AWIPS II to operate. This token list will be dynamic in nature and change as more tokens are discovered.

- Copy the AWIPS I .Apps\_defaults\_site file into the new directory with the new file name syntax:

```
cp /awips/hydroapps/.Apps_defaults_site hydro/Apps_defaults
```

- Verify that the following tokens ARE NOT defined in the Apps\_defaults file, as they need to remain their AWIPS II baseline definition. If these tokens are present, use the vi editor to edit the file and remove them:

```
apps_dir
mpe_dir
pproc_dir
```

- Verify that the following tokens ARE defined in the Apps\_defaults file for proper EDEX Hydro functionality. If they are not defined, edit the file to add these tokens in:

```
vi hydro/Apps_defaults
```

If configuring for a WFO:

```
mpe_site_id : xxx
(where xxx is the lower-case 3 letter identifier of your WFO)
mpe_center_lat : ##.###
(where ##.### is the latitude coordinate of your site's center point)
mpe_center_lon : ##.###
(where ##.### is the longitude coordinate of your site's center point)
fxa_local_site : XXX
(where XXX is the upper-case 3 letter identifier of your WFO)
```

If configuring for an RFC:

```
mpe_site_id : xxx
(where xxx is the lower-case 3 letter identifier of your RFC)
mpe_center_lat : ##.###
(where ##.### is the latitude coordinate of your site's center point)
mpe_center_lon : ##.###
(where ##.### is the longitude coordinate of your site's center point)
fxa_local_site : XXX
(where XXX is the upper-case 3 letter identifier of your RFC)
rfctb_site_id : xxx
(where xxx is the lower-case 3 letter identifier of your RFC)
st3_rfc : xxxxx
```

```
(where xxxxx is the lower-case 5 letter identifier of your
RFC)

ifp_rfc : xxxxx
(where xxxxx is the lower-case 5 letter identifier of your
RFC)

rfcw_rfctime : xxxxx
(where xxxxx is the lower-case 5 letter identifier of your
RFC)
```

- Ensure proper ownership and permission of the common hydro configuration directory tree:

```
chown -R awips:fxalpha hydro/Apps_defaults
chmod -R 775 hydro/Apps_defaults
```

## 15.5 Create Radar, NCEP/Hydro and UpperAir Menu Files

EDEX dynamically creates the files needed for the CAVE Radar, NCEP/Hydro, and UpperAir menus from specific input files in the common utility configuration directory tree. Create these files using those delivered with the OAX localization as guides.

### 15.5.1 Create/Edit radarsInUse.txt File

**Section Note:** As of the date on this document, there is a DR created against the software's ability to successfully create the radar menus in CAVE when a site has no ASR or ARSR radars listed in the radarsInUse.txt configuration file. For this reason, if the desired site does not ingest an ASR or ARSR radar, please leave the default entries from the OAX version of this file.

Radar menu configuration is done dynamically by the EDEX server when launched based on a single input file:

```
$EDEX_CONFIG/common_static/site/<XXX>/radar/radarsInUse.txt
```

The file is split into six main sections, which are used by the software to build the menus on the main CAVE toolbar, and under the Radar menu. To configure the radar menus in CAVE, do the following:

- If not already logged in, log into an EDEX server and change to the common utility configuration directory for the desired site:

```
ssh root@${EDEX1}
cd ${EDEX_CONFIG}/common_static/site/<XXX>
```

- Copy the base version of radarsInUse.txt into the desired site's directory:

```
cp ../../base/radar/radarsInUse.txt radar/
```

- Change directories to the local site's common radar configuration directory:

- ```
# cd radar
```
- Edit the *radarsInUse.txt* file to configure radar menus:
- ```
vi radarsInUse.txt
```

Table 15.5-1 describes the five main sections used for radar menu configuration. It includes the title of each section (which is a necessary line in the *radarsInUse.txt* file) and a description of what should follow the title line in the file.

**Table 15.5-1. *radarsInUse.txt* title Lines and Descriptions**

| <i>radarsInUse.txt</i> Title                                    | Description of What Follows                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # LOCAL_RADARS<br>(including terminal) -<br>MUST HAVE THIS LINE | Includes a list of four-letter radar IDs to list in the main tool bar of CAVE. Each entry will be a full menu of dedicated radar products and will be created between the Satellite and Radar menus. Each ID is separated by a new line character.<br><br>In AWIPS I, this is every radar ID listed with a + sign in one of the following files:<br>/data/fxa/customFiles/radarsOnMenu.txt<br>OR<br>/data/fxa/customFiles/XXX-radarsOnMenu.txt<br>OR<br>/awips/fxa/data/localization/XXX/XXX-radarsOnMenu.txt |
| # DIAL_RADARS -<br>MUST HAVE THIS LINE                          | Includes a list of four-letter radar IDs to list under the Dial Radars submenu of the Radars menu in CAVE. Each ID is separated by a new line character.<br><br>In AWIPS I, this is every radar ID not listed with a + sign in one of the following files:<br>/data/fxa/customFiles/radarsOnMenu.txt<br>OR<br>/data/fxa/customFiles/XXX-radarsOnMenu.txt<br>OR<br>/awips/fxa/data/localization/XXX/XXX-radarsOnMenu.txt                                                                                       |
| # ASR_RADARS - MUST<br>HAVE THIS LINE                           | Includes a list of four-letter ASR radar (e.g., eeri) IDs to list in the main tool bar of CAVE. Each entry will get its own menu created and should be separated by a new line character.<br><br><b>DR 8004</b> workaround requires you add a radar ID here. Use eeri.                                                                                                                                                                                                                                        |
| # ARSR_RADARS -<br>MUST HAVE THIS LINE                          | Includes a list of four-letter ARSR radar (e.g., fqwa) IDs to list in the main tool bar of CAVE. Each entry will get its own menu created and should be separated by a new line character.<br><br><b>DR 8004</b> workaround requires you add a radar ID here. Use fqwa.                                                                                                                                                                                                                                       |
| # MOSAIC_RADARS -<br>MUST HAVE THIS LINE                        | Includes a list of four-letter radar IDs to load when selecting the default Mosaic products under the Radar menu. Each ID is separated by a new line character.<br><br>In AWIPS I you can find a list of radars in the <i>mosaicRadarList.txt</i> file located in the /awips/fxa/data/localizationDataSets/XXX directory.                                                                                                                                                                                     |

An example of a localized *radarsInUse.txt* file follows.

```
DO NOT EDIT LINES BEGINNING WITH '#'
LOCAL_RADARS (including terminal) - MUST HAVE THIS LINE
koax
tmsp
ktlx

DIAL_RADARS - MUST HAVE THIS LINE
kabr
kcys
kdmx
kgld
kuex
keax
karx
kmpx
klnx
kdvn
kudx
kfsd
ktwx
tmsp

ASR_RADARS - MUST HAVE THIS LINE
eeri

ARSR_RADARS - MUST HAVE THIS LINE
fqwa

MOSAIC_RADARS - MUST HAVE THIS LINE
koax
kabr
kcys
kdmx
kgld
kuex
keax
karx
kmpx
klnx
kdvn
kudx
kfsd
ktwx
```

- Save and quit the text editor.

```
:wq!
```

**Note:** The # CWA entry in the OAX version of this file is no longer used by the software, so a newly created file for another site does not need to include the line.

### 15.5.2 Create/Edit the eavConfigTable.txt

The EAV display and sample strings are done through the same file as in AWIPS I, the eavConfigTable.txt. Configure this file by doing the following:

- If not already logged in, log into an EDEX server and change to the common utility configuration directory for the desired site:

```
ssh root@${EDEX1}
cd ${EDEX_CONFIG}/common_static/site/<XXX>
```

- Copy the AWIPS I version of eavConfigTable.txt into the desired site's directory:

```
cp /data/fxa/nationalData/eavConfigTable.txt radar/
```

### 15.5.3 Create/Edit raobSitesInUse.txt File For Upper Air Menus

The Upper Air RAOB menus are created dynamically with the input of a single common utility configuration file through the EDEX menu builder.

File Location: \${EDEX\_CONFIG}/common\_static/site/<XXX>/upperair

The file has two necessary menu lines:

```
UPPER_AIR menu
LOCAL_UPPER_AIR submenu
```

The EDEX menu builder will look for these lines, and parse the entries that follow to create the RAOBs that sit on the Upper Air Menu itself, and in the Local submenu of the Upper Air CAVE dropdown.

Each entry under the template line consists of three pieces of information:

- **RAOB icao.** This is the four-letter identifier for which the RAOB is best known.
- **WMO ID.** The WMO ID can be found as the stationid returned from the SQL statement below, or within the existing AWIPS file /awips/fxa/data/station\_table.dat.
- **Location Description.** The Location Description should match the RAOB icao. This can be found with the following command on a device that has access to the database server. (Please note that PostgreSQL must be running for this to work):

```
psql -h $DB_SERVER -U awips -d metadata -c "select
name,stationid from common_obs_spatial where catalogtype=22
and icao='XXXX';"
```

**Note:** Substitute the RAOB icao for XXXX in the above command.

**Note:** This information can also be found in the AWIPS I files  
 /data/fxa/nationalData/raobProductButtons.txt, /awips/fxa/data/ICAO\_DICT.TBL,  
 or /awips/fxa/data/raobStationInfo.txt

An example of the file configured for site OAX follows.

```
DO NOT EDIT LINES BEGINNING WITH '#'
FULLY DEFINES ALL SITES USED FOR THE LOCALIZED UPPER AIR MENU
IN CAVE
Format is as follows :
icao city name, state
XXXX SiteID Anywhere, US

UPPER_AIR menu
KOAX 72558 Omaha, NE

LOCAL_UPPER_AIR submenu
KABR 72659 Aberdeen, SD
KBIS 72764 Bismarck, ND
KLBF 72562 North Platte, NE
KMPX 72649 Minneapolis, MN
KOAX 72558 Omaha, NE
KUNR 72662 Rapid City, SD
KTOP 72456 Topeka, KS
```

To configure the Upper Air Menu, follow these steps:

- Collect the needed RAOB icaos, WMO IDs, and Descriptions from an AWIPS I D2D or the AWIPS I localization file  
`/awips/fxa/data/localizationDataSets/<XXX>/raobLocalMenus.txt`
- If not already logged in, log into an EDEX server and change to the common utility configuration directory for the desired site:  
`# ssh root@${EDEX1}`  
`# cd ${EDEX_CONFIG}/common_static/site/<XXX>`
- Copy the base version of hydroSitesInUse.txt into the desired site's directory:  
`# cp ../../base/upperair/raobSitesInUse.txt upperair/`
- Edit the hydroSitesInUse.txt file and, using the example above, change the entries to the correct entries for the desired site:  
`# vi upperair/raobSitesInUse.txt`
- If not already present, create a line containing this exact text (including the '#' symbol):  
`# UPPER_AIR menu`

- Type in the RAOB icao, WMOID and Description – all separated by a space for each RAOB desired to be seen under the Upper Air menu of CAVE.
- If not already present, create a line containing this exact text (including the '#' symbol):
 

```
LOCAL_UPPER_AIR submenu
```
- Type in the RAOB icao, WMOID, and Description – all separated by a space for each RAOB desired to be seen under the Local submenu of the Upper Air menu of CAVE.
- Save the file and exit the text editor:
 

```
:wq!
```

## 15.6 CAVE

### 15.6.1 Create/Edit CAVE Map Displays

CAVE maps and map selector pull down are configured through XML bundle files which reside on the EDEX server. The AWIPS II software delivers baseline XML bundle files which can be used as part of a new site's configuration. Table 15.6.1-1 describes these files.

**Table 15.6.1-1. Delivered AWIPS II Base Scale XML Files**

| XML File Name     | Description                                             |
|-------------------|---------------------------------------------------------|
| NHemisphere.xml   | Default Northern Hemisphere view for a CONUS WFO or RFC |
| NorthAmerican.xml | Default North American view for a CONUS WFO or RFC      |
| CONUS.xml         | Default view of Continental US                          |

Map bundle files can be localized on a site or user level, and are placed in the CAVE utility static configuration directory tree.

Create the map files by doing the following:

- Log into an EDEX server if not already logged in:
 

```
ssh root@${EDEX1}
```
- Change into the CAVE utility static configuration site level directory tree
 

```
cd ${EDEX_CONFIG}/cave_static/site
```
- Create the necessary directory structure if it doesn't already exist:
 

```
mkdir -p <XXX>
```

- Unpack the delivered map bundle XMLs from the provided tarball. The tarball can be found within the AWIPSII\_AUTOMATION\_TOOL.tgz (current version found at <https://collaborate.nws.noaa.gov/trac/siteconfig/wiki/ADAM>):

```
tar -xzvf /data/fixa/INSTALL/ADAM/cave_static_site.tar.gz
.<XXX>/bundles/scales/*
```

- Remove any files that are listed in Table 15.6.1-1.
- Set up the desired site's scalesInfo.xml file, which described the default order inside CAVE that the maps will display. Use the delivered OAX version as a template:
 

```
cp OAX/bundles/scales/scalesInfo.xml <XXX>/bundles/scales
vi <XXX>/bundles/scales/scalesInfo.xml
```
- For most CONUS WFO sites, the entries in the scalesInfo.xml will not change. After changes are made, if needed, save and exit the XML file.
 

```
:wq!
```

### **15.6.2 Create/Edit CAVE Station/Location Plot Information File(s)**

The station plot information (.spi) and location plot information (.lpi) files used in AWIPS can be re-used within CAVE for local display.

Stage the files by following these steps:

- Log into an EDEX server if not already logged in:
 

```
ssh root@${EDEX1}
```
- Change into the CAVE utility static configuration site-level directory tree:
 

```
cd ${EDEX_CONFIG}/cave_static/site
```
- Create the necessary directory structure if it doesn't already exist:
 

```
mkdir -p <XXX>/basemaps
```
- Copy the cities.lpi, and ldad\*.spi file(s) into place:
 

```
scp /awips/fixa/data/localizationDataSets/XXX/cities.lpi
<XXX>/basemaps/
scp /awips/fixa/data/localizationDataSets/XXX/ldad*.spi
<XXX>/basemaps
```

## 15.7 Create / Edit Other CAVE Menus

### 15.7.1 Create / Edit Satellite Menu

**Note:** Most sites will not need to follow the steps outlined in this section, but reading through the section will provide information for making that determination.

The satellite menu in CAVE may need to be configured for OCONUS sites based on the desired site's location. EDEX will attempt to create a version of a localized menu based on the configured AW\_SITE\_IDENTIFIERS center point. If changes have to be made, using the delivered base index.xml as a template in configuring the menu for the desired site.

An example of the file is listed in **Example 15.7.1-1**.

#### Example 15.7.1-1

```
<menuContributionFile>
 <include installTo="menu:satellite?after=GROUP1"
 fileName="menus/satellite/baseSatellite.xml">
 <substitute key="sector0" value="West CONUS"/>
 <substitute key="sector1" value="East CONUS"/>
 <substitute key="sector2" value="Supernational"/>
 <substitute key="sector3" value="Northern Hemisphere Composite"/>
 <substitute key="entity" value="GOES%"/>
 </include>
 <include installTo="menu:satellite?after=GROUP2"
 fileName="menus/satellite/basePOESImagery.xml">
 </include>
</menuContributionFile>
```

Changing the values of each sector affects which satellite image is rendered on each scale. Each sector has its own resolution. The East and West CONUS images are highly preferable for CONUS sites because they provide the images with the highest resolution, whereas the Supernational sector provides less resolution and will only be loaded if the first two are not available, which generally happens on a larger scale.

Images can be combined when their reach does not cover the full extent of a scale. For example, on a CONUS scale sector0 and sector1 (East and West CONUS) images are combined to provide full CONUS coverage of satellite images.

In general, the higher-resolution products should be listed first. For configuring the software for a site that necessitates a change (OCONUS, for example), follow these steps to configure the file:

- Log into an EDEX server if not already logged in:

```
ssh root@${EDEX1}
```

- Change into the CAVE utility static configuration site level directory tree:  
`# cd ${EDEX_CONFIG}/cave_static/site`
- Create the necessary directory structure if it doesn't already exist:  
`# mkdir -p <XXX>/menus/satellite`
- Copy the OAX version of index.xml into the desired site's sat directory:  
`# cp ../base/menus/satellite/index.xml <XXX>/menus/satellite/`
- Use a text editor, like vi, to edit the file and insert the proper values into the values for sector0 through sector4. Utilize Table 15.7.1-1, which describes the different sectors available (as provided by the satellite\_sector\_ids table of the metadata database).

**Table 15.7.1-1. Satellite Sector Names**

Sector Name
Northern Hemisphere Composite
East CONUS
West CONUS
Alaska Regional
Alaska National
Hawaii Regional
Hawaii National
Puerto Rico Regional
Puerto Rico National
Supernational
NH Composite – Meteosat-GOES E-GOES W-GMS

- Save and exit the text editor:

`# :wq!`

### **15.7.2 Configure Local and Regional Warnings Display Menu**

The Local and Regional Warnings Display menu is configured through an XML configuration file that resides in the CAVE utility static configuration directory tree.

File Name:    \${EDEX\_CONFIG}/cave\_static/site/<XXX>/warnings/index.xml

Configure the desired site's Local and Regional Warnings Display by using the delivered OAX version as a template:

- Log into an EDEX server if not already logged in:

`# ssh root@${EDEX1}`

- Change into the CAVE utility static configuration site level directory tree:  
`# cd ${EDEX_CONFIG}/cave_static/site`
- Create the necessary directory structure if it doesn't already exist:  
`# mkdir -p <XXX>/menus/warnings`
- Copy the OAX version of index.xml into the desired site's sat directory:  
`# cp OAX/menus/warnings/index.xml <XXX>/menus/warnings/`
- Using a text editor, such as vi, edit the index.xml to configure the file for the desired site:  
`# vi <XXX>/menus/warnings/index.xml`
- Change the value of the following xml line so that value= the AWIPS identifier of the desired site:  
`<substitute key="site" value="KOAX"`
- Change the value of the following xml line so that value= the surrounding site's identifiers desired to be shown when regional warnings is selected:

```
<substitute key="sites" value="KABR, KFSD, KUNR, KBIS, KFGF,
KBOU, KGJT, KPUB, KCYS, KRIW, KGID, KLBF, KOAX, KDDC, KGLD,
KICT, KTOP, KEAX, KLSX, KSGF, KDMX, KDVN, KDLH, KMPX, KARX,
KGRB, KMXX, KILX, KLOT, KJKL, KLMK, KPAH, KIND, KIWX, KAPX,
KDTX, KGRR, KMQT"
```

**Note:** If it is not known which sites to input in the beginning, a good starting point is to issue the following command and use this as a starting point:

```
grep ^<XXX> /data/fxa/nationalData/allAdjacentWFOs.txt | cut
-f2 -d' | ' | cut -c5-
```

Remember to put "K" or "P" in front of each site ID and to separate them by commas when editing the index.xml file.

- Save and exit the XML file:  
`# :wq!`
- Recursively change the ownership and permissions of the site directory created in the previous steps:  
`# chown -R awips:fxalpha <XXX>`  
`# chmod -R 755 <XXX>`

## **Chapter 16**

### **Customization**

## Chapter 16. Customization

### Table of Contents

	<i>Page</i>
16.0 Customization.....	1
16.1 New CAVE User Setup and User Preference Setup.....	1
16.1.1 New CAVE User Setup .....	1
16.1.2 User Preference Setup .....	4
16.2 CAVE Menu Customization .....	4
16.3 Volume Browser.....	10
16.3.1 Derived Parameters .....	10
16.3.1.1 Starting the Script.....	11
16.3.1.2 Import Statements.....	11
16.3.1.3 Script Global Variables .....	11
16.3.1.4 Derived Parameter Parameters .....	12
16.3.1.5 DerivedParameter cClass.....	12
16.3.1.6 Class Methods .....	12
16.3.1.6.1 Scalar Parameters .....	13
16.3.1.6.2 Array Parameters .....	13
16.3.1.6.3 Vector Parameters .....	14
16.3.1.6.4 3D Parameters .....	14
16.3.1.7 Method Body .....	14
16.3.1.7.1 Return Values .....	14
16.3.1.8 Save It .....	14
16.4 Radar Localization (Add/Delete Radar Mosaic and Change Site).....	15
16.5 Creating Custom Map Scales .....	16
16.6 Alert Viz for Audible Radar Alerting.....	19
16.7 AvnFPS .....	19
16.8 Color Editors .....	20

### List of Exhibits

Exhibit 16.1.1-1. Initial CAVE Startup Dialog.....	2
Exhibit 16.1.1-2. Valid Connectivity Preferences Selected.....	3
Exhibit 16.1.1-3. CAVE Startup Screen .....	3
Exhibit 16.5-1. Projection Dropdown List.....	18

## List of Tables

Table 16.2-1. Baseline Contributions for CAVE-D2D.....	5
Table 16.2-2. Available Plug-in Names.....	7

## 16.0 Customization

Customization refers to all changes made to the system that are not required for site operation.

**DISCLAIMER:** If, after any customization, site problems are reported to the NCF, the NCF reserves the right to return your site to the baselined configuration.

### 16.1 New CAVE User Setup and User Preference Setup

In AWIPS II, the user interface is provided through Common AWIPS Visualization Environment (CAVE), which replaces the Display Two Dimensions (D2D) tool used in AWIPS I. The D2D configuration that is done through GUIs will continue to be done the way they are with AWIPS I. Current AWIPS I documentation (e.g., the *User's Manual*) still applies.

#### 16.1.1 New CAVE User Setup

AWIPS II does not generally distinguish CAVE users from computer users. Simply put, a CAVE user is a computer user who has access to the AWIPS II CAVE application.

Setting up a new CAVE user involves three steps:

1. A standard Linux account is established for the user.
2. CAVE and supporting AWIPS II components are installed for the new user. There are two ways this can be done.
  - a. The CAVE package may be installed onto the user's computer; or
  - b. The CAVE package can be installed on a shared drive that is accessible from the user's computer.
3. The user runs CAVE for the first time.

The first time a user runs CAVE, two events occur.

- First, a directory named *caveData* is created in the user's home directory. CAVE uses the *caveData* directory tree to store local copies of the various configuration files generated by CAVE.
- Second, the user is prompted for the information CAVE needs to connect to its EDEX server and begin operation. The dialog used is the *Connectivity Preferences* dialog. It is shown in Exhibit 16.1.1-1.



Exhibit 16.1.1-1. Initial CAVE Startup Dialog

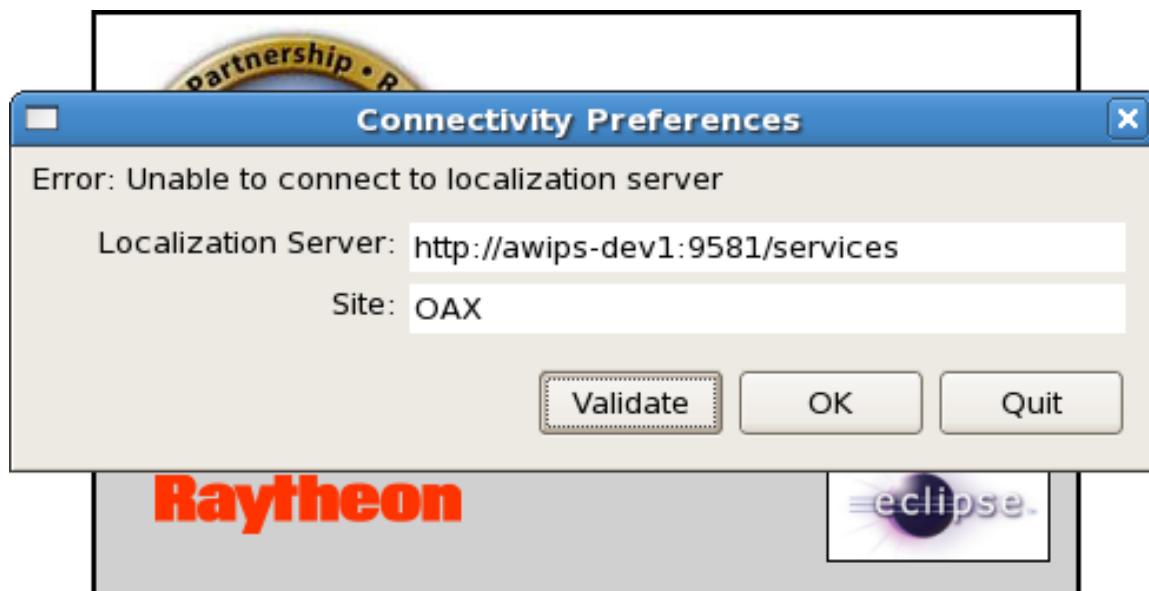
The Initial CAVE Startup Dialog will only be displayed the first time that you use CAVE. This dialog is requesting two critical items of information: 1) the connection address of the EDEX localization server (highlighted in red); and 2) the localization site. The user will need to change *localhost* (in red highlight) to the IP address or DNS name of the EDEX localization server. After Site, enter the three character designator of the WFO.

Clicking *Validate* attempts to verify that the user-provided localization server is correct. If so, the red highlight is removed. Note that the message does not change. Also note that the Site is not validated.

**NOTE:** The text never changes from “**Error: Unable to connect...**”, even after a correct server location is entered and *Validate* clicked.

**NOTE:** This screen can be bypassed without entering a value for the site; however, CAVE will not localize correctly!

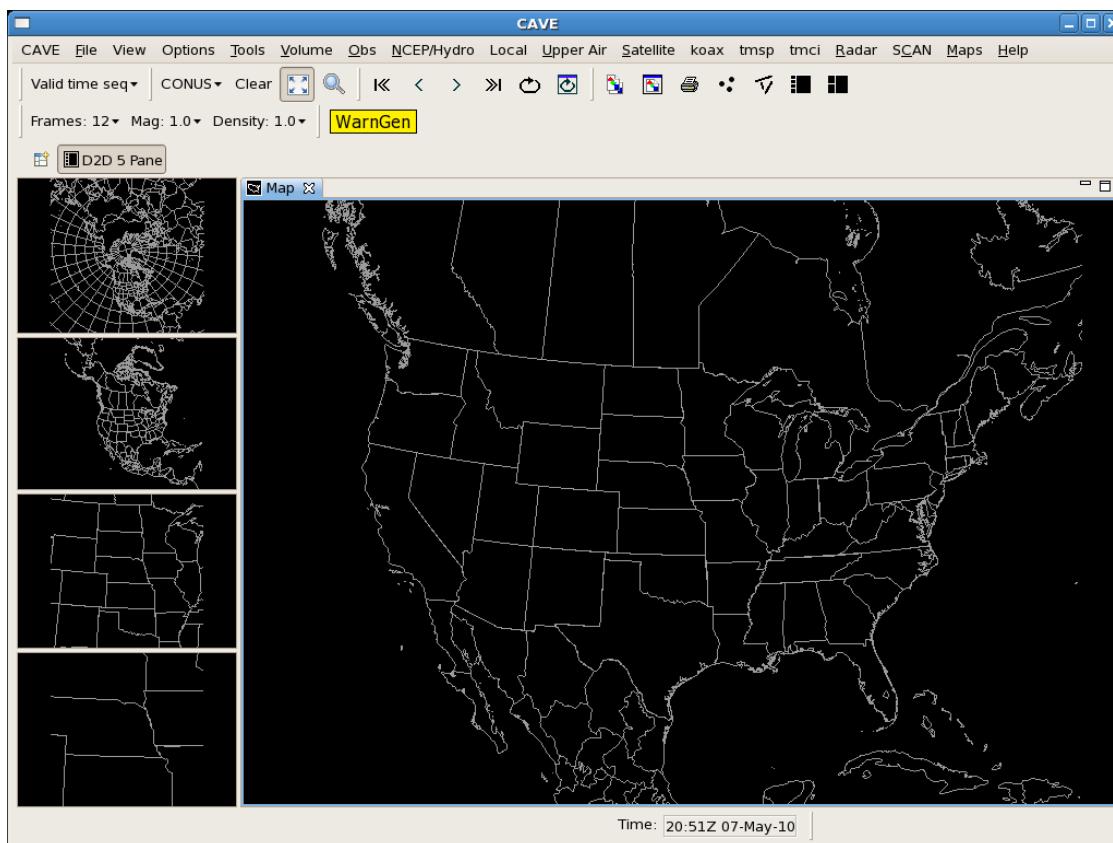
Exhibit 16.1.1-2 shows the Connectivity Preferences with a valid localization server and site entered.



**Exhibit 16.1.1-2. Valid Connectivity Preferences Selected**

Clicking *OK* continues the CAVE startup.

This will bring up the CAVE Startup screen, shown in Exhibit 16.1.1.-3.



**Exhibit 16.1.1-3. CAVE Startup Screen**

The user does not have to validate the localization server before clicking *OK*; however, if the localization server is invalid, a Connectivity Error dialog is displayed. A valid localization server must be specified before CAVE will start.

**Note:** It is also suggested that a valid localization site be entered; if the site is not valid, CAVE started in a default mode.

Clicking *Quit* exits CAVE without completing the startup.

**Note:** Once the initial startup of CAVE is complete, CAVE stores user preferences and other configurations in the `caveData` directory tree. In most situations there will be no need for the user to modify `caveData` directly.

### 16.1.2 User Preference Setup

Most user preferences (the main exception being the localization information discussed above) are pre-set when CAVE is first installed. Other preferences are set automatically by CAVE as the user interacts with the CAVE GUI. For example, CAVE originally opens with the 5-panel D2D perspective selected, with a default window that is somewhat smaller than a typical computer monitor. If the user resizes the CAVE window, opens another perspective (such as the Hydro perspective), switches back to the D2D perspective, and then exits CAVE, when CAVE restarts, it will be the same size as before and will display the same perspectives as before. (Data displayed in CAVE will not be reloaded, however.) This “state memory” is handled automatically by the Eclipse RCP framework used in CAVE, and no user interaction is required.

The individual CAVE user has the option of changing many of the default preferences as needed. Most changes are made using dialogs that are similar to the corresponding application dialogs in AWIPS I. For example, CAVE defaults the image backgrounds in the D2D perspective to black. If the user desires, the background color can be changed using *Options->Set Background Color...* in the D2D perspective menu.

## 16.2 CAVE Menu Customization

The CAVE menu is designed to be highly customizable through XML files. The menu system allows considerable flexibility in structuring menus. It is possible to structure menus in as few or as many files as desired to improve manageability. The baseline CAVE-D2D menu structure is defined in standard Eclipse RCP plugin.xml files in the following plug-ins:

```
com.raytheon.viz.ui.personalities.awips/plugin.xml
com.raytheon.uf.viz.d2d.ui/plugin.xml
```

Individual CAVE-D2D plug-ins build on these menus by making their own baseline contributions. The baseline contributions for CAVE-D2D are shown in Table 16.2-1.

**Table 16.2-1. Baseline Contributions for CAVE-D2D**

Plug-In Menu Contribution Path	CAVE-D2D Menu Items
menus/lightning	Lightning plots under Obs>Lightning
menus/radar	kxxx radar and Radar menus
menus/satellite	Satellite menus
menus/xml	Volume Browser sub menus
menus/warnings	Warning displays under Obs>Hazards
menus/mos	Local menus
menus/obs	Contributions in Obs
menus/upperair	Contributions in Upper Air

Localizing the menus involves adding your own XML files to the EDEX utility data tree at the following location:

```
 ${EDEX_HOME}/data/utility/cave_static/site/XXX/menu/...
 ${EDEX_HOME}/data/utility/cave_static/user/UUU/menu/...
```

If you do not have any local contributions, this directory tree can be blank.

The following describes how to make your own site/user overrides to the baseline menu configuration. All menus are connected together using an “index” XML file that specifies which subfiles to use. For example, here is how overrides to the CAVE-D2D obs menu would be made for the site OAX. The file **index.xml** can be overridden at the site level to add or remove items without changing the “base” files. Create an **index.xml** file and put it at the following location on the EDEX utility tree:

```
 ${EDEX_HOME}/data/utility/cave_static/site/OAX/menus/obs/index.xml
```

The following is an example of **index.xml** overrides:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<menuContributionFile>
 <include installTo="menu:#Levels?after=METAR"
 fileName="menus/obs/baseMetar.xml" />
 <include installTo="menu:obs?after=METAR"
 fileName="menu/obs/koaxMetar.xml" />
 <include installTo="menu:obs?after=MARITIME"
 fileName="menus/obs/koaxBuoy.xml">
 <remove>FixedBuoys</remove>
 <remove>MovingMaritime</remove>
 </include>
</menuContributionFile>
```

Two local additions were added:

- A site has added its own contribution files, presumably adding additional menu items. (koaxMetar.xml and koaxBuoy.xml)
- A site has removed two menu items from the base configuration. (FixedBuoys and MovingMaritime)

The fact that the base file is not modified directly means that upgrades will be smoother without requiring the merging of new files into the site's custom files.

Menu item positioning is done by URI and placed using the “id” components. For example:

- **menu:obs?after=METAR** (finds the obs menu, and installs contributions after the separator or menu item ID'd as “METAR”)

Now, on to the menu files, which, like the **index.xml** files, subscribe to a strict schema that is validated at parse time. (Menu schema is available in CAVE in the **com.raytheon.uf.viz.menus...jar** plug-in as menus.xsd.)

For example, OAX decided to add the menu file **koaxBuoy.xml**, which had a previous reference added to the **index.xml**:

```
 ${EDEX_HOME}/data/utility/cave_static/site/OAX/menu/obs/koaxBuoy.xml

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>

<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <contribute xsi:type="bundleItem" file="bundles/maritimeFixedBuoy.xml"
 menuText="Fixed Buoys" id="FixedBuoys"
 productInterval="3600" productOffset="1800">
 <dataURI>/sfcobs/%/1005/%</dataURI>
 </contribute>
</menuTemplate>
```

This file installs a menu item with the label “**Fixed Buoys**” and id “**FixedBuoys**”. The display bundle file “**bundles/maritimeFixedBuoy.xml**” will be executed. The dataURI reference “**/sfcobs/%/1005/%**” will be used for updating the display time in the menu and is used to control the query for the data when the menu item is selected.

The **productInterval** and **productOffset** refer to the time controls for updating the looping frame for the data display layer in the CAVE-D2D perspective. The **productOffset** is the time in seconds before the data's valid time that a new loop frame gets created. Then **productInterval** is the interval between frames for this data display layer. In the example above, for the “Fixed Buoys” display item, a new frame gets created 30 minutes before the valid time, and the frame is 60 minutes long.

DataURIs in AWIPS II refer to specific data items in the metadata database. The fields in the dataURI are metadata attributes with % being a wild card. The wild card (%) is typically used for time fields, so when the menu item is selected the default behavior of retrieving the latest data that matches the dataURI is retrieved.

DataURIs are created automatically during data ingest for each data item, get stored in the metadata database, and are used for real-time alerting. The datatype plug-in contains a record class that has java annotations for each field of the dataURI. The structure of the dataURI is as follows:

**/PlugInName/dataTime/position1/.../positionN**

The first field is always the PlugInName, and the second field is always the dataTime. A wild card (%) is typically used in a menu reference for dataTime to indicate that the latest data is to be retrieved. The set of available PlugInNames is listed in column 1 in Table 16.2-2. Column 3 lists the dataURI fields that get specified in **position1...positionN** for that particular plug-in.

**Table 16.2-2. Available Plug-in Names**

Plug-In Name	Plug-In Record Class	DataURI Fields in Position Order
airep	AirepRecord.java	reportType, corIndicator, location
binlightning	BinLightningRecord.java	startTime, stopTime
Bufrua	UAObs.java	reportType, corIndicator, location
Ccfp	CcfpRecord.java	validtime, issuetime, location
Gfe	GFERecord.java	parmId, dbId
Goessounding	GOESSounding.java	location
Grib	GribRecord.java	modelInfo
Obs	MetarRecord.java	reportType, stationed, stationLat, stationLon
Sfcobs	ObsCommon.java	reportType, corIndicator, location
Pirep	PirepRecord.java	reportType, corIndicator, location
Poessounding	POESSounding.java	location
Profiler	ProfilerObs.java	reportType, location
Radar	RadarRecord.java	icao, productCode, primaryElevationAngle,
Recco	RECCORecord.java	reportType, corIndicator, location
Redbook	RedbookRecord.java	wmoTTAAii, productId, corIndicator, originatorId, fcstHours, fileID
satellite	SatelliteRecord.java	Source, creatingEntity, sectorID, physicalElement
Taf	TafRecord.java	stationed, corIndicator, amdIndicator, issue_time
Text	TextRecord.java	productId
Warning	WarningRecord.java	pil, xxxid, countyheader, act, etn, seg, phensig
Cwat	CWATRecord.java	icao, fieldname
Qpf	QPFRRecord.java	Icao, fieldname
Acars	ACARSRecord.java	tailNumber, location
Acarssounding	ACARSSoundingRecord.java	timeObs, location
mesowest	MESOWestRecord.java	networkType, timeObs, location

For example, to retrieve the latest visible satellite imagery, the following dataURI would be used in the menu reference:

```
<dataURI>/satellite%/%NESDIS/GOES%/%Imager_Visible</dataURI>
```

Position1...PositionN is defined in **SatelliteRecord.java**. Note the reference to the GINI satellite ICD for the valid names to use.

```
/**
 * The source of the data - NESDIS
 */

@Column(length = 31)
@DataURI(position = 1)
@XmlAttribute
@DynamicSerializeElement

private String source;

/** The creating entity. See table 4.5 of GINI satellite ICD */
@Column(length = 63)
@DataURI(position = 2)
@XmlAttribute
@DynamicSerializeElement

private String creatingEntity;

/** The sector ID. See table 4.6 of the GINI satellite ICD */
@Column(length = 63)
@DataURI(position = 3)
@XmlAttribute
@DynamicSerializeElement

private String sectorID;

/** The physical Element. See table 4.7 of the GINI satellite ICD */
@Column(length = 63)
@DataURI(position = 4)
@XmlAttribute
@DynamicSerializeElement

private String physicalElement;
```

Variable substitution in the **index.xml** file allows you to reuse an entire menu with global substitutions. For example, the baseRadar menu system is reused but with a different icaos:

```
<menuContributionFile>
 <include installTo="menu:radar?after=LOC1"
 fileName="menus/lightning/baseRadar.xml"
 subMenu="koax">
 <substitute key="icao" value="koax" />
 </include>
 <include installTo="menu:radar?after=LOC1"
 fileName="menus/lightning/baseRadar.xml"
 subMenu="kdsm">
 <substitute key="icao" value="kdsm" />
 </include>
</menuContributionFile>
```

Submenus can be created in the menu files using the “submenu” type and nesting structures. For example:

```
<contribute xsi:type="subMenu" menuText="Other Plots">
 <contribute xsi:type="bundleItem"
 file="bundles/15minSurfacePlot.xml"
 menuText="15 min Plot" id="15MinSurfacePlot"
 productInterval="900" productOffset="450">
 <dataURI>/obs/%</dataURI>
 </contribute>
</contribute>
```

Submenus can also be created by using the “submenu” tag on the <include> statement. For example:

```
<menuContributionFile>
 <include installTo="menu:obs?after=HAZARDS"
 fileName="menus/lightning/baseLightning.xml"
 subMenu="Lightning" />
</menuContributionFile>
```

Menu item types can be the following:

- Bundle Loader

- Separator (lines)
- Placeholder (displays “not implemented” dialog)
- Submenu.

In general, the menu system described above can coexist with the standard Eclipse RCP menus, which are defined in “plugin.xml” files. The Eclipse RCP plugin.xml files should be used for setting up the basic menu structures, and contributing items like dialogs and programs.

Menu files can be placed in CAVE plug-ins for the base localization at:

```
localization/menus/pluginName
```

### 16.3 *Volume Browser*

CAVE includes a partial implementation of derived parameters for the Volume Browser.

Derived Parameters are implemented as Python scripts. Mapping of Volume Browser text to Python script for derived parameters is defined in BrowserXXXFields.xml, where XXX represents the desired Volume Browser mode (example: BrowserTimeFields.xml).

Each mapping is represented by a <menuButton/> tag set.

Example: the Dewpoint parameter is defined by

```
<menuButton>
 <buttonText> Dewpoint</buttonText>
 <buttonName> DpT </buttonName>
</menuButton>
```

#### 16.3.1 *Derived Parameters*

Derived parameter files are part of the CAVE installation. They are located in /path/to/cave/etc. The XML files that define the derived parameters are located in /path/to/cave/etc/derivParamXml; Python scripts that compute the derived parameters are located in /path/to/cave/etc/deriveParamScripts.

Each derived parameter is defined in a Python script. The Python scripts are in build/static/cave/etc/derivParamScripts in the AWIPS II ADE baseline. The derived parameter script is named **parameter.py**

Example: for the Dewpoint (DpT) derived parameter, the script is contained in DpT.py.

AWIPS II ADE (AWIPS Development Environment) provides detailed information on creating derived parameter scripts. A derived parameter script is a standard Python script with certain required elements. The general structure is outlined below.

Import statements (optional)  
Script global variables  
parameters<n> strings  
DerivedParameter class  
execute<n> methods

### 16.3.1.1 Starting the Script

First, open a new file in the editor that you use to create Python scripts. Any editor that does not embed hidden formatting characters will do, but several are available that have specific support for Python. The “Idle” editor comes with Python. Most of the scripts available at this time were edited using the Pydev Eclipse plug-in.

### 16.3.1.2 Import Statements

Begin with any import statements needed by the methods you will use. No import statements are required in order to create a derived parameter script, although several are commonly used. Any Python module installed in the system may be imported.

### 16.3.1.3 Script Global Variables

Create a global variable named `variableId`, whose value should be a string containing the short name of the derived parameter. This uniquely identifies the derived parameter. Derived parameter IDs are case sensitive. They should consist of alphanumeric characters and underscores, and be easy for users to read. For the example **Qual** derived parameter, the line would look like this:

```
variableId = "Qual"
```

Create another global variable named `variableName`. This is used to provide more information than the parameter ID, but not much, because it may be displayed in lists or menus. For **Qual**, the line looks like this:

```
variableName = "Air quality"
```

Next comes the derived parameter's units of measure. This is a string called `variableUnit` that has the abbreviated units in which the derived parameter will be measured, such as “m/s”, “Nm”, or the like. If the derived parameter is dimensionless, do not omit this variable -- declare it with an empty string as its value. Qual will be measured in parts per million:

```
variableUnit = "ppm"
```

#### 16.3.1.4 Derived Parameter Parameters

For each method that will be used to calculate the derived parameter, you must provide a string that describes any level restrictions and parameters taken by the method. The string value begins with level restrictions on the method, separated by commas. A pipe character (“|”) separates the method level restrictions from the first parameter. Parameters consist of the ID of a primary or derived parameter, followed by a list of level restrictions on the parameter, separated by commas. Multiple parameters are separated from one another by pipe characters. (If you are familiar with the old virtualFieldTable.txt file, the format is basically identical, except that the “\*” and function name is dropped from the beginning.)

Suppose there are three ways of calculating air quality. The first takes temperature, relative humidity, and wind, but only applies to K surface layers, while the second should be used whenever the first cannot be calculated, and takes the 3D temperature, when it is available. The third is less desirable, but can be used as the default, and only takes temperature as a parameter. The following lines would be added to the script:

```
parameters1 = "Surface,K|T|RH|uW|vW"
parameters2 = "|T,3D"
parameters3 = "|T"
```

Note the pipe character beginning the parameters2 and parameters3 entries. This is necessary to prevent the system from treating the parameters as level restrictions.

Currently, the system has some limitations. At this time, level restrictions can only specify composite levels or the empty level, and only a parameters1 entry (and its corresponding execute1 method, described below) are allowed. These limitations will be removed in a future release.

#### 16.3.1.5 DerivedParameter cClass

A class must be created for the derived parameter. The name of the class must be DerivedParameter. The system distinguishes between different DerivedParameter classes by the source file in which they are declared, so each derived parameter must be in a separate file. For any derived parameter, the declaration looks like this:

```
class DerivedParameter():
```

Your DerivedParameter class can inherit from other classes, provided its constructor does not take any parameters except self.

#### 16.3.1.6 Class Methods

The DerivedParameter class should have one execute<n> method for each parameters<n> declaration at the global level of the script. Each execute method should be a standard

Python class method that takes the parameters specified above. For example, the method for the “parameters2” variable above would start like this:

```
def execute2(self, T_3D):
```

The names of the parameters are not vital; the system takes them in the order in which they appear in the parameters variable for the method. The method would receive the 3D temperature, because that is what “parameters2” is expecting. If the script uses derived parameters in its calculations, it is better to pass the primary parameters to the script and have the script call the script for the derived parameter itself.

For example, if Qual used wSp, it should take uW and vW as parameters rather than wSp, and obtain wSp like so:

```
import wSp
...
def execute1(self,T,RH,uW,vW):
 wSpInst = wSp.DerivedParameter()
 speed = wSpInst.execute1(uW,vW)
 ...
 return qual
```

Your class may have other methods, which may be class methods or static methods, but it MUST have one “execute<n>” method for each “parameters<n>” variable declared at the top level of the script.

#### ***16.3.1.6.1 Scalar Parameters***

Scalar constants are passed to the script as standard Python scalars, either Python integers or floats.

#### ***16.3.1.6.2 Array Parameters***

Most parameters are 2D grids of data points, which are passed to the script as numerical python (numpy) arrays of float32 values.

Under the old virtualFieldTable.txt system, some functions, such as \*Gradient and \*Advection, automatically generated hidden array parameters behind the scenes, which were then passed to the underlying Fortran functions. The hidden parameters were the distance between grid points in the x direction, the distance between grid points in the y direction, and the coriolis component of wind. The current system does not hide these from the user. They are generated “on the fly” by the system if the user specifies dx, dy, or coriolis in the parameter list. This code is still somewhat experimental.

### 16.3.1.6.3 Vector Parameters

Some derived parameters are vectors. For example, Wind is a vector of the wind speed components in the U and V directions. Vectors are passed as tuples, usually a 2-tuple of arrays. For example, Wind is passed as the tuple (uW, vW).

### 16.3.1.6.4 3D Parameters

3D parameters are passed as tuples of arrays, where each element of the tuple is a 2D array for a horizontal layer.

3D parameters are not currently supported. They will be added in a future release.

### 16.3.1.7 Method Body

Perform whatever calculations are needed in the method body. In general, this should involve mathematical and/or logical manipulations on the information supplied as parameters. Derived parameter scripts are not intended to communicate with external objects such as a GUI, database, network, or file system.

### 16.3.1.7.1 Return Values

Each method should return a result. The types of values that can be returned are limited by the Python/Java interface. The most common return value is a numerical python (numpy) array of float32 values. You can also return tuples of numpy arrays (of float32s), integers, or strings safely.

The system is somewhat picky about return values; in particular, you cannot return a float64, a numpy array of float64, or a masked array of any type. While the Python/Java interface can convert float32 nan (not a number) and inf (infinity) values, the system database cannot store them, so returning them from scripts is not recommended. The nan.py file, in derivedParamScripts/functions, contains a handful of functions for converting to and from nans and sentinel values in numpy arrays.

### 16.3.1.8 Save It

Once you have written the Python script for the derived parameter, store it in the directory with the other derived parameters (“build/static/common/cave/etc/derivParamScripts”, on my system), in a file with the same base name as “variableId” and a “.py” extension. For **Qual**, the filename would be “Qual.py”. The system will automatically incorporate the file, allowing it to be used immediately.

## 16.4 Radar Localization (Add/Delete Radar Mosaic and Change Site)

Radar localization is handled by the text file **radarsInUse.txt** in the localization store. When EDEX starts up, the file is used to automatically modify the D2D menus, mosaicking, and FFMP radar controls. The file **radarsInUse.txt** was added to simplify common localization actions that every site needs to perform and is located in the localization store at:

```
 ${EDEX_HOME}/data/utility/common_static/site/XXX/radar/radarsInUse.txt
```

- **Change Local Site's Radar.** In radarsInUse.txt there is a section called “# RadarServer Radars - MUST HAVE THIS LINE.” Following this is the list of the local radars using the ICAO identifier. These radar menus show up after the <Satellite> menu item in the D2D perspective.
- **Change Dial Radars.** Similar to the local site’s radar except that the radars will go into the “Radar” menu under the “Dial Radars” heading. It has the same menu as the RadarServer radars except that it does not get its own menu in CAVE.
- **Change Terminal Radars.** Similar to the local site’s radar. Each entry gets its own menu in CAVE.
- **ARSR Radars and ASR Radars.** These two headings are for Air-Route Surveillance Radars and Airport Surveillance Radars. Not all sites have these. These are given submenus under the Radar menu, and have two entries under them.
- **Change Radar Mosaic Setup.** In radarsInUse.txt there is a section called “# Mosaic Radars - MUST HAVE THIS LINE.” Following this is the list of all the radars that are possible when mosaicking is performed. However, if there is no data for a site within this list, then it will not be mosaicked. Edit this text file for mosaics and the new sites will now show up in mosaicking.

The following is an example of **radarsInUse.txt**.

```
Mosaic Radars - MUST HAVE THIS LINE
NOT EDIT LINES BEGINNING WITH '#'
RadarServer Radars - MUST HAVE THIS LINE
ktlx
Dial Radars - MUST HAVE THIS LINE
kabr
kcys
kdmx
kgld
kuex
keax
karx
```

```
kmpx
klnx
kdvn
kudx
kfsd
ktwx

Terminal Radars - MUST HAVE THIS LINE

tmsp
tmci

ASR Radars - MUST HAVE THIS LINE

eeri

ARSR Radars - MUST HAVE THIS LINE

fqwa

Mosaic Radars - MUST HAVE THIS LINE

koax
kabr
kcys
kgld
kuex
kdmx
keax
karx
kmpx
klnx
kdvn
kudx
kfsd
ktwx
```

## 16.5 Creating Custom Map Scales

Adding new scales to CAVE can be done without the use of localization scripts. New map projects are created through the CAVE menu, saved as a CAVE bundle, and then copied to the EDEX server for use. These steps can be used to create a custom map scale, and add it to the scale dropdown in the D2D perspective of CAVE.

Generally, the following information is needed to create a new map. Use the following as an information collection guide before continuing. Utilize the Lat/Lon sampling feature on a blank map to find values for each of the following:

Central Meridian ( $^{\circ}$ ) \_\_\_\_\_ (East/West)

Latitude of Origin ( $^{\circ}$ ) \_\_\_\_\_ (North/South)

Lower Left Corner Latitude (°) \_\_\_\_\_

Lower Left Corner Longitude (°) \_\_\_\_\_

Upper Right Corner Latitude (°) \_\_\_\_\_

Upper Right Corner Longitude (°) \_\_\_\_\_

**Note:** This information can be retrieved from AWIPS I files with the tool maksuparg. Find the scale file for the customized AWIPS I scale in the /awips/fxa/data/localizationDataSets/XXX directory. From there, run the command **maksuparg FILENAME.sup** where FILENAME is the name of the scale. An example of the expected output follows.

```
maksuparg regionalScale.sup
maksuparg 3 25.000000 -95.000000 25.000000
 1 34.343422 -86.801041 49.222343 -58.918396
 1 52.075909 -85.166916 31.691475 -64.714157
 x 0.046138 0.173107 -0.761975 -0.635005
 o 42.471703 -73.894989 998.277192 998.277192 998.276958 998.276958
 o 25.000000 -95.000000 -762.554509 2861.088761 -1066.558964
3165.092723
```

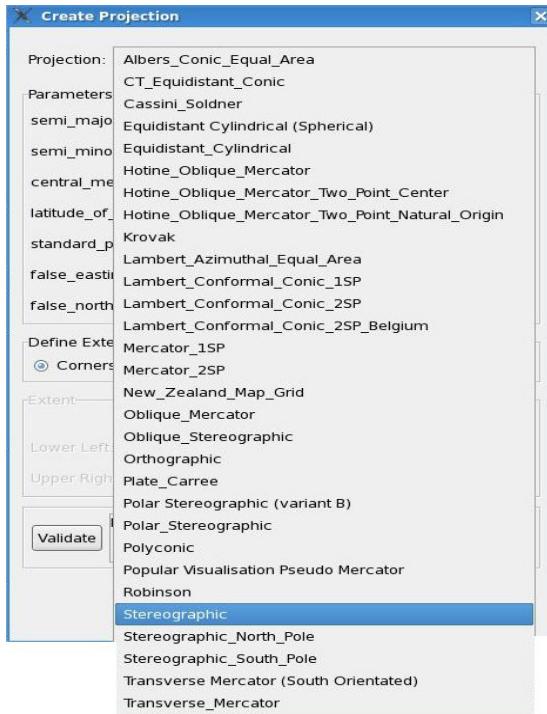
The key to decoding this is as follows:

- The number after the word maksuparg on the second line dictates the scale. Use the following table to associate a number to a scale:

Scale Number	Scale Name
1	Stereographic
2	Othrographic
3	Lambert Conformal (around 1 SP)
4	Azimuthal Equal Area
5	Gnomonic

- The numbers following the scale number are Latitude of Origin and Central Meridian respectively.
  - The numbers on the second line, following the string l, are the coordinates of the lower lefthand corner (lat lon) and upper righthand corner (lat lon) respectively.
1. With CAVE launched, follow this guide to open the Map Projection GUI:\ CAVE → New → Map Projection...

2. Select the projection type appropriate for the desired map scale from the dropdown selector as shown in Exhibit 16.5-1.



**Exhibit 16.5-1. Projection Dropdown List**

3. Fill in the appropriate information as collected above; then select the Validate button. If successfully validated, hit the OK button.

**Note:** If the input boxes for the Lower Left and Upper Right extents are grayed out, or not editable, try clicking on the radio button for Corners, or pressing the Validate button.

4. If the map is not as desired, repeat steps 1 through 3, changing the input values as necessary to project the desired map.
5. Once the desired map is projected, save as a CAVE bundle by following these menu selections:  
CAVE → Load/Save Displays → Save Editor Display...
6. Save the file into a temporary location (e.g., /tmp) with a unique file name.
7. Copy the file to an EDEX server into the  
\${EDEX\_CONFIG}/cave\_static/site/<XXX>/bundles/scales directory and ensure the proper permissions:

```
scp /tmp/NewMap.xml
$EDEX:${EDEX_CONFIG}/cave_static/site/<XXX>/bundles/scales
ssh root@$EDEX
```

- ```
# chown -R awips:fxalpha
${EDEX_CONFIG}/cave_static/site/<XXX>/bundles/scales
# chmod -R 775
${EDEX_CONFIG}/cave_static/site/<XXX>/bundles/scales
```
8. While logged into the EDEX server from previous step, edit the scalesInfo.xml using *vi*. Follow the syntax of a file to add a new <mapScale> tag just below the </mapScales> final tag as seen below:

```
# vi
${EDEX_CONFIG}/cave_static/site/<XXX>/bundles/scales/scaleInfo
.xml
```

```
<mapScales>
    <mapScale displayName="N. Hemisphere" fileName="N Hemisphere.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView1"/>
    </mapScale>
    <mapScale displayName="North American" fileName="NorthAmerican.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView2"/>
    </mapScale>
    <mapScale displayName="CONUS" fileName="CONUS.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.glmapper.GLMapEditor"/>
    </mapScale>
    <mapScale displayName="Regional" fileName="Regional.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView3"/>
    </mapScale>
    <mapScale displayName="State(s)" fileName="States.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView4"/>
    </mapScale>
    <mapScale displayName="WFO" fileName="WFO.xml">
    </mapScale>
    <mapScale displayName="NewMap" fileName="NewMap.xml">
    </mapScale>
</mapScales>
```

9. Save and exit when finished editing the file:

```
# :wq!
```

10. Restarting CAVE is necessary to see the new map projection in the map selector dropdown.

16.6 Alert Viz for Audible Radar Alerting

Refer to Chapter 7.2.6 of this manual. It refers to the customizing Audible Radar Alerting via Alert-Viz.

16.7 AvnFPS

The config.xml located in

CaveData/configuration/user/\${USER}/com.raytheon.viz.aviation directory contains the information displayed in the monitor's Options Setup menu. This configures the monitor and Taf viewer/editor display.

16.8 Color Editors

There are two color editors: 1) the Image Properties Color Editor, which is used to change an images color property; and 2) the Set Background Color Editor, which is used to change the background color of the main and/or monitor panes. The Image Properties Color Editor is also used to modify existing color tables, or create new ones and save them for future use. Please refer to Section 2.2.9 of the *AWIPS CAVE-D2D User's Manual*.

Chapter 17

AWIPS System Monitor

Chapter 17. AWIPS System Monitor

Table of Contents

	<i>Page</i>
17.0 System Monitor Overview	1
17.1 SCAN and FFMP Data Monitoring System	17
17.2 Pages and Templates.....	19
17.3 Configuration Files	20
17.4 Data Display Tools	22
17.4.1 PG Admin III	22
17.4.2 HDFView	25
17.4.3 Cave Product Browser	29

List of Exhibits

Exhibit 17.0-1. Data Set Status Symbols	1
Exhibit 17.0-2. System Control Menu	1
Exhibit 17.0-3. AWIPS System Monitor Default Main Page	2
Exhibit 17.0-4. AWIPS System Monitor Main Page (LDAD Monitoring)	3
Exhibit 17.0-5. AWIPS System Monitor Main Page (SCAN Data Monitoring)	4
Exhibit 17.0-6. AWIPS System Monitor Main Page (FFMP Monitoring)	5
Exhibit 17.0-7. AWIPS System Monitor DATA: Satellite Products Status	6
Exhibit 17.0-8. AWIPS System Monitor DATA: Radar Products Status	7
Exhibit 17.0-9. AWIPS System Monitor: Point Data Products Status	8
Exhibit 17.0-10. AWIPS System Monitor DATA: Grid Products Status	9
Exhibit 17.0-11. AWIPS System Monitor DATA: Redbook Products Status	10
Exhibit 17.0-12. AWIPS System Monitor DATA: Disk Usage	11
Exhibit 17.0-13. AWIPS System Monitor DATA: CPU Utilization	12
Exhibit 17.0-14. Sample CPU Utilization Display	13
Exhibit 17.0-15. AWIPS System Monitor LDAD: LDAD Processes	14
Exhibit 17.0-16. AWIPS System Monitor LDAD: LDAD Acquisition Data	15
Exhibit 17.0-17. AWIPS System Monitor LDAD: LDAD Dissemination Data	16
Exhibit 17.0-18. EXTRAS: Online Documentation and Other Sites	17
Exhibit 17.1-1. SCAN Data Monitoring System	18
Exhibit 17.1-2. FFMP Data Monitoring System	19
Exhibit 17.4.1-1. PG Admin III Main Window	23
Exhibit 17.4.1-2. PG Admin III New Server Registration Dialog	23

Exhibit 17.4.1-3. PG Admin III Edit Data Window	24
Exhibit 17.4.1-4. PG Admin III SQL Query Window	25
Exhibit 17.4.2-1. HDFView Main Window.....	26
Exhibit 17.4.2-2. HDFView with File Loaded and Expanded.....	27
Exhibit 17.4.2-3. HDFView Dataset Selection Dialog.....	27
Exhibit 17.4.2-4. HDFView Tableview (Spreadsheet) of Data	28
Exhibit 17.4.2-5. HDFView Image View of Data	28
Exhibit 17.4.3-1. CAVE with Product Browser Displayed	29
Exhibit 17.4.3-2. Satellite Product Loaded from Product Browser	30

List of Tables

Table 17.4-1. Data Display Tools	22
--	----

17.0 System Monitor Overview

The AWIPS System Monitor is a software-based system used to monitor resources and performance (DATA, LDAD, SCAN, and FFMP). The monitoring software is provided separately from the other AWIPS re-host code. This allows for flexible installation options. The AWIPS System Monitor can be installed on any platform running a stand-alone or clustered instance of the AWIPS II software. For the purposes of this document, the baseline operational testing and evaluation (OT&E) architecture is assumed, and the AWIPS II software is installed and functional. This is valid for AWIPS Build 12,1,2.

When left running, the AWIPS System Monitor automatically updates the displayed AWIPS information, indicating data set status with iconic symbols, as shown in Exhibit 17.0-1.



Exhibit 17.0-1. Data Set Status Symbols

On-time and complete data sets are flagged by a green icon on the monitor display. Late and/or incomplete data sets are flagged by a yellow or red icon, and notice is sent to the Network Control Facility (NCF). Efforts by site staff to track down and correct data delays must be closely coordinated with the NCF.

The AWIPS System Monitor uses a set of scripts to check on the timeliness of various data sets. It produces a display that can be used to track data ingest. The AWIPS System Monitor is accessed via the Internet, which is invoked by selecting Firefox Web Browser from the System Control Menu, as shown in Exhibit 17.0-2.



Exhibit 17.0-2. System Control Menu

Enter the URL: <http://px1/> on the browser main page to open the AWIPS System Monitor to the default main page displaying the top-level statuses of the DATA monitored system, as shown in Exhibit 17.0-3.

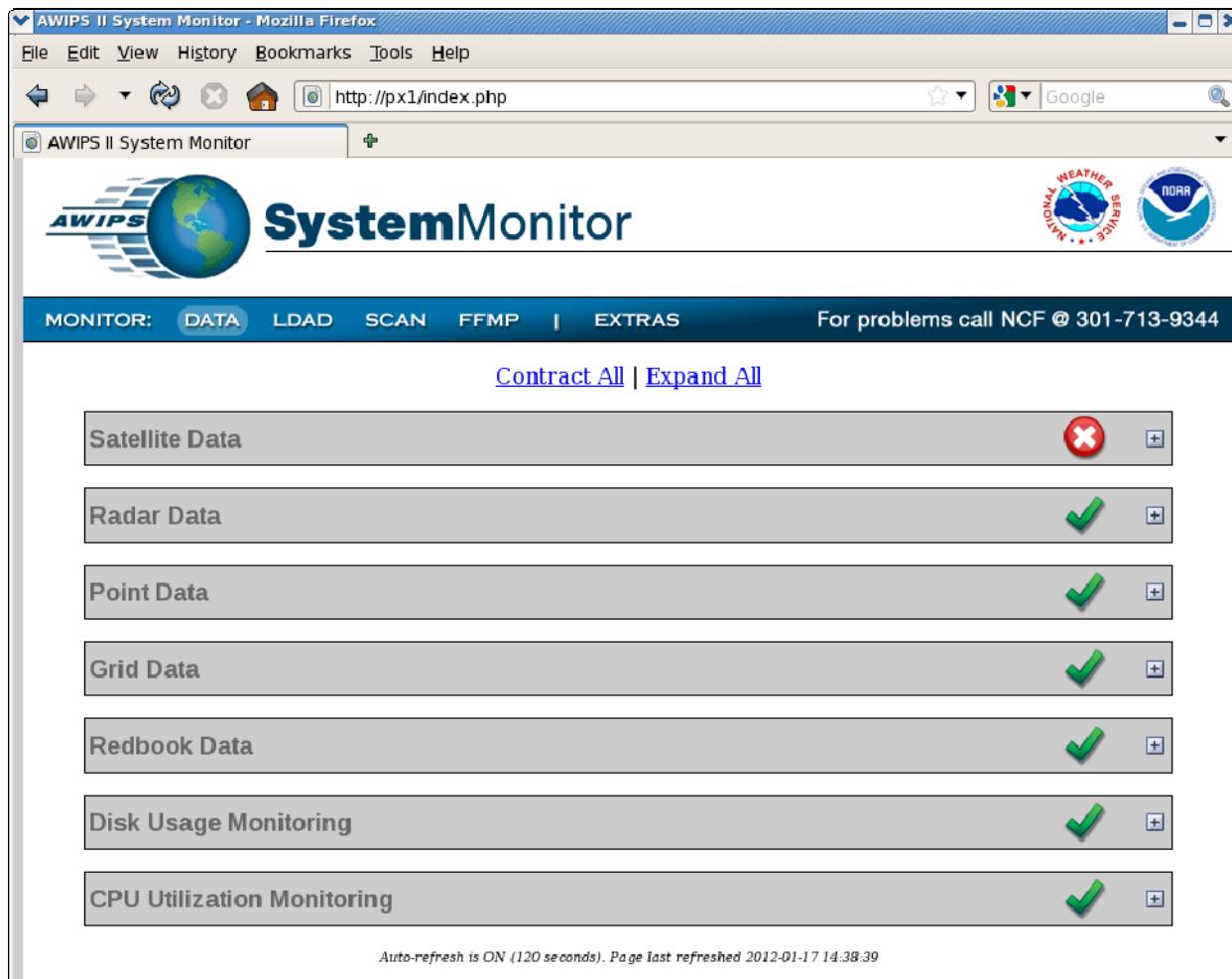


Exhibit 17.0-3. AWIPS System Monitor Default Main Page

The system monitor consists of two distinct components:

- Client
- Server

The client component provides the information in a Web-based format. The server component is responsible for displaying that information. The server component is the component associated with the display portion of the data monitor. It is called a server component because the files associated with it need to be installed on the machine that runs the Mozilla server, which is accessed via the Firefox Web Browser (refer to Exhibit 17.0-2). The client component comprises the files necessary to monitor the data. These files reside on each machine that the user wants to monitor.

The structure of the System Monitor is as follows:

- **System Monitor Main Page.** The System Monitor Main Page, as shown in Exhibit 17.0-3, lists the top-level statuses of the products or processes of the

DATA monitor selection. This is the default System Monitor page that initially opens when the System Monitor URL is entered.

- **Other Product / Processes Monitor Selection:** LDAD is the other monitor selection that lists the top-level statuses of the products or processes associated with LDAD, as shown in Exhibit 17.0-4.

The screenshot shows the AWIPS II LDAD Monitor interface. At the top, there's a standard browser header with tabs for File, Edit, View, History, Bookmarks, Tools, and Help. Below that is a toolbar with icons for back, forward, search, and refresh. The address bar shows the URL <http://px1/LDAD.php>. The main content area has a title bar "AWIPS II LDAD Monitor" and a "SystemMonitor" logo. A navigation menu at the top includes MONITOR: DATA, LDAD (which is highlighted in blue), SCAN, FFMP, and EXTRAS. To the right of the menu, it says "For problems call NCF @ 301-713-9344". Below the menu, there are two links: "Contract All" and "Expand All". The main body contains five items in a list:

- LDAD Processes (status: red X)
- LDAD Acquisition Data (status: green checkmark)
- LDAD Dissemination Data (status: red X)
- Disk Usage Monitoring (status: green checkmark)
- CPU Utilization Monitoring (status: green checkmark)

Each item has a red "X" button and a blue "+" button to its right. At the bottom of the page, a small note says "Auto-refresh is ON (600 seconds). Page last refreshed 2012-01-17 14:40:18".

Exhibit 17.0-4. AWIPS System Monitor Main Page (LDAD Monitoring)

- **Other Monitor Selections:** The other monitor selections are SCAN (shown in Exhibit 17.0-5); and FFMP (shown in Exhibit 17.0-6).

AWIPS II SCAN Monitor - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://px1/SCAN.php

AWIPS II SCAN Monitor

SystemMonitor

NATIONAL WEATHER SERVICE
NOAA

MONITOR: DATA LDAD SCAN FFMP | EXTRAS For problems call NCF @ 301-713-9344

SCAN Data Monitoring System
This page refreshes every 2 minutes



Lightning Data

Most Recent Data		# Strikes - 15 mins
2012-01-17 14:39:53		1

Model Data

Model	Most Recent Data
RUC	2012-01-17 14:36:23
Eta	2012-01-17 14:39:38
LAPS	Not Yet Implemented

Product CZ VIL STI Z MD TVS DMD

	Product	CZ	VIL	STI	Z	MD	TVS	DMD
KOAX VCP:12	On RPS List?	Y	Y	Y	Y	N	Y	Y
	Latest File:	2012-01-17 14:35:31	2012-01-17 14:35:31	2012-01-17 14:35:31	2012-01-17 14:39:42	No Data Found	2012-01-17 14:35:31	2012-01-17 14:39:42
TMSP VCP:N/A	On RPS List?	N	N	N	N	N	N	N
	Latest File:	2012-01-17 14:34:12	2012-01-17 14:34:12	2012-01-17 14:34:12	No Data Found	2012-01-17 14:34:12	No Data Found	No Data Found
KTLX VCP:N/A	On RPS List?	N	N	N	N	N	N	N
	Latest File:	No Data Found						
TJUA VCP:N/A	On RPS List?	N	N	N	N	N	N	N
	Latest File:	No Data Found						

Auto-refresh is ON (This page auto-updates every 120 seconds or with page refresh). Page last refreshed 2012-01-17 14:40:58

Exhibit 17.0-5. AWIPS System Monitor Main Page (SCAN Data Monitoring)

The screenshot shows the AWIPS II FFMP Monitor interface. At the top, there's a navigation bar with links for MONITOR, DATA, LDAD, SCAN, FFMP (which is highlighted), and EXTRAS. A message at the top right says "For problems call NCF @ 301-713-9344". Below the navigation, there's a banner for the "FFMP Data Monitoring System" with a note that it refreshes every 2 minutes. It features the NOAA/NWS/NCEP logos. A "FFMP Plugin Status" box indicates "Enabled". A large circular logo for the "TECHNOLOGICAL DEVELOPMENT LABORATORY - DECISION ASSISTANCE BRANCH" is prominently displayed. Below the logo, two tables provide monitoring details:

QPE Data Sources		
QPE Data	Most Recent Data	Threshold
KOAX - DHR	2012-01-17 14:39:42	10 mins
KUEX - DHR	2012-01-17 14:26:48	10 mins
KDMX - DHR	2012-01-17 14:38:31	10 mins
HPE DHR MOSAIC	File Not Found	15 mins
HPE Bias DHR MOSAIC	File Not Found	15 mins

Non-QPE Data Sources		
Non-QPE Data	Most Recent Data	Threshold
HPE Nowcast	File Not Found	15 mins
HPE Bias Nowcast	File Not Found	15 mins

Exhibit 17.0-6. AWIPS System Monitor Main Page (FFMP Monitoring)

- **Individual Data Set Pages.** Individual pages are opened by clicking on any of the links located on the collapsed main page (DATA and LDAD). There is a set of links for each data type for each machine being monitored. Individual pages contain detailed listings of products and processes within each data set and their respective state.
 - **DATA Products Status.** Exhibits 17.0-7 through 17.0-11 illustrate the

individual pages for monitoring DATA products, Disk Usage, and CPU Utilization.

Satellite Product	Last Update	Status
West CONUS Imager 11 micron IR	2012-01-17 14:30:00	✓
West CONUS Imager 12 micron IR	2011-12-06 15:00:13	✗
West CONUS Imager 3.9 micron IR	2012-01-17 14:30:00	✓
West CONUS Imager 6.7-6.5 micron IR (WV)	2012-01-17 14:30:00	✓
West CONUS Imager Visible	2012-01-17 14:30:00	✓
Supernational Imager Visible	2012-01-17 14:15:00	✓

Exhibit 17.0-7. AWIPS System Monitor DATA: Satellite Products Status

The screenshot shows the AWIPS II System Monitor interface. At the top, there's a menu bar with File, Edit, View, History, Bookmarks, Tools, and Help. Below the menu is a toolbar with icons for back, forward, search, and other functions. The address bar shows the URL <http://px1/index.php>. To the right of the address bar are links to Google and a search icon.

The main header features the "SystemMonitor" logo with the AWIPS II globe icon and the text "SystemMonitor". To the right are the National Weather Service and NOAA logos.

The navigation bar at the top includes MONITOR: **DATA** (selected), LDAD, SCAN, FFMP, and EXTRAS. It also includes a link to contact NCF at 301-713-9344.

Below the navigation bar are two links: [Contract All](#) and [Expand All](#).

The main content area contains several monitoring sections:

- Satellite Data**: Status: **X** (red)
- Radar Data**: Status: **✓** (green)
- Radar Product**:

Radar Product	Last Update	Status
KOAX 8-Bit Base Reflectivity (Z) elev0_5	2012-01-17 14:40:47	✓ (green)
- Point Data**: Status: **✓** (green)
- Grid Data**: Status: **✓** (green)
- Redbook Data**: Status: **✓** (green)
- Disk Usage Monitoring**: Status: **✓** (green)
- CPU Utilization Monitoring**: Status: **✓** (green)

At the bottom of the page, a note says: *Auto-refresh is ON (120 seconds). Page last refreshed 2012-01-17 14:42:36*.

Exhibit 17.0-8. AWIPS System Monitor DATA: Radar Products Status

The screenshot shows the AWIPS II System Monitor interface in Mozilla Firefox. The title bar reads "AWIPS II System Monitor - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The toolbar includes Back, Forward, Stop, Home, Refresh, and a search bar with "http://px1/index.php" and a Google link. The main header features the AWIPS logo (globe with "AWIPS" text) and the text "SystemMonitor". To the right are the National Weather Service and NOAA logos. A navigation bar at the top has "MONITOR:" followed by tabs for DATA, LDAD, SCAN, FFMP, and EXTRAS, with "DATA" being the active tab. To the right of the tabs is the text "For problems call NCF @ 301-713-9344". Below the navigation bar are links "Contract All" and "Expand All". The main content area displays sections for Satellite Data, Radar Data, Point Data, Grid Data, Redbook Data, Disk Usage Monitoring, and CPU Utilization Monitoring. Each section has a status indicator icon (red X for Satellite, green checkmark for others) and a plus sign icon. Under the Point Data section, there is a table:

Point Product	Last Update	Status
Lightning Data	2012-01-17 14:42:30	✓
METAR Data	2012-01-17 14:43:00	✓
Profiler Data	2012-01-17 14:00:00	✓

At the bottom, a message says "Auto-refresh is ON (120 seconds). Page last refreshed 2012-01-17 14:44:37".

Exhibit 17.0-9. AWIPS System Monitor: Point Data Products Status

The screenshot shows the AWIPS II System Monitor interface in Mozilla Firefox. The title bar reads "AWIPS II System Monitor - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The toolbar has icons for Back, Forward, Stop, Home, and Search, with the URL http://px1/index.php. The main header features the AWIPS logo (a globe with "AWIPS" and "SystemMonitor" text) and the National Weather Service/National Centers for Environmental Prediction (NCEP) logos.

The top navigation bar has tabs for MONITOR, DATA (which is selected), LDAD, SCAN, FFMP, and EXTRAS. A message at the top right says "For problems call NCF @ 301-713-9344". Below the navigation is a link to "Contract All | Expand All".

The main content area displays a table of grid products with their last update times and status indicators:

Grid Product	Last Update	Status
GFS360	2012-01-17 10:42:28	✓
GFS90	2012-01-17 10:42:34	✓
GFS40	2012-01-17 10:43:49	✓
NAM12	2012-01-17 14:43:54	✓
RUC80	2012-01-17 14:44:09	✓
RUC40	2012-01-17 14:44:27	✓
RUC13	2012-01-17 14:44:36	✓
DGEX	2012-01-17 10:01:38	✓
GWW REG	2012-01-17 10:45:03	✓

Below the table is a section for Redbook Data, which is currently empty. The bottom of the window shows a toolbar with icons for Print, Refresh, Stop, and Home.

Exhibit 17.0-10. AWIPS System Monitor DATA: Grid Products Status

MONITOR: **DATA** LDAD SCAN FFMP | EXTRAS For problems call NCF @ 301-713-9344

[Contract All](#) | [Expand All](#)

Redbook Product	Last Update	Status
Redbook Graphics	2012-01-17 14:43:09	

Auto-refresh is ON (120 seconds). Page last refreshed 2012-01-17 14:44:37

Exhibit 17.0-11. AWIPS System Monitor DATA: Redbook Products Status

Disk Usage Monitoring and CPU Utilization Monitoring is updated via cron every 20 minutes. These two options, which are shown in Exhibits 17.0-12 and 17.0-13, display the usage and performance of the monitored workstation. Both are accessible from either the DATA or LDAD monitoring screens. In order to display the CPU utilization chart on the Data or LDAD Monitor pages under the menu CPU Utilization Monitoring, click the link:

“Click here to display CPU Usage for the system”

This will execute the script /awips/fxa/bin/showCPU.sh and redirect the user to a new page. While executing, it will display the following message “Attempting to launch the CPU monitor on \$IpAddress” where \$IpAddress is the IP address of the machine launching the script. A sample CPU utilization display is shown in Exhibit 17.0-14.

NOTE: The showCPU.sh script can only be executed on a valid LX or XT workstation on the same subnet as the local LAN.

The screenshot shows the AWIPS II System Monitor interface in Mozilla Firefox. The title bar reads "AWIPS II System Monitor - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The address bar shows "http://px1/index.php". The main content area features the "SystemMonitor" logo and navigation links for MONITOR: DATA, LDAD, SCAN, FFMP, and EXTRAS. A contact number "For problems call NCF @ 301-713-9344" is displayed. Below the navigation is a link to "Contract All | Expand All". The DATA section contains several monitoring panels: "Satellite Data" (red X icon), "Radar Data" (green checkmark icon), "Point Data" (green checkmark icon), "Grid Data" (green checkmark icon), "Redbook Data" (green checkmark icon), and "Disk Usage Monitoring" (green checkmark icon). A note below the Disk Usage panel states: "Disk space statistics are updated via cron every 20 minutes, NOT on page refresh. Only partitions that are above the "caution" threshold (93%) or "error" threshold (95%) are shown here." A message box indicates "No partitions currently exceed threshold values". The CPU Utilization Monitoring panel is also shown with a green checkmark icon. At the bottom, a footer note says "Auto-refresh is ON (120 seconds). Page last refreshed 2012-01-17 16:01:42".

Exhibit 17.0-12. AWIPS System Monitor DATA: Disk Usage

The screenshot shows a Mozilla Firefox browser window with the title bar "AWIPS II System Monitor - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The address bar shows the URL "http://px1/index.php". The main content area displays the "SystemMonitor" page. At the top left is the AWIPS logo (a globe with "AWIPS" text) and at the top right are the National Weather Service and NOAA logos. Below the logos, the word "SystemMonitor" is prominently displayed. A navigation bar at the top has tabs for MONITOR, DATA, LDAD, SCAN, FFMP, and EXTRAS, with "DATA" being the active tab. To the right of the tabs is the text "For problems call NCF @ 301-713-9344". Below the navigation bar are links "Contract All" and "Expand All". The main content area lists several monitoring categories: Satellite Data, Radar Data, Point Data, Grid Data, Redbook Data, Disk Usage Monitoring, and CPU Utilization Monitoring. Each category has a green checkmark icon and a small "+" or "-" button. A note below the list states: "CPU usage statistics are updated via cron every 20 minutes, NOT on page refresh. Only SERVER CPU's are monitored and those that are above the "caution" threshold (80%) or "error" threshold (90%) are shown here." A message box indicates "No server CPU's currently exceed threshold values". Below this is a link "Click here to display CPU Usage for the system". At the bottom of the page, it says "Auto-refresh is ON (120 seconds). Page last refreshed 2012-01-17 14:46:37".

Exhibit 17.0-13. AWIPS System Monitor DATA: CPU Utilization

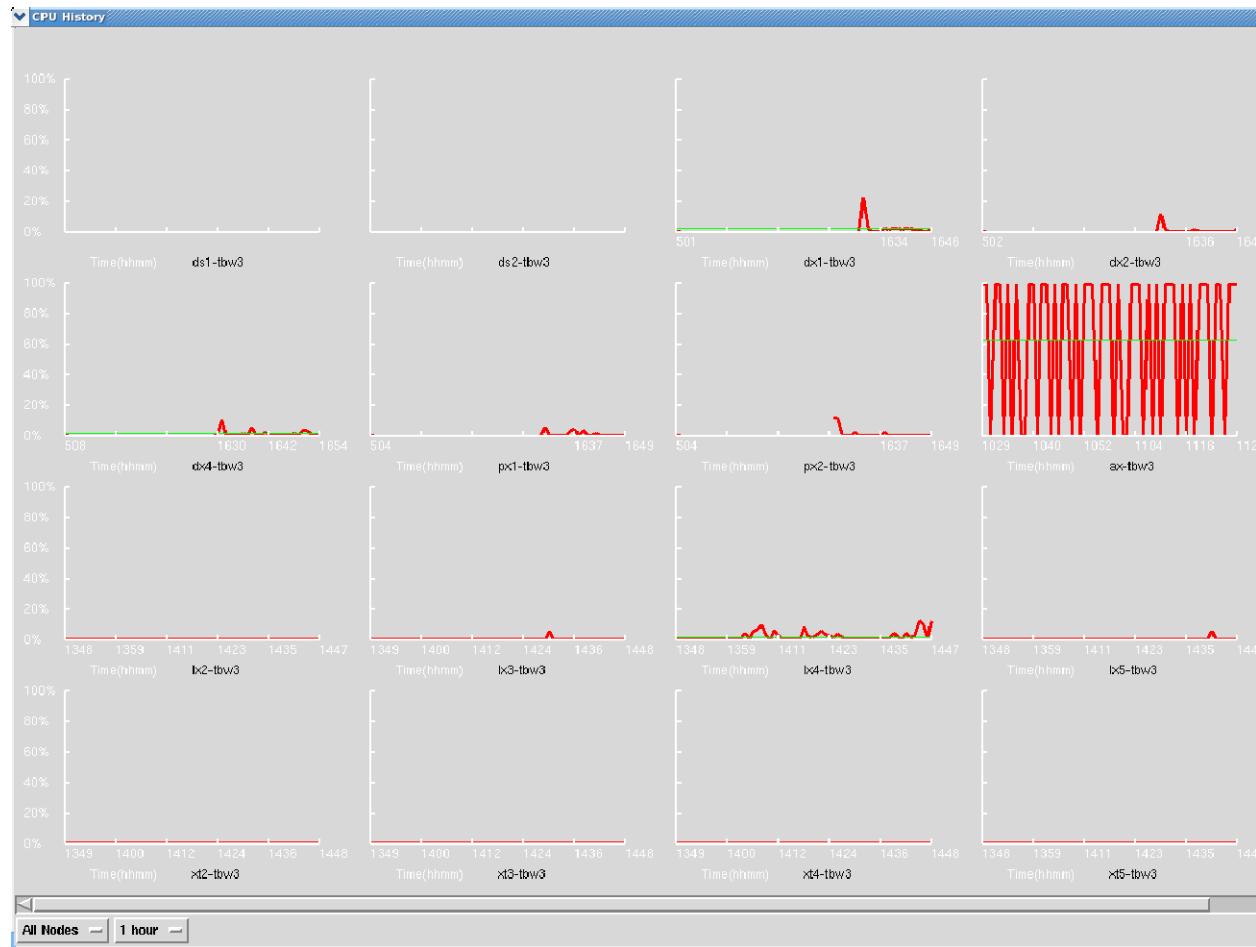


Exhibit 17.0-14. Sample CPU Utilization Display

- **LDAD Processes and Products Status.** Exhibits 17.0-15 – 17.0-17 illustrate the individual pages for monitoring LDAD Processes and Products.

AWIPS II LDAD Monitor - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://px1/LDAD.php

AWIPS II LDAD Monitor

SystemMonitor

NATIONAL WEATHER SERVICE
NOAA

MONITOR: DATA LDAD SCAN FFMP | EXTRAS For problems call NCF @ 301-713-9344

[Contract All](#) | [Expand All](#)

Process Name	Host Server	Status
routerStoreTextEDEX	px2f	✓
routerShefEncoderEDEX	px2f	✓
routerStoreEDEX	px2f	✓
ldadServer	px2f	✓
newLDADdataNotification	ls1	✓
hmingestd	ls1	✓
watchDogExternal.sh	ls1	✓
ROSA_Acq PAD	ls1	✓
ROSA_Acq DTMF	ls1	✗

LDAD Processes

LDAD Acquisition Data

LDAD Dissemination Data

Disk Usage Monitoring

CPU Utilization Monitoring

Auto-refresh is ON (600 seconds). Page last refreshed 2012-01-17 14:50:17

Exhibit 17.0-15. AWIPS System Monitor LDAD: LDAD Processes

The screenshot shows a Mozilla Firefox browser window titled "AWIPS II LDAD Monitor - Mozilla Firefox". The address bar displays "http://px1/LDAD.php". The main content area is titled "SystemMonitor" and features the AWIPS logo (a globe with "AWIPS" text) and the National Weather Service/National Oceanic and Atmospheric Administration (NOAA) logos.

The navigation menu at the top includes "MONITOR: DATA LDAD SCAN FFMP | EXTRAS" and a contact number "For problems call NCF @ 301-713-9344". Below the menu, there are links "Contract All | Expand All".

The main content area displays several monitoring sections:

- LDAD Processes:** Status is shown with a red "X" icon and a plus sign icon.
- LDAD Acquisition Data:** Status is shown with a green checkmark icon and a plus sign icon.
- LDAD Acquisition Product:** Sub-section for "RAWS" is listed with "Last Update" as "2012-01-17 14:45:01" and a green checkmark icon.
- LDAD Dissemination Data:** Status is shown with a red "X" icon and a plus sign icon.
- Disk Usage Monitoring:** Status is shown with a green checkmark icon and a plus sign icon.
- CPU Utilization Monitoring:** Status is shown with a green checkmark icon and a plus sign icon.

At the bottom of the page, a note states "Auto-refresh is ON (600 seconds). Page last refreshed 2012-01-17 14:50:17".

Exhibit 17.0-16. AWIPS System Monitor LDAD: LDAD Acquisition Data

The screenshot shows the AWIPS II LDAD Monitor interface in Mozilla Firefox. The title bar reads "AWIPS II LDAD Monitor - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The toolbar has icons for Back, Forward, Stop, Home, and Search, with the URL http://px1/LDAD.php. The main content area features the AWIPS logo and the text "SystemMonitor". It includes the National Weather Service and NOAA logos. A navigation bar at the top right says "MONITOR: DATA LDAD SCAN FFMP | EXTRAS" and "For problems call NCF @ 301-713-9344". Below this are links "Contract All" and "Expand All". The main panel displays several sections: "LDAD Processes" (red X), "LDAD Acquisition Data" (green checkmark), "LDAD Dissemination Data" (red X), "LDAD Dissemination Product" (DEN Special Weather Statement, Last Update: No File Found, Status: red X), "Disk Usage Monitoring" (green checkmark), and "CPU Utilization Monitoring" (green checkmark). At the bottom, a note says "Auto-refresh is ON (600 seconds). Page last refreshed 2012-01-17 17:01:39".

Exhibit 17.0-17. AWIPS System Monitor LDAD: LDAD Dissemination Data

- **EXTRAS:** Provides link for Online Documentation for the User's Guide and AWIPS System Manager's Manual is available as shown in Exhibit 17.0-18.

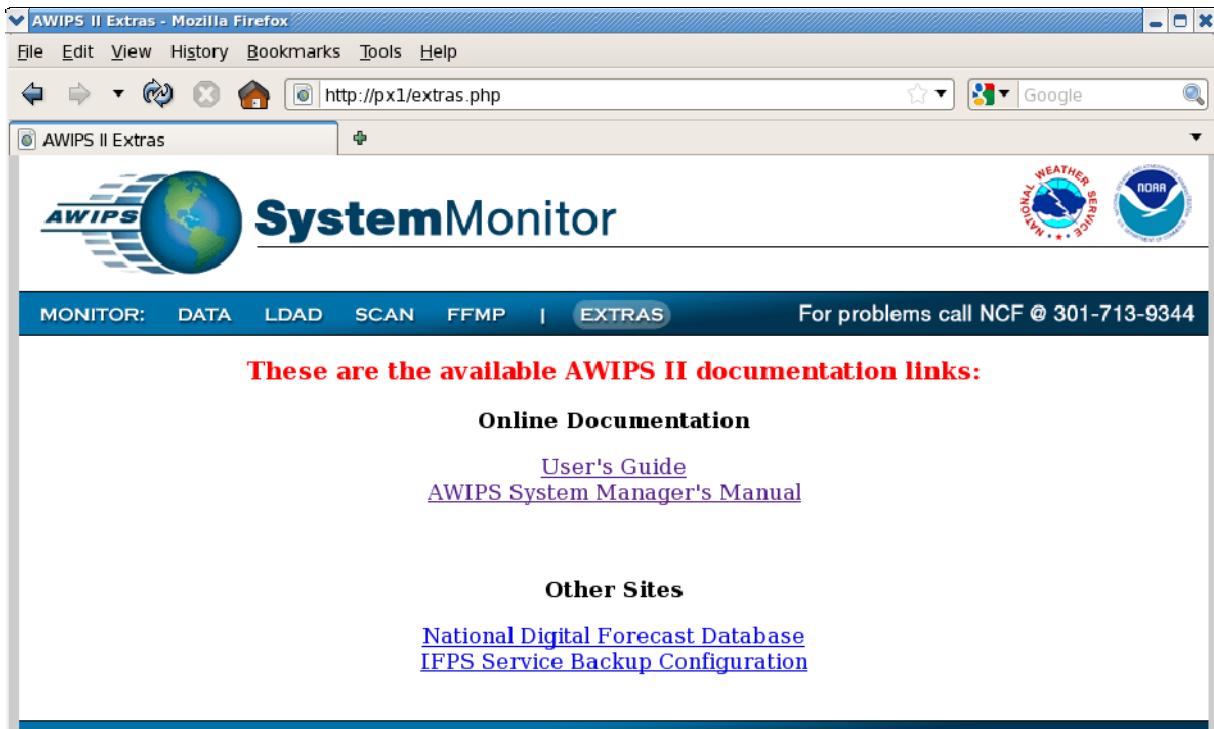


Exhibit 17.0-18. EXTRAS: Online Documentation and Other Sites

17.1 SCAN and FFMP Data Monitoring System

The SCAN_DMS and FFMP_DMS have been incorporated into the AWIPS II System Monitor, as shown in Exhibits 17.0-5 and 17.0-6. Detailed information for these two monitored systems follows.

The information loaded on the page occurs on page-load or refresh. Depending on the amount of data being kept in the data store and the number of SCAN radars in use, the page load can vary between 5 and 15 seconds. The legacy SCAN_DMS loads blank and requires the user to click on a button to run an external script.

The default `/var/www/html/config/scan_radar.xml` ships with an Omaha localization.

Replace the `<rda>` tags with the RDA name of the SCAN-enabled radars. An identical configuration exists for the FFMP DMS page named `ffmp_radar.xml`.

```

<radar>
  <data>
    <rda>KOAX</rda>
    <errorthresh>600</errorthresh>
  </data>

  <data>
    <rda>KUEX</rda>
    <errorthresh>600</errorthresh>
  </data>

```

```

<data>
  <rda>KDMX</rda>
  <errorthresh>600</errorthresh>
</data>
</radar>

```

The FFMP Data Monitoring System (DMS) contains a second configuration file for the RFC grids named **ffmp_grids.xml**.

The default installation ships with all the RFC grids being monitored and can be trimmed as needed by each site.

The grid monitoring on the SCAN DMS page is controlled inside the SCAN.php template. As on the Data Monitor, simple SQL queries are executed against the metadata database. Lightning strikes are obtained by executing a uEngine script named **bltool.py**, which queries the HDF5 and sums up the past 15 minutes' worth of lightning data. See Exhibit 17.1-1.

bltool.py in scripts dir

query {RUC|ETA|LAPS} defined in SCAN.php

scan_radarxml

Station	Precipitation	CZ	VIL	STI	Z	MD	TVS	DMD
KOAX VCP12	On RPS List?	Y	Y	Y	Y	N	Y	Y
	Latest File	2012-01-17 14:35:31	2012-01-17 14:35:31	2012-01-17 14:35:31	2012-01-17 14:39:42	No Data Found	2012-01-17 14:39:53	2012-01-17 14:39:42
TMSP VCP/N/A	On RPS List?	N	N	N	N	N	N	N
	Latest File	2012-01-17 14:54:12	2012-01-17 14:54:12	2012-01-17 14:54:12	No Data Found	2012-01-17 14:54:12	No Data Found	No Data Found
KTIX VCP/N/A	On RPS List?	N	N	N	N	N	N	N
	Latest File	No Data Found						
TJUA VCP/N/A	On RPS List?	N	N	N	N	N	N	N
	Latest File	No Data Found						

Auto refresh is ON (This page auto-updates every 100 seconds or with page refresh). Page last refreshed 2012-01-17 14:40:58.

Exhibit 17.1-1. SCAN Data Monitoring System

The FFMP monitor also displays the status of the ffmp_plugin (below the DAT logo). It monitors only the primary EDEX server as defined in the **params.xml** file. See Exhibit 17.1-2.

FFMP Data Monitoring System
This page refreshes every 2 minutes

QPE Data	Most Recent Data	Threshold
KOAX - DHHR	2012-01-17 14:39:42	10 mins
KUEX - DHR	2012-01-17 14:26:48	10 mins
KDMX - DHR	2012-01-17 14:38:31	10 mins
HPE DHHR MOSAIC	File Not Found	15 mins
HPE Bias DHR MOSAIC	File Not Found	15 mins

Non-QPE Data	Most Recent Data	Threshold
HPE Nowcast	File Not Found	15 mins
HPE Bias Nowcast	File Not Found	15 mins

ffmp_radar.xml

ffmp_grids.xml

Exhibit 17.1-2. FFMP Data Monitoring System

17.2 Pages and Templates

The Apache directory is /etc/httpd/conf. Any pre-existing configuration inside this location on the px1 is not baseline. The existing httpd.conf will be saved before installation and renamed AWIPS1-httpd.conf. This is the apache server configuration, which rarely needs to be deviated from the national baseline.

The installation directory for the AWIPS II System Monitor is: /var/www/html and all configuration, scripts, and page templates are installed here.

The main php page templates are in the top-level directory and are:

index.php	default page loaded when browsing http://px1f
LDAD.php	LDAD System Monitor loaded when browsing http://px1f/LDAD.php
SCAN.php	SCAN DMS loaded when browsing http://px1f/SCAN.php
FFMP.php	FFMP DMS loaded when browsing http://px1f/FFMP.php

All actions performed on page load, such as SQL queries to the metadata database, are contained inside these page template files.

There is no persistent process running and sending information to the AWIPS II System Monitor. All database queries and scripts are run on page load, refresh, or after refresh threshold is lapsed. The exceptions are the CPU and disk monitoring sections, which run via cronjob.

There are 4 root cronjobs that run to monitor the disk and cpu statistics. These crons are in /etc/ha.d/cron.d/a2px1cron and run on the server running the a2px1apps package, default PX1. The crons populate the Disk Monitor and CPU Monitor sections of the System and LDAD Monitor pages.

```
# cron to update disk monitor portion of awips II system monitor
*/20 * * * * /var/www/html/scripts/diskMon.sh >> /dev/null
*/20 * * * * /var/www/html/scripts/ldad_diskMon.sh >> /dev/null

# cron to update CPU monitor portion of awips II system monitor
*/20 * * * * /var/www/html/scripts/cpuMon.sh >> /dev/null
*/20 * * * * /var/www/html/scripts/ldad_cpuMon.sh >> /dev/null
```

Note: The AWIPS II rehost script will configure the heartbeat and cron appropriately. If the rehost script is not run, a manual insert of the above 4 cronjobs is required. In order to make the AWIPS II System Monitor highly available without running the rehost script, simply add the httpd (apache service) to /etc/ha.d/resource.d/a2px1apps.

17.3 Configuration Files

The configuration files are contained in **/var/www/html/config**.

The environment configuration is contained in **params.xml**

/var/www/html/config/params.xml	
<pre><params> <config> <dbserver>dx1</dbserver> <primary_edex>dx3</primary_edex> <client_edex>dx4</client_edex> <dbuser>awips</dbuser> <dbpass>awips</dbpass> <refresh>120</refresh> <ldad_refresh>600</ldad_refresh> <scan_refresh>120</scan_refresh> <ffmp_refresh>120</ffmp_refresh> <edex_home>/awips2/edex</edex_home> <common_base>/data/utility/common_static/base</common_base> <monitor_plugin>/monitoring/MonitorPluginState.xml</monitor_plugin> </config> </params></pre>	<p>The values entered to the left are default and as shipped. Should the baseline system architecture change, these values may need to be changed as well to reflect such.</p> <p>The <refresh> options are for the PHP template pages and are in seconds.</p>

The configuration for the various products monitored are contained in this directory.

/var/www/html/config	
satellite.xml	The SQL commands execute on page load or refresh and are contained in these files and under the tag <sqltext>. The warning and error threshold for each data type is also contained therein, defined by <warnthresh> and <errorthresh>. The name to display in the monitor is defined by the <productname> tag.
radar.xml	
point.xml	
grid.xml	
graphic.xml	
ldad.xml	
ffmp_grids.xml	The ffmp_grids.xml contains the configuration for the RFC grids while the ffmp_radar.xml contains the configuration for the radars.
scan_radar.xml	scan_radar.xml contains the radars for which SCAN is applicable.
ffmp_radar.xml	To add products or radars to any of these configuration files, simply copy a pre-existing XML tag and change the appropriate variables, e.g., <rda>.

17.4 Data Display Tools

Several tools are available for data display/system monitoring. This section introduces three useful tools: PG Admin III; HDFView; and CAVE Product Browser. Table 17.4-1 provides a brief description of each tool.

Table 17.4-1. Data Display Tools

Tool	Description
PG Admin III	PG Admin III is a PostgreSQL-specific database administration tool. PG Admin III provides a graphical user interface (GUI)-based interface to the database and allows the user to view data and run SQL commands. PG Admin III is part of the existing AWIPS toolset.
HDFView	HDFView is a GUI-based tool that provides an Explorer-style interface into the contents of an HDF5 file. HDFView is not part of the AWIPS toolset. It has been installed on the systems at the NWS Training Center and is available for download at the AWIPS Evolution web site.
CAVE Product Browser	The CAVE Product Browser is part of CAVE, the AWIPS II visualization environment. Used in conjunction with the CAVE D2D perspective, it provides access to displayable data and other products available in AWIPS II.

17.4.1 PG Admin III

PG Admin III is part of the existing AWIPS toolset and is available for use after AWIPS II has been installed. In the current architecture, it is installed in /usr/local/pgadmin3 and is accessible from AWIPS LX and XT workstations. PG Admin III provides a GUI interface to a PostgreSQL database.

To run PG Admin II, you will need to:

1. Log on to an LX or XT workstation.
2. Open a terminal window.
3. In the terminal window, change directory to /usr/local/pgadmin3/bin.
4. In the terminal window, enter: **./pgadmin3 &**.

This will display PG Admin III's main window, shown in Exhibit 17.4.1-1.

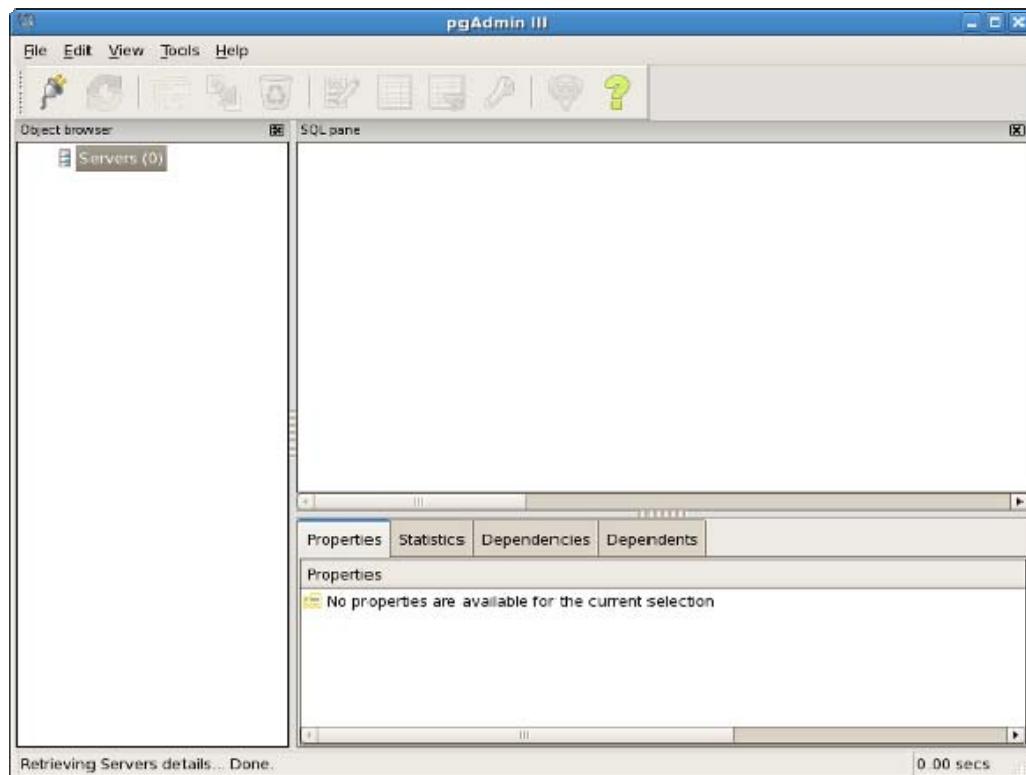


Exhibit 17.4.1-1. PG Admin III Main Window

The first time PG Admin is used with the AWIPS II databases, you will need to set up a connection to the database. The connection is established using the *New Server Registration* dialog (shown in Exhibit 17.4.1-2). The *New Server Registration* dialog is accessed via the “connection to server” button () on the PG Admin III toolbar.

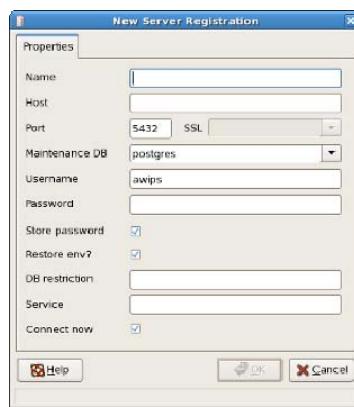


Exhibit 17.4.1-2. PG Admin III New Server Registration Dialog

When you register a new server, you need to provide four values:

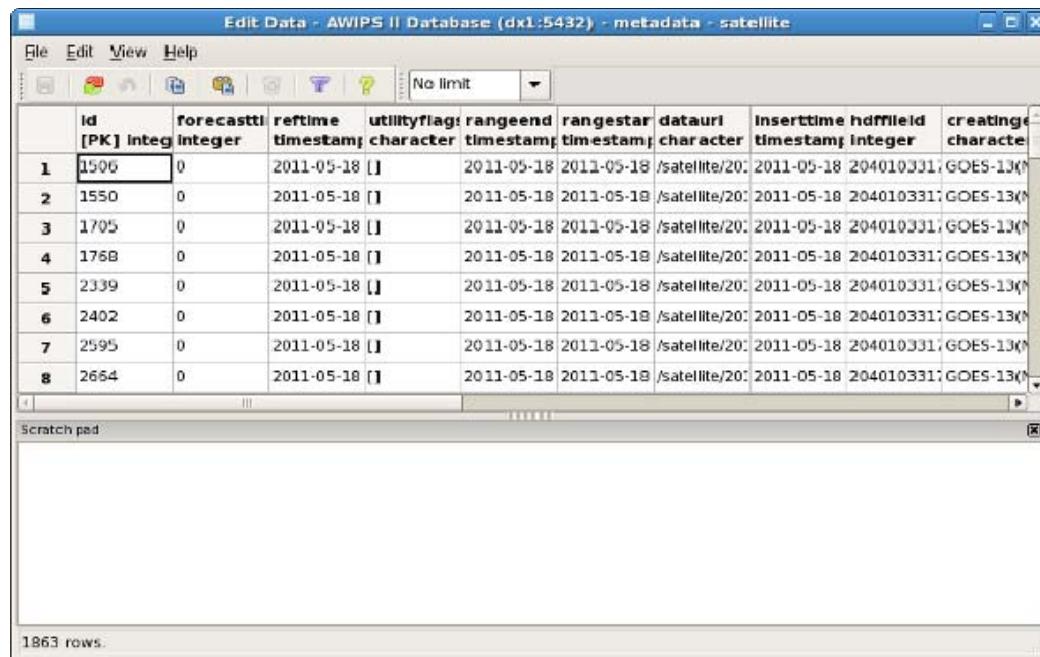
1. The name of the database. This can be anything you want but it should be something meaningful such as “AWIPS II Database.”
2. The name of the host system. For AWIPS II, the host system is *dx1f*.

3. The username. For AWIPS II, the correct user name is *awips*.
4. The password.

To use PG Admin to view data, locate the desired table in the tree view on the left side of the main window and click the ‘view data’ button () on the toolbar. The table will display in the

Edit Data window (see Exhibit 17.4.1-3).

Note: The *Edit Data* window opens and displays a database cursor; any changes made to the data in this window will propagate to the underlying database.



The screenshot shows the PG Admin III software interface. The title bar reads "Edit Data - AWIPS II Database (dx1:5432) - metadata - satellite". The main window displays a table with 1863 rows. The columns are: Id [PK] integer, forecastid integer, reftime timestamp, utilityflag character, rangeend timestamp, rangestar timestamp, dataurl character, inserttime timestamp, hdffield integer, and creating character. The first few rows of data are as follows:

	Id [PK] integer	forecastid integer	reftime timestamp	utilityflag character	rangeend timestamp	rangestar timestamp	dataurl character	inserttime timestamp	hdffield integer	creating character
1	1590	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
2	1550	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
3	1705	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
4	1768	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
5	2339	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
6	2402	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
7	2595	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	
8	2664	0	2011-05-18 11:00:00	2011-05-18	2011-05-18 11:00:00	/satellite/20110518110000	204010331:GOES-13K	2011-05-18 204010331:GOES-13K	204010331:GOES-13K	

A scratch pad window is visible at the bottom of the interface.

Exhibit 17.4.1-3. PG Admin III Edit Data Window

PG Admin III can also be used to execute SQL against the database. In order to execute SQL, you need to open the PG Admin II SQL Query window. To open this window, first find the desired database in the tree view on the left side of the main window and then click the ‘execute SQL’ button () in the toolbar. This will display the SQL Query window, shown in Exhibit 17.4.1-4.

Note: Use extreme care when executing SQL statements against the database. SQL is an extremely powerful database manipulation language and can be used to alter the structure and/or contents of the database. A change made to the database generally cannot be reversed.

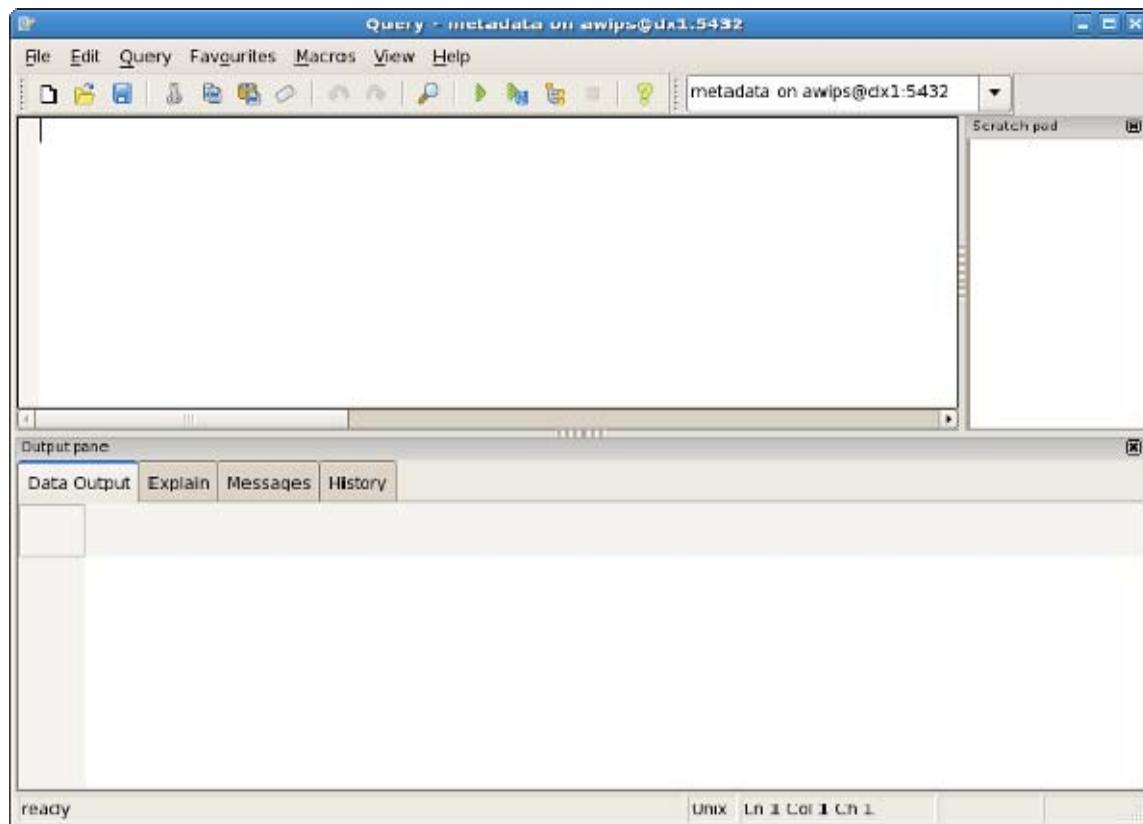


Exhibit 17.4.1-4. PG Admin III SQL Query Window

17.4.2 HDFView

HDFView is a GUI-based tool that allows you to view the data in an HDF5 file. It provides an Explorer-style interface for locating the data and various options for viewing the data. HDFView is most effective when used to view raster data such as satellite imagery. Note that HDFView errors out when attempting to display Gridded Binary (GRIB) data in AWIPS II.

At the NWS Training Center, HDFView has been installed in /awips2/tools/bin/hdfview2.7 on both DX1 and DX2. Since the AWIPS II HDF5 files are in a file system that is only mounted on the server running the a2dx1apps high-availability package, you will log into dx1f to run HDFView.

Note: HDFView is not part of the AWIPS toolset and is not delivered as part of the AWIPS II software delivered by Raytheon. It has been installed on the systems at the NWS Training Center and is available for download at the AWIPS Evolution web site.

To run HDFView, you will need to do the following:

1. Log on to an LX or XT workstation.
2. Open a terminal window.
3. Remote log into dx1f.

4. Change directory to /awips2/tools/bin/hdfview2.7.
5. Enter: **./hdfview**.

This will display the main HDFView window (see Exhibit 17.4.2-1).

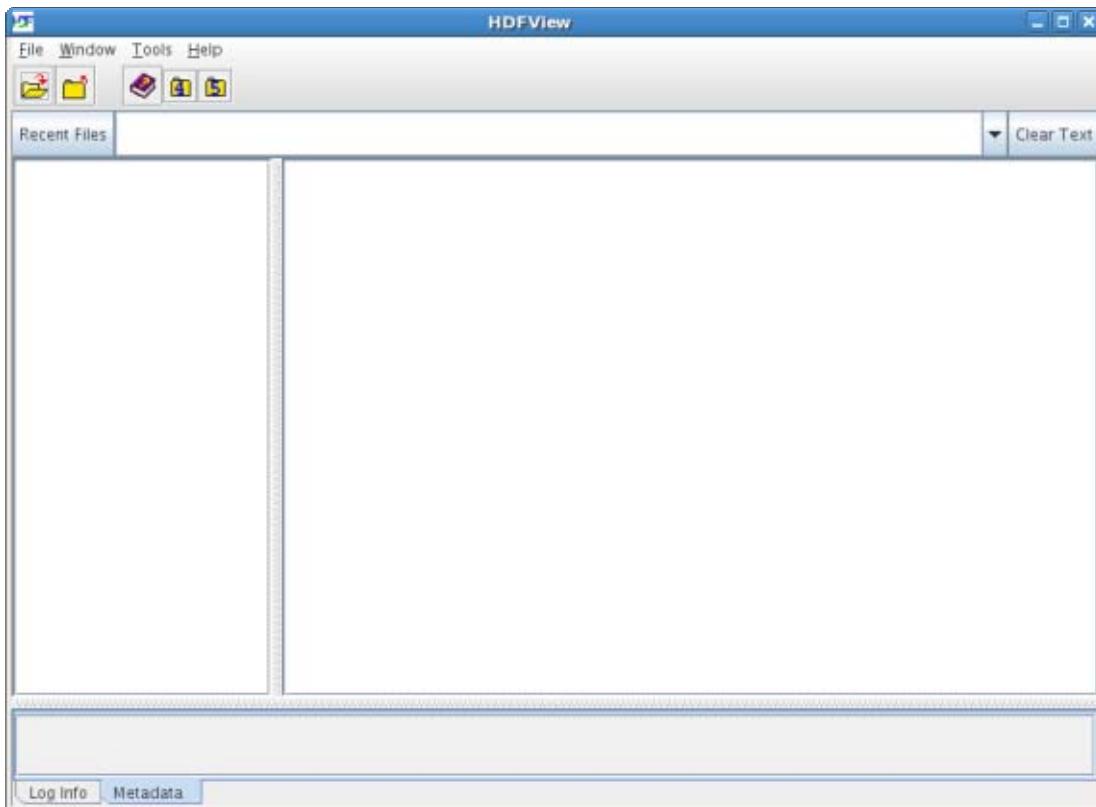


Exhibit 17.4.2-1. HDFView Main Window

To locate and load an HDF5 file, select ‘File→Open Read-Only’ from the HDFView menu. This will display a file open dialog. Browse for the desired file and click ‘Open’. This will display the file contents in a tree structure on the left side of the main window (see Exhibit 17.4.2-2).

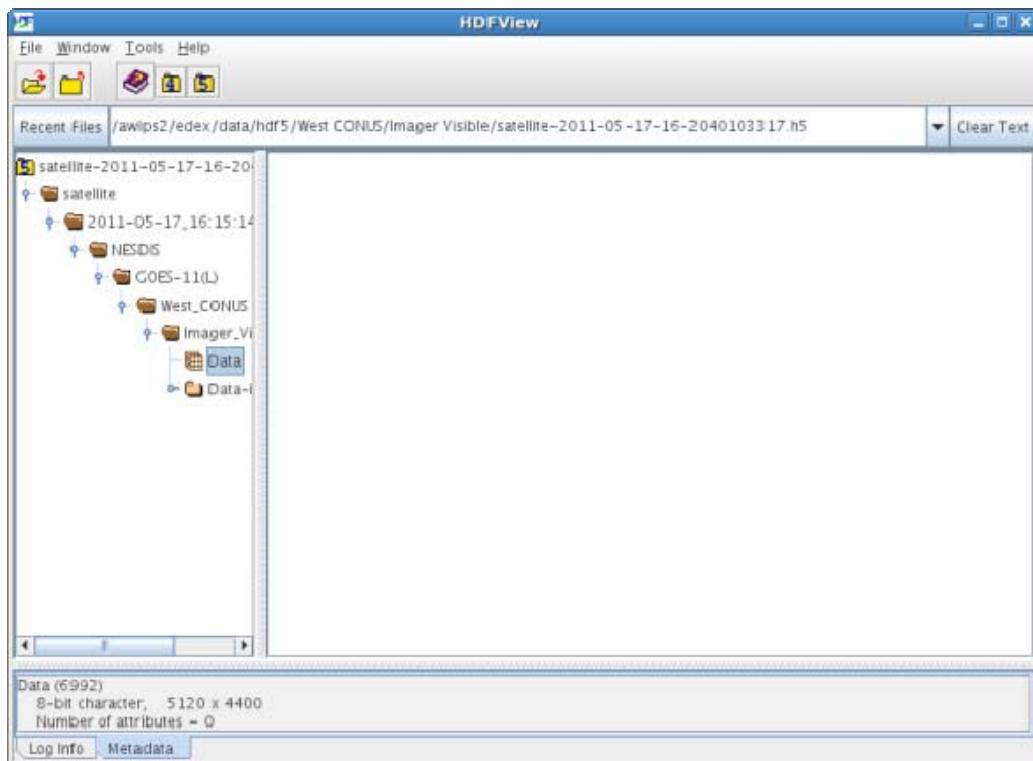


Exhibit 17.4.2-2. HDFView with File Loaded and Expanded

To view the product:

1. Expand the tree view to find and click on the data for the desired product.
2. Right click on the data and select ‘Open As’.

This opens the Dataset Selection dialog, shown in Exhibit 17.4.2-3.

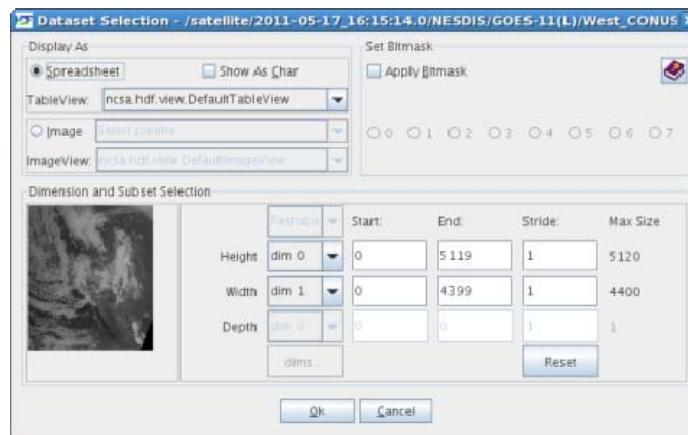


Exhibit 17.4.2-3. HDFView Dataset Selection Dialog

From this dialog, you can display the data as a spreadsheet or as an image. Use care when displaying data in the spreadsheet (table) view because the data can be modified in this view. Exhibit 17.4.2-4 illustrates the spreadsheet view; the image view is shown in Exhibit 17.4.2-5.

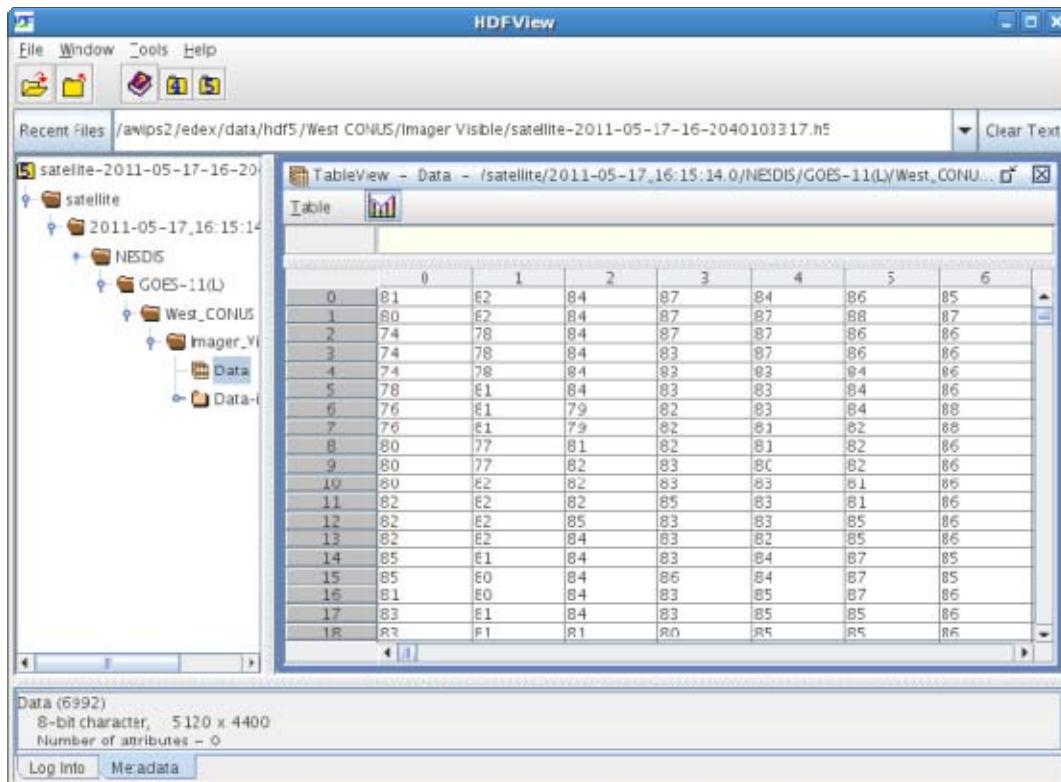


Exhibit 17.4.2-4. HDFView Tableview (Spreadsheet) of Data

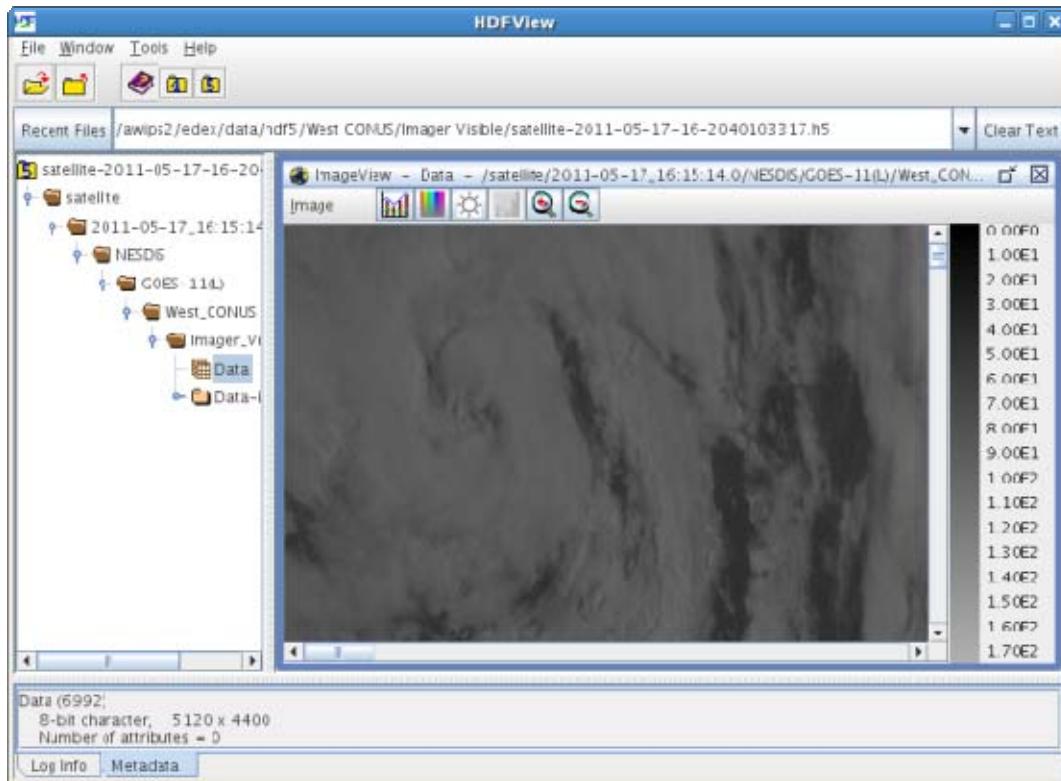


Exhibit 17.4.2-5. HDFView Image View of Data

17.4.3 Cave Product Browser

The CAVE Product Browser provides an Explorer-style tree view of data and other products that may be viewed in CAVE. It may be added to the selected CAVE perspective by selecting ‘CAVE→Data Browsers→Product Browser’ from the CAVE menu system.

Note: Although the CAVE Product Browser may be added to any perspective, this discussion demonstrates adding it to the D2D perspective.

To use the CAVE Product Browser, first launch CAVE on an AWIPS LX or XT workstation. Once CAVE is running, select ‘CAVE→Data Browsers→Product Browser’ from the CAVE menu system. The Product Browser will be added to the right side of the active perspective. (See Exhibit 17.4.3-1.)

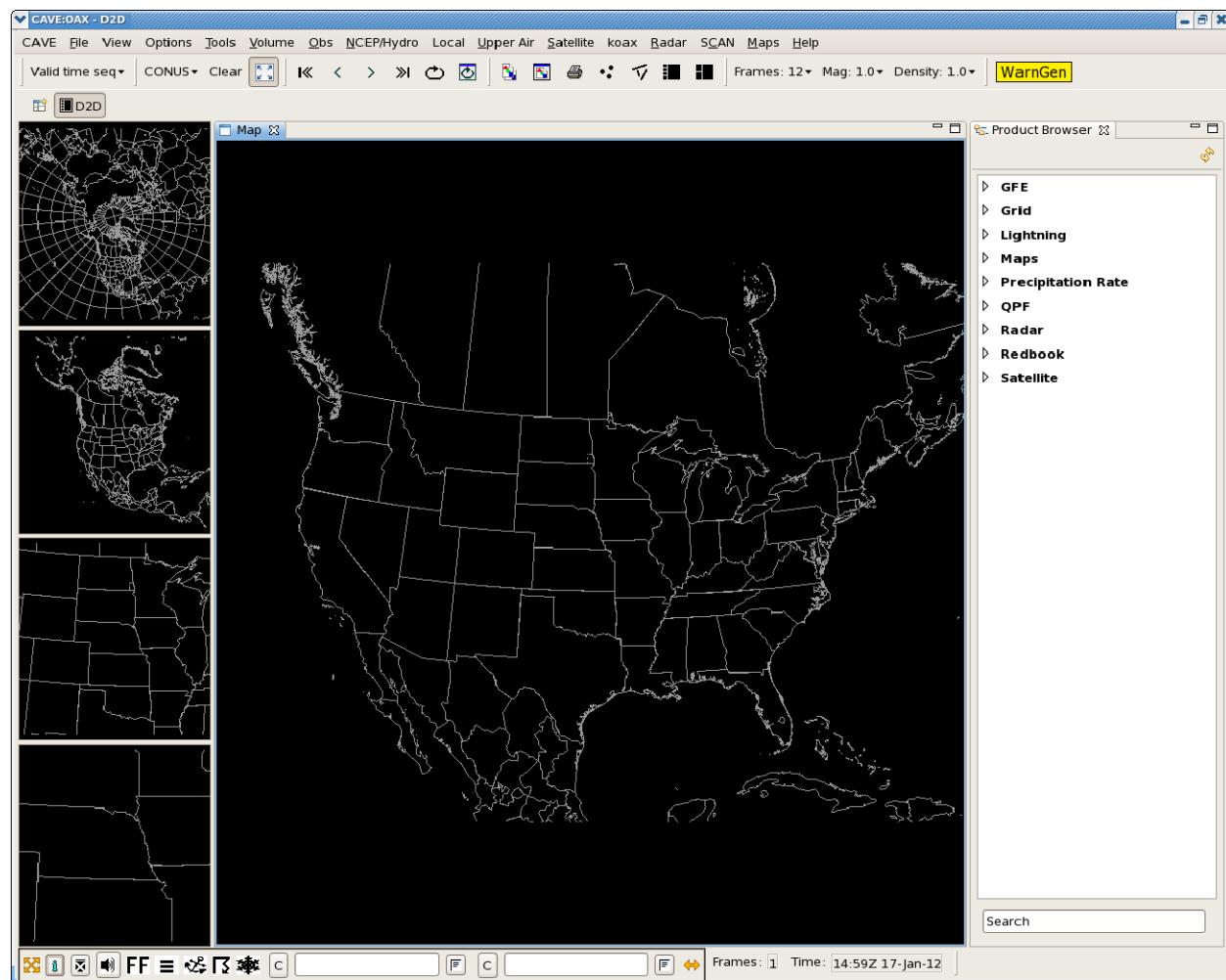


Exhibit 17.4.3-1. CAVE with Product Browser Displayed

Once the Product Browser has been loaded, expand the desired product type node to find the desired product; then right click on the product and select ‘Load Product’. After a short pause, the selected product will load (see Exhibit 17.4.3-2). [Note: For GRIB

products, right click on the product and select ‘Load As→Contour’ or ‘Load As→Image’.]

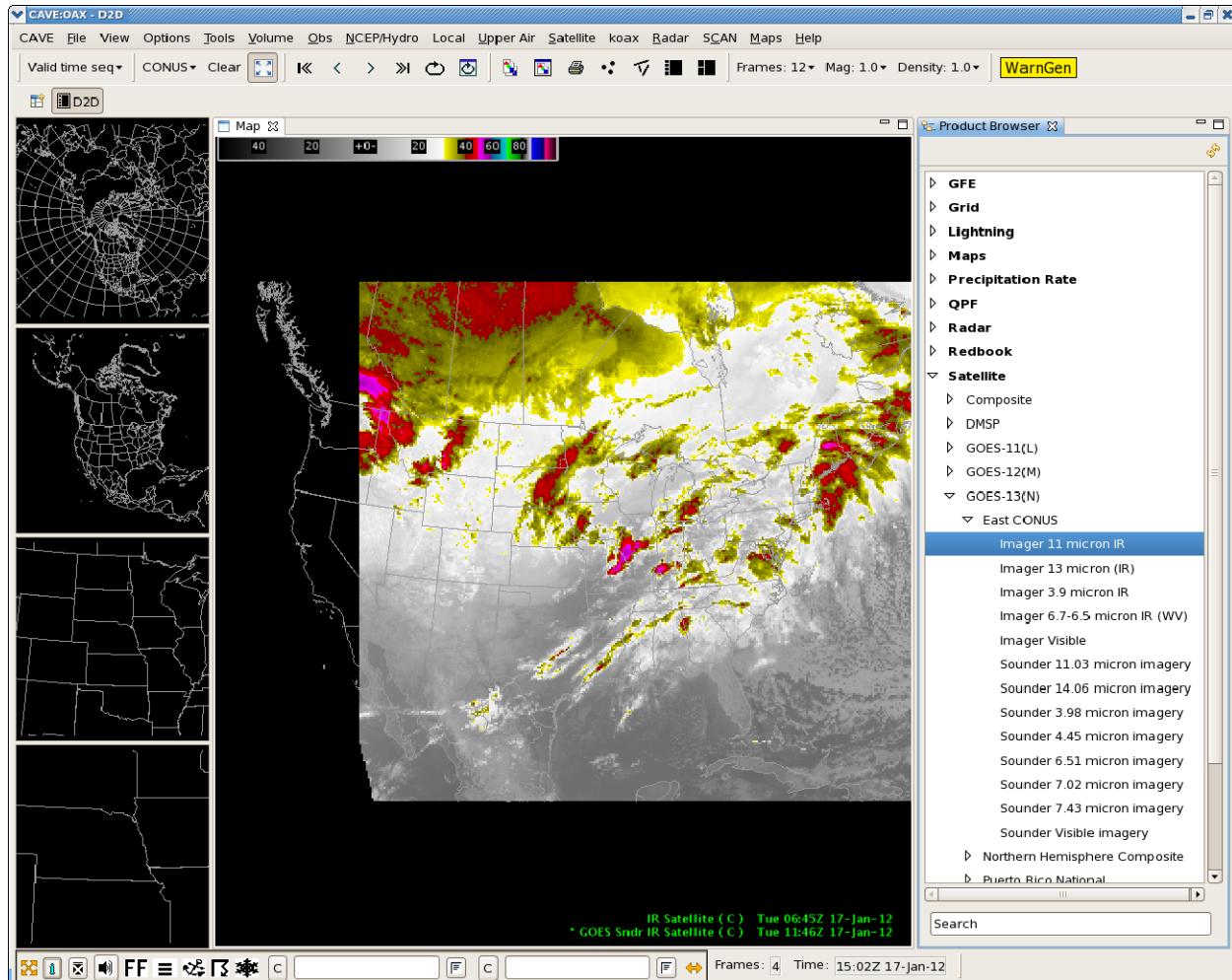


Exhibit 17.4.3-2. Satellite Product Loaded from Product Browser

Once the product has been loaded, it can be manipulated the same as any product loaded into D2D. Note in particular that time matching applies to products loaded by this method. As a result, attempting to load multiple products may result in errors being reported in AlertViz.

Chapter 18

Failover Management Procedures

Chapter 18. Failover Management Procedures

Table of Contents

	<i>Page</i>
18.0 Failover Management Procedures: Introduction.....	1
18.1 Communications Processors	1
18.1.1 SBN Communications Processors.....	1
18.1.1.1 SBN Communications Processors Failover Procedures.....	3
18.1.1.2 Monitoring Data Acquisition on SBN Communications Processor.....	3
18.2 Linux Servers.....	5
18.2.1 Red Hat Cluster Manager	5
18.2.1.1 Linux Data Server Failover Scenarios	6
18.2.1.2 Linux Preprocessor Server Failover Scenarios	8
18.2.2 Post-Failover Events.....	11
18.2.3 NCF Post-Failover Actions	11
18.3 River Ensemble Processors (REP).....	12
18.3.1 REP Server High-Availability Software	12
18.3.2 REP Server Failover Scenarios	13
18.3.3 Managing the Heartbeat Cluster Service.....	15
18.3.4 EDEX/IPVS, LDM Failovers.....	15
18.4 AWIPS II to AWIPS I Fallback.....	16
18.4.1 AWIPS I/AWIPS II Co-existence	16
18.4.2 Swapping Procedures	17
18.4.3 Limitations on System Swapping.....	18

List of Exhibits

Exhibit 18.2.1.1-1. Cluster Status Monitor.....	8
Exhibit 18.2.1.2-1. Sample Output	9
Exhibit 18.2.1.2-2. Sample Verbose Output from Linux Cluster Status Command.....	10

18.0 Failover Management Procedures: Introduction

This chapter describes AWIPS failover management procedures. It contains three sections. Section 18.1 describes the communications processors. Refer to Section 18.2 for the Linux data servers (DX) failover management procedures. Section 18.3 describes the River Ensemble Processors (REP).

18.1 Communications Processors

The Communications Processors (CP) are the front-end processors that allow data to be acquired from sources external to the site. These CPs do not execute hydrometeorological applications. Their primary function is to provide protocol support to the external communication lines.

The SBN CPs support the ingest of NESDIS and NWSTG/NWSTG2 data from the Network Control Facility. Failover procedures for each are discussed in this section.

18.1.1 SBN Communications Processors

The Satellite Broadcast Network (SBN) is the network that distributes weather data from the NCF to receiving sites throughout the United States. The network consists of the uplink Satellite Broadcast Processor (SBP) at the Master Ground Station (MGS) or backup MGS, the uplink MGS antenna in Hauppauge, New York; the backup MGS antenna at the NASA IV&V Facility in Fairmont, West Virginia; the SES-1 satellite; the downlink antenna at the locations receiving data; and the downlink SBP or NOAAPORT Receive Processor (NRP).

There are two components to the ingest software on the CPSBNs in AWIPS II:

1. **LDM NOAAport receiver software.** Ingest from DVB to CPSBN.
2. **UniData LDM software.** Routing/ingest from CPSBN acting as an upstream LDM host to the downstream LDM client & writer (running on dx2f in normal configuration).

In AWIPS II the **LDM NOAAport receiver software** will be used for ingesting all four NOAAPORT Channels.

At each AWIPS site, there are two CPSBNs responsible for receiving GOES products and a combination of NCEP products from the NCF. No site has more than two CPSBNs unless it has an NRS. CPSBN1 and CPSBN2 function as a heartbeat cluster; failover is managed automatically or manually. Note that only a single high-availability package is currently used on this cluster. The package name is a2cp1apps. In failover mode, package execution shifts to the backup server. Note that there is software (notably the LDM(U) processes) that runs on both CPSBN1 and CPSBN2 and is not part of the a2cp1apps package. The a2cp1apps package manages the cp1f floating server name. Note that

floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.

First, check for the running of the LDM, as user ldm:

TYPE: ps -U ldm -u ldm u

```
[ldm@cpsbn1-tbw3 ~]$ ps -U ldm -u ldm u
USER  PID %CPU %MEM   VSZ RSS TTY STAT START TIME COMMAND
ldm  22419  0.0  0.0  2740 1060 ?    Ss Jan16  0:00 rpc.lldmd -I 165
root 22421  0.2  2.6 162140 162136 ?    SL Jan16  6:26 dvbs_multicast
root 22422  0.0  0.1 10140 10136 ?    SL Jan16  0:35 dvbs_multicast
root 22423  0.1  2.6 162140 162136 ?    SL Jan16  4:54 dvbs_multicast
root 22424  0.0  0.1 10140 10136 ?    SL Jan16  0:45 dvbs_multicast
ldm  22425  0.3 18.6 1172500 1160996 ?    S Jan16 10:29 readnoaaport -m
ldm  22426  0.0 15.4 1042400 960140 ?    S Jan16 0:12 readnoaaport -m
ldm  22427  0.1 19.0 1195064 1183580 ?    S Jan16  5:06 readnoaaport -m
ldm  22428  0.0 15.8 1021776 986156 ?    S Jan16  1:43 readnoaaport -m
ldm  22429  0.4 15.7 995088 982936 ?    S Jan16 14:12 rpc.lldmd -I 165
ldm  24674  0.0  0.0  4960  1676 pts/0  S  22:01  0:00 -bash
ldm  24751  0.0  0.0  4552 1140 pts/0  R+ 22:01  0:00 ps -U ldm -u ld
```

To check whether all DVB-S channels are running on cpsbn1 in AWIPS II:

TYPE: config_dvb

```
Found all DVB channels NMC GOES NMC2 NOAAPORT_OPT NMC3
Checking file and shmem status for cpsbn1-tbw3
*****
Link SBN      ---config_file--- ----- current_status -----
      Channel      type    rd_enable  reader    dh_proc  MCAST(DVB)
  0  NMC          MCAST    ON     DOWN     DOWN    n/a
  1  GOES         MCAST    ON     UNKNOWN UNKNOWN n/a
  2  NMC2         MCAST    ON     UNKNOWN UNKNOWN n/a
  3  NOAAPORT_OPT MCAST    ON     UNKNOWN UNKNOWN n/a
  4  NMC3         MCAST    ON     UNKNOWN UNKNOWN n/a
```

NOTE: Ensure that the rd_enable column reads ON. UNKNOWN status is nominal for the dh_proc and MCAST(DVB) columns when running in AWIPS II as these are AWIPS I-specific statistics.

In AWIPS II the **UniData LDM** software is used as a replacement for the CP ingest software.

- The file **pqact.conf** located at **/usr/local/ldm/etc** in the LDM installation contains the configuration information that tailors the data flow to AWIPS II.
- The file **pqact.conf** serves the same purpose in AWIPS II as **acq_patterns.txt** in AWIPS 1.

18.1.1.1 SBN Communications Processors Failover Procedures

All CPSBN problems that you encounter should be reported immediately to the NCF.

If a CPSBN should fail,

- **Call the NCF.** The CPSBNs for your site can be swapped from the NCF by way of the Simple Network Management Protocol (SNMP). Refer to Exhibit 2.2.2-1 in Chapter 2 for rack configuration.

NOTE: During a DX failover, the CPSBNs will remain up and running because they are designed to send data to the active DX.

18.1.1.2 Monitoring Data Acquisition on SBN Communications Processor

NOTE: To monitor data acquisition you will need **root** access to the system.

Because the DVB has replaced the demods, both CPSBNs receive the complete data stream. At any one time, however, only one CP is actively acquiring and routing the data from the DVBS (default configuration has CPSBN1 active-active, CPSBN2 active-standby).

Connect to the active-active CPSBN1. Then, as user **root**, run the following command to monitor the state of network connections associated with LDM:

TYPE: `netstat -ta | grep cpsbn`

tcp	0	0	cpsbn2-tbdw.er.awips.no:ldm *.*	LISTEN
tcp	0	0	cpsbn2-tbdw.er.awips:sunrpc 165.92.175.19:60519	ESTABLISHED
tcp	0	0	cpsbn2-tbdw.er.:xmlrpc-beep dx1-tbdw:932	TIME_WAIT
tcp	0	0	cpsbn2-tbdw.er.awips.no:942 dx1-tbdw:932	TIME_WAIT
tcp	0	0	cpsbn2-tbdw.er.awips.no:940 dx1-tbdw:932	TIME_WAIT
tcp	0	0	cpsbn2-tbdw.er.awips.no:ldm dx2-tbdw:59558	ESTABLISHED
tcp	0	0	cpsbn2-tbdw.er.awips.:58070 dx1-tbdw:sunrpc	TIME_WAIT
tcp	0	0	cpsbn2-tbdw.er.awips.:45877 dx1-tbdw:sunrpc	TIME_WAIT
tcp	0	0	cpsbn2-tbdw.er.awips.:43601 dx1-tbdw:sunrpc	TIME_WAIT
tcp	0	0	cpsbn2-tbdw.er.awips.no:ssh cpsbn1-tbdw.er.awips.:41543	ESTABLISHED

Logfiles for SBN ingest on the active-active CPSBN are located under **/data/logs/ldm** and controlled via the syslog daemon (**syslogd**), which is started by the **init** process in runlevels 2-3-4-5. The syslog also spawns a kernel logging daemon, **klogd**, which does not concern itself with user-space logging. To check to see if the **syslogd** process is running run, as user **root**:

TYPE: `service syslog status`

**syslogd (pid 32306) is running...
klogd (pid 32309) is running...**

The process ID (PID) will be returned along with the status of running if the process is currently active.

NOTE: While the **service** command may be executed by any user, it requires access to the PID files in /var/run for **syslogd** and **klogd**, which are 600 permissions. Output when the service command is run by a non-root user will appear to show the process (in this case **syslogd**) as “dead,” which is inaccurate.

The configuration files for the **syslogd** are located in **/etc** and **/etc/sysconfig**. They are:

```
/etc/syslog.conf  
/etc/sysconfig/syslog
```

The configuration file **/etc/sysconfig/syslog** controls the daemon logging options, while **/etc/sysconfig** controls the user-level process logging and in this case the **LDM** logging configuration. You should not have to be concerned about **/etc/sysconfig/syslog**.

Inside **/etc/syslog.conf** are entries for the logging of LDM:

# UCAR Unidata LDM Logging	
local0.debug	/data/ldm/logs/ldmd.log
local3.debug	/data/ldm/logs/nwstg.log
local4.debug	/data/ldm/logs/goes.log
local5.debug	/data/ldm/logs/nwstg2.log
local6.debug	/data/ldm/logs/oconus.log

These entries dictate the location for the logging facility of the various LDM NOAAPort receivers that acquire the SBN data feed from the DVBs. The first entry in **/etc/syslog.conf** is also pertinent to LDM because it “excludes” the logging of the NOAAPort receivers from the facility **messages**. The logging facility for the NOAAPort receivers is defined in the LDM source.

To watch the receipt of data from the DVBs to the LDM, the above logfiles may be monitored or the **ldmadmin** utility used to view the feed in real-time. As user **ldm** on the active-active CPSBN:

TYPE: **ldmadmin watch**

```
Nov 02 18:12:44 pqutil INFO: 4717 20111102181244.528 NEXRAD3 480885342
SDUS33 KPAH 021804 /pN3SVWX
Nov 02 18:12:44 pqutil INFO: 138 20111102181244.528 IDS|DDPLUS 480885343
SXMI55 KWAL 021812
Nov 02 18:12:44 pqutil INFO: 77 20111102181244.528 IDS|DDPLUS 480885344
SRUS76 KMOB 021812 /pRR70J4
Nov 02 18:12:44 pqutil INFO: 438 20111102181244.528 IDS|DDPLUS 480885345
```

```
SOVD83 KWNB 021800 RRD
Nov 02 18:12:44 pqutil INFO: 962 20111102181244.528 IDS|DDPLUS 480885346
SXVT44 KWAL 021812
Nov 02 18:12:44 pqutil INFO: 2030 20111102181244.528 IDS|DDPLUS 480885347
SXXX90 KWAL 021812
```

NOTE: Further information on the LDM and LDM monitoring may be obtained by visiting the UniData LDM Monitoring website @ <http://www.unidata.ucar.edu/software/ldm/ldm-6.6.5/basics/monitoring.html>

18.2 *Linux Servers*

The four DX servers have been paired into two, two-server clusters.

The DX1 and DX2 are managed by a third-party software product that maintains a continuous heartbeat between the two members of the failover pair and accomplishes an automatic processing switch to the secondary processor should the primary processor fail. DX3 and DX4 do not form a primary/backup server pair. Rather, the EDEX processes run on both servers. EDEX uses QPID and the IP Virtual Server (IPVS), running on the CP1/2 cluster, to provide both load balancing and request balancing. IPVS is used to load balance the connections from clients (AlertViz, CAVE, etc.) to the EDEX cluster (DX3/4). It is configured so that, when an incoming connection request is made to the IPVS virtual server, it looks to see which server, DX3 or DX4, has the smaller number of connections. It then routes the connection to that server. If DX3 and DX4 have the same number of active connections, it routes to DX4 by default because it is configured with DX4 weighted higher than DX3.

18.2.1 *Red Hat Cluster Manager*

The Red Hat Cluster Manager provides automatic failover when either of the active PXs or DXs in the AWIPS configuration is lost. The AWIPS functionality hosted on that PX/DX server will automatically swap to the remaining corresponding server. Whenever an automatic failover action occurs, it causes a configuration alarm event to be forwarded to the NCF via an SNMP trap.

The Red Hat Cluster Manager uses the concept of a cluster made up of nodes within its managed environment. The Linux Data Servers are paired as two, two-server clusters (DX1/DX2, DX3/DX4), and the Linux Preprocessor Servers (PX1 and PX2) are the members of the AWIPS Red Hat Cluster Manager cluster configuration.

The Red Hat Cluster Manager also uses the concept of “services” to transfer responsibilities from one node in the network to another. For the purposes of AWIPS configuration, the DXs (two pairs) make up two distinct package groups and the PXs make up two distinct package groups.

18.2.1.1 Linux Data Server Failover Scenarios

Key Components

- **Node.** Linux Data Server (DX).
- **Cluster.** Networked group of managed nodes (DX1 and DX2, DX3 and DX4).
- **Package.** The Red Hat Cluster Manager refers to “services,” which are equivalent to MC/ServiceGuard “packages.” The Red Hat Cluster Manager uses redundant hardware, shared disk storage, power management, and robust cluster communication and application failover mechanisms. The DX service/package names are:
 - **a2dx1apps** (usually runs on dx1-<siteID>, may run on dx2)
 - **a2dx2apps** (usually is active, but may run on dx2/1 in future releases)
 - **a2dx3apps** (usually is inactive, but may run on dx3/dx4 in future releases)
 - **a2dx4apps** (usually is inactive, but may run on dx4/dx4 in future releases).

NOTE: In AWIPS II, the package-naming concept is preserved with the addition of an “a2” preceding the package name. For example, in AWIPS I there is a package named dx1apps. In AWIPS II this package is modified and renamed **a2dx1apps**. The same naming convention is preserved for ingest. In AWIPS I there is an ingest script named startIngest.dx1. In AWIPS II this script is modified and renamed startA2Ingest.dx1. Similarly, the HA cronfiles also exist; they are named **a2dx1cron** and **a2SITEDx1cron**.

Currently, the dx2apps, dx3apps, and dx4apps packages are inactive in an AWIPS II environment, i.e., there is no analogous a2[dx3|dx4]apps package.

When issuing an **hb_stat** on a device that is not currently configured to have a package managed (e.g., DX3/DX4) you will see:

dx3-tbw3 is not part of an heartbeat cluster

NOTE: The device name will change depending on which server the command is issued upon.

The heartbeat services are stopped on those nodes that do not manage any packages or resources. The reason the **hb_stat** command will still execute is that the command performs a sanity check not on whether the heartbeat process is running, but rather on the existence of the heartbeat RPM in the rpm-database.

- **Floating IP Address:** Relocatable IP address that can move between like nodes in a cluster as opposed to a stationary IP address (e.g., dx1f-<siteID>, dx2f-<siteID>, dx3f-<siteID>, and dx4f-<siteID>, instead of dx1-<siteID>, dx2-<siteID>, dx3-<siteID>, and dx4-<siteID>).

Red Hat Cluster Manager Failovers

AWIPS supports two types of Red Hat Cluster Manager failovers – automatic and manual.

- **Automatic Failover.** If a DX fails, its associated package will be transferred automatically to the other node/server (backup server) in the package group (DX1 to DX2 and vice versa; DX3 to DX4 and vice versa). Failure scenarios, triggering automatic failover, include the following:
 - Loss of SCSI connectivity
 - Loss of Ethernet connectivity
 - CPU hang or panic
 - CPU failure
 - System disk failure
 - Power failure.
- **Manual Failover.** There may be times when you will want to have a manual failover initiated (for example, if the software on the primary node fails to operate properly or if the disk on the primary node becomes corrupted). As the system manager, you need to communicate the request for a manually initiated failover to the NCF; it is the NCF's responsibility to initiate all manual failovers using Red Hat Cluster Manager.

Failover Time

The DX failover time, under normal conditions, is about 2 to 3 minutes.

Package Switching

When a DX failure occurs, the resident DX package is switched to the other DX because each is capable of handling the full load of applications as a backup node. Once the failed node has been revived, the package that moved should be transitioned back to its original node (server). The NCF is responsible for this transition. The transition back to the original node should be scheduled with the NCF in advance so that it can occur at an appropriate time (i.e., not during a severe weather condition).

To verify that swap packages have been enabled for the swap package (**a2dx1apps**) as user **root**,

TYPE:

hb_stat

- **Result:** Look for output similar to Exhibit 18.2.1.1-1.

Heartbeat Status Monitor			Nov 02 18:15:29	
===== Member Status =====				
Member	Status	IP address		
dx1-tbdw	Up	165.92.29.131		
dx2-tbdw	Up	165.92.29.132		
===== Service Status =====				
Service	IPAddr	Cronfile	Owner	Start Time
a2dx1apps	165.92.29.195	a2dx1cron,a2SIT	dx1-tbdw	2011-07-11 20:21:50
a2dx2apps	165.92.29.196	a2dx2cron,a2SIT	dx2-tbdw	2011-10-21 17:05:18

Exhibit 18.2.1.1-1. Cluster Status Monitor

18.2.1.2 Linux Preprocessor Server Failover Scenarios

Key Components

- **Node.** Linux Preprocessor Server (PX).
- **Cluster.** Networked group of managed nodes (PX1 and PX2).
- **Package.** The Red Hat Cluster Manager refers to “services,” which are equivalent to MC/ServiceGuard “packages.” The Red Hat Cluster Manager uses redundant hardware, shared disk storage, power management, and robust cluster communication and application failover mechanisms. PX service/package names:
 - **a2px1apps** (usually runs on px1-<siteID>, may run on px2)
 - **a2px2apps** (usually runs on px2-<siteID>, may run on px1)
- **Floating IP Address.** Relocatable IP address that can move between like nodes in a cluster as opposed to a stationary IP address (e.g., px1f-<siteID> and px2f-<siteID> instead of px1-<siteID> or px2-<siteID>)

Red Hat Cluster Manager Failovers

AWIPS supports two types of Red Hat Cluster Manager failovers – automatic and manual.

- **Automatic Failover.** If a PX fails, its associated package will be transferred automatically to the other node/server (backup server) in the package group. Failure scenarios, triggering automatic failover, include the following:
 - Loss of SCSI connectivity
 - Loss of Ethernet connectivity
 - CPU hang or panic
 - CPU failure
 - System disk failure

- Power failure.
- **Manual Failover.** There may be times when you will want to have a manual failover initiated (for example, if the software on the primary node fails to operate properly or if the disk on the primary node becomes corrupted). As the system manager, you need to communicate the request for a manually initiated failover to the NCF; it is the NCF's responsibility to initiate all manual failovers using Red Hat Cluster Manager.

Failover Time

The PX failover time, under normal conditions, is about 2 to 3 minutes.

Package Switching

When a PX failure occurs, the resident PX package is switched to the other PX because each is capable of handling the full load of applications as a backup node. Once the failed node has been revived, the package that moved should be transitioned back to its original node (server). The NCF is responsible for this transition. The transition back to the original node should be scheduled with the NCF in advance so that it can occur at an appropriate time (i.e., not during a severe weather condition).

To verify that swap packages have been enabled for each swap package (**px1apps** and **px2apps**) as user **root**,

TYPE:

hb_stat

- **Result:** Look for output similar to Exhibit 18.2.1.2-1. Exhibit 18.2.1.2-2 shows output of a verbose version of this command (**hb_stat -v**).

```
Heartbeat Status Monitor Nov 02 18:25:41

===== Member Status =====

Member Status IP address
-----
px1-tbdw Up 165.92.29.137
px2-tbdw Up 165.92.29.138

===== Service Status =====

Service IPAddr Cronfile Owner Start Time
-----
a2px1apps 165.92.29.193 a2px1cron,a2SIT px1-tbdw 2011-10-13 17:40:47
a2px2apps 165.92.29.194 a2px2cron,a2SIT px2-tbdw 2011-10-13 17:43:54
```

Exhibit 18.2.1.2-1. Sample Output

```

Heartbeat Status Monitor                               Nov 02
18:20:42

===== Member Status
=====

Member      Status     IP address
-----
px1-tbdw    Up        165.92.29.137
px2-tbdw    Up        165.92.29.138

===== Heartbeat Status
=====

Node       Type      Devices
-----
px1-tbdw   ucast    bond0 165.92.29.138
px1-tbdw   ping     router-tbdw
px2-tbdw   ucast    bond0 165.92.29.137
px2-tbdw   ucast    eth1  10.0.4.1
px2-tbdw   ping     router-tbdw

===== Service Status
=====

Service    IPAddr     Cronfile   Owner      Start Time
-----
a2px1apps 165.92.29.193  a2px1cron,a2SIT px1-tbdw  2011-10-13
17:40:47
a2px2apps 165.92.29.194  a2px2cron,a2SIT px2-tbdw  2011-10-13
17:43:54

===== Resource Status
=====

Resource   Parameters   Owner      Status      Start Time
-----
IPAddr     165.92.29.193  px1-tbdw  unknown
a2px1apps                         px1-tbdw  OK        2011-10-13
17:40:47
Crontab    a2px1cron    px1-tbdw  OK        2011-10-13
17:40:47
Crontab    a2SITEpx1cron px1-tbdw  OK        2011-10-13
17:40:48
caveData: Unknown host
ifconfig: `--help' gives usage information.
IPAddr     165.92.29.194  px2-tbdw  unknown
a2px2apps                         px2-tbdw  OK        2011-10-13
17:43:54
Crontab    a2px2cron    px2-tbdw  OK        2011-10-13
17:43:54
Crontab    a2SITEpx2cron px2-tbdw  OK        2011-10-13
17:43:54

```

Exhibit 18.2.1.2-2. Sample Verbose Output from Linux Cluster Status Command

In AWIPS II the **a2px2apps** also controls the following:

- **LDM edexBridge.** This serves up the data from the LDM client/writer to the EDEX cluster for processing. It is stopped/started along with the LDM client/writer software.
- **NFS.** nfsd controls the export of the **/data_store** raw archive from the device running the **a2px2apps** to all other nodes on the network. All other nodes mount the **/data_store** via NFS. This is due to the high-frequency read/writes that LDM performs to the raw data archive. The overhead of NFS causes high latency times; thus the raw data archive cannot be an NFS mount on the LDM client/writer.
- **Apache daemon.** This is the httpd process that controls the AWIPS II System Monitor webpage. The resource configuration stops|starts the httpd process.

NOTE: All the above processes (**LDM edexBridge**, **NFS**, and the **Apache daemon**) are controlled via failover management and require no site or user interaction to configure or control outside of the cluster management suite.

18.2.2 Post-Failover Events

Events that take place after an automatic or manually initiated failover are as follows:

- The Red Hat Cluster Manager service will be swapped to the failover node.
- The NCF will be notified, by way of a pop-up dialog or an audible alarm from within HP OpenView Operations (OVO), of the swap completion and of the failover node in question. The node outage is alarmed (red) within OVO. The pop-up alarm is triggered by way of an SNMP trap sent to OVO at the NCF by Red Hat Cluster Manager at the site.

18.2.3 NCF Post-Failover Actions

NCF post-failover actions are provided for site information. NCF operators follow procedures contained in the Trouble Ticket software's knowledge base, i.e.:

- Contact the site to confirm failover.
- Perform analysis of the new system to determine if any problems have occurred during failover and, if so, take the following appropriate steps to correct them:
 - View status of node and package
 - Examine package log file
 - Examine system for known problems.
- Execute various manual procedures to complete additional operations not included as a normal swap function.

- Recontact the site to determine if the site is continuing to acquire and process data (desktop data display applications are receiving and able to display the appropriate product data).

18.3 *River Ensemble Processors (REP)*

Two River Ensemble Processors (REP) are located at each RFC AWIPS site. The REP suite, part of the NWS' Advanced Hydrologic Prediction Service (AHPS) program, was designed as a high-performance “blank slate” on which the RFCs can load new or site-modified applications in an environment that is very similar to AWIPS. It includes an availability infrastructure that allows failing-over of processes and crons if desired. In the future, this hardware will host “baseline” OH applications implemented via AWIPS or AHPS, as appropriate. The REP provides the RFCs with a platform designed for easy expansion based on mission requirements. The REP suite was delivered as a self-contained unit that includes a rack, a NAS device, two commodity servers, a GbE LAN, and a tape backup device. The servers are installed with Red Hat Linux 7.2. The file system structure of the servers and NAS is consistent with current operations and is ready to support installation of hydrology software.

18.3.1 *REP Server High-Availability Software*

The REP servers use Heartbeat for high-availability (see **heartbeat(8)** (type: **man heartbeat**) and <http://linux-ha.org/HeartbeatProgram/> for more information). Documentation resides in the **/usr/share/doc/heartbeat-1.2.3** directory.

Terminology

- **Cluster.** A group of computers that provide access to resources.
- **Node.** A single computer in the cluster. A node may have multiple central processing units (CPUs) and/or LAN interfaces. Each node may provide access to any and all cluster resources.
- **Resource.** A service or device that is managed by the cluster (e.g., an IP address, a daemon, a file system, or a set of cron jobs).
- **Resource Group.** A set of resources that are always swapped together as a unit. This is equivalent to the notion of “package” for HP MC/ServiceGuard or “service” for the Linux Red Hat Cluster Manager.

Configuration

The cluster configuration file **/etc/ha.d/ha.cf** defines nodes, heartbeat channels, and various failover parameters. Most parameters have been left at their default values for because there has been no reason to change them. Descriptions of some parameters of note follow.

- **Nice fallback on.** This setting prevents resources from automatically failing over to the default host when it becomes available. The rationale behind this setting is that the failback should occur in a controlled manner. Automatic failback could cause unnecessary interruptions to applications that do not know or care whether a particular resource is on the default or backup node. Furthermore, the cause of the original failure may require investigation and repairs may be required before the default node is brought back into service. This option is required in order to allow network interface failures to induce a failover (see **ipfail plug-in** below).
- **Logfacility local0.** Use **syslog** for high-availability software log messages. The **syslog** configuration is configured to log these files to **/var/log/ha-log** and **logrotate** is configured to maintain a history of these log files.
- **bcast eth1.** Broadcast heartbeat messages on the eth1 interface. Eth1 interfaces to the private subnet for the cluster.
- **ucast eth0 <peer_ip>.** Unicast heartbeat messages to peer on the eth0 interface. Eth0 interfaces to the site LAN. Having two cluster heartbeat interfaces ensures cluster integrity even if one of the interfaces goes down.
- **watchdog /dev/watchdog.** Reboot if we do not receive our own heartbeat messages within a minute. This option ensures that a node that has been cut off from the cluster due to a heartbeat network interface failure to relinquish its resources before another node takes them over.
- **node rp1-xxx rp2-xxx.** The list of nodes that comprise the cluster. Additional nodes may be added as required. Each of these nodes must be capable of providing access to any and all cluster resources.
- **ping router-xxx.** Treat router-xxx as a pseudo-cluster member. If a node cannot access router-xxx, it will query the other nodes to determine whether the **ping** node is down or the node's network interface has failed.
- **respawn hacluster /usr/lib/heartbeat/ipfail.** Run the **ipfail plug-in**. This plug-in will fail over any held resources when a node determines that its network interface has failed (due to the failure to reach a **ping** host). Note that **ipfail** requires the **nice_failback** option.

The resource configuration file **/etc/ha.d/haresources** defines resource groups and preferred nodes. This configuration file must be identical on all nodes. A detailed description of the syntax for this file is contained in the header of the file.

18.3.2 REP Server Failover Scenarios

Cluster status monitoring is accomplished via the **/awips/ops/bin/hb_stat** utility script. With no arguments, the script reports the status of the heartbeat cluster daemons on each node and the owner/status of each resource group. In the example of sample output that follows, the heartbeat cluster daemons are up on both nodes, Resource Group 1 is running on rp2-tbdr, and Resource Group 2 is running on rp1-tbdr.

```

Heartbeat Status Monitor                               Feb 02 15:45:52

===== Member Status =====

Member      Status     IP address
-----
rp1-tbdr    Up        165.92.29.75
rp2-tbdr    Up        165.92.29.76

===== Service Status =====

Service      IPAddr      Cronfile      Owner      Start Time
-----
REPsvc1     165.92.29.77  REPcron1    rp2-tbdr   Jan 30 20:47:20
REPsvc2     165.92.29.78  REPcron2    rp1-tbdr   Jan 30 20:47:30

```

The cluster daemons log information and error messages to **/var/log/cluster**. This log file is managed by **syslog** and is rotated weekly.

Automatic Failover

A node will automatically take over a resource group if it cannot contact the owner of the resource group via either heartbeat channel within **deadtime** seconds (30 seconds). A node will automatically give up a resource group to a peer if it cannot ping the router within **deadtime** seconds. If a node does not receive its own heartbeat message within a minute, it will reboot itself, thereby giving up any resource groups it may have been managing. Failover of resource groups based on the failure of a managed process is not implemented at this time; no managed processes have yet been defined.

Manual Failover

Manual failover is provided via the **/awips/ops/bin/hb_swap** script. This script requests a resource group swap from the heartbeat cluster daemons. The first argument must be a resource unique to the resource group to be swapped as it appears in the **haresources** file (including any arguments). The entire resource group will be swapped, not just the resource specified. If that is not the desired result, the cluster is not configured correctly. If the node option is used, it must match the node name specified in the **ha.cf** and **haresources** files.

As an example, given the **haresources** file entries on site **tbdr** (a testbed),

```

rp1-tbdr IPAddr::165.92.29.77 REPsvc1 crontab::REPCron1
rp2-tbdr IPAddr::165.92.29.78 REPsvc2 crontab::REPCron2

```

To swap the first resource group to node rp2-tbdr, run any **one** of the following commands:

TYPE: **hb_swap IPAddr::165.92.29.77 rp2-tbdr**
or

TYPE: **hb_swap REPsvc1 rp2-tbdr**

or

TYPE: `hb_swap crontab::REPcron1 rp2-tbdr`

If the node argument is omitted, the node to which the resource group is being given is deemed to be the local host. If **rsh** is not enabled, this is the way the script must be run. **rsh** is used to deliver the request message to the cluster daemon that is taking over. So, to perform the example swap without using **rsh**, the following command could be run on rp2-tbdr:

TYPE: `hb_swap REPsvc1`

18.3.3 Managing the Heartbeat Cluster Service

The heartbeat service is configured to start automatically at Run Level 3 and may be started and stopped and started manually. This service may be managed using **chkconfig(8)**. Use the **/sbin/service** command to stop/start/restart and check the status of the heartbeat service.

TYPE: `/sbin/service heartbeat start`

TYPE: `/sbin/service heartbeat stop`

TYPE: `/sbin/service heartbeat restart`

TYPE: `/sbin/service heartbeat status`

18.3.4 EDEX/IPVS, LDM Failovers

EDEX runs on dx3 and dx4. There is no “failover” as it is managed as a cluster. Both machines can accomplish all the tasks. If one machine goes down, then the other has to handle the full load, whereas otherwise they share the load. EDEX mostly communicates with qpid by reading messages off of it. However, it also receives connections from CAVE. This is where IPVS comes in. IPVS monitors the EDEX cluster, and “serves” connections to it. This means that CAVE connections are routed through IPVS onto one of the EDEX servers. If one of the servers, dx3 or dx4, is down, then IPVS would route all the connections to the only available node in the cluster. If they are both up, then it will try to keep an equal number of connections to each, to balance the load.

The EDEX and IPVS are managed through System V init scripts, for example, service edex_camel start for EDEX and service pulse start for IPVS. IPVS currently runs on CPs.

LDM is managed through heartbeat. Heartbeat manages the /data_store mount and nfs export to the rest of the platform. It will also start and stop the ldm feed. By default it runs on dx2f.

18.4 AWIPS II to AWIPS I Fallback

AWIPS II is designed to co-exist with the AWIPS I software that it is replacing. This includes the capability to switch between AWIPS I operation and AWIPS II operation. The intent is to allow a site – Weather Forecast Office (WFO), River Forecast Center (RFC), etc. – to revert to AWIPS I operation if significant problems occur in the operation of the AWIPS II software.

Note: The fallback should not be attempted without appropriate approval and this is intended only to a qualified ESA or ITO who initially installed the AWIPS II system and currently manages the AWIPS II software to run on AWIPS I.

Many of the operations required to switch between AWIPS I and AWIPS II operation are controlled by a single script: *rehost_awips.sh*. *rehost_awips.sh* is part of the AWIPS II installation package.

AWIPS II-to-AWIPS I fallback consists of a series of operations that back up the AWIPS II databases, switch from AWIPS II to AWIPS I operation, and import the previously backed-up AWIPS II databases. Scripts are provided for the first two steps; a manual procedure is provided for the third step.

The process of switching from AWIPS I to AWIPS II consists of a series of operations that back up the AWIPS I databases, switch from AWIPS I to AWIPS II operation, and import the previously backed-up AWIPS I databases. Scripts are provided for the first two steps; a manual procedure is provided for the third step.

18.4.1 AWIPS I/AWIPS II Co-existence

The AWIPS II software is designed to co-exist¹ with the existing AWIPS I software. This co-existence is intended to minimize the impact to operations during the initial installation of the AWIPS II software, and allow the AWIPS II software installation and much of the initial setup to be performed while the existing – AWIPS I – software is in operation.

This design also provides a mechanism for reverting the system to AWIPS I operation if significant problems are encountered following the AWIPS II installation.

This installation design relies on three factors:

1. The AWIPS II software is installed into a separate file system, generally located at /awips2 on the affected servers and workstations.
2. A switchover script, *rehost_awips.sh*, is provided as part of the AWIPS II installation package. This script provides semi-automated switching between AWIPS I and AWIPS II operations.

¹ “Co-exist” means that both software packages can be installed on the same system. Only one package can be used at a time, however.

3. When similar functionality exists between AWIPS I and AWIPS II, soft links using the AWIPS I names are used to point the user to the correct executable for the current operational mode (AWIPS I or AWIPS II).

Prior to installation, the AWIPS II installation package should be staged on a network-accessible file system. The location of the staging area is referred to in this module as <**AWIPS2_INSTALL_DIR**>.

It is important to realize, however, that while both AWIPS I and AWIPS II can be installed, only one of the software packages may be in operation at any one time.

Note: In the remainder of this chapter, the operational modes are referred to as follows:

- *AWIPS I operational mode* means that the system is running AWIPS I software. This may also be referenced as *AWIPS I mode*.
- *AWIPS II operational mode* means that the system is running AWIPS II software and rehosted applications. This may also be referenced as *AWIPS II*.

It is also important to recognize that AWIPS II stores much of its data differently from AWIPS I, using PostgreSQL databases and HDF5 files where AWIPS I used NetCDF files.

18.4.2 Swapping Procedures

In the event that your site needs to swap operations from AWIPS I to AWIPS II mode, the latest procedures will be sent to your office by the appropriate NWS or NCF personnel.

The procedures boil down to a few general steps:

1. Backing up the postgres database and vtec information.
2. Running the rehost script to swap operations to the other mode.
3. Importing the databases and vtec information.
4. Verifying the new operations.

**** CAUTION ****

Swapping operational modes from AWIPS II to AWIPS I requires that all server software be shut down. As a result, all client software must also be shut down during the swap.

18.4.3 Limitations on System Swapping

When swapping between AWIPS I mode and AWIPS II mode, certain limitations must be considered.

1. The actual swap requires approximately an hour. Much of this time is devoted to exporting and importing the common databases, and running the swap script. During most of the switchover, no data is being ingested.
2. AWIPS II stores much of its decoded data in a different format than AWIPS I. As a result, there is no practical way to import much of the decoded data from AWIPS I into AWIPS II and vice versa.
3. Even though both AWIPS I and AWIPS II use the text database fxatext, the table structure differs. As a result, there is no practical way to import decoded text from AWIPS I into AWIPS II and vice versa.

Following the swap between AWIPS I and AWIPS II, standard data recovery procedures can be used to backfill missing data. In most cases, there will be a delay in data availability as new data is being ingested.

Chapter 19

System Backup and Recovery Procedures

Chapter 19. System Backup and Recovery Procedures

Table of Contents

	<i>Page</i>
19.0 Introduction to System Backup and Recovery Procedures.....	1
19.1 DX NAS Backups	1
19.2 Other Backups.....	2
19.2.1 NAS Weekly Backup Strategy.....	2
19.3 REP/NS1 Backup (RFCs Only)	3
19.4 Recovery Procedures	3
19.4.1 Volume Table.....	3
19.4.2 How To Recover a Single File.....	4
19.4.3 How to Recover an Entire Volume	5
19.4.4 How to Recover an Entire Volume to a Temporary Location	5
19.4.5 Other Helpful Commands	6

List of Tables

Table 19.2-1. DX NAS Directories for Backup.....	2
--	---

19.0 Introduction to System Backup and Recovery Procedures

Backups include a mix of cron-generated backups and snapshots that are taken using Linux system utilities. Backups should be transparent to the sites except that sites will need to swap out some tapes on a weekly basis. Because sites may occasionally want to keep a tape, it is recommended that the sites have more than two tapes on hand so that tapes are still available for rotation even when a site wants to keep a tape.

19.1 DX NAS Backups

The weekly Network Attached Storage (NAS) backup is controlled by a root cron on the Archive Server (AX). This weekly backup (*nas_backup_weekly*) executes Mondays at 0310Z and backs up NAS volumes to an external tape drive connected to the AX. The weekly backup dumps all of the file systems created on the NAS to tape (i.e., the entire NAS). Another cron launches a daily backup (*nas_backup_daily*) at 0210Z and merely creates a tar archive file in /data/fxa/DAILY_BACKUP. This cron runs in conjunction with the a2dx1apps package. Tapes used for the weekly backups should be rotated on a weekly basis, and it is recommended that sites purchase additional blank tapes so they can keep a tape (i.e., move it out of the rotation) if needed or desired.

Checkpoint Backups

Checkpoints occur weekly at 0000Z. The system preserves four weekly snapshots.

NOTE: With the introduction of the Sun StorageTek 5320, nightly checkpoints are also taken.

Snapshot is enabled for the following file systems:

1. /home
2. /awips/adapt
3. /awips/gis
4. /awips/dev
5. /data/local
6. aiidata

aiidata is a directory on the NAS. It is located at nas1:/aiidata. Various systems have mounts to all or part of aiidata. Generally, these mounts are at /awips2/edex/data or a subdirectory. On DX3/4, nas1:/aiidata is mounted at /awips2/edex/data. On PX1/2, nas1:/aiidata is mounted on /awips2/edex/data. On the LX and XT workstations, nas1:/aiidata/share is mounted on /awips2/edex/data/share.

NOTE: The /data/local snapshot should be monitored for dynamic “live” data.

Checkpoints should not be done on partitions with a lot of dynamic files activity, such as **/data/fxa**. The **/awips/hydroapps** file system could not be included in the snapshot strategy either, due to the mix of static and dynamic data within the same file system.

19.2 Other Backups

A daily online backup will **tar** key directories that are not within the partitions that have checkpoints configured. The results are saved in the **/data/fxa/DAILY_BACKUP** directory.

Table 19.2-1 lists the directories that are backed up by the NAS daily backup, including the **/awips/hydroapps** file system backups. You can view the daily NAS daily backup log at `/data/logs/daily_backup.log` on the server that currently hosts the dx1apps package.

Table 19.2-1. /data/fxa Directories for Backup

/data/fxa/archive
/data/fxa/customFiles
/data/fxa/rps-lists
/data/fxa/scripts
/data/fxa/siteConfig
/data/fxa/userPrefs
/data/fxa/workFiles
/awips/hydroapps Files/ Directories for OHD-related Backup
/awips/hydroapps/.Apps_defaults*
/awips/hydroapps/lx/geo_data
/awips/hydroapps/precip_proc/local/data/app
/awips/hydroapps/whfs/local/data/app
/awips/hydroapps/whfs/local/data/geo
/awips/hydroapps/set_hydro_env
/awips/hydroapps/lx/rfc/idma/images
/awips/hydroapps/lx/rfc/nwsrfs/ens/app-defaults
/awips/hydroapps/lx/rfc/nwsrfs/icp/app-defaults
/awips/hydroapps/lx/rfc/nwsrfs/ifp/app-defaults
/awips/hydroapps/lx/rfc/nwsrfs/ifp/help_files
/awips/hydroapps/lx/rfc/nwsrfs/ifp/options
/awips/hydroapps/lx/rfc/xdat/parameters
/awips/hydroapps/lx/rfc/xnav/parameters
/awips/hydroapps/lx/rfc/xsets/files

19.2.1 NAS Weekly Backup Strategy

A cron is initiated from the Archive Server (AX) on a weekly basis which performs a backup to tape of all NAS volumes. The LTO-II tape drive is hooked to the Archive Server via an external SCSI cable.

The `/awips/ops/bin/nas_weekly_backup` script performs the work of the backup. This script was modified for the deployment of the StorageTek NAS to run only from the AX and utilizes the tar command to write the entire contents of the NAS to tape. Each NAS

share (or file volume) will reside on one tape “file.” A tape file is merely a pointer to the start of a new data set. To eliminate the problems with backing up a live file system, a temporary checkpoint is created for each file volume prior to the backup and used for creating the backup. This checkpoint is then removed at the end of the backup.

The script will automatically rewind and eject the tape at the end of each backup. Sites are responsible for rotating tapes when they arrive *at the office Monday morning*.

19.3 REP/NS1 Backup (RFCs Only)

No script was provided to the RFCs to back up their LTO-II. However, the following checkpoints are taken of the **/awips/rep** file system:

- **Nightly.** Once a day at 0000Z for 7 days (then tapes should be rotated or the tape will be overwritten)
- **Weekly.** Once a week at 0000Z for 4 weeks (then tapes should be rotated or the tape will be overwritten).

These snapshots are conservative and may not be possible at some RFCs. Because River Ensemble Processor (REP) requirements do not state how the device is to be used, the snapshots may need to be adjusted on a per-site basis depending on file system usage. Sites with very dynamic data sets will need to reduce the frequency or quantity of snapshots.

NOTE: This backup strategy will not change with the replacement of the NetApp FAS250, except that the snapshots will be named checkpoints.

19.4 Recovery Procedures

19.4.1 Volume Table

In order to recover a file or an entire volume, you must consult the following table:

Volume No.	Volume
0	dataGFE
1	dataX400
2	awipsADAPT
3	DSshared
4	dataADAPT
5	awipsGIS
6	awipsDEV
7	awipsHOME
8	dataLOCAL
9	awipsHYDRO

Volume No.	Volume
10	awipsGFESuit
11	dataFXA
12	aiidata
13	GFESuite2
14	qpид
15	localapps

This table is derived from a variable called 'arBackupList' in this file:

```
ax:/awips/ops/bin/nas_backup_weekly
```

19.4.2 How To Recover a Single File

Assume that you need to recover this file:

```
/data/fxa/engDict
```

The six steps required to recover the file follow.

1. Log onto AX as the root user

```
ssh root@ax
```

2. Identify the filesystem upon which the file is located.

The volume on which the file must be located. To do this, type the following commands:

```
cd /data/fxa
df -h .
```

You will see this output:

Filesystem	Size	Avail	Use%	Mounted on
nas1:/vol/data_fxa	65G	53G	15G	81% /data/fxa

This output tells us that the file to be recovered (engDict) is located on the dataFXA volume. Consulting the Volume Table, we see that dataFXA is volume number 11.

3. Eject the tape and place a tape in that you know contains the file you need to recover.
4. Rewind the tape to the beginning (commands issued from the AX as user root):

```
mt -f nst0 rewind
```

5. Forward the tape to the beginning of volume 11 (dataFXA):

```
mt -f nst0 fsf 11"
```

6. Restore the file:

```
tar -xzvf /dev/nst0 -C /data/fixa engDict
```

This completes the steps required to recover the file.

19.4.3 How to Recover an Entire Volume

This procedure will restore an entire volume, overwriting all files with data from the backup tape. If you do not wish to overwrite all of your data, skip to the next section (19.4.4, “How to Recover an Entire Volume to a Temporary Location”).

1. Identify the volume you would like to restore.

[In this example, we will restore volume 6 (awipsDEV), which is mounted on /awips/dev.]

2. Insert a tape into the backup tape drive that contains the volume you would like to restore.
3. Rewind the tape to the beginning (commands issued from the AX as user root).

```
mt -f nst0 rewind
```

4. Forward to the beginning of volume 6 (awipsDEV).

```
mt -f nst0 fsf 6
```

5. Type the following command to restore the files in this volume.

```
tar -xzvf /dev/nst0a -C /awips/dev
```

19.4.4 How to Recover an Entire Volume to a Temporary Location

This procedure will copy an entire volume from backup tape to a temporary location on disk. This is useful if you need to choose an array of files to restore without overwriting existing data.

1. Identify the volume to restore. In this example we will restore to a temporary location the dataLOCALvolume (volume number 8).
2. Identify the size of the volume you need to restore.

```
df -h /data/local
```

You should see output similar to this:

Filesystem	Size	used	Avail	Use%	Mounted on
nas1:/vol/data/local	8.2G	1.7G	6.5G	21%	/data/local

There is no way to tell how large the volume is on the tape device, so we have to assume that the size of the data on tape is relatively the same as the size existing on disk (after all, it is a backup). So, because the "Use%" is less than 50%, this

allows us to assume that we have enough space to make a complete copy of the backup tape's data_local volume inside /data/local.

3. Create a temporary directory to hold our restored files on /data/local

```
cd /data/local
mkdir RESTORED
```

4. Log into the AX as user root

```
ssh root@ax
```

5. Rewind the tape.

```
mt -f nst0 rewind
```

6. Step the tape forward to our desired volume (volume 8, dataLOCAL).

```
mt -f nst0 fsf 8
```

7. Restore the files to our RESTORED directory

```
tar -xzvf /dev/nst0 -C /data/local/RESTORED
```

Note: Suppose there is not enough space to put your RESTORED directory in /data/local/ ... You could restore the data_local volume to //data/fxa/RESTORED if there is enough space in the dataFXA volume.

19.4.5 Other Helpful Commands

The status command tells you what volume and block you are currently located at. You always need to be at block 0 of the volume you are concerned with (e.g., volume 9 block 0). If you are not, you need to rewind the tape and step it forward to the volume point before restoring.

The status command is:

```
ssh ax "mt -f nst0 status"
```

If you are not sure if the file you need is on the volume, you can list them using tar -tzf /dev/nst0

```
tar -tzf /dev/nst0 engDict
```

The preceding command will list the file if it is present or tell you that it is not found.

Use this command to retrieve a list of ALL the files in the backup volume:

```
tar -tzf /dev/nst0
```

Chapter 20

System Console

Chapter 20. System Console

List of Tables

	<i>Page</i>
Table 20-1. ATS1 Port and Logical Port Assignments	3
Table 20-2. ATS2 Port and Logical Port Assignments	4
Table 20-3. LTS1 Port and Logical Port Assignments	5

The Cyclades terminal server connects the console ports for the site hardware to the system console and the server private LAN. These connections provide the Monitor and Control console functionality either via the system console or via a private LAN Telnet session. The Cyclades terminal server provides the NCF remote system console functionality via Cyclades modem connections, private LAN Telnet sessions, or the WAN.

The local system console is an HP Thin Client, and can be used to monitor either the AWIPS or LDAD systems by switching to the A or B position of the A/B switch box.

- There is one Cyclades (two at an RFC) for AWIPS and one Cyclades for LDAD. The system console (HP Thin Client) can be directed to either Cyclades, via an A/B switch box.
- To access either Terminal Server, you must first log into the Thin Client and then double-click on the ‘TeemTalk’ icon on the desktop to open the terminal emulating application.
- If an AWIPS or LDAD connection cannot be established, at the Terminal Server’s shell prompt, as root, issue the following:

```
ps -ef |grep [#####]
```

(where ‘#####’ is the logical port number of the inaccessible device)

```
kill -9 [pid]
```

(where ‘pid’ is the process ID of the session accessing the device).

- Console access to the devices can be acquired from a menu or directly by telnet/ssh, if the logical port number is known.

To view a list of devices from a menu:

On AWIPS Terminal Server 1/2 (ATS1/2), issue the following:

```
ts_menu
```

On LDAD Terminal Server 1 (LTS1), issue the following:

```
menush
```

To access a device directly using the logical port number,

```
telnet ats1 7001      or      ssh ats1 7001
```

Refer to Section 20.0-1 for the output of ‘ts_menu’ on ATS1.

Refer to Section 20.0-1 for the output of ‘menush’ on LTS1.

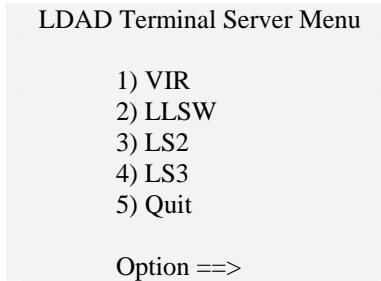
The Cyclades terminal server is used to access all the server and workstation console ports in the beginning and at the end of the process. Additionally, miscellaneous devices connect through the Cyclades including the switches, routers, Terminal Interface Unit (TIU), VIR, and CPSBNs.

The AWIPS Cyclades ATS1 menu follows.

1 DX1	2 DX2	3 DX3	4 DX4
5 PX1	6 PX2	7 AX	8 NAS
9 02-b6-65P9	10 02-b6-65P10	11 PSW	12 DMZ
13 ROUTER1	14 ROUTER2	15 HSW1	16 HSW2
17 FW1	18 FW2	19 VIR	20 ADTRAN1
21 LX1	22 LX2	23 LX3	24 LX4
25 LX5	26 02-b6-65P26	27 02-b6-65P27	28 02-b6-65P28
29 02-b6-65P29	30 02-b6-65P30	31 XT1	32 XT2
33 XT3	34 XT4	35 XT5	36 02-b6-65P36
37 CPSBN	38 CPSBN2	39 M&C_modem	40 DX1-DAS
41 DX2-DAS	42 02-b6-65P42	43 02-b6-65P43	44 02-b6-65P44
45 02-b6-65P45	46 02-b6-65P46	47 OPEN	48 OPEN

Type 'q' to quit, a valid option[1-48], or anything else to refresh.

The LDAD Cyclades LTS1 menu follows.



Note that Cyclades does not have a “Login Screen.” Instead, it has just a plain text prompt asking for a username and password as shown below.

ats1 login:

Password:

From the Cyclades Terminal Server, issue the following key sequence to disconnect from a console connection,

Ctrl-]

Then type ‘e’ to exit and then ‘q’ to quit the ts_menu. If accessed directly to the logical port number, ‘Ctrl-]’ will disconnect the session and return you to the terminal server shell prompt.

Routers can be directly accessed only through the terminal server from RFC and stand-alone WFO systems.

ATS1 Port and Logical Port Assignments for ATS1 follow in Table 20-1.

Table 20-1. ATS1 Port and Logical Port Assignments

Device Name	Port Num	Logical Port
DX1	1	7001
DX2	2	7002
DX3	3	7003
DX4	4	7004
PX1	5	7005
PX2	6	7006
AX	7	7007
NAS1	8	7008
OPEN	9	7009
OPEN	10	7010
PSW	11	7011
DMZ	12	7012
RTR1	13	7013
RTR2	14	7014
HSW1	15	7015
HSW2	16	7016
FW1	17	7017
FW2	18	7018
VIR	19	7019
TIU	20	7020
LX1	21	7021
LX2	22	7022
LX3	23	7023
LX4	24	7024
LX5	25	7025
LX6	26	7026
OPEN	27	7027
OPEN	28	7028
OPEN	29	7029
OPEN	30	7030
XT1	31	7031
XT2	32	7032
XT3	33	7033
XT4	34	7034
XT5	35	7035
XT6	36	7036
CPSBN1	37	7037
CPSBN2	38	7038
M&C	39	7039
DX1-DAS	40	7040
DX2-DAS	41	7041
RTR3*	42	7042
PX3**	43	7043

Device Name	Port Num	Logical Port
PX4**	44	7044
OPEN	45	7045
OPEN	46	7046
OPEN	47	7047
OPEN	48	7048
* ACR – Router3		** AFC – PX3/PX4

ATS2 Port and Logical Port Assignments for ATS1 follow in Table 20-2.

Table 20-2. ATS2 Port and Logical Port Assignments

Device Name	Port Num	Logical Port
OPEN	1	7001
OPEN	2	7002
OPEN	3	7003
OPEN	4	7004
OPEN	5	7005
OPEN	6	7006
OPEN	7	7007
RP1	8	7008
RP2	9	7009
GSW1	10	7010
GSW1	11	7011
NS1	12	7012
OPEN	13	7013
OPEN	14	7014
OPEN	15	7015
TIU-2	16	7016
TIU-3	17	7017
TIU-4	18	7018
OPEN	19	7019
OPEN	20	7020
LX7	21	7021
LX8	22	7022
LX9	23	7023
LXA	24	7024
LXB	25	7025
LXC	26	7026
LXD	27	7027
OPEN	28	7028
OPEN	29	7029
OPEN	30	7030
XT7	31	7031
XT8	32	7032
XT9	33	7033

Device Name	Port Num	Logical Port
XTA	34	7034
XTB	35	7035
XTC	36	7036
XTD	37	7037
OPEN	38	7038
OPEN	39	7039
OPEN	40	7040
OPEN	41	7041
OPEN	42	7042
OPEN	43	7043
OPEN	44	7044
OPEN	45	7045
OPEN	46	7046
OPEN	47	7047
OPEN	48	7048

LTS1 Port and Logical Port Assignments for ATS1 follow in Table 20-3.

Table 20-3. LTS1 Port and Logical Port Assignments

Device / Interface Type	Port Num	Logical Port
7e1out	1	7001
8n1out	2	7002
pppInteractive	3	RRS IP Address
pppInteractive	4	RRS IP Address
csportd	5	2500
pppInteractive	6	RRS IP Address
csportd	7	2700
csportd	8	2800
csportd	9	2900
csportd	10	3000
csportd	11	3100
csportd	12	3200
csportd	13	3300
csportd	14	3400
csportd	15	3500
csportd	16	3600
csportd	17	3700
csportd	18	3800
csportd	19	3900
csportd	20	4000
csportd	21	4100
csportd	22	4200
csportd	23	4300

Device / Interface Type	Port Num	Logical Port
csportd	24	4400
csportd	25	4500
csportd	26	4600
csportd	27	4700
VIR	28	
LLSW	29	
FAX	30	5000
LS2	31	7031
LS3	32	7032

Chapter 21

System Shutdown and Startup

Procedures

Chapter 21. System Shutdown and Startup Procedures

Table of Contents

	<i>Page</i>
21.0 System Shutdown and Startup Procedures	1
21.1 System Shutdown Procedures.....	1
21.2 AWIPS II System Startup Procedures	8
21.3 Verification of System Startup While Running AWIPS II Configuration	12
21.4 AWIPS II Checklist	17

21.0 System Shutdown and Startup Procedures

As with all complex computer systems, a prescribed order of steps must be completed to shut down or restart AWIPS. It is necessary to follow this process in order to preserve the integrity of the data files and the safe termination of any hung or running processes.

A complete reboot of the system is not usually required, but if it is, the system manager must perform the AWIPS shutdown and restart.

This chapter includes shutdown and startup procedures for AWIPS II configuration only.

As noted in Chapter 2, AWIPS II System Architecture, some dependencies exist within the AWIPS II systems. These dependencies dictate the best order for shutting down software and hardware, and are briefly described here:

- The HDF5 repository and postgreSQL persistence are served over a block-based Fibre Channel (FC) protocol implemented currently via the Direct Attached Storage (DAS) at WFOs and RFCs connected via FC to DX1 and DX2. At NCEP centers the same is achieved via the NetApp filer device.
- Data ingest processes such as the AWIPS Local Data Manager (Downstream) (LDM(D)), Radar Configuration Manager (RCM), and Local Data Acquisition and Dissemination (LDAD) rehosted applications write raw data into the /data_store mount, which is also a block-based FC implementation served via a Network File System (NFS) from DX2f to other devices on the AWIPS LAN.
- Environmental Data Exchange (EDEX) reads and processes raw data files from the /data_store mount.
- EDEX is dependent on both Queue Processor Interface Daemon (QPID) and the postgreSQL database engine running before it starts.
- AWIPS II site data configuration and localization files are stored on an NFS protocol mount physically hosted on the NAS device.

NOTE: You must be logged in as root to perform system shutdown and startup. Please notify the Network Control Facility at 301.713.9344 before shutting down any part of the system. This will minimize any miscommunication when the NCF begins getting ITO alarms.

21.1 System Shutdown Procedures

If a user is already logged into an LX or XT workstation (i.e., an X-session is running) go to the KMenu (the KMenu is indicated by the RedHat “shadow man” icon on the bottom of the panel) and left-click and select Logout. When the logout menu appears, select TURN OFF COMPUTER. If the workstation is at a GDM login prompt, select Actions from the GDM menu and Shut Down. When prompted to choose Cancel or Shut Down, select Shut Down. If you want to use a command line (manual) shutdown, then log in to a

workstation as user root. Open a Terminal window. On each workstation LX, and XT,

- TYPE:** `shutdown -h 0`
- The workstations will power off automatically once the shutdown is complete; this is indicated by the LED either above or back-lighting the power-supply switch (located on the front of the workstation chassis) turning dark.
 - Power off the LX, XT, and monitors when the monitor displays all black.

Complete the following steps to perform an orderly shutdown of an AWIPS II system

1. [RFC Only] – Shut down rp2apps.

ssh rp2f hostname

Use return hostname in the following command.

Enter: **ssh << hostname >>**

Enter: **hb_halt rp2apps**

2. [RFC Only] – Shut down rp1apps.

ssh rp1f hostname

Use return hostname in the following command.

Enter: **ssh << hostname >>**

Enter: **hb_halt rp1apps**

3. [RFC Only] – Shut down RP1 and RP2.

Enter: **ssh rp2**

Enter: **shutdown -h now && exit**

Enter: **ssh rp1**

Enter: **shutdown -h now && exit**

4. Log in and shut down the AX.

Enter: **ssh ax**

Enter: **service postgresql stop** [RFC Only]

Enter: **shutdown -h now && exit**

5. Stop a2px2apps.

The a2px2apps runs peripheral system-level and LDAD application software. The LDAD software in particular is dependent upon having QPID running and the /data_store mount read/write accessible. The EDEX manual endpoint /awips2/edex/data/manual is also a prerequisite for the functionality of the

applications managed by the resource group a2px2apps. Other than LDAD external processes, no other system-wide dependencies exist **on** the a2px2apps running.

Enter: **ssh px2f hostname**

Get the hostname from the previous step and use in the next step.

Enter: **ssh <hostname>**

Enter: **hb_halt a2px2apps**

Enter:

hb_stat [Ensure the package has stopped]

Enter: **exit** [Back to dx1 shell]

6. Stop a2px1apps.

The a2px1apps also runs peripheral system-level processes as well as rehosted application software such as MSAS, LAPS, and FSI. The rehosted software in particular is dependent upon having QPID running and the /data_store mount read/write accessible. The EDEX manual endpoint /awips2/edex/data/manual is also a prerequisite for functionality of the applications managed by the resource group a2px1apps. Other than the rehosted processes, no other system-wide dependencies exist **on** the a2px1apps running.

Enter: **ssh px1f hostname**

Get the hostname from the previous step and use in the next step.

Enter: **ssh <hostname>**

Enter: **hb_halt a2px1apps**

Enter: **hb_stat** [Ensure the package has stopped]

Enter: **exit** [Back to dx1 shell]

7. Shut down LS2 and LS3 servers.

Because the LDAD Server (LS) software is only dependent on the a2px2apps package, we can safely shut these down, now that the Linux Preprocessor (PX) server software has been shut down.

Enter: **ssh ls3**

Enter: **shutdown -h now && exit**

(This will stop all software.)

Connect to the LS2 via ssh and shut down the server.

Enter: **ssh ls2**

Enter: **shutdown -h now && exit**

(This will stop all software.)

8. Stop EDEX on dx4 (and dx5, dx6 at NCEP Centers)

Enter: **ssh dx4**

Enter: **service edex_camel stop**

Enter: **ps -fu awips**

[Ensure processes are no longer running]

Enter: **exit**

[Return to dx1 shell]

9. Stop EDEX on dx3

Enter: **ssh dx3**

Enter: **service edex_camel stop**

Enter: **ps -fu awips**

[Ensure processes are no longer running]

Enter: **exit**

[Return to dx1 shell]

10. Stop RCM.

Enter: **ssh dx1f**

Enter: **service edex_rcm stop**

Enter: **ps -wef|grep rcm**

[Ensure process is no longer running]

Enter: **exit**

11. Stop a2dx2apps.

At this point it is safe to stop a2dx2apps because no other running process relies on the /data_store mount being present.

The /data_store mount is an NFS mount shared by the device running the a2dx2apps on all devices that mount the partition **except** the device running a2dx2apps. On that device, typically dx2, it is a block-device shared via FC protocol and physically hosted on the DAS or NetApp filer at NCEP Centers.

Enter: **ssh dx2f hostname**

Get the hostname from the previous step and use in the next step

Enter: **ssh <hostname>**

Enter: **hb_halt a2dx2apps**

Enter: **hb_stat**

[Ensure the package has stopped]

Enter: **exit**

12. Stop LDM (Upstream) on cpsbn1 and cpsbn2 and a2cp1apps on the host running the package.

Enter: **ssh cp1f hostname**

Use the return value from the above command in place of the word \$HOST below.

Enter: **ssh \$HOST**

Enter: **hb_halt a2cp1apps**

Enter: **hb_stat**

[Ensure the package has stopped]

Enter: **exit**

Enter: **ssh cpsbn1**

Enter: **service ldmcp stop**

Enter: **ps -fu ldm** [ensure the processes have stopped]

Enter: **exit**

Enter: **ssh cpsbn2**

Enter: **service ldmcp stop**

Enter: **ps -fu ldm** [ensure the processes have stopped]

Enter: **exit**

13. If this site has remote CPs (GUM, HFO, PBP and VRH), shut down qpid and pulse on px1.

Enter: **ssh px1**

Enter: **service pulse stop**

Enter: **ps -wef|grep pulse** [ensure the processes have stopped]

Enter: **service qpid stop**

Enter: **ps -fu awips** [ensure the processes have stopped]

14. Stop a2dx1apps.

Nothing left running relies on the PostgreSQL database engine running, so it is safe to stop all software running with the package.

Enter: **ssh dx1f hostname**

Get the hostname from the previous step and use it in the next step.

Enter: **ssh <hostname>**

Enter: **hb_halt a2dx1apps**

Enter: **hb_stat** [Ensure the package has stopped]

Enter: **exit**

15. Shut down CPSBN1, CPSBN2, DX1, DX2, DX3, DX4, PX1, PX2.

Connect to cpsbn2 via the System Console

Enter: **shutdown -h now**

Connect to cpsbn1 via the System Console

Enter: **shutdown -h now**

Connect to px2 via the System Console

Enter: **shutdown -h now**

Connect to px1 via the System Console

Enter: **shutdown -h now**

Connect to dx4 via the System Console

Enter: **shutdown -h now**

Connect to dx3 via the System Console

Enter: **shutdown -h now**

Connect to dx2 via the System Console

Enter: **shutdown -h now**

Connect to dx1 via the System Console

Enter: **shutdown -h now**

At NCEP Centers, also shut down the DX5 but keep the DX6 up until Step 16 is completed.

16. Shut down NAS.

Connect to the nas via the System Console

Enter: **halt -f**

NCEP Centers ONLY:

Connect via a shell originated on DX6, which was left up in the previous step, e.g., use the console server to connect to DX6 and login as root. Issue the following commands from the connection.

From a shell prompt on DX6 issue:

Enter: **umount -t nfs**

Once a command prompt returns:

Enter: **ssh nas1**

Enter: **halt -f 0**

At this point, shut down the clustered controller partner **nas2**:

Enter: **ssh nas2** (after exiting back to a DX6 shell prompt)

Enter: **halt -f 0**

Note that the ‘-f’ flag prevents failover of the clustered resources from nas1/nas2.

Now it is safe to shut down the DX6 from the console connection issue **shutdown -h 0**

17. Shut down DAS through the system console. **Note:** This must be done by completing the dx2-das head first, followed by the dx1-das.

Enter: **halt -f**

NCEP Centers: The NCEP Centers do not have a separate DAS device; the DAS/NAS functionality at a WFO/RFC is combined into the NetApp filer.

18. Power off the printers.

19. Verify that power has been shut down to the racks and the following devices:

- All 4-port hubs (Phubs) and 5-port switches
- All HP 24-port switches
- All VIR communication switch panels
- Modem nest
- Routers
- Terminal Server
- ADTRAN
- Channel Service Unit / Digital Service Unit (CSU/DSU)
- System console
- Plaintree LAN switches
- Power Strips
- DVB receivers
- Direct-Attached Storage (DAS)

Note: The following steps are included here as a quick reference for the Linux Workstation and X-Terminal Manual Shutdown and Startup.

1. On the middle screen of the three-headed Linux workstation, click on the **RedHat “shadowman”** icon on the tool bar.

2 **Select: Logout**

3. After the windows have closed and you are logged out, on the GDM login GUI:

Select: Actions
Select: Shut Down

4. Select **Y** when prompted about whether you want to halt the workstation.

NOTE: The Linux workstation will take several minutes to halt. You can follow its shutdown on the Cyclades Terminal Server.

5. The workstation should power itself off unless a problem is encountered. If it does not power off, hold down the power button until the power light goes out. (The network activity light will stay on.) Wait a moment, and then power the CPU on again.

When the GDM login screen displays, the workstation is ready for use.

21.2 AWIPS II System Startup Procedures

Complete the following steps to perform an orderly startup of an AWIPS II system.

1. Verify that power has been applied to the racks and the following devices:
 - All 4-port hubs (Phubs) and 5-port switches
 - All HP 24-port switches
 - All VIR communication switch panels
 - Modem nest
 - Routers
 - Terminal server
 - ADTRAN
 - CSU/DSU
 - System console
 - Power Strips
 - DVB receivers
 - Direct-Attached Storage (DAS)
2. Verify that the following conditions are met before proceeding:
 - NAS is powered on and up.
 - All switch settings on each VIR communication switch panel are powered on and set to A.
3. Power on the HP Thin Client (if it is not already powered on) and login as user root.
4. On the HP Thin Client, if no menu is displayed while being logged into ATS1/2, enter **ts_menu** to get the ATS menu prompt.
5. Power (or cycle power) to ETO tape drive and FCBR fiber bridge.
6. Power on the DAS (NetApp FAS2020c direct-attached storage device).
NCEP ONLY: Power up the NAS1/2 (FAS3160A) NetApp Filer
7. Power on the CPs (CPSBNs).
 - a. Verify that the CPSBN1 is accessible.

TYPE: `ssh cpsbn1-<siteID>`
▪ Where <siteID> is the site identifier

TYPE: `exit`

- b. Verify that the CPSBN2 is accessible.

TYPE: `ssh cpsbn2-<siteID>`
▪ Where <siteID> is the site identifier

TYPE: `exit`

8. Power on DX1.

9. Ensure the DX1 server boots, and starts the a2dx1apps package.

Connect to the dx1 via the System Console and log in as root once booted

Enter: `hb_stat`

If the package is NOT running, perform the following two steps:

Enter: `hb_run a2dx1apps`

Enter: `hb_stat` [Check for package run]

10. If not already running, start LDM, pulse, and QPID on CPSBN1. Then verify that they are accessible and that software is running. This is necessary because most processes have a dependency on QPID, but the processes running on the CPSBN do not depend on any other process or mount to function properly.

Note: If site with remote CPs, then power up px1 at this time and start up pulse and qpid as indicated below.

Connect to cpsbn1 via the System Console

Check to see if a2cp1apps is running.

Enter: `hb_stat`

Enter: `tail -f /var/log/cluster`

If the package fails to start after a few minutes, force the package start.

Enter: `hb_run a2cp1apps`

Check to see if LDM(U) software is running

Enter: `ps -fu ldm`

If the processes are NOT running, perform the following two steps:

Enter: `service ldmcp start`

Enter: `ps -fu ldm` [check for processes]

Enter: **ps -fu awips**

If QPID is not running, then perform the following two steps:

Enter: **service qpidd start**

Enter: **ps -fu awips** [check for qpidd]

Enter: **ps -wef | grep pulse**

If IPVS (pulse) is not running perform following two steps:

Enter: **service pulse start**

Enter: **ps -wef | grep pulse**

Disconnect from cpsbn1

Log into CPSBN2 and check to see if the LDM(U) software is running. If it is not running, use the above command to start the software before exiting the ssh session.

Enter: **ssh cpsbn2**

Enter: **ps -fu ldm**

Enter: **ps -wef | grep dvbs | grep -v grep**

Enter: **exit**

11. Power on DX2 server.

12. Ensure the DX2 server boots, and starts the a2dx2apps package.

Connect to the dx2 via the System Console and log in as root once booted

Enter: **hb_stat**

If the package is NOT running, perform the following two steps:

Enter: **hb_run a2dx2apps**

Enter: **hb_stat** [Check for package run]

13. Power on the remaining servers (DX3, DX4, PX1, PX2, PX3, PX4, AX, LS3, LS2, RP1 and RP2). *At this point the rest of the dependencies are not as critical as having /data_store mounted and accessible and the PostgreSQL engine running.*

14. Check for EDEX and start on DX3 if it isn't already running.

Connect to the dx3 via the System Console and log in as root once booted

Enter: **ps -fu awips** [Make sure no processes are running]

Enter: **service edex_camel start**

Enter: `service edex_camel status` [Make sure all processes show running]

Enter: `ps -fu awips` [Ensure all processes are running]

15. Check for EDEX and start on DX4 if it isn't already running.

Connect to the dx4 via the System Console and log in as root once booted

Enter: `ps -fu awips` [Make sure no processes are running]

Enter: `service edex_camel start`

Enter: `service edex_camel status` [Make sure all processes show running]

Enter: `ps -fu awips` [Ensure all processes are running]

NCEP Only: Power up the DX5 and DX6 using the same steps used for the DX4 in Step 15.

16. Check for the a2px1apps package and start on PX1 if it isn't already running.

Connect to the px1 via the System Console and log in as root once booted

Enter: `df /data_store`

Enter: `hb_stat`

Look for the a2px1apps package running. If it is NOT running, issue the following two commands:

Enter: `hb_run a2px1apps`

Enter: `hb_stat` [Check for package running]

17. Check for the a2px2apps package and start on PX2 if it isn't already running.

Connect to the px2 via the System Console and log in as root once booted

Enter: `df /data_store`

Enter: `hb_stat`

Look for the a2px2apps package running. If it is NOT running, issue the following two commands:

Enter: `hb_run a2px2apps`

Enter: `hb_stat` [Check for package running]

21.3 Verification of System Startup While Running A WIPS II Configuration

IMPORTANT → Before continuing, ensure that all servers, workstations, and devices are powered-on and accessible via the network.

1. Verify that all HA packages are up and that a valid **Start Time** is reported via the **hb_stat** command.

An example of a typical output of the **hb_stat** command, on DX1 and DX2, follows.

```
Heartbeat Status Monitor          Oct 27 22:26:31
=====
===== M e m b e r   S t a t u s =====
=====
Member      Status    IP address
-----
dx1-tbdw    Up       165.92.29.131
dx2-tbdw    unknown  165.92.29.132
=====
===== S e r v i c e   S t a t u s =====
=====
Service    IPAddr     Cronfile   Owner    Start Time
-----
a2dx1apps  165.92.29.195 a2dx1cron,a2SIT dx1-tbdw  2011-07-11 20:21:50
a2dx2apps  165.92.29.196 a2dx2cron,a2SIT none     down
```

An example of a typical output of the **hb_stat** command, on DX3 and DX4, follows.

dx[3|4]-tbdw is not part of an heartbeat cluster

An example of a typical output of the **hb_stat** command, on PX1 and PX2, follows.

```
Heartbeat Status Monitor          Oct 27 22:28:52
=====
===== M e m b e r   S t a t u s =====
=====
Member      Status    IP address
-----
px1-tbdw    Up       165.92.29.137
px2-tbdw    unknown  165.92.29.138
=====
===== S e r v i c e   S t a t u s =====
=====
Service    IPAddr     Cronfile   Owner    Start Time
-----
a2px1apps  165.92.29.193 a2px1cron,a2SIT px1-tbdw  2011-10-13 17:40:47
a2px2apps  165.92.29.194 a2px2cron,a2SIT none     down
```

2. Verify that the pertinent mounts are present.

When running in AWIPS II configuration, the AWIPS I NFS and local mounts will still be active on all nodes at all times. In addition to those AWIPS I mounts, the following AWIPS II-specific mounts should be present.

- On **PX2**:
 - /dev/mapper/vg00-lvol_awips2 → /awips2
 - nas1: /aiidata -> /awips2/edex/data
 - nas1: /GFESuite2 -> /awips2/GFESuite
 - dx2f:/data_store /data_store
- On **PX1**:
 - /dev/mapper/vg00-lvol_awips2 → /awips2
 - nas1: /aiidata -> /awips2/edex/data
 - nas1:/GFESuite2 → /awips2/GFESuite
 - dx2f:/data_store /data_store
- On **DX1**:
 - /dev/mapper/vg00-lvol_awips2 → /awips2
 - /dev/mapper/vg_aiidb-awipsiadb -> /awips2/data
 - /dev/mapper/vg_anihdf5-awipsiihdf5 -> /awips2/edex/data/hdf5
 - nas1:/aiidata/utility -> /awips2/edex/data/utility
 - nas1:/GFESuite2 → /awips2/GFESuite
 - dx2:/data_store /data_store
- On **DX2**:
 - /dev/mapper/vg00-lvol_awips2 → /awips2
 - /dev/mapper/vg_aiildm-awipsiildm → /data_store
 - nas1:/aiidata/utility -> /awips2/edex/data/utility
 - nas1:/GFESuite2 → /awips2/GFESuite
- On **DX3** and **DX4**:
 - /dev/mapper/vg00-lvol_awips2 → /awips2
 - nas1:/aiidata → /awips2/edex/data
 - dx2f:/data_store /data_store

3. Check for running processes.

- On **DX3** and **DX4** issue the following command:

```
TYPE: ps -ef | grep edex | cut -d "-" -f1,2 | grep -v grep
```

awips	6639	7211	0 22:43 ?	00:00:00	/bin/ksh /awips2/edex/data/share/hydroapps/precip_proc/bin/start_hpe
awips	7138	1	0 19:14 ?	00:00:00	/bin/bash /awips2/edex/bin/start.sh -noConsole
awips	7196	7138	0 19:14 ?	00:00:00	/awips2/edex/bin/linux-x86
awips	7211	7196	61 19:14 ?	02:08:40	/awips2/java/bin/java -Dedex.run.mode=ingest
awips	7251	1	0 19:14 ?	00:00:00	/bin/bash /awips2/edex/bin/start.sh -noConsole

awips	7309	7251	0 19:14 ?	00:00:00 /awips2/edex/bin/linux-x86
awips	7311	7309	0 19:14 ?	00:01:51 /awips2/java/bin/java -Dedex.run.mode=ingestGrib
awips	7353	1	0 19:14 ?	00:00:00 /bin/bash /awips2/edex/bin/start.sh -noConsole
awips	7411	7353	0 19:14 ?	00:00:00 /awips2/edex/bin/linux-x86
awips	7414	7411	8 19:14 ?	00:17:12 /awips2/java/bin/java -Dedex.run.mode=ingestDat
awips	7461	1	0 19:14 ?	00:00:00 /bin/bash /awips2/edex/bin/start.sh -noConsole
awips	7530	7461	0 19:14 ?	00:00:00 /awips2/edex/bin/linux-x86
awips	7532	7530	1 19:14 ?	00:03:55 /awips2/java/bin/java -Dedex.run.mode=request

NOTE: There should be three **start.sh** scripts running, which are the parent processes of the three wrappers (the Java wrapper serves as, among other things, a watchdog for the JVM should it crash and require to be restarted). One **start.sh** is kicked off by the System V init script **edex_camel** and launches the wrapper which launches the three JVMs: 1) ingestGrib; 2) request; and 3) ingest. In total there should be **NINE (9)** EDEX ESB Java-related processes running on DX3 and DX4 respectively. There should also be a single **start_hpe** process running which controls the related HPE (e.g., DHRgather) processes.

- On **DX1**, issue the following command:

TYPE: `ps -fU awips | grep -v idle | cut -d "-" -f1,2`

UID	PID	PPID	C	STIME	TTY	TIME	CMD
awips	1068	3888	0	21:16 ?		00:00:19	/awips2/httpd_pypes/usr/sbin/httpd -f /awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips	1764	3888	0	21:18 ?		00:00:25	/awips2/httpd_pypes/usr/sbin/httpd -f /awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips	3821	1	0	18:40 ?		00:00:00	/awips2/postgresql/bin/postmaster -D /awips2/data
awips	3823	3821	0	18:40 ?		00:00:00	postgres: logger process
awips	3826	3821	0	18:40 ?		00:00:00	postgres: writer process
awips	3827	3821	0	18:40 ?		00:00:00	postgres: wal writer process
awips	3828	3821	0	18:40 ?		00:00:00	postgres: autovacuum launcher process
awips	3829	3821	0	18:40 ?		00:00:01	postgres: stats collector process
awips	3886	3882	0	18:40 ?		00:00:00	bash -c /awips2/python/bin/python
awips	3887	3886	0	18:40 ?		00:00:03	/awips2/python/bin/python -u /awips2/python/lib/python2.7/site
awips	4043	1	1	18:40 ?		00:03:36	/awips2/java/bin/java -cp /awips2/rcm/data/config/res::/awips2/rcm/lib/activation
awips	6210	3888	0	21:28 ?		00:00:23	/awips2/httpd_pypes/usr/sbin/httpd -f /awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips	6211	3888	0	21:28 ?		00:00:25	/awips2/httpd_pypes/usr/sbin/httpd -f /awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips	6212	3888	0	21:28 ?		00:00:26	/awips2/httpd_pypes/usr/sbin/httpd -f

```
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 11895 3888 0 22:31 ? 00:00:05 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 13639 3821 2 22:36 ? 00:00:24 postgres: awips fxitext 165.92.29.133(47931)
SELECT
awips 13865 3821 0 22:37 ? 00:00:03 postgres: awips metadata 165.92.29.133(47946)
BIND
awips 26680 3888 0 22:01 ? 00:00:16 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 26912 3888 0 22:02 ? 00:00:18 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 27122 3888 0 22:03 ? 00:00:13 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 28216 3888 0 22:05 ? 00:00:12 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 28436 3888 0 22:06 ? 00:00:10 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 28444 3888 0 22:06 ? 00:00:14 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips 28445 3888 0 22:06 ? 00:00:12 /awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
```

NOTE: There should be a single postmaster process running which drives the postGreSQL AWIPS II database engine along with 5 subsequent process threads (logger, writer, wal writer, autovacuum, stats collector). There will be a variable number of httpd processes for Pypes, and the AWIPS II RadarServer (**edex_rcm**) should be running as stand-alone process.

- On **DX1** there will only be LDM processes running (ps -ef | grep ldm).
 - LDM should have FIVE (5) processes running: pqact; edexBridge (connected to the server running Qpid); and THREE (3) rpc.ldmd.
- On **DX2**, there should be no AWIPS II-related process running. DX2 serves as a “hot spare” or “hot-standby” to the DX1 and the a2dx1apps resource.
- On **PXI**, issue the following command:

TYPE: ps -fU fxa,awips

```
awips 11111 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
awips 11112 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
awips 11113 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
awips 11114 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
awips 11115 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
awips 11116 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
awips 11117 14491 0 Oct26 ? 00:00:00 /usr/sbin/httpd
```

awips	11118	14491	0 Oct26 ?	00:00:00 /usr/sbin/httpd
fxa	13841	1	0 Oct13 ?	00:00:01 /awips/fxa/bin/asyncPilMsgServer
fxa	13844	1	0 Oct13 ?	00:00:07 /awips/fxa/bin/asyncScheduler
fxa	14277	13844	0 Oct13 ?	00:00:05 test1 23 20 1 test1 /dev/ttyn1a
fxa	14278	13844	0 Oct13 ?	00:01:36 test2 25 23 2 test2 /dev/ttyn1b
fxa	14279	13844	0 Oct13 ?	00:01:51 ttyn1h 27 25 8 ttyn1h /dev/ttyn1
fxa	14280	1	0 Oct13 ?	00:00:00 /usr/bin/perl /awips/fxa/bin/asy
fxa	14288	1	0 Oct13 ?	00:00:00 /awips/fxa/bin/hmMonitorServer
fxa	14306	1	0 Oct13 ?	00:02:06 /awips/fxa/bin/NWWSSchedule
fxa	30288	1	0 Sep19 ?	00:50:21 /awips/fxa/bin/purgeProcess -com

NOTE: There should be **EIGHT (8) httpd** threads running which control the AWIPS II System Monitor. There should be two getty serial ports initialized named **/dev/ttynq[a,b]** which are used by the **asyncScheduler**, which should also be running with the two async processes, **asyncPilMsgServer** and **asyncPollData.pl**. The AWIPS II **hmMonitorServer** and **NWWSSchedule** should be running. The GUI controller for IPVS (named **piranha.gui**) should be listed as well as the IPVS process **nanny**, connected on port 9581 to the IPADDR of the DX3 and DX4.

4. On **PX2**, issue the following commands:

TYPE: `ps -fU ldad,fxa,ldm | cut -d "-" -f1,2; ps -ef | egrep 'iscsi|nfs' | \ grep -v grep`

NCEP Only: Note that some of the baseline fxalpha rehosted code is not operational at NCEP Centers; therefore, output might be different. Contact the NCF if you believe that system startup on the **PX_SERVERS** was not completed properly.

NOTE: The above command is all on one line. The “\” character at the end is an indication to the reader of such, and should not be included in the command issuance.

A table of running processes on PX2 follows.

UID	PID	PPID	C	STIME	TTY	TIME	CMD
fxa	2046	1	0	Oct13 ?		00:00:00	/awips/fxa/bin/ldadServer
fxa	2081	1	0	Oct13 ?		00:00:00	/bin/sh /awips/fxa/FSIedex/bin/fsiWatchdog.sh
fxa	2083	2081	0	Oct13 ?		00:07:44	/awips/fxa/FSIedex/bin/FSIprocessorEDEX
fxa	2085	1	0	Oct13 ?		00:00:00	/awips/fxa/fsi/bin/rssd
ldad	2603	1	0	Oct13 ?		00:00:00	/awips/ldad/bin/listener

```

ldad  3016  1 0 Oct13 ?    00:00:05 /awips/fxa/bin/CommsRouter LDAD_ROUTER
ldad  3024  1 0 Oct13 ?    00:00:04 /awips/fxa/bin/DataController LDAD_ROUTER
ldadController.config
ldad  3027 3024 0 Oct13 ?    00:00:15 /awips/fxa/bin/routerLdadDecoder px2-
tbdw/44356/3024 152708368
ldad  3028 3024 0 Oct13 ?    00:01:41 /awips/fxa/bin/routerStoreNetcdf px2-
tbdw/44356/3024 152735008
ldad  3029 3024 0 Oct13 ?    00:00:16 /awips/fxa/bin/routerStoreEDEX px2-
tbdw/44356/3024 152743928
ldad  3030 3024 0 Oct13 ?    00:00:18 /awips/fxa/bin/routerShefEncoderEDEX px2-
tbdw/44356/3024 152744152
ldad  3031 3024 0 Oct13 ?    00:00:16 /awips/fxa/bin/routerStoreTextEDEX px2-
tbdw/44356/3024 152744456
ldad  3048  1 0 Oct13 ?    00:00:29 /bin/sh /awips/ldad/bin/watchDogInternal.sh
fxa   9624  1 0 Sep08 ?    01:03:58 /awips/fxa/bin/purgeProcess -commit
ldad  18092 3048 0 23:43 ?    00:00:00 sleep 30
ldad  24387 3048 0 00:00 ?    00:00:02 /usr/bin/perl /awips/ldad/bin/pollForData.pl Start
/awips/ldad/data/pollForData.conf

```

NOTE: The AWIPS II LDAD and FSI processes should be running and match those in the output above (with the exception of the node domain name which will match your siteID).

21.4 AWIPS II Checklist

Start the browser on the workstation and check the System Monitor.

DX1

- Is postgres running (ps -ef | grep postgres)? Logging (/awips2/data/pg_log)?
- Is RadarServer running (ps -ef | grep Radar)? Logging (/awips2/rcm/data/logs)?
- Any partitions full (df)? Everything mounted (/awips2, dx2:/data_store, /awips2/data, /awips2/GFESuite, /awips2/edex/data/hdf5, nas1:/awips2/edex/data/utility)?
- Heartbeat running, a2dx1apps running, dx1f up (ping dx1f)?
- MHS (ps -ef | grep mhs; ypcat hosts | grep mhs)? Sendmail? (ps -ef | grep sendmail; msg_send -atbdr -c0;)

DX2

- Is ldm running (ps -ef | grep ldm)?
- Is data being received (su – ldm -c 'ldmadmin watch')?
- Is data being logged and processed (/usr/local/ldm/logs)?
- Heartbeat running, a2dx2apps running, dx2f up (ping dx2f)?
- Any partitions full (df)? Everything mounted (/awips2, /data_store, /awips2/GFESuite, nas1:/awips2/edex/data/utility)?

DX3/4

- Is edex ingest, ingestGrib, ingestDat and request running (ps -ef | grep edex)?
- Are they logging and ingesting data (/awips2/edex/logs, edex-ingest, edex-ingestGrib, ingestDat, request, ingest-satellite, ingest-radar, ingest-shef, ingest-text, ingest-purge, ingest-gen_areal_ffg)?
- Any partitions full (df)? Everything mounted (/awips2, dx2f:/data_store, /awips2/edex/data, /awips2/GFESuite)?
- Clustering loopback device up (ifconfig lo:0)?
- (Also check PX3|4 on TBW4)

NCEP Only: Also check DX5 and DX6.

CPSBN1

- Is ldm running (ps -ef | grep ldm, ps -wef|grep dvbs)?
- Is data being received (su – ldm -c 'ldmadmin watch', check logs in ~ldm/logs)?
- Is qpid running (ps -ef | grep qpid)?
- IPVS running (ps -ef|grep pulse, ipvsadm)?
- Heartbeat running, a2cp1apps running, cp1f up (ping cp1f, hb_stat)?
- Any partitions full (df)? Everything mounted (/awips2, nas1:/awips2/qpid/messageStore)?

PX1

- Any partitions full (df)? Everything mounted (/awips2, /awips2/edex/data/share, dx2f:/data_store)?
- Heartbeat running, a2px1apps running, px1f up (ping px1f)?
- Rehosted apps running (ps -ef | grep fxa)?

PX2

- Any partitions full (df)? Everything mounted (/awips2, dx2f:/data_store, /awips2/edex/data/share)?
- Heartbeat running, a2px2apps running, px2f up (ping px2f)?
- Rehosted apps running (ps -ef | grep ldad; ps -ef|grep fsi)?

Workstations

- DNS, NIS, NTP working? Any partitions full (df)? Everything mounted (/awips2/edex/data/share, dx2f:/data_store, /awips2)?
- Launch CAVE. Does it come up okay? Data current in the menus and selected products load? (Load Radar (i.e., koax) > Composite Ref; Satellite > IR Window; Obs > Station Plot (load the latest under METAR); Maps > Hires TOPO Image (checkbox); Load GFE, make sure gfeConfig is selected in Config column, click OK.)

Chapter 22

Maintenance Management Procedures

Chapter 22. Maintenance Management Procedures

Table of Contents

	<i>Page</i>
22.0 Maintenance Management Procedures: Introduction	1
22.1 General System Administration Activities	1
22.1.1 Oversight and Administration of Site OT&E Activities	1
22.1.2 Coordination with NCF and AWIPS Contractor.....	2
22.1.3 Performance and Administration of System Software Upgrades.....	2
22.1.4 Performance and Administration of System Hardware Upgrades and Modifications.....	3
22.1.5 Coordination with Regional and National NWS AWIPS Staffs	3
22.1.6 Site Hardware Configurations	3
22.1.7 System Software Configurations.....	3
22.1.8 Site Applications and Extension Software Configurations	3
22.1.9 Site AWIPS System Security	4
22.1.10 Site Documentation Data.....	4
22.1.11 Global and Local AWIPS System Software Backups.....	4
22.1.12 Daily Monitoring and Administration of Operational System.....	4
22.1.13 EMRS Maintenance Data Reporting and Monitoring.....	5
22.2 System Maintenance Activities	5
22.2.1 Daily Actions.....	5
22.2.2 Weekly Actions	6
22.3 Maintenance Troubleshooting Checklist	6
22.3.1 Routine Maintenance Checklist	7
22.3.2 Unscheduled Maintenance Checklist	7
22.4 AWIPS Maintenance and System Administration Reporting.....	7
22.4.1 Modification/Software/Maintenance Note and Request for Change (RC) Implementation.....	9
22.5 Demarcation of AWIPS Hardware Maintenance Responsibility	9

List of Tables

Table 22.4-1. AWIPS Equipment Codes	8
Table 22.4.1-1. Reporting Guidelines for Modifications.....	9

22.0 Maintenance Management Procedures: Introduction

NOTE: Changes to the release strategy have been recommended to the Government, and have not yet been approved. The deployment mechanisms (push/pull, media, etc.) have not yet been determined.

Because of the complexity of the AWIPS hardware, software, and other integrated devices, it is necessary to perform an extensive suite of maintenance activities on a regularly scheduled basis. Significant daily system monitoring and maintenance tasks are required to maintain a high level of successful operational capability.

The guidelines and tasks in this chapter are recommendations and form a base for the site-specific system(s) maintenance program. Maintenance shall be performed following NWSI 30-2113 AWIPS maintenance policy. For this chapter only, “ESA” is defined to mean Electronic Systems Analyst (ESA), Information Technology Officer (ITO), or electronic maintenance staff, as assigned.

22.1 General System Administration Activities

This section describes an overall system administrative and equipment maintenance plan and addresses specific activities for AWIPS II operational systems. It is intended as a reference for ESAs in maintaining their AWIPS sites. It is not all inclusive, and it is not directive in nature.

22.1.1 Oversight and Administration of Site OT&E Activities

Major functional releases undergo an Operational Test and Evaluation (OT&E) phase, and the ESA will play a large part in these activities. The test and evaluation phase is critical for generating feedback about the system to AWIPS developers and National Weather Service Headquarters (WSH) managers.

During OT&E, many facets of the site’s AWIPS operations and administration are evaluated by local staff and managers, and by assigned NWS personnel at WSH. For example, products, display capabilities, enhancements, communications, data feed from radar and the Satellite Broadcast Network (SBN), grids, data reception, data storage and retrieval, and many other areas of the overall system operation are scrutinized.

The ESA participates in the logging of OT&E data collection, ensuring that the evaluation data are forwarded to the NWS in a timely manner. Further, the ESA coordinates all software and hardware trouble reports with the Network Control Facility and administers all software and hardware modifications to the system.

22.1.2 Coordination with NCF and AWIPS Contractor

Coordination with the NCF is necessary to ensure that all site system hardware and software are monitored, and anomalies and failures are repaired efficiently.

The NCF telephone number, 301.713.9344, is intended for use by any operations or administrative staff member and should be prominently posted in the WFO/RFC operations areas.

The ESA performs preliminary examination of system failures and discusses findings with NCF staff. If necessary, the ESA should be able to engage in dialog with software developers (Raytheon Technical Services Company LLC, Systems Engineering Center [SEC], Global Systems Division [GSD]) and to discuss hardware issues with designers, engineers, and technicians associated with the Raytheon Technical Services Company LLC, Verizon (FTS2001), NOAA Net, GTSI, Globecomm, and the NCF.

When on-site repairs are necessary, the ESA should monitor the work of assigned contractor personnel and assist those technical contractors, when needed.

All maintenance actions, software, and hardware are documented in appropriate reports with the NCF and in the NWS Engineering Management Reporting System (EMRS).

22.1.3 Performance and Administration of System Software Upgrades

During the life cycle of the system, the ESA should be able and available to perform the many software installations and upgrades that will be necessary to ensure that the system is always configured according to all established configuration management guidelines. The ESA will be the site focal point for all system upgrades and will ensure that these upgrades are accomplished in accordance with authorized system upgrade instruction notes. The ESA will also ensure that all system upgrades at his or her site are documented in EMRS.

Software upgrades can take any of the following forms:

- **Application Releases.** The AWIPS Contractor distributes application releases to the sites by CD-ROM or DVD, depending on the size of the release. The ESA loads the software from the CD-ROM or DVD following the install instructions; the install may be monitored remotely by the AWIPS Contractor personnel.
- **Maintenance Releases and Emergency Releases.** Depending on the size of the release, maintenance upgrades and emergency releases may be distributed to the sites on CD-ROM or DVD, or downloaded to the sites over the WAN. The ESA accomplishes the upgrade using scripts and install instructions provided by the software developers. The installation may be monitored remotely by AWIPS Contractor personnel.
- **Patches.** Often, small short-term patches in system software are accomplished by developers, and an isolated program file is downloaded to the appropriate site system

by the NCF, the AWIPS Contractor, or NWS developers. In all cases, the ESA will be notified of the changes being made.

22.1.4 Performance and Administration of System Hardware Upgrades and Modifications

Occasionally, AWIPS hardware configuration items must be upgraded or replaced with a newer device. As the site focal point for all such modifications, the ESA will interface directly with Contractor personnel to coordinate the time for the upgrade, and work with the actual hardware upgrade or replacement. The ESA will ensure that these upgrades are accomplished at the site in accordance with authorized instruction notes; the ESA will also ensure that all upgrades are documented in EMRS.

22.1.5 Coordination with Regional and National NWS AWIPS Staffs

The ESA should maintain a regular dialog with regional AWIPS staff members to ensure that all regional directives and guidelines are applied to the operation and maintenance of his or her system.

22.1.6 Site Hardware Configurations

In coordination with regional and national AWIPS staff, the ESA maintains records of all installed equipment. The ESA also ensures that all modifications and repairs are accomplished properly and that no unauthorized system configuration changes or additions are installed without approval from NWS Headquarters.

Many hardware records, materials reports, and documentation are delivered with the system. Some of these will be updated with each software or hardware modification. The ESA maintains all system hardware records.

22.1.7 System Software Configurations

In coordination with regional and national AWIPS staff, the ESA maintains records of all installed software systems. The ESA ensures that all system upgrades, modifications, and local applications are accomplished properly and that no unauthorized system configuration changes or additions are installed without approval from NWS Headquarters.

Each national software build and incremental upgrade will require updates to local site configuration files, map databases, and other records.

22.1.8 Site Applications and Extension Software Configurations

Ultimately, local sites will adapt their older PC-based software to AWIPS platforms and will generate new programs for local use on AWIPS. The ESA will maintain a record of

all local applications suites and extensions and ensure that all site software operates properly in the AWIPS environment.

ESAs must be constantly aware of all local applications installed on their local systems and ensure that they do not adversely affect any approved and established system and applications software.

22.1.9 Site AWIPS System Security

In coordination with regional and national AWIPS staff, the ESA must be fully involved in all system security efforts. These responsibilities include the management of national security systems, as well as local site security issues.

The NWS operates a national firewall system in the National Weather Service Modernization and Test Integration System (NMT) in Silver Spring, Maryland. This firewall isolates all AWIPS intranet sites from unauthorized external influences. It is the site ESA's responsibility to ensure that all access through the national firewall is registered. Refer to Appendix F, NWS/AWIPS Security Policy, for information on registering for firewall access.

Local firewalls will be developed and deployed as necessary to accommodate acquisition of other data (e.g., LDAD firewall).

22.1.10 Site Documentation Data

All site documentation should be maintained by the ESA. This includes operations manuals, system support documentation, installation records, maintenance records, system administration logs, and backup documentation and media.

22.1.11 Global and Local AWIPS System Software Backups

The ESA should ensure that all system backup procedures are properly established and correctly accomplished on a suitable schedule. These backups include system software and configuration data, database transaction records, local applications, and configuration software and data, as applicable.

22.1.12 Daily Monitoring and Administration of Operational System

The ESA must participate in the daily operational monitoring and administration of the local AWIPS. He or she will coordinate closely with the site operational personnel to ensure that all system functions are working correctly and take immediate action whenever anomalies are noted. Refer to checklist in Appendix I, Section I.10.1

22.1.13 EMRS Maintenance Data Reporting and Monitoring

The ESA will measure how effectively his or her site has satisfied EMRS reporting requirements by reviewing AWIPS maintenance activity, system upgrade, and modification reports via the EMRS web page http://ops13web.nws.noaa.gov/pls/emrsuser/emrs_main.home. The ESA will take action to comply fully with guidelines identified in NWS Instruction 30-2104, Maintenance Data Documentation.

22.2 System Maintenance Activities

This section describes the type and frequency of AWIPS hardware maintenance actions recommended for NWS field ESAs and maintenance staff.

22.2.1 Daily Actions

ESAs should complete the following actions on a daily basis.

- **Coordinate with operational personnel.** The ESA should check with the operational staff members each morning to discuss the general operation of the system and any problems or anomalies that users may have noted. Ensure that all unusual situations described are entered in the daily site logs.
- **Ensure that daily logs are completed.** All assigned daily AWIPS log sheets should be reviewed and properly completed. All warranted action items noted should be resolved as quickly as possible.
- **Determine requirements for additional local backups.** As AWIPS users become familiar with the system, they will create local scripts and executable programs to be used for various purposes. These programs and data sets must be backed up at the site.
- **Check the Satellite Ground Station.** Visually inspect the ground station antenna for obstructions and proper heater operation. Clean as necessary.
- **Perform a general system check.** Open a terminal window and log in to each server and workstation. Verify that each device responds properly. Check for and remove core dumps. Check disk statistics and processes on each device, ensuring that all necessary programs are operating and that no runaway processes are present. Kill runaway processes as necessary. Check LAN and WAN connectivity by pinging another local device and then pinging a remote system, such as one of the NCF servers or an adjacent WFO device.
- **Launch the system data monitor, and verify that all data are current.** Investigate any evidence of late or missing data.
- **Review log files.** As necessary, review appropriate system log files, looking for error messages and other indications of communications, data retrieval, data routing, data

storage, and data display anomalies and failures. Make appropriate notes in the site logs and take action to correct any noted deficiencies.

- **Verify D2D functionality.** In coordination with the users, operate D2D at each workstation, verifying proper menu availability and product display capability.
- **Visually check each workstation area for neatness and cleanliness.** Clean all monitor screens with appropriate glass cleaner and a soft, lint-free cloth. Check for other contaminants, such as spills in keyboards, and clean as necessary.
- **Verify printer functionality.** Check each system printer for proper operation. Verify that all copies are complete and colors are correct.

22.2.2 Weekly Actions

ESAs should complete the following actions on a weekly basis.

- **Back up applications and data sets.** Perform backups of all locally developed applications and data sets, as necessary.
- **Check power cables and connections.** Check the areas around each workstation, ensuring that all cables are properly distributed between the monitors and the workstation base unit and that connections are secure. Check cables, as well as all power cables and connections.
- **Clean work surfaces and base units.** With a soft, damp cloth, clean areas around monitors and workstation surface areas, removing any dust and other debris. Ensure that all dust and other debris are cleaned from all surfaces of workstation base unit, especially around cooling fans.
- **Check printer connections.** Check the areas around each system printer to ensure that all cables are properly distributed between the printer and servers and that connections are secure. Check all power cables and connections.
- **Clean printer surfaces.** With a soft, damp cloth, clean areas around printers and associated work surface areas, removing any dust and other debris. Open the printers and remove dust and other debris.

22.3 Maintenance Troubleshooting Checklist

This section includes two quick checklists – one for routine maintenance and one for unscheduled maintenance. The Routine Maintenance checklist includes items that should be checked daily. The Unscheduled Maintenance checklist includes items to be checked as needed.

22.3.1 Routine Maintenance Checklist

- Printer queue
- All devices. Partition sizes (using and df command for Linux servers)
- Cron system monitoring

22.3.2 Unscheduled Maintenance Checklist

- Hardware monitor
- Printer maintenance
- NCF interaction

22.4 AWIPS Maintenance and System Administration Reporting

AWIPS maintenance and system administration activities are documented in EMRS. NWS Instruction 30-2104, Maintenance Data Documentation and the *Systems Maintenance, NWSPD 30-21*.

Please note that System Managers Manual, Appendix F describes policy and procedures necessary for documenting AWIPS maintenance and system administration.

In most cases as illustrated in the EMRS NWS Instruction 3—2104 Maintenance Data Documentation one WS Form A-26 (<http://www.weather.gov/wsom/manual/archives/NA149505.HTML#APPENDIX%20A>) is initiated for each maintenance action performed. A single WS Form A-26 may be initiated on a biweekly basis to report all system administration duties. Initiate a WS Form A-26 for all designated AWIPS equipment, systems, or subsystems when the Field Electronics Staff:

- Resolves equipment failures
- Performs routine maintenance
- Relocates equipment
- Conducts special activities or data collection
- Activates deactivates, or modifies equipment
- Accomplishes system administration.

Four equipment codes have been defined for use when documenting AWIPS maintenance activity in EMRS. The AWIPS equipment codes are listed in Table 22.4 -1.

Table 22.4-1. AWIPS Equipment Codes

Equipment Type	Equipment Code
AWIPS Local Data Acquisition and Dissemination Server	LDAD
AWIPS Remote Display	ARD
AWIPS Linux Servers and Workstations	AWLNX
AWIPS System Administration Reporting Code	AWIPS

NOTE: Use EMRS Equipment Code “FAC” to report incidental facilities maintenance/activities performed at the AWIPS site.

AWIPS equipment codes are activated in EMRS by the Field Staff. Submit one WS Form A-26 to report all activities associated with site preparation, installation, and checkout of the equipment, system, or subsystem. Field Staff may be responsible for activating particular AWIPS equipment as directed in an official Modification Note, Maintenance Note, Software Note, or Request for Change Implementation Memorandum. Follow the equipment-specific instructions included in the equipment change documentation to activate AWIPS equipment in EMRS. Prior to official activation, the NWS Electronics Staff will report all pre-acceptance activities using the reportable equipment code “AWIPS” and the serial number “001.”

AWIPS system administration is defined as all activities related to managing software operating systems and overseeing systems performance. This includes managing user access and privileges, configuring devices, making backups, training users, managing system security, installing approved operating system software changes and resolving fault isolation issues (e.g., software versus hardware failures).

Configuration Management (CM) information related to scheduled routine maintenance, corrective maintenance, and equipment management activities is documented by the AWIPS maintenance contractor. However, CM information related to activities performed by the NWS Field Staff is documented in EMRS using WS Form A-26. When AWIPS equipment fails, the NCF must be notified. The NCF may determine that the unit will be repaired by the maintenance contractor, returned to the National Reconditioning Center (NRC), or repaired by the Field Staff. When the removal and replacement of the failed unit is performed by the Field Staff, specific CM data reporting is required. These requirements are:

- For each part that fails, enter the correct Agency Stock Number and Serial Number of the failed part.
- For each replacement part, enter the correct Vendor Part Number and Serial Number of the replacement part.

NOTE: When replacing an entire subsystem or a part of the subsystem having a uniquely identified serial number, complete two separate WS Forms A-26. The first WS Form A-26 (Deactivation A-26) contains the serial number of the subsystem being removed. The second WS Form A-26 (Activation A-26) contains the serial number of the newly installed subsystem.

22.4.1 Modification/Software/Maintenance Note and Request for Change (RC) Implementation

In addition to the data reporting requirements outlined above, follow specific CM data reporting requirements outlined in each official instruction note. Ensure that the modification number has been entered in the WS Form A-26 and that the date-of-action is completed. General reporting requirements are defined in Table 22.4.1-1.

Table 22.4.1-1. Reporting Guidelines for Modifications

Modification Type	TM Code	AT Code	Mod. No.
Hardware Mod	M (Modification)	M (Modify)	The Mod #
Software Mod	M	M	S and the #
Software Patch Mod	M	M	SP and the #
Contractor Interface Note	M	M	CI and the #
System Administration Note	M	M	SA and the #
Information Note	E	M	I and the #
AWIPS System Security Note	M	M	SS and the #
Maintenance Note	E (Equip. Mgmt.)	M	M and the #
RC Implementation	E	M	The RC #
Other Mods	S (Special Acct)	M	None
Application Software Installation	M	M	None

22.5 Demarcation of AWIPS Hardware Maintenance Responsibility

The AWIPS Contractor is responsible for providing AWIPS hardware maintenance. However, several Government hardware and communications interfaces to AWIPS require maintenance outside the scope of Contractor-provided maintenance. The ESA has the systems maintenance responsibilities for equipment such as the WSR-88D radar and various non-AWIPS workstations (i.e., other than those delivered with AWIPS). Routine and nonroutine hardware and software maintenance is performed by ESAs. Additionally, the NWS electronics staff is typically responsible for performing all system administration.

AWIPS hardware maintenance is managed via the AWIPS NCF and the AWIPS subcontractors. AWIPS maintenance providers are as follows:

Raytheon Technical Services Company LLC

- Maintenance and logistics support
- AWIPS Network Control Facility

GTSI (subcontractor)

- Services for all AWIPS hardware except for FTS2001 components and Globecomm satellite components

Globecomm Systems, Inc. (also known as GSI)

- Services for the AWIPS SBN

Verizon (FTS2001) and NOAANet (Sprint) (Government-furnished equipment and services)

- Telecommunications services (FTS2001)

NLSC (Government Maintenance)

When equipment fails, the NCF will attempt to diagnose the cause of the problem. After determining whether the failure is software or hardware related, the NCF will take the appropriate action. During certain types of failures, the NCF may request assistance from the local electronics maintenance staff. Depending on the nature of the failure and the impact on the site's operations, local electronics maintenance staff may work with the NCF or its maintenance subcontractor to repair and restore AWIPS functionality. Any Government-provided external interface to AWIPS is the responsibility of the NWS.

In accordance with NWS directives, any maintenance or system administration performed by NWS Field Staff in support of these activities, regardless of the problem source (hardware or software), shall be reported via EMRS. System administrative work shall be reported biweekly.

Examples of these tasks follow.

- Install system software upgrades.
- Ensure that all AWIPS functions operate normally after upgrades.
- Maintain knowledge of locally developed software.
- Ensure that the security policy is adhered to for local computer networks and interfaces.
- Administer locally assigned passwords.
- Perform backup/recovery for file systems.
- Perform manual system shutdown/startup.
- Manage system log files.
- Manage product retention/replenish parameters.
- Coordinate and oversee the maintenance contractor's work.
- Advise NCF of progress or resolution of maintenance-related problems.

Site hardware maintenance tasks to be performed by the ESA follow.

- Manage AWIPS image tapes (create, store, insert, and remove tapes).
- Perform a hard reset of devices.

- Assist the NCF when troubleshooting possible cable or external interface problems.
- Visually verify device status lights or configurations when requested by the NCF.

Refer to EHB-13, Series II, for additional maintenance guidance.

Site administrators who experience problems or have concerns regarding the NCF or its maintenance providers should contact the Government point of contact for NCF operations:

Kevin Conaty
Voice 301.713.0864 x170
Fax 301.713.1409
Kevin.Conaty@noaa.gov

Chapter 23

NCF Archive

Chapter 23. NCF Archive

Table of Contents

	<i>Page</i>
23.0 NCF Archive: Introduction	1
23.1 Preparing to Launch the NCF Archive GUI	1
23.2 Executing and Using the NCF Archive GUI	1
23.3 Displaying Retrieved Archive Products.....	7
23.4 Changing NCF Archive Configuration at a Site	8

List of Exhibits

Exhibit 23.2-1. NCF Archive Window	2
Exhibit 23.2-2. Archive Request Window	2
Exhibit 23.2-3. Archive Help Screen for Archive Request Window.....	4
Exhibit 23.2-4. Archive Response Browser Window (All Requests Completed)	5
Exhibit 23.2-5. Archive Response Browser Window (with Both Completed and Outstanding Requests)	5
Exhibit 23.2-6. Request Window	6
Exhibit 23.2-7. NCF Archive Actions Window.....	7
Exhibit 23.4-1. Archive Config Window in NCF Archive	9

23.0 *NCF Archive: Introduction*

The Network Control Facility Product Archive provides the capability to automatically store Guidance Products, Radar Data, Observations, and Official User Products for the most recent 15 days. Data/products are archived by WMO header and date/time group (DTG). Each AWIPS site can query the NCF Archive contents via an interactive GUI and retrieve these data/products for local site storage. Archive request parameters are currently sent from the site to the NCF via an SMTP message. At the NCF, the requested products are retrieved from the archive and transmitted to the requesting site via an SMTP message. The requesting site stores these products to files and updates the **Archive Response Browser** window to show receipt. At this time, only text products can be displayed. Text products can be viewed in a Telnet window using as described in Section 23.3.

23.1 *Preparing to Launch the NCF Archive GUI*

Change to a directory appropriate for temporary storage; create a new archive files subdirectory if one does not already exist. It is strongly recommended this subdirectory be created in the **/tmp** directory.

TYPE: `cd /tmp`

TYPE: `mkdir archtest`

TYPE: `cd archtest`

Note: The **NCF Archive GUI** should be launched from this temporary directory. Any archived data/products received from the NCF will be stored in this directory. Files stored in non-temporary files will not be purged and may cause your file system to fill up. Files stored in **/tmp** are purged upon device reboot; however, it is recommended that you manually remove any files that you are not using from the **/tmp/archtest** directory.

23.2 *Executing and Using the NCF Archive GUI*

- ▶ To Execute the NCF Archive GUI on a workstation

TYPE: `/awips/ops/bin/arch_gui &`

The NCF Archive GUI can be launched on any server or workstation; however using the primary data server will cause less load on the system

To execute the NCF Archive GUI remotely

TYPE: `ssh dx1f"/awips/ops/bin/arch_gui"`

Exhibit 23.2-1 displays the NCF Archive Window.

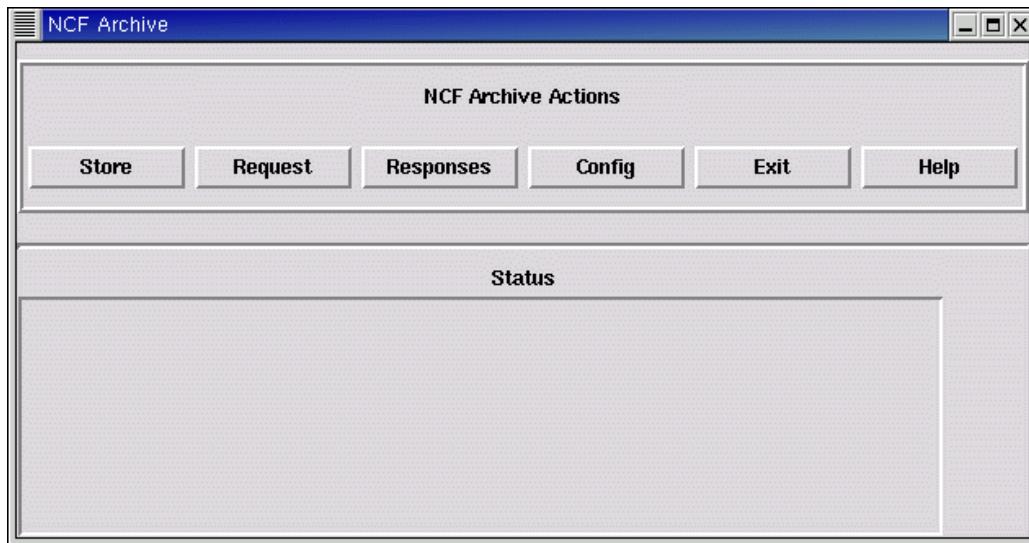


Exhibit 23.2-1. NCF Archive Window

NOTES:

- The **Store** button on the NCF Archive menu has not been implemented and an information menu box will pop up with this information if that button is selected.
- The scan interval, max products, and max list can be changed using the **Config** button on the **NCF Archive** window. However, there is a 20-product maximum and a 200-list maximum. There is no predefined maximum on the scan interval; however, the users probably will not want to increase the default. Refer to section 23.4 for more information. Once the main menu is up, you can proceed to enter your request.
- ▶ To Request Archived Data/Products

Select: **Request** from the **NCF Archive Actions** section of the **NCF Archive** window
 ▪ Displays the **Archive Request** window. See Exhibit 23.2-2.

Exhibit 23.2-2. Archive Request Window

- Fill in request parameters as follows (every field is optional):
 - **WMO Header.** This is the standard WMO header format “TTAAii CCCC <DTG>”; e.g., SAUS97 KMGM 120100. Wildcards may be used (see Note below).
 - **NNNXXX.** The standard AFOS-based NNNXXX (e.g., MTRIAD) to request products in this manner.
 - **SBN Channel.** The SBN Channel for the products you want to retrieve (GOES, NOAAPORT_OPT, NWSTG, and NWSTG2).
 - **Start Date/Time and End Date/Time.** The time period (range) for which you want to retrieve products (i.e., the time the product was stored at the NCF). The **NCF Archive GUI** supports numerous DTG formats. It assumes times are in GMT. Some examples of operative DTG formats include the following:
 - 6/08/10 00:00:00Z
 - 6/08/10 11:31:20GMT
 - June 08, 2010
 - 11:30
 - **Max Products.** The maximum number of products you want returned. This can be left blank to use the default (20), or you can specify the number of products to be returned. There are limits on the number of products returned.

NOTE: The **NCF Archive GUI** allows you to use asterisks (*) as wildcards (e.g., SAUS* or SAUS31 KWBC*). The **Help** feature explains this and provides examples. Exhibit 23.2-3 depicts the **Help** window for this screen. User-friendly help menus are available throughout this application.

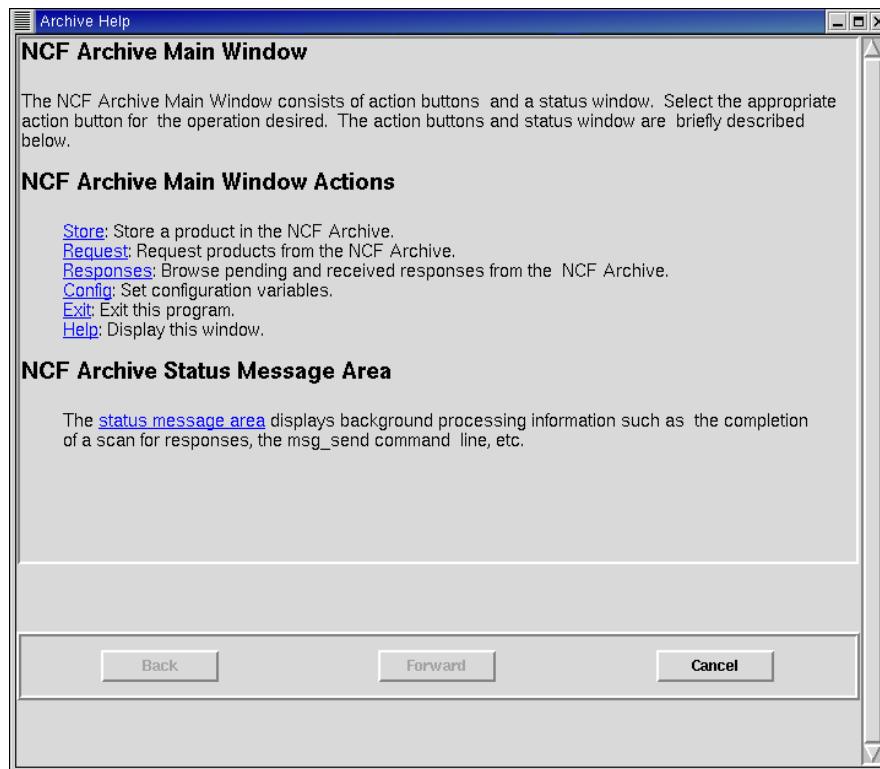


Exhibit 23.2-3. Archive Help Screen for Archive Request Window

Select: **Send** from the **Request Actions** section of the **Archive Request** window

- If your request exceeds the product limit, an information window pops up. This window gives you the option of accepting the default number of products. Select **OK** to continue.
- Displays **Send Confirmation** window with your archive request ID (e.g, TBDW-26369).

Select: **OK** on the **Send Confirmation** window

- Transmits your request to the NCF.
- Displays the **NCF Archive** window showing that the message was transmitted to the NCF.

You can monitor the status of your request using the **Archive Response Browser**, launched by clicking on **Responses**. Refer to Exhibits 23.2-4 and 23.2-5. Both completed and outstanding requests are displayed. Outstanding requests have asterisks (****) across the **Receive Time** and **Response File** columns. When the requested products have arrived, the **Archive Browser**, **Receive Time**, and **Response File** fields are updated. All requests are displayed in the **Archive Response Browser** until they are deleted.

NOTE: Selecting the **Delete** button in the **Archive Response Browser** removes the request from the browser and deletes its query, header, and any retrieved products from the temporary store directory if the **arch_gui** was launched from the data server.

NOTE: The directory in which the retrieved products have been placed is reflected in the top part of the **Archive Browser** screen. Be sure to use a /tmp directory!

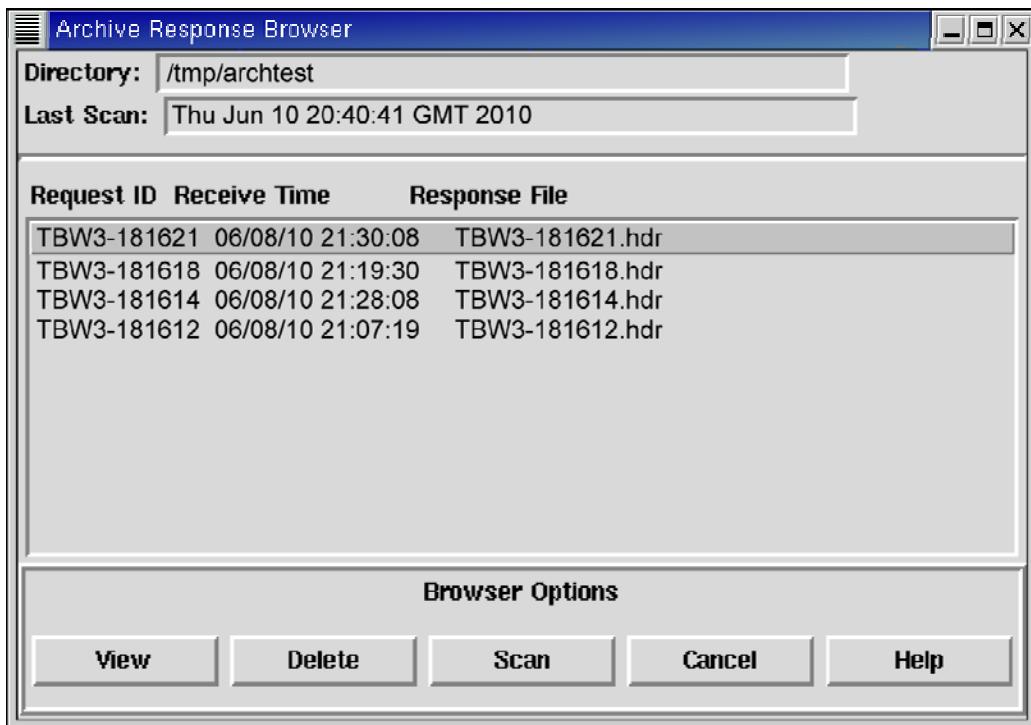


Exhibit 23.2-4. Archive Response Browser Window (All Requests Completed)



Exhibit 23.2-5. Archive Response Browser Window (with Both Completed and Outstanding Requests)

To view the products retrieved from the **NCF Archive**,

- Select:** The desired request from the **Archive Browser**
- Highlights the desired request.
- Select:** **View from Browser Options in the Archive Browser**
- Displays the Archive data for first 200 matches. Refer to Exhibit 23.2-6.
 - Displays the maximum number of products and the number of matches in the request window.
 - Adjusts the start and end times to narrow or refine your search.
 - Displays each product's file name in the **Path** column. The retrieved products are numbered sequentially.

The screenshot shows a Windows application window titled "TBW3-181621". The window contains the following fields:

Request ID:	TBW3-181621
WMO Header:	[empty]
NNNXXX:	SWROK
Start Date/Time:	Tue Jun 8 00:00:00 GMT 2010
End Date/Time:	Tue Jun 8 21:00:00 GMT 2010
Max Products:	10
Total Matches:	42

Below these fields is a table listing 10 products:

Channel	SBN_seqno	WMO_header	NNNXXX	Path
NMC	130614473	ASUS44 KOUN 172010	SWROK	TBW3-181621.001
NMC	130607556	ASUS44 KOUN 172000	SWROK	TBW3-181621.002
NMC	130571096	ASUS44 KOUN 171910	SWROK	TBW3-181621.003
NMC	130564439	ASUS44 KOUN 171900	SWROK	TBW3-181621.004
NMC	130532465	ASUS44 KOUN 171810	SWROK	TBW3-181621.005
NMC	130525628	ASUS44 KOUN 171800	SWROK	TBW3-181621.006
NMC	130494301	ASUS44 KOUN 171710	SWROK	TBW3-181621.007
NMC	130483145	ASUS44 KOUN 171700	SWROK	TBW3-181621.008
NMC	130459238	ASUS44 KOUN 171610	SWROK	TBW3-181621.009
NMC	130452156	ASUS44 KOUN 171600	SWROK	TBW3-181621.010

At the bottom of the window is a "Response Options" button bar with the following buttons: Display, Request, Acquire, Delete, Cancel, Help.

Exhibit 23.2-6. Request Window

NOTES:

- Products listed in the request window that do not have a path name have not been retrieved, but they are available and can be requested. If you want one of these products, highlight it and select the **Request** button at the bottom of the window to initiate a new request to the NCF for that specific data/product. This is a new request, with its own **Request ID**, so you must return to the **Archive Response Browser**. Highlight this new request to open a new window in which that retrieved product will be listed
- The **Acquire** button has been enabled. This functionality allows you to store products to the database. The **NCF Archive Actions** window will display a message indicating that the file has been sent to the **acqserver** on the primary DX. An example is shown in Exhibit 23.2-7 (the appropriate text is highlighted).
- The **Display** button is not grayed out but you will receive a “not yet implemented” dialog box if you select it. It will be enabled in a later release and will allow you to display products on D2D and the Text Browser.
- The **Delete** button may be used to delete products from the request window. Selecting the **Delete** button removes the product both from the **Request Window** and from the temporary store directory if the **arch_gui** was launched from the data server.

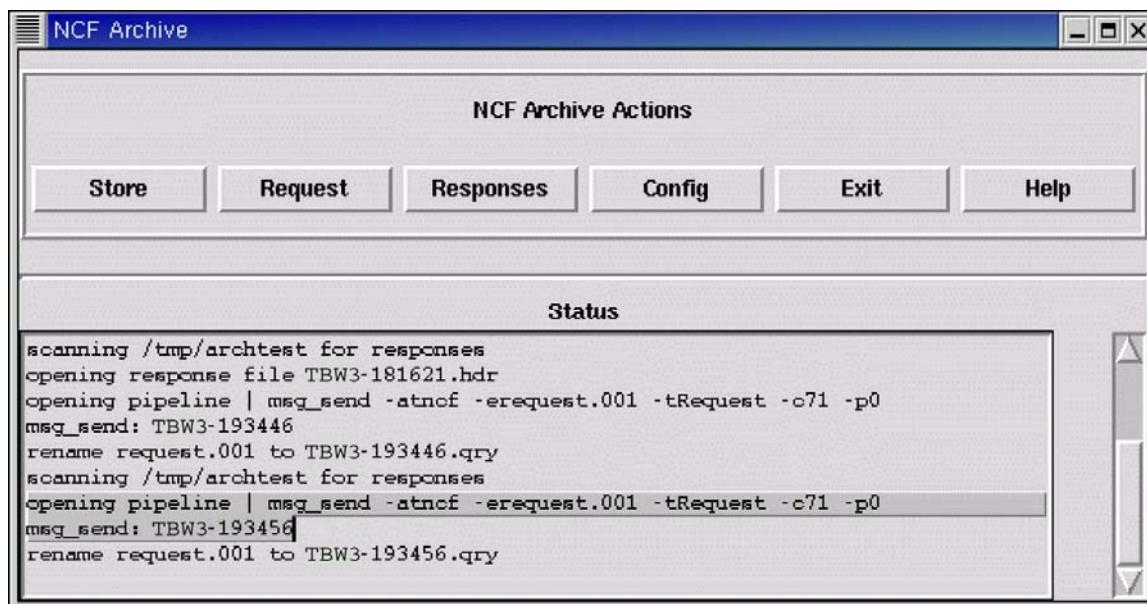


Exhibit 23.2-7. NCF Archive Actions Window

23.3 *Displaying Retrieved Archive Products*

The display function of the NCF Archive is not currently implemented because this application was developed as a “proof of concept” and was not originally intended to be deployed to the field. However, retrieved text products can be displayed by using the **cat** or **more** commands in a Terminal window on any workstation.

In the same Terminal window from which you launched the **NCF Archive GUI**,

TYPE: `pwd`

- Check to ensure you are in the temporary directory in which the retrieved products were placed. If you are not in this directory, use the `cd` command to change to it.

TYPE: `ls -l`

- Displays a list of all the retrieved products. The file name format is <**device-requestID.prodNumber**> (e.g., **TBDW-26369.001**, **TBDW-26369.002**, etc.), like the following sample output:

```
-rw-rw-rw- 1 smithel fxalpha      226 Jun  8 17:31 TBW3-26369.qry
-rw-rw-rw- 1 root    sys          35568 Jun  8 17:33 TBW3-26369.hdr
-rw-rw-rw- 1 root    sys          2699  Jun  8 17:33 TBW3-26369.001
-rw-rw-rw- 1 root    sys          116   Jun  8 17:33 TBW3-26369.002
-rw-rw-rw- 1 root    sys          235   Jun  8 17:33 TBW3-26369.003
-rw-rw-rw- 1 root    sys          119   Jun  8 17:33 TBW3-26369.004
-rw-rw-rw- 1 root    sys          157   Jun  8 17:33 TBW3-26369.005
-rw-rw-rw- 1 root    sys          2607  Jun  8 17:33 TBW3-26369.006
-rw-rw-rw- 1 root    sys          140   Jun  8 17:33 TBW3-26369.007
-rw-rw-rw- 1 root    sys          116   Jun  8 17:33 TBW3-26369.008
-rw-rw-rw- 1 root    sys          113   Jun  8 17:33 TBW3-26369.009
-rw-rw-rw- 1 root    sys          125   Jun  8 17:33 TBW3-26369.010
```

Use the `cat` or `more` commands to view a specific text product.

TYPE: `cat <RequestID.prodNumber>`

or

TYPE: `more <RequestID.prodNumber>`

- Where <**RequestID.prodNumber**> is the text product to be retrieved (i.e., enter `cat TBW3-26369.007` from the example above).
- Displays the retrieved text product in the Terminal window.

NOTE: The asterisk wild card can be used to view more than one product (e.g., `more TBDW-26369*`), but it will return a lot of data. It is strongly recommended that you use the `more` command in some capacity to view multiple products.

23.4 *Changing NCF Archive Configuration at a Site*

Click the **Config** button on the main menu to change configuration options. A maximum of 20 products in **Max Products** and a maximum of 200 lists in **Max List Entries** can be selected. There is no predefined maximum on the scan interval; however, the users probably will not want to increase the default.

- ▶ To Change NCF Archive Configuration at a Site

Select: `Config` button from the **NCF Archive** window

- Displays the **Archive Config** window; refer to Exhibit 23.4-1

- The configuration menu allows you to change configuration options, as shown in Exhibit 23.4-1.

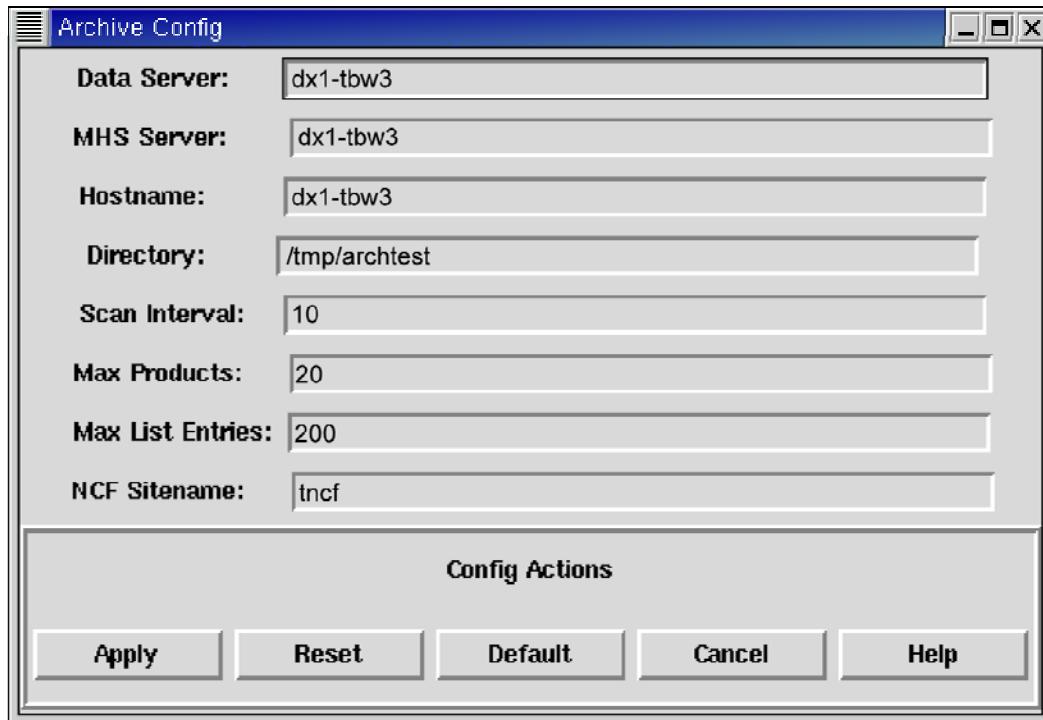


Exhibit 23.4-1. Archive Config Window in NCF Archive

Chapter 24

Data Archive Server

Chapter 24. Data Archive Server

Table of Contents

	<i>Page</i>
24.0 Data Archiver.....	1
24.1 WFO Archive Server	1
24.1.1 Initialization of Configuration Files	1
24.1.2 Customization and Archive Activation	2
24.1.3 Permanently Capturing and Archiving Data	3
24.1.4 AWIPS II Testing Approach	5
24.2 RFC Archive Server.....	6

List of Exhibits

Exhibit 24.1.3-1. Select Dates to Store GUI.....	3
Exhibit 24.1.3-2. Make CD or DVD GUI.....	5

24.0 Data Archiver

This chapter describes the data archivers for the WFOs and the RFCs.

24.1 WFO Archive Server

The AWIPS II data archiver system is rehosted from AWIPS I.

The WFO Archive Server (WAX) preserves the WSR-88D requirement for a local data archive. The WAX maintains a temporary (“roll-over”) archive of the last 5 days.

NOTE: The separate CD drive should be labeled as a non-operational drive during installation. This technology allows for very large data sets (up to 4.7 GB) to be written to a single digital disk, allowing for easy transport and ingest by the WES systems, as well as the use of less expensive CD-Rs for writing the smaller data sets typical of the Level IV data archives. The WAX meets the NWS’ Level IV Data Archive capability requirement.

The initial archiving function is accomplished by several scripts running as cron jobs that copy decoded data from the network file system (NFS)-mount to a set of subdirectories on a local WAX disk.

After initial setup, all routine management can be accomplished by using the two Archive Server Graphical User Interfaces (GUI). The GUIs are accessible from the applications menu on the AWIPS workstations.

The GUIs are as follows:

- **Select dates to store** (to select dates from the previous 4 days and the current day to compress and store permanently) **and Select data to archive** (to select which data should be stored in the 5-day temporary archive).
- **Make CD or DVD** (to select compressed data and write it to a CD or DVD).

NOTE: Only DVD-R and CD-R media should be used to archive data. DVD+R media is no longer supported.

24.1.1 Initialization of Configuration Files

► To Initialize the Archive Server Configuration Files

Log on to the WAX as user **archiver**. Enter the following command:

TYPE: `Install.tcl`

- Initializes the archiver’s configuration files to save all possible data.

NOTE: Running **Install.tcl** destroys any previous configuration made using the **Setup GUI**. Typically, **Install.tcl** will be run only once, immediately after installation of the **archiver** software from the CD.

24.1.2 Customization and Archive Activation

The **Setup.tcl** program presents a GUI listing all data directories available for archiving. Edit the lists to remove the directories you do not want to archive. Save your changes and exit.

► To Customize Your Configuration Files

There are three ways to run the **Setup.tcl** program.

1. Log on to the WFO Archive Server as user **archiver**. Set the **DISPLAY** variable and enter the following command:

TYPE: **Setup.tcl**

Or

2. Log on to the WFO Archive Server as user **archiver**. Set the **DISPLAY** variable and enter the following command:

TYPE: **Archive.tcl**

Click the “**Run Setup Program**” button at the bottom of Archive Compressor GUI.

Or

3. Log on to an AWIPS workstation. On the **Data Archiver** submenu:

Select: **Select data to archive**

This customizes your configuration files, which were initialized to contain all possible directories by the **Install.tcl** program at installation time. After running **Setup.tcl**, do not rerun **Install.tcl** unless you want to reinitialize the configuration files. There are four buttons at the bottom of Archiver Setup GUI:

- **Save:** Save finished configuration files
- **Get Original:** Get the initial baseline configuration files (with suffix .orig file extension) to customize
- **Get Current:** Get the customized configuration files
- **Exit:** Exit Archiver Setup GUI

To delete the unwanted entry on the display GUI, double-click it and confirm it.

Setup.tcl can be rerun at any time to include new directories for archiving (the names will need to be entered in the GUI) or to delete entries from the list being archived.

4. Use any text editor to edit the configuration file.

Edit the initial baseline configuration files (with suffix .orig extension, like grib.cfg.orig), remove the unwanted data to be archived, and save the customized files without suffix .orig extension, like grib.cfg.

24.1.3 Permanently Capturing and Archiving Data

To be saved permanently, data must be saved within 4 days. For example, if a weather event of interest occurs on Thursday, it must be saved before 2359Z the following Monday.

► **To Select the Dates of Data To Store**

From an AWIPS workstation on the **Data Archiver** submenu,

Select: **Select dates to store**

Action: Double-click on the dates to be archived

- The dates will move from the **Dates Available** column to the **Dates to Archive** column (refer to Exhibit 24.1.3-1).

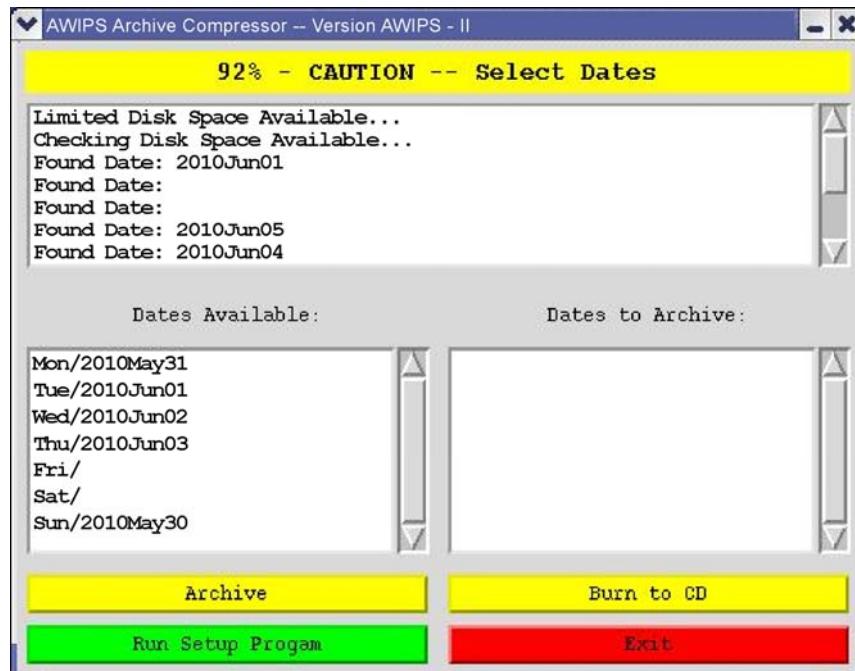


Exhibit 24.1.3-1. Select Dates to Store GUI

► **To Archive the Selected Data**

After all dates of interest have been selected, archive the data by selecting the **Archive** button on the **Select dates to store** submenu (refer to Exhibit 24.1.3-1).

Select: **Archive on the Select dates to store submenu**

- Creates compressed data for the selected dates.

NOTE: This can take quite a while to complete.

To watch the progress of the compression, log on as user **archiver** and look at the dates of the files:

TYPE: `watch "ls -lt /data/archiver/compressed/*"`

The GUI also displays the directory it is compressing. Also, note that when users are making compressed files, they will receive a pop-up asking if they want to delete the data. Answering **yes** to that question will delete the data from the 5-day archive on the WAX.

After the compression step is finished, data can be written to CD or DVD immediately or at a later time. Data in the compressed directory are not deleted until the disk is written or you choose to delete them.

► **To Write Data to CD or DVD**

The **Make CD or DVD** GUI can be entered directly from the **Select dates to store** GUI by selecting **Burn to CD** or from the **Make CD or DVD** option on the **Data Archiver** submenu on the AWIPS workstation.

From an AWIPS workstation on the **Data Archiver** submenu,

- Select:** **Make CD or DVD**
- Displays a list of archived files available for writing to CD or DVD (refer to Exhibit 24.1.3-2).
- Select:** The files to write by double-clicking on them
- Displays the total size of the saved set displayed as you click on the files.

NOTE: You can select the CD/DVD size to be 700MB or 4700MB.

On the **Make CD or DVD** (CD Burner) GUI, you can choose whether to erase the data after the CD or DVD is made. Also note that when the users are burning CDs or DVDs, they will receive a pop-up asking if they want to erase the data. Answering **yes** to that question will delete the **compressed.tar.gz** files after they are written to CD or DVD.

NOTE: The program has no way of knowing if the CD burn operation was successful. If you choose to have the data erased and the burn fails, you will have to go back to the **Select dates to store** GUI and recompress the data (if it is still in the 5-day archive). You may choose, therefore, not to have the CD burner script delete the data, but instead log on to the Archive Server and delete the data manually after you have verified that the data have been successfully written to the CD or DVD.

The compressed data are stored in **/data/archiver/compressed**.

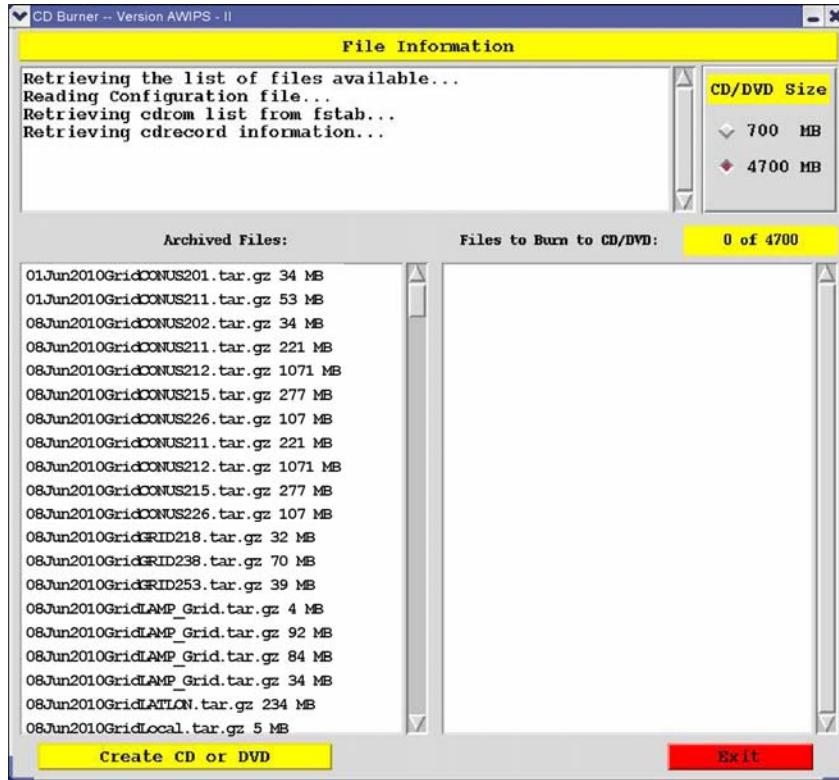


Exhibit 24.1.3-2. Make CD or DVD GUI

24.1.4 AWIPS II Testing Approach

There are three parts in the data archiver system. The first part is called “**Setup**” or “**Select data to archive**”. Before running this setup, the user first edits the data archiving configuration files in the config directory. The default configuration files are listed with a suffix appended to the name as ‘.orig’, like gridsbn.cfg.orig, gridsat.cfg.orig, etc. The user copies these files into the files with no ‘.orig’ suffix, like gridsbn.cfg, gridsat.cfg, etc. The user can use any text editor to remove unwanted data filenames from the list to be archived.

Alternatively, the user can use the “**Select data to archive**” GUI to manage the data to be archived. In the GUI, the user deletes those unwanted data directories by double-clicking the directory names. When only the data directories to be archived remain, the user clicks the “**Save**” button and this saves the list of archiving data directories back into the configuration files.

To go back to the original data archiving configuration files, the user can copy the files from the original configuration files or click “**Get original**” from the GUI.

In the meantime, the user should back up these configuration files and save them with a suffix appended to the name as ‘.bak’. To go back to the previous list of selected archiving data, clicking the “**Get current**” button will restore the previous configuration files.

The data archiver cron then uses the current configuration files (with no ‘.orig’ or ‘.bak’ suffix) to save the daily data into the 5dayRollover directory.

After completing this selection process, the user proceeds to the second part by bringing up another GUI: “**Select dates to store**”. Once the user picks one or more dates to store, the archiver should start compressing the data for the selected data directories from /data/archiver/5dayRollover directory and saving them into the /data/archiver/compressed directory.

After having completed compressing/storing data, the user proceeds to the third part by bringing up another GUI: “**Make CD or DVD**”. This will transfer the archived data to a CD or DVD.

24.2 *RFC Archive Server*

The RFC Archive Server (RAX) supports the RFC mission of requiring collection and analysis of hydrologic data over much larger areas than the typical WFO. Because of a lack of storage space, much of the hydrologic data available from field collection sites historically has not been stored on the HP Data Servers. Thus there was no opportunity to process it. The RFC Archive Server addresses both of these issues. RAX provides additional disk storage capacity to allow this previously unstored data to be stored in a new database, and it also provides the processing power and associated software to process large amounts of hydrologic data. RAX is not a redundant server; however, it does have an SCSI RAID Level 5 storage array (Ultra32, ServeRAID-5i SCSI Controller). RAID-5 allows for a single drive to fail at any given time without any data loss. It also has a DVD Drive/Recorder (DVR-A04 Pioneer DVR), and data can be selected and moved to more permanent storage or written to a CD or DVD.

NOTE: Only DVD-R and CD-R media should be used to archive data. DVD+R media is no longer supported.

The hardware specifications are as follows:

- Dedicated system, Rack mounted
- Intel Xeon 2.4GHz/400MHz
- 2 - 512MB PC2100 CL2.5 ECC DDR SDRAM RDIMM
- Ultra 320, ServeRAID-5i SCSI Controller (single channel)
- Six 73.4GB 10K rpm Ultra160 SCSI HS
- 10/100/1000 Port Ethernet Server Adapter
- Tape drive - 40/80GB DLT VS HH Int. SCSI Drive (Half-High) and Ultra 160 PCI Adapter(required for Tape device when using ServeRAID5i)
- DVD Drive/Recorder - DVR-A04 Pioneer DVR).

Chapter 25

AWIPS II/EDEX Administration Guide

Chapter 25. AWIPS II/EDEX Administration Guide

Table of Contents

	<i>Page</i>
25.0 Introduction to the AWIPS II/EDEX Administration Guide.....	1
25.1 Document Conventions and Assumptions	1
25.2 AWIPS II Deployment.....	2
25.2.1 EDEX Deployment Considerations.....	2
25.2.2 Operational Considerations	4
25.2.3 Additional AWIPS II Software Packages	4
25.3 Basic Data Flow Concepts	6
25.3.1 Basic Data Flow for ORPG/SPG Products.....	8
25.4 System Management.....	9
25.4.1 Managing EDEX on the DX3/4 Cluster.....	9
Example 25.4.1-1: Checking Status of EDEX Processes	10
Example 25.4.1-2: Starting EDEX Processes	11
Example 25.4.1-3: Starting EDEX Process (When Already Running)	11
Example 25.4.1-4: Using ps to Check for EDEX Processes.....	12
25.4.2 Managing Software on CPSBN1/21/2	15
25.4.3 Managing Software on DX1/2	20
25.4.4 Managing Software on PX1/2	25
25.4.4 Managing Software on DX3/4	25
25.5 System Configuration	30
25.6 EDEX Process Log and Log Format	30
25.6.1 Process Logs.....	30
25.6.2 Additional Log Files.....	30
25.6.3 Process Log File Naming Convention.....	30
Example 25.6.3-1: Log File Names	31
25.6.4 Log Formats	31
25.6.5 EDEX Logging Levels	31
Example 25.6.5-1: Monitoring EDEX Process Log for Errors.....	32
25.6.6 Controlling Logging Levels	33
25.7 EDEX System Monitoring.....	33
25.7.1 Using Standard Linux Tools.....	34
Example 25.7.1-1: Determining the EDEX Version	34

Example 25.7.1-2: Determining EDEX Status	35
Example 25.7.1-3: Determining EDEX Process Restarts	35
Example 25.7.1-4: Determining Available Data Types from Ingest	36
Example 25.7.1-5: Monitoring Data Ingest	38
Example 25.7.1-6: Monitoring Data Ingest Latency	41
Example 25.7.1-7: Monitoring Ingest Failures	43
Example 25.7.1-8: Verifying EDEX Ready to Execute	44
Example 25.7.1-9: Monitoring General EDEX Server Status	45
Example 25.7.1-10: Monitoring Just the EDEX Processes	47
25.7.2 Using the JConsole Tool	48
Example 25.7.2-1: Using JConsole to Monitor an EDEX Process	49
Example 25.7.2-2: Using JConsole to Examine Data Ingest Status	51
Example 25.7.2-3: Using JConsole to Monitor Request Status	54
Example 25.7.2-4: Using JConsole to Change Logging Thresholds	55
25.8 Other EDEX-Related Monitoring	58
25.8.1 Monitoring the Database	58
Example 25.8.1-1: Identifying the Database Used by EDEX.....	58
Example 25.8.1-2: Verifying that PostgreSQL Server Is Running.....	59
Example 25.8.1-3: Verifying Database Availability.....	60
Example 25.8.1-4: Determining Data Type Tables in Metadata Database.....	61
Example 25.8.1-5: Determine Latest Insertion Time of GRIB Metadata.....	62
Example 25.8.1-6: Determining Database Session Information Using psql	63
Example 25.8.1-7: Determining Data Type Tables in Metadata Database (Revisited).....	66
25.8.2 Monitoring the Data Store	69
Example 25.8.2-1: Determining the Disk Space Used by the Data Store.....	69
Example 25.8.2-2: Modifying Data Retention Time	69
Example 25.8.2-3: Determining Available Data Types (in the Data Store)	71
25.8.3 Monitoring QPID	74
Example 25.8.3-1: Verifying QPID Execution.....	74
Example 25.8.3-2: Monitoring QPID Execution	74
Example 25.8.3-3: Monitoring QPID Logging.....	75
25.8.3.1 QPID Monitoring Tools	76
Example 25.8.3.1-1: Determining the Status of the QPID Cluster	77
Example 25.8.3.1-2: Monitoring QPID Queue Status	78
Example 25.8.3.1-3: Monitoring Individual QPID Queues	79
25.8.4 Monitoring IP Virtual Server (IPVS)	81
Example 25.8.4-1: Verify/Monitor pulse Operation.....	83

Example 25.8.4-2: Verify/Monitor lvsd Operation.....	84
Example 25.8.4-3: Verify/Monitor nanny Operation	85
Example 25.8.4-4: Monitoring IPVS Using the ipvsadm Tool	86
25.8.5 Monitoring the LDM	90
Example 25.8.5-1: Verifying LDM Operation on the CP or DX Cluster	90
Example 25.8.5-2: Monitoring LDM Data Flow on the CP or DX Cluster	92
Example 25.8.5-3: Monitoring LDM Log on the CP or DX Cluster.....	94
25.8.6 Monitoring Radar Server.....	95
Example 25.8.6-1: Verifying Radar Server Operation	95
Example 25.8.6-2: Monitoring RCM Performance Using top.....	96
Example 25.8.6-3: Monitoring RCM Using JConsole.....	97
Example 25.8.6-4: Monitoring the Radar Server Log	98
25.8.7 Monitoring EDEX Subscription Script Running.....	99
Example 25.8.7-1: Identifying Registered Subscriptions – Using psql.....	100
Example 25.8.7-2: Identifying Registered Subscriptions – Using the CLI	105
Example 25.8.7-3: Identifying Text DB Triggers – Using the CLI.....	107
Example 25.8.7-4: Determining if Subscriptions Are Firing from the EDEX Process Logs	108
Example 25.8.7-5: Determining if Subscriptions Are Firing Using JConsole	109
25.8.8 Monitoring EDEX Smart Init Processing.....	111
Example 25.8.8-1: Monitoring the EDEX Ingest Process Log for Smart Init Processing.....	111
Example 25.8.8-2: Monitoring Smart Init Calculations (in the EDEX ingest process log).....	112
Example 25.8.8-3: Monitoring Smart Init Using JConsole	113
HDF5 Tools 116	
25.9.1 HDF5 Tools - Procedures.....	116
Example 25.9.1-1: The h5ls Tool	117
Example 25.9.-2: The h5dump Tool	117
Example 25.9.1-3: The h5stat Tool.....	117
Example 25.9.1-4: The h52gif Tool.....	118
Example 25.9.1-5: Tracing SBN Data into HDF5	118
25.9.2 The μEngine Web Test Driver	123
Example 25.9.2-1: Retrieving a Satellite Image via the μEngine Web Test Driver.....	123
25.10 CAVE/Workstation Setup Considerations.....	125
2.10.1 CAVE Startup Modes.....	125
25.10.2 Cave Installation.....	126
25.10.3 CAVE Startup.....	127
Example 25.10.3-1: Validating the LX VIZ Installation	128
Example 25.10.3-2: Validating the XT VIZ Installation	129

Example 25.10.3-3: Cave Connection Problems	129
25.11 Verifying that AWIPS II Processes Are Running.....	131
25.12 EDEX Startup and Shutdown Procedures.....	137
25.12.1 AWIPS II/EDEX Software Dependencies	138
25.12.2 Starting AWIPS II/EDEX Software	140
25.12.3 Verifying Software Execution.....	141
25.12.4 Stopping EDEX Software	143
25.12.5 Verifying Software Shutdown.....	144
25.12.6 Alternative Shutdown Scenarios	146
25.13 Troubleshooting Basic AWIPS II Data Flow	151
Example 25.13-1: Troubleshooting Satellite Data Flow.....	151
Example 25.13-2: Troubleshooting Radar Data Flow	152
25.14 Additional Resources	153

List of Exhibits

Exhibit 25.2.1-1. AWIPS II EDEX Installation.....	2
Exhibit 25.2.1-2. EDEX Install Structure	3
Exhibit 25.3-1. Basic SBN Data Flow	7
Exhibit 25.3.3-1. Local Radar Data Flow in AWIPS II.....	8
Exhibit 25.7.1-1. Basic <i>top</i> Display	46
Exhibit 25.7.1-2. <i>Top</i> Display with Selected Processes.....	48
Exhibit 25.7.2-1. Initial JConsole Display.....	50
Exhibit 25.7.2-2. JConsole MBean Tab, Initial Display.....	51
Exhibit 25.7.2-3. JConsole MBean Tab with org.apache.camel Expanded.....	52
Exhibit 25.7.2-4. Partial Listing of Camel Routes.....	52
Exhibit 25.7.2-5. Radar Decoder Route with Attributes Displayed	53
Exhibit 25.7.2-6. EDEX Request in JConsole with Routes Expanded.....	54
Exhibit 25.7.2-7. Micro Engine Http Thrift Bean Attributes.....	55
Exhibit 25.7.2-8. EDEX Logging Controls via JConsole	56
Exhibit 25.7.2-9. Set Level Operation of the Logging MBean.....	56
Exhibit 25.7.2-10. Changing a Logging Level	57
Exhibit 25.8.3.1-1. Typical Output of qpid-stat for Queue Monitoring	79
Exhibit 25.8.3.1-2. Typical Output of qpid-stat Monitoring Ingest Queues.....	80
Exhibit 25.8.3.1-3. Typical Output of qpid-queue-stats Monitoring Ingest Queues	81
Exhibit 25.8.4-1. Client Interaction with CAVE via IPVS	82
Exhibit 25.8.4-2. Basic Hierarchy of Tools in IPVS	83

Exhibit 25.8.4-3. <i>Top</i> Output Monitoring <i>pulse</i>	84
Exhibit 25.8.4-4. <i>Top</i> Output Monitoring <i>lvsd</i>	85
Exhibit 25.8.4-5. <i>Top</i> Output Monitoring <i>nanny</i>	86
Exhibit 25.8.4-6. Monitoring IPVS Connections Using <i>watch</i>	88
Exhibit 25.8.4-7. Monitoring IPVS Connection Statistics Using <i>watch</i>	89
Exhibit 25.8.4-8. Monitoring IPVS Rate Statistics Using <i>watch</i>	90
Exhibit 25.8.6-1. Using <i>top</i> to Monitor the Radar Server.....	97
Exhibit 25.8.6-2. Using JConsole to Monitor Radar Server	98
Exhibit 25.8.7-1. Sample Result of Timer Type Query	103
Exhibit 25.8.7-2. Sample Result of System Runner Query	104
Exhibit 25.8.7-3. Data Arrival Script Runner Bean Attributes.....	110
Exhibit 25.8.8-1. gfe-camel-spring Route in JConsole.....	114
Exhibit 25.8.8-2. smartInitTrigger Bean Attributes in JConsole	114
Exhibit 25.8.8-3. smartInitWork Bean Attributes in JConsole.....	115
Exhibit 25.8.8-4. JConsole Bean Attributes with Graphs	116
Exhibit 25.10.2-1. Standard CAVE Installation	126
Exhibit 25.10.3-1. CAVE Connectivity Error When Alert VIZ Is Not Available.....	130
Exhibit 25.10.3-2. CAVE Connectivity Error When Alert VIZ Is Available.....	130
Exhibit 25.10.3-3. No Alert VIZ, Localization Available	131
Exhibit 25.12-1. AWIPS II Software Deployment	138
Exhibit 25.12.1-1. AWIPS II Server Software Dependencies	139
Exhibit 25.13-1. Basic Data Flow Troubleshooting	151
Exhibit 25.13-2. Expanded EDEX Data Flow	152

List of Tables

Table 25.2.1-1. EDEX Installed Directories	3
Table 25.2.2-1. Available EDEX Operational Modes	4
Table 25.2.3-1. Additional AWIPS II Software Packages.....	Error! Bookmark not defined.
Table 25.4.1-1. edex_camel Command Line Options	9
Table 25.4.1-2. EDEX Process Log Locations	10
Table 25.4.2-1. CPSBN1/2 Services.....	15
Table 25.4.3-1. AWISP II Services on DX1/2.....	20
Table 25.4.3-2. DX1/2 Mounts on the DAS	20
Table 25.7.1-1. Useful Tools for Monitoring EDEX	34
Table 25.7.2-1 EDEX JConsole Ports.....	48
Table 25.8.3.1-1. Basic QPID Tools.....	77
Table 25.8.5-1. Selected LDM Feed Types	93

Table 25.8.7-1. Subscriptions Table Fields	101
Table 25.8.7-1 Basic Flags for Subscription CLI Tool.....	105
Table 25.8.7-2. Script Runners by EDEX Process	108
Table 25.9.1-1. Useful HDF5 Tools from the HDF Group	117
Table 25.10.1-1. CAVE Startup Modes.....	126
Table 25.10.2-1. Contents of VIZ Install Directory.....	127
Table 25.12.3-1. Expected Output from <i>ps</i> Commands.....	143

25.0***Introduction to the AWIPS II/EDEX Administration Guide***

This AWIPS II/EDEX Administration Guide provides information on the implementation of AWIPS II within the existing AWIPS system. It is intended as a resource for AWIPS System Managers who need a quick source of information for use in diagnosing and administering the AWIPS II software.

The structure of this administration guide differs from that of other SMM chapters. Sections 25.1 – 25.3 describe conventions used throughout the chapter, outline AWIPS II deployment considerations, and address the basic data flow concepts. The final section (25.14) identifies additional resources. The remaining sections focus on specific procedures for monitoring EDEX (the Environmental Data Exchange).

The procedural sections include a series of “examples,” which illustrate techniques that can be used to monitor or manage the AWIPS II/EDEX processes. The examples are broken down into “recipes,” which are actually step-by-step procedures (or “recipes”) for performing a specific task.

As you review the specific EDEX monitoring procedures presented here, remember that the following steps provide a general guide to checking EDEX operation.

- Check for running EDEX services.
- Check system log file for exceptions.
- Check for data ingest.
- Check for products in database.
- Check CAVE operation.

Finally, keep in mind that, unlike many of the diagrams presented elsewhere in the SMM, the diagrams in this chapter should be considered *conceptual*. For example, a diagram may have a single box representing a cluster.

25.1***Document Conventions and Assumptions***

In order to provide a consistent presentation of information that reflects the known state of the AWIPS II system, several conventions have been adapted for use in this administration guide. In addition, assumptions were made about the AWIPS II installation environment. A list of these assumptions and conventions follows.

1. It is assumed that AWIPS II software on a server is installed into /awips2.
2. It is assumed that EDEX software is being installed on DX3 and DX4. On fielded systems, the server names may be dx3-xxx and dx4-xxx, where xxx is the site identifier.
3. In Examples involving user interaction with a server, it is assumed that the user will open a terminal and log into the server. A generic prompt (\$) is used. User inputs are shown in an *italic Courier New* font; computer output is shown in a plain font, also *Courier New*.

4. All Examples utilize the Linux ssh utility to perform remote logins to the server; other remote login tools are available, for example, putty. If another tool is used, the Examples may need to be adjusted.
5. When you log on to a server, the server returns a banner for display by the client. To save space in the recipes, this banner is omitted from listings.
6. To simplify command line interactions, it is assumed that all tools are located on the user's PATH. If that is not the case, command lines should be adjusted.

25.2

AWIPS II Deployment

EDEX is deployed to DX3 and DX4. Additional EDEX-related components are installed on other servers.

25.2.1 EDEX Deployment Considerations

On each DX box, the deployment consists of a set of directories under /awips2, as shown in Exhibit 25.2.1-1.

```
/awips2
| - - GFESuite
| - - adapt
| - - edex
| - - fxa
| - - java
| - - notification
| - - psql
| - - python
| - - qpid
` - - tools

(On DX 3/4)
```

Exhibit 25.2.1-1. AWIPS II EDEX Installation

NOTE: There is a single installation of EDEX; all EDEX instances run from this single installation. This increases operational flexibility while simplifying installation.

The installation structure under the *edex* directory is shown in Exhibit 25.2.1-2.

```

/awips2/edex
| -- bin
| -- conf
| -- data
| -- etc
| -- lib
| -- logs
`-- webapps

(On D\ 3/4)

```

Exhibit 25.2.1-2. EDEX Install Structure

From an administration/monitoring standpoint, the important directories are *bin*, *conf*, *data*, and *logs*. For a list of specific files of interest in this installation tree, see Table 25.2.1-1.

Table 25.2.1-1. EDEX Installed Directories

Directory	File	Description/Use
bin		Directory that contains the basic scripts used to run the EDEX processes. The contents of this directory are not normally modified in the field.
	start.sh	Basic startup script for EDEX. Normally, this file will not be changed once the system has been installed.
	setup.env	Basic localization information for EDEX. See the Localization document cited in section 25.14, Additional Resources, for guidance on when it should be modified.
	<process>.pid	Contains the Product Identifier (PID) of the wrapper instance controlling an EDEX process. (<process> represents the name of the EDEX process; valid process names are <i>ingestDat</i> , <i>ingestGrib</i> , <i>ingest</i> , and <i>request</i> . These files exist only when the EDEX processes are executing.
conf		Contains basic configuration for the EDEX processes. See the Localization document cited in section 25.14, Additional Resources for guidance on when files should be modified.
	banner.txt	Contains the <i>banner</i> logged at each EDEX startup. The banner can be used to identify the installed version of EDEX.
data		Directory tree that contains the files utilized and/or generated by the EDEX processes. In the EDEX cluster, this directory is mounted to a shared directory (on the NAS). All files in this directory tree are visible to all servers in the EDEX cluster.
	modes.xml	Defines the EDEX operational modes: <i>ingestDat</i> , <i>ingestGrib</i> , <i>ingest</i> , and <i>request</i> . This file should not be modified; changing this file will adversely effect EDEX operation.
	log4j-ingest.xml and log4j.xml	Defines EDEX logging. For details, see section 25.6.

Directory	File	Description/Use
data/static and data/utility		Directories containing the data used and/or generated by the EDEX processes. Some of the files here are part of the EDEX localization; see the Localization document cited in section 25.14, Additional Resources for guidance on when files should be modified.
data/hdf5		Directories under data/hdf5 that contain the HDF5 files which hold data ingested by the EDEX Ingest process. These directories may be monitored to get a rough idea of what data is being ingested.
etc		Contains the following scripts that are sourced by start.sh to customize EDEX startup: debug.sh ingestDat.sh ingest.sh request.sh default.sh ingestGrib.sh profiler.sh
logs		Directory that contains logs files for the EDEX processes. See EDEX Process Logs for more information on the logs.

25.2.2 Operational Considerations

EDEX has been re-engineered to allow it to run multiple configurations out of a single installation. This is done via command line switches. EDEX currently supports four command line switches – *ingest*, *ingestGrib*, *ingestDat*, and *request*. In operational settings, the syntax for starting EDEX is

```
/awips2/edex/bin/start.sh [mode]
```

The operational modes currently supported are shown in Table 25.2.2-1.

Table 25.2.2-1. Available EDEX Operational Modes

EDEX Mode	Token	Description
Ingest	ingest	Starts an EDEX (radar, satellite, text, trigger, gen_areal_ffg, shef-performance, smartInit) process that supports Ingest operations.
DAT Ingest	ingestDAT	Starts an EDEX process that supports the ingest process for the Decision Aids Toolset (DAT).
GRIB Ingest	ingestGrib	Starts an EDEX process that supports ingest of GRIB products.
Request	request	Starts an EDEX process that supports Request operations.

If no mode is specified, a single EDEX process that supports all Ingest and Request operations is started. If an invalid mode is specified, EDEX will run long enough to generate a log for the specified (invalid) mode, but will then shut down.

Which operational modes will be used when starting EDEX depends upon the available memory on the EDEX server. The Ingest, GRIB Ingest and Request processes will always be started; the DAT Ingest process is started only on servers having at least 4 GByte of memory.

25.2.3 Additional AWIPS II Software Packages

In addition to EDEX installed on DX3 and DX4, AWIPS II installs additional software packages on several AWIPS servers. (See Exhibit 25.2-1.) These additional software packages provide functionality to support EDEX and are listed in Table 25.2.3-1.

Table 25.2.3-1. Additional AWIPS II Software Packages

Package	Server	Function
PostgreSQL*	DX1/2	Hosts the AWIPS II database, including rehosted application databases.
PyPIES	DX1/2	AWIPS II data store management software – performs read/write operations in the HDF5 data store.
QPID	CP1/2	Message broker – handles IPC between EDEX instances, LDM and EDEX, RCM and EDEX, EDEX and CAVE, etc.
RCM	DX1/2	AWIPS II Radar Server – provides the bridge between ORPG/SPG and EDEX ingest.
IPVS	CP1/2	IP Virtual Server – provides IP aliasing between DX3 and DX4.
LDM	CP1/2 & DX 1/2	Provides a bridge for data between the SBN and EDEX and RCM and EDEX. Also manages the Data Archive.

***Postgres Database (v8.3.4):** EDEX uses Postgres as the repository for storing metadata extracted during the data ingest process. The database also contains the text database, the maps database, and the hydro database.

In a typical AWIPS II installation, the Postgres database, by default, is installed on the dx1 server under the /awips2/postgresql directory. The following is an overview of some important directories and files in the postgres installation.

- **/awips2/postgresql/bin** ◦ **start_developer_postgres.sh** and **start_postgres.sh**. Either of these scripts can be used to start the postgres server on a development workstation.
- **psql**. This is the command line interface for interacting with the postgres database. A typical usage of this command to connect to the metadata database is as follows: psql -d metadata -U awips -h dx1. You would then enter the password for user awips, which is awips. Once connected, you are now able to interact with the database using SQL or the set of meta-commands provided by psql. Detailed documentation about using psql and psql's meta-commands can be found here:
<http://www.postgresql.org/docs/8.3/static/app-psql.html>

Further documentation about the client applications in this directory can be found here:
<http://www.postgresql.org/docs/8.3/static/reference-client.html>

- **/awips2/postgresql/doc**. This directory contains a complete set of html documents detailing the usage of postgres.
- **/awips2/postgresql/include**. This directory contains code used internally by postgres and should not be manually modified.
- **/awips2/postgresql/lib**. This directory contains libraries used by postgres and should not be manually modified.
- **/awips2/postgresql/man**. Unix man pages for client applications included in the postgres installation.

The /awips2/data directory is used by postgres to store table information (schemas, tablespaces, etc) and user configurable files. Some important directories and files contained in this directory are:

- **/awips2/data/postgresql.conf.** This file controls a number of items defining how Postgres behaves behind the scenes including memory usage, logging, and querying. Modifying items in this file can have significant performance implications. Therefore, modifications should be carefully considered. A series of documentation explaining the various configuration items contained in this file is here: <http://www.postgresql.org/docs/8.3/static/runtime-config-file-locations.html>.
- **/awips2/data/pg_hba.conf.** This file controls client connection permissions and authentication. Detailed documentation about this file and other client authentication concerns can be found here:
<http://www.postgresql.org/docs/8.3/static/client-authentication.html>.
- **/awips2/data/pg_log.** This directory contains the postgres logs. Logging behavior can be enabled/disabled and modified in the aforementioned postgresql.conf file.

The complete set of documentation for Postgres 8.3 is located here:

<http://www.postgresql.org/docs/8.3/static/index.html>.

PGAdmin3: PGAdmin3 is a graphical interface to view postgres databases. Refer to the PGAdmin3 documentation for usage details: <http://www.pgadmin.org/docs/>.

25.3 Basic Data Flow Concepts

EDEX is fairly agnostic as to the actual source of its data; however, there are two specific routes by which data may be delivered to EDEX:

1. The data source moves a file into the manual processing directory (manual ingest); or
2. The data source sends a message to the message broker (QPID) defining the data that is ready to process. The message contains the path to a file containing the data to ingest.

Option 1, manual ingest, is beyond the scope of this administration guide.

Exhibit 25.3-1 shows the basic flow of data from the Satellite Broadcast Network (SBN) to the EDEX ingest processes.

Data received over the SBN includes non-local radar products, satellite imagery, GRIB data, ASCII text-based products such as METAR, and Terminal Aerodrome Forecast (TAF) products and weather bulletins. All SBN data ingest shares the same general pattern. This general pattern is shown in Exhibit 25-3.1.

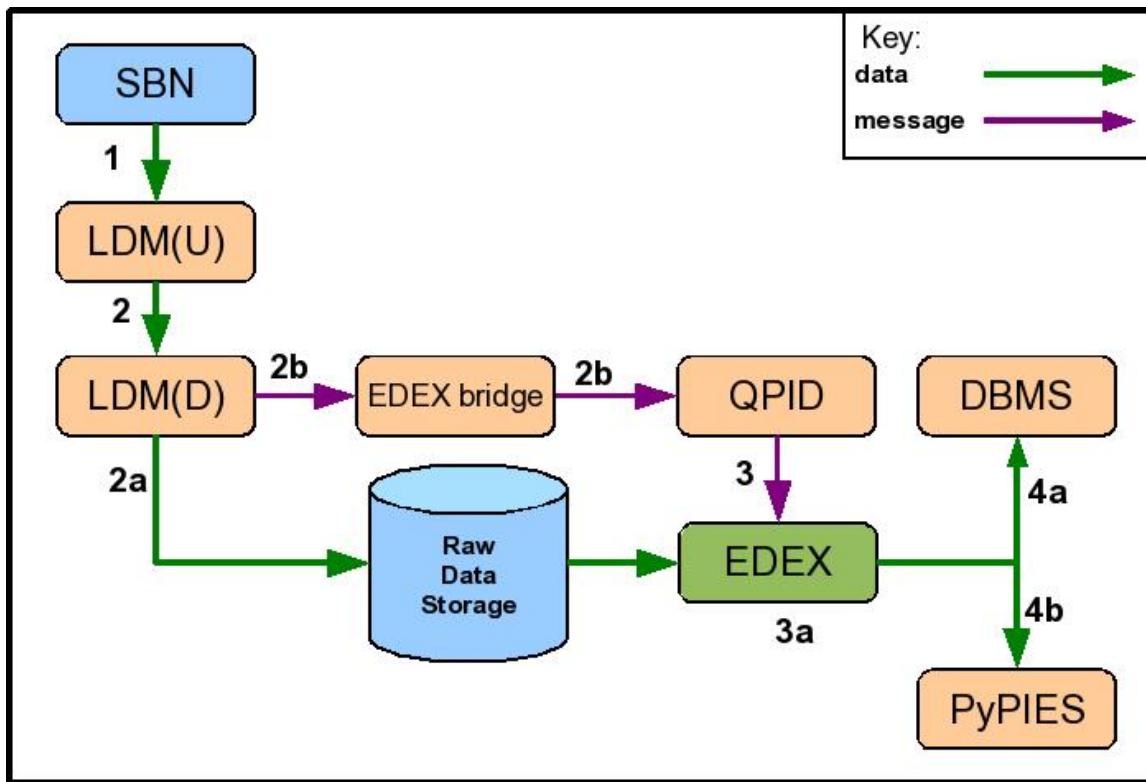


Exhibit 25.3-1. Basic SBN Data Flow

As shown in Exhibit 25.3-1:

1. Data is received from the SBN by the LDM(U). (Included is a sequence number to identify the data.)
2. The LDM(U) passes the data to the LDM(D). The LDM(D) performs two functions:
 - a. LDM(D) writes the product as a file to Raw Data Storage.
 - b. A “data available” message is sent via the EDEX bridge to the QPID message broker.
3. The EDEX Ingest process obtains the “data available” message from QPID and determines the data decoder to use to ingest the data.
 - a. The data decoder reads the raw data from Raw Data Storage and decodes it.
4. Once decoded, the data is persisted for later retrieval.
 - a. The data is sent to the DBMS.
 - i. Information about the data is persisted to the AWIPS II metadata database.
 - ii. Some types of data, such as text products, are written to tables in the AWIPS II database.
 - b. Certain types of data (satellite imagery, radar imagery, GRIB data, and certain point data) are written to Hierarchical Data Format – 5 (HDF5) files in HDF5 data storage. This is performed via the PyPIES process on DX1/2.

5. In some cases, EDEX will automatically run scripts on arrival of the data.

To verify this data flow, log into the various servers in the system and examine log files to trace the data from the source to its final destination. You can also examine the database and file systems to verify that the data has been ingested.

If you discover that the data flow has been interrupted, make sure that the applications involved in the data flow are running. If one of the applications is not running, diagnose and correct the problem; then restart the application.

25.3.1 Basic Data Flow for ORPG/SPG Products

Local radar data is obtained from the ORPG/SPG and written to Raw Data Storage by the AWIPS II Radar Server. The Radar Server then passes a “data available” message to QPID. The basic data flow is shown in Exhibit 25.3.1-1.

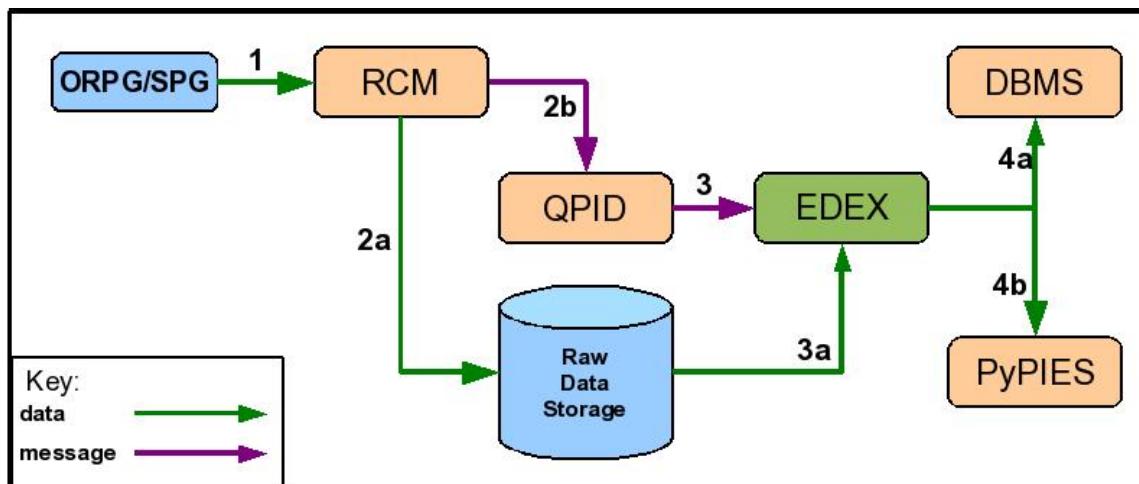


Exhibit 25.3.1-1. Local Radar Data Flow in AWIPS II

As shown in Exhibit 25.3.3-1:

1. The RCM obtains a local radar product from the ORPG/SPG.
2. The Radar Server performs two operations for the data it receives.
 - a. The Radar Server writes the product as a file to Raw Data Storage.
 - b. The Radar Server posts a “data available” message to the QPID message broker.
3. The EDEX Ingest process obtains the “data available” message from QPID and determines the data decoder to use to ingest the data.
 - a. The data decoder reads the raw data from Raw Data Storage and decodes it.
4. Once decoded, the data is persisted for later retrieval.
 - a. The data is sent to the DBMS.
 - i. Information about the data is persisted to the AWIPS II metadata database.

- ii. Some types of data, such as text products, are written to tables in the AWIPS II database.
- b. Certain types of data, including radar imagery, are written to HDF5 files in Processed Data Storage. This is performed via the PyPIES process on DX1/2.

Note: In some cases, EDEX will automatically run scripts on arrival of the data. To verify the local radar data flow, log into the various servers in the system and examine log files to trace the data from the source to its final destination. You can also examine the database and file systems to verify that the data has been ingested.

If you discover that the data flow has been interrupted, make sure the applications involved in the data flow are running. If one of the applications is not running, diagnose and correct the problem; then restart the application.

25.4 System Management

AWIPS II system management involves the control of both EDEX on the DX3/4 and the additional software packages described Section 25.2.3. This section covers basic system management for these software systems.

25.4.1 Managing EDEX on the DX3/4 Cluster

Once EDEX has been installed, the recommended means of control is via the `edex_camel` script, which is located in `/etc/init.d`. This script conforms to the standard interface for system control scripts:

```
/etc/init.d/edex_camel option [service [service] ...]
```

The standard options – start, stop, and restart – are supported, as are additional, mode-specific options. The options that are currently available are listed in Table 25.4.1-1.

Table 25.4.1-1. edex_camel Command Line Options

Option	Effect
start	Starts all EDEX processes
stop	Stops all EDEX processes
restart	Restarts all EDEX processes
reload	Requests a reload of all EDEX processes
status	Obtains status information for the EDEX processes

If no option is specified, a usage message is displayed. If one or more services are specified, only those services are used. For a list of available EDEX processes, see Section 25.2.2, [Operational Considerations](#).

For example, to check the status of the request instance, the command line in use is

```
/etc/init.d/edex_camel status request
```

NOTE: *edex_camel* controls the EDEX processes on a single server. Because of the nature of the script, it should be used only by the root user. (There is one exception to the rule, i.e., any user may use the *status* option to determine if each EDEX process is running.)

The EDEX process logs routine status messages as well as error messages. Note that EDEX keeps separate logs on DX3 and DX4; as a result, both servers logs must be examined when monitoring the system and confirming system startup and shutdown. The locations of the EDEX logs on DX3 and DX4 are listed in Table 25.4.1-2.

Table 25.4.1-2. EDEX Process Log Locations

Server	EDEX Process	Log Location
DX3	EDEX Ingest (radar, satellite, text, trigger, gen_areal_ffg, shef-performance, smartInit)	/awips2/edex/logs
DX3	EDEX DAT Ingest	/awips2/edex/logs
DX3	EDEX GRIB Ingest	/awips2/edex/logs
DX3	EDEX Request	/awips2/edex/logs
DX4	EDEX Ingest	/awips2/edex/logs
DX4	EDEX DAT Ingest	/awips2/edex/logs
DX4	EDEX GRIB Ingest	/awips2/edex/logs
DX4	EDEX Request	/awips2/edex/logs

Details on the EDEX process logs, including log file naming conventions, log entry formatting, and logging configuration, are covered in Section [25.6, EDEX Process Log and Log Format](#).

Example 25.4.1-1: Checking Status of EDEX Processes

This recipe presents two scenarios: 1) checking the status of all EDEX processes; and 2) checking the status of a specific EDEX process. The steps to follow for each scenario are:

Scenario 1: To Check the Status of the EDEX Processes on DX3

```
$ ssh root@dx3
root@dx3's password:
$ cd /etc/init.d
$ ./edex_camel status

EDEX Camel (ingest) is running (wrapper PID 24173)
EDEX Camel (ingest) is running (java PID 24175)
EDEX Camel (ingestGrib) is running (wrapper PID 24272)
EDEX Camel (ingestGrib) is running (java PID 24274)
EDEX Camel (ingestDat) is running (wrapper PID 17309)
EDEX Camel (ingestDat) is running (java PID 17314)
EDEX Camel (request) is running (wrapper PID 24497)
EDEX Camel (request) is running (java PID 14130)
```

Scenario 2: To Check the Status of the EDEX Request Process on DX3

```
$ ssh root@dx3
root@dx3's password:
$ cd /etc/init.d
$ ./edex_camel status request

EDEX Camel (request) is running (wrapper PID 24497)
EDEX Camel (request) is running (java PID 14130)
```

Example 25.4.1-2: Starting EDEX Processes

To start EDEX processes on DX4, use this recipe:

```
$ ssh root@dx4
root@dx4's password:
$ cd /etc/init.d
$ ./edex_camel start

Starting EDEX Camel (ingest): WARNING: EDEX ingest instance
already running, not starting another instance
OK

Starting EDEX Camel (ingestGrib): WARNING: EDEX ingestGrib
instance already running, not starting another instance
OK

Starting EDEX Camel (ingestDat): WARNING: EDEX ingestDat
instance already running, not starting another instance
OK

Starting EDEX Camel (request): WARNING: EDEX request instance
already running, not starting another instance
OK
```

edex_camel does some checking prior to taking a start/stop action. Specifically, it checks for existing EDEX processes in each case. Then, for a start action:

1. It displays a warning if the process **is** already running, and
2. It displays a warning if the process **is not** already running.

In both cases, the action is terminated after the warning is issued.

Example 25.4.1-3: Starting EDEX Process (When Already Running)

To attempt to start the EDEX ingest process on DX3 when it is already running, these are the steps to follow:

```
$ ssh root@dx3
root@dx3's password:
$ cd /etc/init.d
```

```
$ ./edex_camel start ingest
Starting EDEX Camel (ingest): WARNING: EDEX ingest instance
already running, not starting another instance
OK
```

Because of the *SEDA Load Balancing* provided by the QPID message broker, an EDEX process running on DX3 or DX4 may be stopped with minimal impact to overall system operation. The remaining EDEX process, on the other DX box, will automatically pick up the full load. Restarting the EDEX process will result in the load balance being restored.

One additional concept on system management is this: EDEX is a Java process that runs as a Java Virtual Machine (JVM). To improve the reliability/robustness of EDEX, AWIPS II uses *Java Service Wrapper* (wrapper) from Tanuki Software to manage the JVM running each EDEX process. Wrapper is an independent process that starts and monitors the EDEX JVM; should the JVM crash, wrapper will restart the EDEX process automatically. Both the crash and the restart are logged to the EDEX process log.

Example 25.4.1-4: Using ps to Check for EDEX Processes

The Linux *ps* tool is commonly used to obtain basic information on processes running on a Linux server. Because *ps* will provide a bunch on information, the Linux *grep* tool is normally used to filter its output. Use *ps* to obtain information on the EDEX ingest process on DX3. The steps to follow:

```
$ ssh root@dx3
root@dx3's password:
$ ps aux | grep ingest

awips      13458  0.0  0.0   6404  1584 ?          S     Jan24
0:00 /bin/bash /awip      s2/edex/bin/start.sh -noConsole -h
ingest

awips      13518 99.9 15.8 1624492 1312692 ?          S1    Jan24
422:35 /awips2/java/bi      n/java -Ddedex.run.mode=ingest -
-Ddedex.home=/awips2/edex -XX:MaxPermSize=128m -Dded
ex.dev.mode=%DEV_MODE% -Dcom.sun.management.jmxremote -
Duser.timezone=GMT -XX:+U           seConcMarkSweepGC -
XX:+CMSIncrementalMode -Djava.net.preferIPv4Stack=true -Ddb.a
ddr=dx1f -Ddb.port=5432 -Dbroker.addr=cp1f -
Ddc.db.name=dc_ob7oax -Dfxa.db.name=        fxatext -
Dhm.db.name=hmdb -Dih.db.name=hd_ob92oax -
Daw.site.identifier=OAX -Ddat           a.archive.root=/data_store
-Djms.pool.min=64 -Djms.pool.max=128 -Ddb.metadata.po
ol.min=10 -Ddb.metadata.pool.max=50 -
Dcom.sun.management.jmxremote.port=1617 -Dc
om.sun.management.jmxremote.authenticate=false -
Dcom.sun.management.jmxremote.ss      l=false -
DBYTEARRAYOUTPUTSTREAMPOOL.maxPoolSize=16 -
DBYTEARRAYOUTPUTSTREAMPOOL.i      nitStreamSize=2 -
```

```

DByteArrayOutputStreamPool.maxStreamSize=6 -
Dpypes.server=http://dx1f:9582 -
Dpypes.maxConnections=50 -Dlog4j.configuration=log4j-
ingest.xml - Dhttp.server=http://ec:9581/services -
Djms.server=tcp://cp1f:5672 -DHightMem=on -
Dmanagement.port=9602 -Dqpid.dest_syntax=BURL -Xms512m -
Xmx896m -Djava.library.path=/awips2/edex/bin/linux-x86-
32:/awips2/edex/lib/native/linux32/awips1:/awips
2/java/lib:/awips2/python/lib:/awips2/sql/lib:/awips/ops/sharedLib:/awips2/edex
/lib/native/linux32/ -classpath /awips2/edex/bin/wrapper.jar:/awips2/edex/lib/pl
ugins/com.raytheon.uf.edex.esb.camel.launcher.jar:/awips2/edex
/conf:/awips2/ede
x/conf/cache/:/awips2/edex/conf/spring/ -
Dwrapper.key=_qJJ2kOGibslGjtk -Dwrapper .port=32000 -
Dwrapper.jvm.port.min=31000 -Dwrapper.jvm.port.max=31999 -
Dwrapper.pid=13516 -Dwrapper.version=3.5.10 -
Dwrapper.native_library=wrapper -Dwrapper.cp u.timeout=10
-Dwrapper.jvmid=1 org.tanukisoftware.wrapper.WrapperSimpleApp
com.r aytheon.uf.edex.esb.Main start

awips 13570 0.0 0.0 6404 1588 ? S Jan24
0:00 /bin/bash /awip s2/edex/bin/start.sh -noConsole -h
ingestGrib

awips 13631 8.7 16.3 1535852 1354104 ? S1 Jan24
36:59 /awips2/java/bi n/java -Ddedex.run.mode=ingestGrib -
Ddedex.home=/awips2/edex -XX:MaxPermSize=128m -
Ddedex.dev.mode=%DEV_MODE% -Dcom.sun.management.jmxremote -
Duser.timezone=GMT -X:+UseConcMarkSweepGC -
XX:+CMSIncrementalMode -Djava.net.preferIPv4Stack=true -D
db.addr=dx1f -Ddb.port=5432 -Dbroker.addr=cp1f -
Ddc.db.name=dc_ob7oax -Dfxa.db.name=fxatext -
Dhm.db.name=hmdb -Dih.db.name=hd_ob92oax -
Daw.site.identifier=OAX - Ddata.archive.root=/data_store
-Djms.pool.min=4 -Djms.pool.max=16 -Ddb.metadata.
pool.min=4 -Ddb.metadata.pool.max=10 -
Dcom.sun.management.jmxremote.port=1618 -D
com.sun.management.jmxremote.authenticate=false -
Dcom.sun.management.jmxremote.ssl=false -
DByteArrayOutputStreamPool.maxPoolSize=16 -
DByteArrayOutputStreamPool.initStreamSize=2 -
DByteArrayOutputStreamPool.maxStreamSize=6 -Dpypes.server=htt
p://dx1f:9582 -Dpypes.maxConnections=50 -
Dlog4j.configuration=log4j.xml -Dhttp.
server=http://ec:9581/services -Djms.server=tcp://cp1f:5672 -
DHightMem=on -Dmanagement.port=9603 -
Dqpid.dest_syntax=BURL -Xms128m -Xmx1024m -
Djava.library.path=/awips2/edex/bin/linux-x86-
32:/awips2/edex/lib/native/linux32/awips1:/awips2/jav
a/lib:/awips2/python/lib:/awips2/sql/lib:/awips/ops/sharedLib
:/awips2/edex/lib/ native/linux32/ -classpath

```

```

/awips2/edex/bin/wrapper.jar:/awips2/edex/lib/plugins
/com.raytheon.uf.edex.esb.camel.launcher.jar:/awips2/edex/conf
/:/awips2/edex/con      f/cache/:/awips2/edex/conf/spring/ -
Dwrapper.key=N-ejKXCFk6w9b4r8 -Dwrapper.port      =32001 -
Dwrapper.jvm.port.min=31000 -Dwrapper.jvm.port.max=31999 -
Dwrapper.pid=1      3628 -Dwrapper.version=3.5.10 -
Dwrapper.native_library=wrapper -Dwrapper.cpu.tim      eout=10
-Dwrapper.jvmid=1 org.tanukisoftware.wrapper.WrapperSimpleApp
com.raythe      on.uf.edex.esb.Main start

awips      13671 0.0 0.0   6404  1580 ?           S     Jan24
0:00 /bin/bash /awip      s2/edex/bin/start.sh -noConsole -h
ingestDat

awips      13732 10.6 16.2 1748828 1352364 ?           S1    Jan24
45:03 /awips2/java/bi      n/java -Ddedex.run.mode=ingestDat -
Ddedex.home=/awips2/edex -XX:MaxPermSize=128m -
Ddedex.dev.mode=%DEV_MODE% -Dcom.sun.management.jmxremote -
Duser.timezone=GMT -XX      :+UseConcMarkSweepGC -
XX:+CMSIncrementalMode -Djava.net.preferIPv4Stack=true -Dd
b.addr=dx1f -Ddb.port=5432 -Dbroker.addr=cplf -
Ddc.db.name=dc_ob7oax -Dfxa.db.na      me=fxatext -
Dhm.db.name=hmdb -Dih.db.name=hd_ob92oax -
Daw.site.identifier=OAX -D      data.archive.root=/data_store
-Djms.pool.min=16 -Djms.pool.max=32 -Ddb.metadata.
pool.min=15 -Ddb.metadata.pool.max=30 -
Dcom.sun.management.jmxremote.port=1619 -
Dcom.sun.management.jmxremote.authenticate=false -
Dcom.sun.management.jmxremote.      ssl=false -
DByteArrayOutputStreamPool.maxPoolSize=16 -
DByteArrayOutputStreamPool      .initStreamSize=2 -
DByteArrayOutputStreamPool.maxStreamSize=6 -Dpypies.server=ht
tp://dx1f:9582 -Dpypies.maxConnections=50 -
Dlog4j.configuration=log4j.xml -Dhttp
.server=http://ec:9581/services -Djms.server=tcp://cplf:5672 -
DHIGHMem=on -Dmax      gement.port=9604 -
Dqpid.dest_syntax=BURL -Xms256m -Xmx1280m -Djava.library.path=
/awips2/edex/bin/linux-x86-
32:/awips2/edex/lib/native/linux32/awips1:/awips2/ja
va/lib:/awips2/python/lib:/awips2/sql/lib:/awips/ops/sharedLi
b:/awips2/edex/lib      /native/linux32/ -classpath
/awips2/edex/bin/wrapper.jar:/awips2/edex/lib/plugin
s/com.raytheon.uf.edex.esb.camel.launcher.jar:/awips2/edex/conf
/:/awips2/edex/co      nf/cache/:/awips2/edex/conf/spring/ -
Dwrapper.key=AzLqV2W7m2zZIRVr -Dwrapper.port      t=32002 -
Dwrapper.jvm.port.min=31000 -Dwrapper.jvm.port.max=31999 -
Dwrapper.pid=      13729 -Dwrapper.version=3.5.10 -
Dwrapper.native_library=wrapper -Dwrapper.cpu.ti      meout=10
-Dwrapper.jvmid=1 org.tanukisoftware.wrapper.WrapperSimpleApp
com.rayth      on.uf.edex.esb.Main start

```

At this point, it is easy to see that further tuning of the *ps / grep* approach for monitoring an EDEX process is required. This requires more information about the EDEX system and is covered in more detail in section 25.7, [EDEX System Monitoring](#).

25.4.2 Managing Software on CPSBN1/2/1/2

CPSBN1 and CPSBN2 function as a heartbeat cluster; failover is managed automatically or manually. Note that only a single high-availability package is currently used on this cluster. The package name is a2cp1apps. In failover mode, package execution shifts to the backup server. Note that there is software (notably the LDM(U) processes) that runs on both CPSBN1 and CPSBN2 and is not part of the a2cp1apps package. The a2cp1apps package manages the cp1f floating server name. Note that floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages.

The AWIPS II services used on CPSBN1/2 are listed in Table 25.4.2-1.

Table 25.4.2-1. CPSBN1/2 Services

System	AWIPS II Services
CPSBN1 and CPSBN2	LDM Upstream (LDM(U)), Queue Processor Interface Daemon (Apache AMQP Message Broker) (QPID), Java, Python, rehost

The AWIPS II services on CPSBN1/2 are managed using the standard Linux *service* tool, which requires root access to run and is normally located /sbin. They can also be managed by directly executing the System V scripts located in /etc/init.d. In addition, LDM(U) may be controlled directly using the *ldmadmin* tool. The root user must switch user to ldm prior to running ldmadmin, however.

The AWIPS II services may be started with the Linux *service* command; the basic command format is *service <name> start*. To start the AWIPS II services on either CPSBN1 or CPSBN2, log into the target server using the root account and password.

1. To start ldmcp:

Enter: **service ldmcp start**

2. To start qpid:

Enter: **service qpid start**

3. To start pulse:

Enter: **service pulse start**

The AWIPS II services may be stopped with the Linux *service* command; the basic command format is *service <name> stop*. To stop the AWIPS II services on either CPSBN1 or CPSBN2, log into the target server using the root account and password.

1. To stop ldmcp:

Enter: **service ldmcp stop**

2. To stop qpidd:

Enter: **service qpidd stop**

3. To stop pulse:

Enter: **service pulse stop**

The AWIPS II services may be status checked with the Linux *service* command; the basic command format is *service <name> status*. It is also useful to use the Linux *ps* command to operation.

The CP1/2 cluster is a heartbeat cluster, although the architecture is somewhat different from that of DX1/2. On the CP1/2 cluster, the LDM(U) processes will normally run on both CPSBN1 and CPSBN2 and are not heartbeat managed. The heartbeat manages QPID and pulse (IPVS), which run on one of the servers. This server is accessed via the cp1f floater. You will log into the servers using the *root* login and password.

The software to check on the CP1/2 cluster consists of:

- The heartbeat service (CPSBN1 and CPSBN2)
- The LDM(U) processes (CPSBN1 and CPSBN2)
- The QPID message broker (cp1f)
- The pulse (IPVS) service (cp1f)

Dataflow to check on the CP1/2 cluster:

- LDM(U) data flow (on CPSBN1 and CPSBN2)

For verification, perform these steps:

- a. Open a terminal window on your workstation.
- b. Log into CPSBN1 using the *root* login.

Enter: **ssh root@cpsbn1**

- c. Verify the heartbeat service is running.

Enter: **service heartbeat status**

```
heartbeat OK [pid 28624 et al] is running on cpsbn1-tbdw [cpsbn1-tbdw]...
```

- d. Verify LDM(U) processes are running.

Enter: **ps -ef | grep ldmd | grep -v grep | cut -b -80**

```
ldm      9224      1  0 Oct20 ?          00:00:00 rpc.ldmd -I  
165.92.29.181 -P 388  
ldm      10651    9224  0 Oct20 ?          00:05:31 rpc.ldmd -I  
165.92.29.181 -P 388
```

Enter: **ps -wef | egrep 'dvbs_| retransmit'**

```

root      4835  4731  0 23:51 pts/0    00:00:00 egrep dvbs_|  

retansmit  

root      30320 30319  0 Oct20 ?          00:10:40 dvbs_multicast -b  

40000 -m 224.0.1.1  

root      30322 30319  0 Oct20 ?          00:00:51 dvbs_multicast -m  

224.0.1.2  

root      30323 30319  0 Oct20 ?          00:06:32 dvbs_multicast -b  

40000 -m 224.0.1.3  

root      30324 30319  0 Oct20 ?          00:01:08 dvbs_multicast -m  

224.0.1.4

```

- e. Verify LDM(U) data flow.

Enter: **su - ldm**

Enter: **ldmadmin watch**

Note: Look for a continuous stream of “INFO:” messages; press <Ctrl-D> to terminate the watch.

```

Jan 25 01:03:05 pqutil INFO:      75 20120125010304.852
IDS|DDPLUS 901919 SRUS75 KBOI 250102 /pRR7BNO
Jan 25 01:03:05 pqutil INFO:      264 20120125010304.852
IDS|DDPLUS 901920 SXCO40 KWAL 250102
Jan 25 01:03:05 pqutil INFO:      75 20120125010304.852
IDS|DDPLUS 901921 SRUS76 KSEW 250102 /pRR7AST
Jan 25 01:03:05 pqutil INFO:      141 20120125010304.852
IDS|DDPLUS 901922 SXVT50 KWAL 250102
Jan 25 01:03:05 pqutil INFO:      75 20120125010304.852
IDS|DDPLUS 901923 SRUS75 KLKN 250102 /pRR7ELY
Jan 25 01:03:05 pqutil INFO:      114 20120125010304.852
IDS|DDPLUS 901924 SAUS42 KCHS 250102 /pMTRNBC
Jan 25 01:03:05 pqutil INFO:      6975 20120125010304.852 NEXRAD3
901925 SDUS23 KJKL 250055 /pN2QJKL !nids/
Jan 25 01:03:05 pqutil INFO:      4133 20120125010304.852 NEXRAD3
901926 SDUS29 PAFG 250057 /pN1UAEC !nids/
Jan 25 01:03:05 pqutil INFO:      5042 20120125010304.852 NEXRAD3
901927 SDUS53 KLSX 250100 /pNOVLSX

```

Enter: **exit**

- f. Log off CPSBN1.

Enter: **exit**

- g. Log into CPSBN2 using the *root* login.

Enter: **ssh root@cpsbn2**

- h. Verify the heartbeat service is running.

Enter: **service heartbeat status**

```

heartbeat OK [pid 5029 et al] is running on cpsbn2-tbdw [cpsbn2-
tbdw]...

```

- i. Verify the LDM(U) processes are running.

Enter: **ps -ef | grep ldm | grep -v grep | cut -b -80**

```
ldm      9268  1  0 Jan24 ?          00:00:00 rpc.ldmd -I
165.92.24.50 -P 388
ldm      9274  9268  0 Jan24 ?          00:01:23 readnoaaport -m
224.0.1.1 -n -u
ldm      9275  9268  0 Jan24 ?          00:00:02 readnoaaport -m
224.0.1.2 -n -u
ldm      9276  9268  0 Jan24 ?          00:00:36 readnoaaport -m
224.0.1.3 -n -u
ldm      9277  9268  0 Jan24 ?          00:00:13 readnoaaport -m
224.0.1.4 -n -u
ldm      9673  9268  0 Jan24 ?          00:01:52 rpc.ldmd -I
165.92.24.50 -P 388
root    18044 17806  0 01:00 pts/0      00:00:00 su - ldm
ldm     18045 18044  0 01:00 pts/0      00:00:00 -bash
ldm     18289 18045  0 01:05 pts/0      00:00:00 ps -ef
ldm     18292 18045  0 01:05 pts/0      00:00:00 cut -b -80
```

Enter: **ps -wef | egrep 'dvbs_| retransmit'**

```
root      9269  9268  0 Jan24 ?          00:00:51
dvbs_multicast -b 40000 -m 224.0.1.1

root      9270  9268  0 Jan24 ?          00:00:06
dvbs_multicast -m 224.0.1.2

root      9272  9268  0 Jan24 ?          00:00:38
dvbs_multicast -b 40000 -m 224.0.1.3

root      9273  9268  0 Jan24 ?          00:00:05
dvbs_multicast -m 224.0.1.4

ldm      18297 18045  0 01:06 pts/0      00:00:00 egrep
dvbs_| retransmit
```

- j. Verify LDM(U) data flow.

Enter: **su - ldm**

Enter: **ldmadm watch**

Note: Look for a continuous stream of “INFO:” messages; press <Ctrl-D> to terminate the watch.

```
Jan 25 01:09:09 pqutil INFO: 23592 20120125010909.681 HDS
909666 YQWA00 KWBG 250000 /mRUC2
!grib/ncep/RUC2/#236/201201250000/F000/HLCY/sfc/
Jan 25 01:09:09 pqutil INFO: 6306 20120125010909.696 HDS
909667 YHQA90 KWBG 250000 /mRUC
!grib/ncep/RUC/#211/201201250000/F000/HGT/900 mb/
Jan 25 01:09:09 pqutil INFO: 492 20120125010909.713
IDS|DDPLUS 909668 NTUS99 KNCF 250109 /pTSTNCF
```

```

Jan 25 01:09:09 pqutil INFO: 4682 20120125010909.728 HDS
909669 YRQA35 KWBG 250000 /mRUC
!grib/ncep/RUC/#211/201201250000/F000/RH/350 mb/
Jan 25 01:09:09 pqutil INFO: 149 20120125010909.729
IDS|DDPLUS 909670 SZNC42 RJTD 250108
Jan 25 01:09:09 pqutil INFO: 19326 20120125010909.748 HDS
909671 YUWA98 KWBG 250000 /mRUC2
!grib/ncep/RUC2/#236/201201250000/F000/UGRD/10 m above gnd/
Jan 25 01:09:09 pqutil INFO: 25724 20120125010909.749 HDS
909672 YPWA98 KWBG 250000 /mRUC2
!grib/ncep/RUC2/#236/201201250000/F000/PRES/sfc/
Jan 25 01:09:09 pqutil INFO: 27858 20120125010909.769 HDS
909673 YHWA55 KWBG 250000 /mRUC2
!grib/ncep/RUC2/#236/201201250000/F000/HGT/550 mb/
Jan 25 01:09:09 pqutil INFO: 9649 20120125010909.769 NEXRAD3
909674 SDUS33 KOAX 250106 /pN3ROAX
Jan 25 01:09:09 pqutil INFO: 29990 20120125010909.790 HDS
909675 YRWA86 KWBG 250000 /mRUC2
!grib/ncep/RUC2/#236/201201250000/F000/RH/30-0 mb above gnd/
Jan 25 01:09:09 pqutil INFO: 13936 20120125010909.791 NEXRAD3
909676 SDUS86 KSEW 250107 /pN2KLGX !nids/

```

Enter: **exit**

- k. Log off CPSBN2.

Enter: **exit**

- l. Log into cp1f using the *root* account.

Enter: **ssh root@cp1f**

- m. Verify QPID is running.

Enter: **service qpidd status**

```
qpidd (pid 29150) is running...
```

Enter: **ps -ef | grep qpidd | grep -v grep | cut -b -80**

```
awips      29150      1 16 Oct20 ?          09:04:15
/awips2/qpid/sbin/qpid -daemon
```

- n. Verify pulse (IPVS) is running.

Enter: **service pulse status**

```
pulse (pid 3906) is running..
```

Enter: **ps -ef | grep pulse | grep -v grep | cut -b -80**

```
root      3906      1  0 May24 ?          00:00:00 pulse
```

- o. Log off cp1f.

Enter: **exit**

- p. Error results: As a general rule, if one of the processes is not running, the *ps* command will not print anything. If the service commands return a “not running” message, heartbeat is not running and automated failover will fail. If the floater (*cplf*) login fails, this means that the high-availability package controlling the software is not running.

25.4.3 Managing Software on DX1/2

DX1 and DX2 function as a heartbeat cluster; failover is managed automatically or manually. Note that both DX1 and DX2 normally run separate high-availability packages; a2dx1apps on DX1 and a2dx2apps on DX2. In failover mode, both packages shift to the same server. Access to DX1 and DX2 is via server name alias: dx1f points to the server running the a2dx1apps package; dx2f points to the server running the a2dx2apps package. The high-availability packages are also used to manage several shared mounts to the Direct Attached Storage (device (DAS) including the raw data storage which is mounted at /data_store and is shared for other systems to access. Note that the floating names are available only when the high-availability packages are running; they cannot be used to start or stop the high-availability packages. The AWIPS II services used on DX1/2 are listed in table 25.4.3-1. The NAS and DAS file system mounts are listed in Table 25.4.3-2.

Table 25.4.3-1. AWISP II Services on DX1/2

Service	Applications Controlled	Notes
edex_postgres	PostgreSQL DBMS	managed by a2dx1apps
edex_rcm	Radar Server	managed by a2dx1apps
httpd-pypes	PyPIES	managed by a2dx1apps
LDM(D)	LMD, SCOUR	managed by a2dx2apps

Table 25.4.3-2. DX1/2 Mounts on the DAS

Mount	Mount Point	Notes
das1:/aiihdf5	/awips2/edex/data/hdf5	managed by a2dx1apps
das1:/aiidb	/awips2/data	managed by a2dx1apps
das1:/aiildm	/data_store	managed by a2dx2apps
nas1:/aiidata/utility	/awips2/edex/data/utility	managed by a2dx1apps
nas1:/GFESuite2	/awips2/GFESuite	

In addition to the AWIPS II services listed in Table 25.4.3-1, several re-hosted AWIPS II services continue to operate on DX1/2; these services are managed by the appropriate high-availability package.

In addition to using the heartbeat utilities for controlling the AWIPS II services, they may be managed individually. The edex_postgres, edex_rpm, and httpd-pypes may be controlled using the Linux *service* command; the LDM(D) process may be controlled using the *ldmadmin* tool.

The DX1/2 cluster is a heartbeat cluster with both nodes normally running AWIPS II processes. The two cluster nodes are accessible via the virtual server names **dx1f** and **dx2f**. You will be able to log into the appropriate node using the floating name **dx1f** or **dx2f**, and the *root* account and password.

The software to check on the DX1/2 cluster consists of:

- The heartbeat service (DX1 and DX2)
- The PostgreSQL database server (on dx1f)
- The Radar Server (on dx1f)
- The PyPIES data server (on dx1f)
- The LDM(D) processes (on dx2f)

Dataflow to check on the DX1/2 cluster:

- LDM(D) data flow (on dx2f)
- Radar Server data flow (on dx1f)

For verification, perform these steps:

- a. Open a terminal window on your workstation.
- b. Log into dx1f using the *root* login.

Enter: **ssh root@dx1f**

- c. Verify that the heartbeat service is running.

Enter: **service heartbeat status**

```
heartbeat OK [pid 1515 et al] is running on dx1-tbdw [dx1-
tbdw]...
```

- d. Verify that the PostgreSQL server is running.

Enter: **ps -ef | grep postmaster | grep -v grep | cut -b -80**

```
awips      8003      1  0 Oct20 ?          00:00:25
/awips2/postgresql/bin/postmaster
```

- e. Verify that the Radar Server (RCM) is running.

Enter: **ps -ef | egrep "[/]rcm/" | tr -s ' ' | cut -b -80**

```
awips 8387 1 2 Oct20 ? 01:27:45 /awips2/java/bin/java -cp
/awips2/rcm/data/config
```

- f. Verify that the PyPIES data server is running.

Enter: **ps -ef | grep httpd_pypes | grep -v grep | cut -b -80**

awips	2875	8149	2 Oct22 ?	00:00:35
/awips2/httpd_pypes/usr/sbin/ht				
awips	5952	8149	5 00:15 ?	00:00:09
/awips2/httpd_pypes/usr/sbin/ht				
awips	6159	8149	3 00:15 ?	00:00:05
/awips2/httpd_pypes/usr/sbin/ht				
awips	6842	8149	2 Oct22 ?	00:00:46
/awips2/httpd_pypes/usr/sbin/ht				
root	8149	1	0 Oct20 ?	00:00:00
/awips2/httpd_pypes/usr/sbin/ht				
awips	8823	8149	2 Oct22 ?	00:00:31
/awips2/httpd_pypes/usr/sbin/ht				
awips	8846	8149	2 Oct22 ?	00:00:41
/awips2/httpd_pypes/usr/sbin/ht				
awips	8847	8149	2 Oct22 ?	00:00:29
/awips2/httpd_pypes/usr/sbin/ht				
awips	11479	8149	2 Oct22 ?	00:00:32
/awips2/httpd_pypes/usr/sbin/ht				
awips	11496	8149	3 Oct22 ?	00:00:45
/awips2/httpd_pypes/usr/sbin/ht				
awips	11497	8149	2 Oct22 ?	00:00:29
/awips2/httpd_pypes/usr/sbin/ht				
awips	11529	8149	3 Oct22 ?	00:00:40
/awips2/httpd_pypes/usr/sbin/ht				
awips	11530	8149	2 Oct22 ?	00:00:33
/awips2/httpd_pypes/usr/sbin/ht				
awips	11531	8149	2 Oct22 ?	00:00:37
/awips2/httpd_pypes/usr/sbin/ht				
awips	11532	8149	2 Oct22 ?	00:00:27
/awips2/httpd_pypes/usr/sbin/ht				
awips	12843	8149	2 Oct22 ?	00:01:02
/awips2/httpd_pypes/usr/sbin/ht				
awips	19247	8149	2 Oct22 ?	00:00:54
/awips2/httpd_pypes/usr/sbin/ht				
awips	19269	8149	1 Oct22 ?	00:00:50
/awips2/httpd_pypes/usr/sbin/ht				
awips	26434	8149	2 Oct22 ?	00:00:45
/awips2/httpd_pypes/usr/sbin/ht				
awips	28162	8149	2 Oct22 ?	00:00:44
/awips2/httpd_pypes/usr/sbin/ht				
awips	28507	8149	2 Oct22 ?	00:00:48
/awips2/httpd_pypes/usr/sbin/ht				
awips	31098	8149	2 Oct22 ?	00:00:45
/awips2/httpd_pypes/usr/sbin/ht				
awips	31328	8149	2 Oct22 ?	00:00:49
/awips2/httpd_pypes/usr/sbin/ht				

g. Verify Radar Server data flow.

Enter: `tail -f /awips2/rcm/data/logs/radarserver.log`

Note: Look for messages containing “Stored message in”; press **<Ctrl-C>** to terminate tail.

```

INFO 01:13:44,026 [TCM Read kakq #2] RadarServer: kakq: message
code=153 size=199632 elev=0.5 sequence=181 vs=2012-01-25 01:17:57 #3
INFO 01:13:44,245 [TCM Read kakq #2] RadarServer: Stored message in
/data_store/radar/kakq/Z/elev0_5/res0_25/az0_5/level256/kakq.153.201201
25_0117
INFO 01:13:45,484 [TCM Read kakq #2] RadarServer: kakq: message
code=94 size=29097 elev=0.5 sequence=153 vs=2012-01-25 01:17:57 #3
INFO 01:13:45,518 [TCM Read kakq #2] RadarServer: Stored message in
/data_store/radar/kakq/Z/elev0_5/res1/level256/kakq.94.20120125_0117
INFO 01:13:46,490 [TCM Read kakq #2] RadarServer: kakq: message
code=19 size=16436 elev=0.5 sequence=118 vs=2012-01-25 01:17:57 #3
INFO 01:13:46,582 [TCM Read kakq #2] RadarServer: Stored message in
/data_store/radar/kakq/Z/elev0_5/res1/level16/kakq.19.20120125_0117
INFO 01:13:46,585 [TCM Read kakq #2] RadarServer: kakq: message
code=20 size=14810 elev=0.5 sequence=122 vs=2012-01-25 01:17:57 #3
INFO 01:13:46,600 [TCM Read kakq #2] RadarServer: Stored message in
/data_store/radar/kakq/Z/elev0_5/res2/level16/kakq.20.20120125_0117
INFO 01:13:46,824 [TCM Read koax #2] RadarServer: koax: message
code=149 size=5821 elev=5.1 sequence=190 vs=2012-01-25 01:10:51 #3
INFO 01:13:46,888 [TCM Read koax #2] RadarServer: Stored message in
/data_store/radar/koax/DMD/elev5_3/koax.149.20120125_0110

```

- h. Log off dx1f.

Enter: **exit**

- i. Log into dx2f using the *root* login.

Enter: **ssh root@dx2f**

- j. Verify the heartbeat service is running.

Enter: **service heartbeat status**

```

heartbeat OK [pid 1515 et al] is running on dx2-tbdw [dx2-
tbdw]...

```

- k. Verify the LDM(D) processes are running.

Enter: **ps -ef | egrep "ldmd|pqact|edex" | grep -v grep | cut -b -80**

```

ldm      22216      1  0 Oct21 ?
165.92.29.132 -P 388          00:00:00 rpc.ldmd -I
ldm      22217  22216  0 Oct21 ?
ldm      22219  22216  0 Oct21 ?
cp1f
ldm      22220  22216  0 Oct21 ?
165.92.29.132 -P 388          00:18:25 pqact -e
                                         00:07:40 edexBridge -s
                                         00:18:56 rpc.ldmd -I

```

- l. Verify LDM(D) data flow.

Enter: **su - ldm**

Enter: **ldmadmin watch**

Note: Look for a continuous stream of “INFO:” messages; press <Ctrl-D> to terminate the watch.

```
Oct 23 01:03:55 pqutil INFO: 97 20111023010353.043
IDS|DDPLUS 117380698 SRME20 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 114 20111023010353.043
IDS|DDPLUS 117380699 SROR20 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 233 20111023010353.043
IDS|DDPLUS 117380700 SRNE20 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 84 20111023010353.043
IDS|DDPLUS 117380701 SROR20 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 120 20111023010353.043
IDS|DDPLUS 117380702 SRIA30 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 281 20111023010353.043
IDS|DDPLUS 117380703 SRCN40 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 131 20111023010353.043
IDS|DDPLUS 117380704 SRMO30 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 312 20111023010353.044
IDS|DDPLUS 117380705 SRLA20 KWAL 230103
Oct 23 01:03:55 pqutil INFO: 130383 20111023010353.446 NEXRAD3
461942157 SDUS74 KMEG 230102 /pTV1MEM !nids/
Oct 23 01:03:55 pqutil INFO: 265 20111023010353.446 NEXRAD3
461942158 SDUS52 KMFL 230057 /pNVLFLL
Oct 23 01:03:55 pqutil INFO: 15285 20111023010353.446 NEXRAD3
461942159 SDUS54 KEWX 230102 /pN0REWX
```

Enter: **lmdadmin tail**

Note: Look for a continuous stream of “NOTE: Filed in” messages; press <Ctrl-C> to terminate the tail.

```
Oct 23 01:05:41 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/23/00/UKPA02_KWBC_230000_461944359.20111023":
782 20111023010537.877 IDS|DDPLUS 461944359 UKPA02 KWBC 230000
RRC
Oct 23 01:05:41 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/23/00/UEPA02_KWBC_230000_461944360.20111023":
486 20111023010537.877 IDS|DDPLUS 461944360 UEPA02 KWBC 230000
RRA
Oct 23 01:05:41 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/23/00/ULPA02_KWBC_230000_461944361.20111023":
258 20111023010537.877 IDS|DDPLUS 461944361 ULPA02 KWBC 230000
RRA
Oct 23 01:05:41 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/radar/KRDU/NCR/SDUS52_0100_KRDU_NCR_461944381.rad":
2719 20111023010539.884 NEXRAD3 461944381 SDUS52 KRAH 230100
/pNCRRDU
Oct 23 01:05:41 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/23/01/SXNC50_KWAL_230105_461944385.20111023":
143 20111023010539.884 IDS|DDPLUS 461944385 SXNC50 KWAL 230105
```

Enter: **exit**

m. Log off dx2f.

Enter: **exit**

- n. Error Results: As a general rule, if any of the *ps* commands has an empty return, the specific process being checked is not running. If the service commands return a “not running” message, heartbeat is not running and automated failover will fail. If either login fails, this means the high-availability package controlling the software is not running.

25.4.4 Managing Software on PX1/2

No AWIPS II specific processes have been added to PX1/2. Rather, PX1/2 are used to run various re-hosted applications. As in AWIPS I, the PX1/2 cluster is a heartbeat cluster. The main operational change is the names of the high-availability packages. For AWIPS II they are a2px1apps and a2px2apps.

The AWIPS II high-availability packages on PX1 are controlled using the heartbeat utilities: *hb_run*, *hb_halt*, and *hb_stat*. In normal operation, only the a2px1apps high-availability package is running on PX1.

1. To start a2px1apps:

Enter: ***hb_run a2px1apps***

2. To stop a2px1apps:

Enter: ***hb_halt a2px1apps***

3. To verify a2px1apps:

Enter: ***hb_stat***

The AWIPS II high-availability packages on PX2 are controlled using the heartbeat utilities: *hb_run*, *hb_halt*, and *hb_stat*. In normal operation, only the a2px2apps high-availability package is running on PX2.

1. To start a2px2apps:

Enter: ***hb_run a2px2apps***

2. To stop a2px2apps:

Enter: ***hb_halt a2px2apps***

3. To verify a2px2apps:

Enter: ***hb stat***

Logging by the re-hosted apps on PX1/2 is generally unchanged. Specifically, log locations are unchanged for the re-hosted applications.

25.4.4 Managing Software on DX3/4

DX3 and DX4 are independent servers, both of which run the EDEX server software. **There is no failover between DX3 and DX4.** Both servers are load balanced and share data processing responsibilities; if one server is stopped, the other will pick up the entire

data processing load. Processing load balancing between DX3 and DX4 is provided by QPID as data messages are removed from QPID queues and processed by the EDEX instance having available processing capacity. Client request balancing for DX3 and DX4 is managed by Internet Protocol Virtual Server (IPVS) (the pulse service). Both QPID and IPVS run on CPSBN1 and CPSBN2.

Unlike the other servers, the AWIPS II software must be verified on both DX3 and DX4. Access to both servers is by direct login; you may log in using your student account. The steps in this procedure are to be performed on both DX3 and DX4 using the *root* login and password.

The software to check on DX3 and DX4 consists of:

- EDEX server software.

Dataflow to check on the DX3/4:

- EDEX ingest processes (on DX3 and DX4).

For verification, perform these steps:

- a. Open a terminal window on your workstation.
- b. Log into DX3 using the *root* login.

Enter: **ssh root@dx3**

- c. Determine the available memory on the server.

Enter: **free -g**

total	used	free	shared	buffers	cached
Mem:	7	6	0	0	0
1					
-/+ buffers/cache:	5	2			
Swap:	2	0	2		

- d. Verify the EDEX server software is running.

Note: There are four possible instances of EDEX: ingest, request, ingestGrib, and ingestDat. If the available memory indicated by the *free -g* command is less than 4 GB, ingestDat will not be running.

Enter: **service edex_camel status**

EDEX Camel (ingest) is running (wrapper PID 27792)
EDEX Camel (ingest) is running (java PID 27794)
EDEX Camel (ingestGrib) is running (wrapper PID 27896)
EDEX Camel (ingestGrib) is running (java PID 27898)
EDEX Camel (ingestDat) is running (wrapper PID 28001)
EDEX Camel (ingestDat) is running (java PID 28003)
EDEX Camel (request) is running (wrapper PID 28119)
EDEX Camel (request) is running (java PID 28121)

Enter: **ps -ef | grep edex.run.mode | grep -v grep | cut -b -80**

```

awips      27794 27792 99 Oct21 ?          1-11:51:39
/awips2/java/bin/java -Dedex.r
awips      27898 27896 9 Oct21 ?          03:08:57
/awips2/java/bin/java -Dedex.run
awips      28003 28001 6 Oct21 ?          02:00:38
/awips2/java/bin/java -Dedex.run
awips      28121 28119 2 Oct21 ?          00:40:45
/awips2/java/bin/java -Dedex.run

```

- e. Verify EDEX ingest process data flow.

Enter: `cd /awips2/edex/logs`

Enter: `tail -f edex-ingest-`date +%Y%m%d`.log`

Note: Look for a continuous display of messages containing “processed in:”; press <Ctrl-C> to terminate tail.

```

INFO 2012-01-25 02:28:55,576 [genericThreadPool-28] Ingest:
EDEX: Ingest - goessounding::
/data_store/goessndg/02/JUTX05_KNES_250227_1013027.20120125
processed in: 0.0800 (sec) Latency: 0.1880 (sec)
Time spent in persist: 121
INFO 2012-01-25 02:28:55,713 [genericThreadPool-28] Ingest:
EDEX: Ingest - goessounding::
/data_store/goessndg/02/JUTX05_KNES_250227_1013028.20120125
processed in: 0.1350 (sec) Latency: 0.3190 (sec)
INFO 2012-01-25 02:28:56,418 [genericThreadPool-28] Ingest:
EDEX: Ingest - goessounding::
/data_store/goessndg/02/JUTX05_KNES_250227_1013119.20120125
processed in: 0.0110 (sec) Latency: 0.0180 (sec)
INFO 2012-01-25 02:28:57,420 [genericThreadPool-28] Ingest:
EDEX: Ingest - goessounding::
/data_store/goessndg/02/JUTX05_KNES_250227_1013123.20120125
processed in: 0.0120 (sec) Latency: 0.0170 (sec)

```

Enter: `tail -f edex-ingestGrib-`date +%Y%m%d`.log`

Note: Look for a continuous display of messages containing “processed in:”; press <Ctrl-C> to terminate tail.

```

INFO 2012-01-25 02:30:29,123 [gribThreadPool-4] Ingest: EDEX:
Ingest - grib::
/data_store/grib/GRID212/NAM_84/20120125/0000Z_F048_TMP-
YTRI90_KWBE_1014898.00.20120125 processed in: 0.0270 (sec)
Latency: 1.0220 (sec)
INFO 2012-01-25 02:30:29,151 [gribThreadPool-2] Ingest: EDEX:
Ingest - grib::
/data_store/grib/GRID217/NAM_84/20120125/0000Z_F048_VIS-
YKYI98_KWBE_264547.00.20120125 processed in: 0.0430 (sec)
Latency: 1.0530 (sec)
INFO 2012-01-25 02:30:29,155 [gribThreadPool-1] Ingest: EDEX:
Ingest - grib::
/data_store/grib2/GRID218/NAM_84/20120125/0000Z_F048_HGHT-
LHBI95_KWBE_277584.grib2.20120125 processed in: 0.3730 (sec)
Latency: 1.0590 (sec)

```

```

INFO 2012-01-25 02:30:29,175 [gribThreadPool-3] Ingest: EDEX:
Ingest - grib::
/data_store/grib/GRID216/NAM_84/20120125/0000Z_F048_HGT-
YHVI60_KWBE_264554.00.20120125 processed in: 0.0250 (sec)
Latency: 0.0720 (sec)
INFO 2012-01-25 02:30:29,244 [gribThreadPool-1] Ingest: EDEX:
Ingest - grib::
/data_store/grib/GRID216/NAM_84/20120125/0000Z_F048_TMP-
YTVI65_KWBE_264557.00.20120125 processed in: 0.0470 (sec)
Latency: 0.1400 (sec)
INFO 2012-01-25 02:30:29,248 [gribThreadPool-2] Ingest: EDEX:
Ingest - grib::
/data_store/grib/GRID217/NAM_84/20120125/0000Z_F048_VGRD-
YVVI98_KWBE_264555.00.20120125 processed in: 0.0520 (sec)
Latency: 0.1450 (sec)

```

- f. Log off DX3.

Enter: **exit**

- g. Log into DX4 using the *root* login.

Enter: **ssh root@dx4**

- h. Determine the available memory on the server.

Enter: **free -g**

total	used	free	shared	buffers	cached
Mem:	7	7	0	0	0
2					
-/+ buffers/cache:	4		3		
Swap:	2	0	1		

- i. Verify the EDEX server software is running.

Note: There are four possible instances of EDEX: ingest, request, ingestGrib, and ingestDat. If the available memory indicated by the *free -g* command is less than 4 GB, ingestDat will not be running.

Enter: **service edex_camel status**

```

EDEX Camel (ingest) is running (java PID 23995)
EDEX Camel (ingestGrib) is running (wrapper PID 24110)
EDEX Camel (ingestGrib) is running (java PID 24112)
EDEX Camel (ingestDat) is running (wrapper PID 24213)
EDEX Camel (ingestDat) is running (java PID 24215)
EDEX Camel (request) is running (wrapper PID 24333)
EDEX Camel (request) is running (java PID 24336)

```

Enter: **ps -ef | grep edex.run.mode | grep -v grep | cut -b -80**

```

awips      23995 23992 99 Oct21 ?
/awips2/java/bin/java -Dedex.r          1-08:00:31
awips      24112 24110  9 Oct21 ?        03:07:58
/awips2/java/bin/java -Dedex.run
awips      24215 24213  2 Oct21 ?        00:41:29
/awips2/java/bin/java -Dedex.run
awips      24336 24333  1 Oct21 ?        00:32:08
/awips2/java/bin/java -Dedex.run

```

- j. Verify EDEX ingest process data flow.

Enter: `cd /awips2/edex/logs`

Enter: `tail -f edex-ingest-`date +%Y%m%d`.log`

Note: Look for a continuous display of messages containing “processed in:”; press <Ctrl-C> to terminate tail.

```

INFO 2012-01-25 02:33:44,295 [genericThreadPool-36] Ingest:
EDEX: Ingest - obs::
/data_store/text/25/02/SPCN47_CWAO_250232_1018946.20120125
processed in: 0.2180 (sec) Latency: 0.4770 (sec)
Time spent in persist: 181
INFO 2012-01-25 02:33:48,067 [genericThreadPool-36] Ingest:
EDEX: Ingest - obs::
/data_store/text/25/02/SPCN45_CWAO_250232_1019007.20120125
processed in: 0.2230 (sec) Latency: 0.2340 (sec)

```

Enter: `tail -f edex-ingestGrib-`date +%Y%m%d`.log`

Note: Look for a continuous display of messages containing “processed in:”; press <Ctrl-C> to terminate tail.

```

INFO 2012-01-25 02:35:14,080 [gribThreadPool-1] Ingest: EDEX:
Ingest - grib::
/data_store/grib2/GRID242/NAM_84/20120125/0000Z_F054_TMPK-
MTSM85_KWBE_278771.grib2.20120125 processed in: 0.2750 (sec)
Latency: 0.2840 (sec)
INFO 2012-01-25 02:35:14,159 [gribThreadPool-3] Ingest: EDEX:
Ingest - grib::
/data_store/grib2/GRID242/NAM_84/20120125/0000Z_F054_RELH-
MRSM72_KWBE_278774.grib2.20120125 processed in: 0.3530 (sec)
Latency: 0.3600 (sec)
INFO 2012-01-25 02:35:14,270 [gribThreadPool-2] Ingest: EDEX:
Ingest - grib::
/data_store/grib2/GRID242/NAM_84/20120125/0000Z_F054_VREL-
MVSM45_KWBE_278773.grib2.20120125 processed in: 0.4640 (sec)
Latency: 0.4720 (sec)
INFO 2012-01-25 02:35:14,271 [gribThreadPool-4] Ingest: EDEX:
Ingest - grib::
/data_store/grib2/GRID242/NAM_84/20120125/0000Z_F054_TMPK-
MTSM62_KWBE_278772.grib2.20120125 processed in: 0.4660 (sec)
Latency: 0.4730 (sec)

```

k. Log off DX4.

Enter: **exit**

- l. Error results: If the EDEX software is not running, the *ps* command will display nothing. If fewer than three lines of output are produced, one or more EDEX processes are not running.

NOTE: The *free -g* command in step c. can be refined to limit the output. Entering *free -g | grep Mem | tr -s [:space:] | cut -d ' ' -f 2* will display a single number identifying the memory size in gigabytes.

25.5 System Configuration

Most system configuration is handled at system installation. See the installation and localization documents listed in section 25.14, [Additional Resources](#) for details.

25.6 EDEX Process Log and Log Format

The EDEX processes generate a number of log files as they execute. This section gives a brief overview of these logs and includes detailed information on the primary process log. More Recipes on monitoring the process logs are included in Section 25.7, [EDEX System Monitoring](#).

25.6.1 Process Logs

EDEX process logs are located in the /awips2/edex/logs directory. This directory will contain several logs; one log is created for each EDEX process, each day. EDEX is normally configured to retain up to 30 log files for each EDEX process.

25.6.2 Additional Log Files

In addition to the EDEX process logs, the JVM occasionally generates an error log in the JVM's run directory. For the EDEX processes, the run directory is /awips2/edex/bin.

These logs are created when 1) the JVM crashes, and 2) it is able to generate a log file before it crashes. In the event the JVM crashes, this log may contain valuable information relating to the cause of the crash. Any reporting of EDEX crashes should include the information in this log.

The JVM error log files are named *hs_err_pidxxxx.log*, where *xxxx* is the PID of the JVM that generated the log.

25.6.3 Process Log File Naming Convention

The EDEX process logs are located in the /awips2/edex/logs directory. The logs are named *edex-{process}-{date}.log*. {process} . This naming convention identifies the EDEX process that creates the log; the EDEX processes, as discussed in section 25.2.2,

[Operational Considerations](#), are ingest, ingestGrib, and request. *{date}* is the date the log was created; the date format is YYYYMMDD.

Example 25.6.3-1: Log File Names

The log created by the EDEX Ingest process on October 22, 2011, is named *edex-ingest-20111022.log*.

25.6.4 Log Formats

The EDEX processes use a console appender to capture all logging to a single log file; this includes both formatted log messages and unformatted output such as that produced by writing to Linux's STDOUT and STDERR. As a result, most entries in an EDEX process log follow a standard format, which, as specified in the log4j configuration, is

```
%-5p %d [%t] %c{1}: %m%n
```

The components of this format definition are:

1. **%-5p** – The “p” specifies that the logging level is to be output. The “%-5” specifies the formatting; it is to be left justified in a five-character field
2. **%d** – This component specifies that the date/time of the message is to be printed. The format used is YYYY-MM-DD hh:mm:ss,xxx where xxx is milliseconds.
3. **[%t]** – This component specifies that the thread generating the message is listed. For EDEX, this is generally the camel route’s thread pool; it can usually be ignored for diagnostic purposes.
4. **%c{1}** – This component specifies that the logger handling the message is listed. The “{1}” specifies that only the final component of the logger name is listed. Usually, this is the name of the class that logs the message. The colon is printed immediately following the logger name.
5. **%m%n** – The “%m” specifies that the message from the application is logged; the “%n” specifies that it should be followed by a new-line character.

To summarize, the standard log format is

LEVEL DATE-TIME [THREAD] LOGGER: MESSAGE

If the log message contains multiple lines, as is the case when a Java stack trace is included, only the first line of the message follows this format. Of the standard elements in a log message, the logging level and the logger can be used with the Linux *tail* and *grep* tools to provide real-time filtering of log messages. In addition, there are some standard message patterns that can be useful in monitoring for specific information/problems in an EDEX instance.

25.6.5 EDEX Logging Levels

EDEX logs messages at one of these five severity levels: DEBUG; INFO; WARNING; ERROR; and FATAL. Each message logged by the application is given one of these

levels. In addition, the logging facility is configured with a logging level. Only messages that meet or exceed the configured logging level are written to the log file. For example, if the logging facility is configured to a logging level of **WARNING**, only messages with a level of **WARNING** and above (i.e., **WARNING**, **ERROR**, and **FATAL**) are logged.

Out of the box, most EDEX logging is at the **INFO** level; in this case **INFO**, **WARNING**, **ERROR**, and **FATAL** messages are logged.

Example 25.6.5-1: Monitoring EDEX Process Log for Errors

To monitor for errors in the EDEX Ingest process on DX4, we can use *tail* to display the EDEX log. To filter for errors, pipe the results of *tail* to *grep*, using the appropriate filter on *grep*. (Note: For this example, assume the current date is October 22, 2011). The steps to follow:

```
$ ssh awips@dx4
awips@dx4's password:
$ cd /awips2/edex/logs
$ tail -f edex-ingest-20111022.log | grep -P "^ERROR"

ERROR 2011-10-22 00:00:05,758 [DefaultQuartzScheduler_Worker-2] RPGEvironmentalDataManager: EDEX: RPGEvData - Error
getting geographic information: Clipped region for radar tbwi
is outside RUC236 grid bounds

ERROR 2011-10-22 00:00:17,089 [genericThreadPool-39]
JDBCEceptionReporter: Batch entry 0 insert into obs
(forecastTime, refTime, utilityFlags, rangeEnd, rangeStart,
dataURI, insertTime, correction, elevation, latitude,
location, locationDefined, longitude, stationId, idx, refHour,
reportType, id) values (0, 2011-10-21 23:56:00.000000
+00:00:00, [], 2011-10-21 23:56:00.000000 +00:00:00, 2011-10-
21 23:56:00.000000 +00:00:00, /obs/2011-10-
21_23:56:00.0/METAR/null/PAMK/63.49/-162.11, NULL, NULL, 28,
63.49, <stream of 21 bytes>, 0, -162.11, PAMK, 7459, 2011-10-
22 00:00:00.000000 +00:00:00, METAR, 457043849) was aborted.
Call getNextException to see the cause.

ERROR 2011-10-22 00:00:17,089 [genericThreadPool-39]
JDBCEceptionReporter: ERROR: duplicate key value violates
unique constraint "obs_datauri_key"

WARN 2011-10-22 00:00:17,089 [genericThreadPool-39]
PointDataPluginDao: EDEX - Error storing pointdata batch
to database, applying dup check and storing batch individually

ERROR 2011-10-22 00:00:17,395 [genericThreadPool-39]
JDBCEceptionReporter: Batch entry 0 insert into obs
(forecastTime, refTime, utilityFlags, rangeEnd, rangeStart,
dataURI, insertTime, correction, elevation, latitude,
location, locationDefined, longitude, stationId, idx, refHour,
reportType, id) values (0, 2011-10-21 23:50:00.000000
+00:00:00, [], 2011-10-21 23:50:00.000000 +00:00:00, 2011-10-
```

```
21 23:50:00.000000 +00:00:00, /obs/2011-10-
21_23:50:00.0/METAR/null/PTKK/7.47/151.85, NULL, NULL, 2,
7.47, <stream of 21 bytes>, 0, 151.85, PTKK, 7513, 2011-10-22
00:00:00.000000 +00:00:00, METAR, 457043927) was aborted.
Call getNextException to see the cause.

ERROR 2011-10-22 00:00:17,395 [genericThreadPool-39]
JDBCEceptionReporter: ERROR: duplicate key value violates
unique constraint "obs_datauri_key"

WARN 2011-10-22 00:00:17,395 [genericThreadPool-39]
PointDataPluginDao: EDEX: EDEX - Error storing pointdata batch
to database, applying dup check and storing batch individually
```

NOTE: Messages shown would appear on a single line in the terminal window.

25.6.6 Controlling Logging Levels

This section will be updated as information becomes available.

25.7 EDEX System Monitoring

This section discusses a few of the options available for monitoring the EDEX processes. The EDEX processes are deployed on DX3 and DX4 (see [Exhibit 25.2-1](#)).

System monitoring is somewhat complicated by the general design and deployment of EDEX, as described earlier. Factors to be considered include the following:

1. Each EDEX process is designed around the Service Oriented Architecture (SOA) concept. As a result, each EDEX process is a collection of services that perform specific tasks or functions in response to events. In the ingest stream discussed earlier (see section 25.3, Basic Data Flow Concepts), the event that triggers an action in a Data Decoder service is the arrival of a message in that decoder's message queue. Other events include time-based (Quartz triggered) events and client requests (http/thrift events). A good way to visualize SOA events is to picture your favorite GUI application. As you manipulate the GUI, events are created that cause the application to perform processing for you. EDEX utilizes the SOA concept to provide somewhat similar, event-driven processing.
2. Each EDEX process logs primarily to a single log file.¹ As a result, some filtering is needed to extract information specific to a service from the combined log file of the EDEX process.
3. EDEX services replace many of the separate processes running on the AWIPS I servers. As noted previously, the result is that messages from all *services* in each EDEX process are combined in a single log file.

¹ The basic logging should stay the same, although some of the messages being logged may change.

25.7.1 Using Standard Linux Tools

Several standard Linux tools can be used to monitor the EDEX processes, as shown in Table 25.7.1-1. In addition, the Java Jconsole tool, packaged with EDEX, is a useful monitoring tool. Although not packaged with EDEX, the PG Admin tool and HDF View may be used to check the database and the data store.

Table 25.7.1-1. Useful Tools for Monitoring EDEX

Tool	Location	Monitoring Use
ps	/bin	Can be used to get information about specific processes
cat	/bin	Used to display a text file in a terminal
tail	/usr/bin	Used to provide a dynamic picture of process logs
grep	/bin	Used to filter content of process logs; used to filter output of other tools
top	/usr/bin	Provides a dynamic view of the memory and cpu usage of the EDEX processes
tee	/usr/bin	Sends command line output to a file
less	/usr/bin	Used to give a page-oriented view of files; includes search capabilities
edex_camel	/etc/init.d	Determines the PIDs of the EDEX processes
JConsole	/awips2/java/bin	Monitors the internal state of an EDEX process

The rest of this section is a series of Examples that illustrate various monitoring activities for EDEX processes. All of these Examples make the following simple assumptions:

1. EDEX is installed on DX3. For other servers, the initial login should be modified as appropriate.
2. EDEX is installed under /awips2. Supporting software such as Java and Python is also installed under /awips2.
3. The administrator is logging into the server using ssh from a Linux workstation.

Example 25.7.1-1: Determining the EDEX Version

The installed EDEX version is listed in a file named *banner.txt*, which is located in */awips2/edex/conf*. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/conf
$ cat banner.txt
```

```
*****
* AWIPS II EDEX ESB Platform          *
* Version: 12.1.2                      *
* Raytheon Company                    *
*-----*
* Build Date : 01-20-2012            *
```

```
* Build Time : 13:59:49 EST          *
* Build System: build1.nws.noaa.gov      *
* Built from Tag: 12.1.2-3            *
*****
```

Note: Version and build information displayed will be different depending on the installed version of EDEX.

Example 25.7.1-2: Determining EDEX Status

The status of the EDEX processes may be determined using the *status* option of the *edex_camel* script. This option is also helpful for determining the PID of each EDEX process. Unlike other options involving *edex_camel*, the *status* option is usable by only **root** user account on the server. The steps to follow:

```
$ ssh root@dx3
root@dx3's password:
$ cd /etc/init.d
$ ./edex_camel status
EDEX Camel (ingest) is running (wrapper PID 24173)
EDEX Camel (ingest) is running (java PID 24175)
EDEX Camel (ingestGrib) is running (wrapper PID 24272)
EDEX Camel (ingestGrib) is running (java PID 24274)
EDEX Camel (ingestDat) is running (wrapper PID 17309)
EDEX Camel (ingestDat) is running (java PID 17314)
EDEX Camel (request) is running (wrapper PID 24497)
EDEX Camel (request) is running (java PID 14130)
```

This output indicates that three EDEX processes are running. Note that the reported PIDs will depend on the actual PIDs on the server being monitored.

TIP: To determine the status of a specific EDEX process, specify the process name on the command line. For example: `./edex_camel status request`.

TIP: If one of the EDEX processes is not running, the status reported will be “EDEX Camel (*process*) is not running” where *process* is the name of the process that is not running. (See section 25.2.2, [Operational Considerations](#) for a list of EDEX processes.)

Example 25.7.1-3: Determining EDEX Process Restarts

Each time wrapper starts a JVM running an EDEX process, it prints *Launching a JVM...* in the process log. This provides an easy means of determining the number of times an EDEX process has been started. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:

$ cd /awips2/edex/logs

$ ls edex*-20110123.log
edex-ingest-2011023.log
edex-ingestDat-2011023.log
edex-ingest-gen_areal_ffg-2011023.log
edex-ingest-gen_areal_qpe-2011023.log
edex-ingestGrib-2011023.log
edex-ingest-purge-2011023.log
edex-ingest-radar-2011023.log
edex-ingest-satellite-2011023.log
edex-ingest-shef-2011023.log
edex-ingest-shef-performance-2011023.log
edex-ingest-smartInit-2011023.log
edex-ingest-text-2011023.log
edex-ingest-trigger-2011023.log
edex-ingest-unrecognized-files-2011023.log
edex-request-2011023.log
edex-request-productSrvRequest-2011023.log

$ grep "Launching" edex-ingest-2011023.log

edex-ingest-2011023.log:Launching a JVM...
edex-ingest-2011023.log:Launching a JVM...
```

This output shows that the EDEX *ingest* process was started twice on Oct 23, 2011. In this case the EDEX installation was also performed on Oct 23, so we know *wrapper* restarted the *ingest* process once – this indicates a process crash that should be investigated.

Tip: To determine the starts logged in each process log, use the *-c* (count) option on *grep*.

NOTE: The names of the available log files depend on when EDEX was first started and the length of time the EDEX processes have actually been running on the server.

Example 25.7.1-4: Determining Available Data Types from Ingest

This Example shows how to monitor ingest of a specific data type on one of the EDEX servers. This Example obtains a list of data types being ingested. The list can then be used to selectively monitor ingest of a specific data type. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
```

Note: For today's log file, for example use `ls edex-* 20111023.log`

```
edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log

$ grep -Po "Ingest: .+::" edex-ingest-20111023.log > ingest-
types.txt
```

```
Ingest: EDEX: Ingest - sfcobs::
Ingest: EDEX: Ingest - sfcobs::
Ingest: EDEX: Ingest - obs::
Ingest: EDEX: Ingest - qc::
Ingest: EDEX: Ingest - sfcobs::
Ingest: EDEX: Ingest - sfcobs::
Ingest: EDEX: Ingest - obs::
Ingest: EDEX: Ingest - qc::
Ingest: EDEX: Ingest - obs::
Ingest: EDEX: Ingest - bufrua::
Ingest: EDEX: Ingest - pirep::
Ingest: EDEX: Ingest - pirep:::
```

```
Ingest: EDEX: Ingest - pirep::  
Ingest: EDEX: Ingest - pirep::  
Ingest: EDEX: Ingest - pirep::  
Ingest: EDEX: Ingest - obs::  
Ingest: EDEX: Ingest - bufrua::  
Ingest: EDEX: Ingest - obs::  
Ingest: EDEX: Ingest - qc::  
Ingest: EDEX: Ingest - taf::  
Ingest: EDEX: Ingest - obs::  
Ingest: EDEX: Ingest - obs::  
Ingest: EDEX: Ingest - obs::  
Ingest: EDEX: Ingest - sfcobs::  
Ingest: EDEX: Ingest - obs::  
Ingest: EDEX: Ingest - obs::
```

(On a typical system, this process yielded a total of 32 distinct data types.)

This output shows a sorted list of data types being processed on this server.

Tip: The *-P* option on grep allows you to use a *Perl 5* regular expression as your search pattern. The *-o* option limits the output to *only* the portion of the line that matches the pattern.

Tip: This recipe uses the *sort* and *uniq* tools to help identify/filter information. See the man pages for details.

Example 25.7.1-5: Monitoring Data Ingest

Each time a data file is successfully ingested, the EDEX Ingest process logs a message. The general format of the message is *INFO <date> <time> [thread] Ingest: type:: <message>*. (Note that there are two spaces between INFO and the start of the date stamp.) The strategy is to tail the active log file and use grep to limit the output to show successful data ingest messages. This recipe presents two scenarios for monitoring data ingest: 1) monitoring all data ingest; and 2) monitoring ingest of a specific type of data.

Scenario 1: Monitoring General Data Ingest

For general data ingest, we can ignore the *type* token and simply look for INFO messages from ingest. (A Perl 5 regex that matches is *^INFO .+ Ingest: .*) The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs

$ ls edex-* -20111023.log

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log

$ tail -f edex-ingest-20111023.log | grep -P "^\$INFO .+
Ingest:"

INFO 2011-10-23 03:02:50,739 [genericThreadPool-79] Ingest:
EDEX: Ingest - modelsounding:::
/data_store/mdlsndg/02/JUSA42_KWNO_230200_462076176.20111023
processed in: 0.2530 (sec) Latency: 321.3730 (sec)

INFO 2011-10-23 03:02:51,029 [genericThreadPool-79] Ingest:
EDEX: Ingest - modelsounding:::
/data_store/mdlsndg/02/JUSA42_KWNO_230200_462076178.20111023
processed in: 0.2490 (sec) Latency: 321.6620 (sec)

INFO 2011-10-23 03:02:51,038 [genericThreadPool-79] Ingest:
EDEX: Ingest - modelsounding:::
(as EDEX Ingest writes to the log file, lines identifying
successful ingest are displayed.)
```

To stop monitoring, press <ctrl-c>.

Scenario 2: Monitoring Specific Data Ingest

To monitor a specific data ingest, it is necessary to include the *type* token in the grep. (A Perl 5 regex that matches is *^INFO .+ Ingest: type::*. Replace *type* with the name of the data type to monitor.) For this example, we will monitor radar ingest. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
$ ls edex-*20111023.log
edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log

$ tail -f edex-ingest-20111023.log | grep -P "^\nINFO .+ Ingest:
pirep::"

INFO 2011-10-23 00:00:22,199 [genericThreadPool-58] Ingest:
EDEX: Ingest - pirep::
/data_store/text/23/00/UBUS31_KWBC_230000_461873296.20111023
processed in: 0.0050 (sec) Latency: 0.9310 (sec)

(as EDEX Ingest writes to the log file, lines identifying
successful text ingest are displayed.)
```

To stop monitoring, press <ctrl-c>.

NOTE: In both scenarios, the Linux *cut* utility can be used to limit the displayed output. For example, to eliminate the date stamp from the output, pipe the tail/grep command from either scenario into *cut -d ' ' -f 1,4,6-15*. (This also eliminates the [thread] from the output but includes the data type and file name.)

Example 25.7.1-6: Monitoring Data Ingest Latency

Latency is the elapsed time between when the AWIPS II system first contacts a data file and when the data has been ingested, decoded, and is ready for retrieval by either CAVE or another client application. This information is logged into the EDEX process logs for every file that is ingested. The general format of the message is *INFO <date> <time> [thread] Ingest: <type>:: <file> processed in: <time> Latency: <time>*. (Note that there are two spaces between INFO and the start of the date stamp.) This pattern can be used to monitor the EDEX Ingest process logs for ingest latency, using the pattern to filter out undesirable messages.

This recipe presents two scenarios: 1) general latency monitoring; and 2) monitoring latency for a specific data type. Both scenarios use the Linux *tail* and *grep* tools to provide real-time display of the log files while filtering to eliminate extra output. They also use the Linux *cut* tool to eliminate some extra information from the lines being displayed.

Scenario 1: Monitoring General Data Latency

For general data latency, we can ignore the *type* token and simply capture the *INFO* messages from Ingest. To simplify the output, we will use *cut* to eliminate the date and time stamps, the thread identifier, the data type, and the file name from the output.

The Perl 5 regex: ^INFO .+ Ingest:

The cut command: *cut -d ' ' -f 1,4,6-9-*

The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
$ ls edex-* -20111023.log
edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
```

```

edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log

$ tail -f edex-ingest-20111023.log | grep -P "^\w+INFO .+"
Ingest:" | cut -d ' ' -f 1,4,6,9-
(as EDEX Ingest writes to the log file, lines identifying
successful ingest with processing and latency times are
displayed.)

```

To stop monitoring, press <ctrl-c>.

Typical messages will be similar to

INFO 18:41:56,011 Ingest: processed in: 0.0440 (sec) Latency: 0.0880 (sec)
INFO 18:41:58,021 Ingest: processed in: 0.0830 (sec) Latency: 0.0870 (sec)
INFO 18:41:58,061 Ingest: processed in: 0.0380 (sec) Latency: 0.1260 (sec)

Scenario 2: Monitoring Data Latency for a Specific Data Type

To monitor a specific data type, the *type* is important. Other than that, the process is nearly identical to scenario 1. For this example, we will monitor radar data.

The Perl 5 regex: ^INFO .+ Ingest: radar::

The cut command: cut -d '' -f 1,4-6,9-15

The steps to follow:

```

$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
$ ls edex-*.*log

```

Note: For today's log file, for example, use `ls edex-*--20111023.log`

```

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log

```

```
edex-ingest-unrecognized-files-20111023.log  
edex-request-20111023.log  
edex-request-productSrvRequest-20111023.log  
  
$ tail -f edex-ingest-radar-20111023.log | grep -P "^\[INFO .+ Ingest: radar::\]" | cut -d ' ' -f 1,4,6,7,9
```

To stop monitoring, press <ctrl-c>.

Typical messages will be similar to this:

```
INFO 2011-10-23 00:00:02,132 [radarThreadPool-1] Ingest:  
EDEX: Ingest - radar:::  
/data_store/radar/BWI/TV0/SDUS51_BWI_TV0_222358_461873052.rad  
processed in: 0.0090 (sec) Latency: 0.9870 (sec)
```

```
INFO 2011-10-23 00:00:02,305 [radarThreadPool-1] Ingest:  
EDEX: Ingest - radar:::  
/data_store/radar/KEAX/N3Q/SDUS23_2351_KEAX_N3Q_461873056.rad  
processed in: 0.0670 (sec) Latency: 1.1600 (sec)
```

NOTE: You can expect the latency time to vary somewhat during the day depending on the rate at which data is arriving at the particular time of day. Extended periods of high latency are an indication of general system problems.

TIP: To monitor other data types, change *radar* to the name of the data type. See [Example 25.7.1-4](#) to determine available data types.

Example 25.7.1-7: Monitoring Ingest Failures

Unfortunately, as of this writing, there is no standard message logged when an ingest process fails. The closest available is a message with the general format of *ERROR <date> <time> [thread] Logger:< message>*. (A Perl 5 regex that matches this pattern is *^\[ERROR .+ Logger: .\]*) This pattern has two problems. First, it does not name the file being ingested when the error occurred, and second, it is not exclusive to file ingest. Because all ingest is handled by the EDEX ingest or GRIB ingest process, the second problem is less of an issue. The steps to follow:

```
$ ssh awips@dx3  
awips@dx3's password:  
$ cd /awips2/edex/logs  
  
$ ls edex-*-20111023.log
```

Note: For today's log file, for example use `ls edex-*-20111023.log`

```

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log

```

```

$ tail -f edex-ingest-20111023.log | grep -P "^\w+ERROR .+
Logger:"
(as EDEX Ingest writes errors to the log file they are
displayed.)

```

To stop monitoring, press <ctrl-c>.

Example 25.7.1-8: Verifying EDEX Ready to Execute

When an EDEX process is started, it performs a series of initial operations before it is operational, that is, before it is ready to process data or handle client requests. EDEX logs three distinct messages during the startup process:

Launching a JVM... is logged as wrapper starts the EDEX process:

- * *AWIPS II EDEX ESB Platform* is logged as the EDEX process starts.
- * *EDEX ESB is now operational* is logged once the process is operational.

grep can be used to search the log at startup to determine if the EDEX process is operational. The steps to follow:

```

$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
$ ls edex*-20111023.log

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log

```

```
edex-ingest-satellite-20111023.log  
edex-ingest-shef-20111023.log  
edex-ingest-shef-performance-20111023.log  
edex-ingest-smartInit-20111023.log  
edex-ingest-text-20111023.log  
edex-ingest-trigger-20111023.log  
edex-ingest-unrecognized-files-20111023.log  
edex-request-20111023.log  
edex-request-productSrvRequest-20111023.log
```

```
$ grep -Pw "Launching/Platform/operational" edex-ingest-  
20111023.log  
Launching a JVM...  
* AWIPS II EDEX ESB Platform *  
* EDEX ESB is now operational *  
Launching a JVM...  
* AWIPS II EDEX ESB Platform *  
* EDEX ESB is now operational *
```

This output shows that the EDEX ingest process started and became operational twice on October 23, 2011. Assuming EDEX ingest has not been stopped, it also shows that the EDEX ingest process is ready to process data.

Tip: The *-P* option on *grep* allows you to use a *Perl 5* regular expression as the search pattern. The *-w* option instructs *grep* to search for whole word matches only.

Example 25.7.1-9: Monitoring General EDEX Server Status

The Linux *top* utility can be used to monitor the general status of a server. *top* is designed to provide dynamic real-time view of the system. It provides a system summary and a list of executing tasks on the server.

The basic steps for running *top*:

```
$ ssh awips@dx3  
awips@dx3's password:  
$ top
```

To exit *top*, either press *q* or *<ctrl-c>*. Typical output is shown in Exhibit 25.7.1-1.

Interesting values to watch are in the PID, VIRT, RES, SHR, %CPU, %MEM and TIME columns. From the top main page:

```
top - 03:25:10 up 73 days, 10:24, 1 user, load average: 2.84, 2.78, 2.77
Tasks: 213 total, 1 running, 212 sleeping, 0 stopped, 0 zombie
Cpu(s): 6.8%us, 2.5%sy, 0.0%ni, 86.9%id, 0.5%wa, 0.4%hi, 2.9%si,
0.0%st
Mem: 8306672k total, 7517240k used, 789432k free, 18520k buffers
Swap: 2199544k total, 6920k used, 2192624k free, 1608884k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
24175	awips	22	0	1666m	1.3g	17m	S	72.8	16.6	5315:37	java
17314	awips	20	0	1683m	918m	14m	S	14.3	11.3	380:07.88	java
22469	root	15	0	2632	1264	924	R	0.3	0.0	0:00.11	top
1	root	15	0	2160	540	512	S	0.0	0.0	0:12.62	init
2	root	RT	-5	0	0	0	S	0.0	0.0	1:28.10	migration/0
3	root	34	19	0	0	0	S	0.0	0.0	0:18.69	ksoftirqd/0
4	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/0
5	root	RT	-5	0	0	0	S	0.0	0.0	0:05.76	migration/1
6	root	34	19	0	0	0	S	0.0	0.0	0:00.87	ksoftirqd/1
7	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/1
8	root	RT	-5	0	0	0	S	0.0	0.0	0:07.58	migration/2
9	root	34	19	0	0	0	S	0.0	0.0	0:00.35	ksoftirqd/2
10	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/2
11	root	RT	-5	0	0	0	S	0.0	0.0	0:06.77	migration/3
12	root	39	19	0	0	0	S	0.0	0.0	0:02.91	ksoftirqd/3
13	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/3
14	root	RT	-5	0	0	0	S	0.0	0.0	0:08.81	migration/4
15	root	34	19	0	0	0	S	0.0	0.0	0:00.34	ksoftirqd/4
16	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/4
17	root	RT	-5	0	0	0	S	0.0	0.0	0:05.04	migration/5
18	root	34	19	0	0	0	S	0.0	0.0	0:01.11	ksoftirqd/5
19	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/5
20	root	RT	-5	0	0	0	S	0.0	0.0	0:08.65	migration/6
21	root	34	19	0	0	0	S	0.0	0.0	0:00.36	ksoftirqd/6
22	root	RT	-5	0	0	0	S	0.0	0.0	0:00.00	watchdog/6
23	root	RT	-5	0	0	0	S	0.0	0.0	0:04.72	migration/7
24	root	34	19	0	0	0	S	0.0	0.0	0:01.04	ksoftirqd/7

Exhibit 25.7.1-1. Basic *top* Display

- **PID:** Process Id.
- **VIRT:** Virtual Image (kb). The total amount of virtual memory used by the task. It includes all code, data, and shared libraries plus pages that have been swapped out.

- **RES:** Resident size (kb). The non-swapped physical memory a task has used.
- **SHR:** Shared Mem size (kb). The amount of shared memory used by a task. It simply reflects memory that could be potentially shared with other processes.
- **%CPU:** CPU usage. The task's share of the elapsed CPU time since the last screen update, expressed as a percentage of total CPU time.
- **TIME:** CPU Time. Total CPU time the task has used since it started. When 'Cumulative mode' is "On," each process is listed with the cpu time that it and its dead children have used.
- **TIME+:** CPU Time, hundredths. The same as 'TIME', but reflecting more granularity through hundredths of a second.
- **%MEM:** Memory usage (RES). A task's currently used share of available physical memory.

Example 25.7.1-10: Monitoring Just the EDEX Processes

Top supports several command line options; one of the most useful is the ability to select the processes to monitor. This is done using the *-p* flag. The basic syntax is

top -p PID1[, PID2[, PID3 ...]]

This can be used to have *top* monitor just the EDEX processes. The steps to follow:

```
$ ssh root@dx3
root@dx3's password:
$ /etc/init.d/edex_camel status | grep java
EDEX Camel (ingest) is running (java PID 24175)
EDEX Camel (ingestGrib) is running (java PID 24274)
EDEX Camel (ingestDat) is running (java PID 17314)
EDEX Camel (request) is running (java PID 14130)

$ top -p 24175, 24274, 17314, 14130
```

To exit *top*, press either *q* or *<ctrl-c>*. Typical output is shown in Exhibit 25.7.1-2.

```

top - 03:32:22 up 73 days, 10:31, 1 user, load average: 2.08, 2.41, 2.58
Tasks: 4 total, 0 running, 4 sleeping, 0 stopped, 0 zombie
Cpu(s): 14.5%us, 3.0%sy, 0.0%ni, 79.6%id, 0.7%wa, 0.3%hi, 1.9%si,
0.0%st
Mem: 8306672k total, 7715440k used, 591232k free, 23132k buffers
Swap: 2199544k total, 6920k used, 2192624k free, 1755508k cached

          PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+   COMMAND
24175 awips      22   0 1677m 1.3g  17m S 117.6 16.6   5323:16 java
24274 awips      22   0 1529m 1.3g  17m S  6.0 16.7 458:16.28 java
14130 awips      17   0 2718m 1.8g  17m S  4.0 22.9 73:18.21 java
17314 awips      20   0 1683m 918m  14m S  0.0 11.3 381:46.94 java

```

Exhibit 25.7.1-2. Top Display with Selected Processes

25.7.2 Using the JConsole Tool

The JConsole tool has been part of the standard Java release since Java 1.5. It provides a GUI interface into an executing Java program and is a basic tool for monitoring the EDEX Processes. JConsole utilizes the Java Management Extension (JMX) to provide a low-impact view into the internals of a Java application.

EDEX has been configured to support JConsole connectivity options that allow both local and remote monitor monitoring.

In this context, “local” means logged onto the server as the user, normally awips, running EDEX. This also means that we must first identify the PID of the AWIPS Process we want to monitor. Finally, because JConsole is a GUI based application, you will need to export display from the EDEX server being monitored to the workstation. If you log into the server using *ssh*, the *-X* flag may be used to export display.

Remote monitoring allows a user to monitor the EDEX without logging into the server running EDEX. In order to do so you need the hostname of the server and the port the EDEX instance exposes for JConsole monitoring. The ports currently exposed by EDEX are listed in Table 25.7.2-1.

Table 25.7.2-1 EDEX JConsole Ports

Process	Token	JConsole Port
EDEX Request	request	1616
EDEX Ingest	ingest	1617
EDEX GRIB Ingest	ingestGrib	1618
EDEX DAT Ingest	ingestDAT	1619

NOTE: Remote monitoring requires that Java 1.5 or later be installed on the computer running JConsole.

The next few recipes discuss using JConsole to interact with the running EDEX processes.

NOTE: When possible, remote monitoring should be used for monitoring; this results in a lower processing load on the EDEX server.

Example 25.7.2-1: Using JConsole to Monitor an EDEX Process

This recipe presents the basics for using JConsole. There are two scenarios: local monitoring of the EDEX process; and remote monitoring of the EDEX process. In the next few recipes, it will be assumed that the steps provided in this recipe are used to start JConsole.

Scenario 1: Using JConsole in Local Monitoring Mode

For local monitoring, you need to be logged into the EDEX server using the same account that is running EDEX. Normally, this is the *awips* account.

The steps to follow to initiate a JConsole connection to an operating EDEX ingest process:

```
$ ssh -X awips@dx3
awips@dx3's password:
$ /etc/init.d/edex_camel status ingest | grep java
EDEX Camel (ingest) is running (java PID 13603)
$ /awips2/java/bin/jconsole 13603 &
$
```

For the other EDEX processes, replace *ingest* with the token for the desired EDEX process. (See section 25.2.2, [Operational Considerations](#) for a list of EDEX processes.)

Scenario 2: Using JConsole in Remote Monitoring Mode

For remote monitoring you will need two items – the host name of the EDEX server and the connection port. The command line format for remote connection is:

```
jconsole host:port.
```

In this recipe, we will connect to the EDEX Ingest process on DX3. The port used by the EDEX request process is 1616, see section 25.7.2, [Using the JConsole Tool](#) (Table 25.7.2-1) for a list of ports for the other EDEX processes.

NOTE: This scenario assumes that Java 1.5 or better has been installed on the workstation and that the JConsole executable is in the path.

The steps to follow to initiate a remote JConsole connection to an operating EDEX Request process:

(Open a terminal window on your workstation.)

```
$ jconsole dx3:1616 &
$
```

In both scenarios, JConsole starts with the *Overview* tab selected. The display will be similar to Exhibit 25.7.2-1.

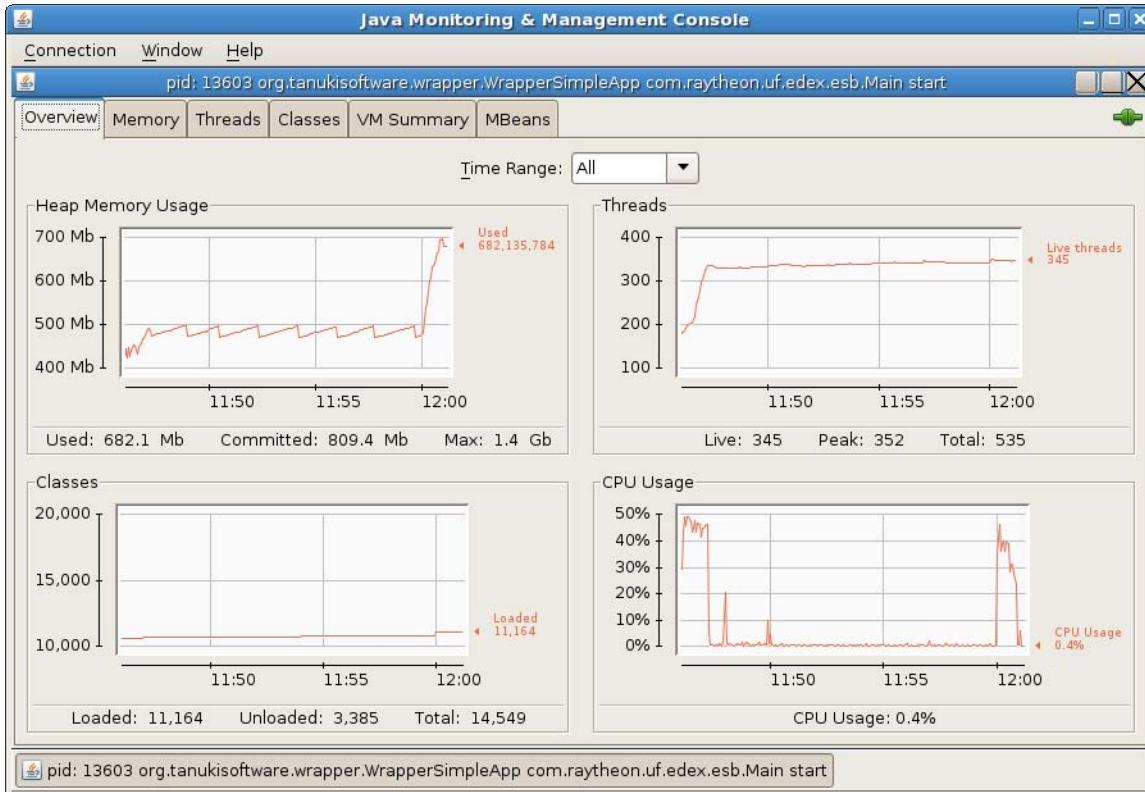


Exhibit 25.7.2-1. Initial JConsole Display

JConsole has six tabs that provide different views into the running application. Of these, the most useful are:

- *Overview*: Provides a general view of the application
- *Memory*: Provides detailed information on memory usage by the application.
- *MBeans*: Provides access into detailed information and (some) control of the processes.

TIP: This recipe uses one of the command line options available for starting JConsole. Use /awips2/java/bin/jconsole -h to see the other options.

Example 25.7.2-2: Using JConsole to Examine Data Ingest Status

The **MBeans tab** on JConsole provides a means to examine the inner workings of the various components that make up EDEX. The various components of EDEX, as shown in Exhibit 25.7.2-2, are known as MBeans; this means they expose attributes that can be displayed in JConsole. They may also expose operations that can be executed from JConsole. This recipe looks at some of the component data that is available via that page. For illustrative purposes, we will examine the data available in the Radar decoder service. Other data types may be examined using the same basic steps.

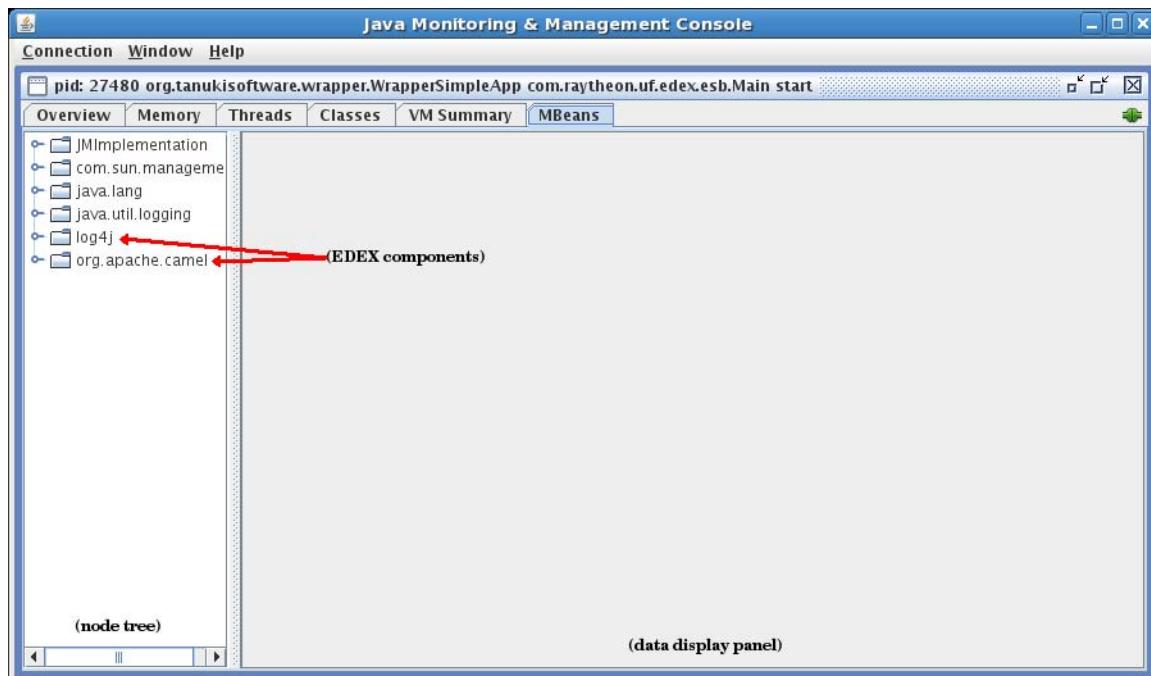


Exhibit 25.7.2-2. JConsole MBean Tab, Initial Display

Follow the basic steps in [Example 25.7.2-1/Scenario 2](#) to start JConsole monitoring the EDEX ingest process on DX3. Once JConsole is running, click the *MBeans* tab. This will display the *MBeans* browser, which is a fairly standard tree browser. On the left is an expandable tree view of the process' MBeans, while the right side is used to display information about the selected node of the MBeans tree.

The initial tree display presents the top-level view of the components visible in JConsole. Of these, *log4j* and *org.apache.camel* are the nodes containing EDEX components, as shown in Exhibit 25.7.2-3. Clicking the *toggle* in front of a node name in the tree expands that node; selecting a node name displays available information on that node.

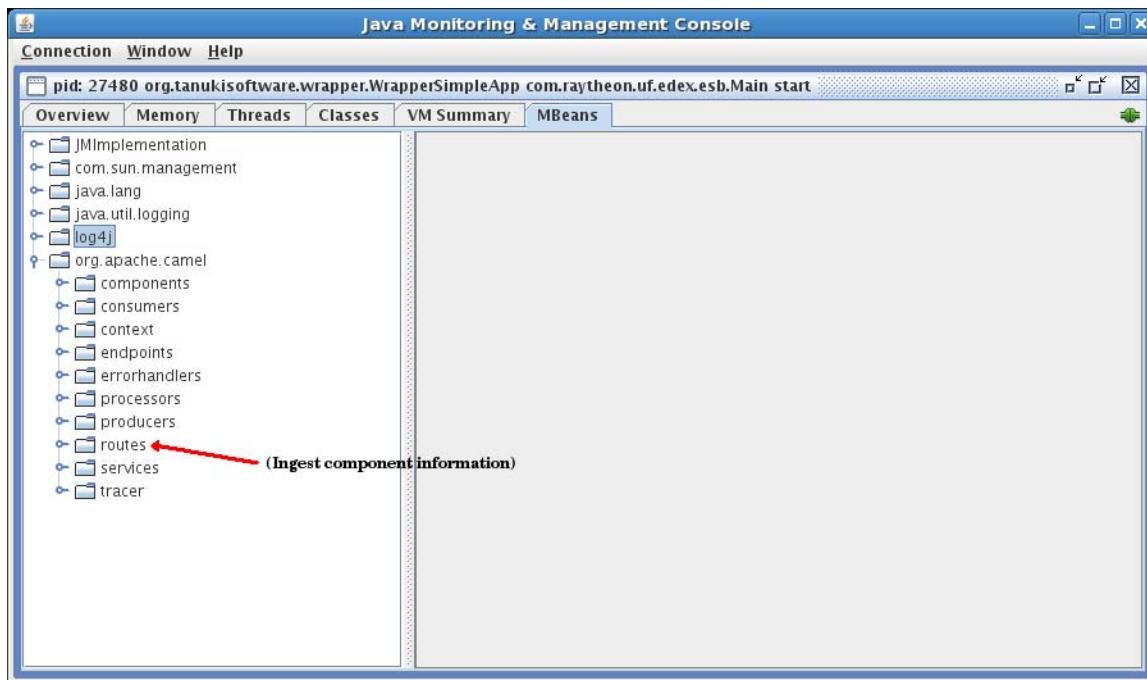


Exhibit 25.7.2-3. JConsole MBean Tab with *org.apache.camel* Expanded

The nodes under *org.apache.camel* provide information about both the EDEX components and the Camel framework on which they are running. (The node is named *org.apache.camel* because EDEX runs within the Camel framework.) Of the nodes under *org.apache.camel* the one providing the most status information is the *routes* node, as shown in Exhibit 25.7.2-4, which displays a partial listing of Camel routes. Roughly speaking, a Camel route equates to an EDEX service. (Technically, this list contains Camel contexts.)

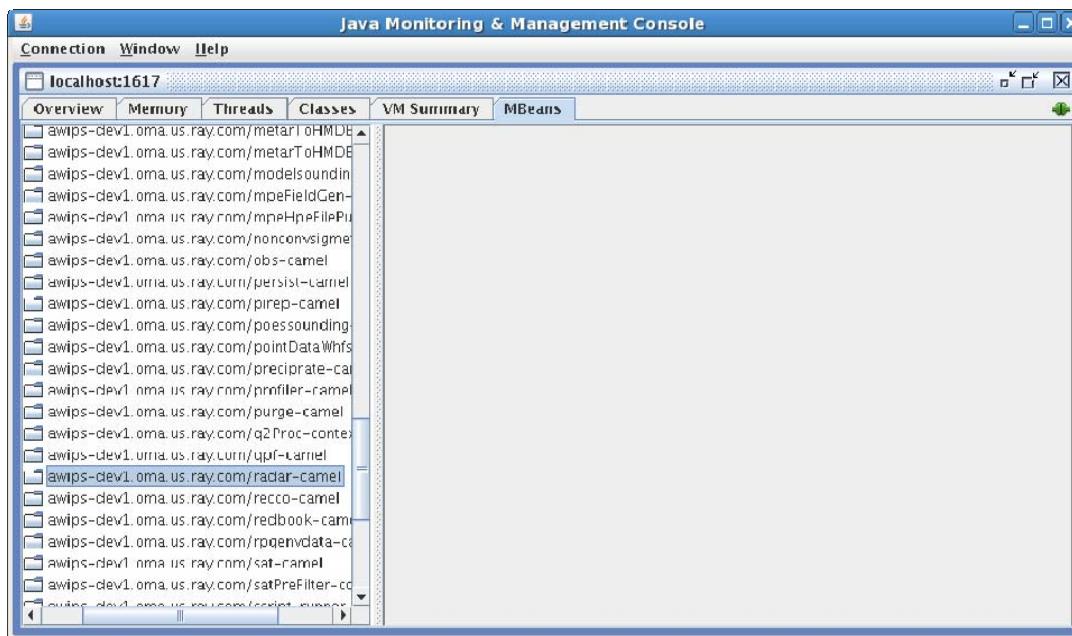


Exhibit 25.7.2-4. Partial Listing of Camel Routes

The names of the route nodes are `<host>/node`. In particular, the name of the Camel route node for Radar ingest is `<host>/node`. Note that the `<host>` name is a fully qualified domain name.

NOTE: The images in this recipe were captured from a development server (awips-dev1.oma.us.ray.com) running the latest development build of EDEX. On a production system, the computer name will change appropriately.

Clicking the toggle to expand the `radar-camel` node, we see that `radar-camel` has two beans listed – `radarFileConsumerRoute` and `radarIngestAlert`. See Exhibit 25.7.2-5.

Ingest components will normally have a route with a name like `dataIngestRoute`. Note the naming pattern; the data type name is followed by the `IngestRoute`. This bean provides the information on the status of the ingest component.

Clicking the toggle on the `radarIngestRoute`, we see that the `radarIngestRoute` can display Attributes, Operations, and Notifications. Selecting *Attributes* displays the attributes in the data display panel.

Of the attributes listed, the most interesting are the three “Exchanges” attributes, and the “Processing Time” attributes. These are generally self-explanatory, although the units are not. The processing time attributes are given in milliseconds.

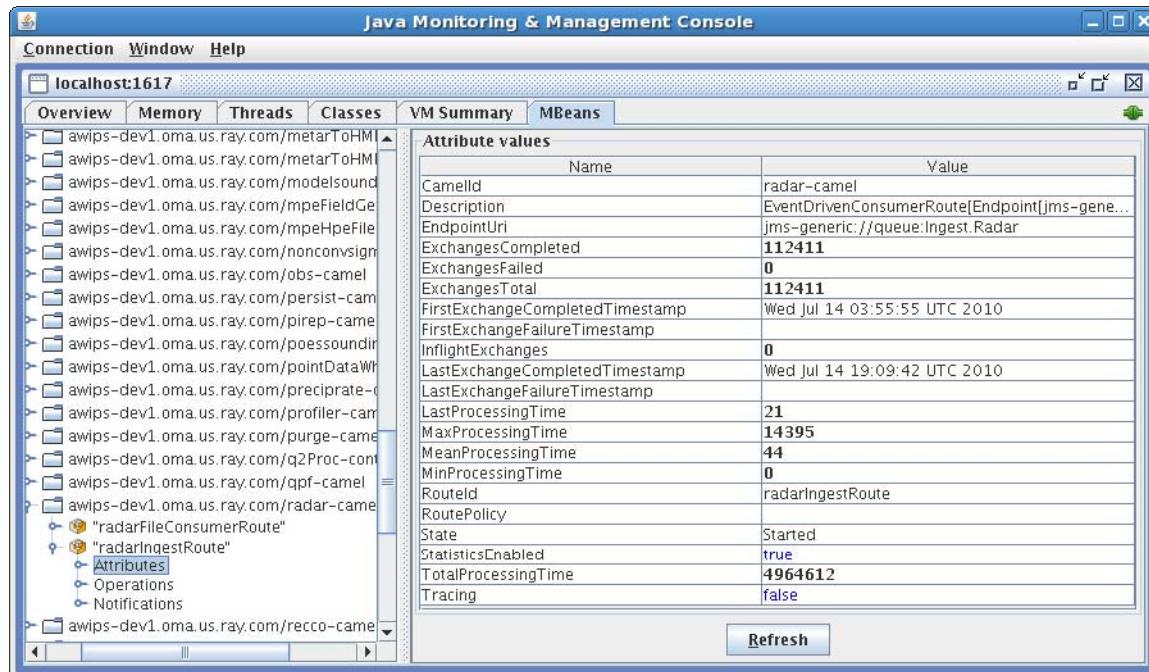


Exhibit 25.7.2-5. Radar Decoder Route with Attributes Displayed

TIP: You can generally double click on any numeric attribute to get a real-time graphical view of that attribute.

Example 25.7.2-3: Using JConsole to Monitor Request Status

The *MBeans* tab on JConsole, as shown in Exhibit 25.7.2-6, provides a means to examine the inner workings of the various components that make up EDEX. The various components of EDEX are known as *MBeans*; this means they expose attributes that can be displayed in JConsole. They may also expose operations that can be executed from JConsole. This recipe looks at some of the component data that is available via that page. For illustrative purposes, we will examine μEngine (Micro Engine) requests.

Follow the basic steps in [Example 25.7.2-1/Scenario 2](#) to start JConsole monitoring the EDEX Request process on DX3. Once JConsole is running, click the *MBeans* tab. This will display the *MBeans* browser, which is a fairly standard tree browser. On the left is an expandable tree view of the process' *MBeans*, while the right side is used to display information about the selected node of the *MBeans* tree.

Click the toggle to expand the *org.apache.camel* node of the tree. As with monitoring the ingest process in [Example 25.7.2-2](#), the most useful information is in the tree under the *routes* node. Click the toggle to expand this node.

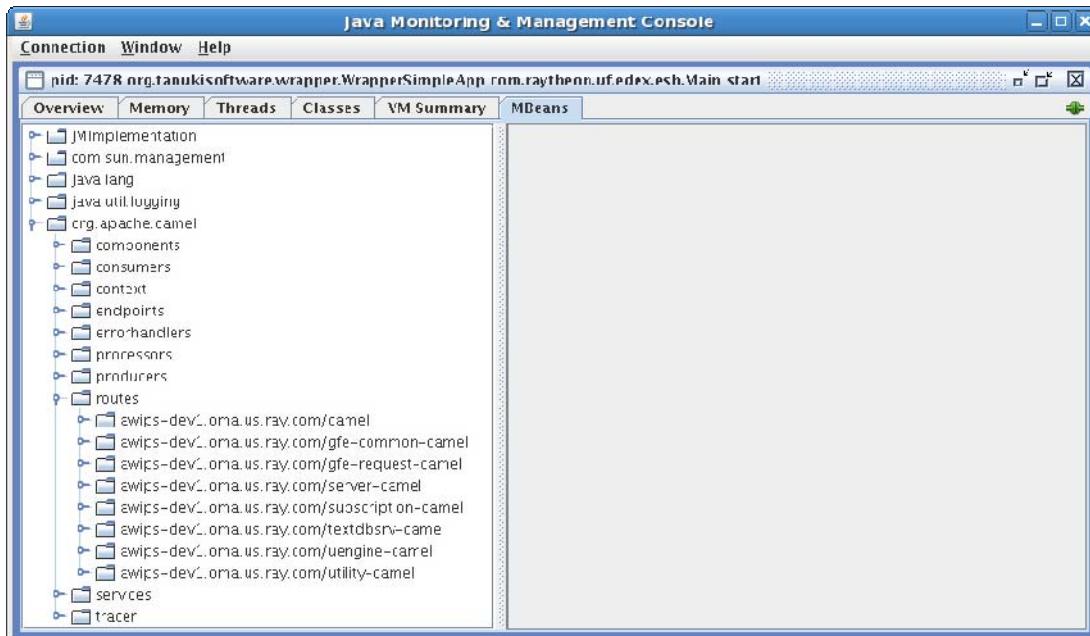


Exhibit 25.7.2-6. EDEX Request in JConsole with Routes Expanded

Micro Engine requests are handled by the *uengine-camel* route (remember, routes are listed as server/route). When we expand this node, we see that the *uengine-camel* has two Beans listed – *uEngineHttpJaxb* and *uEngineHttpThrift*. These beans represent the two ways a client can submit requests to the Micro Engine. In AWIPS II, CAVE makes all requests via the *uEngineHttpThrift* bean. Thus, the attributes of this bean provide information on the number and time spent on CAVE requests.

Click on the Micro Engine (*uengine-camel*) node and then expand the *uEngineHttpThrift* bean. Finally select the *attributes* node. The result is shown in Exhibit 25.7.2-7.

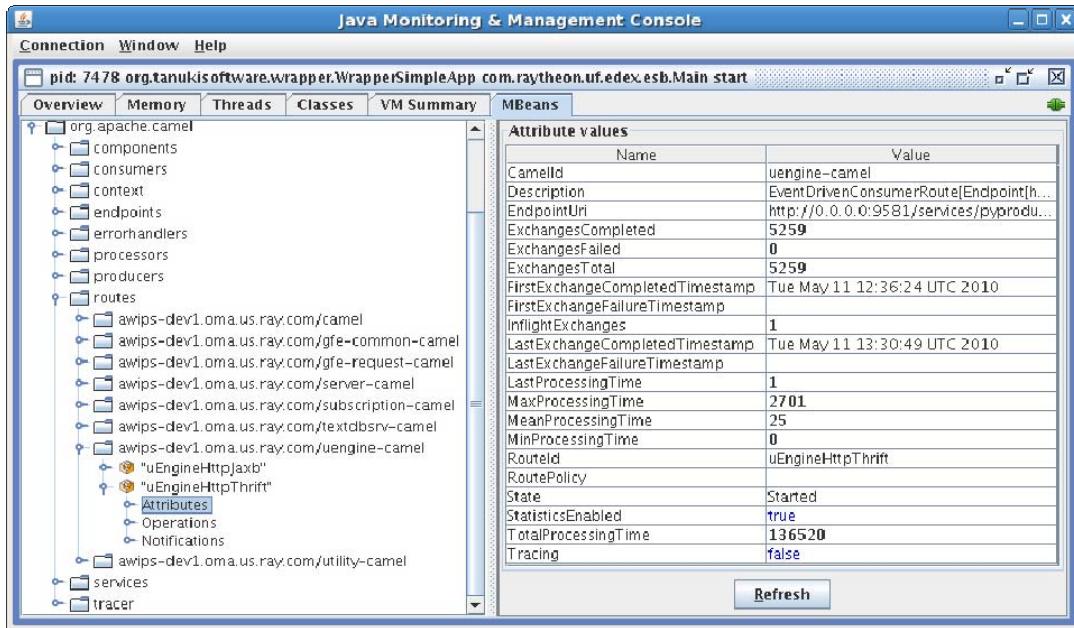


Exhibit 25.7.2-7. Micro Engine Http Thrift Bean Attributes

Example 25.7.2-4: Using JConsole to Change Logging Thresholds

As discussed previously (see section 25.6.5, [EDEX Logging Levels](#)), the messages being logged to the EDEX process log are controlled in part by changing the threshold level of the appropriate logger. The EDEX server provides a mechanism where this threshold may be changed using JConsole. It is important to realize that this change is temporary – the threshold value will revert to its configured value when the system is restarted.

To illustrate the process, we will change the logging level for the Subscription Service's Script Runner to DEBUG. This threshold change will provide additional log messages in the EDEX process log. The Subscription Service's Script Runner is a Service in the EDEX Ingest process.

To get started, follow the steps in [Example 25.7.2-1/Scenario 2](#) to connect to the EDEX ingest process on DX3. Once connected, select the *MBeans* tab and expand first the *log4j* node and then the *settings* bean, as shown in Exhibit 25.7.2-8.

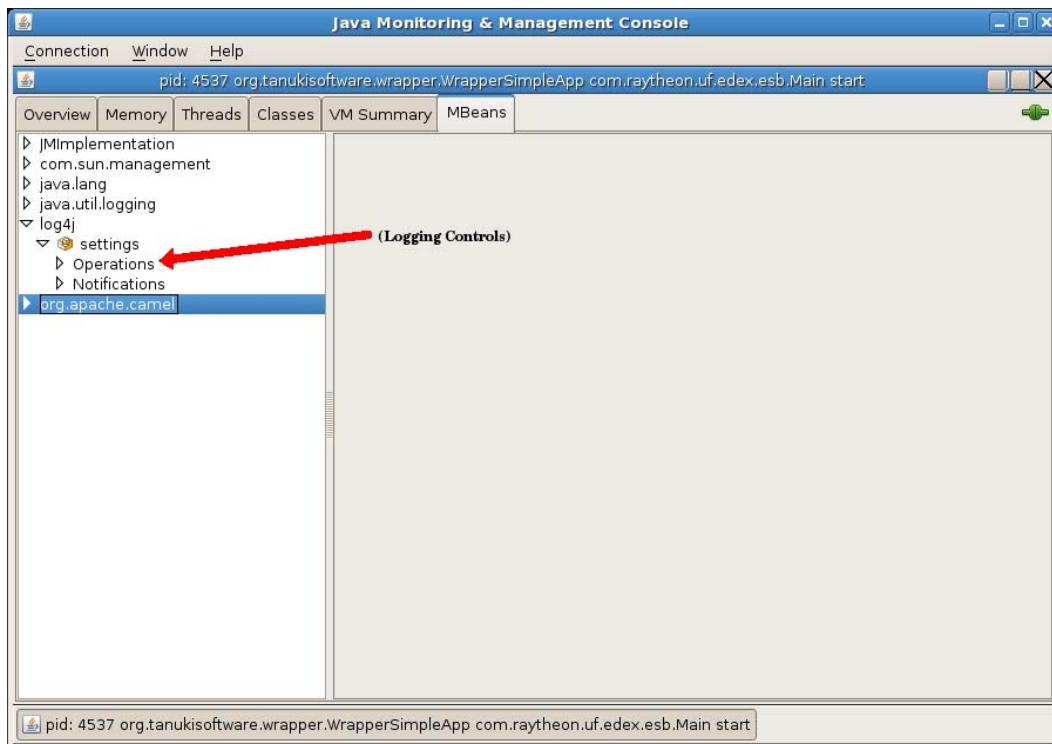


Exhibit 25.7.2-8. EDEX Logging Controls via JConsole

The settings *MBean* has no Attributes; controls are listed under the Operations node. Selecting the Operations node displays the list of available operations. (See Exhibit 25.7.2-9.)

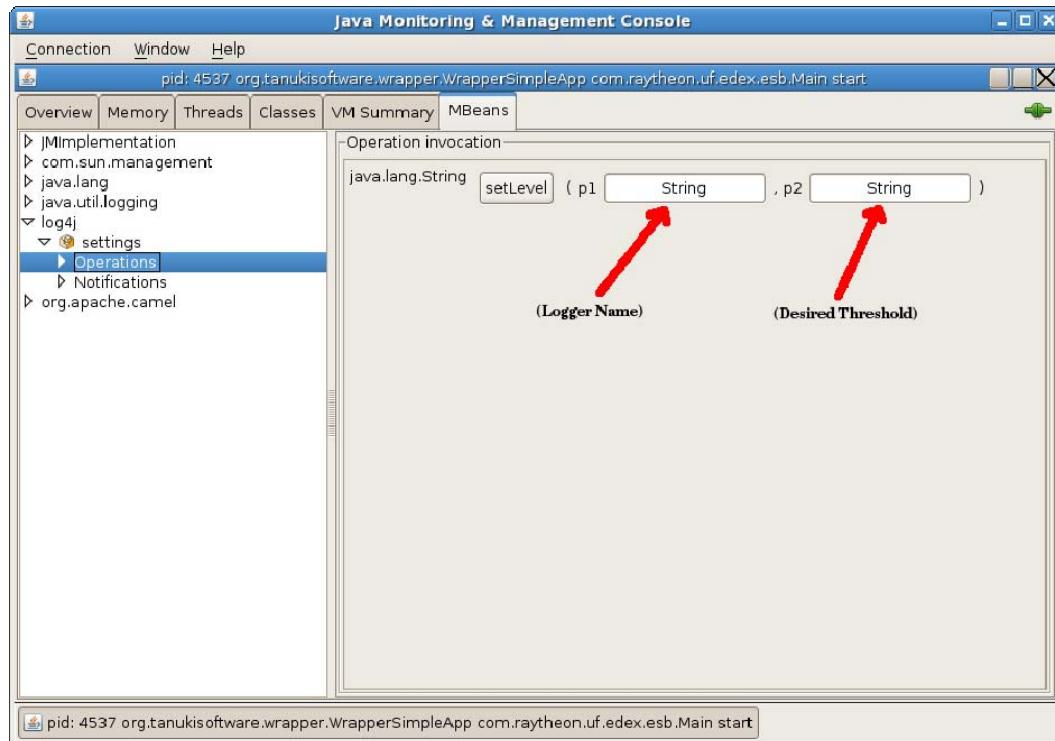


Exhibit 25.7.2-9. Set Level Operation of the Logging MBean

Unfortunately, JConsole does not provide a very user friendly display of the available operations. The display lists the method name for the operation correctly, but the user inputs are identified simply as p1, p2, p3, etc. The JConsole GUI does identify the expected type of each input and does provide a text box for entering the value.

For setting EDEX Logging Thresholds, the Operation is called *setLevel*. *setLevel* takes two string arguments – the name of the logger (labeled as p1) and the new logging threshold (labeled as p2). The logging thresholds are simply the logging levels listed in Section 25.6.5, [EDEX Logging Levels](#): DEBUG; INFO; WARNING; ERROR; and FATAL.

To change the logging threshold for the Subscription Service's script runner, we will set the following loggers to DEBUG:

**com.raytheon.edex.services.ScriptRunner
com.raytheon.edex.subscription
com.raytheon.edex.uengine.runners**

NOTE: This changes the logging threshold for any class having one of these strings as the prefix of its package. (The first one is a class, but the others could result in unexpected additional logging. Sorry, but that's the way LOG4J works.)

Refer to Exhibit 25.7.2-9. Enter the first logger name, *com.raytheon.edex.services.ScriptRunner*, in the p1 text box, then enter DEBUG in the p2 text, and then click *setLevel*. The update status message is displayed in a separate dialog, as shown in Exhibit 25.7.2-10. Click *OK* to close the dialog.

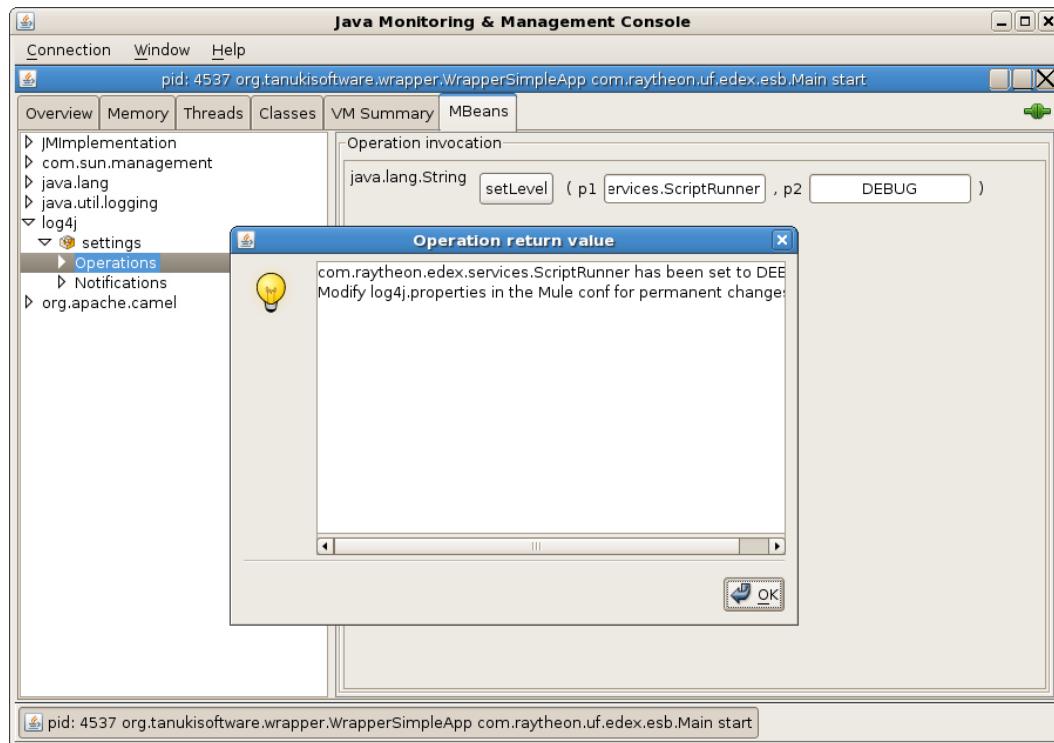


Exhibit 25.7.2-10. Changing a Logging Level

Repeat the process for the other two loggers (com.raytheon.edex.subscription and com.raytheon.edex.uengine.runners).

To verify the change, monitor the EDEX log. You should start seeing DEBUG level logging. In particular, you should start see DEBUG level messages similar to *ScriptRunner: script runner fired: type= timer, trigger= [1273594140002]*.

TIP: The logging threshold will only be in effect until EDEX is restarted.

25.8 Other EDEX-Related Monitoring

While the EDEX processes run on DX3 and DX4, they rely on processes running on other servers for operation. Key among these are the database, running on DX1/2, the QPID Message Broker, running on CP1/2, the Radar Server, running on DX1/2, and the LDM data manager, running on CP1/2 and PX1/2. These processes are discussed in this section. Also discussed is the HDF5 data store, which is accessible via /awips2/edex/data/hdf5 from either DX3 or DX4.

NOTE: There are tools other than those discussed in this section that may be used for monitoring. Some of these tools are standard Linux utilities. This section is limited to tools that are either 1) part of the standard RedHat Linux distribution, or 2) delivered as part of the AWIPS II distribution.

25.8.1 Monitoring the Database

This document limits the discussion of database monitoring to EDEX-related monitoring. In the recipes presented, only Linux tools and database tools delivered with the EDEX installation are discussed.

Example 25.8.1-1: Identifying the Database Used by EDEX

When EDEX is installed, the installer sets the Database Host and Port into the EDEX environment file, /awips/edex/bin/setup.env. This file is sourced at EDEX startup to set the runtime environment for EDEX. Examining this file allows you to determine the server name and port of the database EDEX is using to store data.

The lines containing the information start *export DB_ADDR* and *export DB_PORT*. We can use *grep* to extract this information from the startup script. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/bin
$ grep -P "^\bexport DB\b" setup.env
export DB_ADDR=dx1f
export DB_PORT=5432
$
```

TIP: The information obtained here is used each time we want to connect to the database.

NOTE: Other Linux tools, such as *less* or *view*, can be used to examine the EDEX environment file. In this case, *grep* was used due to the size (25 lines) of the file and the fact that a search pattern was known.

Example 25.8.1-2: Verifying that PostgreSQL Server Is Running

The Linux *ps* tool may be used to verify that the PostgreSQL server is running. It can also be used to determine the source and status of connections to the database. This check is performed from the database server.

To simplify the output somewhat, we will choose the *-o* option of the *ps* tool. This option allows you to specify the outputs; we will limit the outputs to the process id (pid) and the command line used to start the process (args). The basic steps to follow:

```
$ ssh awips@dx1
awips@dx1's password:
$ ps ax -o pid,args | grep -v grep | grep post
<<filtered output from ps>>
$
```

The output at this point depends on a number of factors; however, if nothing is displayed it means the PostgreSQL server is not running. If PostgreSQL is running you will see output similar to this:

```
14898 /awips/postgres/bin/postmaster -D /awips/data -p 5432
14905 postgres: logger process
14907 postgres: writer process
14908 postgres: wal writer process
14909 postgres: autovacuum launcher process
14910 postgres: stats collector process
14913 postgres: awips postgres 127.0.0.1(50547) idle
14914 postgres: awips fxatext 127.0.0.1(50548) idle
```

This output indicates that the PostgreSQL server consists of the “postmaster” and a number of “postgres” children. The children may be divided into two types: 1) background processes; and 2) client service processes. The background processes have a command line that ends with *process*. Client service processes, which handle client interactions with the PostgreSQL server, include login information from the client, including the IP address of the client. We can use this information for status checking.

To determine if the PostgreSQL server is running, we can change the command to filter for *postmaster* rather than the more general *post*. The basic steps are:

```
$ ssh awips@dx1
awips@dx1's password:
```

```
$ ps ax -o pid,args | grep -v grep | grep postmaster  
14898 /awips/postgres/bin/postmaster -D /awips/data -p 5432  
$
```

As before, if the PostgreSQL server is not running, no output will be displayed.

To get a list of client connections, we can change the original command somewhat to filter for IP addresses. The basic steps are:

```
$ ssh awips@dx1  
awips@dx1's password:  
$ ps ax -o pid,args | grep-vgrep | grep -P "post.+  
\d+\.\d+\.\d+\.\d+"  
14913 postgres: awips postgres 127.0.0.1(50547) idle  
14914 postgres: awips fxatext 127.0.0.1(50548) idle  
$
```

In this case, if there are no client connections, no output is displayed.

Each line of output includes, in order, the following entries: the Process ID (PID) and name of each process, the login name of the client, the IP address of the client, the port used by the client, and the status of the client’s connection. In this example, the client is logged in using the *awips* account and has connections to the *postgres* and *fxatext* databases. The login is from the database server itself – indicated by the “local” IP address of 127.0.0.1, and both connections are idle.

Example 25.8.1-3: Verifying Database Availability

Database availability can be verified by attempting to log into the database using the *psql* command line database client, which is normally installed with the AWIPS II software. To complete the login, you may need to specify a password – that depends on the authentication levels set for the database. At this writing, the new AWIPS II databases require passwords; the legacy (AWIPS I) databases utilized by EDEX do not.

To simplify connecting to the database using *psql*, several command line flags may be used. The basic syntax to use is

```
psql -h host -p port -d database -U user
```

where:

- ***host*** is the host name identified in [Example 25.8.1-1](#)
- ***port*** is the port identified in [Example 25.8.1-1](#)
- ***database*** is the database you wish to access
- ***user*** is the database user for the login.

For a complete listing of command line options, run *psql --h* from the command line. Running *psql --h* will also identify the defaults for any command line options.

To test the availability of the EDEX database, we will attempt to connect to the *metadata* database as user *awips*. Because are interested in confirming the availability of the database to EDEX, we will attempt the connection from DX3. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
```

Welcome to psql 8.3.4, the PostgreSQL interactive terminal.

```
Type: \copyright for distribution terms
\h for help with SQL commands
\? for help with psql commands
\g or terminate with semicolon to execute query
\q to quit
```

```
metadata=#
```

NOTE: Please provide the password if prompted.

This listing shows a complete session connecting to the metadata database as user *awips* and then logging out. It is important to note that the request for a password shows the connection is accessible. If the database is not available, *psql* will return a message similar to this:

```
Psycopg: could not connect to server: Connection refused
Is the server running on host "dx1" and accepting
TCP/IP connections on port 5432?
```

NOTE: To save space, the welcome banner was omitted from this listing. It is also omitted from other recipes involving *psql*.

Example 25.8.1-4: Determining Data Type Tables in Metadata Database

AWIPS II uses the metadata database to store information about ingested data. To get a list of the main table names that store the metadata, we can query a table named *plugin_info* in that database. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select name, tablename from plugin_info
metadata=# where database='metadata'
metadata=# and tablename != '<unspecified>';
metadata=#
```

```

      name      |    tablename
-----
acarssounding | acarssounding
level         | level
grib          | grib
(more rows are printed - there are 51 rows total)
ldadmanual   | ldad_manual
bufrmos      | bufrmos
metadata=# \q
$
```

As an example, this result shows that the main table of GRIB is *grib*.

Tip: You can spread the sql query over several lines in PSQL; simply press return to at the end of the line. Note that the prompt changes slightly. To execute the query, terminate the line with a semicolon and then press return.

Example 25.8.1-5: Determine Latest Insertion Time of GRIB Metadata

One basic method for checking on data flow is to query the latest insertion time of the metadata for a specific data type. Most of the data type tables contain a field named *inserttime* that contains the data/time stamp of the insertion. This is not the same as the valid time of the data,² of course, but it can indicate if a decoder is actively performing metadata data inserts.

Note the use of a couple of PostgreSQL functions – *to_char()* and *now()*. *now()* provides the current data/time on the database server; *to_char()* is used to modify the print format of the time fields. The steps to follow:

```

$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select to_char((select now()),'MM/DD HH24:MI')
metadata-# as "Time Now", to_char((select inserttime
metadata(# from awips.grib order by inserttime desc
metadata(# limit 1),'MM/DD HH24:MI') as "Latest";
Time Now      |      Latest
-----+-----
05/11 21:25 | 05/11 21:24
metadata=# \q
$
```

² In most tables, the valid time of the data is contained in a field named *reftime*.

This result shows the current time as well as the most recent insert time for GRIB data. Note that the last insert was at 21:24 while the current time is 21:25.

TIP: To check the latest insert time for a different data type, simply change *grib* to the desired data table name.

TIP: Given the length of the query, you may want to save it into a file for later use. Assuming the query has been saved to /path/to/file/query.sql, you execute it by entering \i /path/to/file/query.sql at the psql command prompt.”

Example 25.8.1-6: Determining Database Session Information Using psql

The *postgres* database contains useful information about the database that may be queried to help determine the state/health of the database. Two useful tables are the *pg_database* table and the *pg_stat_activity* table. The *pg_database* table provides information about the databases available in the PostgreSQL server; the *pg_stat_activity* provides a snapshot of the current activity in the server. In addition, the *information_schema.columns* table can be used to get a listing of the columns in a specific table. This Example presents two scenarios: 1) determining the available databases; and 2) determining the activity for a specific client.

Scenario 1: Determine the Databases Available in the PostgreSQL Server on DX1

To determine the available databases, we connect to the *postgres* database in the PostgreSQL server on DX1 using *psql*. Note that we make the connection from DX3 because we are interested in the structure of the database used by the EDEX server. (See [Example 25.8.1-1](#) to determine the database used by EDEX on DX3.) We then query the *pg_database* table to determine the available table names. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d postgres -U awips
      Password for user awips:
postgres=# select table_name,column_name from
postgres-# information_schema.columns
postgres-# where table_name = 'pg_database';
table_name | column_name
-----+-----
pg_database | datname
pg_database | datdba
pg_database | encoding
pg_database | datistemplate
pg_database | datallowconn
pg_database | datconnlimit
```

```
pg_database | datlastsysoid
pg_database | datfrozenxid
pg_database | dattablespace
pg_database | datconfig
pg_database | datacl
(11 rows)

postgres=# select datname as "database"
postgres-# from pg_database
postgres-# where datistemplate='f';
      database
-----
postgres
metadata
fxatext
maps
hd_ob83oax
dc_ob7oax
hmdb
(7 rows)

postgres=# \q
```

As this output shows, there are six AWIPS II databases available on DX1. As noted before, *postgres* is a standard database that contains general information and is not specific to AWIPS II.

Scenario 2: Determining Status of Database Clients

To determine client status with the PostgreSQL server, we connect to the *postgres* database in the PostgreSQL server on DX1 using *psql*. Note that we make the connection from DX3 because we are interested in client connections of the database used by the EDEX server. (See [Example 25.8.1-1](#) to determine the database used by EDEX on DX3.)

Once connected, we will first query the *pg_stat_activity* table to determine the status of each database connection. The columns to query are somewhat arbitrarily chosen; several “trial and error” queries were attempted before deciding on the query shown here. The *as* modifier is used on some columns in the query to provide more readable output. In addition, the *where* clause is used to filter out the activity created by running this query.

Also note the use of a couple of PostgreSQL functions; *to_char()* and *now()*. *now()* provides the current date/time on the database server; *to_char()* is used modify the print format of the time fields. The steps to follow:

```
$ ssh awips@dx3
```

```
awips@dx3's password:  
$ psql -h dx1 -p 5432 -d postgres -U awips  
postgres=# select table_name,column_name from  
postgres-# information_schema.columns  
postgres-# where table_name = 'pg_stat_activity';  
table_name      | column_name  
-----+-----  
pg_stat_activity | datid  
pg_stat_activity | datname  
pg_stat_activity | procpid  
pg_stat_activity | usesysid  
pg_stat_activity | username  
pg_stat_activity | current_query  
pg_stat_activity | waiting  
pg_stat_activity | xact_start  
pg_stat_activity | query_start  
pg_stat_activity | backend_start  
pg_stat_activity | client_addr  
pg_stat_activity | client_port  
(12 rows)  
  
postgres=# select datname,username,current_query as  
postgres-# status,to_char(backend_start,'MM/DD HH24:MI')  
postgres-# as start_time,client_addr as client  
postgres-# from pg_stat_activity where current_query  
postgres-# not like '%pg_stat_activity%';  
datname | username | status | start_time | client  
-----+-----+-----+-----+-----  
postgres | awips | <IDLE> | 05/19 15:04 | 127.0.0.1  
fxatext | awips | <IDLE> | 05/19 15:04 | 127.0.0.1  
dc_ob7oax | awips | <IDLE> | 05/19 15:04 | 127.0.0.1  
metadata | awips | <IDLE> | 05/19 17:14 | 127.0.0.1  
metadata | awips | <IDLE> | 05/19 15:46 | 127.0.0.1  
(5 rows)  
  
postgres=# select to_char(now(),'MM/DD HH24:MI') as now;  
now  
-----  
05/19 17:33  
(1 row)  
  
postgres=# \q  
$
```

This output gives a snapshot of the client activity for each database that is currently engaged. As we can see, there are a total of five client connections, all of which are currently idle. Displaying the start time and then querying for the current time provides an idea of how long each connection has been in use.

NOTE: Some of the queries used by AWIPS II are rather long, so the output may not be this brief.

NOTE: The sample output was produced by querying an isolated database; in an active AWIPS II installation, the number of connections will be considerably higher.

Example 25.8.1-7: Determining Data Type Tables in Metadata Database (Revisited)

When combined, [Example 25.8.1-4](#) and [Example 25.8.1-5](#) present a method for determining the latest insertion time for the AWIPS II GRIB metadata table. This Example presents additional information on how this was done. The intent is to present a pattern of queries that can be adapted to mine other data from the database.

Generally, we will follow these steps:

1. Connect to the database server using *psql*.
2. Query to determine available schema in the database.
3. Query to determine the tables in the schema.
4. Query to determine the fields in the desired table.
5. Query to determine contents of a specific table.

When possible, *where* clauses should be used to limit queries. For example, many of the PostgreSQL elements have a name that is prefaced with “*pg_*”. These can be filtered out using a *where* clause similar to *where <>field name>> not like ‘pg_%’*.

Following this general outline, the steps to follow are:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select table_name,column_name
metadata-# from information_schema.columns
metadata-# where table_name='schemas';
table_name | column_name
-----+-----
schemas   | catalog_name
schemas   | schema_name
schemas   | schema_owner
schemas   | default_character_set_catalog
```

```
schemata      | default_character_set_schema
schemata      | default_character_set_name
schemata      | sql_path
(7 rows)

metadata=# select catalog_name, schema_name
metadata-# from information_schema.schemata
metadata-# where schema_name not like 'pg_%'
metadata-# and schema_name not like 'information_%';
catalog_name | schema_name
-----+-----
metadata    | public
metadata    | awips
metadata    | subscription
metadata    | vtec
(4 rows)

metadata=# select table_name, column_name
metadata-# from information_schema.columns
metadata-# where table_name = 'pg_tables';
table_name | column_name
-----+-----
pg_tables   | schemaname
pg_tables   | tablename
pg_tables   | tableowner
pg_tables   | tablespace
pg_tables   | hasindexes
pg_tables   | hasrules
pg_tables   | hastriggers
(7 rows)

metadata=# select schemaname, tablename
metadata-# from pg_tables
metadata-# where schemaname = 'awips'
metadata-# order by tablename asc;
schemaname |           tablename
-----+-----
awips     | acars
awips     | acarsbuilder
awips     | acarssounding
awips     | acarssoundinglayer
awips     | airep
awips     | airmet
```

```

awips      / airmet_location
<<several rows deleted>>
awips      / goessounding
awips      / grib
awips      / grib_lambertconformal_coverages
<<a bunch of rows deleted>>
awips      / vil
awips      / warning
awips      / warning_ugczone
(94 rows)

metadata=# select table_name,column_name
metadata-# from information_schema.columns
metadata-# where table_name = 'grib'
metadata-# and column_name like '%time';
table_name | column_name
-----+-----
grib      | forecasttime
grib      | reftime
grib      | inserttime
(3 rows)

metadata=# select to_char(select now(),'MM/DD HH24:MI')
metadata-# as "Time Now", to_char(select inserttime
metadata-# from awips.grib order by inserttime desc
metadata(# limit 1),'MM/DD HH24:MI') as "Latest";
      Time Now    |    Latest
-----+-----
      05/11 21:25 | 05/11 21:24

metadata=# \q
$
```

The final query shows that the latest insert time is approximately 1 minute prior to the current time. From this we know the insertions are recent; it does not identify whether the data being inserted is up to date, however.

Here are a couple more notes on these queries. First, the PostgreSQL query engine is geared toward queries into the *public* schema of a database. To query into other schemata, you need to preface the table name with the schemata name, for example, *information_schema.schemata* or *awips.grib*. Second, note that many, but not all, of the AWIPS II metadata tables include an *inserttime* field, so it may be necessary to use a *where* clause similar to *where column_name like '%time'* to identify time fields to query.

25.8.2 Monitoring the Data Store

EDEX uses Hierarchical Data Format (HDF) 5 files to store data that has been ingested. EDEX does not interact directly with the HDF5 repository; rather it interacts with PyPIES, running on the DX1/2 cluster, to access the Data Store. The HDF5 files are located in a directory that is shared between DX1 and DX2. As seen from either DX1 or DX2, the HDF5 Data Store is located in */awips2/awips/edex/data/hdf5*. This directory contains both the HDF5 data store and other directories, notably the topo directory, which must be shared between DX1 and DX2 to allow the EDEX servers to operate correctly.

For gridded data, stored in the *grib* directory, and forecast grids, stored in the *gfe* directory, the structure is somewhat different. Gridded data is stored (and purged) by model and model run, so the *grib* directory contains a subdirectory for each model; HDF5 files for each model run are located in each subdirectory. For forecast grids, located under the *gfe* directory, grids are stored by site and specific type and model run.

Although the directory structure varies, there are some general techniques that apply to all data types. These techniques are covered in the Examples in this section.

Example 25.8.2-1: Determining the Disk Space Used by the Data Store

Disk space with the Data Store is managed by the EDEX Purge Service. This allows the data stored in the HDF5 repository to remain in synch with the metadata in the database. In order to determine optimal data retention rules, it is desirable to determine the disk usage in the Data Store.

The Linux *du* tool can be used to get a rough idea of the size of the Data Store. This information can then be used to determine if retention rules need to be modified to prevent over utilization of disk space. The basic procedure is

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/data/hdf5
$ du -sh --exclude=topo
42G .
$
```

This result shows that the data store currently contains approximately 42 GBytes of data. Note that the *--exclude* flag is used to have the topo file not counted.

Example 25.8.2-2: Modifying Data Retention Time

The Purge Service utilizes information packaged with each data decoder plug-in to determine the data retention rules for the plug-in. The data retention rules are then applied to delete records from the database and HDF5 files from the Data Store. Most data plug-ins use a simple, retention time-based purging. The rule here is simple: “If the data is more than X hours old, delete it.” The main plug-in that does not use this strategy is the grib plug-in; it uses a purge strategy based on the desired number of model runs to retain.

Data retention time is tracked in the awips.plugin_info table, which is in the metadata database in AWIPS II. The key fields are name, which identifies the data type, *retentiontime*, which identifies the number of hours to retain the data. When the Purge Service runs, it queries the database for the retention time; because of this, the retention time for a specific data type can be changed without requiring a restart of the EDEX server.

This Example presents two scenarios: 1) determining retention time; and 2) changing retention time. The data type used to illustrate this process is *satellite*.

Scenario 1: Determining Retention Time for Satellite Data

The retention time for *satellite* data may be obtained with a simple database query. This can be performed from any computer that has *psql* installed. For consistency with other *psql* examples, we will perform the test from the EDEX server. The basic steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select name, retentiontime
metadata=# from awips.plugin_info
metadata=# where name = 'satellite';
      name      | retentiontime
-----+-----
satellite |          24
(1 row)

metadata=# \q
$
```

From this result, we see that the retention time for *satellite* data is 24 hours.

Scenario 2: Changing Retention Time for Satellite Data

The retention time for *satellite* data is changed by changing its retention time entry in the *plugin_info* table. This is accomplished using an SQL update command. The update command changes the value in the database. A word of caution: Be very careful running this command; small errors made when using *update* can cause unexpected problems and generally cannot be corrected/rolled back.

For this example, we will first change the *satellite* data retention time to 18 hours and then repeat the query from scenario 1 to confirm the change. The basic procedure is:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
```

```

Password for user awips:
metadata=# update awips.plugin_info
metadata=# set retentiontime = 18
metadata=# where name = 'satellite';
UPDATE 1
metadata=# select name, retentiontime
metadata=# from awips.plugin_info
metadata=# where name = 'satellite';
      name      | retentiontime
-----+-----
satellite |          18
(1 row)

metadata=# \q
$
```

The next time the Purge Server runs, all *satellite* data more than 18 hours old will be purged.

Tip: If you are running the EDEX server from a canned data set, you can avoid having to re-ingest the data by modifying the data retention rule. Simply set the retention time to a *large* number of hours, say 99999 – approximately 11 and a half years – and it will not be purged.

Example 25.8.2-3: Determining Available Data Types (in the Data Store)

There are several means of determining data availability on the EDEX cluster. Database queries similar to those presented in [Example 25.8.1-4](#) and [Example 25.8.1-5](#) can be used to determine the data type EDEX can process as well as the latest insert time for the various data types. In this Example, we approach the question from the Linux file system. As is frequently the case with file system issues, basic Linux tools such as *ls*, *find*, and *tree* can provide useful information. This Example presents two scenarios; 1) getting a basic listing of available data types; and 2) determining which data types have current HDF5 repositories.

Scenario 1: Determining available data types

If *ls* is used to get a listing of the contents of */awips2/edex/data/hdf5*, we will get a rough indication of the available data types. What we really need, however, is a listing of the subdirectories of */awips2/edex/data/hdf5* that are the root of a directory tree containing HDF5 files.

A quick check for available data can be performed using the Linux *find* tool. Because available data is in HDF5 files, we use *find* to search for HDF5 files. The basic command is *find . -name "*.h5"*. Unfortunately, the number of HDF5 files on an active EDEX cluster can reach the thousands. As a result, we need to do some

filtering of the output from *find* to generate a more compact list. The techniques will be similar to those used in [Example 25.8.1-4](#). The basic steps to follow:

```
$ ssh awips@dx1
awips@dx3's password:
$ cd /awips2/edex/data/hdf5
$ find . -name "*.h5" |grep -Pv "\.\\gfe" |cut -d '/' -f 2 >
ingest-types.txt
$ sort ingest-types.txt > sorted-ingest-types.txt
$ uniq sorted-ingest-types.txt ingest-types.txt
$ cat ingest-types.txt
binlightning
bufrascat
bufrhdw
bufrmosEta
bufrmosGFS
<<several more lines>>
scan
sfcobs
sfcobs
tcg
tcs
topo
vil
```

(On a typical AWIPS II installation, this process yielded a total of 32 data types stored in HDF5 archives.)

The final output shows a sorted list of data types that utilize HDF5 for data storage. Note that it does not identify specifics such as GRIB models, satellite regions, or radar types. Those can be determined more easily by searching the database.

Scenario 2: Determining the latest available data for a data type

The *-l* flag on the Linux *ls* tool can be used to determine the latest modification time for the contents of a directory. However, what we really want is to find the newest file in a directory structure when only the root of the structure is known.

A quick and dirty check can be performed using some of the options of the Linux *tree* tool. The options to use are *-D* (print modification time), *-f* (print full path information – also suppresses tree style output), *-i* (don't print indentation lines), and *-t* (sort by modification time). Finally, we will use the *grep* tool to limit the output to HDF5 files and the *cut* tool to reduce the output somewhat. The steps to follow (using *satellite* as the data type):

```
$ ssh awips@dx1
awips@dx3's password:
```

```
$ cd /awips2/edex/data/hdf5
$ tree -Dfit satellite |grep -P "\.h5$" |cut -d '/' -f 1
[Oct 25 13:43] satellite
[Oct 25 12:27] satellite
[Oct 25 10:41] satellite
[Oct 25  9:54] satellite
[Oct 25  8:24] satellite
[Oct 25  7:40] satellite
[Oct 25  7:24] satellite
[Oct 25  6:12] satellite
[Oct 25  5:54] satellite
[Oct 25  4:44] satellite
[Oct 25  2:41] satellite
[Oct 25  1:41] satellite
[Oct 25  1:11] satellite
[Oct 25  0:55] satellite
[Oct 24 23:41] satellite
[Oct 24 23:25] satellite
[Oct 24 22:41] satellite
[Oct 24 20:41] satellite
[Oct 24 19:41] satellite
[Oct 24 17:41] satellite
[Oct 24 16:42] satellite
[Oct 24 16:11] satellite
```

In this case, we see that the latest modification to the satellite data stored in HDF5 was at 13.43 on October 25.

Once again, due to the potential number of HDF5 files in the data store on an EDEX cluster, it may be desirable to pipe the output of this command into a file and use a text viewer to examine the file. In this case, we use the Linux *head* tool to view the first few lines of the file. The steps to follow (using *grib* as the data type):

```
$ ssh awips@dx1
awips@dx3's password:
$ cd /awips2/edex/data/hdf5
$ tree -Dfit grib |grep -P "\.h5$" > available-grib.txt
$ head -n 5 available-grib.txt

[Oct 25 15:05] grib/Aviation/Aviation-2011-10-25-14-FH-012.h5
[Oct 25 15:01] grib/Aviation/Aviation-2011-10-25-14-FH-009.h5
[Oct 25 14:55] grib/Aviation/Aviation-2011-10-25-14-FH-006.h5
[Oct 25 14:51] grib/Aviation/Aviation-2011-10-25-14-FH-002.h5
[Oct 25 14:49] grib/Aviation/Aviation-2011-10-25-14-FH-003.h5
```

This output appears to show that the most recent grib file modified was at 15:05 on Oct 25. This output is a bit deceptive, however, because the time sorting is performed on files within a single directory. A more accurate result is obtained by either sorting the output file or filtering for a specific *grib* model.

25.8.3 Monitoring QPID

QPID is an Advanced Message Queuing Protocol (AMQP) broker that provides for messaging between the various components in the EDEX cluster. It allows for a fairly high level of load balancing within the cluster and helps to minimize the loss of data ingest in the event an EDEX instance experiences an unplanned restart. QPID also allows the LDM to post messages to EDEX; see section 25.3, Basic Data Flow Concepts for details. At this writing, QPID runs on the CP 1/2 cluster. In this section, we will assume QPID is running on CP1.

Example 25.8.3-1: Verifying QPID Execution

QPID execution can be verified by logging onto the CP1 and using either *ps* or *pidof* to verify that the process is running. Note that the actual QPID process is running as *qpidd*.

First, the steps for using *ps*:

```
$ ssh awips@cpsbn1
awips@cpsbn1's password:
$ ps ax -o pid,args | grep qpidd | grep -v grep
20632 /awips2/qpid/sbin/qpidd --daemon --config
/awips2/qpid/etc/qpid.conf
```

This shows that QPID is running; if QPID is not running, there will be no output.

The linux *pidof* tool outputs the process ID (PID) of a process; if the process is not running, a blank line is output. Here are the steps to follow:

```
$ ssh awips@cpsbn1
awips@cp1's password:
$ pidof qpidd
20632
$
```

NOTE: The Linux *pidof* tool is normally installed in */sbin*, which may not be in a user's path. If a *command not found* error is displayed, try using */sbin/pidof*.

Example 25.8.3-2: Monitoring QPID Execution

As with the EDEX processes (see [Example 25.7.1-10](#)), the general status of QPID may be monitored using the Linux *top* utility. To do so, we first use *pidof* to determine the PID of the QPID process, and then use the *-p* option on *top* to limit monitoring to the QPID instance. The steps to follow:

```
$ ssh awips@cpsbn1
awips@cp1's password:
$ pidof qpidd
9240
$ top -p 20632
```

To exit *top*, press either *q* or <*ctrl-c*>. Typical output is shown in Exhibit 25.8.3-1.

```
top - 15:32:19 up 118 days, 1:33, 1 user, load average: 0.17, 0.34, 0.43
Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
Cpu(s): 0.3%us, 0.1%sy, 0.0%ni, 99.5%id, 0.0%wa, 0.0%hi, 0.0%si,
0.0%st
Mem: 6222480k total, 5588912k used, 633568k free, 463344k buffers
Swap: 2047992k total, 44900k used, 2003092k free, 3365204k cached

 PID USER      PR NI VIRT  RES  SHR S %CPU %MEM     TIME+ COMMAND
20632 awips      15   0 511m 191m 5832 S  2.0  3.1 266:28.76 qpidd
```

Exhibit 25.8.3-1. Top Display Monitoring QPID

Example 25.8.3-3: Monitoring QPID Logging

When it is running, QIPD writes */var/log/messages*; this file is owned by *root* and is readable only by *root*, but it can be monitored to provide information on QPID's operation. QPID messages are formatted as follows:

```
<date> <time> <server> qpidd[PID] <message>
```

This format allows you to scan */var/log/messages* for QPID messages; it also allows you to monitor QPID in real time.

Scenario 1: Scanning for QPID Messages

This scenario is similar to the recipes for scanning the EDEX process logs, e.g., [Example 25.6.5-1](#) or [Example 25.7.1-3](#). As in those previous recipes, the Linux *grep* utility is our weapon of choice. The steps to follow:

```
$ ssh awips@cpsbn1
awips@cp1's password:
$ cd /var/log
$ grep qpidd messages

Oct 23 22:52:38 cpsbn1-tbdw qpidd[20632]: 2011-10-23 22:52:38
warning task overran 4 times by 2ms (taking 8493ns) on average.
Oct 23 22:52:54 cpsbn1-tbdw qpidd[20632]: 2011-10-23 22:52:54
warning task overran 6 times by 2ms (taking 11172ns) on
average.
Oct 23 22:52:54 cpsbn1-tbdw qpidd[20632]: 2011-10-23 22:52:54
warning ManagementAgent::periodicProcessing task overran 1
times by 4ms (taking 2773858ns) on average.
```

```
Oct 23 22:53:10 cpsbn1-tbdw qpidd[20632]: 2011-10-23 22:53:10
warning ManagementAgent::periodicProcessing task overran 1
times by 2ms (taking 2523683ns) on average.
(lines matching "qpidd" are displayed)
$
```

The displayed messages will vary depending on conditions encountered by QPID. Normally, QPID logs very few messages. If no messages are displayed and QPID is known to be running (see Example 25.8.3-1), you can assume that QPID is running normally.

Scenario 2: Real-Time Scanning of QPID Messages

This scenario is similar to the recipes for real-time scanning of the EDEX process logs, e.g., [Example 25.7.1-5](#) or [Example 25.7.1-6](#). As in those previous recipes, the trick is to use the Linux *tail* utility to obtain a real-time display of the log and to pipe *tail*'s output to *grep* to filter the display for QPID messages. The basic steps:

```
$ ssh awips@cpsbn1
awips@cp1's password:
$ cd /var/log
$ tail -f messages | grep qpidd
```

```
Oct 25 15:33:42 cpsbn1-tbdw qpidd[20632]: 2011-10-25 15:33:42
warning task overran 1 times by 2ms (taking 2629ns) on average.
Oct 25 15:33:58 cpsbn1-tbdw qpidd[20632]: 2011-10-25 15:33:58
warning task overran 163 times by 2ms (taking 2121ns) on
average.
Oct 25 15:34:05 cpsbn1-tbdw qpidd[20632]: 2011-10-25 15:34:05
warning task overran 82 times by 2ms (taking 1967ns) on
average.
Oct 25 15:34:19 cpsbn1-tbdw qpidd[20632]: 2011-10-25 15:34:19
warning task overran 2 times by 2ms (taking 20550ns) on
average.
Oct 25 15:34:29 cpsbn1-tbdw qpidd[20632]: 2011-10-25 15:34:29
warning task overran 1 times by 2ms (taking 3275ns) on
average.
(as QPID writes messages, the display will update.)
```

To stop monitoring, press <ctrl-c>.

As in Scenario 1, the absence of messages means QPID is operating correctly.

25.8.3.1 QPID Monitoring Tools

QPID supports both stand-alone and clustered operation. Clustered operation facilitates failover operations on the CPSBN cluster, allowing failover of QPID operation without loss of messages. QPID management and monitoring is accomplished by a set of Python language tools that are installed on the CPSBN cluster. As these tools provide both

monitoring and management/control functions, care must be taken to avoid operational impact. All examples in this section have been designed to provide monitoring functionality without affecting operations.

QPID monitoring tools are located in /awips2/python/bin on the CPSBN1/2 cluster. They may be installed on other systems as well. This section focuses on five of these tools. They are listed and described in Table 25.8.3.1-1.

Note: The QPID tools described here can be used with both the clustered and the unclustered QPID. In addition, all the tools have a *-h* option, which will cause the tool to print a usage message and terminate.

Table 25.8.3.1-1. Basic QPID Tools

Tool	Usage (Arguments)	Description
qpid-cluster	[options] [host[:port]]	General administration tool. Use to query information and administer the QPID cluster. Monitoring options: -C: view client connections for all cluster members -c: View client connections for a specific cluster member
qpid-stat	[options] [host[:port]]	Displays statistics on QPID operation Monitoring options: -b: show brokers -c: show connections -e: show exchanges -q: show queues -S: sort by a specified column name; msg, msgIn, msgOut and bytes are useful columns -L: limit the number of lines to display
qpid-printevents	[host[:port]]	Provides a real-time view of QPID events. Monitoring options: -h: display usage message <crtl-C> to terminate
qpid-queue-stats	[options] [-a host[:port]]	Provides a real-time view of QPID queue statistics. Monitoring options: -f: list of queues to monitor, comma separated, regex are accepted <crtl-C> to terminate
qpid-config	[-a host[:port]] [command]	General QPID administration tool. Use to query and administer QPID. Monitoring commands: queues: prints a list of queues exchanges: prints list of exchanges With no command, summary statistics are printed.

Example 25.8.3.1-1: Determining the Status of the QPID Cluster

QPID runs on the CPSBN1/2 cluster. In normal operation, QPID runs in clustered mode. The *qpid-cluster* tool may be used both to determine the status of the QPID cluster and to

identify the members of the cluster. This tool is also used to manage the QPID cluster; care must be exercised to avoid affecting operations.

The basic steps to follow:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ cd /awips2/python/bin
root@cpsbn1-tbw3 bin]# qpid-stat -b

Brokers
  broker      cluster      uptime      conn   sess
exch  queue

=====
=====
  localhost:5672  <standalone>  3d 22h 26m 28s      0      0
  8      177
```

The output above is typical but will vary by site. If QPID is not operating in clustered mode, the following message is printed:

```
Failed: Exception - Clustering is not installed on the broker
```

Example 25.8.3.1-2: Monitoring QPID Queue Status

The *qpid-stat* tool provides statistics on various QPID activities – queues, brokers, exchanges, and connections. In this example, we will monitor the top 10 queues by number of messages in the queue. The output from *qpid-stat* is rather long (generally about 170 characters per line), so *cut* is used to shorten the output length to 145 characters. To provide near real-time display, *watch* is used to update the display every 5 seconds. The basic command for this is **watch -n 5 “./qpid-stat -q -S msg -L 10 | cut -b -135”**.

The full procedure:

```
$ ssh awips@cpsbn1
awips@cpsbn1's password:
$ cd /awips2/python/bin
$ watch -n 5 "qpid-stat -q -S msg -L 10 | cut -b -135"
<<results of watch are displayed>>
<ctrl-C>
```

Typical output is shown in Exhibit 25.8.3.1-1.

```

Every 5.0s: qpid-stat -q -S msg -L 10 | cut -b -135      Tue Oct 25 15:51:12
2011
Queues
  queue
    dur   auto
Del excl msg    msgIn   msgOut  bytes  bytesIn  bytes0
=====
=====
  Ingest.dhr
    3.90k 19.0k 15.0k    269k  1.31m   1.04m
  scheduledQCScanWork
    1.12k 1.13k    14      0      0      0
  watchwarn
    10    3.41m 3.41m    560    198m   198m
  Ingest.RadarRadarServer
    0      0      0      0      0      0
  _edex.alerts.utility@amq.topic_0f77cb37-292b-4682-9eb4-ab1f9a543dd0 Y
    Y      0      52      52      0    30.6k   30.6k
  _rebuildD2DCache@amq.topic_76c92477-6363-4d2b-b671-71d59afa3aad Y
    Y      0     95     95      0      0      0
  Ingest.wcp
    0      4      4      0    214    214
  Ingest.ffg
    0    1.65k 1.65k      0   96.3k   96.3k
  satNotification

```

Exhibit 25.8.3.1-1. Typical Output of *qpidd-stat* for Queue Monitoring**Example 25.8.3.1-3: Monitoring Individual QPID Queues**

This same general approach can be used to monitor specific queues by piping the output of *qpidd-stat* into *grep* with an appropriate pattern. As an example, the EDEX ingest processes pull messages from QPID queues whose names start with *Ingest*. We can use this information to monitor ingest queues. As before, *cut* is used to shorten the output and *watch* is used to provide near real-time monitoring. The basic command for this is **watch -n 5 ‘./qpidd-stat -q -S msg | grep -P “Queues|queue|==|=Ingest” | cut -b -135’**. (The *grep* search string selects lines of output that contain *Queues*, *queue*, *==|=*, or *Ingest*. The first three will match the header lines output by *qpidd-stat*; the final choice catches the ingest queue stats.)

The full procedure:

```

$ ssh awips@cpsbn1
awips@cpsbn1's password:
$ cd /awips2/python/bin
$ watch -n 5 'qpidd-stat -q -S msg | grep -P
"Queues/queue/==|=Ingest" | cut -b -135'
<<results of watch are displayed>>
<ctrl-C>
$
```

Typical output is shown in Exhibit 25.8.3.1-2.

```
Every 5.0s: qpid-stat -q -S msg | grep -P "Queues|q...  Tue Oct 25 15:54:52 2011
Queues
queue                                            dur
autoDel  excl  msg    msgIn   msgOut  bytes  bytesIn  b
=====
=====
Ingest.dhr                                         Y
      3.92k  19.0k  15.0k    270k  1.31m    1
Ingest.RadarRadarServer                           Y
      0      0      0      0      0
Ingest.wcp                                         Y
      0      4      4      0     214
Ingest.ffg                                         Y
      0    1.65k  1.65k    0    96.3k    9
Ingest.bufrsigwx                                    Y
      0    176    176    0    10.2k    1
Ingest.lsr                                         Y
      0    352    352    0    21.1k    2
Ingest.Mosaic                                       Y
      0      0      0      0      0
Ingest.obs                                         Y
      0   198k   198k    0   11.9m    1
```

Exhibit 25.8.3.1-2. Typical Output of qpid-stat Monitoring Ingest Queues

The *qpidd-queue-stats* tool can also be used to provide real-time monitoring of individual queue status. *qpidd-queue-stats* provides some filtering; unlike *watch*, the new output is appended to the screen each time the statistics are updated. No sorting is provided; the output lines are shorter, however. The filtering mechanism is for specific queues; regex pattern matching is supported. To use *qpidd-queue-stats* to display Ingest queue statistics, the basic command is **./qpidd-queue-stats -f Ingest.***.

The full procedure:

```
$ ssh awips@cpsbn1
awips@cpsbn1's password:
$ cd /awips2/python/bin
$ ./qpidd-queue-stats -f Ingest.*
<<results of qpid-queue-stats are displayed>
<ctrl-C>
$
```

Typical output is shown in Exhibit 25.8.3.1-3.

Queue Name	Sec	Depth	Enq Rate	Deq Rate
<hr/>				
Ingest.Radar	10.00	0	2.20	2.20
Ingest.Shef	10.00	0	0.20	0.20
Ingest.Text	10.00	0	1.10	1.10
Ingest.airmet	10.00	0	0.40	0.40
Ingest.dhr	10.00	23663	0.20	0.00
Ingest.dpa	10.00	0	0.10	0.10
Ingest.modelsounding	10.00	7529	28.71	10.90
^[[6~Ingest.Radar	10.00	0	3.00	3.00
Ingest.Text	10.00	0	1.80	1.80
Ingest.airmet	10.00	0	0.10	0.10
Ingest.bufrmos	40.01	0	0.02	0.02
Ingest.dhr	10.00	23668	0.50	0.00
Ingest.dpa	10.00	0	0.50	0.50
Ingest.modelsounding	10.00	7778	35.60	10.70
Ingest.obs	40.01	0	0.02	0.02
Ingest.sfcobs	30.00	0	0.03	0.03
Ingest.taf	30.00	0	0.03	0.03
Ingest.Radar	10.00	0	2.80	2.80
Ingest.Shef	20.00	0	0.15	0.15
Ingest.Text	10.00	0	4.90	4.90
Ingest.Warning	110.02	0	0.01	0.01

Exhibit 25.8.3.1-3. Typical Output of *qpidd-queue-stats* Monitoring Ingest Queues

One comment here: These two tools may produce different results. In particular, *qpidd-stat* tends to display more Ingest queues than *qpidd-queue-stats*.

25.8.4 Monitoring IP Virtual Server (IPVS)

The IP Virtual Server (IPVS) is used to load balance the connections from clients (AlertViz, CAVE, etc.) to an EDEX cluster, as shown in Exhibit 25.8.4-1. IPVS is hosted on the CP 1/2 cluster. It is configured so that when an incoming connection request is made to the IPVS IP address, it looks to see which server has the fewest number of connections. It then routes the connection to the server with fewer active connections. If both servers have the same number of active connections, it is configured with DX4 weighted higher than DX3. This means that it will route to DX4 by default if both servers have the same number of active connections.

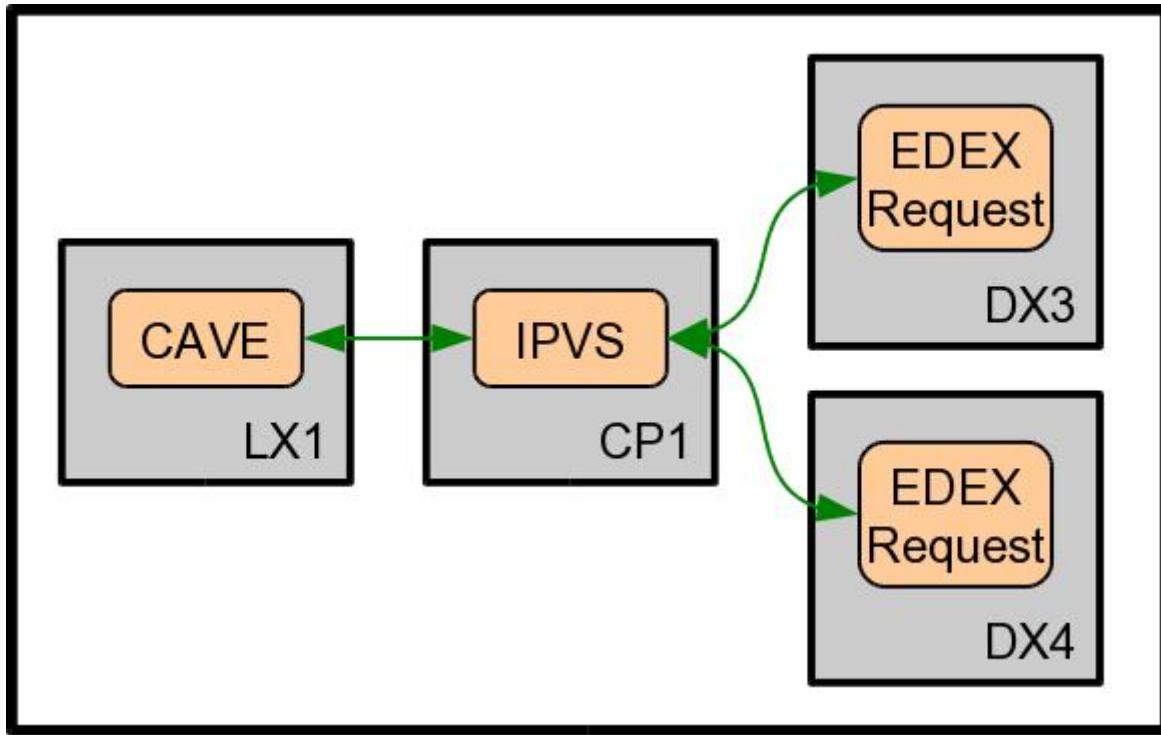


Exhibit 25.8.4-1. Client Interaction with CAVE via IPVS

For clients such as CAVE that interact with the EDEX Request process, IPVS allows a single connection string to be used regardless of the number of EDEX servers that are available. CAVE connects to a virtual address that is managed by IPVS on the CP1/2 cluster, shown here as CP1. (The virtual address used by CAVE is TS1.) Once the request is received, IPVS performs a handoff of one of the EDEX request servers, which fulfills the request. This results in a balancing of requests between DX3 and DX4.

IPVS is a standard part of the Red Hat Linux kernel that is installed on CP1/2.

On the clustered server, IPVS is managed by a number of Linux services and tools.

- *pulse* is a Linux heartbeat daemon for monitoring the health of cluster nodes. On a server that is part of a cluster, service *pulse* status can be used to determine if *pulse* is running; *top* may be used to monitor *pulse*.
- *lvsd* is the Linux daemon for controlling Red Hat clustering services. It is started by *pulse*. *lvsd* operation may be verified using *ps* and monitored using *top*.
- *nanny* is a Linux tool that monitors the status of services in a cluster. It is used by *pulse* and should not be used directly. *nanny* operation may be verified using *ps* and monitored using *top*.
- *ipvsadm* is the Linux Virtual Server administration management tool. It is used to manage the virtual server table and include some diagnostic/monitoring tools as well. *ipvsadm* must be run as root. When using *ipvsadm* for monitoring, use extreme care in the commands you execute.

The basic interaction of these tools is shown in Exhibit 25.8.4-2.

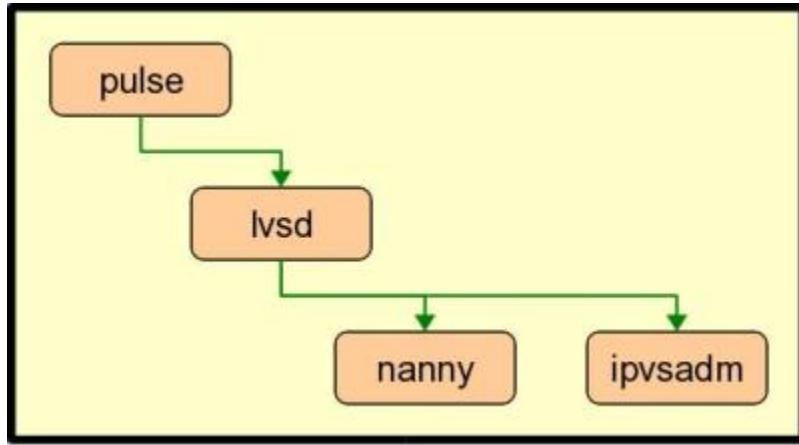


Exhibit 25.8.4-2. Basic Hierarchy of Tools in IPVS

Example 25.8.4-1: Verify/Monitor pulse Operation

pulse is the top-level tool involved in IPVS; it is a Linux daemon that is responsible for managing the cluster. Because IPVS is part of the CP1/2 cluster, *pulse* is ultimately responsible for its execution. If *pulse* is not running on all members of a cluster, cluster failover and other activities will fail. This recipe contains two scenarios: 1) verifying *pulse* execution; and 2) monitoring *pulse* execution using *top*.

Scenario 1: Verifying Pulse Execution

pulse is a Linux service whose operation may be controlled using the Linux *service* utility. Execution may be verified using *service pulse status*.

The basic steps to follow:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ service pulse status
pulse (pid  27173) is running...
$
```

You should see output similar to the sample output above. (The actual PID will be different, of course.)

Scenario 2: Monitoring Pulse Execution Using top

The Linux *top* utility provides for a near real-time picture of computer operation; the *-p* flag is used to limit the processing being watched. The syntax is *top -p <PID list>*.

The basic steps follow, and the *top* output monitoring *pulse* is shown in Exhibit 25.8.4-3.

```
$ ssh root@cpsbnx1
root@cpsbn1's password:
$ service pulse status
```

```

pulse (pid 27173) is running...
$ top -p 27173
(Typical top output is shown below, press q to quit top.)

```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
27173	root	15	0	1884	336	256	5	0	0.0	0:00.00	pulse

Exhibit 25.8.4-3. Top Output Monitoring pulse

Example 25.8.4-2: Verify/Monitor lvsd Operation

lvsd is the Linux daemon that is responsible for controlling the clustering. As such, it is part of the chain of tools responsible for the operation of IPVS. As with *pulse*, *lvsd* should be running on all members of a cluster to ensure proper operation of IPVS on the cluster. This Example contains two scenarios: 1) verifying *lvsd* execution; and 2) monitoring *lvsd* execution using *top*.

Scenario 1: Verifying lvsd Operation

Since *lvsd* is controlled by *pulse*, we use the Linux *ps* tool to verify that it is executing.

The basic steps to follow:

```

$ ssh root@cpsbn1
root@cpsbn1's password:
$ ps ax -o pid,args | grep lvsd | grep -v grep
22787 /usr/sbin/lvsd --nofork -c /etc/sysconf/ha/lvs.cf
$ 

```

The first entry in the line is the *lvsd* process ID (PID); it will vary depending on the actual PID. In normal operation, you should expect to see a single instance of *lvsd*.

Scenario 2: Monitoring lvsd Operation Using top

As with other processes, *lvsd* may be monitored using *top*.

The basic steps follow, and the *top* output monitoring *lvsd* is shown in Exhibit 25.8.4-4.

```

$ ssh root@cpsbn1
root@cpsbn1's password:
$ ps ax -o pid,args | grep lvsd | grep -v grep
22787 /usr/sbin/lvsd --nofork -c /etc/sysconf/ha/lvs.cf

```

```
$ top -p 22787
(Typical top output is shown below, press q to quit top.)
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
22787	root	18	0	1876	604	520	S	0	0.0	0:00.00	lvsd

Exhibit 25.8.4-4. Top Output Monitoring lvsd

Example 25.8.4-3: Verify/Monitor nanny Operation

nanny is a Linux tool that is used to monitor the status of services in a cluster. As such, it is used to monitor IPVS to ensure continued operation. Note that *nanny* is started by *lvsd*; as with *lvsd*, *nanny* should be running on all members of a cluster to ensure proper operation of IPVS on the cluster. This recipe contains two scenarios: 1) verifying *nanny* execution; and 2) monitoring *nanny* operation using *top*.

Scenario 1: Verifying nanny Operation

As with *lvsd*, *nanny* runs as a child process of *pulse*; as a result *nanny* operation is checked using the Linux *ps* tool.

The basic steps to follow:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ ps ax -o pid,args | grep nanny | grep -v grep
27213 /usr/sbin/nanny -c -h 155.157.61.161 -p 9581 -s GET /
HTTP/1.0\r\n\r\n -x HTTP -a 15 -I /sbin/ipvsadm -t 6 -w 1 -V
155.157.61.165 -M g -U none --lvs
27214 /usr/sbin/nanny -c -h 155.157.61.162 -p 9581 -s GET /
HTTP/1.0\r\n\r\n -x HTTP -a 15 -I /sbin/ipvsadm -t 6 -w 2 -V
155.157.61.165 -M g -U none -lvs
$
```

You should see a single line of output for each virtual host. The general format of each line of output is

```
PID /usr/sbin/nanny -c -h <address> -p <port> -s <ping> -x
<response> -a <time> -I <ipvsadm> -t <time> -w weight -V
<address> -M method -U none -lvs
```

The key values are the two addresses in each line. The first address is the IP for a DX server (DX3 or DX4); the second address is the virtual IP address for the IPVS server.

Tip: The output from *ps* for *nanny* is extremely long; *cut* can be used to shorten the output of the *grep* output, making the result easier to read. For example, piping the final *grep* in the example above into *cut -d ' ' -f -7* results in

```
27213 /usr/sbin/nanny -c -h 155.157.61.161 -p 9581
27214 /usr/sbin/nanny -c -h 155.157.61.162 -p 9581
```

Scenario 2: Monitoring *nanny* Operation Using *top*

The Linux *top* utility is used to monitor *nanny* operation; in this case there are multiple PIDs to monitor. Note the format of the *top* command.

The basic steps to follow and the *top* output monitoring *nanny* is shown in Exhibit 25.8.4-5.

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ ps ax -o pid,args | grep nanny | grep -v grep | cut -d ' ' -f -7
27213 /usr/sbin/nanny -c -h 155.157.61.161 -p 9581
27214 /usr/sbin/nanny -c -h 155.157.61.162 -p 9581
$ top -p 27213, 27214
(Typical top output is shown below, press q to quit top.)
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
27213	root	15	0	1856	672	528	S	0	0.0	0:17.86	nanny
27214	root	15	0	1852	668	528	S	0	0.0	0:16.51	nanny

Exhibit 25.8.4-5. *Top* Output Monitoring *nanny*

Example 25.8.4-4: Monitoring IPVS Using the *ipvsadm* Tool

ipvsadm is the Linux Virtual Server tool. It is used by *lvsd* to assist in managing the virtual servers in a cluster. *ipvsadm* is an extremely powerful tool and must be used with care; it is available only by the root user.

That said, *ipvsadm* does include some options that provide useful diagnostic information.

- *ipvsadm -L [-t <service>]* lists the Virtual Server Table, optionally for the specified service.
- *ipvsadm -L -c* lists current connection output including client system, virtual host and destination.
- *ipvsadm -L -stats* displays the statistics information of services and their servers.

- *ipvsadm -L -rate* displays the rate information of services and their servers (use *-n* to get numeric output of servers/services).

Caution: Use extreme care when using *ipvsadm*; several of the options available in *ipvsadm* perform modifications on the IPVS Virtual Server Table. Modifying the Virtual Server Table may have an adverse impact on system operation.

The IP aliasing information used by IPVS is contained in the Virtual Server Table. The Virtual Server Table identifies the aliased server and the real servers available via that alias. It also identifies the weighting scheme used for distributing the requests between the servers and connection information. *ipvsadm* is the tool used to display and manipulate the Virtual Server Table.

To display Virtual Server Table for IPVS:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ ipvsadm -L
IP Virtual Server version 1.2.1 (size=4096)
Prot LocalAddress:Port Scheduler Flags
    -> RemoteAddress:Port          Forward Weight ActiveConn InActConn
TCP   ts1-oma:9581 lc
    -> dx4-oma:9581               Route    2        0        0
    -> dx3-oma:9581               Route    1        0        0
$
```

In this display, captured on a typical AWIPS II installation, we see that there are two servers, DX3 (dx3-oma) and DX4 (dx4-oma), that are aliased by TS1 (ts1-oma). The connection port for all three servers is 9581. The weighting scheme for the two servers is 2:1 in favor of DX4. This means that, when both servers are available to handle requests, DX4 will get a new request.

Tip: To see a more dynamic view of the Virtual Server Table, use the Linux *watch* command to run *ipvsadm -L*.

As shown here, *ipvsadm* defaults to showing server information using DNS names; to display IP addresses, add an “-n” flag to the *ipvsadm* command.

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ ipvsadm -L -n
IP Virtual Server version 1.2.1 (size=4096)
Prot LocalAddress:Port Scheduler Flags
    -> RemoteAddress:Port          Forward Weight ActiveConn InActConn
TCP   155.157.61.165:9581 lc
    -> 155.157.61.162:9581       Route    2        0        0
    -> 155.157.61.161:9581       Route    1        0        0
$
```

Note: The same display, showing the IP addresses of the servers, is available via service *ipvsadm status*; either form may be used. In both cases, you must be logged on as the root user to run the command.

The *ipvsadm* tool can be used to display a snapshot of the connection information between clients and servers. The command to use is *ipvsadm -L -c*; when used with the *watch* command, this provides a near real-time tracking of server routing, as shown in Exhibit 25.8.4-6.

IPVS connection entries			Tue Oct 25 18:07:26 2011
proto	expire	state	source
destination			virtual
TCP	11:57	ESTABLISHED	lx2-tbdw:53238
			edexcluster-tbdw:9581 dx4-tbdw:9581
TCP	14:18	ESTABLISHED	lx2-tbdw:53227
			edexcluster-tbdw:9581 dx3-tbdw:9581
TCP	11:57	ESTABLISHED	lx2-tbdw:53242
			edexcluster-tbdw:9581 dx4-tbdw:9581
TCP	01:59	FIN_WAIT	px1-tbdw:45573
			edexcluster-tbdw:9581 dx4-
			tbdw:9581
TCP	11:57	ESTABLISHED	lx2-tbdw:53236
			edexcluster-tbdw:9581 dx3-tbdw:9581
TCP	00:13	FIN_WAIT	px1-tbdw:45568
			edexcluster-tbdw:9581 dx3-
			tbdw:9581
TCP	13:51	ESTABLISHED	lx4-tbdw:53500
			edexcluster-tbdw:9581 dx3-tbdw:9581
TCP	00:47	FIN_WAIT	lx4-tbdw:53499
			edexcluster-tbdw:9581 dx4-
			tbdw:9581
TCP	11:57	ESTABLISHED	lx2-tbdw:53243
			edexcluster-tbdw:9581 dx3-tbdw:9581
TCP	14:59	ESTABLISHED	px1-tbdw:45574
			edexcluster-tbdw:9581 dx4-tbdw:9581
TCP	12:04	ESTABLISHED	lx2-tbdw:53233
			edexcluster-tbdw:9581 dx4-tbdw:9581
TCP	12:04	ESTABLISHED	lx2-tbdw:53240
			edexcluster-tbdw:9581 dx3-tbdw:9581
TCP	12:05	ESTABLISHED	lx2-tbdw:53244
			edexcluster-tbdw:9581 dx4-tbdw:9581
TCP	11:57	ESTABLISHED	lx2-tbdw:53237
			edexcluster-tbdw:9581 dx4-tbdw:9581
TCP	11:57	ESTABLISHED	lx2-tbdw:53239
			edexcluster-tbdw:9581 dx3-tbdw:9581

Exhibit 25.8.4-6. Monitoring IPVS Connections Using *watch*

To display the IPVS connection information in near real-time:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ watch ipvsadm -L -c
(Typical output is displayed below; use <Ctrl-C> to terminate)
```

In this display, which was captured on a AWIPS II installation, we see that three clients (lx2, lx4, and px1) are connected to DX3 (dx3-tbdw) and DX4 (dx4-tbdw) via the edexcluster-tbdw:9581.

The *ipvsadm* tool can be used to display statistics about the virtual server, including connections and packet and byte statistics, as shown in Exhibit 25.8.4-7. The command to use is *ipvsadm -L --stats* (note the double dash). As is the case with other *ipvsadm* options, *watch* can be used to provide a near real-time view of the system performance.

To display IPVS connection statistics in near real-time:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ watch ipvsadm -L --stats
(Typical output is displayed below; use <Ctrl-C> to terminate)
```

Front LocalAddress:Port	Conns	InPkts	OutPkts	InBytes	OutBytes
TCP tsl-oma:9581	4606	16739052	0	5697M	0
> dx3 oma:9581	21	45762	0	25092601	0
-> dx4-oma:9581	24	49653	0	29702850	0

Exhibit 25.8.4-7. Monitoring IPVS Connection Statistics Using *watch*

In this display, which was captured on a typical AWIPS II installation, we see that the two servers, DX3 (dx3-oma) and DX4 (dx4-oma), are carrying a roughly equal load of connections, packets, and bytes. The actual percentages are:

Server	Connections	Packets	Bytes
DX3	47%	48%	47%
DX4	53%	52%	53%

NOTE: IPVS is not handling outbound traffic so the zeros for OutPkts and OutBytes are normal.

To display IPVS rate statistics in near-real time:

```
$ ssh root@cpsbn1
root@cpsbn1's password:
$ watch ipvsadm -L --rate
(Typical output is displayed below; use <Ctrl-C> to terminate)
```

The results are displayed in Exhibit 25.8.4-8.

In this display, captured on a typical AWIPS II installation, we see that the two servers, DX3 (dx3-oma) and DX4 (dx4-oma), are handling client requests. DX4 is averaging 60 packets per second (inbound) and 3,479 bytes per second (inbound).

NOTE: IPVS is not handling outbound, so the zeros for OutPPS and OutBPS are normal. Connections per second (CPS) also tends to be 0 because CAVE requests are generally infrequent.

Prot	LocalAddress:Port	CPS	InPPS	OutPPS	InBPS	OutBPS
TCP	tsl-oma:9581	0	106	0	7511	0
	-> dx4-oma:9581	0	60	0	4032	0
	-> dx3-oma:9581	0	46	0	3479	0

Exhibit 25.8.4-8. Monitoring IPVS Rate Statistics Using *watch*

25.8.5 Monitoring the LDM

The Local Data Management (LDM) is the system used by AWIPS II to transfer data from the SBN to the EDEX ingest processes. (See section 25.3, [Basic Data Flow Concepts](#).) The LDM is covered extensively in other documents; this section presents basic recipes for monitoring the LDM.

In AWIPS II, parts of the LDM run on two separate systems – the CP cluster and the DX cluster. (Refer back to [Exhibit 25.2-1](#).) Basic data flow involving the LDM is shown in [Exhibit 25.3-1](#). As shown in Exhibit 25.6-1, the LDM on the CP cluster obtains data from the SBN and communicates with/sends data to the LDM on the DX cluster.

NOTE: For data to be made available to the EDEX ingest processors, both LDM components must be operational.

The LDM system includes a general administration tool, *ldmadmin*. That tool is used to start and stop the LDM; it also provides some of the monitoring capabilities used in this set of examples.

Example 25.8.5-1: Verifying LDM Operation on the CP or DX Cluster

Although *ldmadmin* provides a tool for determining if the LDM is running, it can be easier to use the Linux *ps* utility to verify operation. This example presents both approaches. In addition, because the procedures are the same for both the CP cluster and the DX cluster, the procedures are shown for the DX cluster. For the CP cluster, change the login from *dx2f* to *cpsbn1*.

Scenario 1: Verify LDM Operation Using the Linux ps Utility

```
$ ssh ldm@dx2f
ldm@dx2f's password:
$ ps -u ldm -o user,pid,args
```

USER PID COMMAND

ldm 22216 rpc.ldmd -I 165.92.29.132 -P 388 -M 256 -m 3600 -o 3600 -q /usr/l

```

ldm 22217 pqact -e
ldm 22219 edexBridge -s cp1f
ldm 22220 rpc.ldmd -I 165.92.29.132 -P 388 -M 256 -m 3600 -o 3600 -q /usr/l
ldm 25463 crond
ldm 25464 /bin/sh -c ~/bin/ldmadmin scour >& ~/logs/scour.log && find /data
ldm 25466 /usr/bin/perl /usr/local/ldm/bin/ldmadmin scour
ldm 25486 /bin/sh /usr/local/Ldm-6.8.1/bin/scour /usr/local/Ldm-6.8.1/etc/s
ldm 25912 /bin/sh /usr/local/Ldm-6.8.1/bin/scour /usr/local/Ldm-6.8.1/etc/s
ldm 25916 find . -type f -mtime +0 -name * -print
ldm 25917 sed s\(^n\)\\\1/g
ldm 25918 xargs rm -f
ldm 30328 [rm] <defunct>

```

The exact output will vary. Note, however, that the critical lines are those with arguments *rpc.ldmd*, *pqact*, and *edexBridge*. These indicate that the various parts of the LDM are operating.

Scenario 2: Verify LDM Using the ldmadmin Program

The *ldmadmin* program's *isrunning* option checks to see if the LDM is running. Unfortunately, this option simply returns 0 or 1 and exits; 0 is returned if the LDM is running, and a 1 is returned if it is not running. After executing *ldmadmin isrunning*, you need to check its return value. This sequence should work under most shells:

```

$ ssh ldm@dx2f
ldm@dx2f's password:
$ ldmadmin isrunning
$ echo $?
0
$

```

This output indicates that the LDM is running. If it were not running, the *echo \$?* command would print a 1.

If you are using the *bash* shell, you can combine things slightly and produce a more readable result. The modified command sequence:

```

$ ssh ldm@dx2f
ldm@dx2f's password:
$ ldmadmin isrunning > /dev/null 2>&1 && echo "Running"
Running
$

```

Once again, this output indicates that the LDM is running; if it were not, no output would be displayed.

Example 25.8.5-2: Monitoring LDM Data Flow on the CP or DX Cluster

The *ldmadmin* program provides for real-time monitoring of the LDM product queue. This can be used to determine quickly if data is passing through the LDM; it can also be filtered by data feed to concentrate on a specific data type. Three scenarios are presented: 1) basic product queue monitoring; 2) identifying data feeds; and 3) monitoring a specific data feed.

Scenario 1: Basic Product Queue Monitoring

The *ldmadmin* program's *watch* option provides a real-time view of the LDM's message queue. Monitoring this queue provides a quick verification of the status of the LDM. The basic steps to follow:

```
$ ssh ldm@dx2f  
ldm@dx2f's password:  
$ ldmadmin watch  
(type ^D when finished)
```

At this point, you should see output similar to

```
Oct 25 18:12:28 pqutil INFO: 135 20111025181227.275 IDS|DDPLUS 467094474  
SACN91 CWAO 251700 RRH  
  
Oct 25 18:12:28 pqutil INFO: 114 20111025181227.275 IDS|DDPLUS 467094475  
SXUS22 KWNB 251800 RRX  
  
Oct 25 18:12:28 pqutil INFO: 166 20111025181227.275 IDS|DDPLUS 467094476  
SMSQ01 LZIB 251800 CCA  
  
Oct 25 18:12:28 pqutil INFO: 968 20111025181227.275 IDS|DDPLUS 467094477  
SXVT44 KWAL 251811  
  
Oct 25 18:12:28 pqutil INFO: 299 20111025181227.275 IDS|DDPLUS 467094478  
UBUS01 KMSC 251800  
  
Oct 25 18:12:28 pqutil INFO: 144 20111025181227.392 IDS|DDPLUS 118824215  
SRMT30 KWAL 251811  
  
Oct 25 18:12:28 pqutil INFO: 152 20111025181227.392 IDS|DDPLUS 118824216  
SRAL20 KWAL 251811  
  
Oct 25 18:12:28 pqutil INFO: 113 20111025181227.392 IDS|DDPLUS 118824217  
SRLA20 KWAL 251811
```

If data is flowing, this output will scroll past fairly rapidly and the message date time stamp should be current. If no messages are scrolling, it is likely that there is an issue "upstream" from the LDM.

Scenario 2: Identifying LDM Data Feeds

The *ldmadmin* program's *watch* facility has an option to filter output for a specific feed type. The basic command is *ldmadmin watch -f <feed>*. This scenario presents a method for identifying the available feeds.

The feeds used by LDM are defined in a file named pqact.conf, which is located in <ldm-home>/etc. While this file can be examined to determine the available feed types, the process can be automated using the known structure of the file and a few basic Linux utilities. The lines defining LDM feeds have the following structure:

```
FEEDTYPE <tab> pattern <tab> action [<tab> options] [<tab> args]
```

Note that lines defining feed types start with at least one upper-case letter. This allows you to filter for the feed definitions and extract the feed names. The steps to follow:

```
$ ssh ldm@cpsbn1
ldm@cpsbn1's password:
$ cd etc
$ grep -P "^[A-Z]+" pqact.conf | cut -f 1 > feeds.txt
$ sort feeds.txt > sorted-feeds.txt
$ uniq sorted-feeds.txt ldm-feeds.txt
$ cat ldm-feeds.txt
ANY
GPSSRC
GRID
HDS
HRS
IDS/DDPLUS
NEXRAD2
NIMAGE
NNEXRAD
$
```

The final output is a sorted list of feed names. The list may differ somewhat depending on the exact data flow configuration for the server. Some of the feed type names are rather cryptic; common feed types are identified in Table 25.8.5-1.

Table 25.8.5-1. Selected LDM Feed Types

Feed Name	Description
ANY	wildcard – matches any feed type
GRID	NOAAport high-resolution model output
NEXRAD2	NEXRAD Level-II radar data
NIMAGE	NOAAport satellite imagery
NNEXRAD	NEXRAD Level-III products

Scenario 3: Monitoring the Radar Data Feed

The feed type names determined in Scenario 3 may be used to filter the output of the *ldmadmin* program's *watch* facility. For level III radar, the feed type name is *NNEXRAD*. The basic procedure:

```
$ ssh ldm@dx2f
ldm@dx2f's password:
$ ldmadmin watch -f NNEXRAD
(type ^D when finished)
```

At this point you should see output similar to

```
Oct 25 18:13:42 pqutil INFO: 12470 20111025181341.554
NEXRAD3 467095894 SDUS21 KBOX 251807 /pN2QBOX !nids/
Oct 25 18:13:44 pqutil INFO: 12157 20111025181343.559
NEXRAD3 467095895 SDUS24 KFWD 251811 /pN2QGRK !nids/
Oct 25 18:13:44 pqutil INFO: 3495 20111025181343.559
NEXRAD3 467095896 SDUS53 KBIS 251809 /pDSPBIS !nids/
Oct 25 18:13:44 pqutil INFO: 1300 20111025181343.559
NEXRAD3 467095897 SDUS33 KBIS 251809 /pN1PBIS
Oct 25 18:13:44 pqutil INFO: 807 20111025181343.559
NEXRAD3 467095898 SDUS54 KTSA 251808 /pDPASRX
Oct 25 18:13:44 pqutil INFO: 6918 20111025181343.559
NEXRAD3 467095899 SDUS26 KOTX 251809 /pN1QOTX !nids/
```

As in scenario 1, the key is to look for recent message date/time stamps and a generally constant flow of messages. In this case, a lack of messages indicates that the specific feed is not getting any messages; if frequent products are expected, this indicates a problem "upstream" from the LDM.

Example 25.8.5-3: Monitoring LDM Log on the CP or DX Cluster

The LDM writes a process message, i.e., a routing status message and errors, to a log. The *ldmadmin* program provides two facilities for checking the log – *log* and *tail*. *Log* allows the user to page through the current LDM log – similar to the Linux *more* utility. *Tail* accesses the current log in a manner similar to the Linux *tail -f* utility. The basic procedure:

```
$ ssh ldm@dx2f
ldm@dx2f's password:
$ ldmadmin tail
```

At this point you should see output similar to

```
Oct 25 18:14:47 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/25/18/SAAK41_KNKA_251814_467097155.20111025"
: 234 20111025181444.808 IDS/DDPLUS 467097155 SAAK41
KNKA 251814
```

```

Oct 25 18:14:47 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/25/18/SPZZ40_KAWN_251814_467097156.20111025"
: 1240 20111025181444.808 IDS/DDPLUS 467097156 SPZZ40
KAWN 251814 RRB

Oct 25 18:14:47 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/grib/GRID252/AWC_CIP/20111025/1800Z_F000-
YJXA30_KKCI_467097157.grib.20111025": 42458
20111025181444.808 HDS 467097157 YJXA30 KKCI 251800
/mAWC_CIP !grib/ncep/AWC_CIP/#252/201110251800/F000/SIPD/9144
m above MSL/

Oct 25 18:14:47 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/grib/GRID252/AWC_CIP/20111025/1800Z_F000-
YJXA81_KKCI_467097158.grib.20111025": 59390
20111025181444.808 HDS 467097158 YJXA81 KKCI 251800
/mAWC_CIP !grib/ncep/AWC_CIP/#252/201110251800/F000/SIPD/1828
m above MSL/

Oct 25 18:14:47 dx2-tbdw pqact[22217] NOTE: Filed in
"/data_store/text/25/18/WOUS45_KTFX_251814_467097159.20111025"
: 1248 20111025181444.808 IDS/DDPLUS 467097159 WOUS45
KTFX 251814 /pADRMT

```

What will be displayed depends on what has been logged. In this case, you will need to enter <ctrl-c> to terminate the tail.

25.8.6 Monitoring Radar Server

The AWIPS II system consolidated several legacy AWIPS I radar communication and management processes into a new application called “RadarServer.” The Radar Server (RCM) is an independent application that runs on the DX1/2 cluster. It provides a bridge between the Open Radar Products Generator (ORPG) and the EDEX Ingest processes.

Like EDEX, RCM is written in Java. As a result, most monitoring of RCM is similar to the techniques used to monitor the EDEX processes: basic Linux tools and JConsole.

NOTE: Radar data comes from two sources: 1) the SBN for nationally distributed data; and 2) the Radar Server for locally collected radar data, including routine data and one-time as well as multiple requests from network radars.

Example 25.8.6-1: Verifying Radar Server Operation

Unlike EDEX, the startup script for RCM does not include a status check option. Rather, the Linux *ps* utility is used to verify RCM execution. The basic procedure:

```

$ ssh awips@dx1
awips@dx1's password:
$ ps ax -o args | grep rcm.mqsrvr | grep -v grep
/awips2/bin/java -cp
/awips2/rcm/data/config/res:::/awips2/lib/activation-1.1.jar
(several lines of output have been deleted)

```

\$

From this output, we can see that RCM is currently executing. If the Radar Server is not running, there will be no output.

NOTE: Recall that all Java programs show the Java VM as the first argument. The first *grep* is used to identify the Radar Server. The second *grep* filters out the first *grep* from the output.

Tip: Output can be simplified somewhat by piping the second *grep* into *wc -l*; in that case, the output should be 0 or 1: 0 if Radar Server is running; 1 otherwise.

If it is desirable to also identify the PID of the Java instance running RCM, add it to the output list in the *ps* call. With that modification, the procedure becomes:

```
$ ssh awips@dx1
awips@dx1's password:
$ ps ax -o pid,args | grep rcm.mqsrvr | grep -v grep
17883 /awips2/bin/java -cp
/awips2/rcm/data/config/res:::/awips2/lib/activation-1.1.jar
(several lines of output have been deleted)
$
```

Example 25.8.6-2: Monitoring RCM Performance Using top

As with the EDEX processes, the Linux *top* utility may be used to monitor RCM. (See [Example 25.8.6-3](#) for additional details.) The basic procedure:

```
$ ssh awips@dx1
awips@dx1's password:
$ ps ax -o pid,args | grep rcm.mqsrvr | grep -v grep
17883 /awips2/bin/java -cp
/awips2/rcm/data/config/res:::/awips2/lib/activation-1.1.jar
(several lines of output have been deleted)
$ top -p 17883
```

To exit *top*, press either *q* or <*ctrl-c*>. Typical output is shown in Exhibit 25.8.6-1.

What's it mean? Even with a reasonably full flow of ORPG products, CPU usage for RCM is normally low, typically no more than 1–2 percent; usage above that value should be investigated further.

Exhibit 25.8.6-1. Using *top* to Monitor the Radar Server***Example 25.8.6-3: Monitoring RCM Using JConsole***

Like EDEX, the Radar Server is a Java program; as a result, JConsole may be used to monitor the Radar Server. The techniques used here are essentially the same as those used for monitoring EDEX. (See [Example 25.7.2-1](#), [Example 25.7.2-2](#), and [Example 25.7.2-3](#) for more details on using JConsole.) This recipe covers the steps required to connect JConsole to the Radar Server. The basic steps follow, and the Exhibit 25.8.6-2 displays the results.

```
$ ssh -X awips@dx1
awips@dx1's password:
$ ps ax -o pid,args | grep rcm.mqsrvr | grep -v grep
17883 /awips2/bin/java -cp
/awips2/rcm/data/config/res:::/awips2/lib/activation-1.1.jar
(several lines of output have been deleted)
$ /awips2/java/bin/jconsole 2823 &
[1]28181
$
```

NOTE: Radar Server does not support certain connectivity options of JConsole. As a result, only local connections to Radar Server are supported. In this context, “local” means logged onto the server as the user, normally awips, running Radar Server. This also means that we must first identify the PID of the Radar Server in order to monitor it. Once that is done, we can pass the PID to JConsole on the command line.

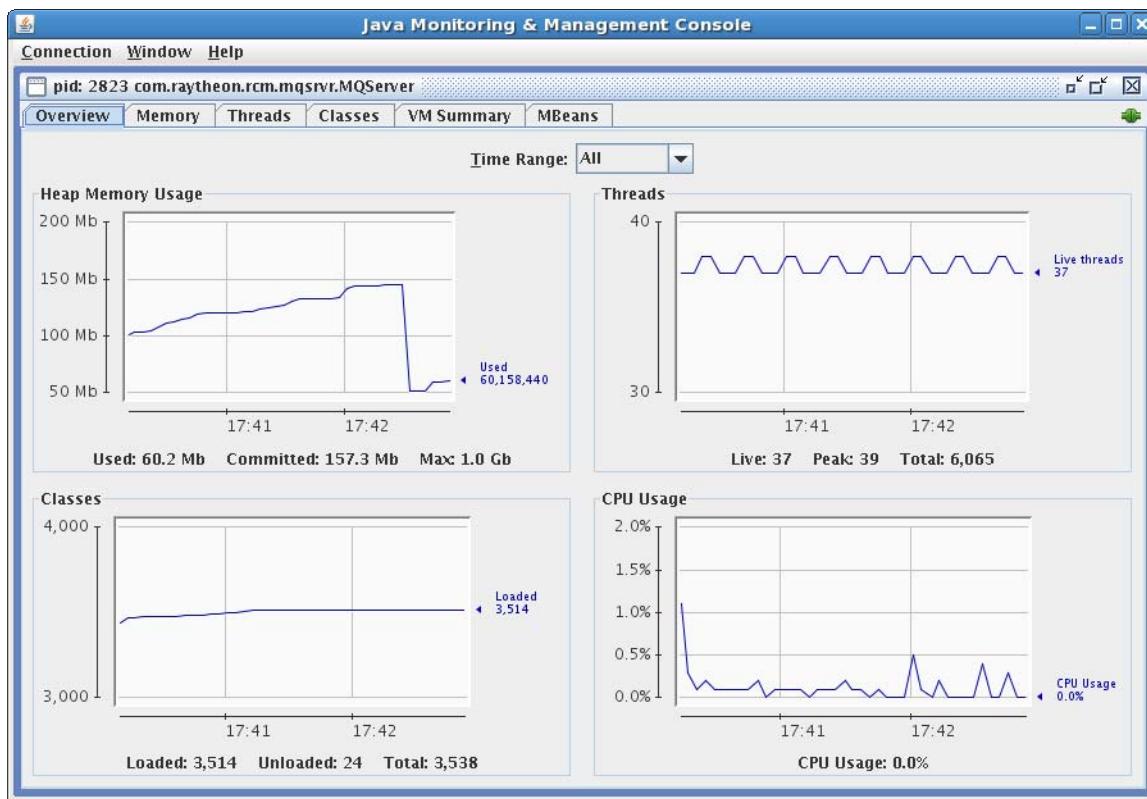


Exhibit 25.8.6-2. Using JConsole to Monitor Radar Server

Example 25.8.6-4: Monitoring the Radar Server Log

Like the EDEX Processes, the Radar Server logs important events to a process log. The process logs are located on the DX 1/2 cluster in /RadarServer/data/logs. The Radar Server maintains a rolling set of logs; a new log is created daily. The current log is named *radarserver.log*; previous logs have the date of log appended. For example, the log for May 31, 2010 will have the name *radarserver.log.2010-05-31*.

The basic format of the entries in the Radar Server log is the same as for the EDEX server logs; see section 25.6.4, [Log Formats](#) for more information on the EDEX log message formatting.

As with EDEX Process logs, the basic tools for monitoring Radar Server logs are *tail* and *grep*. This recipe presents two scenarios: 1) general log monitoring; and 2) filtered log monitoring.

Scenario 1: Monitoring Radar Server Execution

This scenario uses the Linux *tail* utility to provide a real-time view of events the Radar Server logs to its process log. Specific output is not displayed.

```
$ ssh -X awips@dx1
awips@dx1's password:
$ cd /awips2/rcm/data/logs
$ tail -f radarserver.log
```

```
INFO 03:12:12,587 [TCM Read tbwi #2] RadarServer: tbwi:  
message code=3 size=48 productCode=180 sequence=31 elev=6  
flags=not-gen  
  
INFO 03:12:12,608 [TCM Read kdmx #2] RadarServer: kdmx:  
message code=149 size=9694 elev=1.8 sequence=190 vs=2012-01-25  
03:10:15 #14  
  
INFO 03:12:12,615 [TCM Read tbwi #2] RadarServer: Stored  
message in /data_store/radar/tbwi/PRR/tbwi.3.20120125_0312  
  
INFO 03:12:12,664 [TCM Read kdmx #2] RadarServer: Stored  
message in  
/data_store/radar/kdmx/DMD/elev1_8/kdmx.149.20120125_0310
```

To stop monitoring, press <ctrl-c>.

What to look for: Generally, you should expect to see several messages display per minute. Most of the messages should be *INFO* messages. The message frequency depends on the number of ORPG connections and the operational mode of the radars, including the RPS list employed.

Scenario 2: Monitoring for Radar Product Delivery

When the Radar Server writes a file to disk and sends a message to EDEX (via QPID), it logs a message giving the location of the file. The format of this message is:

```
INFO <time> [thread] RadarServer: Stored message in <path>
```

We use this information to filter the output of *tail* to display only the “stored message” lines from the Radar Server log. The basic steps:

```
$ ssh -X awips@dx1  
awips@dx1's password:  
$ cd /awips2/rcm/data/logs  
$ tail -f radarserver.log | grep -P "^\w+INFO.+Stored message"  
(the display scrolls to display the latest messages as the  
Radar Server writes the messages to the log file)
```

To stop monitoring, press <ctrl-c>.

What to look for: Generally, you should expect to see several messages per minute being logged. If the logging stops for an extended period of time, there is a problem with the ingest path.

25.8.7 Monitoring EDEX Subscription Script Running

The EDEX Subscription Script Runner provides a mechanism for executing arbitrary scripts based on system-level events. Three event types are supported: Quartz timer-based events; general data arrival-based events; and text product arrival-based events. (For text products, the Script Runner functions similarly to the existing text database watch/warn triggers.)

The Script Runner supports three types of script execution: text data triggered (ldad) scripts; generic (system) scripts; and μEngine (python) scripts. Text data triggered scripts are programs that reside on the server and, when triggered, are passed the AFOS PIL of the ingested text data. Generic scripts are also programs that reside on the server. The difference is the arguments passed to the program; any appropriate arguments can be passed to a generic script. A μEngine script is a Python script that is stored in the database. It can access the full capabilities of the EDEX μEngine.

The Subscription Script Runner consists of three separate components: the EDEX Subscription Service; the EDEX Script Runner; and the Command Line Interface (CLI) tool package. The CLI is covered in more detail elsewhere; the recipes in this section are oriented toward system diagnostics.

Example 25.8.7-1: Identifying Registered Subscriptions – Using psql

EDEX Script Runner Subscriptions are stored in the *subscriptions* table in the AWIPS II database; the *subscriptions* table is in the *subscription* schema of the *metadata* database. We can use the *psql* tool to check for subscriptions. (For more information on the AWIPS II database and the *psql* tool, see [Examples 25.21-1 through 25.21-7](#).)

This recipe presents four scenarios: 1) identifying available fields in the *subscription* table; 2) identifying available subscription trigger types, identifying timer-triggered subscriptions; and 4) identifying system runner subscriptions.

Scenario 1: Identifying Available Fields in the Subscription Table

This scenario provides information needed to access the subscription table in the AWIPS II database. In addition to the field names, we also obtain the required connection/login information. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/bin
$ grep -P "^\w+ DB" start.sh
export DB_ADDR=dx1
export DB_PORT=5432
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select table_name,column_name from
metadata# information_schema.columns
metadata# where table_name = 'subscriptions';
      table_name      |      column_name
-----+-----
subscriptions | id
subscriptions | active
subscriptions | type
subscriptions | runner
```

```

subscriptions | trigger
subscriptions | script
subscriptions | filepath
subscriptions | arguments
(8 rows)

```

```

metadata=# \q
$
```

Some information on the fields of the subscriptions table may be helpful here. (See Table 25.8.7-1.)

Table 25.8.7-1. Subscriptions Table Fields

Field	Description
id	(bigint) Unique ID of the subscription
active	(boolean) True if the subscription is active – i.e., will fire
type	(char 10) Type of trigger event (timer, data, ldad) timer – event is triggered at a specific time data – event is triggered by data ingest ldad – event is triggered by text product ingest
runner	(char 10) Type of script runner needed for the subscription python – use Python uEngine jscript – (deprecated) use JavaScript uEngine system – run the script as a separate process ldad – run the script using the text script runner
trigger	(char 512) pattern to match to trigger the event
script	(char 4048) script to run. Used only for <i>python</i> and <i>jscript</i> runners. Is encoded to preserve formatting for python.
filepath	(char 512) full path to script to execute. Used only for <i>ldad</i> and <i>system</i> runners.
arguments	(char 512) arguments to pass to the script. Used only for <i>ldad</i> and <i>system</i> runners. Optional. Special token, %TRIGGER%, specifying passing the trigger event to the script – used mainly for <i>ldad</i> runner.

Scenario 2: Identifying Available Subscription Trigger Types

The *type* field of the *subscriptions* table contains the subscript type. While valid subscription types are timer, ldad, and data, we can query the database to determine which types are currently registered. The steps to follow:

```

$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select distinct type from
metadata-# subscription.subscriptions

```

```
metadata=# order by type;
type
-----
timer
(1 row)
```

```
Metadata # \q
$
```

Scenario 3: Identifying Timer-Triggered Subscriptions

Once we know the available subscription types, we can easily query for subscriptions of a specific type. In this scenario, we query for *timer* type subscriptions. The steps to follow:

```
$ ssh awips@dx3
Awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select id,active,type,runner,trigger
metadata-# from subscription.subscriptions
metadata-# where type = 'timer';
id | active | type | runner | trigger
-----+-----+-----+-----+
 3 | t      | timer | python | 0 * * * ?
 6 | t      | timer | system | 0 0/5 * * ?
(2 rows)

metadata=# \q
$
```

The output shows the single timer subscription that is currently registered. Because the value of the active field is *true*, this script should execute each minute. Note that we did not print out the fields that identify the script being executed. For *python* runners, the script is stored in the database as a binary encoded string and is not readable; for the other runners it may be useful to identify the file path and arguments. This can be accomplished easily using a slightly more complicated SQL query. The steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
Password for user awips:
metadata=# select type,runner,trigger,
metadata-# (case when char_length(script) > 1 then
```

```

metadata(# 'SCRIPT' else '' end) as script,
metadata# filepath,arguments from
metadata# subscription.subscriptions
metadata# where type = 'timer';
type | runner | trigger | script |           filepath
| arguments
-----+-----+-----+-----+
-----+-----+
timer | python | 0 * * * * ? | SCRIPT |
|
timer | system | 0 0/5 * * * ? |           /
/awips2/fxa/bin/myScript.sh | %TRIGGER%
(2 rows)

metadata=# \q
$
```

To shorten the display, the id and active fields are not included in the query. The result, as displayed in an xTerm, is shown in Exhibit 25.8.7-1.

The screenshot shows an xTerm window with the title 'mfegan@dev07:~'. The window contains the following text:

```

File Edit View Terminal Tabs Help
metadata=# select type,runner,trigger,(case when char_length(script) > 1 then "SCRIPT" else '' end) as script,filepath,arguments from subscription.subscriptions where type = 'timer';
type | runner | trigger | script |           filepath           | arguments
-----+-----+-----+-----+
timer | python | 0 * * * * ? | SCRIPT |           /awips2/fxa/bin/myScript.sh | %TRIGGER%
timer | system | 0 0/5 * * * ? |           |           /awips2/fxa/bin/myScript.sh | %TRIGGER%
(2 rows)

metadata=#

```

Exhibit 25.8.7-1. Sample Result of Timer Type Query

NOTE: To see the actual script, use *decode(script, 'hex')* as *script* in place of the *case* construct in the above query.

Scenario 4: Identifying System Runner Subscriptions

This scenario is nearly the same as Scenario 3; the main change is in the *where* clause. To identify a runner, the field to check is the *runner* field.

```

$ ssh awips@dx3
awips@dx3's password:
$ psql -h dx1 -p 5432 -d metadata -U awips
```

```

Password for user awips:
metadata=# select distinct runner from
metadata# subscription.subscriptions
metadata# order by runner;
runner
-----
ldad
python
system
(3 rows)

metadata # select type, runner, trigger,
metadata # (case when char_length(script) > 1 then
metadata # 'SCRIPT' else '' end) as script,
metadata # filepath,arguments from
metadata # subscription.subscriptions
metadata # where runner = 'system';
type | runner | trigger | script |           filepath
| arguments
-----+-----+-----+-----+-----+
timer | system | 0 0/5 * * * ? |      | /awips2/fxa/bin/myScript.sh | %TRIGGER%
(1 row)
metadata # \q
$
```

From this output, we see that: 1) there is one *system* runner script; 2) it fires every 5 minutes; and 3) it runs *myScript.sh*, passing the value of the trigger to the script. This output is shown again in Exhibit 25.8.7-2.

```

File Edit View Terminal Tabs Help
select type,runner,trigger,
(case when char_length(script) > 1 then
'SCRIPT' else '' end) as script,
filepath,arguments from
subscription.subscriptions
where runner = 'system';
type | runner | trigger | script |           filepath           | arguments
-----+-----+-----+-----+-----+
timer | system | 0 0/5 * * * ? |      | /awips2/fxa/bin/myScript.sh | %TRIGGER%
(1 row)

metadata=#

```

Exhibit 25.8.7-2. Sample Result of System Runner Query

Example 25.8.7-2: Identifying Registered Subscriptions – Using the CLI

The Command Line Interface (CLI) tools are a set of tools that provide basic capabilities for interaction with the EDEX server. The CLI tools are normally installed on DX 3/4 in /awips2/bin, and they are available for installation on workstations that also support CAVE. Of interest here is the *subscription* tool, which is a custom EDEX client for managing subscriptions. This recipe introduces the *subscription* tool and provides scenarios for determining available subscriptions. As an EDEX client, it does not interact directly with the database; rather, it interacts with the EDEX server and returns specifically formatted responses. If additional information is desired, the *psql* tool can be used to interface directly with the AWIPS II database. (See [Example 25.8.7-1](#) for details.)

The *subscription* CLI tool uses a flag/value CLI for requesting information, as shown in Table 25.8.7-1. The flags used for subscription query operations are

Table 25.8.7-1 Basic Flags for Subscription CLI Tool

Flag	Name	Description
-o	operation	Operation to perform. Valid values are <i>read</i> , <i>add</i> , <i>delete</i> , and <i>update</i> .
-p	trigger	The specific trigger for the subscription.
-t	type	The type of subscription trigger. Valid values are <i>timer</i> , <i>data</i> , and <i>ldad</i> .
-r	runner	The type of script runner for the subscription. Valid values are <i>python</i> , <i>jscript</i> , <i>system</i> , and <i>ldad</i> , although <i>jscript</i> is deprecated and should not be used.

For querying subscription information, the operation to use is *read*.

NOTE: The *subscription* tool uses a standard output format for output; the values of the *id*, *active*, *type*, *runner*, and *trigger* fields are displayed. The script is also displayed: for *python* runners, the hex encoded script is displayed; for *system* and *ldad* runners, the script's path and arguments are displayed.

Scenario 1: Identifying Timer-Triggered Subscriptions

To determine the subscriptions of a specific trigger type, *timer* in this case, we use the *-t* with the appropriate subscription type name. The basic steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/bin
$ ./subscription -o read -t timer
ID      ACTIVE TYPE    RUNNER TRIGGER      SCRIPT
----- -----
3  True    timer python 0 * * * *
696d706f72742048656c6c6f576f726c640a72756e6e6572203d2048656c6c
6f576f726c642e48656c6c6f576f726c6428290a72756e6e65722e7365744d
```

```

657373616765282222220254d455353414745252022222290a7265747572
6e2072756e6e65722e657865637574652829
    6 True    timer system 0 0/5 * * * ?
/awips2/fxa/bin/myScript.sh %TRIGGER%
$
```

It is possible to filter this output to eliminate much of the HEX output. The trick is to use the Linux *cut* tool and specify the number of characters to retain. For example, to filter output and retain just the first 80 characters of each line, “pipe” the command output into *cut -b -80*. With this refinement, the command sequence becomes

```

$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/bin
$ ./subscription -o read -t timer | cut -b -80
ID      ACTIVE TYPE  RUNNER TRIGGER   SCRIPT
----- ----- -----
    3 True    timer python 0 * * * ?
696d706f72742048656c6c6f576f726c640a72756
    6 True    timer system 0 0/5 * * * ?
/awips2/fxa/bin/myScript.sh %TRIGGER%
$
```

In either case, we can see that there are two *timer*-triggered scripts. The first one uses a stored *Python* script and triggers every minute. The second one runs *myScript.sh* every 5 minutes.

Scenario 2: Identifying System Runner Subscriptions

To identify subscriptions using a specific runner, in this case the *system* runner, use the *-r* flag with the appropriate runner name. In this case, we also use the Linux *cut* utility to limit the length of the display lines. The basic steps to follow:

```

$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/bin
$ ./subscription -o read -r system | cut -b -80
ID      ACTIVE TYPE  RUNNER TRIGGER   SCRIPT
----- ----- -----
    6 True    timer system 0 0/5 * * * ?
/awips2/fxa/bin/myScript.sh %TRIGGER%
$
```

NOTE: In both Scenario 3 and Scenario 4, only a single selection criterion is provided. In this case, selection criteria are specified using the -t, -p, or -r flags. In general, multiple flags are permitted but they “anded” together. For example, *subscription -o read -t timer -r system* performs a query for subscriptions that are both *timer* triggered and use external scripts (i.e., *system* runner type). The only way to perform *or* queries is to run separate queries.

Example 25.8.7-3: Identifying Text DB Triggers – Using the CLI

Text DB triggers are executed using the EDEX Script Runner Service. Registered Text DB triggers are stored in the subscription table of the AWIPS II database. The AWIPS II CLI tool set provides a modified version of the *textdb* tool. The CLI *textdb* tool is a command line tool that supports the same functionality as the AWIPS I *textdb* tool. The CLI *textdb* tool allows a user to perform routine queries of the Text DB. It is also used to manage Text DB tools. This example presents two scenarios: 1) using the CLI *subscription* tool to identify Text DB triggers; and 2) using the CLI *textdb* tool to identify Text DB triggers.

Scenario 1: Using the CLI Subscription Tool to Identify Text DB Triggers

To use the subscription tool to identify registered Text DB triggers, you need to know either the runner type or the trigger type used for Text DB triggers. For Text DB triggers, both the runner and the trigger type are “*ldad*”. We can use this information to perform the query.

The basic steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/fxa/bin
$ ./subscription -o read -r ldad
ID      ACTIVE TYPE RUNNER TRIGGER   SCRIPT
----- -----
1 True      ldad    ldad OMAADMOMA null
$ ./subscription -o read -t ldad
PRODUCTID SCRIPT
-----
OMAADMOMA /awips2/fxa/bin/myScript.sh
$
```

What is interesting here is that the results obtained are different. Although both queries show that there is a Text DB trigger registered for a product ID of “OMAADMOMA”, the rest of the information is radically different. The reason for this – the *subscription* tool generally uses the *textdb* tool to perform queries that it recognizes as Text DB related. A trigger type of *ldad* indicates the query is Text DB related.

Scenario 2: Using the CLI *textdb* Tool to I Text DB Triggers

In order to identify Text DB triggers using the CLI *textdb* tool, you need to know the Product ID used to register the trigger.

The basic steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/bin
$ ./textdb -ldad -r OMAADMOMA
PRODUCTID SCRIPT
-----
OMAADMOMA /awips2/fxa/bin/myScript.sh
$ ./textdb -ldad -r OMAMRTOMA
PRODUCTID SCRIPT
-----
$
```

This result shows that there is a single trigger registered for Product ID “OMAADMOMA” and no triggers registered to Product ID “OMAMRTOMA.”

Example 25.8.7-4: Determining if Subscriptions Are Firing from the EDEX Process Logs

The subscription script runner is part of the EDEX Request and Ingest process (see Table 25.8.7-2). Where the script runner is located depends on the type of script runner.

Table 25.8.7-2. Script Runners by EDEX Process

Runner Type	EDEX Process
timer	Ingest
data	Ingest
ldad	Ingest and Request

Note that the *ldad* runner in the EDEX Request process only fires in response to a text product being inserted into the Text DB via the CLI *textdb* tool. Because of this, the main log to monitor is the EDEX Ingest process log.

Each time the subscription fires, it logs to the appropriate EDEX process log some basic information. Generally, when the subscription fires successfully, the log messages match this pattern:

```
INFO <date> <time> [thread] ScriptRunner: Executed script: runner= <runner>, script= <script> <trigger>
```

The script runner may output additional log messages. When script execution fails, the log messages match this pattern:

```
ERROR <date> <time> [thread] ScriptRunner: Encountered errors executing script: runner= <runner>, script= <script> <trigger>
```

This line will normally be followed by a Java Exception stack trace that may be used to help identify the specific problem. In addition, the script runner may output additional log messages. Note that this information may be combined into a single Perl 5 style regular expression:

```
^ERROR|INFO .+ ScriptRunner:
```

You can use this information to monitor the EDEX process log and verify subscription execution.

The basic steps to follow:

```
$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
$ ls edex-*20111023.log

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log
```

```
$ tail -f edex-ingest-20111023.log | grep -P "^(ERROR|INFO
.+ ScriptRunner: "
(as EDEX Ingest writes to the log file, lines identifying
successful ingest are displayed.)
```

To stop monitoring, press <ctrl-c>.

NOTE: The subscription script runners only log information for registered subscriptions and Text DB triggers. A lack of log entries simply indicates that no events, i.e., product arrivals, matching registered subscriptions have been received. See [Example 25.8.7](#) for information on using JConsole to monitor script running.

Example 25.8.7-5: Determining if Subscriptions Are Firing Using JConsole

As discussed in [Example 25.7.2-2](#) and [Example 25.7.2-3](#), JConsole may be used to monitor internal operations and/or states in an EDEX process. This includes monitoring

subscription script running. This is done by finding the appropriate Bean on JConsole's *MBeans* tab. The basic steps to follow are similar to those in either Example 25.7.2-2 or 25.7.2-3. Briefly, these are:

1. Execute JConsole.
2. Establish a connection to the appropriate EDEX process. Use either <host-name>:1616 or <host-name>:1617.
3. Once the connection is complete, click the *MBeans* tab.
4. In the tree browser, expand the *org.apache.camel* node.
5. Under the *org.apache.camel* node, expand the *routes* node.
6. Scroll the tree browser to find the node labeled <host-name>/script-runner-camel.
7. Expand this node.
8. At this point, you will see the available script runner beans. In the EDEX Request process, only a single bean is available – “ldadWatchWarnDirect”. In the Ingest process, there are three beans – dataArrival, ldadWatchWarn, and runnerScheduled.
9. Expand the Bean node for the runner type you want to monitor.
10. Under the expanded Bean node, select attributes. This will produce a display similar to that shown in Exhibit 25.8.7-3.

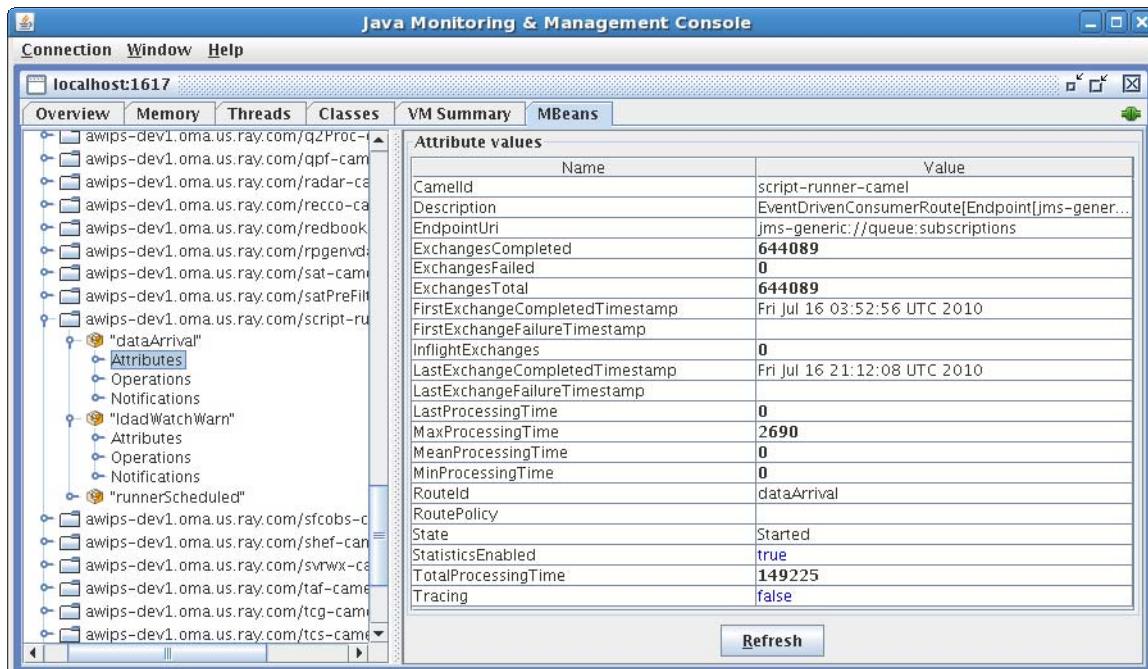


Exhibit 25.8.7-3. Data Arrival Script Runner Bean Attributes

Of the attributes listed, the most interesting are the three “Exchanges” attributes, and the “Processing Time” attributes. These are generally self-explanatory, although the units are not. The processing time attributes are given in milliseconds.

Tip: You can generally double click on any numeric attribute to get a real-time graphical view of that attribute.

NOTE: The images in this recipe were captured from a development server (awips-dev1.oma.ray.com) running the latest development build of EDEX. On a production system, the computer name will change appropriately.

25.8.8 Monitoring EDEX Smart Init Processing

AWIPS II uses the EDEX Ingest process to perform Smart Init processing. As such, basic information on Smart Init execution is logged to the EDEX Ingest process log.

AWIPS II Smart Init processing utilizes an aggregation strategy within EDEX; as GRIB products are ingested within EDEX, product information is forwarded to the aggregation endpoint. EDEX uses a quartz trigger that fires every minute to trigger Smart Init processing.

In the EDEX Ingest process log, Smart Init entries follow a specific general pattern:

```
<level> <date> <time> [smartInitThreadPool-#] <source>:  
<message>
```

This pattern may be used to filter the EDEX Ingest process log for messages generated by Smart Init.

There are two ways to monitor basic Smart Init processing: monitoring the EDEX Ingest process log; and monitoring the EDEX Ingest process using JConsole. The recipes in this section provide information on these two monitoring methods.

Example 25.8.8-1: Monitoring the EDEX Ingest Process Log for Smart Init Processing

(This recipe is similar to [Example 25.7.1-5, Monitoring Data Ingest](#).) We use the Linux *tail* tool to display the process log in real time; to isolate Smart Init processing, we use the Linux *grep* tool to filter and limit the output to Smart Init.

A Perl 5 regex that matches Smart Init log entries is:

```
^.+\[smartInit
```

The basic steps to follow:

```
$ ssh awips@dx3  
awips@dx3's password:  
$ cd /awips2/edex/logs  
$ ls edex-20111023*.log
```

```

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log
edex-ingestGrib-20111023.log
edex-ingest-purge-20111023.log
edex-ingest-radar-20111023.log
edex-ingest-satellite-20111023.log
edex-ingest-shef-20111023.log
edex-ingest-shef-performance-20111023.log
edex-ingest-smartInit-20111023.log
edex-ingest-text-20111023.log
edex-ingest-trigger-20111023.log
edex-ingest-unrecognized-files-20111023.log
edex-request-20111023.log
edex-request-productSrvRequest-20111023.log

edex-response-20111023.log
$ tail -f edex-ingest-20111023.log | grep -P
"^.+\\[smartInit"

```

(As EDEX ingest writes to the log file, lines identifying Smart Init operations are displayed.)

To stop monitoring, press <ctrl-C>.

In normal operation, you should expect to see a fairly steady stream of log messages.

Example 25.8.8-2: Monitoring Smart Init Calculations (in the EDEX ingest process log)

As discussed in [Example 25.7.1-5, Monitoring Data Ingest](#), the output from the Linux *tail* utility may be filtered to isolate specific types of information. As a general rule, you need to examine the log for patterns that indicate specific types of information and adjust the filter pattern accordingly. In this recipe, we need to identify the basic pattern used for logging Smart Init calculations.

A Perl 5 regex that matches Smart Init calculation lines is `^.+\\[smartInit.+Calc :`

The basic steps to follow:

```

$ ssh awips@dx3
awips@dx3's password:
$ cd /awips2/edex/logs
$ ls edex-*20111023.log

```

Note: For this log file, for example, use `ls edex-*20111023.log`

```

edex-ingest-20111023.log
edex-ingestDat-20111023.log
edex-ingest-gen_areal_ffg-20111023.log
edex-ingest-gen_areal_qpe-20111023.log

```

```
edex-ingestGrib-20111023.log  
edex-ingest-purge-20111023.log  
edex-ingest-radar-20111023.log  
edex-ingest-satellite-20111023.log  
edex-ingest-shef-20111023.log  
edex-ingest-shef-performance-20111023.log  
edex-ingest-smartInit-20111023.log  
edex-ingest-text-20111023.log  
edex-ingest-trigger-20111023.log  
edex-ingest-unrecognized-files-20111023.log  
edex-request-20111023.log  
edex-request-productSrvRequest-20111023.log
```

```
$ tail -f edex-ingest-20111023.log | grep -P  
"^.+\[smartInit.+Calc :"
```

(As EDEX Ingest writes to the log file, lines identifying Smart Init operations are displayed.)

To stop monitoring, press <ctrl-C>.

In normal operation, you should expect to see a fairly steady stream of log messages.

Example 25.8.8-3: Monitoring Smart Init Using JConsole

To monitor Smart Init processing using JConsole, you generally need to identify two items – the name of the Camel Route and the name of the MBean (or MBeans) to monitor. (See [Example 25.7.2-1](#), Example 25.7.2-2, and [Example 25.7.2-3](#) for details on connecting to EDEX and finding the correct Camel Route and MBean.)

For Smart Init, the name of the Camel Route is *<host name>/gfe-camel-spring*. This route hosts several Beans that handle Smart Init capabilities; the two that we will examine are *smartInitTrigger* and *smartInitWork*. As the names imply, *smartInitTrigger* is the trigger that fires each minute to initiate processing, while *smartInitWork* is the service that runs the Smart Init scripts.

Follow the procedure in Example 25.7.2-1 to connect to the EDEX Ingest process on DX3. Once the connection is made, select the *MBeans* tab and find the *gfe-camel-spring* route in the tree explorer. Click to expand the *gfe-camel-spring* route. JConsole will look similar to Exhibit 25.8.8-1.

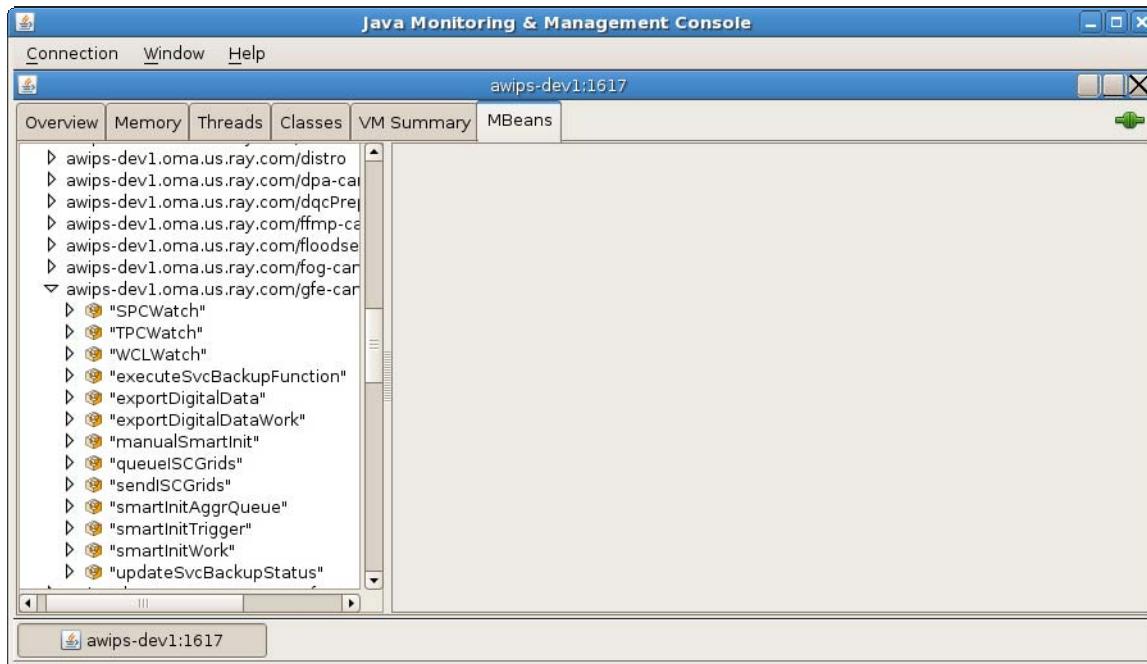


Exhibit 25.8.8-1. gfe-camel-spring Route in JConsole

To monitor Smart Init trigger firing, expand the *smartInitTrigger* bean and click on *Attributes*. This will display the attributes, as shown in Exhibit 25.8.8-2.

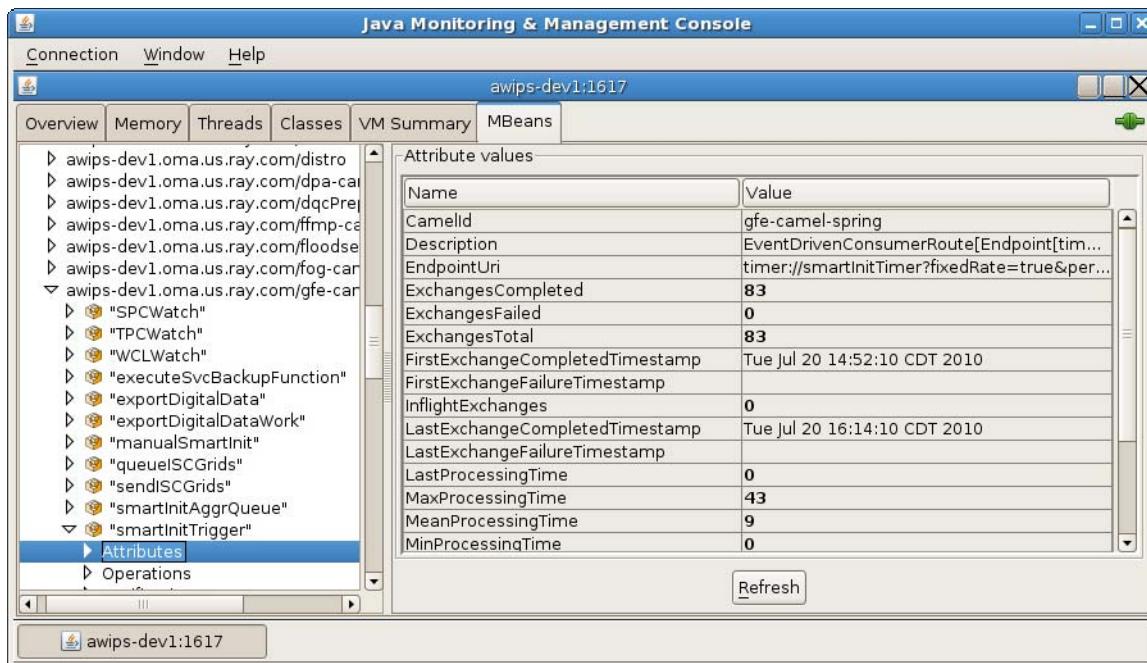


Exhibit 25.8.8-2. smartInitTrigger Bean Attributes in JConsole

As mentioned in [Example 25.7.2-2](#) and [Example 25.7.2-3](#), the interesting attributes are the “Exchanges” and “Processing Time” attributes. Remember that times are given in milliseconds.

To monitor the Smart Init processing, expand on the *smartInitWork* Bean and click on Attributes. This will display the attributes, as shown in Exhibit 25.8.8-3.

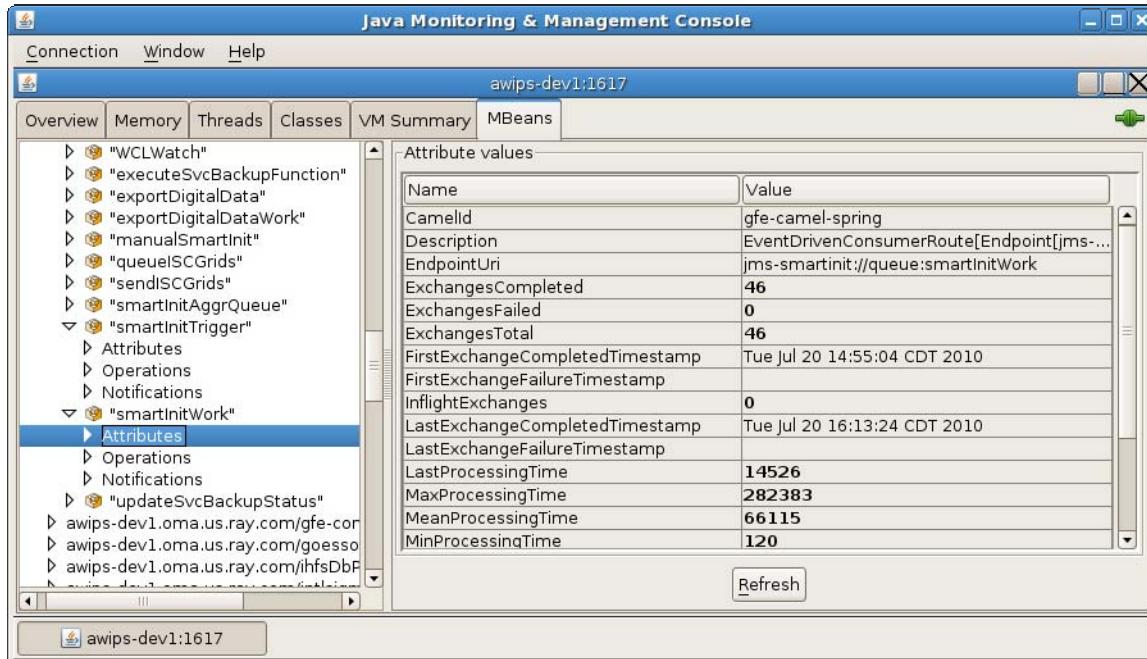


Exhibit 25.8.8-3. smartInitWork Bean Attributes in JConsole

As before, the interesting attributes are the “Exchanges” and “Processing Time” attributes. Remember that times are given in milliseconds.

As mentioned previously, you can usually double click on a numeric attribute in the *attribute values* display panel to get an automatically updating graph of the attribute’s value. An example of this is shown in Exhibit 25.8.8-4.

For both the *smartInitTrigger* bean and the *smartInitWork* bean, the number of Exchanges Completed should match the number of Exchanges Total. Ideally, the number of Exchanges Failed should be zero.

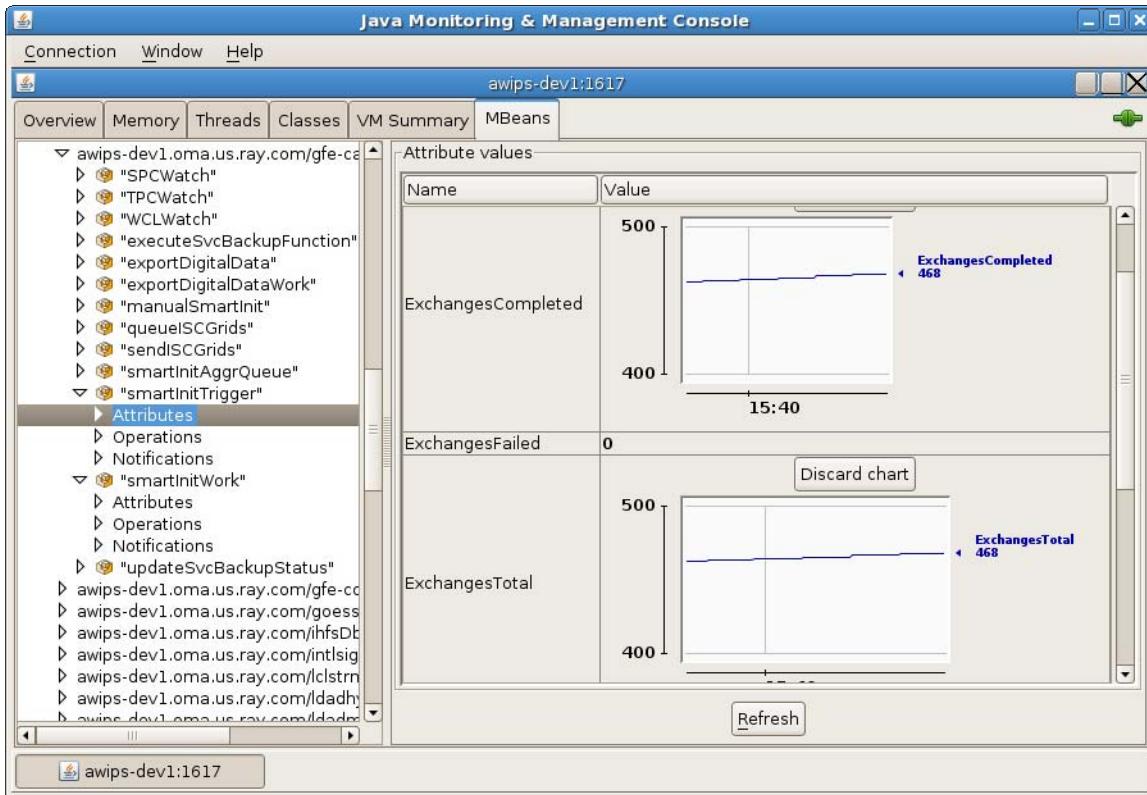


Exhibit 25.8.8-4. JConsole Bean Attributes with Graphs

HDF5 Tools

The HDF5 tool set includes tools that allow examination, export, and modification of HDF5 files. These tools are installed into /awips2/tools on the database servers (DX1 and DX2). The tools themselves are installed in /awips2/tools/bin; the supporting libraries are in /awips2/tools/lib..

25.9.1 HDF5 Tools - Procedures

The general procedure for running the HDF5 tools may be summarized as follows:

1. Log onto the database server (e.g., DX1).
2. Run the tool(s).

Four of the available HDF5 tools that are installed with AWIPS II in the examples that follow. These tools identified in Table 25.9.1-1.

Table 25.9.1-1. Useful HDF5 Tools from the HDF Group

Tool	Description
h5ls	Lists specified features of an HDF5 file. This tool is used to determine the contents of the HDF5 file
h5dump	Dumps the contents of an HDF5 file in ASCII format. This tool is used to examine the actual contents of the HDF5 file.
h5stat	Reports statistics regarding an HDF5 file and the objects stored in the file.
h52gif	Converts images in an HDF5 file to a GIF image.

For all remaining examples in the this section, assume that some satellite images have been archived in an HDF5 file named satellite-1144554058.h5, which is located in /tmp.

Example 25.9.1-1: The h5ls Tool

The *h5ls* tool produces a list of specific features in an HDF5 file. The list is written to standard out and can be redirected into a text file for viewing. The basic command to use is:

```
h5ls -r file[/OBJECT]
```

Where: *file* is the path to the HDF5 file and *OBJECT* is the path within the HDF5 file. The “-r” flag indicates a recursive listing starting with the specified path within the file.

Example 25.9.-2: The h5dump Tool

The *h5dump* tool prints the contents of the HDF5 file to standard out in an ASCII format. The default format for the dump is the HDF Group’s HDF5 Data Description Language and tends to be rather verbose. When using this tool, it is best to redirect the output into a text file and use *vi* or *less* to examine the contents. The basic *h5dump* commands to use are:

```
h5dump file
```

Where: *file* is the path to the HDF5 file, and

```
h5dump -d dataset file
```

Where: *dataset* is the name of a single dataset to dump.

The first form dumps the entire file while the second form dumps a single data object.

NOTE: The other options are available for *h5dump*; to see the available options, run *h5dump* without any command line arguments.

Example 25.9.1-3: The h5stat Tool

The *h5stat* tool reports statistics on an HDF5 file and the objects (i.e., data) that are stored in the file. The statistics reported are somewhat extensive and may be filtered using various command line options. The basic *h5stat* command is:

```
H5stat file
```

Where file is the path to the HDF5 file.

Example 25.9.1-4: The h52gif Tool

The *h52gif* tool extracts an image from an HDF5 file and converts it to a gif-formatted image. To render as an image, the object must be stored in the HDF5 file as a rectangle. To convert a rectangular object to a gif image, the basic command is:

```
h52gif h-file g-file -i image
```

Where: *h-file* is the path to the HDF5 file; *g-file* is the path to the output file; and *image* is the path to the image data in the HDF5 file

Example 25.9.1-5: Tracing SBN Data into HDF5

SBN data and related data flows are covered in SMM Chapters 4 – 7. This data includes satellite imagery, radar data, GRIB data, and many of the text products. These products are also archived in the Data Archive.

Some types of data, generally area based data such as radar, satellite, and forecast grids, as well as certain point data, notably METAR observations, store data in HDF5 files under /awips2/edex/data/hdf5. These files can also be examined to determine if the data has been successfully stored. This recipe presents a procedure for tracing a product and verifying that it has been stored into the HDF5 data store.

In general, to trace an SBN product, you first identify the product's WMO header. As an example, we will trace a GOES 13 product through the system. The general pattern is *Tlxxxx XXXX ddhhmm*. The specific WMO header we will trace is *TICW40 KNES 231430*.

1. Verify that the product was received on CPSBN (CP1).

We verify that the product was received by logging on to CP1 and examining the LDM log. To facilitate the examination, *grep* is used to limit the output. The LDM logs are stored in /usr/local/ldm/logs. The current satellite LDM log is named *goes.log*.

The steps to follow:

```
[root@dx1-tbdw ~]# ssh cpsbn1
[root@cpsbn1-tbdw]# cd ~ldm/logs
[root@cpsbn1-tbdw]# ls *.log
goes.log  ldmd.log  nwstg2.log  nwstg.log  oconus.log
[root@cpsbn1-tbdw]# ls -l goes.log
-rw-rw---- 1 root fxalpha 369016 Oct 23 14:46 goes.log
[root@cpsbn1]# tail -1 goes.log
```

```
Oct 23 14:46:22 cpsbn1-tbdw readnoaaport[21733] NOTE: satz/ch2/GOES-11/SOUND-VIS/20111023 1430/WEST-CONUS/10km/ TICW40 KNES 231430 inserted [cat 3 type 2 ccb 0/0 seq 343135 size 666923]
```

The sequence number (in this case **343135**), is uniquely assigned to this product at transmission by the NWSTG. It may be used to track the product as it is ingested and stored.

2. Verify that the product was received on the dx2f cluster and written to the data archive by logging on to dx2f and checking two locations – the LDM log and the data archive. In both cases, the key to finding the product is the sequence number discovered in step 1

The steps to follow:

```
[root@dx1-tbdw ~]# ssh dx2f
```

```
[root@dx2-tbdw ~]# cd ~ldm/logs
```

```
[root@dx2-tbdw logs]# ls
```

```
ldmd.log      ldmd.log.2    ldmd.log.4    ldmd.log.6    scour.log  
ldmd.log.1    ldmd.log.3    ldmd.log.5    ldmd.log.7
```

```
[root@dx2-tbdw logs]# ls -l ldmd.log
```

```
-rw-r--r-- 1 ldm fxalpha 203592893 Oct 23 14:42 ldmd.log
```

```
[root@dx2-tbdw logs]# grep satz_343135 ldmd.log
```

```
Oct 23 14:46:24 dx2-tbdw pqact[22217] NOTE: Filed in  
"/data_store/sat/GOES-11/SOUND-VIS/20111023/10km_WEST-  
CONUS_1430.satz_343135.20111023": 666923 20111023144622.988  
NIMAGE 343135 satz/ch2/GOES-11/SOUND-VIS/20111023 1430/WEST-  
CONUS/10km/ TICW40 KNES 231430
```

```
[root@dx2-tbdw logs]# find /data_store/sat | grep 343135
```

```
/data_store/sat/GOES-11/SOUND-VIS/20111023/10km_WEST  
CONUS_1430.satz_343135.20111023
```

Note: In this case, find was used because the data archive directory structure for satellite data is somewhat complex. ls can be used, but the search time is considerably longer than using find.

3. Verify that the product has been ingested.

Generally, we can verify that the product has been ingested by examining the EDEX Ingest process logs and looking for an entry identifying the file ingest. This is complicated somewhat by the fact that the product may have been ingested on either DX3 or DX4. There is no way to predict the correct server, so we simply check them both. If the product has been ingested, it will appear in the log on either DX3 or DX4. The basic process is to *grep* for the sequence number in the EDEX Ingest process logs.

The steps to follow on DX3:

```
[root@dx1-tbdw ~]# ssh dx3  
[root@dx3-tbdw ~]# cd /awips2/edex/logs  
[root@dx3-tbdw logs]# date +%F  
2011-10-23  
[root@dx3-tbdw logs]# grep satz_343135 *20111023*.log
```

If the *grep* command results in a single line of output the product ingest has been confirmed and you can proceed to the next step. If the *grep* command results in no output, you will need to repeat these steps on DX4.

```
[root@dx3-tbdw logs]# ssh dx4  
[root@dx4-tbdw]# cd /awips2/edex/logs  
[root@dx4-tbdw logs]# grep satz_343135 *20111023*.log  
  
edex-ingest-satellite-20111023.log:INFO 2011-10-23  
14:46:25,773 [satelliteThreadPool-1] Ingest: EDEX: Ingest -  
satellite:: /data_store/sat/GOES-11/SOUND-  
VIS/20111023/10km_WEST-CONUS_1430.satz_343135.20111023  
processed in: 0.1940 (sec) Latency: 0.2240 (sec)
```

Note: grep satz.343135.was used to match the file naming pattern used by LDM when it writes data to the data archive..

4. Verify that the product has been stored into the database.

These steps are performed on the DX1 as user awips. Unfortunately, identifying the specific conditions on the SQL query is essentially a hit and miss proposition as the satellite table does not have a WMO header or sequence number field.

In the LDM log output in step 2, we see the following string:

```
Oct 23 14:46:24 dx2-tbdw pqact[22217] NOTE: Filed in  
"/data_store/sat/GOES-11/SOUND-VIS/20111023/1km_WEST-  
CONUS_1430.satz_343135.20111023": 666923 20111023144622.988
```

```
NIMAGE 343135 satz/ch2/GOES-11/SOUND-VIS/20111023 1430/WEST-
CONUS/10km/ TICW40 KNES 231430
```

From this information, we can determine a match for the datauri field (datauri like ‘%GOES-11%’), and use grep -i to pattern match on “west”, “conus”, “vis”, “sound”, and a date/time of “20111023.” Using grep in Linux on the output is much simpler than trying to use Postgres data type conversion functions within the psql statement. Also, the more complicated the psql statement is, the more load is put on the Posgres engine to perform the search.

```
[root@dx1-tbdw ~]# su - awips
```

```
[awips@dx1-tbdw ~] psql metadata -c "select * from satellite where datauri like
'%GOES-11%';" | grep -i west | grep -i conus | grep -i sound | grep
'2011-11-01'
```

```
504426273 | 0 | 2011-10-23 07:30:15 | [] |
2011-10-23 07:30:15 | 2011-10-23 07:30:15 | /satellite/2011-10-
23_07:30:15.0/NESDIS/GOES-11(L)/West_CONUS/Sounder_Visible_Imagery
| 2011-10-23 07:40:18.944 | -1152538345 | GOES-11(L) |
1280 | Sounder Visible imagery | 35794 |
0 | -135 | West CONUS | 1100 |
NESDIS | | 0 | 667897505
```

Each field is separated by a “|”. The datauri is field 7, starting with “/satellite”. This will identify the HDF5 file and path to the data.

Using the datauri identified in the previous step, we can identify the rest of the individual fields by connecting to the metadata database. Note that restime and inserttime match the “2011-10-27 17:” search string.

```
[root@dx1-tbdw ~]# su - awips
```

```
[awips@dx1-tbdw ~]$ psql metadata
```

Welcome to psql 8.3.4, the PostgreSQL interactive terminal.

Type: \copyright for distribution terms

\h for help with SQL commands

\? for help with psql commands

\g or terminate with semicolon to execute query

\q to quit

metadata=# \x

Expanded display is on.

metadata=# select * from satellite

metadata-# where datauri like

```
metadata-# '%satellite/2011-10-23_07:30:15.0/NESDIS/GOES-
11(L)/West_CONUS/Sounder_Visible_Imagery%' ;
```

```
-[ RECORD 1 ]---+
id | 504426273
forecasttime | 0
reftime | 2011-10-23 07:30:15
utilityflags | []
rangeend | 2011-10-23 07:30:15
rangestart | 2011-10-23 07:30:15
datauri | /satellite/2011-10-23_07:30:15.0/NESDIS/GOES-11(L)/West_CONUS/Sounder_Visible_Imagery
inserttime | 2011-10-23 07:40:18.944
hdffileid | -1152538345
creatingentity | GOES-11(L)
numrecords | 1280
physicalelement | Sounder Visible imagery
satheight | 35794
satsubpointlat | 0
satsubpointlon | -135
sectorid | West CONUS
sizerecords | 1100
source | NESDIS
units |
upperrightlat | 0
upperrightlon | 0
coverage_gid | 667897505
```

5. Verify that the data is in the HDF5 file.

The HDF5 data archive is located in /awips2/edex/data/hdf5, which is visible from either database server (DX1 or DX2). Data that is stored in HDF5 is located under /awips2/edex/data/hdf5/<type>; in this case <type> is satellite. Under /awips2/edex/data/hdf5/<type>, the directory structure depends on the datatype.

Within that directory, the HDF5 files are named <type><date-hour>-<hdf5 id>.h5: The <type> is the data type; the date-hour stamp has format yyyy-mm-dd-hh as determined by the data reference time; the <hdf5 id> is the value of the hdffileid field, identified in Step (4). In this case, searching todays “satellite-2011-10-23*” files for the datauri in postgres finds the hdf5 entry in satellite-2011--10-23-1152538345.h5

The steps to follow:

```
[root@dx1-tbdw ~]# su - awips
[awips@dx1-tbdw ~]$ cd /awips2/edex/data/hdf5/satellite
[awips@dx1-tbdw satellite]$ find . -name "*1152538345.h5"
```

This will list all the .h5 files including the above file with satellite-2011-10-23-1152538345.h5.

25.9.2 The *μ*Engine Web Test Driver

Built into the AWIPS II EDEX application is a web-based test driver that provides identification information on satellite, radar, GRIB, and ASCII products. The test driver may be used to help verify product data flow and to request displayable products.

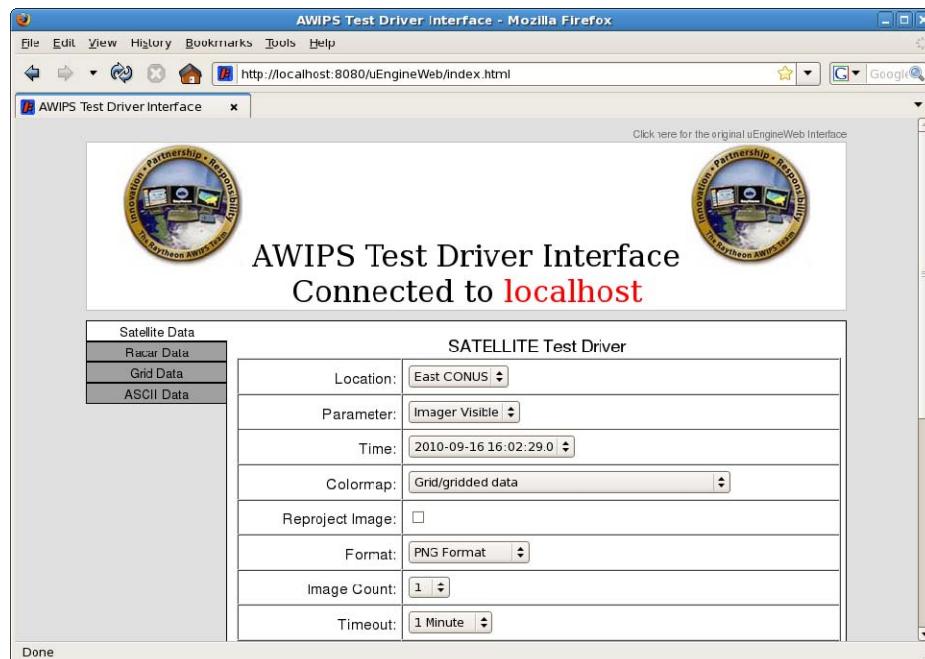
The URL for the test driver is `http:<EDEX server>:8080/uEngineWeb/index.html` where <EDEX server> is the DNS name of the EDEX server, normally dx3 or dx4.

NOTE: IPVS, which provides IP aliasing/load balancing for CAVE-EDEX interactions, does not currently handle web-based interactions with the EDEX server.

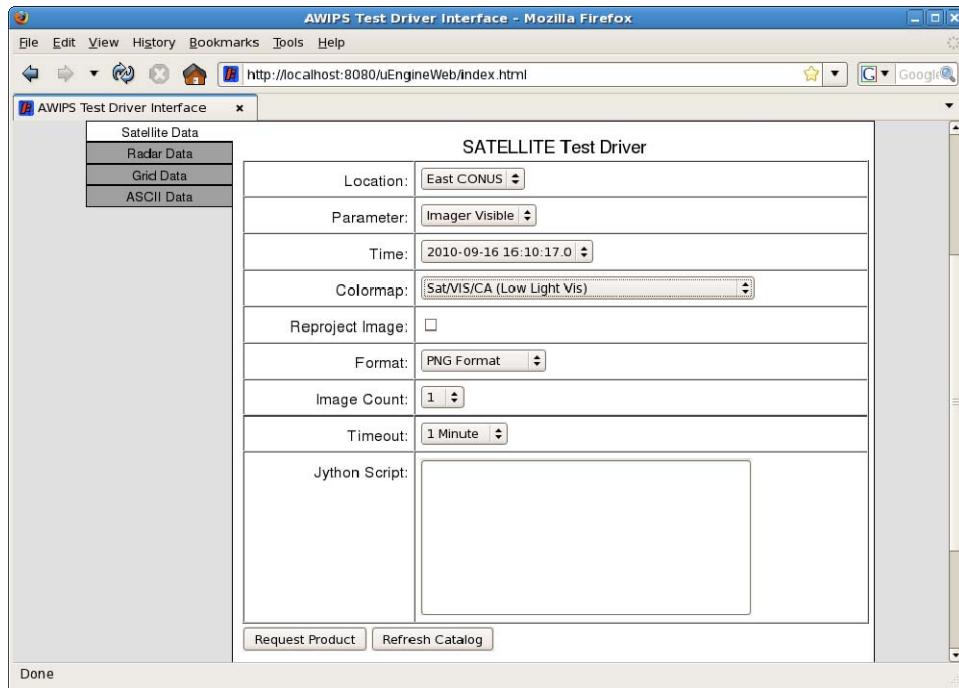
*Example 25.9.2-1: Retrieving a Satellite Image via the *μ*Engine Web Test Driver*

For this recipe, we use the *μ*Engine Web test driver to access and display satellite data. The assumption used is simple: If the data can be displayed, it can be ingested. The *μ*Engine Web test driver is used to allow more control over the selection of specific data than is easily available in CAVE.

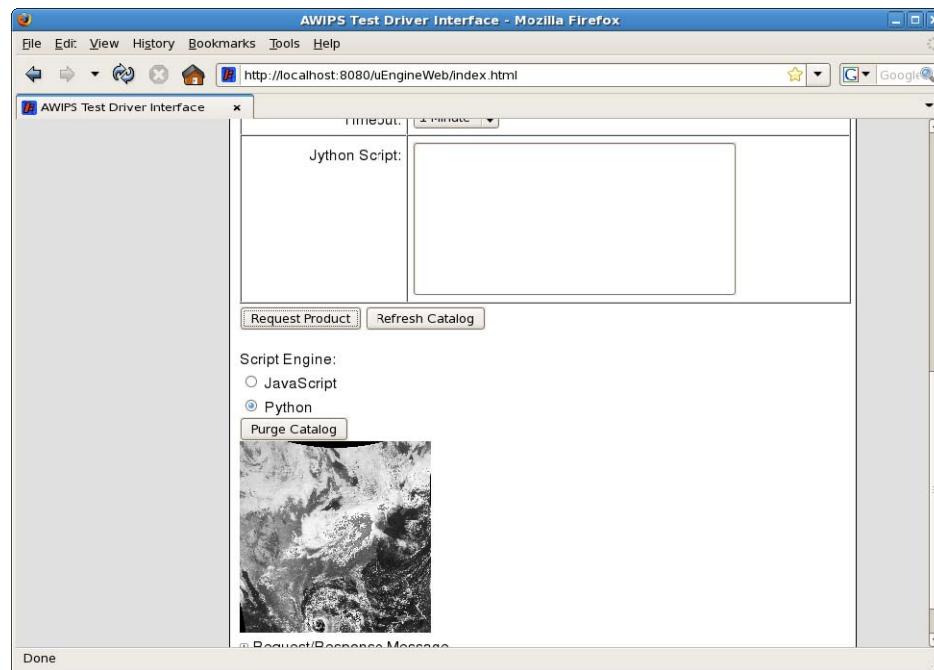
- On a workstation with network access to the EDEX server, open a web browser and enter the *μ*Engine Web's URL into the address bar. A display of the basic *μ*Engine Web's test page follows.



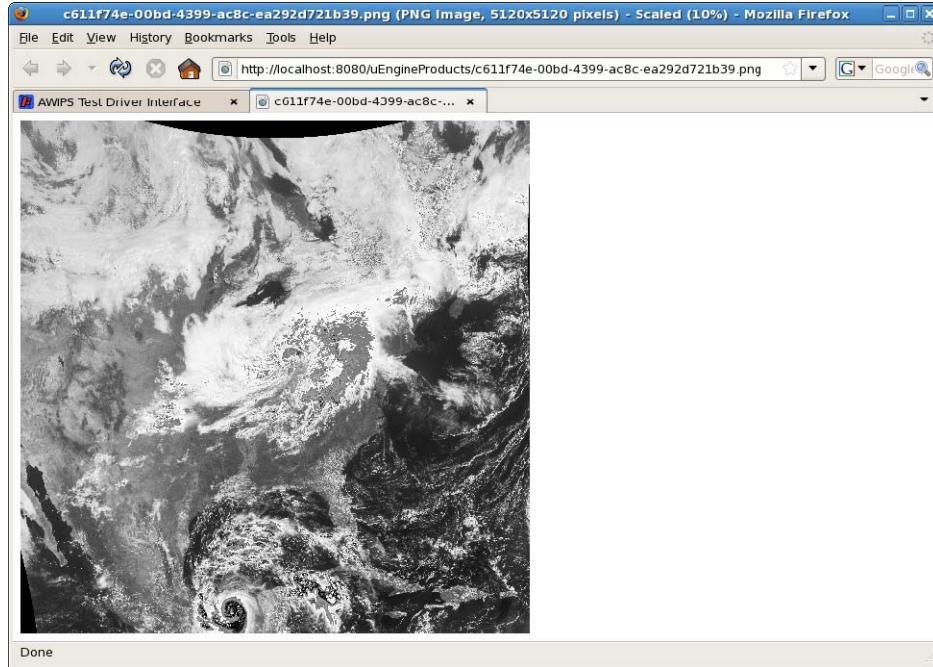
- b. On the test driver, select the location, parameter, and time from the drop down lists. You should also select a color map that is more appropriate to satellite data.



- c. Scroll down the page and click *Request Product*. After a short pause, the image will be displayed. (You may need to scroll down to see the actual image.)



- d. Double click on the image to display a larger version; depending on the browser settings, it may display in a separate tab or in a separate browser.



If there are any problems, a popup error dialog will be displayed.

NOTE: Prior to using the μ Engine Web test page to display the data, the procedure outlined in Example 25.9.1-5 may be used to identify the data to display.

Hint: The μ Engine Web test page only allows you to select data that has been ingested.

25.10 CAVE/Workstation Setup Considerations

Most of this appendix has been oriented toward server operation and troubleshooting. This section discusses potential problems with the main AWIPS II client application, CAVE. In AWIPS II, CAVE (Common AWIPS Visualization Environment) provides much of the functionality of D-2D, GFE, etc. in a single, integrated environment.

2.10.1 CAVE Startup Modes

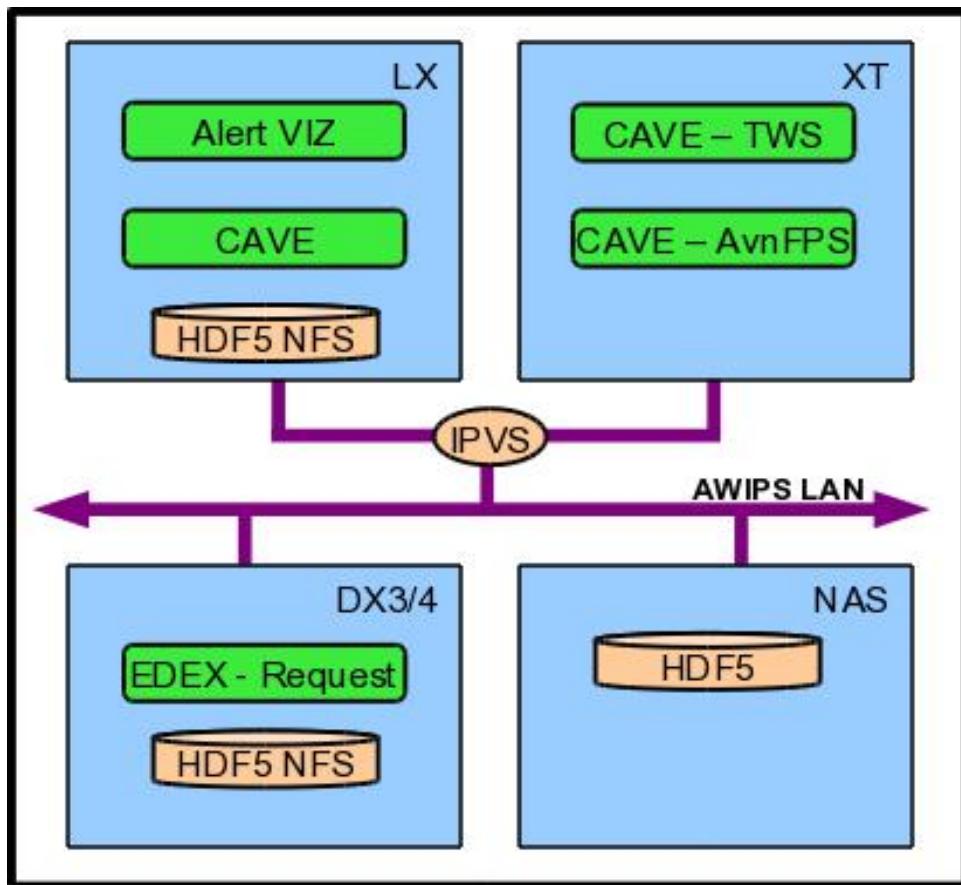
In addition to the standard startup, CAVE has the capability to start in multiple modes: Text WS, AvnFPS Menu, AvnFPS Setup. A startup mode is activated by passing *–component switch* via the command line when starting CAVE. (See Table 25.10.1-1.)

Table 25.10.1-1. CAVE Startup Modes

Mode	Switch	Description
Text WS	textws	Implements Text Workstation functionality from AWIPS.
AvnFPS Menu	avnmenu	Implements the AvnFPS Menu functionality from AWIPS.
AvnFPS Setup	avnsetup	Implements the AvnFPS Setup functionality from AWIPS.

25.10.2 Cave Installation

CAVE is installed on both the LX and the XT workstations. CAVE consists of two main components: CAVE and Alert VIZ. In addition, CAVE may be started in different modes. (See section 25.10.1, [CAVE Startup Modes](#), in Table 25.10.1-1.) The standard CAVE installation is shown in Exhibit 25.10.2-1.

**Exhibit 25.10.2-1. Standard CAVE Installation**

As shown in Exhibit 25.10.2-1, CAVE is installed on the LX and XT workstations; in normal operation, it is started in *standard* mode on the LX workstation and as the Text WS, *textws* mode, on the XT workstation. As also shown in Exhibit 25.10.2-1, CAVE interacts with the remaining components of the AWIPS II system: it interacts via IPVS with the EDEX Request process on DX3/4.

CAVE is normally installed in /usr/local/viz. That installation includes CAVE, Alert VIZ, GFEClient, and support software such as Java and Python. The expected directories under /usr/local/viz are shown in Table 25.10.2-1.

Table 25.10.2-1. Contents of VIZ Install Directory

Directory	Contents
alertviz	Contains the Alert VIZ application and support files.
basemaps	Contains shape files used by CAVE.
bin	Contains executables and scripts used in connection with AWIPS II VIZ software.
cave	Contains the CAVE application and support files.
caveData	Used by the installer.
fxa	Used by the installer.
gfeclient	Contains the GFE Client application.
include	Contains header files for the notification API.
java	Contains Java runtime and documentation files.
lib	Contains library files used in connection with AWIPS II VIZ software.
notification	Contains the notification API.
pgsql	Used by the installer.
python	Used by the installer.
setup	Used by the installer.
Uninstaller	Contains the uninstaller.

25.10.3 CAVE Startup

Starting CAVE depends on how the system is installed. For the recipes in this section, we assume a launcher has been created to run the CAVE startup script, cave.sh., with the appropriate startup mode flag. (See section 25.10.1, [CAVE Startup Modes](#).) This is also assumed for the Alert VIZ application. Note that Alert VIZ should be started prior to starting CAVE.

If a launcher is not available for CAVE, the following steps can be used to start CAVE.

In AWIPS II, there are three methods for starting CAVE:

1. Open a console window and enter: **/awips2/cave/cave.sh**.
2. Open a console window and enter: **cd /awips2/cave/;./cave.sh**.
3. Open a console window and enter: **/bin/bash -l -c /awips2/cave/cave.sh**.

TIP: Both CAVE, in its various modes, and Alert VIZ write information to STDOUT and STDERR. This information may be useful for diagnosing runtime problems. Normally, this information is lost as the terminal window scrolls; it is also lost when starting either application using a launcher. It is possible to capture this information to a file for later review using Linux output redirection. To do so, add `2>&1 / tee ~logs/<app name>.txt` to the command line. You can also add a similar redirect to the launcher.

In each of the recipes that follow, it is assumed you are logged on to the appropriate workstation and have opened a terminal window.

Example 25.10.3-1: Validating the LX VIZ Installation

To validate the CAVE installation, you check to see if the software has been installed on the workstation. In addition, you will need to verify that the NFS mount is available and that the EDEX servers and companion XT workstation are accessible from the workstation. For this recipe, assume you are logged on to the LX1 workstation and have an open terminal window.

The basic steps to follow:

```
$ cd /awips2/viz  
$ ls -l
```

(The list of directories under /awips2/viz is displayed. See Table 25.10.2-1 for a list of the directories that should be displayed.)

```
$ mount | grep -I hdf5  
awips-nas:/hdf5 on /data-int type nfs (rw,addr=147.18.105.156)  
(The server name and local mount point may be different.)  
  
$ ping dx3  
64 bytes from dx3 (xxx.xxx.xxx.xxx): icmp_seq=1 ttl=64  
time=0.614 ms  
64 bytes from dx3 (xxx.xxx.xxx.xxx): icmp_seq=2 ttl=64  
time=0.194 ms  
64 bytes from dx3 (xxx.xxx.xxx.xxx): icmp_seq=3 ttl=64  
time=0.209 ms  
<ctrl-C>  
--- dx3 ping statistics ---  
3 packets transmitted, 3 received, 0% packet loss, time 1999ms  
rtt min/avg/max/mdev = 0.194/0.339/0.614/0.194 ms  
(xxx.xxx.xxx.xxx will be replaced with the IP of DX3.)  
  
$ ping dx4  
64 bytes from dx4 (xxx.xxx.xxx.xxx): icmp_seq=1 ttl=64  
time=0.614 ms
```

```
64 bytes from dx4 (xxx.xxx.xxx.xxx): icmp_seq=2 ttl=64
time=0.194 ms
64 bytes from dx4 (xxx.xxx.xxx.xxx): icmp_seq=3 ttl=64
time=0.209 ms
<ctrl-C>
--- dx4 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.194/0.339/0.614/0.194 ms
(xxx.xxx.xxx.xxx will be replaced with the IP of DX4.)

$ ping xt1
64 bytes from xt1 (xxx.xxx.xxx.xxx): icmp_seq=1 ttl=64
time=0.614 ms
64 bytes from xt1 (xxx.xxx.xxx.xxx): icmp_seq=2 ttl=64
time=0.194 ms
64 bytes from xt1 (xxx.xxx.xxx.xxx): icmp_seq=3 ttl=64
time=0.209 ms
<ctrl-C>
--- xt1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.194/0.339/0.614/0.194 ms
(xxx.xxx.xxx.xxx will be replaced with the IP of XT1.)
```

\$

What's it mean? A correctly set up workstation box will have the directory structure and data (HDF5) mount, and will be able to ping the EDEX servers (DX3/4) and its XT workstation successfully.

TIP: This check can be performed remotely by using *ssh* to log into the LX workstation.

Example 25.10.3-2: Validating the XT VIZ Installation

Validating the XT VIZ install is similar to validating the LX installation. The only difference is that the XT workstation needs to be able to access the LX. For this reason, you can follow the steps in Example 25.10.3-1, replacing *xt1* with *lx1* in the final *ping*.

Example 25.10.3-3: Cave Connection Problems

The first time a user runs CAVE or Alert VIZ (on an LX workstation) or Text WS (on an XT workstation), connection information is requested. This information points CAVE, Alert VIZ, or Text WS to the EDEX localization server. It may also point CAVE or the Text WS to Alert VIZ. This information, as well as certain user preferences, is stored in a directory structure under *caveData* in the user's home directory. Should the *caveData* directory tree be deleted, a VIZ application will request connection information the next time it is started. It does this via the dialogs shown in Exhibits 25.10.3-1 and 25.10.3-2.

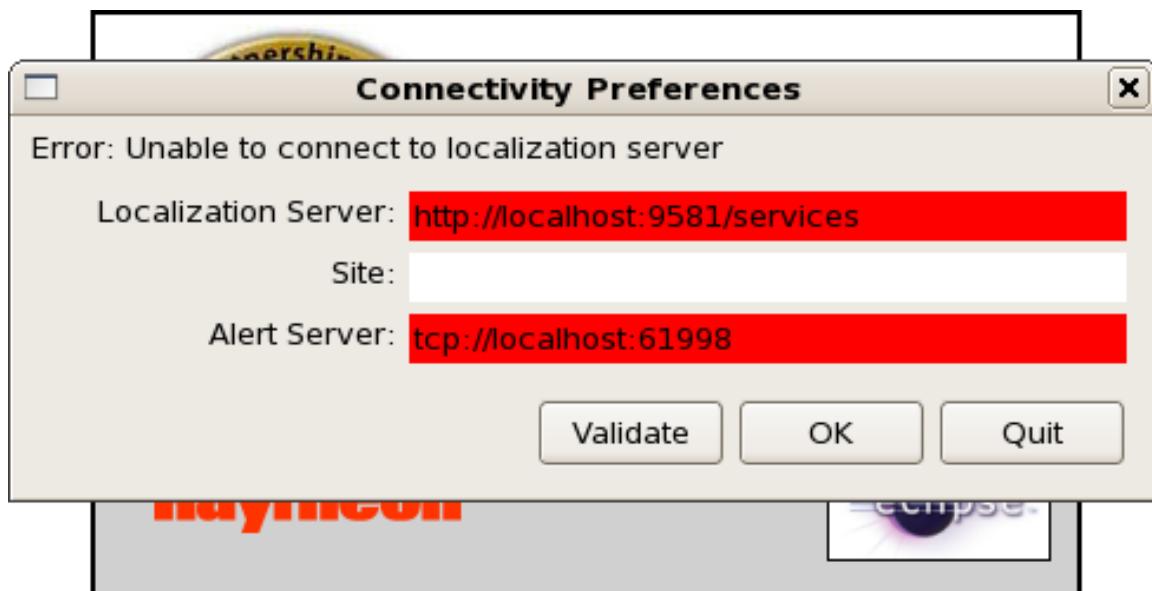


Exhibit 25.10.3-1. CAVE Connectivity Error When Alert VIZ Is Not Available



Exhibit 25.10.3-2. CAVE Connectivity Error When Alert VIZ Is Available

Recall from Section 25.10.1, [CAVE Startup Modes](#) that AlertVIZ must be started or available before starting CAVE. Exhibit 25.10.3-3 shows the startup if CAVE is unable to find Alert VIZ at startup. In this exhibit, CAVE was able to find its localization server.

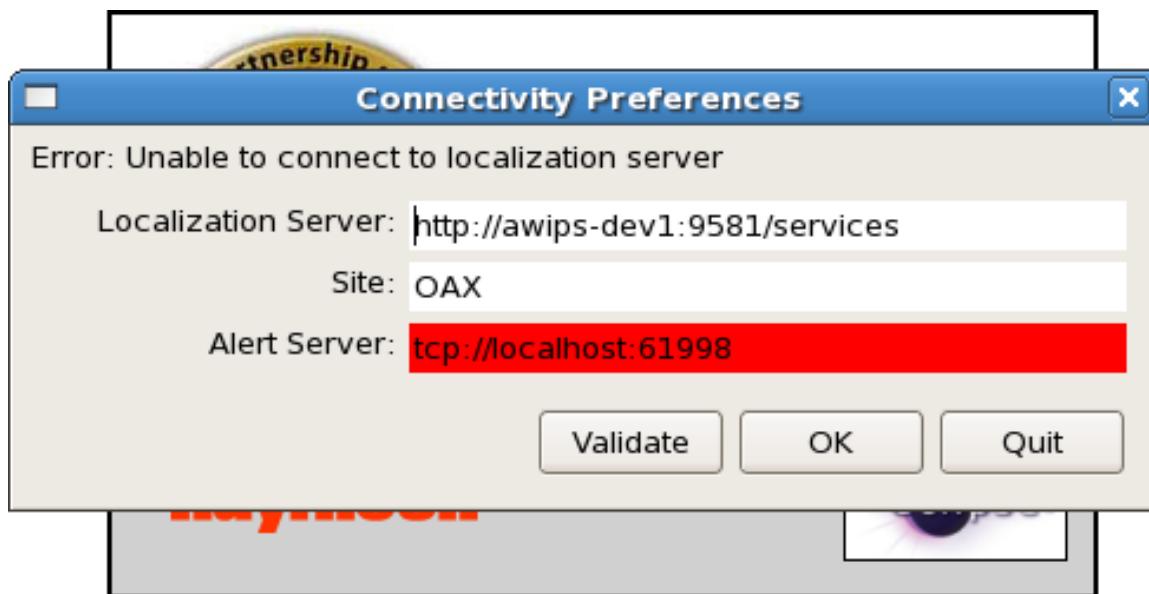


Exhibit 25.10.3-3. No Alert VIZ, Localization Available

NOTE: You will also see this dialog if you attempt to start Alert VIZ on the LX workstation and the localization server is invalid.

If you see either version of this dialog when starting CAVE, Text WS or Alert VIZ, replace *localhost* with the name or IP address of the EDEX request server, enter the desired localization site, and, if the Alert Server box is displayed, replace localhost with the name or IP address of the Alert Server. Finally, click the *validate* button. If the entries are valid, the red highlights will be removed. Note that the localization site is not validated. Also note that the text (i.e., “Error: Unable to connect to localization server”) is not changed when the entries are valid; only the highlight is removed.

25.11 Verifying that AWIPS II Processes Are Running

This section presents alternative methods for validating operation of the EDEX processes. These may be used in place of the methods outlined earlier.

On DX3/4:

```
ps -ef | grep -v grep | grep edex.run.mode | cut -b -80

awips      27008 27004 99 17:12 ?          01:50:01
/awips2/java/bin/java -Dedex.run
awips      27211 27209 19 17:12 ?          00:22:01
/awips2/java/bin/java -Dedex.run
awips      27329 27323  3 17:12 ?          00:03:41
/awips2/java/bin/java -Dedex.run
awips      27434 27432  4 17:12 ?          00:05:09
/awips2/java/bin/java -Dedex.run
```

NOTE: There should be four lines of output, one for each of the EDEX processes: ingest, ingestDat, ingestGrib, and request. The results will be similar on both DX3 and DX4.

On dx1f:

```
ps -fU awips | grep -v idle | cut -d "-" -f1,2

UID      PID  PPID  C STIME TTY          TIME CMD
awips    631  9444  1 18:14 ?          00:00:32
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    636  9444  1 18:14 ?          00:00:36
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    645  9444  1 18:14 ?          00:00:36
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    6094 9444  1 18:20 ?          00:00:28
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    6579 9444  1 18:22 ?          00:00:33
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    6758 9444  0 18:22 ?          00:00:21
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    8935 9444  0 18:28 ?          00:00:18
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    8936 9444  1 18:28 ?          00:00:23
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    8937 9444  1 18:28 ?          00:00:30
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    8947 9444  1 18:28 ?          00:00:34
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips    9002     1  0 Oct21 ?          00:00:26
/awips2/postgresql/bin/postmaster -D /awips2/data
awips    9016 9002  0 Oct21 ?          00:00:02 postgres:
logger process
awips    9022 9002  0 Oct21 ?          00:00:16 postgres:
writer process
```

```
awips      9023  9002  0 Oct21 ?          00:00:00 postgres: wal
writer process
awips      9024  9002  0 Oct21 ?          00:00:03 postgres:
autovacuum launcher process
awips      9025  9002  0 Oct21 ?          00:01:36 postgres:
stats collector process
awips      9149  9002  0 17:31 ?          00:00:25 postgres:
awips metadata 165.92.29.133(60513) PARSE
awips      9442  9438  0 Oct21 ?          00:00:00 bash -c
/awips2/python/bin/python
awips      9443  9442  0 Oct21 ?          00:09:33
/awips2/python/bin/python -u /awips2/python/lib/python2.7/site
awips      10055      1  1 Oct21 ?          01:24:22
/awips2/java/bin/java -cp
/awips2/rcm/data/config/res:::/awips2/rcm/lib/activation
awips      11844  9444  1 18:30 ?          00:00:26
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      11853  9444  1 18:30 ?          00:00:29
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      11854  9444  1 18:30 ?          00:00:26
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      11875  9444  1 18:30 ?          00:00:24
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      12137  9002  0 18:30 ?          00:00:00 postgres:
autovacuum worker process metadata
awips      17121  9444  1 18:41 ?          00:00:21
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      17146  9002  0 18:42 ?          00:00:00 postgres:
autovacuum worker process metadata
awips      20664  9444  1 18:46 ?          00:00:12
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      20666  9444  1 18:46 ?          00:00:17
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      20667  9444  1 18:46 ?          00:00:11
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      21347  9444  0 18:48 ?          00:00:09
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
```

```

awips      21355  9444  0 18:48 ?          00:00:08
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      22928  9444  0 18:51 ?          00:00:07
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      26147  9444  1 18:59 ?          00:00:06
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      31650  9444  1 19:01 ?          00:00:02
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf
awips      32184  9002  0 18:12 ?          00:00:01 postgres:
autovacuum worker process    fxatext

```

NOTE: There should be a single postmaster process running which drives the postgreSQL AWIPS II database engine along with five (5) subsequent process threads (*logger, writer, wal writer, autovacuum, stats collector*). The ISC routing table service (edex_irt) as well as the AWIPS II RadarServer (edex_rcm) should be running as a stand-alone process.

On dx2f:

```
ps -fU fxa,ldm | cut -d "-" -f1,2; ps -ef | egrep 'iscsi/nfs' |
grep -v grep
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
ldm	22216	1	0	Oct21	?	00:00:00	rpc.1dmd -I 165.92.29.132
ldm	22217	22216	1	Oct21	?	00:59:09	pgact -e
ldm	22219	22216	0	Oct21	?	00:23:47	edexBridge -s cp1f
ldm	22220	22216	1	Oct21	?	01:02:06	rpc.1dmd -I 165.92.29.132
root	10335	67	0	Jul21	?	00:00:00	[iscsi_eh]
root	10880	67	0	Oct21	?	00:00:00	[nfsd4]
root	10881	1	0	Oct21	?	00:15:03	[nfsd]
root	10882	1	0	Oct21	?	00:14:56	[nfsd]
root	10883	1	0	Oct21	?	00:14:53	[nfsd]
root	10884	1	0	Oct21	?	00:14:52	[nfsd]
root	10885	1	0	Oct21	?	00:14:52	[nfsd]
root	10886	1	0	Oct21	?	00:14:58	[nfsd]
root	10887	1	0	Oct21	?	00:14:43	[nfsd]
root	10888	1	0	Oct21	?	00:14:58	[nfsd]
root	11485	67	0	Jul21	?	00:01:19	[nfsiod]

NOTE: There should be eight (8) httpd threads running which control the AWIPSII System Monitor. The LDM should have five (5) processes running – *pqact*, *edexBridge* (connected to the server running Qpid), and three (3) *rpc.ldmd*.

On px1f:

```

apache      3738 14491  0 Oct23 ?          00:00:04
/usr/sbin/httpd
apache      3739 14491  0 Oct23 ?          00:00:05
/usr/sbin/httpd
apache      3740 14491  0 Oct23 ?          00:00:05
/usr/sbin/httpd
apache      3741 14491  0 Oct23 ?          00:00:05
/usr/sbin/httpd
apache      3742 14491  0 Oct23 ?          00:00:05
/usr/sbin/httpd
apache      3743 14491  0 Oct23 ?          00:00:05
/usr/sbin/httpd
apache      3744 14491  0 Oct23 ?          00:00:05
/usr/sbin/httpd
apache      3745 14491  0 Oct23 ?          00:00:03
/usr/sbin/httpd
fxa        6766 13164  0 19:10 ?          00:00:00 crond
fxa        6772 6766   0 19:10 ?          00:00:00 csh -c
/awips/adapt/hwr/bin/hwrn
fxa        7428 6772   0 19:10 ?          00:00:00
/usr/local/python/bin/python /aw
fxa        7595 7428   0 19:10 ?          00:00:00 [gettimetz]
<defunct>
fxa        11793 13164  0 19:12 ?          00:00:00 crond
fxa        11794 11793  0 19:12 ?          00:00:00 /bin/sh -c
/bin/csh -c '/usr/bin
fxa        11795 11794  2 19:12 ?          00:00:00 /bin/csh -c
/usr/bin/perl /awips
fxa        11958 11795  0 19:12 ?          00:00:00 /usr/bin/perl
/awips/laps/etc/aw
fxa        11960 11958  1 19:12 ?          00:00:00 /bin/csh
/awips/fxa/bin/convertS
fxa        12822 11960  0 19:12 ?          00:00:00 sleep 3
fxa        13841     1  0 Oct13 ?          00:00:01
/awips/fxa/bin/asyncPilMsgServer
fxa        13844     1  0 Oct13 ?          00:00:07
/awips/fxa/bin/asyncScheduler
fxa        14277 13844  0 Oct13 ?          00:00:04 test1 23 20 1
test1 /dev/ttyn1a

```

```

fxa      14278 13844  0 Oct13 ?          00:01:21 test2 25 23 2
test2 /dev/ttyn1b
fxa      14279 13844  0 Oct13 ?          00:01:33 ttyn1h 27 25 8
ttyn1h /dev/ttyn1
fxa      14280      1  0 Oct13 ?          00:00:00 /usr/bin/perl
/awips/fxa/bin/asy
fxa      14288      1  0 Oct13 ?          00:00:00
/awips/fxa/bin/hmMonitorServer
fxa      14306      1  0 Oct13 ?          00:01:46
/awips/fxa/bin/NWWSSchedule
apache   22859 14491  0 15:45 ?          00:00:03
/usr/sbin/httpd
apache   25305 14491  0 15:45 ?          00:00:05
/usr/sbin/httpd
piranha  27136 6002   0 15:50 ?          00:00:00
/usr/sbin/piranha_gui -f /etc/sy
piranha  28005 6002   0 15:50 ?          00:00:00
/usr/sbin/piranha_gui -f /etc/sy
fxa      30288      1  0 Sep19 ?          00:48:45
/awips/fxa/bin/purgeProcess -com
root    12825 12321  0 19:12 pts/0       00:00:00 grep ipvs

```

NOTE: There should be eight (8) httpd threads running which control the AWIPSII System Monitor. There should be two getty serial ports initialized named /dev/ttynq[a,b] which are used by the asyncScheduler, which should also be running with the two async processes, *asyncPilMsgServer* and *asyncPollData.pl*. The AWIPS II hmMonitorServer and NWWSSchedule should be running. The GUI controller for IPVS named piranha.gui should be listed as well as the IPVS process *nanny* connected on port 9581 to the IPADDR of the DX3 and DX4.

On px2f:

```
ps -fU ldad,fxa | cut -d "-" -f1,2; ps -ef | egrep 'iscsi/nfs' |
grep -v grep
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
fxa	13193	1	0	19:13	?	00:00:00	/awips/adapt/hwr/bin/Linux/nwrxmit -g
							/awips/fxa/bin/NWRBrowser
fxa	13841	1	0	Oct13	?	00:00:01	/awips/fxa/bin/asyncPilMsgServer
fxa	13844	1	0	Oct13	?	00:00:07	/awips/fxa/bin/asyncScheduler
fxa	14277	13844	0	Oct13	?	00:00:04	test1 23 20 1
							test1 /dev/ttyn1a 9600 8 NONE 1 NONE
fxa	14278	13844	0	Oct13	?	00:01:21	test2 25 23 2
							test2 /dev/ttyn1b 9600 8 NONE 1 NONE

```

fxa      14279 13844  0 Oct13 ?          00:01:33 ttyn1h 27 25 8
ttyn1h /dev/ttyn1h 9600 8 NONE 1 NONE
fxa      14280      1  0 Oct13 ?          00:00:00 /usr/bin/perl
/awips/fxa/bin/asyncPollData.pl
fxa      14288      1  0 Oct13 ?          00:00:00
/awips/fxa/bin/hmMonitorServer
fxa      14306      1  0 Oct13 ?          00:01:46
/awips/fxa/bin/NWWSSchedule
fxa      30288      1  0 Sep19 ?          00:48:45
/awips/fxa/bin/purgeProcess -commit
root     4515       35  0 Sep19 ?          00:00:00 [iscsi_eh]
root     4762       1   0 Sep19 ?          00:00:00 brcm_iscsiuio
root     4768       1   0 Sep19 ?          00:00:00 iscsid
root     4769       1   0 Sep19 ?          00:00:00 iscsid
root     5298       35  0 Sep19 ?          00:00:00 [iscsi_q_3]
root     5698       35  0 Sep19 ?          00:01:29 [nfsiod]
root     5970       35  0 Sep19 ?          00:00:00 [nfsd4]
root     5971       1   0 Sep19 ?          00:00:00 [nfsd]
root     5972       1   0 Sep19 ?          00:00:00 [nfsd]
root     5973       1   0 Sep19 ?          00:00:00 [nfsd]
root     5974       1   0 Sep19 ?          00:00:00 [nfsd]
root     5975       1   0 Sep19 ?          00:00:00 [nfsd]
root     5976       1   0 Sep19 ?          00:00:00 [nfsd]
root     5977       1   0 Sep19 ?          00:00:00 [nfsd]
root     5978       1   0 Sep19 ?          00:00:00 [nfsd]

```

NOTE: There should be eight (8) nfsd threads running and two (2) iscsid daemons running which control the /data_store filesystem export. The AWIPSII LDAD and FSI processes should also be running and should match those in the output above (with the exception of the node domain name, which will match your site ID).

25.12 EDEX Startup and Shutdown Procedures

Although EDEX is installed only on the DX 3/4 cluster, it is supported by applications running on several servers. The relevant installations are shown in Exhibit 25.12-1.

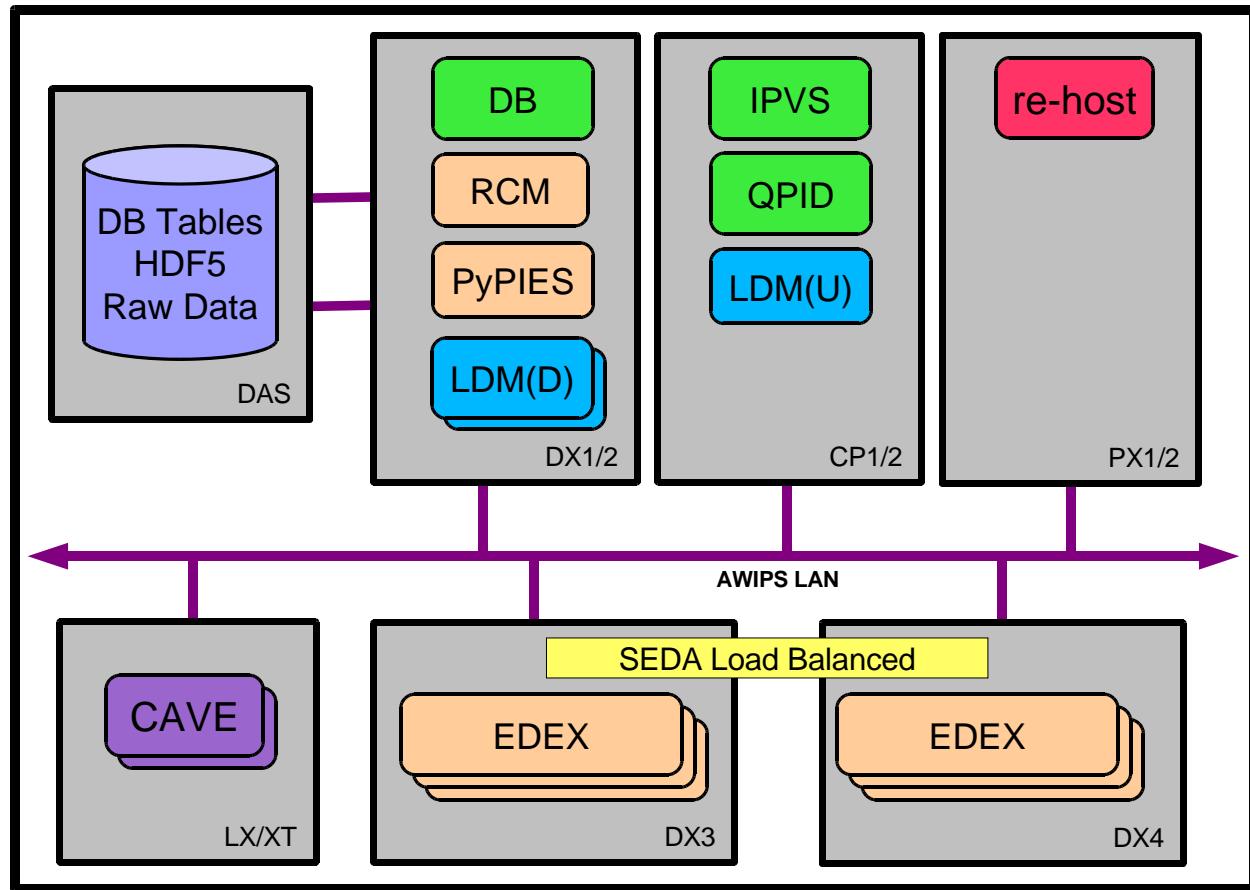


Exhibit 25.12-1. AWIPS II Software Deployment

As shown in Exhibit 25.12-1, the actual EDEX server software is installed on both DX3 and DX4. Please Note: For large memory servers³ an additional EDEX process, EDEX/DAT, is present. Additional software necessary for proper functionality of the EDEX is installed and runs on the DX1/2 cluster, the CP1/2 cluster and the PX1/2 cluster.

As Exhibit 25.12-1 implies, DX1/2 and PX1/2 are set up into heartbeat clusters; although the software is installed on both servers, it is running on only one server at a time in each cluster. IP aliasing is used to provide a single login to the active member of each cluster. In the case of CP1/2, no automatic failover currently exists. As a result, AWIPS II software normally runs on CP1; in the case of failover, references to CP1 should be changed to CP2.

25.12.1 AWIPS II/EDEX Software Dependencies

EDEX is designed to be a distributed processing system. This provides additional system stability by reducing the impact of individual server shutdowns. For example, since the

³ In this case, large memory means at least four gigabytes (GB) of onboard memory.

EDEX server software runs on both DX3 and DX4, it is possible to bump⁴ DX3 without completely interrupting data processing.

There are some dependencies among the various software systems, however. For example, the Apache Advanced Message Protocol Message Broker (QPID) service on the CP1/2 cluster must be running before any EDEX processes on DX3 or DX4 can be started. Exhibit 25.12.1-1 shows the dependencies among the EDEX software. Because EDEX is the same on both DX3 and DX4, it is shown as a single bubble in the dependency graph.

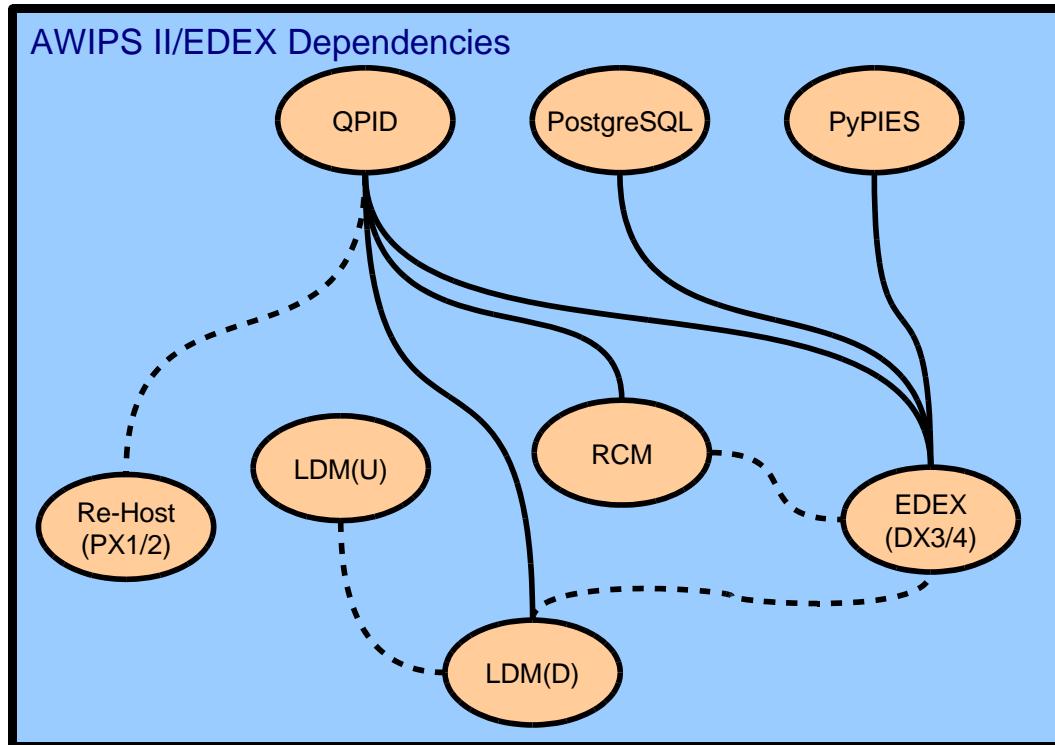


Exhibit 25.12.1-1. AWIPS II Server Software Dependencies

In Exhibit 25.12.1-1, operational dependencies are shown as lines between the bubbles representing processes. Two types of dependencies are identified: Hard⁵ dependencies are shown as solid lines; soft⁶ dependencies are shown as dotted lines. Dependencies run top to bottom; the upper of a pair of dependent processes must be running before the lower one can be started. Conversely, the lower of a pair of dependent processes should be stopped before the upper process may be stopped.

From Exhibit 25.12.1-1 we see that there is a dependency between EDEX (on DX3/4) and QPID. As a result, 1) QPID must be started before starting EDEX, and 2) EDEX

⁴ Shut down and restart.

⁵ In a hard dependency, a dependent process will not start if the other process is not running. Thus, EDEX (on DX3 or DX4) will not start unless QPID is running.

⁶ In a soft dependency, the dependent process does not require the other process to start, but the output of the dependent process may be lost. In this case, LDM(D) and RCM are data producers for which EDEX (on DX3 and DX4) is a data consumer; if EDEX is not running, the data provided by LDM(D) and RCM does not get processed and may be lost.

must be stopped before stopping QPID. The dependency between EDEX (on DX3/4) and RCM, however, is soft; EDX will start even if RCM has not been started, but will log communication errors related to RCM.

Also in Exhibit 25.12.1-1, note that no dependency exists between RCM and Local Data Manager (LDM); as a result, LDM and RCM may be started in any order.

NOTE: The LDM software actually runs on both the CP1/2 cluster and the DX1/2 cluster. The LDM on the CP1/2 cluster is designated LDM Upstream or LDM(U); the LDM on the DX1/2 cluster is designated LDM Downstream or LDM(D). Due to the design of the LDM software, LDM(U) and LDM(D) are independent with respect to startup/shutdown order. Note that LDM(D) will show errors if it cannot connect to LDM(U).

25.12.2 Starting AWIPS II/EDEX Software

Because of the previously discussed software dependencies within the EDEX system, the EDEX software should be started in a specific order. Please refer to Chapter 21 for complete system startup.

Refer to Exhibit 25.12.1-1 to determine software dependencies. What follows is the approved sequence for a full start of the EDEX software system. The standard procedure is to start LDM after EDEX is running on at least one of DX3 and DX4.

The approved steps to follow to perform a complete startup of the AWIPS II/ EDEX system, assuming no processes are running on any server, are:

1. Log into DX1.

Enter: **ssh root@dx1**

2. Start the DX1 high-availability package.

Enter: **hb_run a2dx1apps**

3. Start QPID

Start LDM, pulse, and QPID on CPSBN1. Then verify that they are accessible and that software is running. This is necessary because most processes have a dependency on QPID, but the processes running on the CPSBN do not depend on any other process or mount to function properly.

Note: If site with remote CPs, then power up px1 at this time and start up pulse and qpid as indicated below.

Connect to cpsbn1 via the System Console

Check to see if a2cp1apps is running.

Enter: **hb_stat**

Enter: **tail -f /var/log/cluster**

If the package fails to start after a few minutes, force the package start.

Enter: **hb_run a2cp1apps**

Check to see if LDM(U) software is running

Enter: **ps -fu ldm**

If the processes are NOT running, perform the following two steps:

Enter: **service ldmcp start**

Enter: **ps -fu ldm** [check for processes]

Enter: **ps -fu awips**

If QPID is not running, then perform the following two steps:

Enter: **service qpidd start**

Enter: **ps -fu awips** [check for qpidd]

Enter: **ps -wef|grep pulse**

If IPVS (pulse) is not running perform following two steps:

Enter: service pulse start

4. Start EDEX.

Enter: **ssh dx3 "service edex_camel start"**

Enter: **ssh dx4 "service edex_camel start"**

5. Start the PX1 high-availability package.

Enter: **ssh px1 "hb_run a2px1apps"**

6. Start the PX2 high-availability package.

Enter: **ssh px2 "hb_run a2px2apps"**

7. Start the DX2 high-availability package.

Enter: **ssh dx2 "hb_run a2dx2apps"**

NOTE: IPVS, which runs on the CP1/2 cluster, is part of the Red Hat Linux Kernel. As a result, it is automatically started when the CP servers are started.

25.12.3 Verifying Software Execution

Verifying EDEX software execution is accomplished by logging into each of the servers and running one or more commands. The output from these commands is then evaluated to determine if the expected software is running.

Because software dependencies are not critical in checking for software execution, the commands are grouped by server; this allows a minimum number of logins in the verification process.

The System V service scripts can be used to validate execution of some of the EDEX processes; in addition, the methods presented here use variations of a simple Linux *ps* command. Although these are shown as being performed by the root user, the *ps*-based commands can normally be executed by any user; the System V service scripts can only be run by the root user.

The basic steps to verify software execution are:

1. On DX1/2:

```
ssh root@dx1f
hb_stat
ps -ef | grep postmaster | grep -v grep | cut -b -80
service edex_postgres status
ps -ef | grep Radar | grep -v grep | cut -b -80
service edex_rcm status
ps -ef | grep httpd_pypes | grep -v grep | cut -b -80
ps -ef | grep logging | grep -v grep | cut -b -80
service httpd-pypes status
ssh root@dx2f
ps -ef | grep ldmd | grep -v grep | cut -b -80
```

2. On CP1/2:

```
ssh root@cpsbn1
ps -ef | grep ldmd | grep -v grep | cut -b -80
service ldmcp status
ps -ef | grep gpid | grep -v grep | cut -b -80
service awips2_gpid_cluster_status
ps -ef | grep pulse | grep -v grep | cut -b 80
```

3. On PX1/2:

```
ssh root@px2f
hb_stat
ps -fu fxa -u ldad
```

4. On DX3 and DX4:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
ssh root@dx4
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

NOTE: Each command is entered on a single line. Also note that these commands can be performed via remote login, *ssh*, from DX1.

When the EDEX server software is running, each of these commands will return one or more lines of output. The number of lines of output may vary depending on the number of instances of processes that are running. The expected number of lines of output for each command is shown in Table 25.12.3-1.

Table 25.12.3-1. Expected Output from *ps* Commands

Server	Command	Lines
DX1/2	ps -ef grep postmaster grep -v grep cut -b -80	1
	ps -ef grep Radar grep -v grep cut -b -80	1
	ps -ef grep httpd_pypies grep -v grep cut -b -80	> 1
	ps -ef grep logging grep -v grep cut -b -80	1
CP1/2	ps -ef grep ldmd grep -v grep cut -b -80	2
	ps -ef grep qpidd grep -v grep cut -b -80	1
PX1/2	ps -fu fxa -u ldad	> 1
DX3	ps -ef grep esb.Main grep -v grep cut -b -80	3 or 4
DX4	ps -ef grep esb.Main grep -v grep cut -b -80	3 or 4

NOTE: To determine the correct number of lines (three or four) to expect on DX3 and DX4, you need to check the installed memory on each server. If the amount of memory is greater than 4 GB, you should see four lines of output; otherwise you should see three lines of output.

In addition to the commands shown above, it may be desirable to check the various process log files to determine if the software has started.

25.12.4 Stopping EDEX Software

Because of the previously discussed software dependencies within the EDEX system, the EDEX software should be stopped in a specific order.

Refer to Exhibit 25.12.1-1 to determine software dependencies. The standard procedure is to stop LDM prior to stopping EDEX on DX3 and DX4.

NOTE: The PX1/2 and DX1/2 clusters both utilize high-availability packages to manage software. Because each high-availability package manages the virtual server name assigned to the package, you cannot use the virtual server name to log in when stopping the software. The correct procedure is:

Log into the server via the virtual server name.

Use *hostname* to determine the actual server name.

For the a2px1apps package, the command sequence is:

```
ssh px1f "hostname"
ssh xxx "hb_halt a2px1apps"
```

where *xxx* is the server name determined by the *hostname* command. Both these commands are normally executed from DX1 after logging in as the root user.

The approved steps to perform a complete shutdown of the EDEX system are:

1. Log into DX1.

Enter: **ssh root@dx1**

2. Stop LDM(U).

Enter: **ssh cpsbn1 "service ldmcp stop"**

Enter: **ssh cpsbn2 "service ldmcp stop"**

3. Stop the DX2 high-availability package.

Enter: **ssh dx2f "hostname"**

Enter: **ssh xxx "hb_halt a2dx2apps"**

4. Stop the PX2 high-availability package.

Enter: **ssh px2f "hostname"**

Enter: **ssh xxx "hb_halt a2px2apps"**

5. Stop the PX1 high-availability package.

Enter: **ssh px1f "hostname"**

Enter: **ssh xxx "hb_halt a2px1apps"**

6. Stop EDEX.

Enter: **ssh dx4 "service edex_camel stop"**

Enter: **ssh dx3 "service edex_camel stop"**

7. Stop the DX1 high-availability package.

Enter: **ssh dx1f "hostname"**

Enter: **ssh xxx "hb_halt a2dx1apps"**

8. Stop CPSBN1 high-availability package.

Enter: **ssh cp1f "hostname"**

Enter: **ssh xxx "hb_halt a2cp1apps"**

9. Stop QPID.

ssh cpsbn1 "service edex_qpid stop"

25.12.5 Verifying Software Shutdown

Verifying EDEX software shutdown is accomplished by logging into each of the servers and running one or more commands. The output from these commands is then evaluated to determine if the expected software has been stopped.

Because software dependencies are not critical in checking for software shutdown, the commands are grouped by server; this allows a minimum number of logins in the verification process.

The System V service scripts can be used to validate shutdown of some of the EDEX processes; in addition, the methods presented here use variations of a simple Linux *ps*

command. Although these are shown as being performed by the root user, the *ps*-based commands can normally be executed by any user; the System V service scripts can only be run by the root user.

The basic steps to verify successful software halt are:

1. On DX1/2:

```
ssh root@dx1
hb_stat
ps -ef | grep postmaster | grep -v grep | cut -b -80
service edex_postgres status
ps -ef | grep Radar | grep -v grep | cut -b -80
service edex_rcm status
ps -ef | grep httpd_pypes | grep -v grep | cut -b -80
ps -ef | grep logging | grep -v grep | cut -b -80
service httpd-pypes status
ssh root@dx2
ps -ef | grep ldm | grep -v grep | cut -b -80
```

2. On CP1/2:

```
ssh root@cpsbn1
ps -ef | grep ldm | grep -v grep | cut -b -80
service ldmcp status
ps -ef | grep qpidd | grep -v grep | cut -b -80
service qpidd status
ps -ef | grep pulse | grep -v grep | cut -b -80
service pulse status

ssh root@cpsbn2
ps -ef | grep ldm | grep -v grep | cut -b -80
service ldmcp status
ps -ef | grep qpidd | grep -v grep | cut -b -80
service qpidd status
ps -ef | grep pulse | grep -v grep | cut -b -80
service pulse status
```

3. On PX1/2:

```
ssh root@px1
ps -fu fxa -u ldad
hb_stat
ssh root@px2
ps -fu fxa -u ldad
hb_stat
```

4. On DX3 and DX4:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
ssh root@dx4
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

NOTE: Each command is entered on a single line. Also note that these commands can be performed via remote login, ssh, from DX1.

When the software has been successfully stopped, each of the listed *ps* commands will display no output and each *service* command will provide a “service not running” message; the exact wording will vary depending on the service.

In addition to the commands shown above, it may be desirable to check the various process log files to determine that the software stopped execution.

25.12.6 Alternative Shutdown Scenarios

In addition to the complete startup and shutdown processes, it may be desirable to perform a partial shutdown and restart of the EDEX systems. Although a number of partial shutdown/restart scenarios are possible, only three are considered here: restarting the EDEX services on DX3; restarting PostgreSQL on DX1/2; restarting QPID on CP1/2.

The general rule: *When stopping an EDEX system, all dependent systems must be stopped first.* With this rule in mind, the three scenarios are:

Scenario 1: Restarting the EDEX Services on DX3

We can stop and restart EDEX on DX3 without stopping and restarting the other EDEX system components. (Note that for CAVE to operate successfully, at least one EDEX request process must be running.)

The steps for this scenario are:

1. On DX3, stop EDEX services:

```
ssh root@dx3
service edex_camel stop
```

2. On DX3, verify software shutdown:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

3. On DX3, start EDEX services:

```
ssh root@dx3
service edex_camel start
```

4. On DX3, verify software execution:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

Scenario 1 may be used when it is necessary to modify EDEX configuration files. Because the EDEX services on DX3 and DX4 are independent, each can be stopped and restarted without affecting the rest of the system. Other EDEX system components are not affected.

NOTE: Both EDEX shutdown and restart can take some time. As a result, if EDEX has not shut down (Step 2), wait a short time and retry the test. The same is true for the startup.

Scenario 2: Restarting PostgreSQL on DX1/2

In Exhibit 25.12.1-1, we see that there are dependencies between PostgreSQL and the EDEX services on DX3 and DX4. As a result, the EDEX services on DX3 and DX4 should be stopped before stopping PostgreSQL.

The steps for this scenario are:

1. On DX3, stop EDEX services:

```
ssh root@dx3
service edex_camel stop
```

2. On DX3, verify software shutdown:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

3. On DX4, stop EDEX services:

```
ssh root@dx4
service edex_camel stop
```

4. On DX4, verify software shutdown:

```
ssh root@dx4
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

5. On DX1/2, stop PostgreSQL:

```
ssh root@dx1f
service edex_postgres stop
```

6. On DX1/2, verify software shutdown:

```
ssh root@dx1f
ps -ef | grep postmaster | grep -v grep | cut -b -80
service edex_postgres status
```

7. On DX1/2, start Postgresql:

```
ssh root@dx1f
service edex_postgres start
```

8. On DX1/2, verify software startup:

```
ssh root@dx1f
ps -ef | grep postmaster | grep -v grep | cut -b -80
service edex_postgres status
```

9. On DX3, start EDEX services:

```
ssh root@dx3
service edex_camel start
```

10. On DX3, verify software startup:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

11. On DX4, start EDEX services:

```
ssh root@dx4
service edex_camel start
```

12. On DX4, verify software startup:

```
ssh root@dx4
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service ede_camel status
```

NOTE: Refer to the previous discussion on validating system start and stop for information on interpreting the “verify” steps.

Scenario 2 may be followed when it is necessary to stop the database briefly; for example, to modify its configuration files, which require a software restart. Keep in mind that, although AWIPS II applications access the database via EDEX, local applications and other non-AWIPS II applications may access the database directly. Any applications that access the database should be shut down before performing a database restart.

NOTE: Scenario 2 assumes a short downtime (maximum of 10 to 15 minutes); for longer downtimes, you should also stop and restart LDM(D) and RCM.

Scenario 3: Restarting QPID on CP1/2

As seen in Exhibit 25.12.1-1, there are hard dependencies between QPID and EDEX (on both DX3 and DX4), LDM(D), and RCM. In fact, the only EDEX components that are independent of QPID are PostgreSQL and PyPIES. As a result, EDEX, LDM(D), and RCM must be stopped before stopping QPID. In addition, there are soft dependencies between EDEX (on both DX3 and DX4), LDM(D) and RCM. As a result, LDM(D) and RCM should be stopped before stopping EDEX.

The steps for this scenario are:

1. On DX1/2, stop LDM(D):

```
ssh ldm@dx2f
ldmadmin stop
```

2. On DX2, verify software shutdown:

```
ssh root@dx2f
ps -ef | grep ldm | grep -v grep | cut -b -80
```

3. On PX2, stop rehosted software:

```
ssh root@px2f "hostname"  
ssh root@xxx "hb_halt a2px2apps"
```

4. On PX2, verify software shutdown:

```
ssh root@xxx  
ps -fu fxa -u ldad
```

5. On DX1/2, stop RCM:

```
ssh root@dx1f  
service edex_rcm stop
```

6. On DX1/2, verify software shutdown:

```
ssh root@dx1f  
ps -ef | grep Radar | grep -v grep | cut -b -80  
service edex_rcm status
```

7. On DX3, stop EDEX services:

```
ssh root@dx3  
service edex_camel stop
```

8. On DX3, verify software shutdown:

```
ssh root@dx3  
ps -ef | grep esb.Main | grep -v grep | cut -b -80  
service edex_rcm status
```

9. On DX4, stop EDEX services:

```
ssh root@dx4  
service edex_camel stop
```

10. On DX4, verify software shutdown:

```
ssh root@dx4  
ps -ef | grep esb.Main | grep -v grep | cut -b -80  
service edex_rcm status
```

11. On CP1/2, stop QPID:

```
ssh root@cplf  
service qpidd stop
```

12. On CP1/2, verify software shutdown:

```
ssh root@cplf  
ps -ef | grep qpidd | grep -v grep | cut -b -80  
service qpidd status
```

13. On CP1/2, start QPID:

```
ssh root@cplf  
service qpidd start
```

14. On CP1/2, verify software startup:

```
ssh root@cp1f
ps -ef | grep qpidd | grep -v grep | cut -b -80
service qpidd status
```

15. On DX3, start EDEX services:

```
ssh root@dx3
service edex_camel start
```

16. On DX3, verify software startup:

```
ssh root@dx3
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

17. On DX4, start EDEX services:

```
ssh root@dx4
service edex_camel start
```

18. On DX4, verify software startup:

```
ssh root@dx4
ps -ef | grep esb.Main | grep -v grep | cut -b -80
service edex_camel status
```

19. On DX1/2, start RCM:

```
ssh root@dx1f
service edex_rcm start
```

20. On DX1/2, verify software startup:

```
ssh root@dx1f
ps -ef | grep Radar | grep -v grep | cut -b -80
service edex_rcm status
```

21. On PX2, start rehosted processes:

```
ssh root@px2 "hb_run a2px2apps"
```

22. On PX2, verify software start:

```
ssh root@px2 "hb_stat a2px2apps"
ssh root@px2 "ps -fu fxa -u ldad"
```

23. On DX1/2, start LDM(D):

```
ssh ldm@dx2f
ldmadmin start
```

24. On DX1/2, verify software startup:

```
ssh root@dx2f
ps -ef | grep ldm | grep -v grep | cut -b -80
```

25.13 Troubleshooting Basic AWIPS II Data Flow

This section is designed to “connect the dots,” the dots being the recipes presented in this Administration Guide. In doing so, the goal is to provide a series of steps to follow to diagnose data ingest problems. The data flow consists of a series of steps like links in a chain. The approach used here is to start at the point where the problem is detected and then search upstream until the broken link is found. Once that link is repaired, check the data flow and continue the search as needed. This can be represented as a flow chart. See Exhibit 25.13-1.

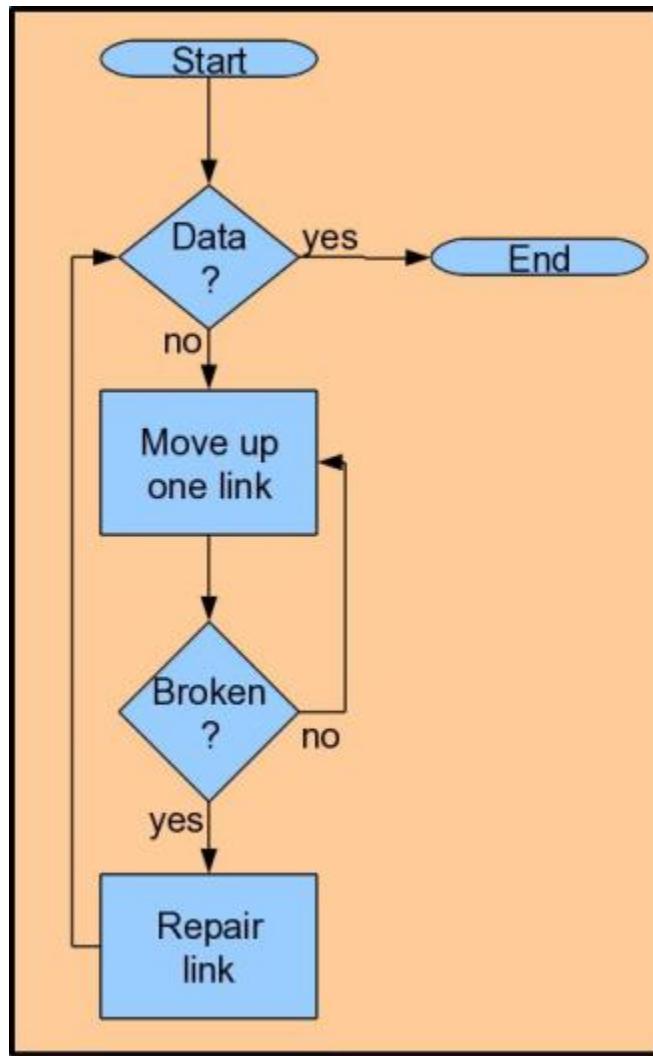


Exhibit 25.13-1. Basic Data Flow Troubleshooting

The next two recipes illustrate this basic approach to troubleshooting the data flow.

Example 25.13-1: Troubleshooting Satellite Data Flow

The basic flow of satellite data into AWIPS II was discussed under Section 25.3, [Basic Data Flow Concepts](#). Exhibit 25.13-1 traces data from the SBN to the EDEX ingest component. Missing from Exhibit 25.13-1, however, is the Data Store, which contains the

decoded data after it has been processed by the AWIPS Ingest processes. Exhibit 25.13-2 presents a more complete picture of the data flow from the SBN through EDEX to the Data Store. (The exhibit does not show the client application; it only shows the dataflow.)

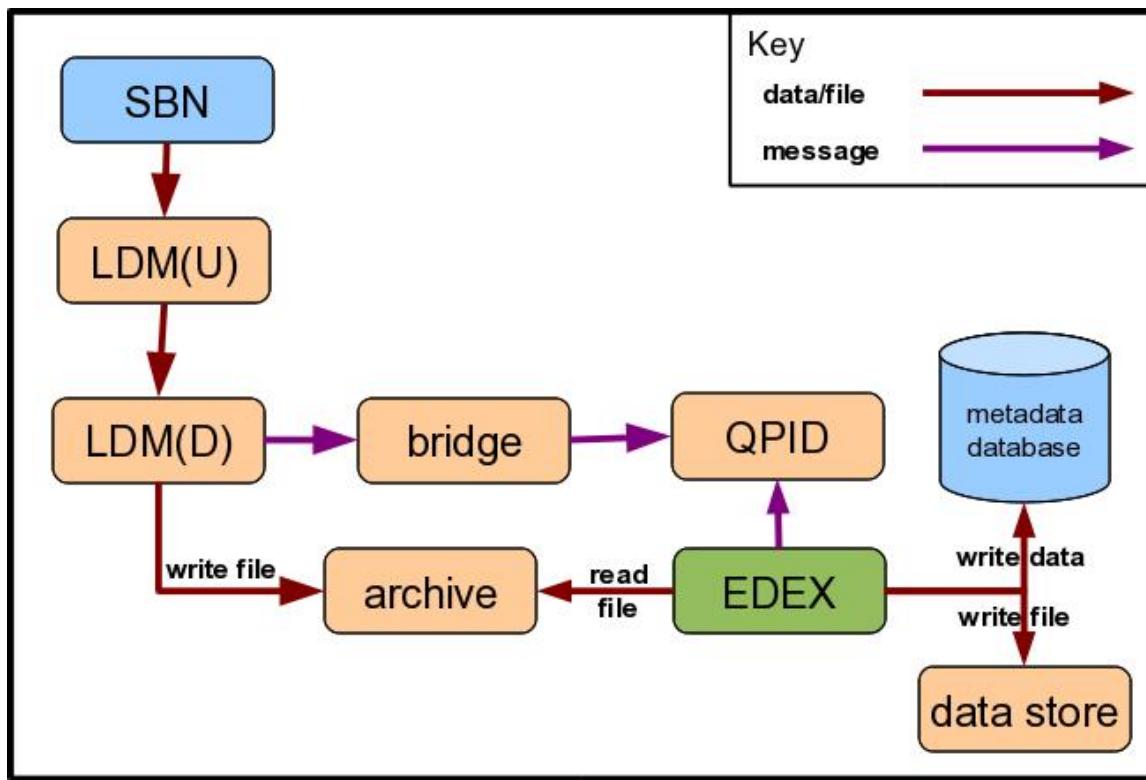


Exhibit 25.13-2. Expanded EDEX Data Flow

Suppose that CAVE is not displaying the satellite data. From Exhibit 25.13-2, we see that the place to start is at the metadata database and the data store and then work upstream. Follow the applicable examples in this chapter.

1. Verify that satellite data is available in the data store.
2. Verify that satellite metadata is available in the database.
3. Verify that satellite data is being ingested.
4. Verify that QPID satellite queue is current.
5. Verify that satellite data is being provided by the LDM.

Example 25.13-2: Troubleshooting Radar Data Flow

Radar data follows the same basic data flow as satellite data with one exception: radar data is available via the ORPG as well as the SBN. ORPG data is handled in AWIPS II by the Radar Server (RCM).

Suppose that CAVE is not displaying radar data. From Exhibit 25.13-2, we see that the place to start is at the metadata database and the data store and then work upstream. In

addition, the Radar Server must be checked, of course. Follow the applicable examples in this chapter.

1. Verify that radar data is available in the data store.
2. Verify that radar metadata is available in the database.
3. Verify that radar data is being ingested.
4. Verify that QPID radar queue is current.
5. Verify that radar data is being provided by LDM.
6. Verify that radar data is being provided by RCM.

25.14 Additional Resources

AWIPS II Site Data Configuration & Localization: Step-By-Step Guide (aka “Localization Document”), AWP.DOC.TOSCAT.LOC-06.00.

Appendix A

Abbreviations and Acronyms

μ Engine

MicroEngine

A

AAP	Alert Adaptation Parameter
ACARS	Aircraft Communications Addressing and Reporting System
ACN	AWIPS Communications Network
ACT	Attribute Color Threshold
ADAPPT	AWIPS Decision Assistance Production Preparation Tools
ADE	AWIPS Development Environment
AFD	Area Forecast Discussion
AFOS	Automation of Field Operations and Services
AGMG	AWIPS GIS Mapping Group
AHPS	Advanced Hydrologic Prediction Service
ALERT	automated local evaluation in real time
AM	Alert Message
AMQP	Advanced Message Queuing Protocol
ANCF	AWIPS Network Control Facility (Silver Spring, MD)
ANSI	American National Standards Institute
ANT	Another Neat Tool, a Java-oriented “build” tool
API	application program interface
APS	Asynchronous Product Scheduler
ASCII	American Standard Code for Information Interchange
ASOS	Automated Surface Observing System
AVN	Aviation model
AvnFPS	Aviation Forecast Preparation System
AWC	Aviation Weather Center
AWIPS	Advanced Weather Interactive Processing System
AX	Archive Server

B

BBS	Bulletin Board Service
BMGS	Backup Master Ground Station
BNCF	Backup NCF (Fairmont, West Virginia)
BSD	Berkeley Software Distribution
BUFR	Binary Universal Form for data Representation

C

CAVE	Common AWIPS Visualization Environment
CCF	NWS Central Collection Facility

CDD	cooling degree days
CFC	Clutter Filter Control
CGI	Common Gateway Interface
CLI	command line interface
CM	Configuration Management
CO	Communications Server
COMT	COMET (WFO Configuration)
CONUS	conterminous United States
COOP	Continuity of Operations Planning
COTS	commercial off-the-shelf
CP	communications processor
CPSBN	Communications Processor - Satellite Broadcast Network
CPU	central processing unit
CPSYNC	Synchronous Communication Processor
CRS	Console Replacement System
CS	Call System
CSCI	Computer Software Configuration Item
CSU	channel service unit
CSVText	Comma Separated Values Text
CWA	county warning area
CWSU	Center Weather Service Unit
CY	calendar year
CZ	Composite Reflectivity
CZC	Composite Reflectivity Contour

D

D2D	Display 2-Dimensional
DAT	digital audiotape
DBMS	database management system
DCP	Data Collection Platform
DDR	Double Data Rate
DGEX	Downscaled GFS and Eta Extension Grids
DHR	Digital Hybrid Scan Reflectivity
DMD	Digital Mesocyclone Display
DMS	Data Monitoring System
dpi	dots per inch
DS	HP-UX Data Server
DSM	Daily Summary Message
DSU	digital service unit
DTG	Date Time Group

DTMF	dual tone multifrequency
DTS	dedicated transmission service
DVB	Digital Video Broadcast
DVD	Digital Video Display
DVD-R	Digital Video Display (Read Only)
DX	Linux Data Server

E

ECMWF	European Centre for Medium-Range Weather Forecasts
EDEX	Environmental Data EXchange
EET	Extreme Echo Tops
EHB	Engineering Handbook
EIA	Electronics Industry Association
EMDS	Emergency Manager Decision Support
EMDS	Emergency Managers Dissemination Service
EMM	Enclosure Management Module
EMRS	Engineering Management Reporting System
ENP	Eastern North Pacific
EOF	end of file
EOR	end of report
EPSS	Enhanced Packet-Switched Service (an FTS2000 service)
ERA	Embedded Remote Access
ERL	Environmental Research Laboratory
ESA	electronic systems analyst
ESRL	Earth System Research Laboratory
ET	echo top
ETC	echo top contour

F

FAA	Federal Aviation Administration
FAC	File Access Controller
FC	Fibre Channel
FDDI	Fiber Distributed Data Interface
FDMA	Frequency Division Multiple Access
FFMP	Flash Flood Monitoring and Prediction
FFG	Flash Flood Guidance
FFFG	Forced Flash Flood Guidance
FFT	Flash Flood Threat Index
FFW	Flash Flood Warning

FMH	Federal Meteorological Handbook
FOSS	Free and Open Source software
FR	frame relay
FSI	Four-dimensional Stormcell Investigator
FSL	Forecast Systems Laboratory
FSR	Field Site Representative
FTM	Free Text Message

G

GB	gigabyte
GELT	Geographic Entity Lookup Table
GFE	Graphical Forecast Editor
GFS	Global Forecast System
GHz	Gigahertz
GIF	Graphics Interchange Format
GINI	GOES Ingest NOAAPORT Interface
GIS	Geographic Information Systems
GMT	Greenwich Mean Time
GOES	Geostationary Operational Environmental Satellite
GRE	Generic Routing Encapsulation
GRIB	gridded binary (data format)
GSD	Global Systems Division
GSI	Globecomm Systems Inc.
GSM	general status message
GUARDIAN	General User Alert Display Panel
GUI	graphical user interface
GWW	Global Wind and Wave

H

HDD	Hard Disk Drive
HDLC	High-Level Data Link Control
HDF	Hierarchical Data Format
HDW	High Density Winds
HDSS	Hierarchical Data Storage System
HFS	Hierarchical File System
HFS	Hydrologic Forecast System
HP	Hewlett-Packard
HPC	Hydrometeorological Prediction Center
HPE	High-resolution Precipitation Estimator

HRAP	Hydrologic Rainfall Analysis Project
HSR	Hybrid Scan Reflectivity
HWO	Hazardous Weather Outlook (replaces or augments the SPS)
HWR	Hourly Weather Roundup

I

I/O	input/output
ICAO	International Civil Aviation Organization
ICP	Intelligent Communications Processor
ICWF	Interactive Computer Worded Forecast
IDE	Integrated Development Environment
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IFL	interfacility link
IFLOWS	Integrated Flood Observing and Warning System
IFPS	Interactive Forecast Preparation System
IGC	Inter-Gateway Communication
IHFS	Integrated Hydrologic Forecast System
IMET	Incident METeorologist
IP	Internet Protocol
IPC	Interprocess Communication
IPVS	IP Virtual Server
ISDN	Integrated Services Digital Network
ISS	Incident Support Specialist
IT/O	HP OpenView Operations (old acronym)
IV&V	Independent Verification and Validation

J

JAI	Java Advanced Imaging
JMS	Java Messaging System
JRE	Java Runtime Environment
JSO	Java Serialized Object
JVM	Java Virtual Machine

L

LAC	Listening Area Code
LAMP	Local AWIPS MOS Program
LAN	Local Area Network
LAPD	Link Access Procedure-D
LAPS	Local Analysis and Prediction System

LARC	local automatic remote collector
LCD	Liquid Crystal Display
LDAD	local data acquisition and dissemination
LDM	Local Data Manager
LED	light-emitting diode
LDM(D)	Local Data Manager (Downstream)
LIIT	Long Island International Teleport
LNB	low-noise block
LS	LDAD server
LST	local standard time
LTO	Linear Tape Open (a technology)
LV	logical volume
LX	Linux workstation

M

mb	millibar
MB	megabyte
MDL	Meteorological Development Laboratory (formerly TDL)
MDP	Mesocyclone Display Parameters
METAR	Aviation Routine Weather Report
MGS	Master Ground Station
MHS	Message Handling System
MicroART	Microcomputer Automated Radio Theodolite
MIDDS	Meteorological Interactive Data Display System
MIPS	million instructions per second
MOS	model output statistics
MPE	Multisensor Precipitation Estimator
MPLS	Multi-Protocol Label Switching
MSAS	MAPS Surface Analysis System
MSM	Monthly Summary Message
MTA	Message Transfer Agent
MTP	multipoint-to-point
MTSATHDW	Japanese High Density Winds from MTSAT

N

NAS	Network Attached Storage
NAT	Network Address Translation
NC	National Center
NCDC	National Climatic Data Center

NCEP	National Centers for Environmental Prediction
NCF	Network Control Facility
NCWF	National Convective Weather Forecast
NDFD	National Digital Forecast Database
NDM	National Data Sets Maintenance
NESDIS	National Environmental Satellite, Data, and Information Service
netCDF	network common data format
NFS	network file system
NGM	Nested Grid Model
NH	Northern Hemisphere
NIS	Network Information Services
NIST	National Institute of Standards and Technology
NLDN	National Lightning Detection Network
NMT	National Weather Service Modernization and Test Integration System (a place, like NCF)
NOAA	National Oceanic and Atmospheric Administration
NOAAPORT	A broadband communications system designed to distribute information products produced or gathered by NOAA organizations
NOC	Network Operations Center
NOGAPS	Navy Operational Global Atmospheric Prediction System
NOHRSC	National Operational Hydrologic Remote Sensing Center
NRC	National Reconditioning Center
NRP	NOAAPORT Receive Processor
NRS	NOAAPORT Receive System
NSM	Netscreen Security Manager
NTP	Network Time Protocol
NUSM	NEXRAD Unit Status Message
NWR	NOAA Weather Radio
NWRE	NOAA Weather Radio Editor
NWRS	NOAA Weather Radio Service
NWRWAVES	NOAA Weather Radio With All-Hazards VTEC Enhanced Software
NWS	National Weather Service
NWSRFS	NWS River Forecast System
NWSTG	NWS Telecommunications Gateway
NWWS	NOAA Weather Wire Service

O

OAR	Oceanic and Atmospheric Research
OB	Operational Build
ODS	Online Dynamic Server

OH	Office of Hydrology
OHD	Office of Hydrologic Development
OM	Office of Meteorology
ORDA	Open Radar Data Acquisition
ORPG	Open Radar Product Generator
OS	operating system
OS	operational site
OSF	Open Software Foundation
OSFW	NEXRAD Operational Support Facility (WFO)
OT&E	operational testing and evaluation
OTR	one-time request
OUP	Official User Product
OVO	OpenView Operations (replaced IT/O)

P

PA	Project Authorization
PC	Personal Computer
PID	process identification
PIL	product inventory list
POES	Polar Orbiting Environmental Satellite
PPI	planned product improvement; plan position indicator
PPID	Parent Data Controller ID
ppm	pages per minute
PRR	Product Request Response
PSS	packet-switching service
PTL	Product List
PTM	point-to-multipoint
PTSU	Pacific Tsunami Warning Center
PTP	point-to-point
PUP	principal user processor
PV	PowerVault
PVC	permanent virtual circuit
PX	Linux Preprocessor
PYRO	Python Remote Objects

Q

QC	quality control
QCMS	Quality Control and Monitoring System
QPE	Quantitative Precipitation Estimate

QPF	Quantitative Precipitation Forecast
QPID	Queue Processor Interface Daemon
QuikSCAT	NASA's Quick Scatterometer
R	
RAID	Redundant Array of Independent Disks
RAM	random access memory
RAMOS	Remote Automatic Meteorological Observing System
RAP	Rapid Alpha Prototype
RAX	RFC Archive Server
RCM	radar-coded message
RCM	Radar Configuration Manager
RCP	Rich Client Platform
RDA	radar data acquisition
RDBMS	relational database management system
REP	River Ensemble Processor
RFC	River Forecast Center
RFC GW	RFC Gateway
RGG	Red Green Blue
RH	relative humidity
RHQ	Regional Headquarters
RMI	Remote Method Invocation
RISC	reduced instruction set computer (workstation)
RMR	radar multiple request
ROC	WSR-88D Radar Operations Center
ROSA	remote observing system automation
RP	REP CPU
RPG	radar product generator
RPS	routine product set
RRS	Radiosonde Replacement System
RTGSST	Real Time High Resolution Global Sea Surface Temperature grids
RUC	Rapid Update Cycle (model)
S	
SAFESEAS	System on AWIPS for Forecasting and Evaluation of Seas and Lakes
SAM	System Administration Manager
SBN	Satellite Broadcast Network
SBP	Satellite Broadcast Processor
SCAN	System for Convection Analysis and Nowcasting

SCD	Supplementary Climate Data
SCID	Storm Cell Identification Display
SCP	Satellite Cloud Product
SCSI	small computer system interface
SCTI	SCAN Convective Threat Index
SDK	Software Developers Kit
SDRAM	Synchronous Dynamic Random Access Memory
SDS	software disk striping; switched data service
SEC	Systems Engineering Center
SEDA	Serial Event Driven Architecture
SFMG	Spaceflight Meteorology Group's (SMG) WFO system identifier
SGS	Site Ground Station
SHEF	Standard Hydrometeorological Exchange Format
SMM	AWIPS System Manager's Manual
SLDFD	site-level data flow diagram
SNMP	Simple Network Management Protocol
SNOW	System for Nowcasting of Winter Weather
SOA	Service Oriented Architecture
SPG	Supplemental Product Generator
SPS	Special Weather Statement
SSH	secure shell
SSMI (/I)	Special Sensor Microwave Imager (both SSMI and SSM/I are used but SSM/I is correct)
SST	sea surface temperature
SST	Site Support Team
STD	season to date
STI	Storm Track Information
SVS	switched voice service
SW	Sky Weather
SW	spectrum width/software
SWP	Severe WX Problem

T

TAF	Terminal Aerodrome Forecast (international code)
TB	terabyte
TC	temperatures in degrees Celsius
Tcl	tool command language
TCP	Transport Control Protocol
TDWR	Terminal Doppler Weather Radar
TF	temperature in degrees Fahrenheit

THP	Total Hourly Precipitation
TIU	terminal interface unit
Tk	tool kit
TPG	Toy Parser Generator
TVS	Tornadic Vortex Signature
TWEB	Transcribed Weather Enroute Broadcast

U

UAM	User Alert Message
UGC	universal geographic code
UI	User Interface
UID	user ID number
ULR	User Selectable Reflectivity
URI	Uniform Resource Identifier
URL	Universal Resource Locator
USP	User Select Precipitation
UTC	Universal Time Coordinated
UW	u-component of wind

V

V	Velocity
VCP	Volume Coverage Pattern
VIL	Vertically Integrated Liquid
VIR	visible infrared
VRP	Voice-Ready Product
VSAT	Very Small Aperture Terminal

W

WAN	wide area network
WAX	WFO Archive Server
WBC	Watch By County
WCL	Watch County List
WCN	Weather Watch County Notification
WES	Weather Event Simulator
WFO	Weather Forecast Office
WIN32	Common 32-bit Microsoft Windows Platform
WMO	World Meteorological Organization (UN)
WOU	Watch Outline Update Message
WSO	Weather Service Office

WSR	Weather Surveillance Radar
WSR-88D	WSR-1988 Doppler Weather Radar
WWV	time-signal broadcast call letters
WW3	WAVEWATCH III

X, Y, Z

XML	eXtensible Markup Language
-----	----------------------------

YTD	Year to Date
-----	--------------

YUM	Yellowdog Updater Modified
-----	----------------------------

Appendix B

Decoding and Storage Data Flow Exhibits

Appendix B. Decoding and Storage Data Flow Exhibits

Table of Contents

	<i>Page</i>
B.0 Introduction.....	1
B.1 AWIPS Data Flow Diagrams.....	1

List of Exhibits

Exhibit B.1-1. AWIPS II Servers Overview	4
Exhibit B.1-2. SBN Data Flow	5
Exhibit B.1-3. Acquire and Ingest of Satellite Products.....	6
Exhibit B.1-4. Acquire and Ingest of NWSTG Products.....	7
Exhibit B.1-5. Acquire and Ingest of Radar Products	8
Exhibit B.1-6. Acquire and Ingest of Asynchronous Products.....	9
Exhibit B.1-7. Acquire and Ingest of Lightning Products	10
Exhibit B.1-8. Acquire and Ingest of METAR Products	11
Exhibit B.1-9. Acquire and Ingest of MOS Products	12
Exhibit B.1-10. Acquire and Ingest of BUFR Products.....	13
Exhibit B.1-11. Acquire and Ingest of Synoptic Products.....	14
Exhibit B.1-12. Acquire and Ingest of SSM/I Products.....	15
Exhibit B.1-13. Generic Acquire and Decode LDAD Product (Page 1 of 2)	16
Exhibit B.1-13. Generic Acquire and Decode LDAD Product (Page 2 of 2)	17
Exhibit B.1-15. Decode LARC/Handar 555 Data (for LDAD) (Page 1 of 2)	19
Exhibit B.1-15. Decode LARC/Handar 555 Data (for LDAD) (Page 2 of 2)	20
Exhibit B.1-16. Acquire Campbell Data (for LDAD)	21
Exhibit B.1-17. Decode Campbell Data (for LDAD) (Page 1 of 2)	22
Exhibit B.1-17. Decode Campbell Data (for LDAD) (Page 2 of 2)	23
Exhibit B.1-19. Decode Sutron Data (for LDAD) (Page 1 of 2)	25
Exhibit B.1-19. Decode Sutron Data (for LDAD) (Page 2 of 2)	26
Exhibit B.1-20. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD) (Page 1 of 2).....	27
Exhibit B.1-20. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD) (Page 2 of 2).....	28
Exhibit B.1-21. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 1 of 2)	29
Exhibit B.1-21. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 2 of 2)	30
Exhibit B.1-22. Decode Alaska Profiler Data.....	31

Exhibit B.1-23. Acquire and Process RRS Data (for LDAD) (Page 1 of 2).....	32
Exhibit B.1-23. Acquire and Process RRS Data (for LDAD) (Page 2 of 2).....	33
Exhibit B.1-24. Climatological Reports Formatter for NWR and NWWS (Daily).....	34
Exhibit B.1-25. Climatological Reports Formatter for NWR and NWWS (Monthly/Seasonal/Annual).....	35
Exhibit B.1-26. Record Climate Data Flow.....	36
Exhibit B.1-27. Hourly Weather Roundup Formatter for NOAA Weather Wire Service.....	37
Exhibit B.1-28. Hourly Weather Roundup Formatter for NOAA Weather Radio	38

List of Tables

Table B.1-1. AWIPS Data Flow Diagrams.....	2
Table B.1-2. AWIPS Data Flow Diagrams by Location	3

B.0 *Introduction*

This section is composed of a series of exhibits that depict a high-level process and data flow from ingest through the routers to the data controllers and to the appropriate decoder. Graphic conventions used in the exhibits are as follows:

- Processes are shown in boxes.
- Servers are shown in shadowed boxes and are labeled as:
 - “CP” for communications processor;
 - “LS” for the LDAD Server, “DX1” for Linux Data Server 1;
 - “DX2” for Linux Data Server 2;
 - “DX3” for Linux Data Server 3;
 - “DX4” for Linux Data Server 4;
 - “PX1” for Linux Preprocessor 1;
 - “PX2” for Linux Preprocessor 2; or
 - “WAX” for WFO Archive Server and RAX for RFC Archive Server.
- The arrows depict primary data flow.

Log files are depicted on the server where the logging process resides. Generated data files and accessed configuration files are all depicted. All files are shown with a full relative path designation.

B.1 *AWIPS Data Flow Diagrams*

Most of the exhibits included in Appendix B also appear in the body of the System Manager’s Manual. Table B.1-1 cross-references the data flow diagrams in this appendix to their locations in the body of the document.

Table B.1-1. AWIPS Data Flow Diagrams

Appendix B Exhibit No.	Title	Chapter Exhibit No.
B.1-1	AWIPS II Servers Overview	4.4-1
B.1-2	SBN Data Flow	4.4-2
B.1-3	Acquire and Ingest of Satellite Products	5.1.1-1
B.1-4	Acquire and Ingest of NWSTG Products	6.3.3-1
B.1-5	Acquire and Ingest of Radar Products	7.1-1
B.1-6	Acquire and Ingest of Asynchronous Products	10.3-1
B.1-7	Acquire and Ingest of Lightning Products	6.4-1
B.1-8	Acquire and Ingest of METAR Products	6.5-1
B.1-9	Acquire and Ingest of MOS Products	6.6-1
B.1-10	Acquire and Ingest of BUFR Products	6.7-1
B.1-11	Acquire and Ingest of Synoptic Products	6.8-1
B.1-12	Acquire and Ingest of SSM/I Products	6.9-1
B.1-13	Generic Acquire and Decode LDAD Product	8.3.1-1
B.1-14	Acquire LARC/Handar 555 Data (for LDAD)	8.7-1
B.1-15	Decode LARC/Handar 555 Data (for LDAD)	8.8-1
B.1-16	Acquire Campbell Data (for LDAD)	8.9-1
B.1-17	Decode Campbell Data (for LDAD)	8.10-1
B.1-18	Acquire Sutron Data (for LDAD)	8.11-1
B.1-19	Decode Sutron Data (for LDAD)	8.12-1
B.1-20	Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD)	8.13-1
B.1-21	Acquire and Process ASOS/MicroART Data (for LDAD)	8.14-1
B.1-22	Decode Alaska Profiler Data	8.16-1
B.1-23	Acquire and Process RRS Data (for LDAD)	8.17-1
B.1-24	Climatological Reports Formatter for NWR and NWWS (Daily)	9.1.3-1
B.1-25	Climatological Reports Formatter for NWR and NWWS (Monthly/Seasonal/Annual)	9.1.3-2
B.1-26	Record Climate Data Flow	9.2.2-1
B.1-27	Hourly Weather Roundup Formatter for NOAA Weather Wire Service	9.3.2-1
B.1-28	Hourly Weather Roundup Formatter for NOAA Weather Radio	9.4.2-1

Table B.1-2 provides an inverse mapping to Table B.1-1, listing the data flow diagrams by their locations in the body of the System Manager's Manual and cross-referencing them to their locations in Appendix B.

Table B.1-2. AWIPS Data Flow Diagrams by Location

Chapter Exhibit No.	Title	Appendix B Exhibit No.
4.4-1	AWIPS II Servers Overview	B.1-1
4.4-2	SBN Data Flow	B.1-2
5.1-2	Acquire and Ingest of Satellite Products	B.1-3
6.3.3-1	Acquire and Ingest of NWSTG Products	B.1-4
7.1-1	Acquire and Ingest of Radar Products	B.1-5
10.3-1	Acquire and Ingest of Asynchronous Products	B.1-6
6.4-1	Acquire and Ingest of Lightning Products	B.1-7
6.5-1	Acquire and Ingest of METAR Products	B.1-8
6.6-1	Acquire and Ingest of MOS Products	B.1-9
6.7-1	Acquire and Ingest of BUFR Products	B.1-10
6.8-1	Acquire and Ingest of Synoptic Products	B.1-11
6.9-1	Acquire and Ingest of SSM/I Products	B.1-12
8.3.1-1	Generic Acquire and Decode LDAD Product	B.1-13
8.7-1	Acquire LARC/Handar 555 Data (for LDAD)	B.1-14
8.8-1	Decode LARC/Handar 555 Data (for LDAD)	B.1-15
8.9-1	Acquire Campbell Data (for LDAD)	B.1-16
8.10-1	Decode Campbell Data (for LDAD)	B.1-17
8.11-1	Acquire Sutron Data (for LDAD)	B.1-18
8.12-1	Decode Sutron Data (for LDAD)	B.1-19
8.13-1	Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD)	B.1-20
8.14-1	Acquire and Process ASOS/MicroART Data (for LDAD)	B.1-21
8.16-1	Decode Alaska Profiler Data	B.1-22
8.17-1	Acquire and Process RRS Data (for LDAD)	B.1-23
9.1.3-1	Climatological Reports Formatter for NWR and NWWS (Daily)	B.1-24
9.1.3-2	Climatological Reports Formatter for NWR and NWWS (Monthly/Seasonal/Annual)	B.1-25
9.2.2-1	Record Climate Data Flow	B.1-26
9.3.2-1	Hourly Weather Roundup Formatter for NOAA Weather Wire Service	B.1-27
9.4.2-1	Hourly Weather Roundup Formatter for NOAA Weather Radio	B.1-28

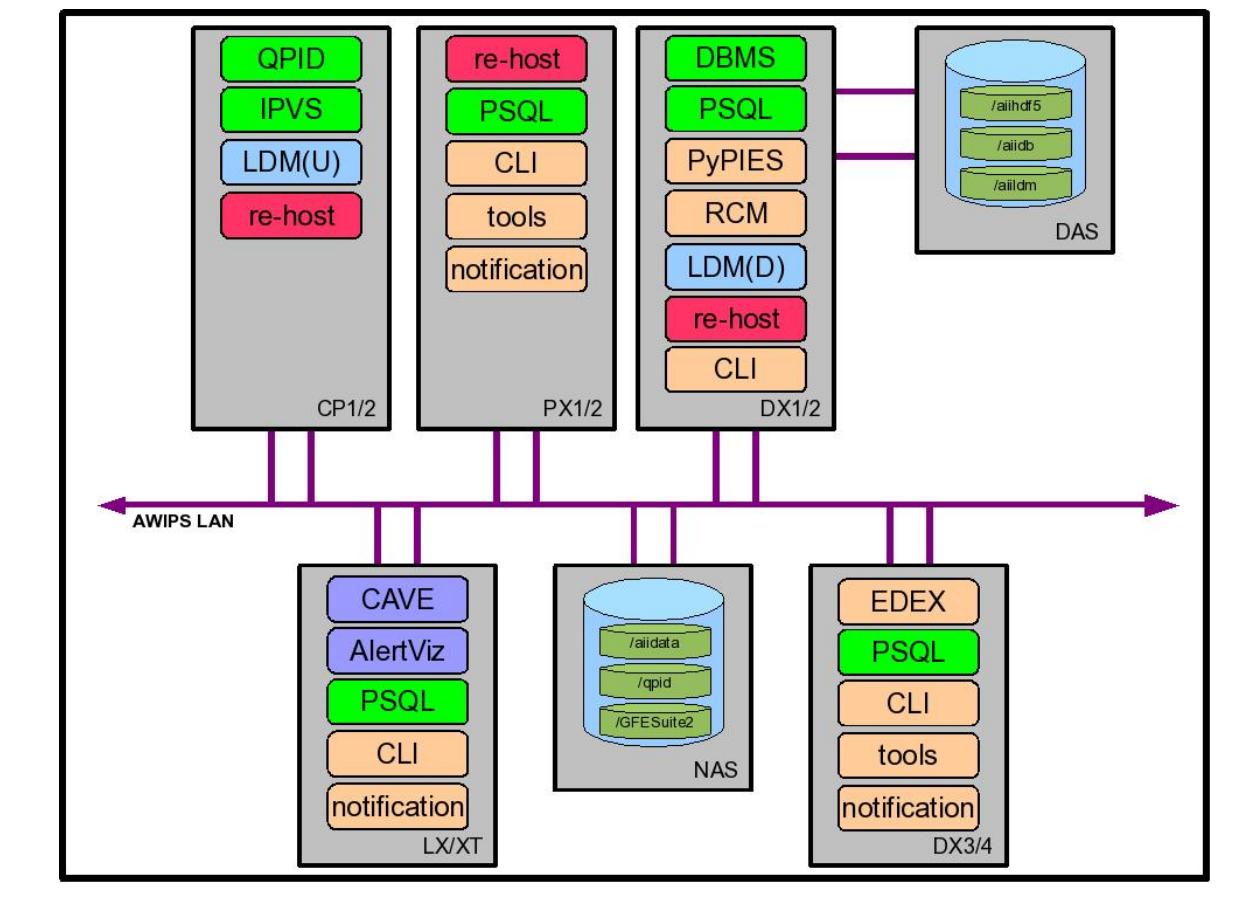


Exhibit B.1-1. AWIPS II Servers Overview

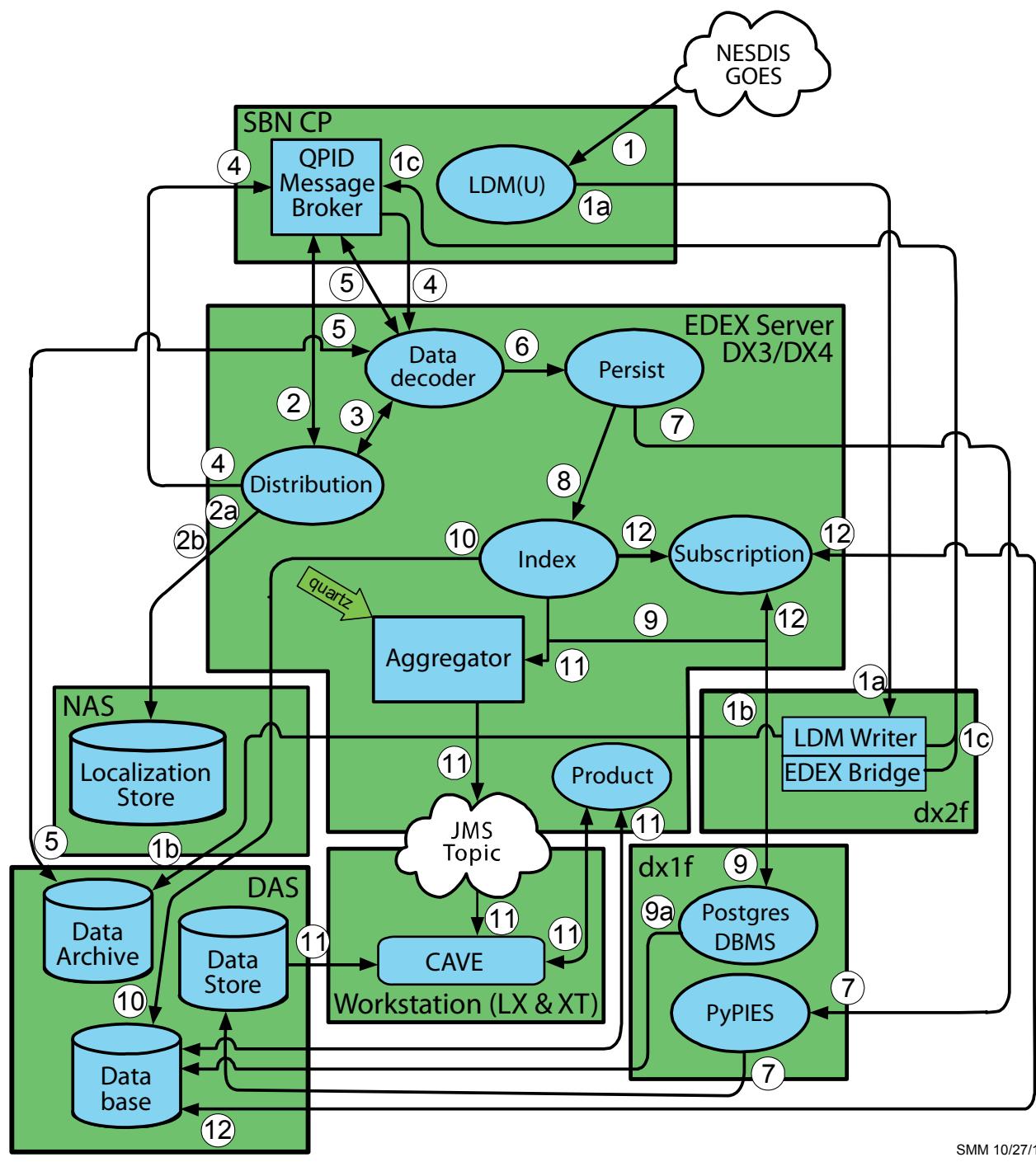


Exhibit B.1-2. SBN Data Flow

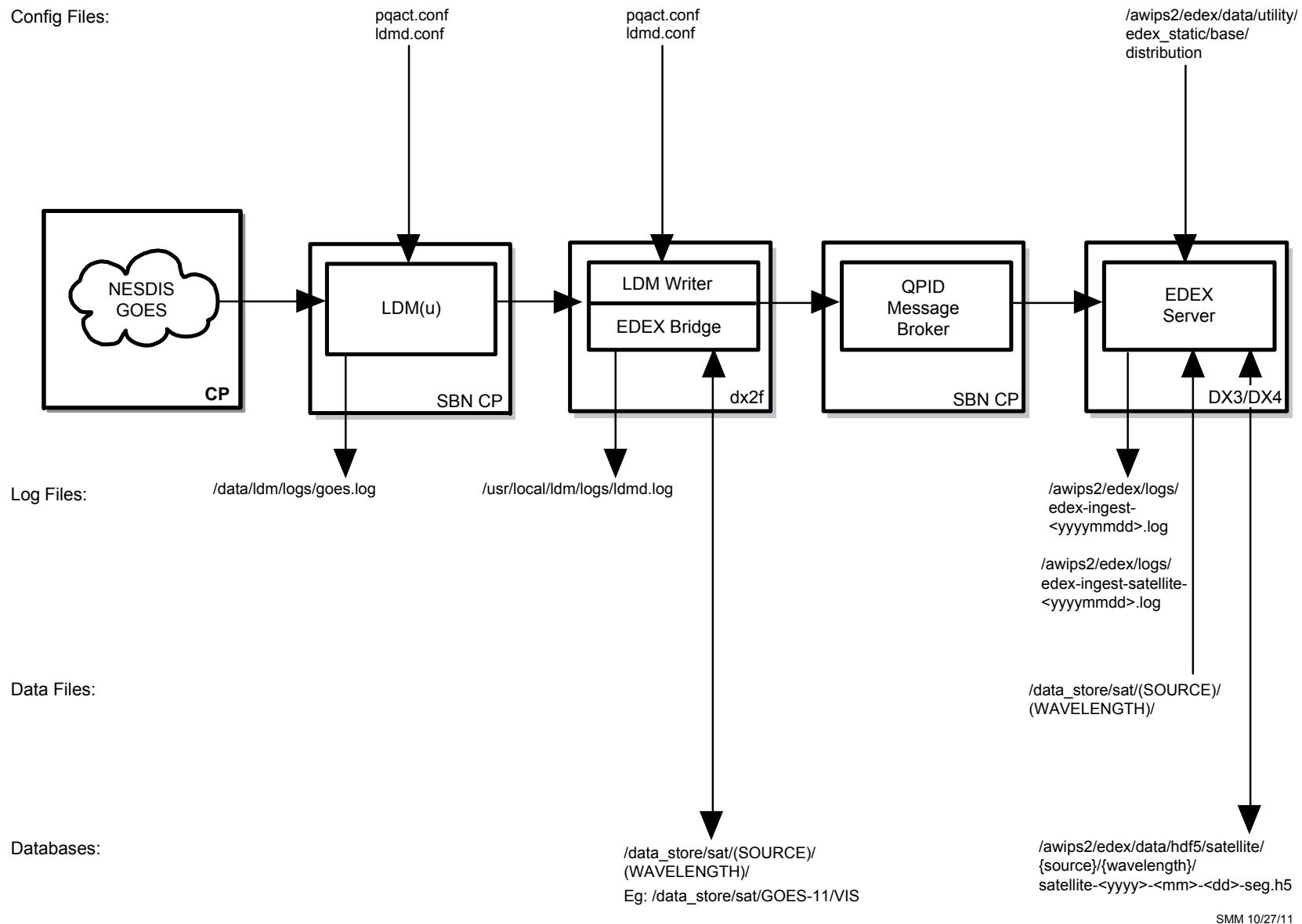
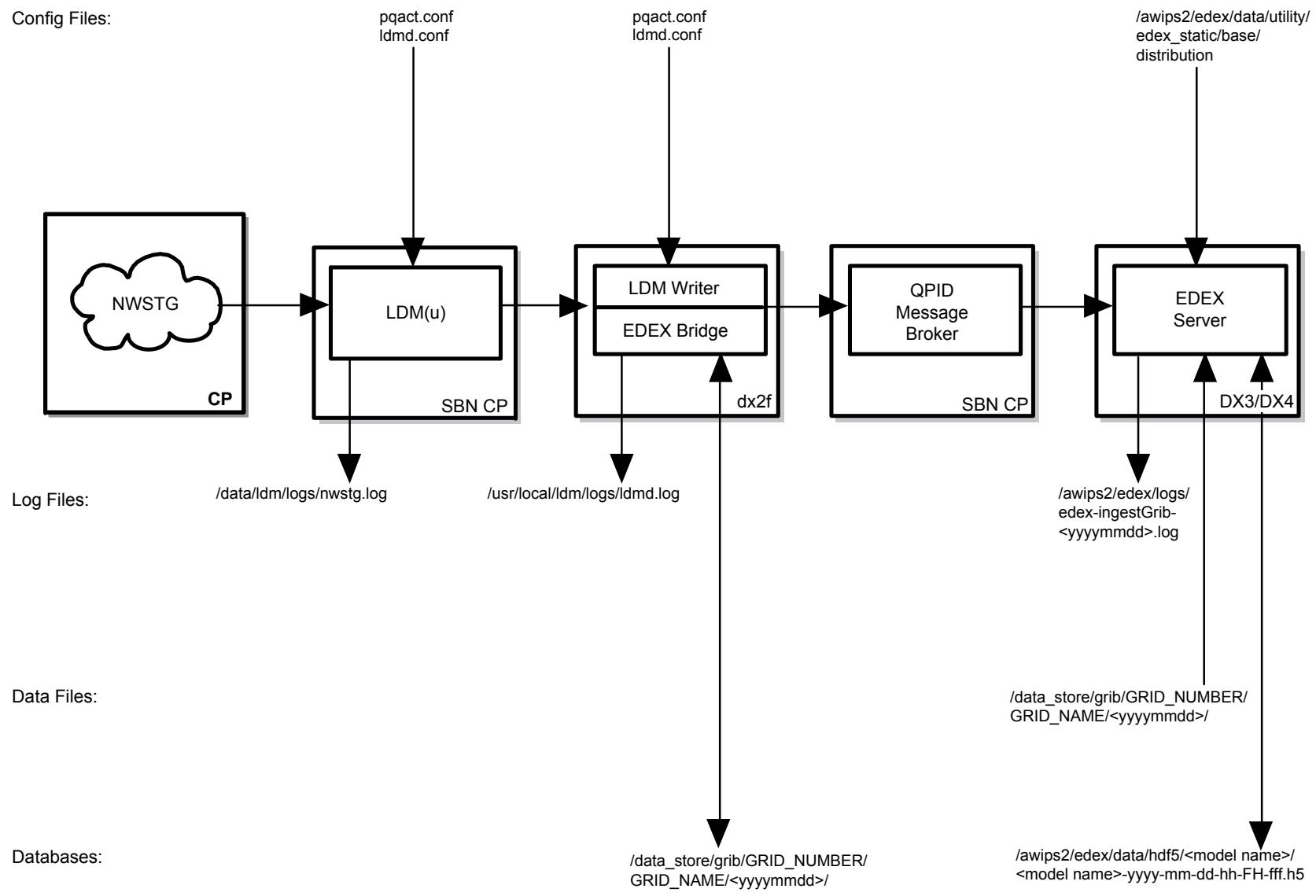
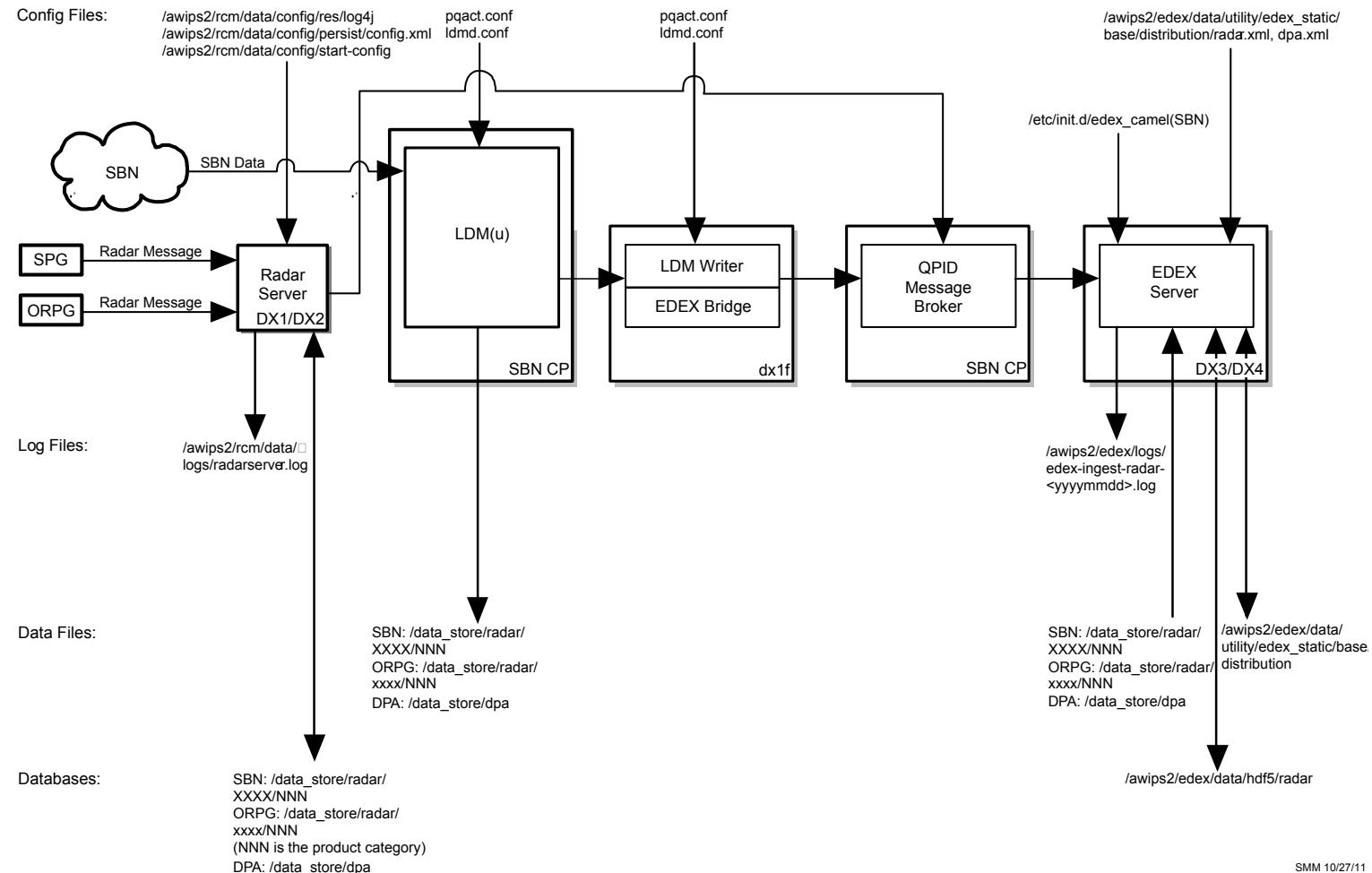


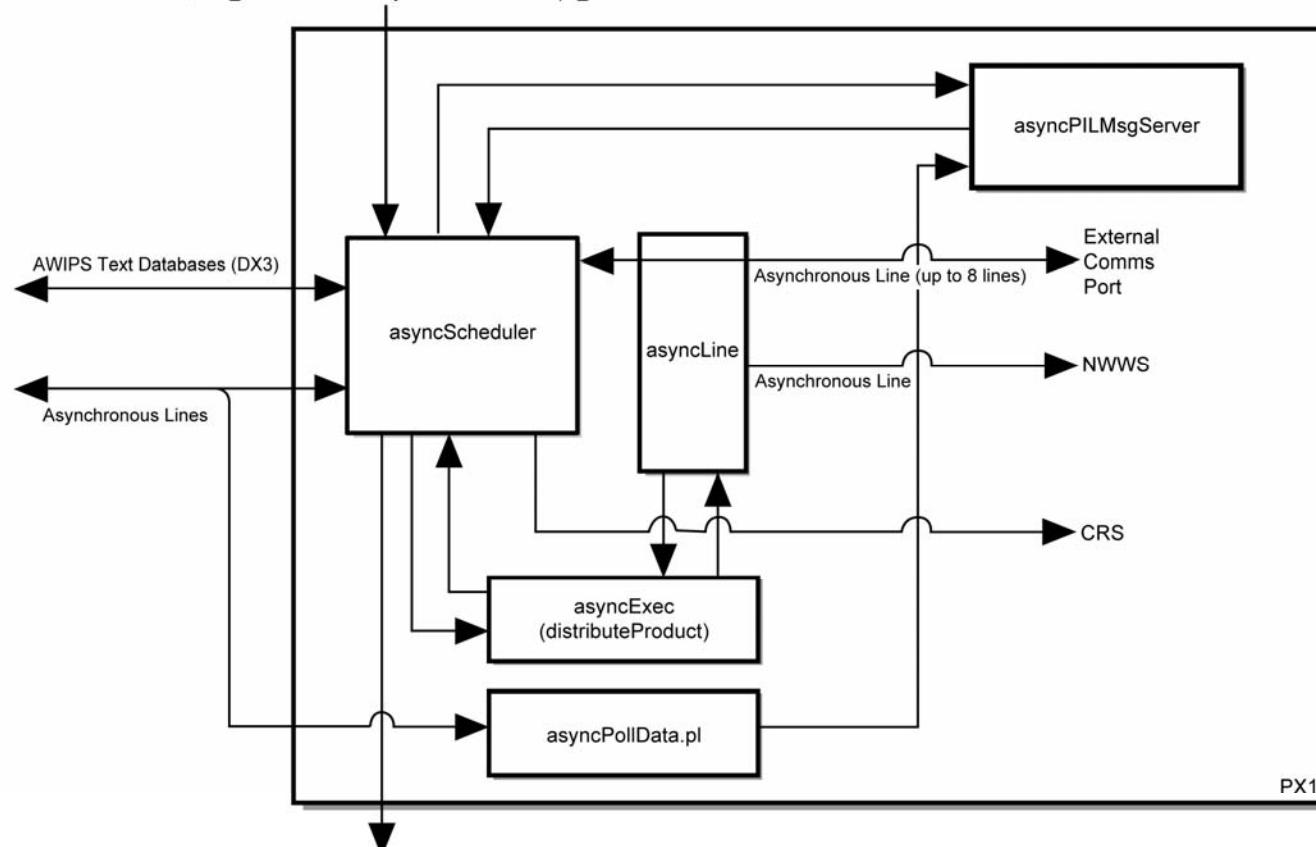
Exhibit B.1-3. Acquire and Ingest of Satellite Products

**Exhibit B.1-4. Acquire and Ingest of NWSTG Products**

**Exhibit B.1-5. Acquire and Ingest of Radar Products**

Config Files:

\$FXA_DATA/workFile/asyncProdScheduler/aps_line.tlb
 \$FXA_DATA/workFiles/asyncProdScheduler/aps_pil.tbl
 \$FXA_DATA/workFiles/asyncProdScheduler/aps_route.tbl



Log Files:

\$LOG_DIR/<yyyymmdd>/asyncScheduler<logid>

Data Files:

Databases:

SMM 10/12/10

Exhibit B.1-6. Acquire and Ingest of Asynchronous Products

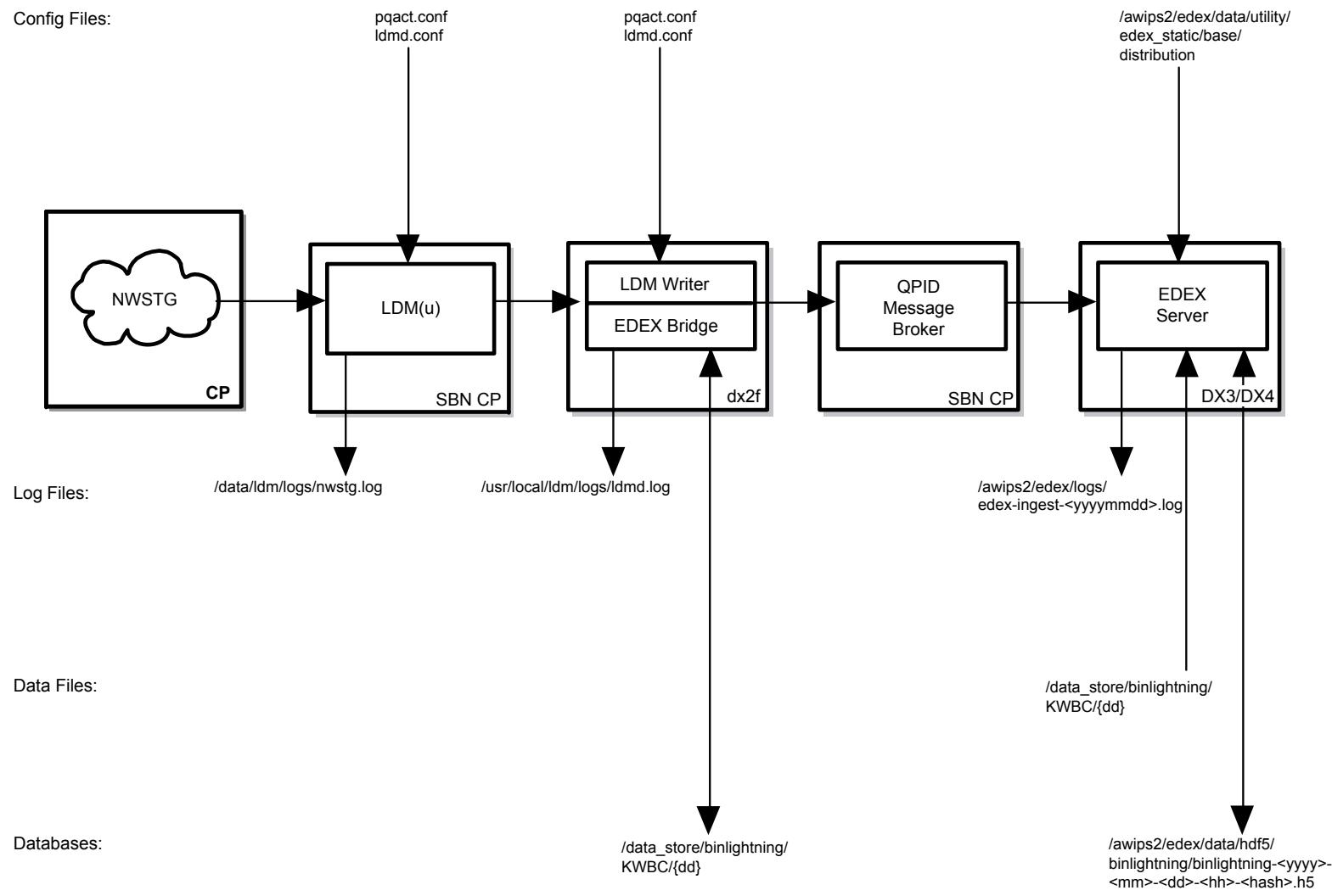
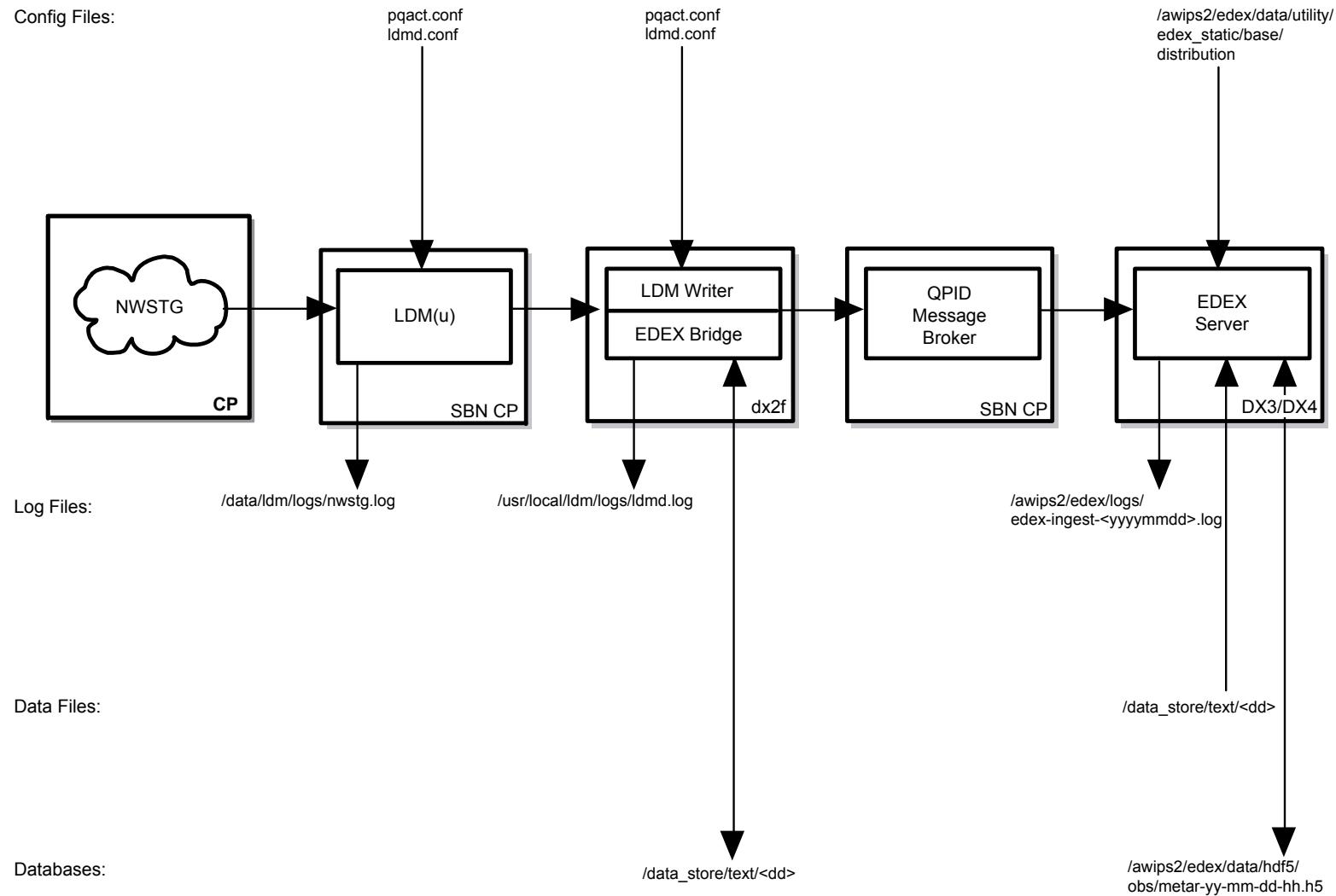
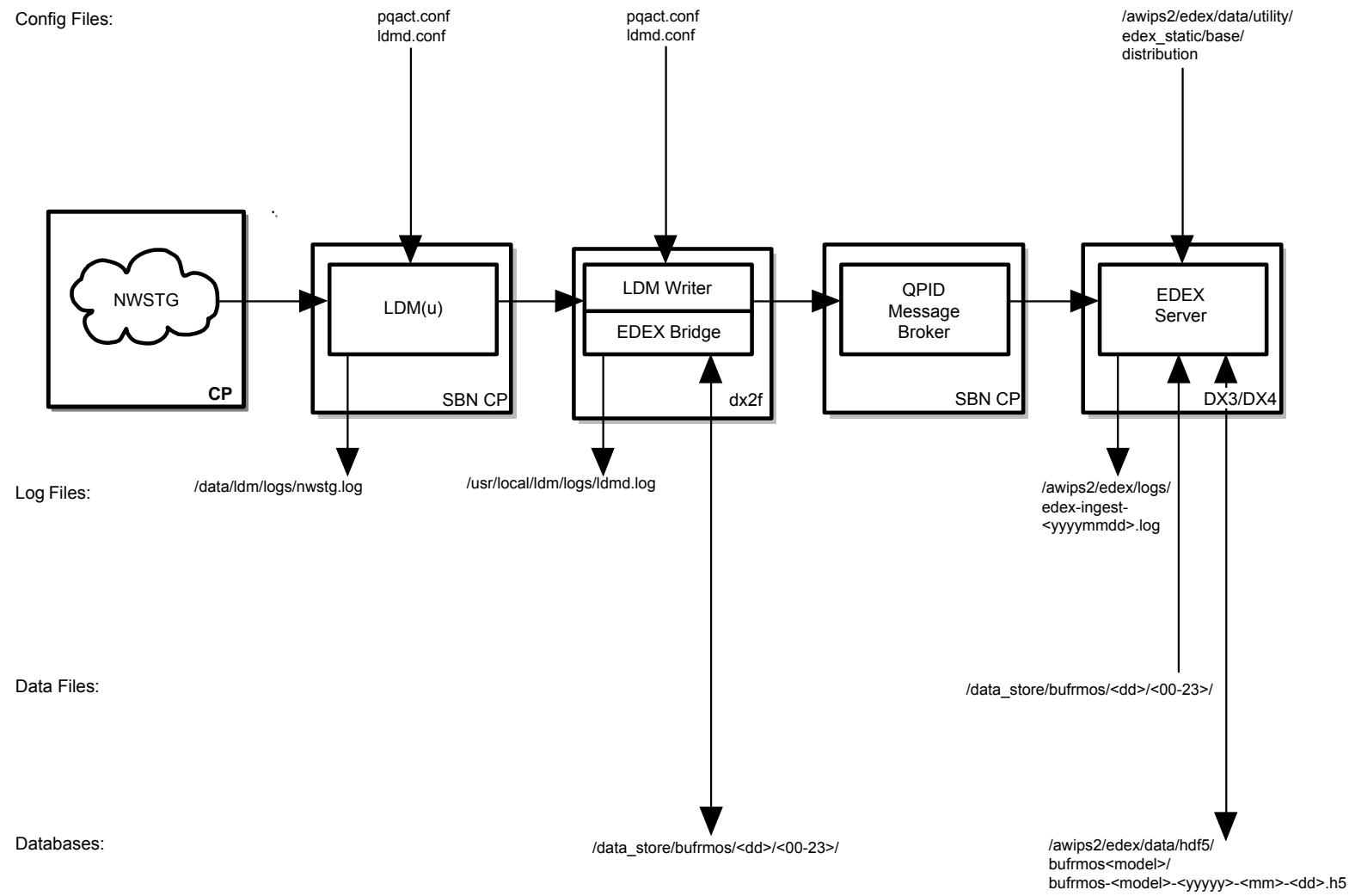


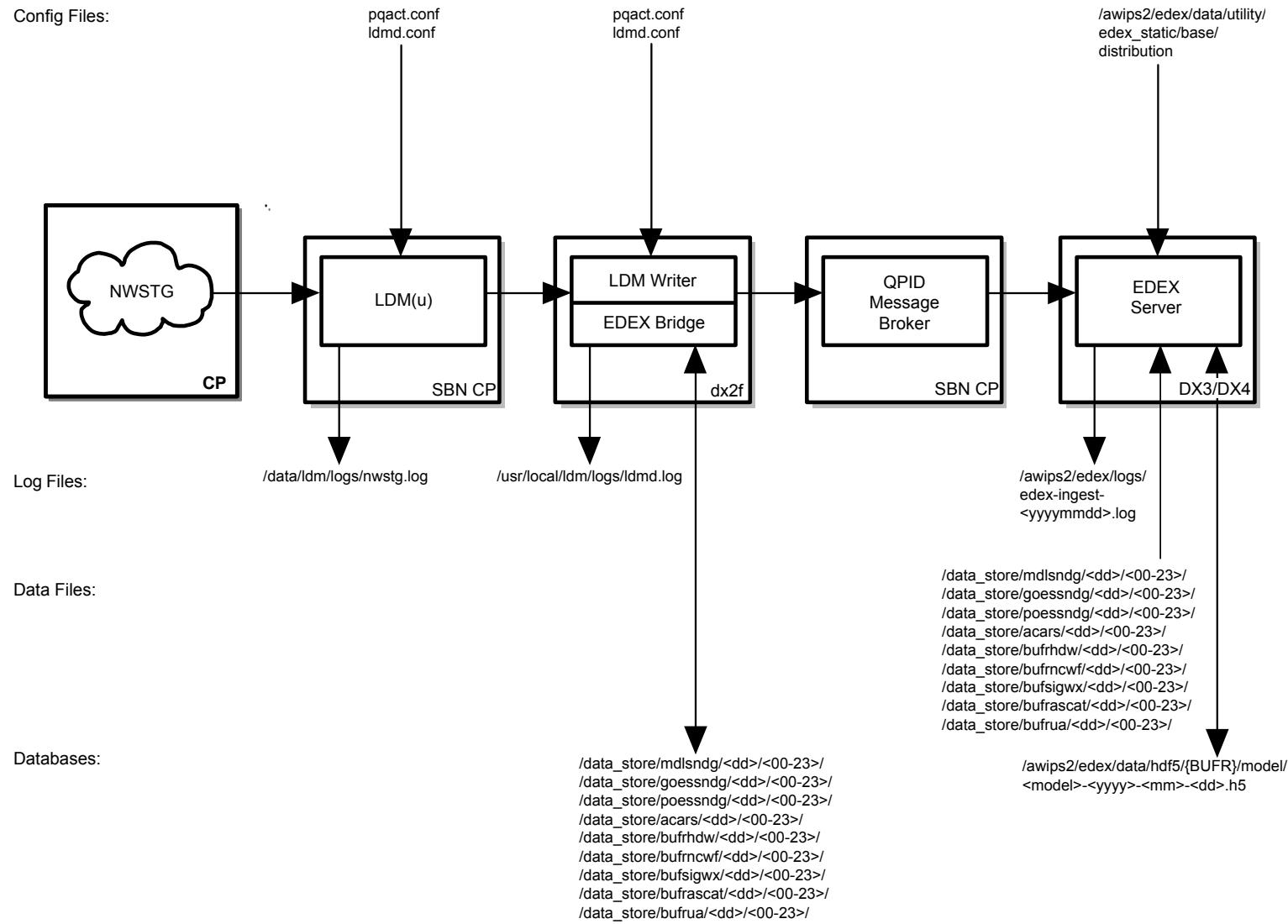
Exhibit B.1-7. Acquire and Ingest of Lightning Products



SMM 10/27/11

Exhibit B.1-8. Acquire and Ingest of METAR Products

**Exhibit B.1-9. Acquire and Ingest of MOS Products**

**Exhibit B.1-10. Acquire and Ingest of BUFR Products**

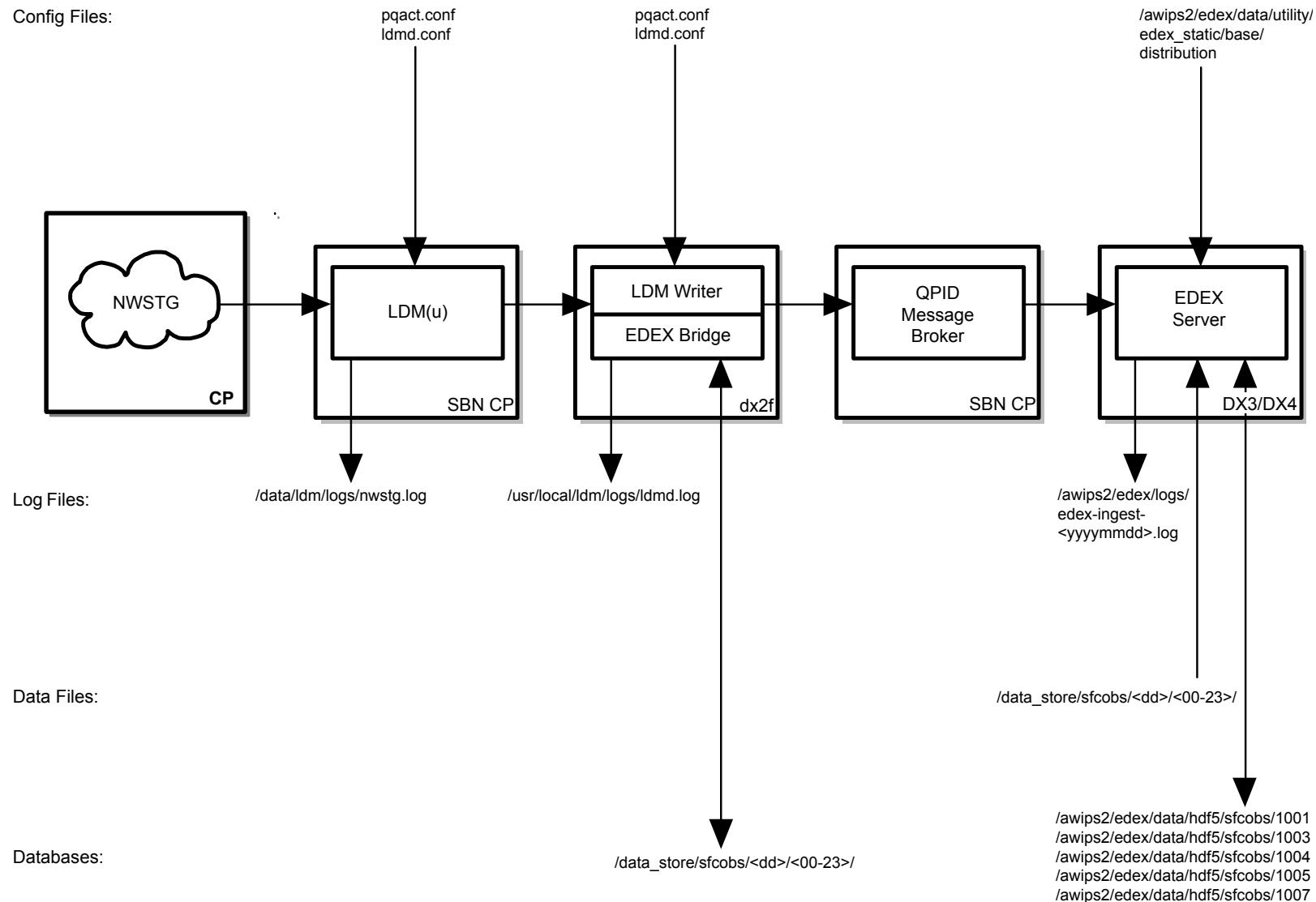


Exhibit B.1-11. Acquire and Ingest of Synoptic Products

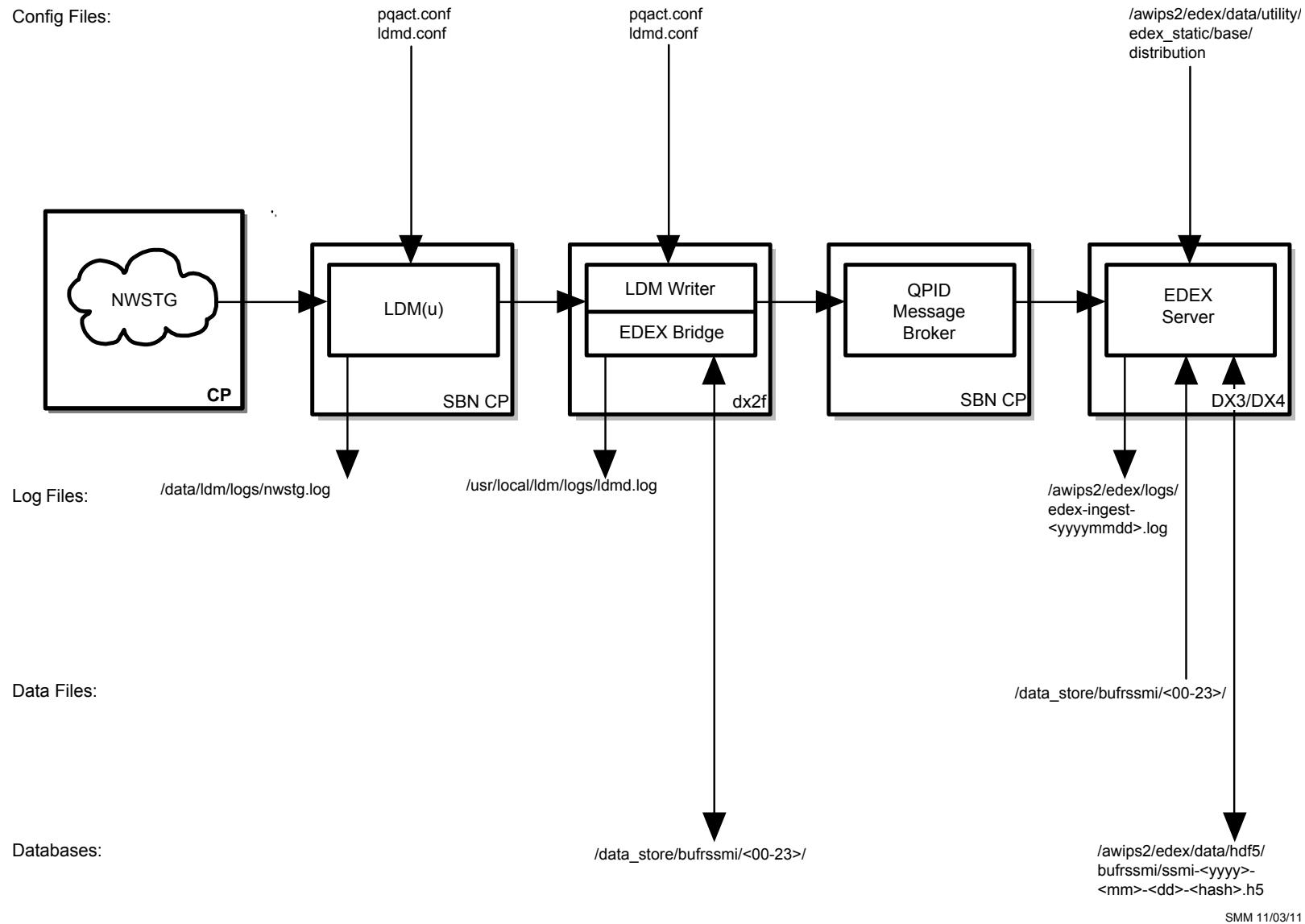
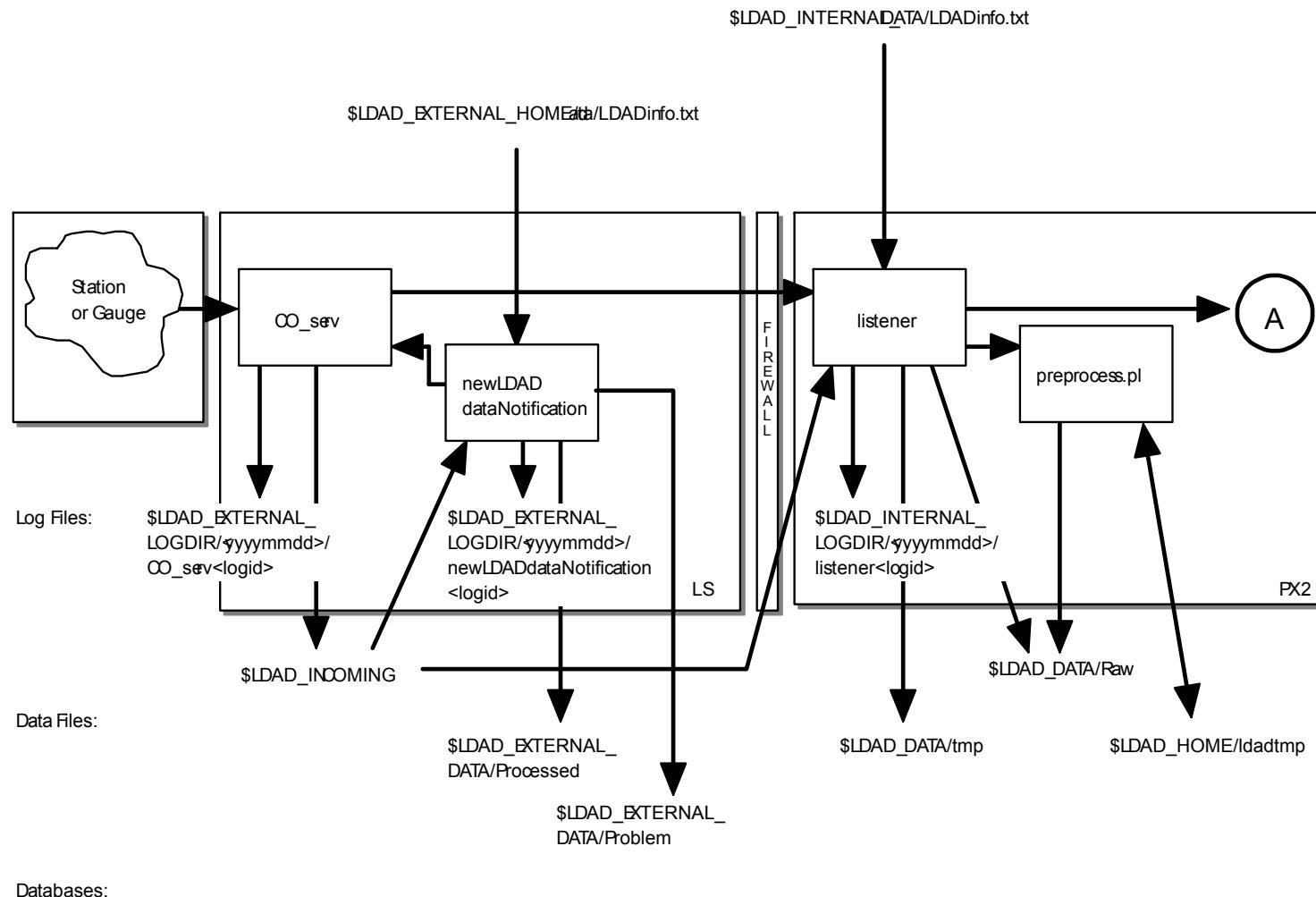


Exhibit B.1-12. Acquire and Ingest of SSM/I Products

Config Files:



SMM 06/13/08

Exhibit B.1-13. Generic Acquire and Decode LDAD Product (Page 1 of 2)

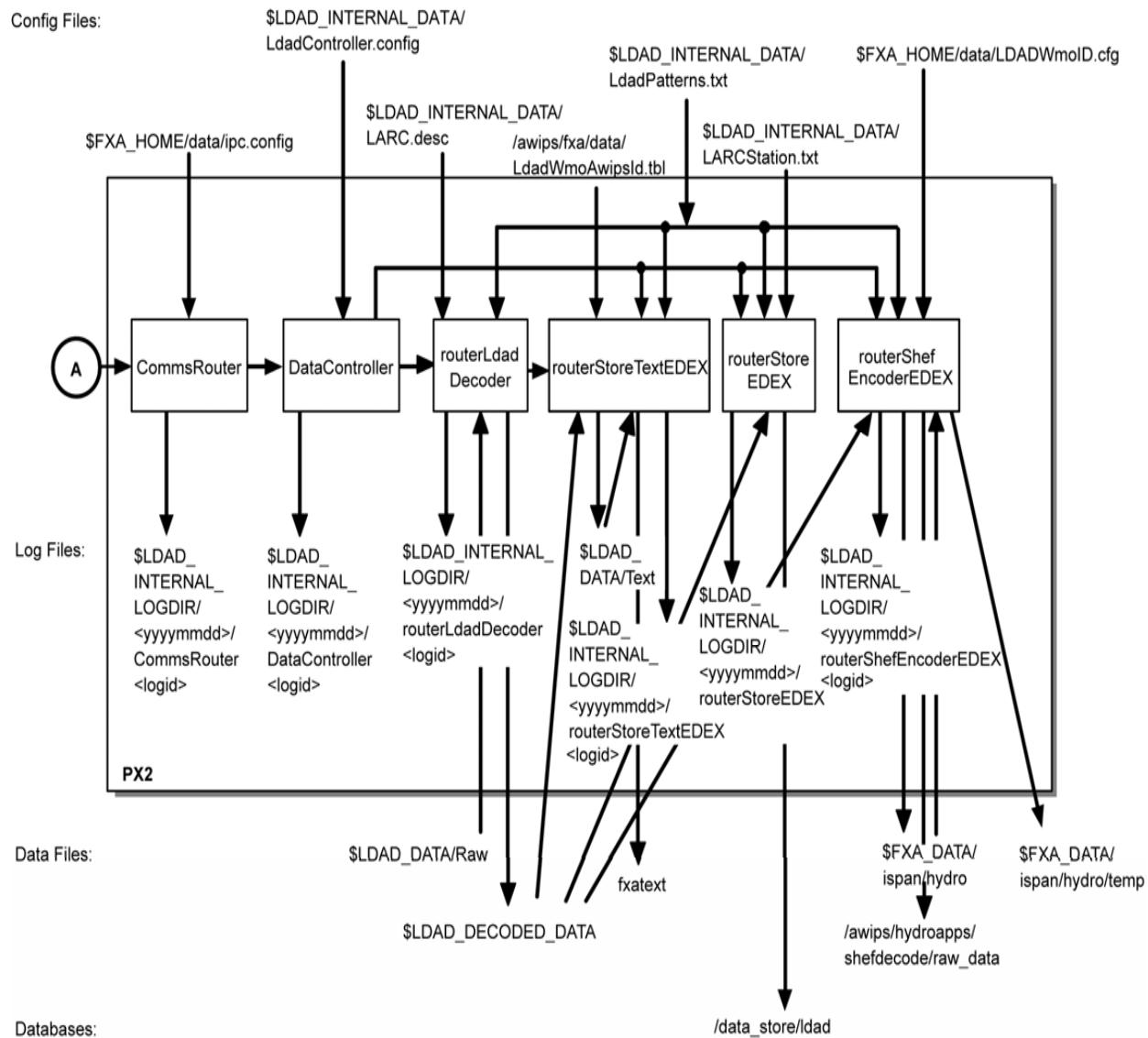


Exhibit B.1-13. Generic Acquire and Decode LDAD Product (Page 2 of 2)

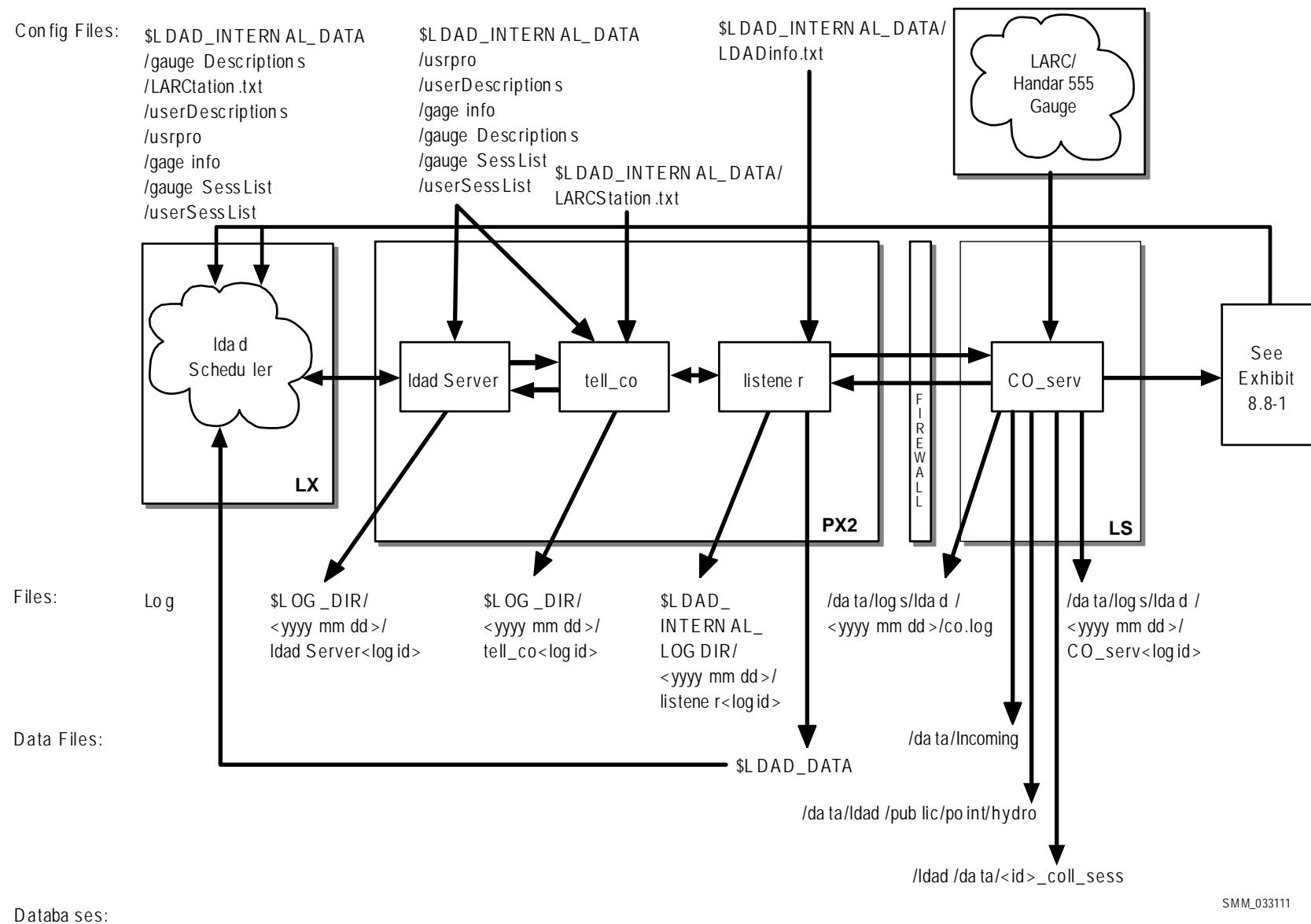
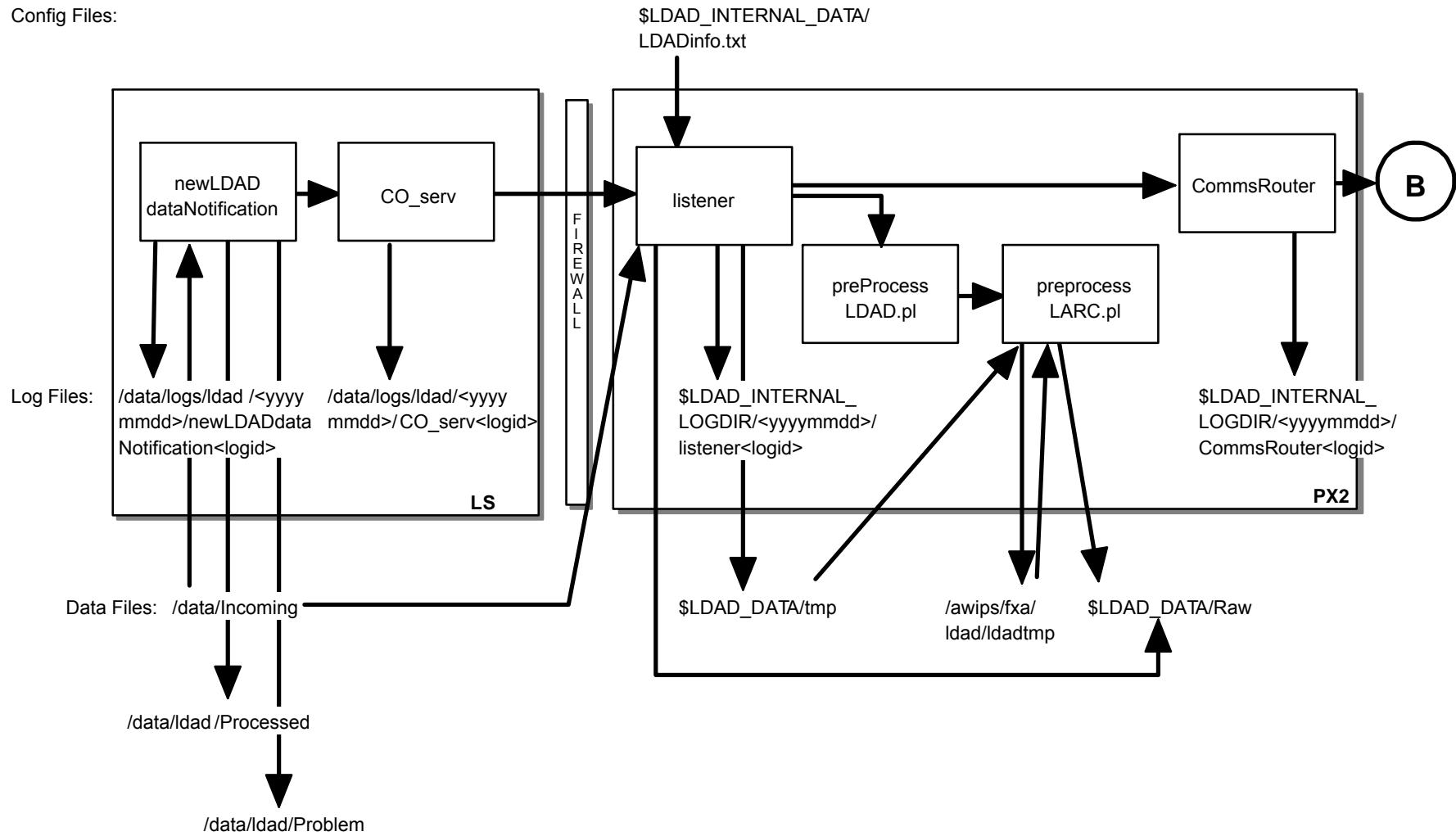


Exhibit B.1-14. Acquire LARC/Handar 555 Data (for LDAD)

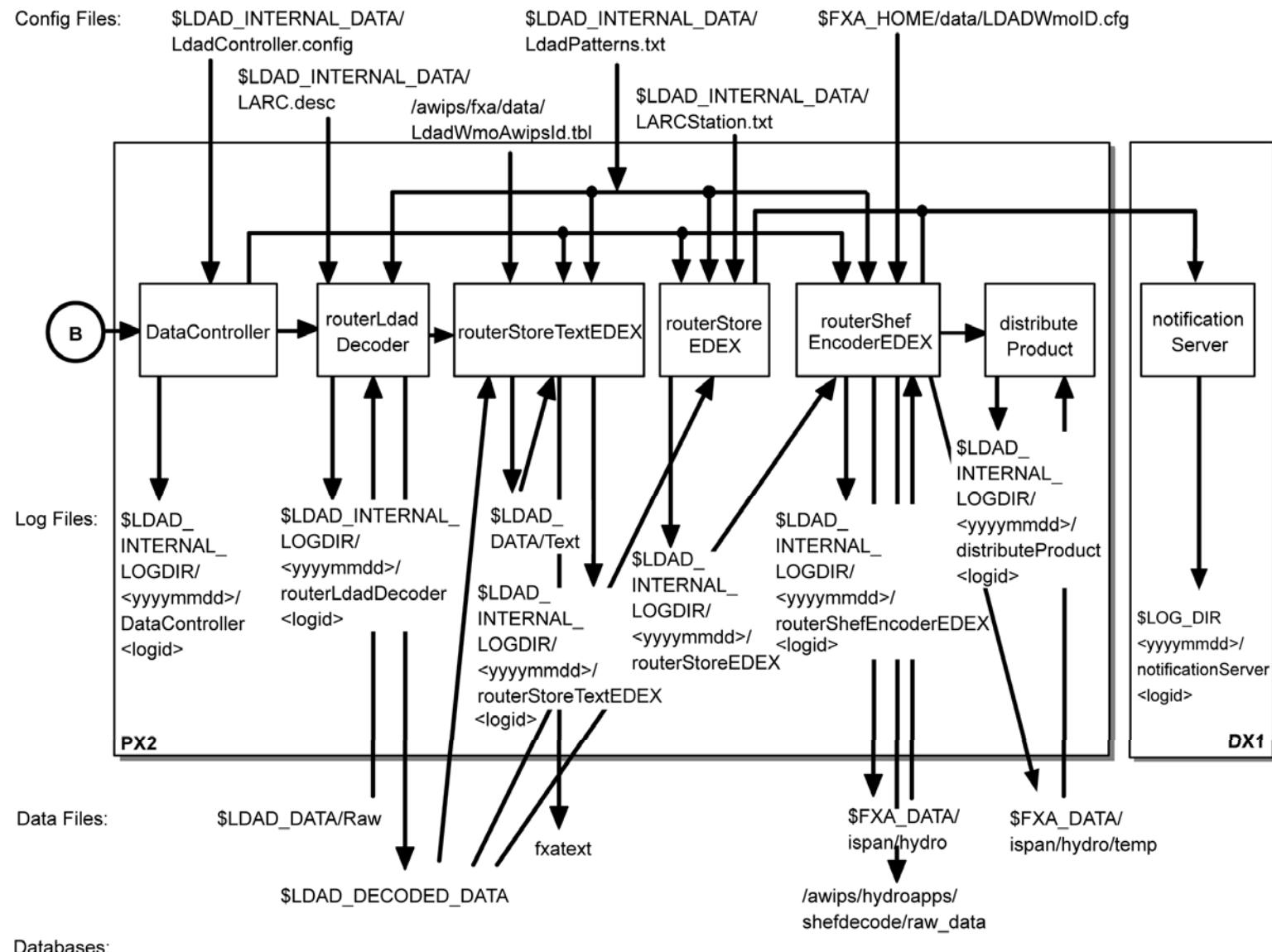
Config Files:



Databases:

SMM 07/13/06

Exhibit B.1-15. Decode LARC/Handar 555 Data (for LDAD) (Page 1 of 2)



SMM 07/13/10

Exhibit B.1-15. Decode LARC/Handar 555 Data (for LDAD) (Page 2 of 2)

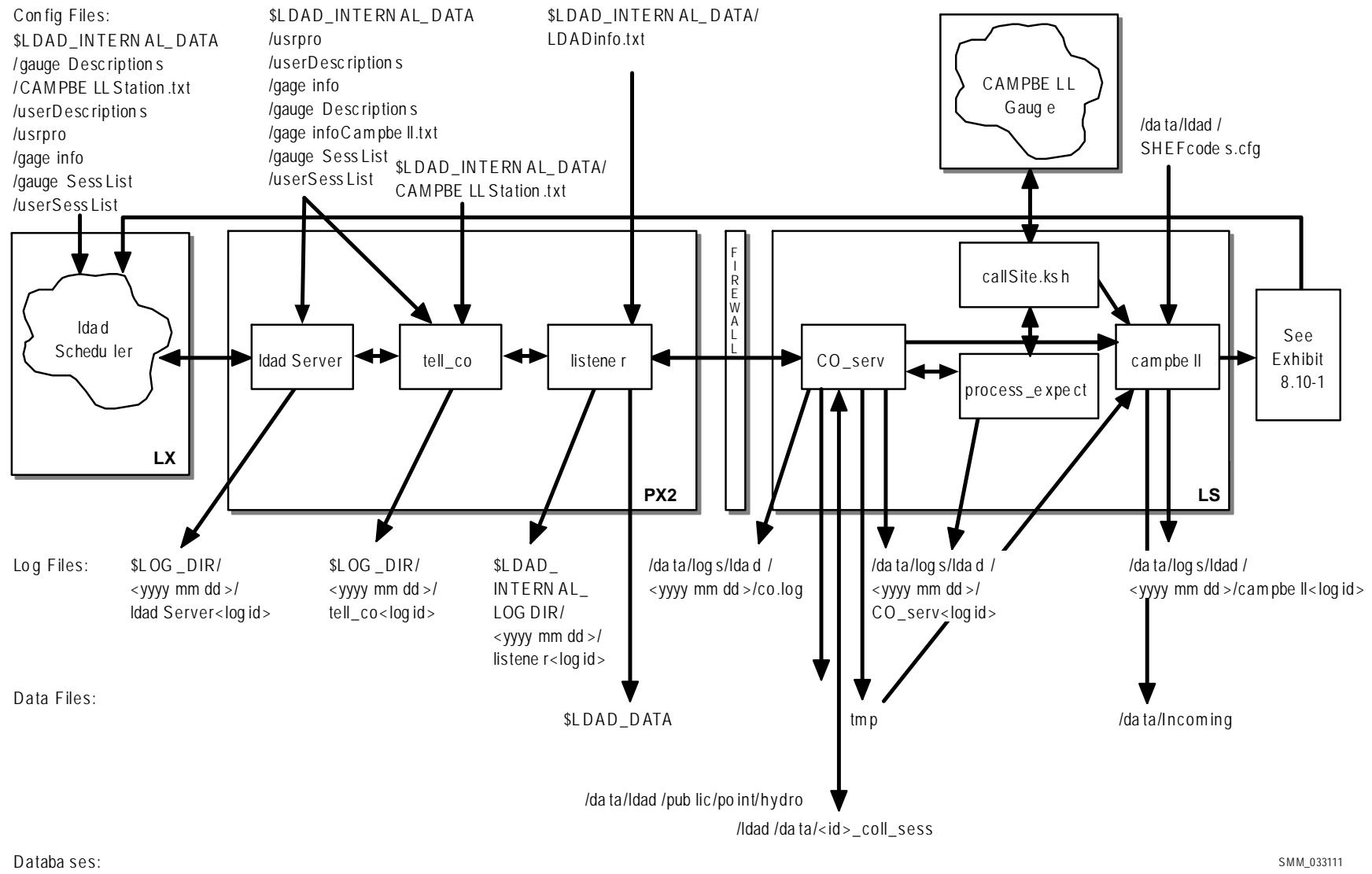


Exhibit B.1-16. Acquire Campbell Data (for LDAD)

SMM_033111

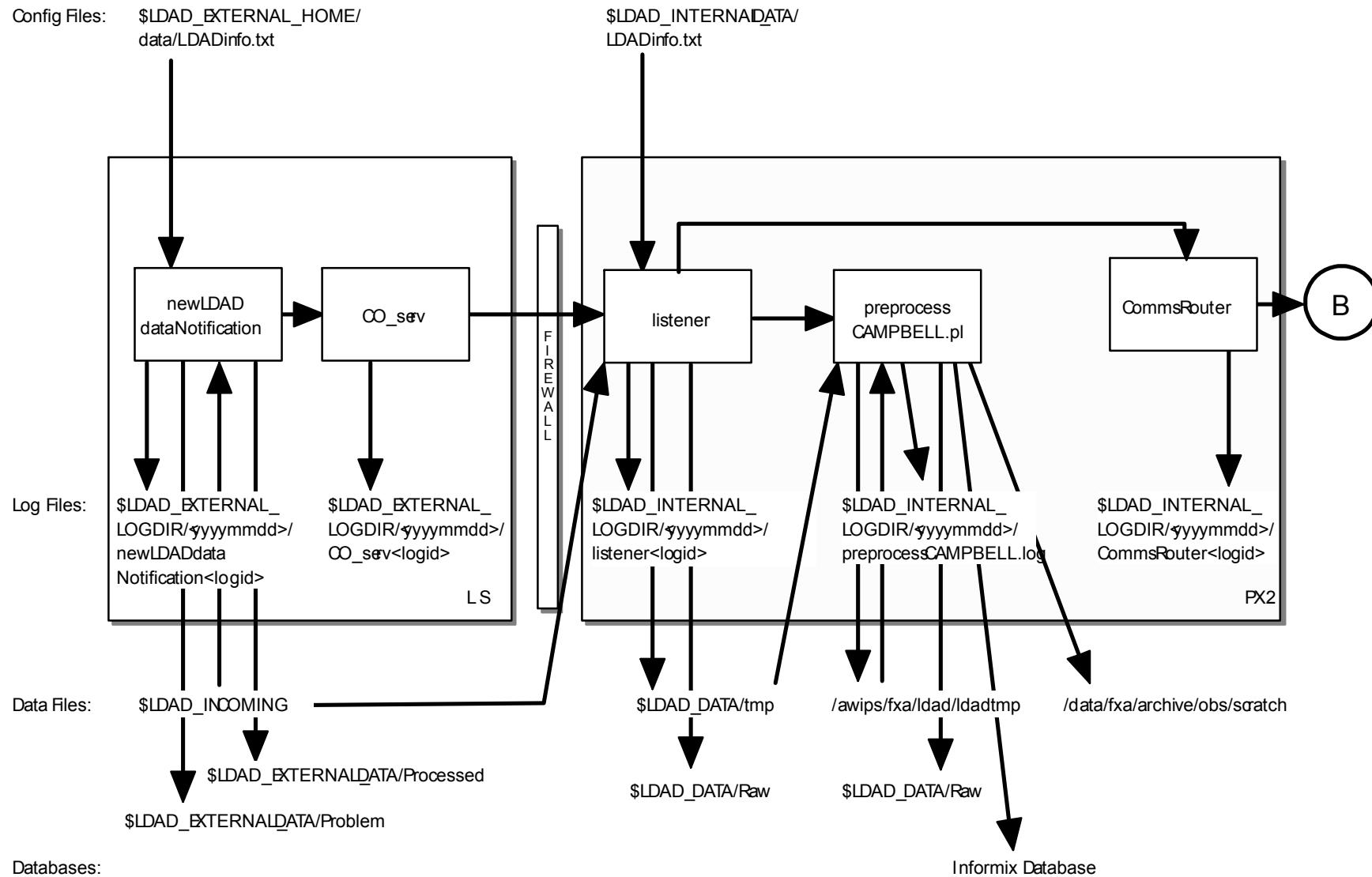
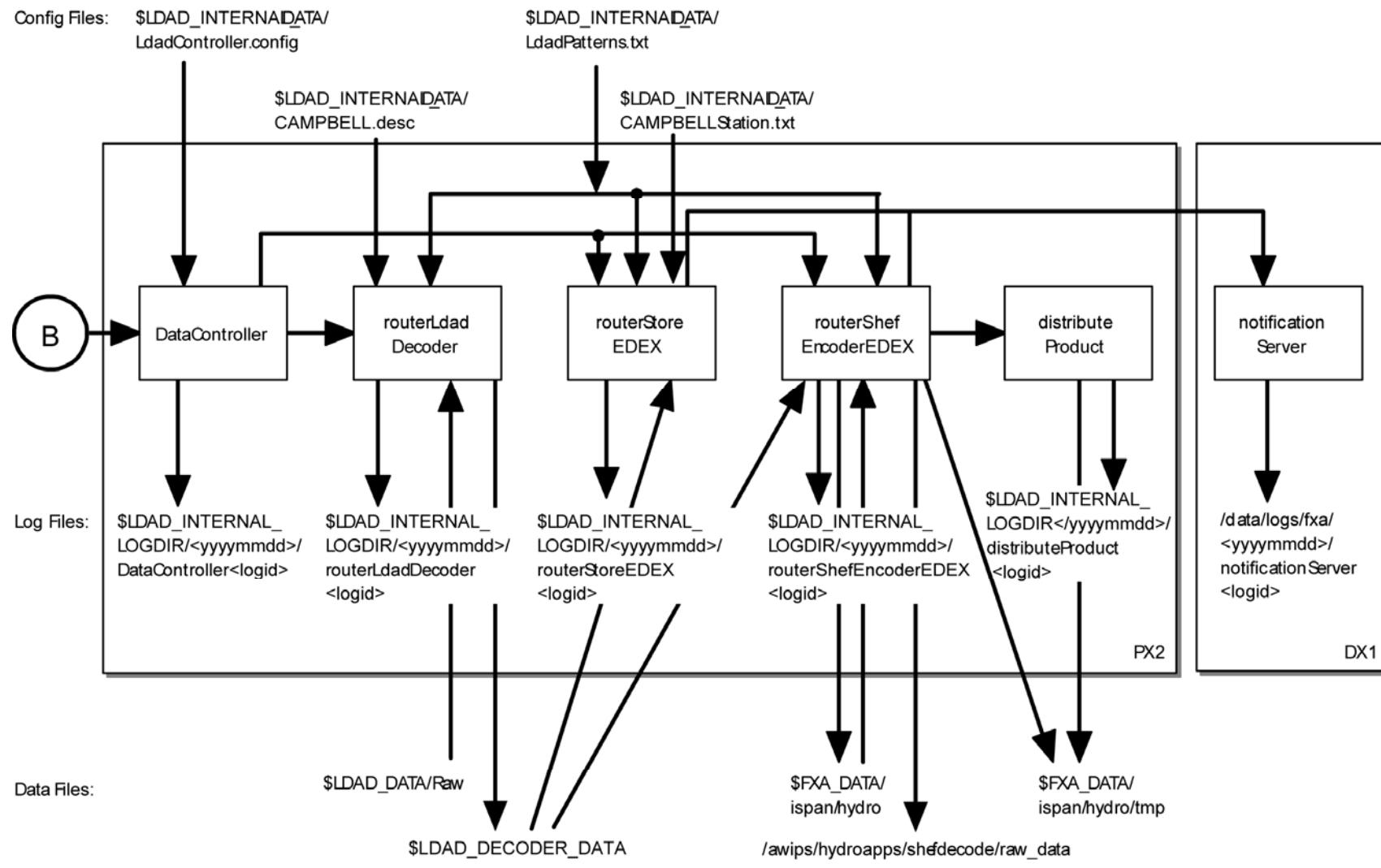


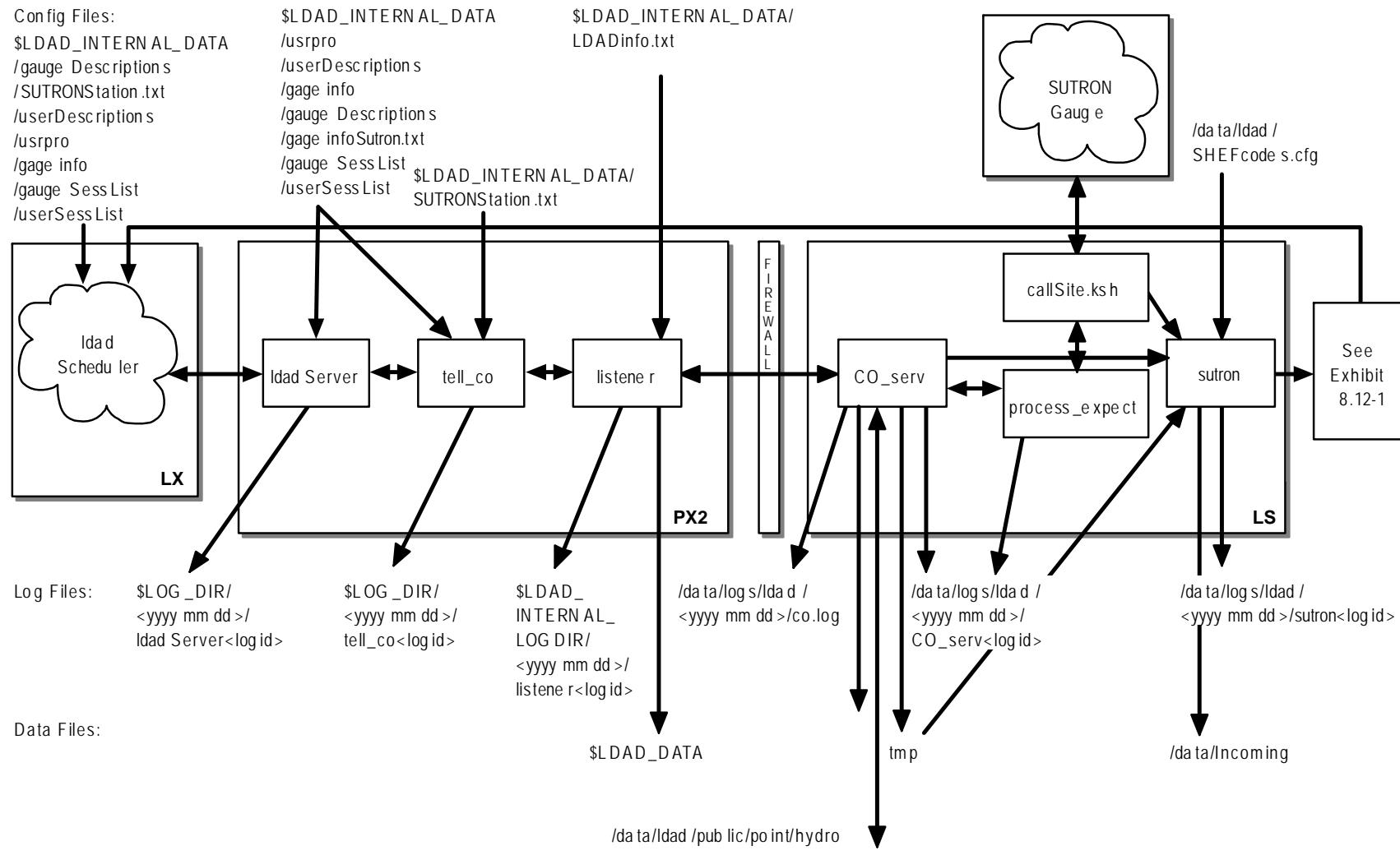
Exhibit B.1-17. Decode Campbell Data (for LDAD) (Page 1 of 2)

SMM 06/14/01



SMM 07/13/10

Exhibit B.1-17. Decode Campbell Data (for LDAD) (Page 2 of 2)



SMM_033111

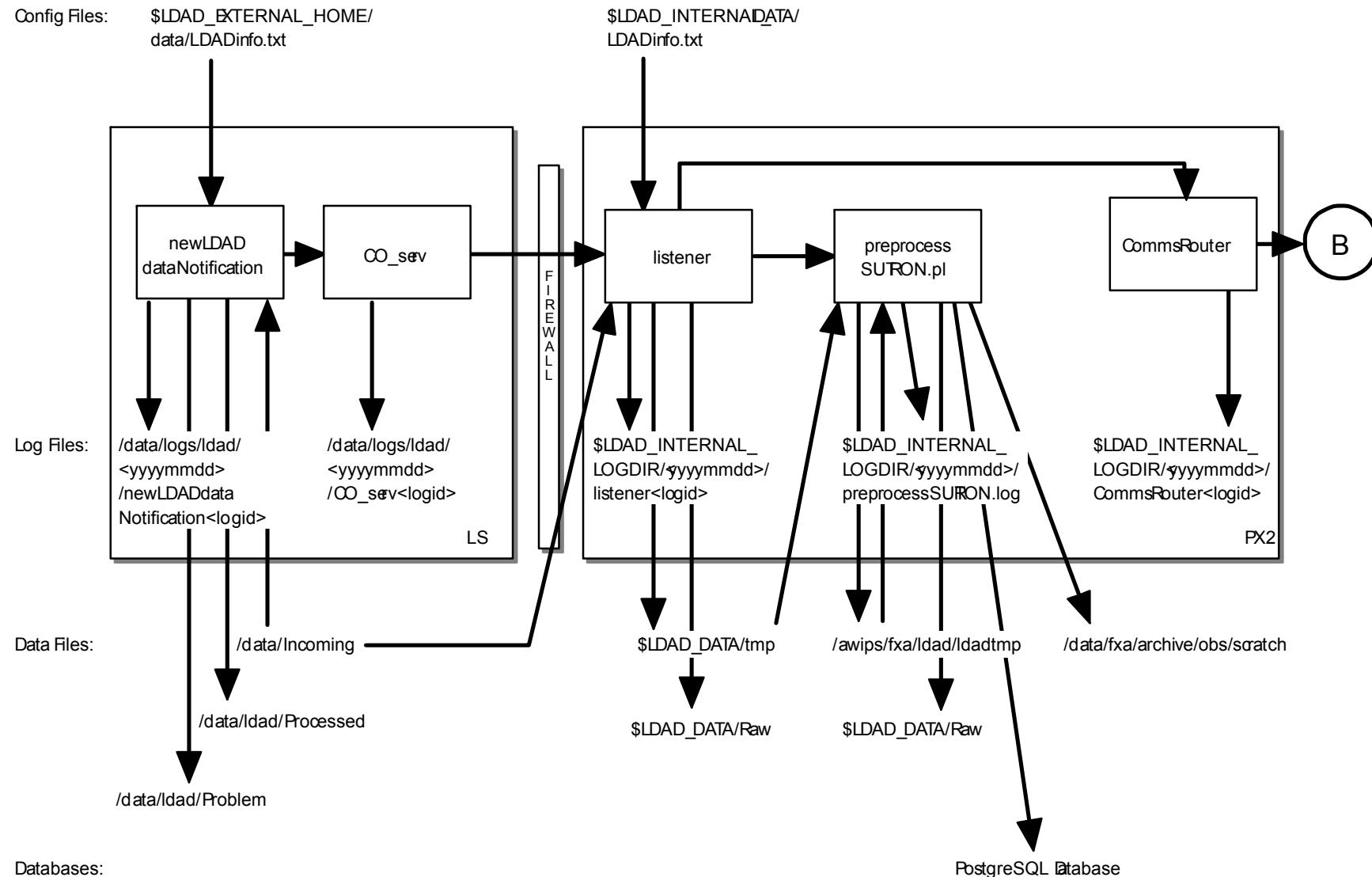


Exhibit B.1-19. Decode Sutron Data (for LDAD) (Page 1 of 2)

SMM 06/14/04

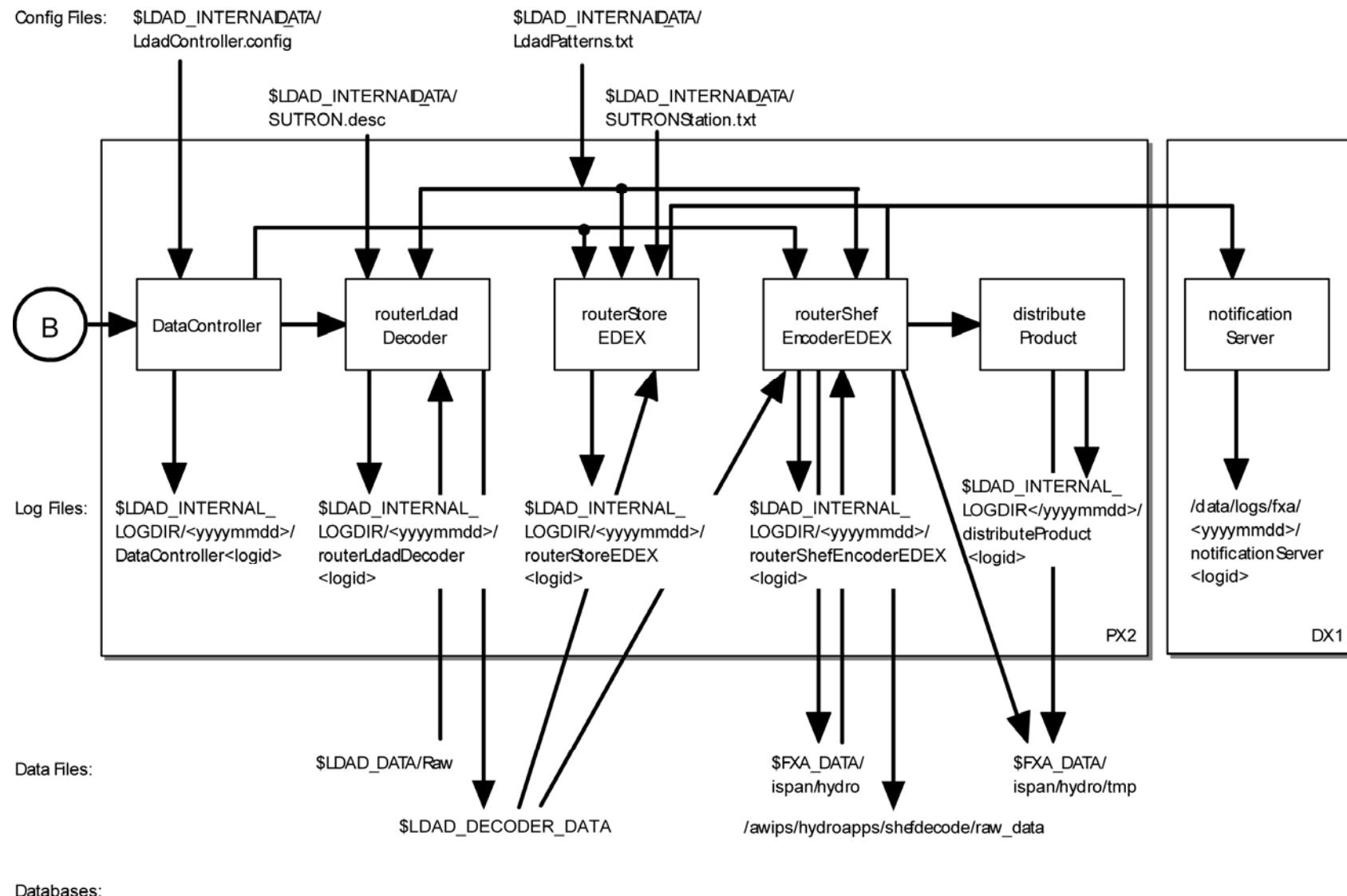


Exhibit B.1-19. Decode Sutron Data (for LDAD) (Page 2 of 2)

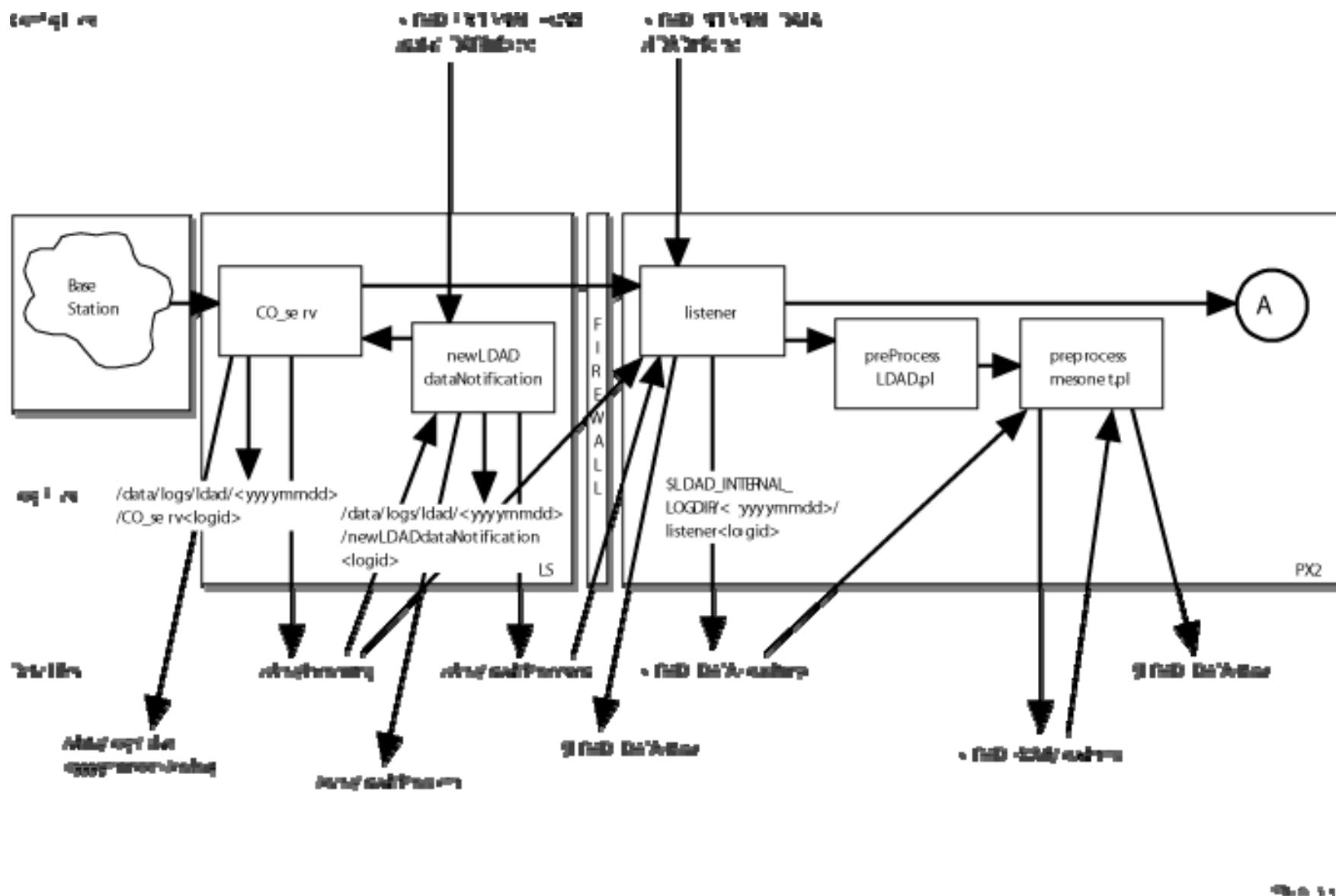


Exhibit B.1-20. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD) (Page 1 of 2)

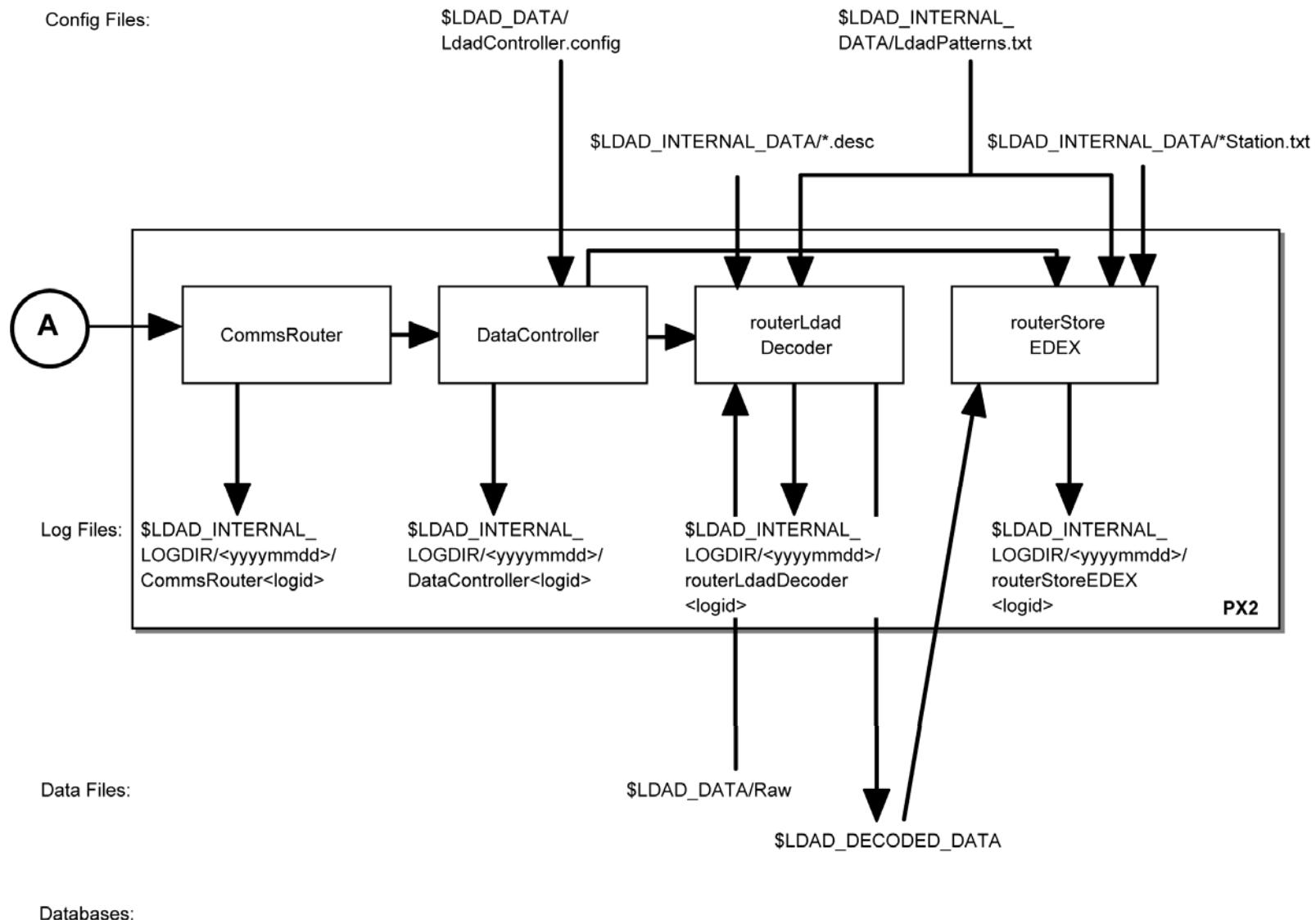


Exhibit B.1-20. Acquire and Decode Comma Separated Variable Mesonet Data (for LDAD) (Page 2 of 2)

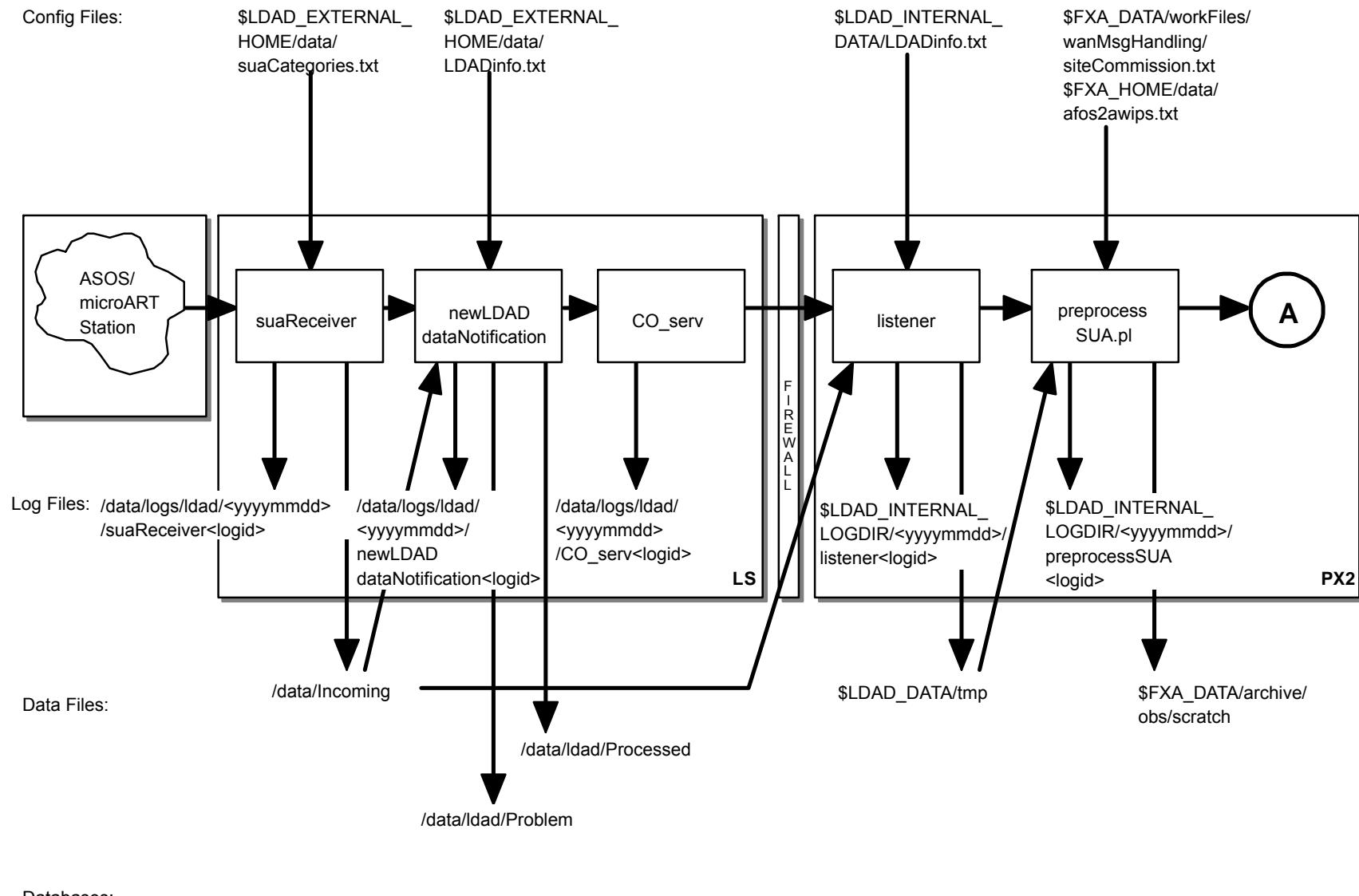


Exhibit B.1-21. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 1 of 2)

SMM 06/14/06

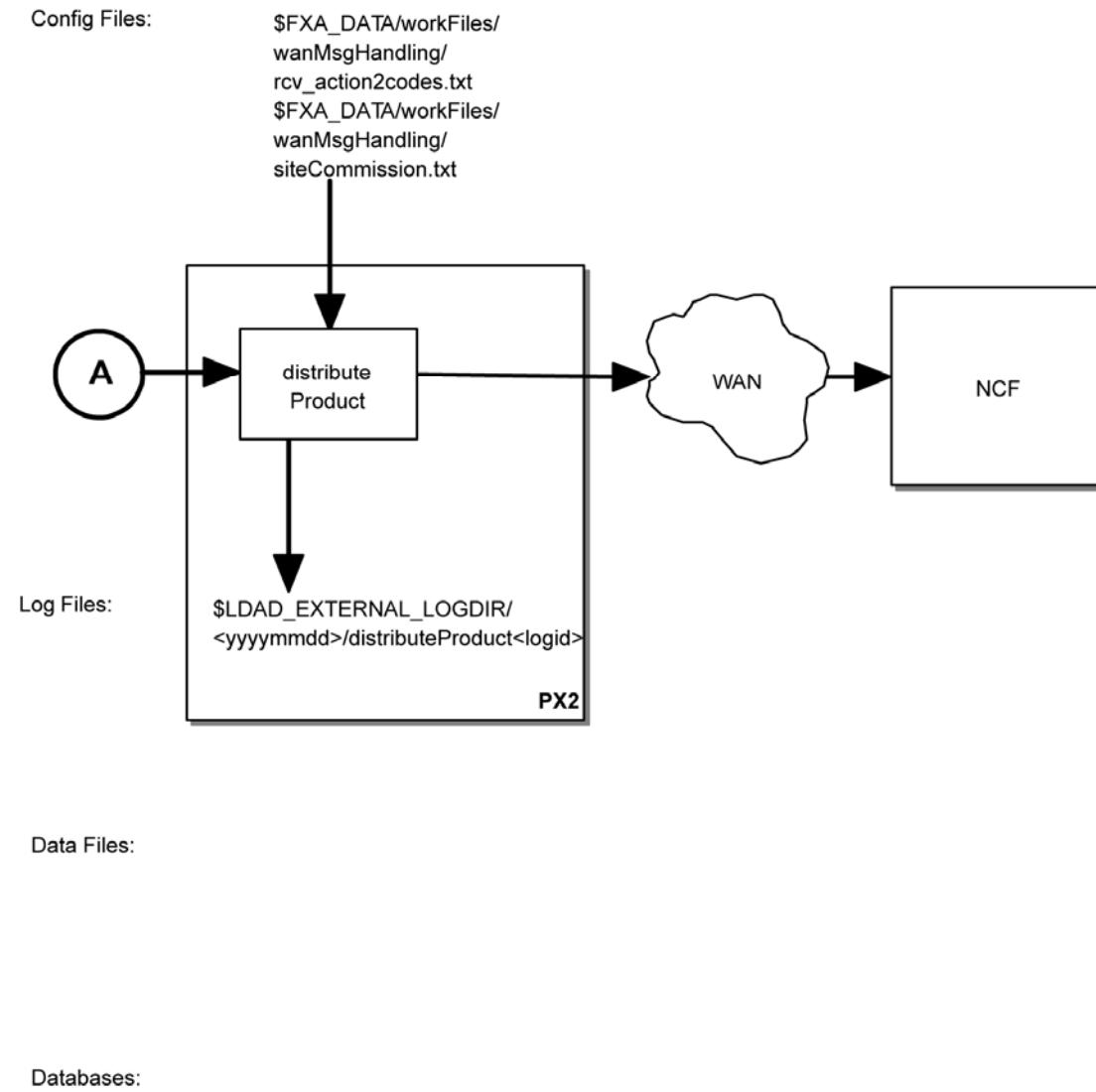


Exhibit B.1-21. Acquire and Process ASOS/MicroART Data (for LDAD) (Page 2 of 2)

SMM 07/13/10

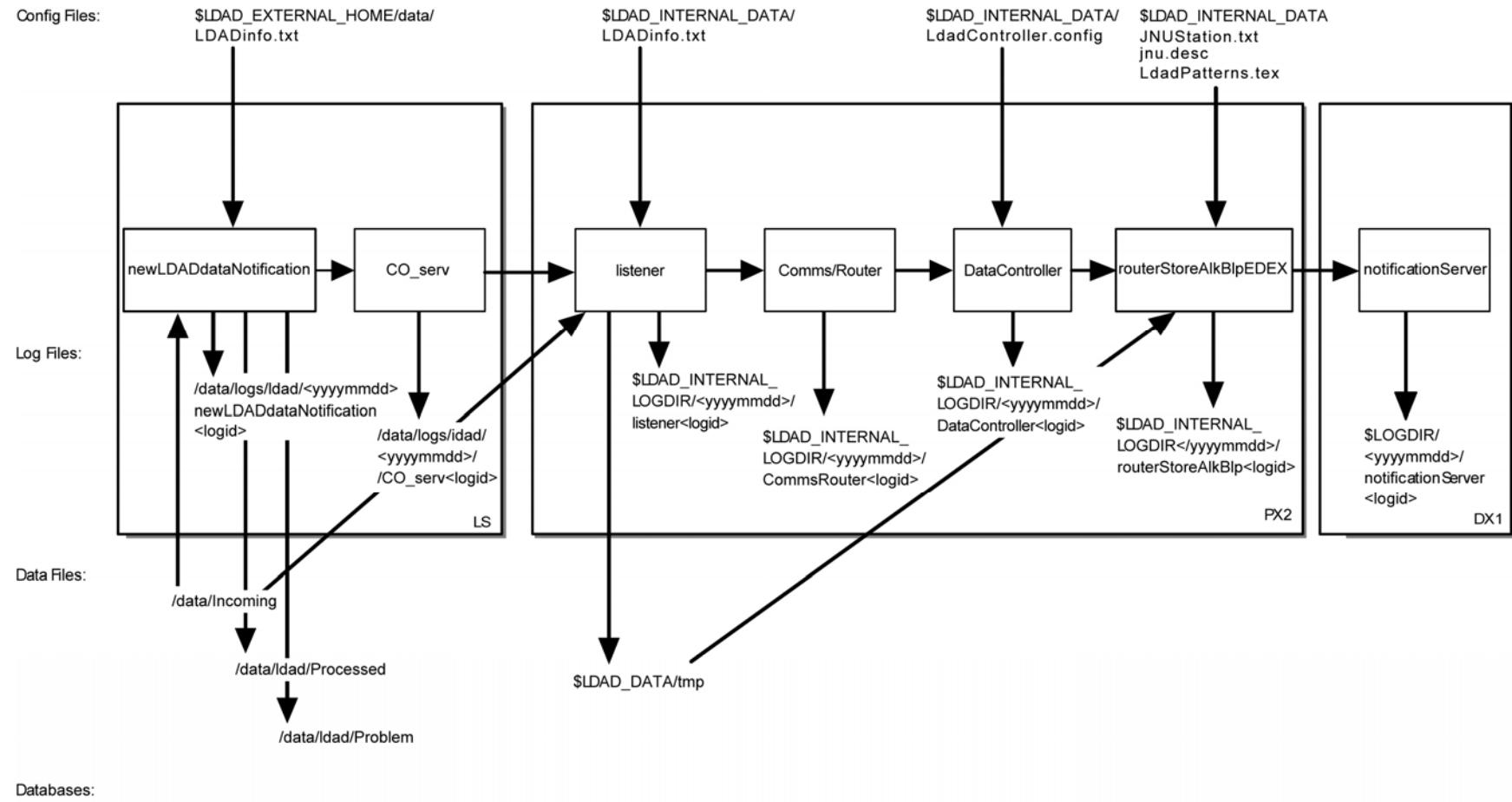


Exhibit B.1-22. Decode Alaska Profiler Data

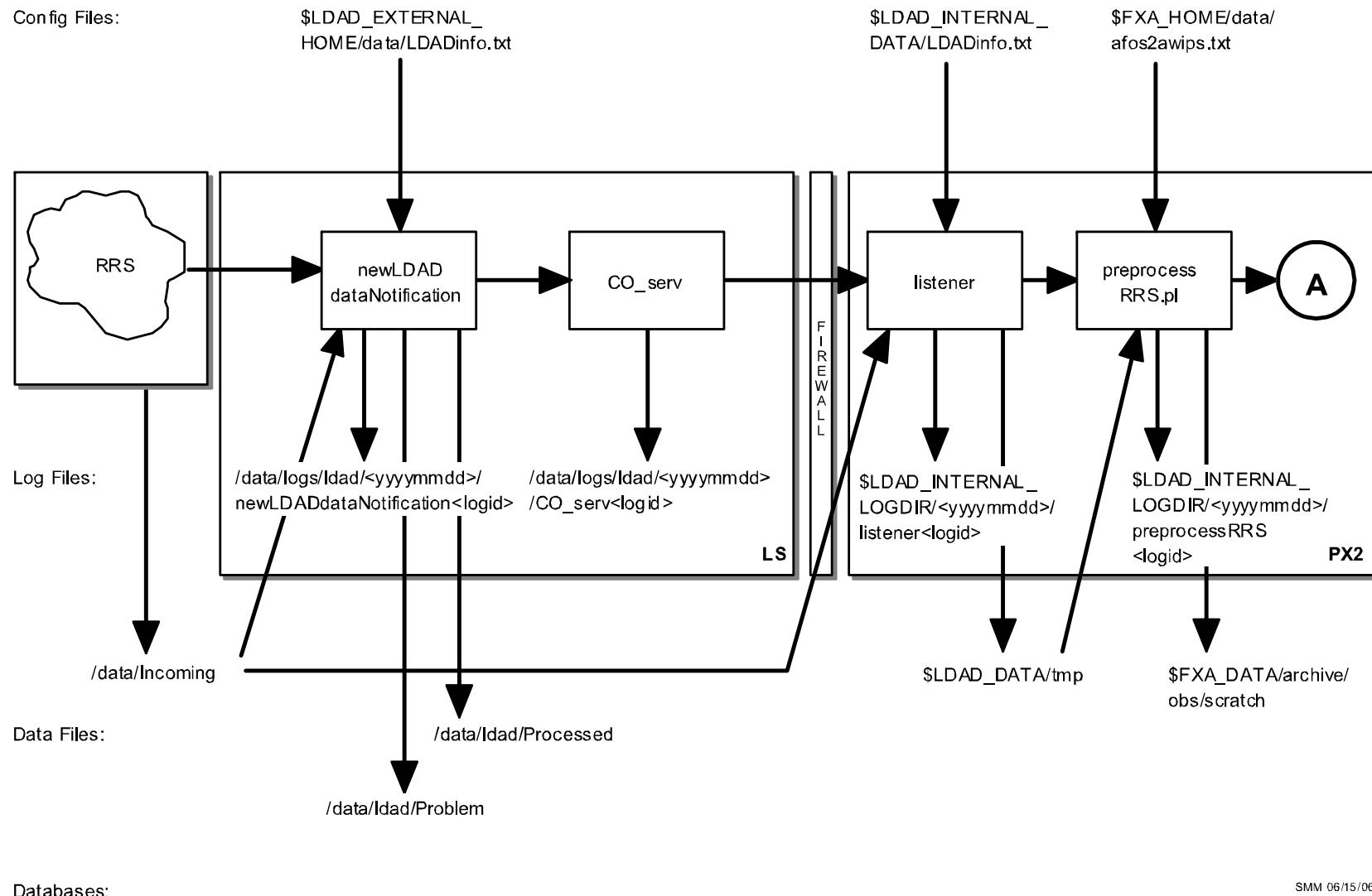


Exhibit B.1-23. Acquire and Process RRS Data (for LDAD) (Page 1 of 2)

Config Files: \$FXA_DATA/workFiles/wanMsgHandling/recv_action2codes.txt

\$FXA_DATA/workFiles/wanMsgHandling/siteCommission.txt

Log Files:

\$LOG_DIR/
<yyyymmdd>/
distributeProduct
<logid>

PX2

Data Files:

/data/fxa/mhs/tmp

Databases:

SMM 07/13/10

Exhibit B.1-23. Acquire and Process RRS Data (for LDAD) (Page 2 of 2)

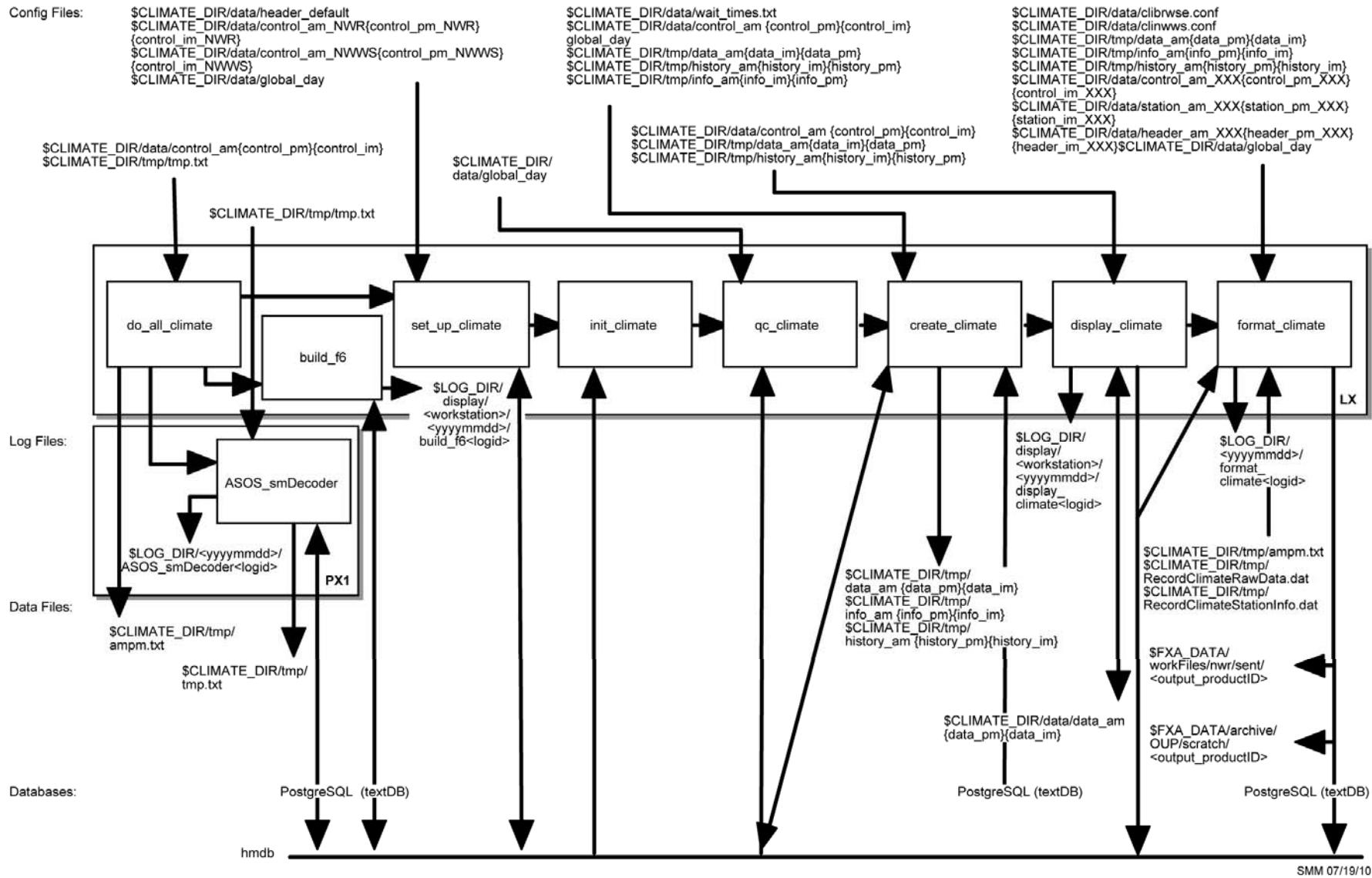


Exhibit B.1-24. Climatological Reports Formatter for NWR and NWWS (Daily)

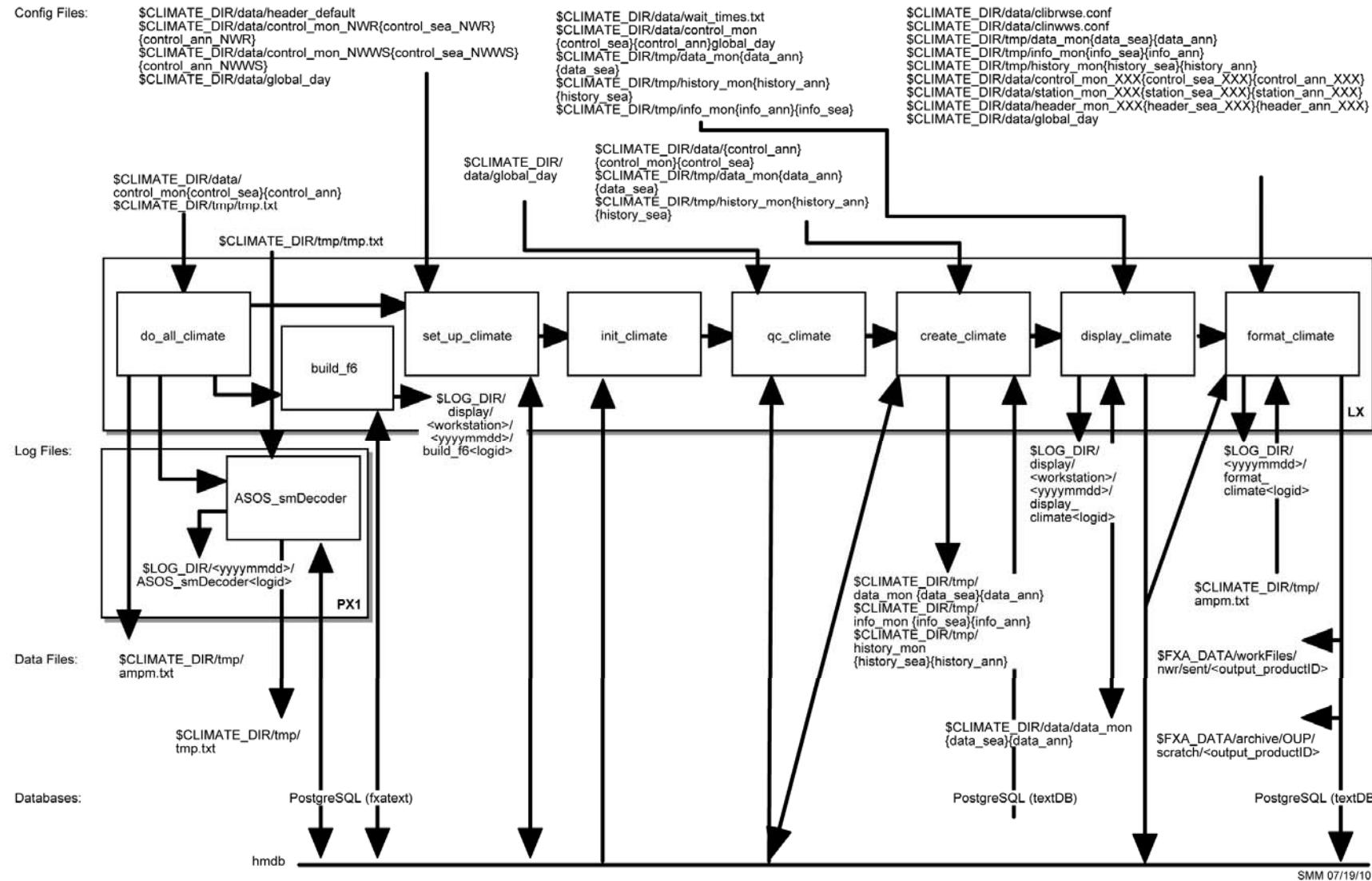


Exhibit B.1-25. Climatological Reports Formatter for NWR and NWWS (Monthly/Seasonal/Annual)

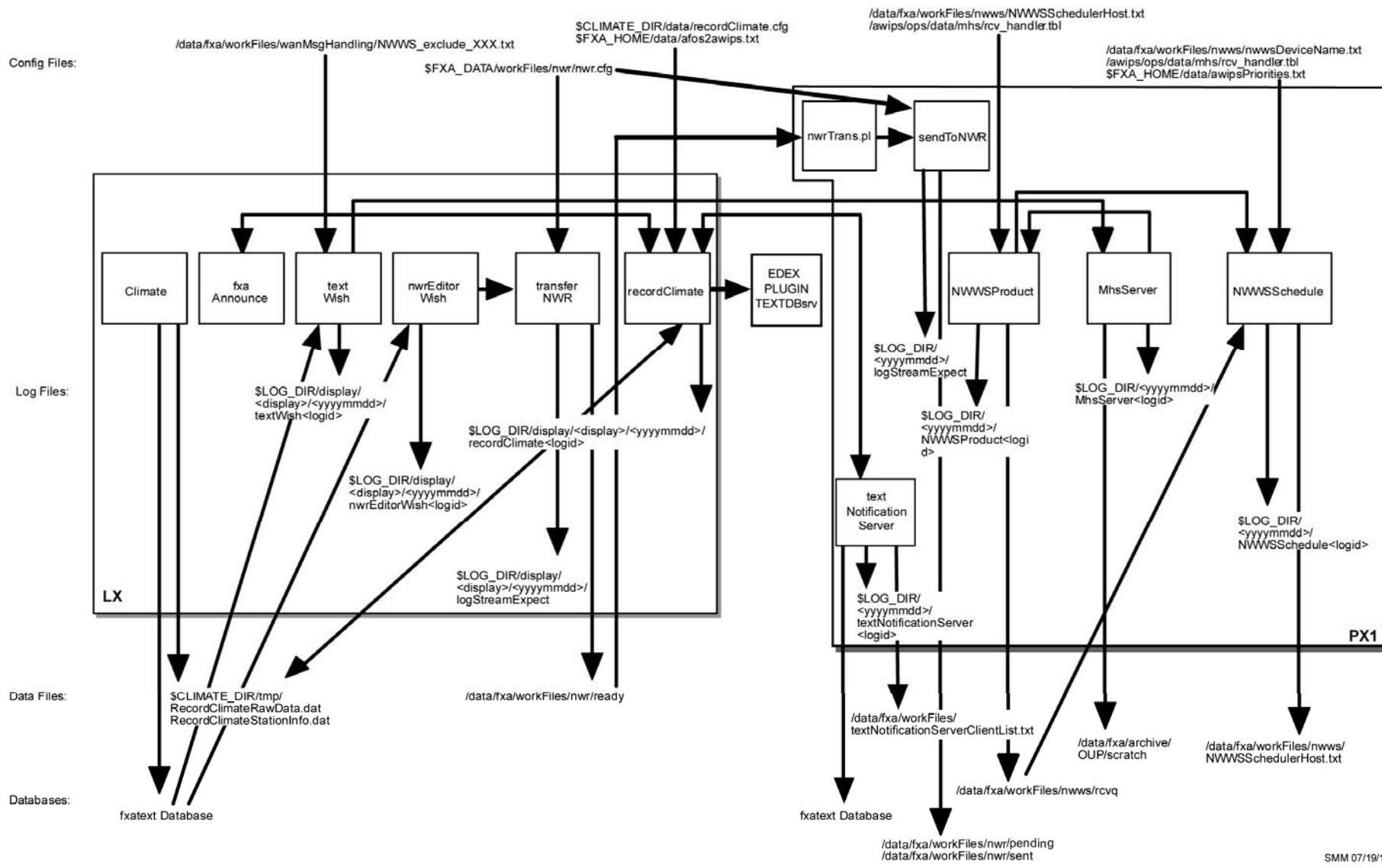
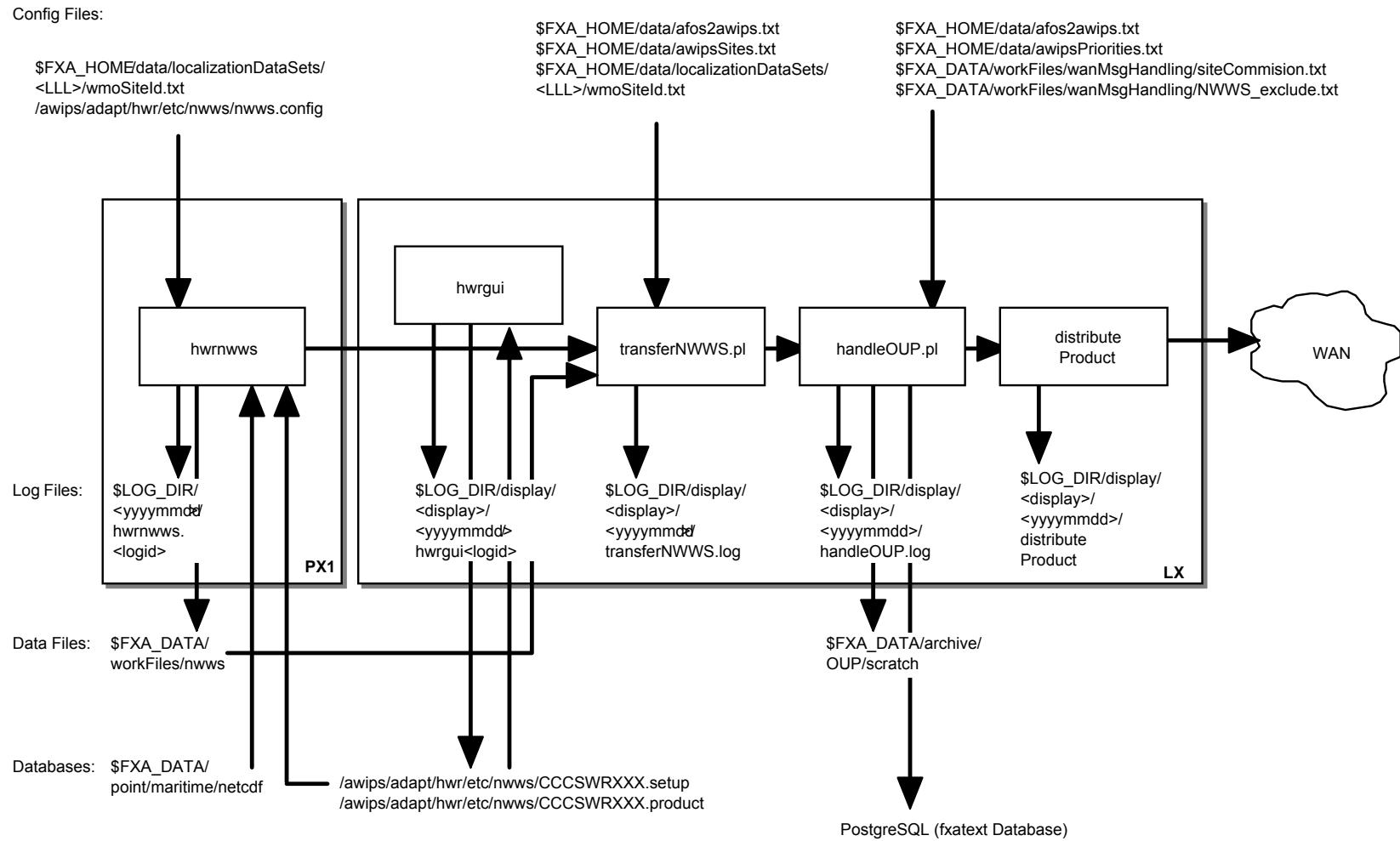


Exhibit B.1-26. Record Climate Data Flow



SMM 8/30/05

Exhibit B.1-27. Hourly Weather Roundup Formatter for NOAA Weather Wire Service

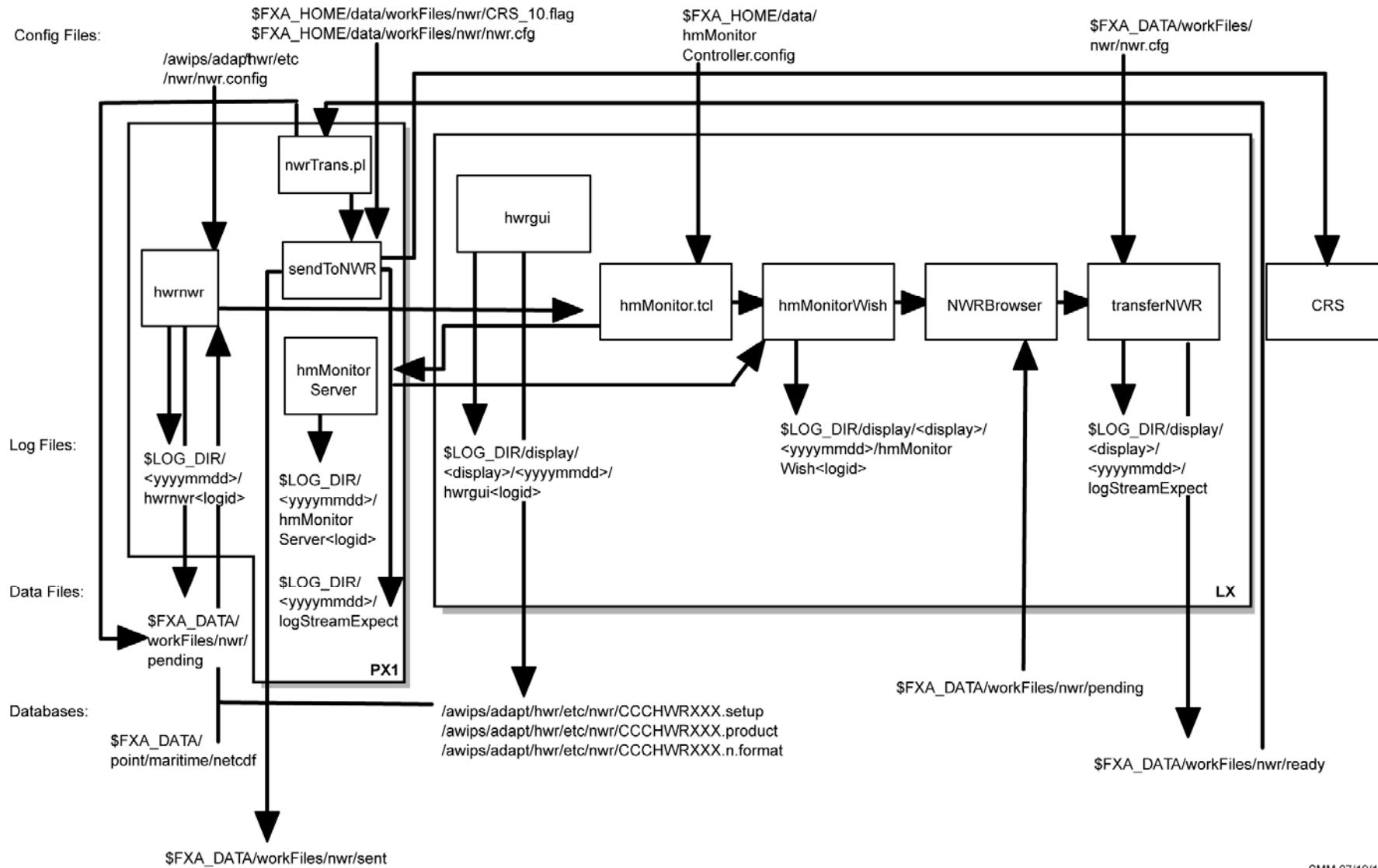


Exhibit B.1-28. Hourly Weather Roundup Formatter for NOAA Weather Radio

Appendix C
Directories for /awips2/edex/data and
/data/fxa

Appendix C.

Directories for /awips2/edex/data and /data/fxa

Table of Contents

	<i>Page</i>
C.0 Introduction.....	1
C.1 Data Directories in /awips2/edex/data	1
C.2 Directory Tree for /data/fxa	10

C.0 Introduction

This appendix includes two sections. Section C.1 contains the /awips2/edex/data directory and Section C.2 contains the outline for the /data/fxa directory tree.

C.1 Data Directories in /awips2/edex/data

/awips2/edex/data

/hdf5

/aviation Contains decoded aviation products in HDF5 format plus some static data.

Example: /awips2/edex/data/hdf5/aviation/KECG.01.nc

/binlightning Contains decoded binlightning products in HDF5 format.

Example:/awips2/edex/data/hdf5/binlightning/binlightning-2011-10-20-20-1152538866.h5

/bufrascat Contains decoded bufrascat products in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrascat/ ascat-2011-07-04-12.h5

/bufrhdw Contains decoded bufrhdw products in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrhdw/hdw-2011-10-19-11.h5

/bufrmossGFS All decoded bufrmossGFS data are under /awips2/edex/data/hdf5/bufrmossGFS/<model>-<yyyy>-<mm>-<dd>-<hh>.h5 in HDF% format.

Example: /awips2/edex/data/hdf5/bufrmossGFS/bufrmoss-GFS-2011-10-19-11

/bufrmossHPC All decoded bufrmossHPC data are under /awips2/edex/data/hdf5/bufrmossHPC/<model>-<yyyy>-<mm>-<dd>-<hh>.h5 in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrmossHPC/bufrmoss-HPC-2011-10-19-11

/bufrmossLAMP All decoded bufrmossLAMP data are under /awips2/edex/data/hdf5/bufrmossLAMP/<model>-<yyyy>-

<mm>-<dd>-<hh>.h5 in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrmosLAMP/bufrmos-LAMP-2011-10-19-11.h5

/bufrmosAVN All decoded bufrmosAVN data are under
 /awips2/edex/data/hdf5/bufrmosAVN/<model>-<yyyy>-
 <mm>-<dd>-<hh>.h5 in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrmosAVN/bufrmos-
 AVN-2011-10-23-11.h5

/bufrmosMRF All decoded bufrmosMRF data are under
 /awips2/edex/data/hdf5/bufrmosMRF/<model>-<yyyy>-
 <mm>-<dd>-<hh>.h5 in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrmosMRF/bufrmos-
 MRF-2011-10-23-11.h5

/bufrmosETA All decoded bufrmosETA data are under
 /awips2/edex/data/hdf5/bufrmosETA/<model>-<yyyy>-
 <mm>-<dd>-<hh>.h5 in HDF5 format.

Example: e.g.: /awips2/edex/data/hdf5/bufrmosETA/bufrmos-
 ETA-2011-10-23-11.h5

/bufrncwf Contains decoded bufrncwf products in HDF5 format.

Example: /awips2/edex/data/hdf5/bufrncwf/bufrncwf-2011-10-
 19-22.h5

/bufrsigwx Contains decoded bufrsigwx products in HDF5 format.

There are three directories under /bufrsigwx

SWBOTH, SWH, SWM

SWBOTH: sigwxVTS-2011-07-04-18.h5

SWH: sigwxCAT-2011-07-05-06.h5, sigwxCLOUD-SWH-
 2011-07-05-00.h5, sigwxJETS-2011-07-05-06.h5

SWM: sigwxCLOUD-SWM-2011-07-04-18.h5,
 sigwxCLOUD-SWM-2011-07-05-06.h5,
 sigwxCAT-2011-07-05-00.h5, sigwxCAT-011-07-05-
 06.h5

/bufrssmi	Contains decoded bufrssmi products in HDF5 format. Example: /awips2/edex/data/hdf5/bufrssmi/ssmi-2011-10-26-16.h5
/bufrua	Contains decoded bufrua products in HDF5 format. Example: /awips2/edex/data/hdf5/bufrua/bufrua-2011-10-25-06.h5
/cwat	Contains decoded cwat products in HDF5 format. Example: /awips2/edex/data/hdf5/cwat/cwat-2011-11-01-02--1181167496.h5
/ffmp	Contains decoded ffmp products in HDF5 format. Example: /awips2/edex/data/hdf5/ffmp/ffmp-2011-11-01-02--1152538345.h5
/fog	Contains decoded fog products in HDF5 format. Example: /awips2/edex/data/hdf5/fog/fog-2011-10-13-16--1152538345.h5
/gfe	Contains forecast grids created by GFE and Smart Init /awips2/edex/data/hdf5/gfe/OAX. Climo GFS80 ISC NAM40 NED Restore RUC80 CRMTopo HIRESWarw LAPS NAM80 Obs RFCQPE SAT DGEX HIRESWnmm MOSGuide NamDNG5 Official RFCQPF SREF Fcst HPCGuide MSAS NCDC PRISM RTMA Topo GFS40 HPCQPF NAM12 NCDCClimo PRISMclimo RUC13
/goessounding	Contains decoded goessounding products in HDF5 format. Example: /awips2/edex/data/hdf5/goessounding/goessounding-2011-10-19-11.h5
/grib	Contains decoded grib products in HDF5 format. AK-NamDNG5 AK-RTMA AKwave10 AKWAVE239 AKwave4

AUTOSPE
Aviation
AVN
AVN203
ETA242
FFG-ALR
FFG-FWR
FFG-KRF
FFG-MSR
FFG-ORN
FFG-PTR
FFG-RHA
FFG-RSA
FFG-STR
FFG-TAR
FFG-TIR
FFG-TUA
GFS161
GFS201
GFS212
GFS213
GFS254
GFSGuide
GFSLAMPTstorm
GlobalWave
GRLKwave
GWW233
HI-NamDNG5
HiResW-ARW-East
HiResW-ARW-HI
HiResW-ARW-West
HiResW-NMM-East
HiResW-NMM-HI
HiResW-NMM-West
HI-RTMA
HPCGuide
HPCqpf
HPCqpfNDFD

HPE
LAPS
mesoEta212
mesoEta215
mesoEta216
mesoEta217
mesoEta237
MOSGuide
MOSGuide-AK
MPE-Local
MPE-Local-ALR
MPE-Local-FWR
MPE-Local-MSR
MPE-Local-ORN
MPE-Local-RHA
MPE-Local-RSA
MPE-Local-SJU
MPE-Local-STR
MPE-Local-TAR
MPE-Local-TIR
MPE-Local-TUA
MPE-Mosaic
MPE-Mosaic-ALR
MPE-Mosaic-FWR
MPE-Mosaic-MSR
MPE-Mosaic-ORN
MPE-Mosaic-RHA
MPE-Mosaic-SJU
MPE-Mosaic-TAR
MPE-Mosaic-TIR
MRF
MRF203
MRF204
MRF205
mrfNH
MSAS
NamDNG5
NCWF

NOHRSC-SNOW
OPCWave180
OPCWave181
OPCWave182
PR-NamDNG5
PROB3HR
PR-RTMA
QPE
QPE-ALR
QPE-Auto-TUA
QPE-FWR
QPE-KRF
QPE-MSR
QPE-RFC-PTR
QPE-RFC-RSA
QPE-RFC-STR
QPE-RHA
QPE-STR
QPE-TAR
QPE-TIR
QPE-TUA
QPE-XNAV-ALR
QPE-XNAV-FWR
QPE-XNAV-KRF
QPE-XNAV-MSR
QPE-XNAV-ORN
QPE-XNAV-RHA
QPE-XNAV-SJU
QPE-XNAV-TAR
QPE-XNAV-TIR
QPE-XNAV-TUA
QPF-KRF
QPF-MSR
RCM
RFCqpf
RTGSST
RTGSSTHR
RTMA

RUC	
RUC130	
RUC236	
SeaIce	
SREF212	
SREF243	
TPCSurgeProb	
TPCWindProb	
UKMET37	
UKMET38	
UKMET39	
UKMET40	
UKMET-NorthernHemisphere	
UnknownModel:9:0:160:Unknown 212 X 222 5 km Polar Stereographic grid	
UnknownModel:9:0:160:Unknown 82 X 80 5 km Polar Stereographic grid	
UnknownModel:9:0:161:Unknown 212 X 222 5 km Polar Stereographic grid	
UnknownModel:9:0:161:Unknown 82 X 80 5 km Polar Stereographic grid	
UnknownModel:9:152:161:250152	
UnknownModel:9:161:151:Unknown 899 X 452 5 km Polar Stereographic grid	
WCwave10	
WCwave4	
WNAwave10	
WNAWAVE238	
WNAwave4	
/lsr	Contains decoded lsr products in HDF5 format. Example: /awips2/edex/data/hdf5/lsr/lsr-2011-10-22-23.h5
/modelsounding	Contains decoded modelsounding products in HDF5 format. Example: /awips2/edex/data/hdf5/modelsounding/modelsounding-2011-10-23-11.h5
/obs	Contains decoded obs (metar) products in HDF5 format.

	Example: /awips2/edex/data/hdf5/obs/metar-2011-10-23-06.h5																						
/poessounding	Contains decoded poessounding products in HDF5 format. Example: /awips2/edex/data/hdf5/poessounding/poessounding-2011-10-23-11.h5																						
/profiler	Contains decoded profiler products in HDF5 format. Example: /awips2/edex/data/hdf5/profiler/profiler-2011-10-31-17.h5																						
/qpf	Contains decoded qpf products in HDF5 format. Example: /awips2/edex/data/hdf5/qpf/qpf-2011-11-01-03--1152538345.h5																						
/radar	Contains radar products in HDF5 format. Example: /awips2/edex/data/hdf5/kabr/radar-kabr-2011-11-01-03.h5																						
/redbook	Contains decoded redbook products in HDF5 format. Example: /awips2/edex/data/hdf5/redbook/PEWA34/redbook-2011-10-31-12--1181167496.h5																						
/satellite	Contains decoded satellite products in HDF5 format. Under each satellite directory, you will find the SOURCE directory: <table> <tbody> <tr> <td>Alaska National</td> <td>Northern Hemisphere Composite</td> </tr> <tr> <td>Alaska Regional</td> <td>Puerto Rico National</td> </tr> <tr> <td>East CONUS</td> <td>Puerto Rico Regional</td> </tr> <tr> <td>Hawaii National</td> <td>Supernational</td> </tr> <tr> <td>Hawaii Regional</td> <td>West CONUS</td> </tr> <tr> <td>NH Composite - Meteosat-GOES E-GOES W-GMS</td> <td></td> </tr> </tbody> </table> Under each SOURCE directory, you will find the RESOLUTION directory. For example, under East CONUS, you will find the following directories: <table> <tbody> <tr> <td>Imager 11 micron IR imagery</td> <td>Sounder 14.06 micron</td> </tr> <tr> <td>Imager 13 micron (IR)</td> <td>Sounder 3.98 micron imagery</td> </tr> <tr> <td>Imager 3.9 micron IR</td> <td>Sounder 4.45 micron imagery</td> </tr> <tr> <td>Imager 6.7-6.5 micron IR (WV)</td> <td>Sounder 6.51 micron imagery</td> </tr> <tr> <td>Imager Visible</td> <td>Sounder 7.02 micron imagery</td> </tr> </tbody> </table>	Alaska National	Northern Hemisphere Composite	Alaska Regional	Puerto Rico National	East CONUS	Puerto Rico Regional	Hawaii National	Supernational	Hawaii Regional	West CONUS	NH Composite - Meteosat-GOES E-GOES W-GMS		Imager 11 micron IR imagery	Sounder 14.06 micron	Imager 13 micron (IR)	Sounder 3.98 micron imagery	Imager 3.9 micron IR	Sounder 4.45 micron imagery	Imager 6.7-6.5 micron IR (WV)	Sounder 6.51 micron imagery	Imager Visible	Sounder 7.02 micron imagery
Alaska National	Northern Hemisphere Composite																						
Alaska Regional	Puerto Rico National																						
East CONUS	Puerto Rico Regional																						
Hawaii National	Supernational																						
Hawaii Regional	West CONUS																						
NH Composite - Meteosat-GOES E-GOES W-GMS																							
Imager 11 micron IR imagery	Sounder 14.06 micron																						
Imager 13 micron (IR)	Sounder 3.98 micron imagery																						
Imager 3.9 micron IR	Sounder 4.45 micron imagery																						
Imager 6.7-6.5 micron IR (WV)	Sounder 6.51 micron imagery																						
Imager Visible	Sounder 7.02 micron imagery																						

Low cloud base imagery Sounder 7.43 micron imagery
Sounder 11.03 micron imagery Sounder Visible imagery

Under each RESOLUTION directory, you will find the satellite products.

Example: Under Imager Visible, you will find the following satellite products:

satellite-2011-10-29-22--1152538345.h5
satellite-2011-11-01-10--1181167496.h5
satellite-2011-10-29-22--1181167496.h5
satellite-2011-11-01-11--1152538345.h5
satellite-2011-10-29-23--1152538345.h5
satellite-2011-11-01-11--1181167496.h5

/scan Contains decoded scan products in HDF5 format.

Example: /awips2/edex/data/hdf5/scan/scan-2011-10-31-19--1181167496.h5

/sfcobs Contains decoded sfcobs products in HDF5 format.

Under sfcobs you will find the following directories:
1003 1004 1005 1006 1007

Under each directory, you will find the corresponding sfcobs products.

Example: awips2/edex/data/hdf5/sfcobs/sfcobs-2011-10-04-12.h5

/svrwx Contains decoded svrwx products in HDF5 format.

Example: /awips2/edex/data/hdf5/svrwx/svrwx-svrwx-0002-12-05-21.h5

/tcg Contains decoded tcg products in HDF5 format.

Example: /awips2/edex/data/hdf5/tcg/tcg-0002-12-05-21.h5

/topo Contains topo files

akTopo.dat.gz
hlsTopo
modelStaticTopo.h5
srtm30.hdf
usTopo.dat.gz
caribTopo.dat.gz licenses

	pacTopo.dat.gz staticTopo.h5 worldTopo.dat.gz
/vil	Contains decoded vil products in HDF5 format. Example: /awips2/edex/data/hdf5/vil/vil-2011-11-01-16--1152538345.h5
	Note: vil is a radar-based product that shows liquid amounts. VIL stands for “Vertically Integrated Liquid.” Also in this group are Digital Vertically Integrated Liquid (DVIL) and Enhanced Vertically Integrated Liquid (EDVIL). Each HDF5 file contains all 3 of these products, which are stored as displayable data blobs (two dimensional grids). For VIL, the grid size is 4KM; the other two are 1 km grids.

C.2 *Directory Tree for /data/fxa*

Directory	Description
/afos	NOT IN USE
/aiv	NOT IN USE
/archive	NOT IN USE
/ax_refresh	NOT IN USE
/badRadar	NOT IN USE
/badSatellite	NOT IN USE
/badText	NOT IN USE
/customFiles	NOT IN USE
/data	NOT IN USE
/dgm	NOT IN USE
/DRT	NOT IN USE
/elt	NOT IN USE
/eLog	NOT IN USE
/flatText	NOT IN USE
/freeware	NOT IN USE
/freeway	NOT IN USE
/Grid	NOT IN USE
/hazCollect	NOT IN USE
/img	NOT IN USE
/ispan	NOT IN USE
/INSTALL	NOT IN USE
/install_root	NOT IN USE
/j24	NOT IN USE
/laps	LAPS
/laps_data	LAPS data

/laps_domain	LAPS domain
/laps_geog	LAPS geography
/LDAD	NOT IN USE
/ldadScheduler	NOT IN USE
/mhs	NOT IN USE
/nationalData	NOT IN USE
/nwr	NOT IN USE
/nwws	NOT IN USE
/point	NOT IN USE
/pgdata	NOT IN USE
/radar	NOT IN USE
/redbook	NOT IN USE
/rps-lists	NOT IN USE
/sat	NOT IN USE
/siteConfig	NOT IN USE
/textWSwork	NOT IN USE
/tmp	NOT IN USE
/trigger	NOT IN USE
/tstorm	NOT IN USE
/userSkewTs	NOT IN USE
/userPrefs	AWIPS user preferences files
/verification	NOT IN USE
/vgf	NOT IN USE
/workFiles	Temporary files

Appendix D

Glossary

AlertViz	The AWIPS II version of the AWIPS I Guardian application. AlertViz is designed to present various notifications, error messages, and alarms to the user. AlertViz can be executed either independently or from CAVE itself.
Camel	An open-source project from Apache that is used to implement the AWIPS II Service Oriented Architecture (SOA).
CAVE	Common AWIPS Visualization Environment, the unified display client for AWIPS II. CAVE is implemented using the Eclipse framework and consists of multiple display perspectives that can run concurrently.
caveData	A directory created by CAVE in each user's home directory. caveData stores a local copy of customization and configuration settings. When CAVE starts, in theory, it refreshes caveData with the current settings from the EDEX server.
dataURI	data Uniform Resource Identifier, a unique identifier for each piece of data in AWIPS II. For example, a dataURI for a surface observation might be /obs/2010-05-11_09_53:00.0/METAR/KMLB/28.1/-80.65/, containing the EDEX decoder plug-in that stored the data (i.e., a generic data type), the date/time of the observation, the type of observation, the metar site ID (Melbourne, Florida), and the latitude and longitude coordinates. The dataURI is used to match the inventory of data with the data itself, which is typically stored in an HDF repository. An example of a dataURI for a single model grid is /grib/2010-05-11_12:00:00.0_(9)/mesoEta216/RH/MB/900.0/, meaning that the data-type is grib (binary grid), from the 12Z model run of the mesoEta on May 11, 2010, on grid number 216. The particular model parameter is a 9-hour forecast (valid at 21Z) of 900 mb relative humidity.
eclipse	An open-source development environment that supports many programming languages, including JAVA and Python. In addition, Eclipse is a rich client platform (RCP) upon which other applications can be developed. Although both CAVE and EDEX are developed and compiled using the Eclipse development environment, CAVE itself is an application developed using the Eclipse RCP, meaning that the user-interface elements and windowing mechanisms are provided by the Eclipse environment. Eclipse also implements a plug-in concept that allows CAVE and other RCP applications to be loosely coupled, meaning that many components can be added and deleted simply by adding and removing plug-ins and not necessarily re-compiling the entire app.
Focus	A state of the system that indicates which component receives keyboard events. A component is said to have the focus if keyboard events are sent to that component.

EDEX	Environmental Data Exchange, the server for AWIPS II. EDEX ingests, decodes, stores, catalogs, and archives all the data used by AWIPS II. It also feeds data to the various CAVE clients.
endpoint	Refers (when used within the context of a Service Oriented Architecture) to the beginning and destination of a particular service. In AWIPS II, “endpoint” commonly refers to the file endpoints that the various EDEX data decoders can use to read data. One way (though not necessarily the most preferred way) to feed data into EDEX is simply to have another program put a file in the proper file endpoint. For example, putting a text file that contains a metar in the endpoint directory of the obs decoder (/awips2/edex/data/SBN/metar) causes the obs decoder to execute using the input text file.
HDF	Hierarchical Data Format, designed by the University of Illinois at Urbana-Champaign as an alternative to netCDF developed by Unidata. HDF5 is the primary data storage format used by AWIPS II. HDF5 supports multiple types of data within a single file. For example, a single HDF5 file of radar data could contain many volume scans of base reflectivity, base velocity plus any associated derived products like composite reflectivity, vertically integrated liquid, and precipitation accumulations, as well as algorithm output. The file may also contain data from multiple radars.
Hibernate	An open-source project used in AWIPS II to provide connectivity between the PostgreSQL database for metadata and the JAVA code itself. Hibernate provides several methodologies to map database fields to variables and complex data objects in Java using either XML configuration files or special annotations in the JAVA code.
LDM	Local Data Manager software, written and supported by Unidata. Many meteorological entities use LDM to manage the movement of data. LDM often connects data that comes from a NOAAPORT or AWIPS Satellite Broadcast Network (SBN) receiver to any number of downstream clients. These downstream clients might store the data, decode the data, or perform other functions on the data in an event-driven manner as the data arrive. In AWIPS II, the LDM provides the link between the AWIPS SBN, which receives raw data via satellite, and EDEX, which decodes and stores the data. In the normal AWIPS II, the LDM writes data directly into an archive and sends a message to EDEX using Qpid. The message tells EDEX that the particular data file is available for processing and uses a file header to determine what kind of file it is.

metadata	Generally defined as “data about data.” In AWIPS II, metadata refers either to either a specific PostgreSQL database or to the data contained within it. AWIPS II queries this metadata database to keep track of what data is currently available. In AWIPS I, the system would search through a system of files to find a particular piece or slice of data, such as radar, surface, model, or satellite data. In AWIPS II, particular pieces of data have a unique identifier, known as a dataURI, that contains enough information to specify the data. For example, metadata for a radar product might contain the radar id, the volume scan time, the elevation angle, and the product type.
perspective	Defined, within CAVE, as a particular type of data display. Former discrete applications of AWIPS I have been unified using perspectives. For example, there is a D2D perspective, a GFE perspective, a Hydro perspective, and a collaboration perspective. Each perspective can be open on a workstation simultaneously and appear in CAVE as individual tabs, much like multiple web pages can be loaded in modern web browsers.
Python	The main scripting language used in AWIPS II.
Qpid	Queue Processor Interface Daemon, the messaging system used in AWIPS II. An open-source project, Qpid is an implementation of the Advanced Message Queuing Protocol. When the LDM receives a data file to be processed, it sends EDEX a message using Qpid. When EDEX has finished decoding the file, it sends CAVE and any other listeners a message that says the particular piece of data (referenced by a dataURI) is available for display or further processing.
Re-engineered application	Some applications in AWIPS II were completely rewritten. These re-engineered applications include GFE, D2D, and FFMP.
Re-hosted application	See “wrapped application.”
SOA	Service Oriented Architecture, the design philosophy behind AWIPS II. In SOA, major system functions are <i>services</i> , and they are loosely coupled, rather than having large monolithic programs. In AWIPS II, raw data are ingested by an IngestSrv service, and are stored using a PersistSrv service. Camel “wires” or connects the services together (i.e., connecting the endpoints of successive services together) using XML configuration files, and the services can be modified without significantly affecting one another.

Tear-Away Menu	A menu that can be moved around the workstation screen, away from the location on the screen where it first opened, by grabbing it in the title area and repositioning it on the screen.
utility data	Data that contains various pieces of configuration information for AWIPS II. Utility data also includes site-level localization information in addition to user-level information such as procedures and mouse configuration settings.
utility store	Is a collection of utility data. The utility store is part of EDEX, and is typically located at /awips2/edex/data/utility/.
Velocity	An open-source template language. AWIPS II uses Velocity to construct WarnGen templates. Certain variables from the WarnGen JAVA code and data fields from the PostgreSQL database have been exposed to the Velocity templates, meaning that this data is available for use by Velocity. Because Velocity is an actual language, it has the ability to perform calculations and comparisons without having to recompile the WarnGen code itself.
wrapped application	AWIPS I programs that have been dropped as-is into AWIPS II, with minimal changes. These wrapped applications include FSI, the hydro apps, and the Climate program.
XML	Extensible Markup Language. XML is not a programming language; rather, it is a common and structured way of formatting data, especially data that contains settings and preferences. In AWIPS II, most of the configuration files are stored in XML-formatted files.

Appendix E

Mass Storage Design

Appendix E. Mass Storage Design

Table of Contents

	<i>Page</i>
E.0 Mass Storage Design: Content Overview	1
E.1 LS Drive Allocations	2
E.2 Linux LX-Drive Allocation – WFO.....	3
E.3 Linux XT-Drive Allocation	5
E.4 Linux CP Drive Allocation	6
E.5 Linux WFO AX Drive Allocation	7
E.6 Linux RFC AX Drive Allocation.....	8
E.7 Linux PX Allocation	9
E.8 Linux DX Drive Allocation and Linux DX Shared Database Allocation.....	10
E.9 DX-NAS (NAS1) Drive Allocation.....	13
E.10 Linux RP RFC Drive Allocation.....	14

E.0 Mass Storage Design: Content Overview

This appendix provides current AWIPS system disk allocations.

E.1 LS Drive Allocations

LS Drive Allocations

LS2 and LS3 - /dev/sda (i686) 80 GBytes			
Volume Name	FS Type	Label	Size (MB)
md0	ext3	/boot	100
vg00/lvol01	ext3	/	7,000
vg00/lvol02	ext3	/tmp	1,000
vg00/lvol03	ext3	/usr	12,000
vg00/lvol04	ext3	/var	3,000
vg00/lvol05	SWAP		2,000
vg00/lvol06	ext3	/data/Incoming	2,000
vg00/lvol07	ext3	/data/ldad	34,000
vg00/lvol08	ext3	/data/logs	1,000
vg00/lvol09	ext3	/home	5,000
vg00/lvol10	ext3	/ldad	3,000
vg00/lvol11	ext3	/opt	2,000
Total Space Used			72,100
Unallocated			4,212

Storage Allocated	72,100
Total Drive Capacity	76,312
Unallocated Space	4,212

Note: This is the baseline configuration for all AWIPS sites.

E.2 Linux LX-Drive Allocation – WFO

Linux LX-Drive Allocation

LX - /dev/sda (i686)			
Volume Name	FS Type	Label	Size (MB)
sda1	Linux ext3	/boot	100
vg00/lvol01	Linux ext3	/	1,000
vg00/lvol02	Linux ext3	/tmp	500
vg00/lvol03	Linux ext3	/usr	15,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux swap		2,000
vg00/lvol06	Linux ext3	/awips/fxa	4,500
vg00/lvol07	Linux ext3	/data/dhm	1,000
vg00/lvol08	Linux ext3	/awips/ifps	1,500
vg00/lvol09	Linux ext3	/awips/idad	1,000
vg00/lvol10	Linux ext3	/awips/ops	300
vg00/lvol11	Linux ext3	/data	4,000
vg00/lvol12	Linux ext3	/local	2,000
Total Space Used			35,900
Internal Disk Drives			

Storage Allocated **35,900**
Total Used Capacity **70,200**

Note: This is the baseline configuration for all AWIPS sites.

Linux LX-Drive Allocation

LX - /dev/sda (i686)			
Volume Name	FS Type	Label	Size (MB)
sda1	Linux ext3	/boot	100
vg01/lvol01	Linux ext3	/	1,000
vg01/lvol02	Linux ext3	/tmp	500
vg01/lvol03	Linux ext3	/usr	15,000
vg01/lvol04	Linux ext3	/var	3,000
vg01/lvol05	Linux swap		2,000
vg01/lvol06	Linux ext3	/awips/fxa	4,500
vg01/lvol07	Linux ext3	/data/dhm	1,000
vg01/lvol08	Linux ext3	/awips/ifps	1,500
vg01/lvol09	Linux ext3	/awips/ldad	1,000
vg01/lvol10	Linux ext3	/awips/ops	300
vg01/lvol11	Linux ext3	/data	4,000
vg01/lvol12	Linux ext3	/local	2,000
Total Space Used			35,900

Storage Allocated Total Used Capacity

35,900

69,804

Note: This is the baseline configuration for all AWIPS sites.

E.3 Linux XT-Drive Allocation

Linux XT-Drive Allocation

XT - /dev/sda (i686)			
Volume Name	FS Type	Label	Size (MB)
sda1	Linux ext3	/boot	100
vg00/lvol01	Linux ext3	/	1,000
vg00/lvol02	Linux ext3	/tmp	500
vg00/lvol03	Linux ext3	/usr	15,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux swap		2,000
vg00/lvol06	Linux ext3	/awips/fxa	4,500
vg00/lvol08	Linux ext3	/awips/ifps	1,500
vg00/lvol09	Linux ext3	/awips/ldad	1,000
vg00/lvol10	Linux ext3	/awips/ops	300
vg00/lvol11	Linux ext3	/data	4,000
vg00/lvol12	Linux ext3	/local	2,000
Total Space Used			34,900
Unallocated			5,200
Internal Disk Drives			

Storage Allocated	34,900
Total Drive Capacity	40,100
Unallocated Space	5,200

E.4 Linux CP Drive Allocation

Linux CP Drive Allocation

CP - /dev/sda (i686)			
Volume Name	FS Type	Label	Size (MB)
c0d0p2	Linux ext3	/boot	100
vg00/lvol01	Linux ext3	/	500
vg00/lvol02	Linux ext3	/tmp	512
vg00/lvol03	Linux ext3	/usr	15,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux swap		2,000
vg00/lvol06	Linux ext3	/awips	512
vg00/lvol07	Linux ext3	/data	100,000
vg00/lvol08	Linux ext3	/home	256
Total Space Used			121,880
Unallocated			18,088
Internal Disk Drives			

Storage Allocated	121,880
Total Drive Capacity	139,968
Unallocated Space	18,088

Note: This is the baseline configuration for all AWIPS sites.

E.5 Linux WFO AX Drive Allocation

Linux WFO AX Drive Allocation

AX - /dev/sda (i686)			
Volume Name	FS Type	Label	Size (MB)
/c0d0p1	Linux ext3	/boot	100
vg00/lvol01	Linux ext3	/	1,024
vg00/lvol02	Linux ext3	/tmp	512
vg00/lvol03	Linux ext3	/usr	9,008
vg00/lvol04	Linux ext3	/var	3,008
vg00/lvol05	Linux swap		2,000
vg00/lvol06	Linux ext3	/awips/fxa	1,008
vg00/lvol08	Linux ext3	/awips/archiver	1,008
vg00/lvol10	Linux ext3	/awips/ops	304
vg00/lvol11	Linux ext3	/data	259,968
vg00/lvol12	Linux ext3	/local	2,000
Total Space Used			279,940
Unallocated			4
Internal Disk Drives			

Storage Allocated	279,940
Total Drive Capacity	279,956
Unallocated Space	4

E.6 Linux RFC AX Drive Allocation

Linux RFC AX Drive Allocation

AX - /dev/sda (i686)					
Partition					
Name	Flags	Part Type	FS Type	Label	Size (MB)
/c0d0p1			Linux ext3	/boot	100
vg00/lvol01			Linux ext3	/	1,008
vg00/lvol02			Linux ext3	/tmp	512
vg00/lvol03			Linux ext3	/usr	9,008
vg00/lvol04			Linux ext3	/var	3,008
vg00/lvol05			Linux swap		2,000
vg00/lvol06			Linux ext3	/rfc_arc	2,000
vg00/lvol08			Linux ext3	/rfc_arc_data	5,008
vg00/lvol10			Linux ext3	/awips/ops	304
vg00/lvol11			Linux ext3	/data	670,000
vg00/lvol12			Linux ext3	/local	2000
Total Space Used					694,948
Unallocated					4,956
Internal Archive Server Disk Drives					

Storage Allocated	694,948
Total Drive Capacity	699,904
Unallocated Space	4,956

Note: This is the baseline configuration for all AWIPS RFC sites.

E.7 Linux PX Allocation

Linux PX Allocation

PX1/PX2/PX3/PX4 - /dev/sda (i686)			
Volume Name	FS Type	Label	Size (MB)
sda1	Linux ext3	/boot	100
vg00/lvol01	Linux ext3	/	1,000
vg00/lvol02	Linux ext3	/tmp	500
vg00/lvol03	Linux ext3	/usr	9,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux swap		2,000
vg00/lvol06	Linux ext3	/awips/fxa	5,000
vg00/lvol07	Linux ext3	/awips/ifps	1,500
vg00/lvol08	Linux ext3	/awips/laps	1,000
vg00/lvol09	Linux ext3	/awips/ldad	1,000
vg00/lvol10	Linux ext3	/awips/ops	300
vg00/lvol11	Linux ext3	/data/logs	2,000
Total Space Used			26,400
Unallocated			112,832
Internal Disk Drives			

Storage Allocated	26,400
Total Drive Capacity	139,232
Unallocated Space	112,832

Note: This is the baseline configuration for all AWIPS sites.

E.8 Linux DX Drive Allocation and Linux DX Shared Database Allocation

Linux DX Drive Allocation

DX1/DX2			
Volume Name	FS Type	Label	Size (MB)
DX!/DX2 c0dop1	Linux ext3	/boot	100
vg00/lvol00	Linux swap		2,148
vg00/lvol01	Linux ext3	/	1,096
vg00/lvol02	Linux ext3	/tmp	1,000
vg00/lvol03	Linux ext3	/usr	10,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux ext3	/awips/fxa	5,248
vg00/lvol06	Linux ext3	/awips/ifps	1,300
vg00/lvol07	Linux ext3	/awips/ldad	1,000
vg00/lvol08	Linux ext3	/awips/ops	280
vg00/lvol09	Linux ext3	/data/logs	2,000
Total Space Used			27,172
Unallocated			112,796
Internal Disk Drives			

Storage Allocated	27,172
Total Drive Capacity	139,968
Unallocated Space	112,796

Linux DX Drive Allocation

DX3/DX4			
Volume Name	FS Type	Label	Size (MB)
DX3/4 sda1	Linux ext3	/boot	100
vg00/lvol00	Linux swap		2,148
vg00/lvol01	Linux ext3	/	1,096
vg00/lvol02	Linux ext3	/tmp	1,000
vg00/lvol03	Linux ext3	/usr	10,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux ext3	/awips/fxa	5,248
vg00/lvol06	Linux ext3	/awips/ifps	1,300
vg00/lvol07	Linux ext3	/awips/ldad	1,000
vg00/lvol08	Linux ext3	/awips/ops	280
vg00/lvol09	Linux ext3	/data/logs	2,000
Total Space Used			27,172
Unallocated			112,208
Internal Disk Drives			

Storage Allocated	27,172
Total Drive Capacity	139,380
Unallocated Space	112,208

Linux DX Shared Database Allocation
(DAS attached to DX1 and DX2)

Volume Name	FS Type	Label	Size (MB)	
			WFO	RFC
vg_db/lvol_pgdata	Linux ext3	/data/db/pgdata	552	552
vg_db/lvol_fxatext	Linux ext3	/data/db/fxatext	2,200	4,400
vg_db/lvol_ihfs	Linux ext3	/data/db/ihfs	1,652	27,000
vg_db/lvol_hmdb	Linux ext3	/data/db/hmdb	660	660
vg_db/lvol_ifps	Linux ext3	/data/db/ifps	1,652	1,652
vg_db/lvol_dblocalrfc	Linux ext3	/data/db/dblocalrfc	35,200	
Total Space Used			6,716	69,464
Unallocated			145,872	83,124

	WFO	RFC
Storage Allocated	6,716	69,464
Total Drive Capacity	152,588	152,588
Unallocated Space	145,872	83,124

Note: This is the baseline configuration for all AWIPS sites.

E.9 DX-NAS (NAS1) Drive Allocation

DX-NAS (NAS1) Drive Allocation

NAS1				
16x500 GB Raw Disks = (RAID 5)				
Disks (16): Root/Data (14) + Parity (1) + Hot Spare (1)				
Flexible Volume Name	Mount Point	SNAP	Size (MB) WFO	Size (MB) RFC
/awips_home	/home	*	114000.0	14000.0
/data_fxa	/data/fxa		500000.0	500000.0
/data_x400	/data/x400		600.0	600.0
/awips_GFESuite	/awips/GFESuite		100000.0 **	100000
/data_GFE	/data/GFE		20	20
/awips_adapt	/awips/adapt	*	10000.0	10000
/data_adapt	/data/adapt		2600.0	2600
/awips_hydro	/awips/hydroapps		10000.0	100000.0
/awips_dev	/awips/dev	*	4000.0	8000.0
/data_local	/data/local	*	50000.0	100000.0
/DS_shared	/DS_shared		1500.0	3000.0
Total Space Used			786,971.0	838220.0
Unallocated			5406824	4824824
Network Attached Storage				

Note: * Indicates that the flex volume includes snapshot backup coverage at 10%.

** Indicates that the size of the flexible volume is increased to 50.0 GB for IFPS multiple domain sites (afc, tbw4, vrh).

E.10 Linux RP RFC Drive Allocation

Linux RP RFC Drive Allocation

RP1/RP2 - /dev/sda (i686) (SCSI ID 0)			
Volume Name	FS Type	Label	Size (MB)
sda1	Linux ext3	/boot	100
vg00/lvol01	Linux ext3	/	1,000
vg00/lvol02	Linux ext3	/tmp	500
vg00/lvol03	Linux ext3	/usr	9,000
vg00/lvol04	Linux ext3	/var	3,000
vg00/lvol05	Linux swap		2,000
vg00/lvol06	Linux ext3	/awips/fxa	5,000
vg00/lvol07	Linux ext3	/awips/ops	300
vg00/lvol08	Linux ext3	/data/logs	2,000
Total Space Used			22,900
Unallocated			116,332
Internal Disk Drives			

Storage Allocated	22,900
Total Drive Capacity	139,232
Unallocated Space	116,332

Note: This is the baseline configuration for all AWIPS sites with RP

Appendix F

NWS/AWIPS Security Policy

Appendix F. NWS/AWIPS Security Policy

Table of Contents

Page

F.0	Introduction.....	1
	F.0.1 Purpose.....	1
	F.0.2 Scope.....	2
	F.0.3 Applicable Documents.....	2
	F.0.4 Changes to AWIPS IT Security Policy	3
F.1	Policy	3
F.2	Responsibilities	4
	F.2.1 IT System Owner	4
	F.2.2 AWIPS ISSO	4
	F.2.3 NWS SISSO.....	5
	F.2.4 Site AWIPS ISSO	6
	F.2.5 AWIPS System Administrator.....	7
	F.2.6 Operational Shift Team Leaders	7
	F.2.7 NCF.....	8
	F.2.8 NWSTC.....	8
	F.2.9 NWS Employees, Non-NWS Government Employees, Non-Government Contractor/Vendor Personnel.....	8
F.3	Allowed Use of AWIPS.....	8
	F.3.1 Access Control	9
	F.3.1.1 Discretionary Access Control (DAC) and Access Control Lists (ACL)	9
	F.3.1.2 Awareness and Password Administration.....	9
	F.3.1.2.1 Awareness	10
	F.3.1.2.2 AWIPS Password Administration.....	10
	F.3.2 Use of Non-AWIPS Software on AWIPS Equipment.....	11
	F.3.3 AWIPS Network Security.....	11
	F.3.3.1 Network Operation and Routing Policy.....	11
	F.3.3.2 Interfaces with Untrusted Networks	12
	F.3.3.3 Services	13
	F.3.3.4 Firewall Rule Set.....	13
	F.3.3.5 AWIPS LAN Connections to Non-AWIPS Systems.....	14
	F.3.3.6 AWIPS IP Address Space Management	15
	F.3.3.7 Dial-in and Dial-out Access.....	15
	F.3.3.7.1 Restricted LDAD Access.....	15

F.3.3.7.2	Restricted Dial-in Access.....	15
F.3.3.7.3	Hardware Controls for Restricted Dial-in Access	15
F.3.3.7.4	Restricted Dial-out Access.....	16
F.3.4	Processing and Handling Classified Information in AWIPS	16
F.3.5	Handling and Storage of AWIPS Magnetic or Storage Media.....	16
F.3.6	Copyrighted AWIPS Software Control	16
F.3.7	AWIPS Site Telecommunications	17
F.4	Implementation of the AWIPS Security Policy	17
F.4.1	Responding to a Security Incident	17
F.4.2	Policy Interpretation and Revision.....	17
F.4.3	Policy Distribution.....	18
F.5	Security Patch Management	18

This appendix is in accordance with the NWS/AWIPS NOAA8107 System Security Plan (SSP) (dated May 12, 2010), NWS Information Technology Directive (<http://www.nws.noaa.gov/directives/sym/pd06007002curr.pdf>), and NOAA Common Controls (<https://www.csp.noaa.gov/noaa/security-program/CandA/NOAACC-201004/Common%20Controls%20Documentation/NOAA%20Common%20Controls%20v4%201%202010%2004%2007.doc>). The SSP was developed in accordance with NIST SP 800-18, Rev-1 and NIST SP 800-53, Rev-3, the NOAA Information Technology Security Manual (ITSM) and Department of Commerce (DOC) IT Security Program Policy (ITSPP), which are web-accessible: (<https://www.csp.noaa.gov/>).

Any updates or changes to the policy and procedures trigger a notification that is sent to the person or persons with security responsibility throughout NOAA via hardcopy distribution as outlined in NOAA Administrative Order (NAO) 212-13 Section 6.04. All policy and procedures have been reviewed and are consistent with all applicable laws, Executive Orders, directives, policies, regulations, standards, and guidance.

The SSP is a living document that is changed as required to reflect system, operational, or organizational changes. The information in this appendix represents the most current policy received to date from the NWS by the Contractor. No changes will be made by the Contractor except for format purposes and the Contractor will only update this section as directed by the Government.

F.0 Introduction

The DOC, NOAA, and NWS are strongly committed to Information Technology (IT) Security. Senior leaders recognize that security must be inherent in our business processes and IT systems. Managers systematically recognize and address information security risks and take steps to understand and manage these risks. Information Technology (IT) systems security for AWIPS presents a constant challenge which must be met at every level of use and management. While various external threats exist, such as: hacker break-ins, terrorist attacks, and malicious intentions, the true risks to security come from poorly configured controls of software and hardware and users/administrators of the system not following the rules set forth in policy.

Use of technology alone, e.g., firewalls and robust operating system software, will not eliminate vulnerabilities in system security. In fact, firewalls can give users a false sense of security leading them to wrongly believe that they no longer need to be personally responsible for following security guidelines. The security of the entire system depends on each user's individual awareness of and commitment to security policy and procedures. Users and administrators must always be aware of the implications of their actions to the security of the system.

F.0.1 Purpose

This document refers to a comprehensive IT Systems policy for the AWIPS. The high-level security policy delineates the allowed use of AWIPS and the general approach for applying the AWIPS security policy. It provides guidance to all personnel operating or servicing AWIPS hardware, software, or networks, including contract personnel, and specifies services and access controls for all AWIPS equipment. In addition, this

document references guidance for the implementation, maintenance, and monitoring of the AWIPS Security Policy.

F.0.2 Scope

This document references the controls, rules, roles, and responsibilities necessary for a viable IT systems security program. It does not specify in detail the procedures, technologies, or specific systems needed to implement the policy. These details are provided in separate documents. The scope of this policy includes:

- All of AWIPS;
- Other systems and equipment interfaced to AWIPS, as covered by this policy;
- All National Weather Service (NWS) and contractor personnel who use, operate, or service AWIPS hardware, software, or networks.

F.0.3 Applicable Documents

- E Government Act (Public Law 107-347), Title III, Federal Information Security Management Act (FISMA) dated December 2002;
- Office of Management and Budget (OMB) Circular A-130 Appendix III, Security of Federal Automated Information Resources dated November 2000;
- FIPS PUB 199, Standards for Security Categorization of Federal Information and Information Systems dated February 2004;
- FIPS PUB 200, Minimum Security Controls for Federal Systems dated March 2006;
- FIPS PUB 201-1, Personal Identity Verification for Federal Employees and Contractors dated March 2006;
- NIST SP 800-16, Information Technology Security Training Requirements: A Role and Performance Based Model dated April 1998;
- NIST SP 800-18 Revision 1, Guide for Developing Security Plans for Federal Information Systems dated February 2006;
- NIST SP 800-26 Revision 1, Guide for Information Security Program Assessments and System Reporting Form dated August 2005;
- NIST SP 800-30, Risk Management Guide for Information Technology Systems dated July 2002;
- NIST SP 800-34, Contingency Planning Guide for Information Technology Systems dated June 2002;
- NIST SP 800-37, Guide for the Security Certification and Accreditation of Federal Information Systems dated May 2004;
- NIST SP 800-47, Security Guide for Interconnecting Information Technology Systems dated August 2002;
- NIST SP 800-50, Building an Information Technology Security Awareness and Training Program dated October 2003;

- NIST SP 800-53A, Recommended Security Controls for Federal Information Systems dated February 2005;
- NIST SP 800-53 Revision 3, Recommended Security Controls for Federal Information Systems dated July 2009;
- NIST SP 800-60 Version 2, Volume I, Guide for Mapping Types of Information and Information Systems to Security Categories and Volume II, Appendixes dated June 2004;
- NIST SP 800-64 Revision 1, Security Considerations in the Information System Development Life Cycle dated June 2004;
- Department of Commerce (DOC) IT Security Program Policy and Minimum Implementation Standards (ITSPP), Revised January 2009;
- Department of Commerce (DOC) IT Security Program Policy and Minimum Implementation Standards, Revised June 30, 2005
- National Oceanic and Atmospheric Administration (NOAA) Common Controls Version 2.0, March 1, 2009
- National Oceanic and Atmospheric Administration (NOAA) IT Security Manual 212-1302, Version 4.2, March 31, 2008

F.0.4 Changes to AWIPS IT Security Policy

Proposed changes to the AWIPS IT Security Policy may be submitted to the Weather Service Headquarters (WSH) AWIPS Information Technology System Security Officer (ISSO). The AWIPS ISSO will disseminate the proposed change to the AWIPS IT Security Focal Points for review and approval. If approved, it will be submitted to AWIPS management for final review and approval. When approved by Management, the change will be incorporated into the policy.

F.1 Policy

AWIPS is critical to the ability of the NWS to accomplish its primary mission of protecting life and property. AWIPS systems will have levels of control consistent with DOC, NOAA, and NWS policy. The objectives of this policy are to:

- Prevent denial of service. Unauthorized access to the AWIPS computers or networks can cause degradation in or loss of the system's operational availability or performance. Tampering with software or hardware can result in loss of data, compromised product integrity, or decreased performance of the entire AWIPS network.
- Preserve the integrity of the AWIPS system and data. Unauthorized changes to data or system configurations must be prevented in order to maintain the integrity of: weather data used to prepare forecast products, the forecast products themselves, and the effective dissemination of these products to the users.
- Protect confidentiality. AWIPS contains sensitive information that requires protection from unauthorized disclosure or dissemination. Examples of such information include, but are not limited to: proprietary data (e.g., lightning reports), NWS

products, sensitive system information, proprietary software, and information enabling access to internal/external computer systems.

F.2 Responsibilities

Responsibilities for NWS IT security starts at the Office of the Assistant Administrator, and flows down through management of all NWS organizations to individual users. AWIPS IT security responsibilities will comply with all provisions of the NWS Information Technology Security Policy. Responsibilities are defined by a role based approach and are derived from ownership as defined below.

F.2.1 IT System Owner

Ownership of information and/or processing IT resources may be assigned to an organization, NWS, or to a functional element within an organization, such as an installation, a position, or a specific individual such as an IT installation manager at the regional, office, center, or laboratory level. When ownership is assigned to an organization, the designated head of the organization shall be the IT system owner. The originator or creator of data or information who has the greatest functional interest and is the physical possessor of the IT resource shall be considered in the determination of IT system ownership. Each IT system owner shall:

- Determine the sensitivity of the IT resources for which there is a responsibility. (The IT system owner shall periodically reevaluate previously specified levels of sensitivity and protection.)
- Determine the level of security which is consistent with appropriate directives and ensure that this level of protection is maintained on those IT resources.
- Complete all required certification actions.
- Designate an individual to serve as the Information System Security Officer (ISSO) with responsibility to develop, implement and manage the security of the IT system. (At the regional, office, center, or laboratory levels, there is a local Information System Security Officer that may serve as the local focal point for ISSO issues.)

F.2.2 AWIPS ISSO

The AWIPS ISSO is responsible for the direct management of the AWIPS IT systems security program. The AWIPS ISSO requires adequate support staff and budget to accomplish all AWIPS specific security tasks. The AWIPS ISSO will be responsible for ensuring AWIPS compliance with requirements of higher level policies and will:

- Manage IT security for the AWIPS Network Control Facility (NCF) and the AWIPS terrestrial Wide Area Network (WAN).
- Approve security policy, plans, procedures, technologies, mechanisms, and devices for AWIPS.
- Manage Security scans and ensure that patches are implemented for the next OB release to fix identified vulnerabilities in the software/hardware.
- Manage all AWIPS Internet Protocol (IP) address space.

- Approve security alerts, patches, and bug fixes for AWIPS systems.
- Manage and track vulnerabilities identified during Accreditation and Continuous Monitoring of system security controls. .
- Manage all WSH AWIPS firewall systems.
- Research and recommend security technologies, mechanisms, devices, and systems for the AWIPS program.
- Assign and approve IP addresses for AWIPS IP address space requests, as appropriate, and maintain the AWIPS IP address data base.
- Maintain liaison with incident response teams from other security organizations.
- Review and implement as directed approved security alerts, patches, and bug fixes required for AWIPS.
- Monitor and ensure the security of all interfaces between AWIPS and external systems.
- Manage the development of AWIPS system-wide security plans, policies, and procedures.
- Develop a review mechanism for AWIPS audit trails which ensures the timely detection of and response to AWIPS security incidents.
- Coordinate development of IT systems security and awareness training for AWIPS System Administrators and users with the NWS Training Center (NWSTC).
- Provide assistance to AWIPS System Administrators and ISSOs on AWIPS IT systems security matters.
- Develop security validation and inspection criteria.
- Review and coordinate physical security requirements for all AWIPS sites.

F.2.3 NWS SISSO

Each Regional ISSO will be responsible for AWIPS IT systems security throughout the region. [The Information Technology Security Officer is the departmental level security officer, i.e., Jeremiah Dewey is the ITSO for OST.] The Regional ISSO will be responsible for all requirements of this and higher level security policies and will:

- Ensure the security of all interfaces between AWIPS and external systems in the region.
- Develop regional security policy, plans, and procedures.
- Evaluate and review security technologies, mechanisms, devices, and systems for all regional sites and recommend changes to the AWIPS ISSO. [The NWS security officer is the Senior Information System Security Officer (SISSO) Robert McKinney.]
- Review, respond to, and report security incidents and maintain logs and records associated with these incidents.
- Maintain liaison with security incident response teams in other regions.

- Issue approved security alerts, patches, and bug fixes to the AWIPS site ISSO's and monitor completion of the same.
- Develop and coordinate regional IT systems security training and awareness programs for AWIPS Administrators and users, and provide assistance to AWIPS field sites on IT systems security matters.
- Manage the AWIPS Local Data Acquisition and Dissemination (LDAD) firewalls consistent with this and higher level policy and procedures. Any requested changes to the configuration of the LDAD firewall will be approved by the Regional ISSO and reported to the AWIPS ISSO. Current records of configuration, including changes, for all firewalls will be maintained.
- Notify the AWIPS ISSO of unusual system activity reported by field sites and actions/support required to mitigate any attempted or successful breach of security.
- Monitor and review physical security policy, practices, and procedures for all regional AWIPS sites.

F.2.4 Site AWIPS ISSO

The overall security of AWIPS at each site is the responsibility of that site's manager or system owner as described above. Contractor sites on the autonomous network will be the responsibility of the WSH AWIPS ISSO and prime contractor consistent with this policy and will apply retroactively from the date of this policy. All future contracts for AWIPS will contain the provisions of this policy.

The day-to-day security operations at each AWIPS site are critical to, and provide the basis for the success of the IT systems security program. The name of the ISSO appointed at each site will be provided to the NWS AWIPS ISSO through the Regional ISSO, if applicable. When possible, the Site ISSO should be someone other than the System Administrator. The Site ISSO is responsible for the local management and oversight for the system security. The Site ISSO will ensure compliance with this and higher level policies [The system level security is now the Information System Security Officer (ISSO)] and will:

- Develop local policy, plans and procedures, commensurate with guidance, or required local enhancements to existing policy, plans and procedures.
- Perform special AWIPS IT system reviews after a security incident, and archive all logs and records associated with the event.
- Notify the site manager and the Regional ISSO of any unusual or unexplained activity on the AWIPS system, and prepare incident reports when required (Local procedures will provide after-hours guidance for shift team leaders to respond to security incidents).
- Ensure the implementation of alerts, patches, and bug fixes.
- Ensure only approved software and hardware are integrated into AWIPS.
- Ensure local procedures and station duty manuals provide instructions for incident reporting, site access requirements, personal security-related information, and

- information on the release of site- specific sensitive information (e.g., what it is, what the release policy is, who has access, etc.).
- Brief new employees on IT security awareness and training as part of the Entry-on-Duty process.
 - Evaluate all IT and automated data processing (ADP) positions for sensitivity level regardless of classified data access.

F.2.5 AWIPS System Administrator

The individual site System Administrators (SAs) perform the majority of the administrative work supporting the local security managers. A strong link exists between the individual responsible for security and the program manager. The site System Administrator will:

- Configure site AWIPS resources commensurate with policies and procedures including: adding, configuring, and removing user accounts; managing system resources; and ensuring compliance with security policy, plans and procedures.
- Perform regularly scheduled analysis of system generated logs as well as special reviews after an unanticipated event and provide, as required, reports to the site ISSO and manager.
- Assist Site ISSO in the development of local policy, plans, and procedures.
- Notify the site manager, Site ISSO and Regional ISSO of any unusual activity on the system and prepare incident reports when required.
- Apply alerts, patches, and bug fixes as required.
- Implement approved software and hardware changes to AWIPS.
- Maintain system logon warning banners.
- Immediately notify the AWIPS NCF of breaches in security and ensure mitigation of security problems.

F.2.6 Operational Shift Team Leaders

Shift team leaders at operational sites may be required to respond to a security incident. The team leaders, in the absence of the local ISSO or System Administrator, will be responsible for reporting the incident to the NCF. The following guidance will be followed.

- Team leaders will report unexplained, significantly decreased performance, access by unknown persons or sites, corruption of data and/or products, unexplained changes to AWIPS software or hardware configuration, and any other perceived breach of security.
- During regular office work hours (0800 - 1600), all incidents will be reported to the site ISSO or Systems Administrator.
- All after-hours incidents will be reported to the NCF for processing and resolution.

F.2.7 NCF

The support mission of the NCF requires that it respond to all reported AWIPS security events. Should a site experience and/or report a perceived breach of security the NCF will, in coordination with the AWIPS Security Manager, take all required steps to mitigate the problem and return the site to a secure, fully operational state. Notifications and incident reports after hours, including archival of records and logs, is the responsibility of the NCF.

F.2.8 NWSTC

The NWSTC will be responsible for developing security training modules. They will provide security awareness training to AWIPS users during operational training and AWIPS System Security training to System Administrators and ISSOs, as required.

F.2.9 *NWS Employees, Non-NWS Government Employees, Non-Government Contractor/Vendor Personnel*

Awareness of and concern for security by all AWIPS users provides the baseline from which security can be maintained. Efforts to secure a system will fail without full cooperation and compliance from users. Each AWIPS user will:

- Be responsible for the security of his or her account. Users must protect their account access information and will not share their access information with any other user.
- Read this policy and acknowledge via signature they have read and understand the policy.
- Ensure their actions do not violate the security policy regardless of the security mechanisms in place.
- Report to the AWIPS Site ISSO or the local team leader any perceived breach of security, misuse of AWIPS systems or critical support equipment and systems, unusual requests for access to AWIPS systems accounts and or physical equipment, and any unexplained system difficulties.

F.3 *Allowed Use of AWIPS*

AWIPS may be used by authorized personnel to support the NWS mission, including forecast and warning operations, training, and/or research and development. User awareness and training, combined with stringent password controls minimize most security risks. Unauthorized user actions leading to disruption or degradation of AWIPS service are prohibited and may be punishable by fine, imprisonment, separation, or administrative consequences. Such actions include, but are not limited to:

- Unauthorized changes to system hardware or software configuration.
- Unauthorized access to AWIPS IT systems or support systems.
- Physical security breaches.

- Actions causing impairment of the AWIPS Network (This type of action may cause an affected site to be disconnected from the WAN pending determination of source and mitigation of problem.)

F.3.1 Access Control

In security vernacular, Discretionary Access Control (DAC) is the level of control applied to files and resources users may access on a system at a given time. These controls provide internal protection of data at the file level and control how, who and what type of access given files or applications have at a given site. Access Control Lists (ACL) are a means of restricting access to; a network segment, protocol, resource or node. ACL's can determine who is allowed to see the network, what protocol the network will pass to what device, or enhanced access control to DAC's for servers.

F.3.1.1 Discretionary Access Control (DAC) and Access Control Lists (ACL)

DAC's and ACL's provide layered protection for sensitive data and resources in AWIPS. DACs in AWIPS have design implications. These controls when changed or enhanced at a site will not affect operation of the system as designed. These controls utilized beyond AWIPS baseline will be used at the discretion of system owners at all sites based on need. Department of Defense Instruction 8510.01 provides a guide for ISSO's use in determining local requirements. Each individual site will consider the totality of the IT systems located, used and controlled specifically at that site as a trusted system or resource for the members of that organization. Minimum security levels will be prescribed by the site ISSO and Manager and implemented by the systems administrator.

ACL's may be used and implemented at the local level as required and are embedded in the established baseline configuration for AWIPS. Primary ACL's are derived from network design and security requirements and are implemented by the Network Control Facility. DAC/ACL security mechanisms provide enhanced security to hardware and software resources used in many different ways in AWIPS. Ultimately however, the end goal is the protection of various types of data. Data security for the NWS is required for proprietary data, personnel data, personal data, military/DOD mission support data/products, operational support data/products, copyrighted software and other data peculiar to a site or organization. All of these data are considered sensitive and will meet the requirements established for data security in the National Weather Service, Information Technology Security Policy.

F.3.1.2 Awareness and Password Administration

AWIPS operational readiness and a site's capability to provide the public with timely warning and forecast products requires continual awareness of system vulnerabilities. Vulnerabilities to a site are multifaceted and may include: physical security vulnerabilities (e.g., unsecured access to communications or environmental controls and hardware, natural phenomena such as hurricanes), collateral equipment vulnerabilities (e.g., unsecured access to computer controlled phone systems, backup power equipment or other critical non-AWIPS mission support equipment), or system specific vulnerabilities (e.g., security hole in the hardware networking infrastructure). Most

vulnerabilities can be controlled through a consistently-applied awareness of security requirements and compliance with published policy.

F.3.1.2.1 Awareness

Site managers, ISSOs and systems administrators will designate which local data is sensitive, determine site physical security and significant collateral equipment security requirements, and review other site-specific security requirements. These local security requirements will be assessed and, as required, policy enhancements will be attached to the AWIPS IT Security Policy. All sites will require authorized AWIPS users to sign a statement of agreement stipulating security policies and procedures have been read and are understood by the employee prior to activation of individual accounts or use of AWIPS assets. **Attachment 4** provides a sample form that may be used.

F.3.1.2.2 AWIPS Password Administration

Passwords provide the foundation for AWIPS security. The minimum rules for password use in AWIPS systems follow.

- Root and other system accounts, including the system administrator accounts, are considered sensitive.
- Immediately after completion of site installation activities and departure of the installation team, the local System Administrator will change all *awipsusr* and *textdemo* account passwords.
- Access to accounts on all servers and workstations will be strictly controlled at each site. The AWIPS System Administrator and local office Manager or their designee will maintain passwords for the sensitive local accounts in a secure place on station. All requirements for site accounts or access to sensitive accounts are subject to owner approval and configuration. For 24 hour maintenance support the Network Control Facility will be advised of any and all changes to root account passwords. Any and all access to AWIPS servers and workstations can only be granted by the owner or the maintaining unit.
- Password lists to all accounts on every piece of password-protected equipment associated in any way with AWIPS will be kept in a secure place and strictly controlled.

NOTE: A protected file on ADP equipment is not considered secure for this purpose.

- Any unauthorized access to password lists or compromise of passwords on the list will require an immediate change of all affected or compromised passwords.
- The NCF and AWIPS Security Manager will be responsible for, and hold complete control of the passwords for all network specific systems such as routers, hubs, communications processors and ancillary password-protected equipment.
- Passwords for restricted accounts will be set to expire every 6 months. All other requirements specified in Engineering Handbook (EHB)-13 shall be adhered to.

Password expiration for all other users should follow the guidelines established in EHB 13.

- Users are responsible for maintaining and securing their individual account passwords consistent with this policy and local guidance.
- Accounts of users who no longer require access to an AWIPS system on the AWIPS network shall be removed as soon as possible. Accounts of Government or contractor employees who have been reassigned, transferred, or terminated, shall be removed at the earliest practical time. Use of account expiration dates is required to ensure a regular review of the continued need for access.
- All individual users will be assigned a unique user ID and password; sharing of accounts is not permitted. The use of “generic” guest or service accounts to gain host access is not allowed. Except where needed to run specific software packages (e.g., the *awipsusr* or *fxa* account), group accounts are not authorized.

F.3.2 Use of Non-AWIPS Software on AWIPS Equipment

All sites will have an applications program manager for locally developed AWIPS applications. The applications manager will provide oversight to all local applications development, including full documentation and functional testing of such applications prior to installation. Extreme caution shall be exerted by local administrators when testing locally developed software on operational resources.

Operational degradation of local or national systems due to non-standard or poorly designed software being installed on operational AWIPS assets will constitute a security violation and must be reported in accordance with this policy.

Non-AWIPS software obtained from commercial sources, other Government agencies, Government contractors, or allied research institutions and locally-developed software may only be installed by the site AWIPS System Administrator or designee. Use of such software on AWIPS equipment must meet all of the following criteria:

- It is required to support the NWS mission.
- It does not interfere with the intended operational use of the system, or networking environment.
- The required approval for installation has been obtained.

F.3.3 AWIPS Network Security

The risk of Internet intrusion to AWIPS is significant. This policy supports the operational mission of the NWS field sites while providing for reasonable network isolation from the Internet through firewalls and authentication mechanisms.

F.3.3.1 Network Operation and Routing Policy

In this policy the term “trusted network” refers to the AWIPS system and associated equipment that uses the designated AWIPS IP address space. Under no circumstance shall this address space be advertised to the Internet. Bridges, gateways or devices

connected to the Internet will not be connected to AWIPS except through the firewall. The trusted network has been designated as a unique “Autonomous System.” The flow and routing of information and data to different segments of the autonomous system, such as those managed by NWS National Centers, will be managed by the NCF as follows:

- For security purposes, only AWIPS-provided routers will be connected to the AWIPS site Local Area Networks (LANs). The AWIPS routers and hubs will be password protected. Router configuration will be centrally managed and controlled by the NCF and AWIPS Security Manager.
- No other IP network or sub-network shall be connected to the trusted network except by way of an approved firewall system as described in Chapter 4.3.2.
- TCP/IP is the standard protocol suite for the AWIPS network. Since LAN bandwidth is a critical factor in the AWIPS design, it must not be compromised by the use of “chatty,” non-standard, PC LAN protocol suites. Network devices that run other protocol suites, such as Novell SPX/IPX, AppleTalk, DECNET, NETbios, XNS, etc., shall not be connected to the AWIPS site LAN. The AWIPS routers will not route or bridge any data communication protocol suites other than TCP/IP over the AWIPS terrestrial WAN.
- The Message Handling System will be the primary vehicle for moving data and products over the WAN. Priority schemes ensuring this traffic receives top network resource priority will be used.

F.3.3.2 Interfaces with Untrusted Networks

The trusted network may be connected to untrusted networks (i.e., external IP networks or sub-networks including those connected to the Internet) through the approved AWIPS firewalls with prior written approval from the NWS AWIPS ISSO for all WSH and National Center firewalls or regional ISSO for field LDAD firewalls. The following are the conditions for connection to and requirements for firewalls in AWIPS:

- These systems will provide an authentication system for all outside-in connections to AWIPS.
- Any requested connection must support NWS operations, research, and/or training needs.
- The requested connection must be accomplished in a manner that protects the AWIPS network from Internet intrusion.
- Required connections to the untrusted networks will be from the inside-out. Exceptions to this will only be as authorized using **Attachment 1 or 2** by the appropriate NWS AWIPS ISSO. Inconvenience will not be considered justification for outside in connections.
- All firewall systems will implement the monitoring, authentication, and access control mechanisms necessary to accommodate the AWIPS allowed-use policy.
- The WSH AWIPS firewall system will be administered by the AWIPS Security Manager, supporting staff, and other personnel approved by the NWS AWIPS ISSO.

- The AWIPS LDAD firewall systems will be configured by the site with the guidance of the Regional ISSO, and will be monitored and managed by the Regional ISSO and supporting staff. Other AWIPS LDAD firewall systems, such as those at NWSTC and National Centers, will be configured and managed by the site ISSO.
- Only the ISSO and AWIPS site System Administrators will have local accounts on the AWIPS firewall systems.
- Traveling lap-top and other home computers will not be used to access the AWIPS autonomous network unless explicitly allowed in writing by the NWS AWIPS ISSO. Lap-top or other computers used on the autonomous network will comply with all other requirements of this policy.

F.3.3.3 Services

The following paragraphs describe the services authorized to be configured between the untrusted networks and the trusted network.

- Transfer of data between trusted and untrusted networks will be by means of File Transfer Protocol (**FTP**) or Remote Copy (**RCP**) as restricted by the rule set in Chapter 4.3.4 for all AWIPS firewalls.
- Administrative connectivity through the AWIPS firewalls shall be through **Telnet** only. X or Windows-related connectivity will not be passed across the firewall for any reason.
- Simple Network Management Protocol (**SNMP**) will be used from the inside-out to the extent required by the NCF to monitor LDAD functionality.
- Remote Shell (**RSH**) will be provided from the autonomous network to the LDAD server (inside-out) only as required to support the LDAD functionality.

F.3.3.4 Firewall Rule Set

All AWIPS firewalls will comply with the following rule set. Deviation from these rules will only be via approval of the appropriate ISSO. All approved deviations will be reported to the NWS AWIPS ISSO. Networking configuration for the firewall will support the following AWIPS firewall rules.

- **FTP and Telnet Access to the Trusted Network from Untrusted Networks.** Firewalls shall be initially configured to disallow any connectivity from untrusted (outside-in) networks. Users requiring outside-in connectivity will request it using **Attachments 1 or 2**. Every effort will be made by approving ISSOs to facilitate user needs via inside-out connections. Users authorized by the appropriate authority, may have access to host computers on the trusted network from untrusted networks provided:
 - Such authorization is granted to individual users, not to organizations, networks or hosts.
 - The authorization is restricted to allow access to specific AWIPS host IP's from specific untrusted IP's.

- The firewall user authentication mechanism (proxy service) approved by the appropriate authority is implemented as part of the access process through the AWIPS firewall.
- Users are only allowed to use the firewall software's FTP and Telnet proxy services.
- **Firewall proxy services.** Use of the firewall proxy services is subject to restrictions imposed by the authorizing official and deemed necessary for the security of AWIPS.
- **RCP and RSH Access Between the Trusted Network and Untrusted Networks.** Firewalls shall be configured to allow RCP/RSH from the trusted network to the LDAD server only. This access is limited to the functionality provided by the AWIPS software utilization of the LDAD server. These services will not be configured for outside-in access nor will they be provided to any other system.
- **FTP and Telnet Access to the Untrusted Network from Trusted Networks.** Firewalls shall be configured to allow connectivity from the trusted networks (inside-out) to untrusted network resources. Inside-out connectivity shall be used for official purposes only. Any breach of this policy, such as the download of inappropriate data, constitutes a security violation and will be reported as a security incident.
- **SNMP Access to the Untrusted Network.** SNMP shall be configured and allowed to traverse the AWIPS firewall to the extent required by and supported in AWIPS for monitoring the LDAD server operation. The LDAD server will be the only authorized point for SNMP traffic outside the firewall.
- **All Other Access Between Trusted and Untrusted Networks.** In no case shall HTTP or X-Windows related traffic or access be allowed across any AWIPS firewall. These and other protocols may be approved by the NWS AWIPS ISSO on a case-by-case basis, provided that they are shown to be necessary to support the NWS mission or operations.

F.3.3.5 AWIPS LAN Connections to Non-AWIPS Systems

Non-AWIPS, NWS mission-support “trusted” IT systems with TCP/IP LAN interfaces (e.g., the NWS’s Console Replacement System) may be interfaced to the AWIPS site LAN and become part of the trusted network, provided:

- They utilize AWIPS IP addresses designated for the trusted network.
- Their use complies with the AWIPS Security Policy and all applicable procedures and guidelines established by the AWIPS IT Security Policy.
- Their interface to the AWIPS LAN has been approved through normal NWS procedures.
- If a major system or new technology, an Interface Control Document for the interface between AWIPS and the trusted system has been written and approved prior to connecting the interface.

F.3.3.6 AWIPS IP Address Space Management

All AWIPS IP addresses will be managed and allocated by the AWIPS Security Manager and may be requested by filling out the IP Address Request Form (**Attachment 3**) and routing it, through appropriate levels, to the NWS AWIPS ISSO. Any single system required for administrative use or research and training may be installed in the trusted network space with approval of the NWS AWIPS ISSO (**Attachment 3**). This equipment will have the latest version of NWS supported virus software and all required security patches, updates, and bug fixes installed and will not use active daemons or hardware to allow other untrusted devices to connect to or through them to AWIPS. The local office will be responsible for ensuring protection of AWIPS resources from security vulnerabilities inherent to these types of systems.

F.3.3.7 Dial-in and Dial-out Access

Improperly configured dial-in or dial-out capabilities can create security vulnerabilities by providing unintended “back-door” access to the AWIPS network. For this reason dial-in and dialout access will be restricted to the provisions described in the following paragraphs.

F.3.3.7.1 Restricted LDAD Access

AWIPS Site Managers may authorize individuals (such as Cooperative Users) and external computer systems and sensors to access the AWIPS LDAD servers. These “LDAD users” will not be allowed to access any AWIPS trusted network host computers, other AWIPS equipment, or facilities except those explicitly designated for LDAD use. All LDAD sites allowing login or BBS types of access to LDAD will ensure the appropriate Unix security actions are taken prior to these authorizations.

F.3.3.7.2 Restricted Dial-in Access

Selected AWIPS users may be authorized by the NWS AWIPS ISSO or the applicable regional ISSO to have dial-in access to AWIPS networks, provided that such access is necessary to support AWIPS for NWS operations. Such authorization will be granted to individual users, not to organizations, computer systems, or networks. The authorization will be restricted to access specific AWIPS hosts and to specific time periods the ISSO deems necessary for the security of AWIPS. Such users may dial into the AWIPS networks using only the telephone numbers, modems, terminal servers, associated security equipment, and procedures approved by the respective ISSO.

F.3.3.7.3 Hardware Controls for Restricted Dial-in Access

Each site manager will ensure modems used to perform maintenance and monitor and control functions during emergencies or any other modem, (except WAN backup circuits) with access or connection to the trusted AWIPS networks or equipment has a locally-installed hardware device which provides a disconnect for the phone lines to those modems when not in use. Procedures for connecting the lines via this device for emergency purposes shall be added to the local station duty manual and all personnel

shall be trained in its use and location. Prior to connecting this device by request from outside sources, steps shall be taken to validate the source of the request (e.g., call back authentication).

F.3.3.7.4 Restricted Dial-out Access

All AWIPS dial-out services and equipment must conform to the guidelines established by the AWIPS System Manager's Manual. Extreme care must be taken to prevent the misuse of dial-out modems that would permit unauthorized access into AWIPS from external networks. Use of dial-out modems to establish IP connections (e.g., using SLIP or PPP protocols) with external networks is not permitted.

F.3.4 Processing and Handling Classified Information in AWIPS

The protection and transmission of classified information has varying degrees of requirements depending on the classification of the data. Classified information must not be processed on IT systems which do not have DOC/NOAA approval to do so. The NWS AWIPS ISSO has additional information concerning the processing and handling of classified information on NOAA IT systems.

F.3.5 Handling and Storage of AWIPS Magnetic or Storage Media

Sensitive or classified data stored on portable media must be protected in a manner similar to the hard-copy equivalent. This will require the storage of backup or archived portable media in secure containers on and off site. Requirements for hard copy information security are explained in Department Administrative Order (DAO) 207-1, Security Programs, dated 24 June 1991. The NWS AWIPS ISSO has additional information concerning the handling and storage of portable storage media.

F.3.6 Copyrighted AWIPS Software Control

Public Law 102-561 amends the Copyright Act, Title 18, United States Code, with respect to the criminal penalties for software copyright infringement. This law now makes certain acts Federal felonies with fines, imprisonment, or both as penalties. Criminal liability results when within a 180-day period at least 10 copies of a copyrighted work with a retail value in excess of \$2,500 have been reproduced or distributed. The act must also have been willful, for commercial advantage, or for private financial gain. Lesser acts of infringement remain a misdemeanor which is punishable by a fine. DOC policy against acts of copyright violation for software purchased by the DOC and its operating units is provided in Chapter 10.11 of the U.S. Department of Commerce Information Technology Management Handbook. All provision of this policy will apply to AWIPS and any software procured for AWIPS systems. Software is automatically protected by Federal copyright law from the moment of its creation. Under the Copyright Act, software developers have exclusive rights to reproduce their copyrighted work. Persons who purchase a copy of software only have the right to:

- Copy or install the software onto a single computer.
- Make another copy for archival purposes only.

When upgrades to software are purchased, the old version must either be destroyed or returned to the software developer. It is illegal to use the old software version on another computer. Upgraded software is usually purchased at a reduced cost and is considered a continuation of the original license and not an additional license. Each AWIPS site will ensure compliance with licensing agreements issued by the manufacturer for software purchased by the Government. Copies of original software, upgrades, and documentation shall be accounted for and retained.

F.3.7 AWIPS Site Telecommunications

The NWS AWIPS ISSO is responsible for recommending procedures and providing advice regarding adequate protection for the communications of sensitive information in accordance with the U.S. Department of Commerce Information Technology Security Manual. National security or classified information **must not** be discussed over or otherwise transmitted or processed by any form of telecommunications unless approved measures are taken to protect the information. Policies and specifications dealing with the security of Federal telecommunications are developed and issued under the purview of the National Security Council. These policies are stated in the U.S. Department of Commerce Information Technology Security Manual and the U.S. Department of Commerce National Security Information Manual.

F.4 Implementation of the AWIPS Security Policy

AWIPS Security is implemented in accordance with the SSP.

F.4.1 Responding to a Security Incident

A security incident is any event that could pose a threat to the integrity, availability, or confidentiality of AWIPS equipment, applications, or data. It is the responsibility of an affected site to report suspected security incidents to the NCF, AWIPS Security Manager and local or regional NWS AWIPS ISSO who in turn will report them as required by the National Weather Service, Information Technology Security Policy to the appropriate authority. The latest “**ADP Security Incident Report**” form, available at the NOAA security web site (www.rdc.noaa.gov/~security/) shall be filled out by the System Administrator at the affected site and submitted. The NCF and AWIPS Security Manager, if required, will coordinate with the NOAA Telecommunications and ADP Security Branch and the affected site’s local or regional ISSO to determine the necessary course of action and provide higher-level reporting. Depending on the severity of the incident and the level of threat, the Federal Bureau of Investigation may become involved and actions may be taken leading to the apprehension and eventual prosecution of a violator. Since the availability of AWIPS is critical to the NWS mission to protect life and property, the highest possible response priority will be given to the restoration of service and the protection of the system from further attack.

F.4.2 Policy Interpretation and Revision

Threats to computer security are constantly evolving. AWIPS also is evolving with the development of new software, hardware, techniques, operational procedures, and

observation and dissemination systems. Because of these evolutionary changes, it is essential to regularly review and update the AWIPS Security Policy and related procedures. The NWS AWIPS ISSO will ensure that the policy is reviewed at least once a year and updated as needed.

F.4.3 *Policy Distribution*

The AWIPS Security Policy will be distributed to all AWIPS system owners and support organizations. All AWIPS users will review the policy annually and sign a statement acknowledging their understanding of and agreement to abide by the AWIPS Security Policy. This agreement can be locally produced and will be maintained at each site.

F.5 *Security Patch Management*

Security scans and patch procedures are in accordance with the Network Control Facility Security Patch Procedures, dated June 23, 2010, contained in the NCF Standard Operating Procedures (SOP), Appendix E, *Security Policies and Procedures*.

Attachment 1
Request for User Id and Password on
The AWIPS WSH Firewall System

Please fill out this form up through "Supervisor's Approval". Then send or fax the form to: Fax 301-713-0173
AWIPS Security Manager, NOAA NWS SSMC2, Rm 15404, 1325 East West Hwy, Silver Spring, MD 20910.

Note: This request assumes that the requester already has obtained a valid user account on an AWIPS System and needs to access his/her account from a system that is not connected to the AWIPS LAN or WAN (e.g., access from a workstation connected to an untrusted network such as a Local LAN/WAN or INTERNET).

Name of Requester, organization, and code:

Phone Number & cemail or email address:

Justification, use and destination: State why and where if not on ds1 at your site you need to access your account on AWIPS from a system that is not connected to the AWIPS LAN or WAN and describe your use, e.g., transfer files via FTP, run Telnet session for, etc.).

Indicate the IP address and domain name of the workstation or PC on INTERNET that you wish to use to communicate with the AWIPS WSH Firewall System and a preferred username of six characters.

I have read the AWIPS Security Policy and agree to abide by that policy.

I will not disclose my user ID and password to other persons.

Requested by:

Signed

Date

Supervisor's approval:

Signed

Date

Security Officer Approval to establish user access to AWIPS firewall system:

Signed

Date

User access to AWIPS firewall system established:

Signed

Date

Attachment 2
Request for User Id and Password in the
AWIPS LDAD Firewall System

Please fill out this form up through “Supervisor’s Approval”. Then send or fax the form to: Regional ISSO, with a cc: to: AWIPS Security Manager, NOAA NWS SSMC2, Rm 15404, 1325 East West Hwy, Silver Spring, MD 20910.

Note: This request assumes that the requester already has obtained a valid user account on an AWIPS System and needs to access his/her account from a system that is not connected to the AWIPS LAN or WAN. (e.g., access from a workstation connected to an untrusted network such as a local LAN or INTERNET.)

Name of Requester, organization, and code:

Phone Number & cemail or email address:

Justification and use: State why you need to access your account on AWIPS via FTP or Telnet from a system that is not connected to the AWIPS LAN or WAN and describe your use, e.g., transfer files via FTP, run Telnet session to access data, etc.

Indicate the IP addresses of each workstation or PC on INTERNET that you wish to use to communicate with the AWIPS LDAD Firewall System:

I have read the AWIPS Security Policy and agree to abide by that policy.
I will not disclose my user ID and password to other persons.

Requested By: _____ Signed _____ Date _____

Supervisor’s approval: _____ Signed _____ Date _____

Regional Approval to establish user
access to AWIPS LDAD firewall system: _____ Signed _____ Date _____

User access to LDAD firewall
system established: _____ Signed _____ Date _____

Attachment 3

Request for AWIPS IP Address

Please fill out this form up through "Supervisor's Approval". Then send or fax the form to: Fax 301-713-0173 or AWIPS NWS ISSO, NOAA NWS SSMC2 Rm 15426, 1325 East West Hwy, Silver Spring MD 20910, via the regional ISSO, with a copy to the NCF.

Name of Requester: _____

Organization: _____

Telephone Number: _____

Proposed Workstation/PC name: _____

Machine Type/Operating System: _____

System Administrator: _____

Justification (Please state what work will be performed on this workstation/PC, and how it relates to the AWIPS system):

Primary Network Applications To Be Utilized (e.g., TELNET, FTP, etc):

I certify that the above stated workstation/PC complies with applicable NOAA UNIX security recommendations, is compliant with AWIPS security policy, and poses minimal risk to the security of the AWIPS system. I understand that the NCF reserves the right to filter any IP traffic that is generated by the above-named device which may be degrading the operational site AWIPS equipment or degrading the operation of the AWIPS Terrestrial Network (ATN).

Requested by: _____ Signed _____ Date _____

NWS Supervisor's Approval: _____ Signed _____ Date _____

Regional Approval: _____ Signed _____ Date _____

AWIPS NWS ISSO: _____ Signed _____ Date _____

ASSIGNED IP ADDRESS:

Attachment 4
User Acknowledgment

As a user of the AWIPS system, I acknowledge my responsibilities to conform to the following requirements and conditions established by the AWIPS Security Policy.

1. I understand that failure to sign this acknowledgment will result in denial of access to the AWIPS system.
2. I understand the need to protect system and individual passwords. I will not share my accounts or passwords. I understand that I am responsible for all actions taken using my accounts. I understand my responsibility to appropriately protect all output generated by me on AWIPS (including printed output, magnetic tapes, floppy diskettes, and downloaded hard disk files) and to properly label all media.
3. I understand my responsibility to report any/all systems or network problems to the system administrator. I will not install, modify, or remove any hardware or software without the permission of the system administrator.
4. I will not induce or process data which the network is not specifically authorized to handle. I acknowledge my responsibility to use the AWIPS system/network only for official NWS business.
5. I understand my use of AWIPS systems/networks is subject to monitoring to ensure proper functioning, to protect against improper or unauthorized use or access, and to verify the presence or performance of applicable security features or procedures. By using the AWIPS system, I grant consent to such monitoring.
6. I will protect my equipment by keeping food, drink, and electrical appliances away from AWIPS resources I use or maintain.
7. I will protect my work area by politely challenging and assisting people who do not belong in the area.
8. I understand my responsibility to backup data as required by local policy and procedures.
9. I acknowledge my responsibility to conform to the requirements of this document and the AWIPS Security Policy when using or maintaining any AWIPS information systems or networks. I also acknowledge that failure to comply with these requirements and conditions may constitute a security violation resulting in denial of access to AWIPS information systems, networks, or facilities and further action as deemed appropriate.

Signature_____ Date _____

Appendix G

AWIPS Password Management Policy

Appendix G. AWIPS Password Management Policy

Table of Contents

	<i>Page</i>
G.0 Introduction.....	1
G.1 Scope.....	1
G.1.1 Request for Password Management Waiver	2
G.1.2 References.....	2
G.2 General Requirements.....	3
G.2.1 System and Administrative Accounts.....	5
G.2.2 Severe Weather Account Sharing	5
G.2.3 Screensavers.....	6
G.2.4 Password Transmission.....	6

G.0 *Introduction*

The AWIPS Password Management Policy in this appendix represents the most current policy received to date by the Contractor. No changes will be made by the Contractor except for format purposes, and the Contractor will only update it as directed by the Government.

This policy establishes minimum practices for management of passwords to support authentication of system users when accessing Department of Commerce (DOC) information technology (IT) systems

G.1 *Scope*

Passwords are a key element for AWIPS information and network security. This document supplements, clarifies, and extends DOC, NOAA, and NWS password management policies for the AWIPS program. AWIPS policy is fully compliant with higher level policies.

This policy applies to all DOC personnel (federal and contractor) and all DOC IT systems or resources, independent of the size of the computer, network, device or information, including all systems using technology where passwords are used to control access. For example, it applies to desktops, laptops, servers, network devices, and networked office automation equipment. This policy also applies to those IT systems operated and used by contractors, guest researchers, collaborators, and other Federal agencies to carry out the DOC mission, whether or not they are owned, leased, or on Government property. This policy must be explicitly addressed in all IT procurement activities. Those IT systems intended to provide unrestricted access are excluded (e.g., public Web pages and kiosks).

This policy specifies the mandatory and recommended password management practices for all DOC IT systems. Each DOC IT system must use passwords as a means for user authentication. Systems may also use biometrics or public-key infrastructure certificates as additional means to control access. The access controls used should provide security commensurate with the level of sensitivity of the system or of specific resources (i.e., information or special devices). All DOC IT systems and associated equipment that rely on passwords as the means to authenticate users must implement effective password management in accordance with this policy.

Operating unit Chief Information Officers must identify any proposed deviations from the mandatory practices of this policy and request a waiver in writing from the DOC IT Security Manager. Approved waivers must be documented as part of the appropriate system security plan(s) that cover the system(s) applicable to the waiver. Identical systems under the same management authority and covered by one system security plan require only one waiver request.

G.1.1 Request for Password Management Waiver

Requests for a Password Management Waiver must:

- Cite the specific mandatory practice(s) for which the waiver is requested,
- Explain the rationale for the requested waiver, and
- If applicable, describe compensating controls to be in place during the period of the requested waiver, until systems are compliant with this policy, and provide an action plan (including target dates) for compliance.

Operating unit Chief Information Officers may appeal the DOC IT Security Manager's waiver decision in writing to the DOC Chief Information Officer.

G.1.2 References

- U.S. Department of Commerce, **IT Security Program Policy and Minimum Implementation Standards**, (http://ocio.os.doc.gov/ITPolicyandPrograms/Policy_Standards/DEV01_002681). This policy specifies and explains the Department of Commerce (DOC) Information Technology (IT) security program requirements and provides guidance on the implementation of IT Security Programs within DOC. It incorporates by reference the requirements of Public Laws, Federal and Departmental regulations listed in Appendix A, IT Security Laws and Federal Regulations.
- U.S. Department of Commerce, **Policy on Password Management**, (http://www.uspto.gov/about/vendor_info/current_acquisitions/sd1_ng/ocio_6012_09_q.pdf). This policy establishes minimum practices for management of passwords to support authentication of system users when accessing Department of Commerce (DOC) information technology (IT) systems.
- NOAA, **IT Security Manual 212-1302**, May 15, 2008, (<http://www.weather.gov/directives/sym/pd06007002curr.pdf>). This document augments and clarifies DOC program policy requirements and supports the NOAA policy requirements.
- NATIONAL WEATHER SERVICE POLICY DIRECTIVE 60-7, **Information Technology Security Policy**, August 28, 2003, - (<http://www.nws.noaa.gov/directives/sym/pd06007curr.pdf>).
 - 60-701 Assignment of Responsibilities, (<http://www.nws.noaa.gov/directives/sym/pd06007001curr.pdf>).
 - 60-702 Management, Operational, and Technical Controls, (<http://www.nws.noaa.gov/directives/sym/pd06007002curr.pdf>).

G.2 General Requirements

Minimum rules for password use in AWIPS systems are as follows:

- Passwords for AWIPS systems are considered sensitive.
- When new equipment is installed, immediately after completion of site installation activities and departure of the installation team, the local Electronic Systems Analyst (ESA) will change the passwords for *root, fxa, oper, informix*, and all other administrative passwords that are known by the installation team.
- Access to accounts on all servers and workstations must be strictly controlled at each site. Access to AWIPS servers and workstations may only be granted with the approval of the maintaining unit.
- The NCF and AWIPS Security Manager is responsible for, and holds complete control of the passwords for all network specific systems such as routers, hubs, communications processors, network attached storage (NAS) devices, and ancillary password-protected equipment.
- Individual users must be assigned a user account with a unique user ID and password; sharing accounts is ordinarily not permitted. Administrative accounts and severe weather condition account sharing policies are described below. The use of “generic” guest or service accounts to gain host access is not allowed.
- Users are responsible for maintaining and securing their individual account passwords in a manner consistent with DOC policy, this policy, and local guidance.

As such, passwords must be created consistent with the following criteria:

- Passwords must have at least eleven (11) non-blank characters;
- It must contain characters from at least three of the following four categories:
 - English upper case characters (A...Z);
 - English lower case characters (a...z);
 - Base 10 digits (0...9);
 - Non-alphanumeric (e.g., !,\$#%).
- Six of the characters must not occur more than once in the password (e.g., ‘AAAAAAA1’ is not acceptable, but ‘A%rmp2g3’ and ‘A%ArmA2g3’ are acceptable);
- Passwords must not include any of following: vendor/manufacturer default passwords: names (e.g., system user names, part or all of your account name, family names), words found in dictionaries (i.e., words from any dictionary, spelled forward or backward), addresses or birthdays, or common character sequences (e.g., 3456, ghijk, 2468). Vendor-supplied default passwords, such as SYSTEM, Password, Default, USER, Demo, and TEST, must be replaced immediately upon implementation of a new system.

- Passwords must be changed as follows:
 - At least every 90 days,
 - Immediately if discovered to be compromised or suspected to be compromised,
 - Immediately if discovered to be in non-compliance with policy, and
 - On direction from management.
- Passwords used for general access should be different than passwords used to access specific applications.
- Passwords used to access Internet or remote systems should be different from passwords used to access internal systems and applications.
- Passwords should be encrypted when transmitted across a local area network.
- Passwords for access to individual workstations (PCs) (such as passwords for screen savers) should be encrypted when stored electronically.
- IT systems should be designed so that temporary User IDs, passwords, and parameters associated with other means of authentication should be designed to automatically expire after a designated date.
- Four (4) failed attempts to provide a legitimate password for access to an IT system should result in the failed attempts being recorded in an audit log, the user being disconnected from the service, and access to be suspended for at least three (3) minutes. (Access is locked out on the 5th attempt.)
- Passwords must never be shared between users, and must be changed immediately when a confidentiality breach is suspected. Any suspected breach must be reported to N-CIRT and a N-CIRT 47-43 report completed to document the security violations.
- Users must also adhere to requirements specified in Engineering Handbook (EHB)-13 and the AWIPS System Manager's Manual.

Note: Systems or applications that have multiple passwords for different levels of

Accounts of users who no longer require access to a system on the AWIPS network must be removed within 24 hours. This includes government and contractor employees who have been reassigned, transferred, or terminated. Either an administrative control mechanism, or a technical control mechanism may be used to help the responsible unit ensure compliance with password aging policies. When feasible, an automated reminder is preferred. However, the mechanism must not automatically lock-out authorized users from doing their job.

- The following rules apply to failed password attempts:
 - AWIPS enforces a limit of three (3) consecutive invalid access attempts within a 15 minute period.

- AWIPS is configured to automatically lock the user account/node for 30 minutes when the maximum number of unsuccessful attempts is reached.
- Privileged user accounts remain locked until unlocked by the help desk, security administrator or other authorized account management person. Unlocking a locked privileged account requires positive identification authentication before the account is unlocked.
- User account lockout resets after 30 minutes.

G.2.1 System and Administrative Accounts

Administrative accounts use group passwords in a manner consistent with DOC Policy on Password Management, and therefore must be used in conjunction with some other mechanism that identifies the actual user and assures accountability. Examples of administrative accounts include *root, fxa, ldad, ifps, informix, and oper*.

All administrative accounts must be documented in the AWIPS System Security Plan along with the mechanism used to ensure accountability. Typically a user enters the command *su* to the administrative account from his/her own account.

The number of individuals with access to an administrative password should be kept to a minimum. Passwords must not be shared outside the group. Common passwords must not be used for groups with different membership. The site ISSO must keep an up-to-date list of group members in a secure place, and the list must be strictly controlled. A protected file on a computer system or NAS is not considered secure for this purpose.

When a user no longer requires access to the administrative account, the password must be changed. Group passwords must never be re-used. NCF must be advised of changes to root account passwords. The password must be communicated in a secure manner.

Any unauthorized access to password lists, or compromise of passwords on the list, will require an immediate change of all affected or compromised passwords.

G.2.2 Severe Weather Account Sharing

Normally, forecasters logs off from their accounts at the end of shift, and their relief logs in. Delays incurred by re-setting up workstation displays during severe weather may be unacceptable. Therefore, it may become operationally necessary for one forecaster to take over another's logged in workstation.

The Forecaster in Charge determines when an overriding operational necessity condition exists and authorizes bypassing the normal logout procedure. User accountability for the workstation is maintained by immediately recording the event in the shift log.

The Forecaster in Charge is responsible for making the log entry. Each entry must contain information that will allow unambiguous determination of responsibility. In particular, each log entry must specify at least the following information: time when account sharing starts, ID of the workstation, original user, and relief forecaster.

The account owner must verify that a log entry has been made before surrendering the station. As soon as operations permit, relief forecasters must logoff and logon under their own names.

G.2.3 Screensavers

Screensaver programs that automatically lock a user session, after an idle period, are required where they are appropriate – for example, remote access applications and insecure locations. They are not required for devices that are located in a secured area when the screensaver may interfere with normal operations. System users are always responsible for their workstation, and may manually activate a locking screensaver.

G.2.4 Password Transmission

Passwords must be encrypted when sent between systems. Exceptions are permitted for:

- Ftp to or from a legacy system that cannot support encryption, but both systems must be on the same AWIPS trusted LAN.
- Password free protocols such as rcp, or anonymous ftp. However, these protocols represent network security problems which must be addressed before use. They should only be used as a last resort for legacy systems.

Appendix H
SBN Products for WAN Transmission
During an SBN Failure

Appendix H. SBN Products for WAN Transmission During an SBN Failure

Table of Contents

	<i>Page</i>
H.0 Introduction.....	1
H.1 Transmitted SBN Products	1

H.0 Introduction

This appendix comprises the current list of SBN products that would be transmitted over the WAN in the event of an SBN failure.

H.1 Transmitted SBN Products

The file, **/awips/ops/data/wanbu_prodtbl.nmc**, resides on DSUP at the NCF. It contains the default address lists, which consist of the product IDs and the default attributes, in the following format:

```
"<prodID>" |<sitelist>|<priority>|<valid_time>
```

Note: <prodID> must be in quotes, as shown.

Example:

```
"^YH[IJ][A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
    o      where
        <prodID> is "^YH[IJ][A-K](99|85|70|50|40|30|20|15|10) KWBC"
        <sitelist> is ALL
        <priority> and <valid_time> are not specified for these products
```

The current file default address lists are provided below. Note that <prodID> and <sitelist> (= ALL) are the only attributes currently specified for any of these products.

```
#-----
# AVN 202 & 203
#-----
"^YH[IJ][A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
"^YT[IJ][A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
"^YR[IJ][A-K](99|85|70|50|40|30) KWBC" |ALL
"^YU[IJ][A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
"^YV[IJ][A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
"^YO[IJ][A-K](85|70|50|30|20) KWBC" |ALL
"^YT[IJ][A-K]98 KWBC" |ALL
"^YP[IJ][A-K]98 KWBC" |ALL
"^YU[IJ][A-K]98 KWBC" |ALL
"^YV[IJ][A-K]98 KWBC" |ALL
"^YE[IJ][B-K]98 KWBC" |ALL
"^YP[IJ][A-K]89 KWBC" |ALL
"^YR[IJ][A-K]00 KWBC" |ALL
"^YQ[IJ][A-K]98 KWBC" |ALL
"^YE[IJ][A-K]00 KWBC" |ALL
"^YE[IJ][B-K]98 KWBC" |ALL
#-----
# AVN 225
#-----
"^YHZ[A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
"^YTZ[A-K](99|85|70|50|40|30|20|15|10) KWBC" |ALL
"^YRZ[A-K](99|85|70|50|40|30) KWBC" |ALL
```

```

"^\YUZ[A-K](99|85|70|50|40|30|20|15|10) KWBC" | ALL
"^\YZV[A-K](99|85|70|50|40|30|20|15|10) KWBC" | ALL
"^\YOZ[A-K](85|70|50|30|20) KWBC" | ALL
"^\YTZ[A-K]98 KWBC" | ALL
"^\YPZ[A-K]98 KWBC" | ALL
"^\YUZ[A-K]98 KWBC" | ALL
"^\YVZ[A-K]98 KWBC" | ALL
"^\YEZ[B-K]98 KWBC" | ALL
"^\YPZ[A-K]89 KWBC" | ALL
"^\YRZ[A-K]00 KWBC" | ALL
"^\YQZ[A-K]98 KWBC" | ALL
"^\YEZ[A-K]00 KWBC" | ALL
"^\YEZ[B-K]98 KWBC" | ALL

#-----
# BUFR
#-----
"^\IUPTO[1-4]" | ALL
"^\IUPT40" | ALL
"^\IUAK01" | ALL
"^\IUS[TX][0-9][0-9]" | ALL
"^\JSMT4[1-6]" | ALL
"^\JSMT5[1-6]" | ALL
"^\P" | ALL
"^\P.* KWAL" | !ALL

#-----
# ETA 211
#-----
"^\YZ]HQ[AB](99|95|90|85|80|75|70|65|60|55|50|45|40|35|30|25|20|15|10) KWBE" | ALL
"^\YZ]TQ[AB](99|95|90|85|80|75|70|65|60|55|50|45|40|35|30|25|20|15|10) KWBE" | ALL
"^\YZ]UQ[AB](99|95|90|85|80|75|70|65|60|55|50|45|40|35|30|25|20|15|10) KWBE" | ALL
"^\YZ]VQ[AB](99|95|90|85|80|75|70|65|60|55|50|45|40|35|30|25|20|15|10) KWBE" | ALL
"^\YZ]RQ[AB](99|95|90|85|80|75|70|65|60|55|50|45|40|35|30) KWBE" | ALL
"^\YZ]TQ[AB]98 KWBE" | ALL
"^\YZ]RQ[AB]98 KWBE" | ALL
"^\YZ]UQ[AB]98 KWBE" | ALL
"^\YZ]VQ[AB]98 KWBE" | ALL
"^\YZ]PQ[AB]89 KWBE" | ALL
"^\YZ]QQ[AB]98 KWBE" | ALL
"^\YZ]EQ[AB]00 KWBE" | ALL
"^\YZ]EQ[AB]98 KWBE" | ALL
"^\YZ]EQ[AB]98 KWBE" | ALL

#-----
# GOES
#-----
"^\TIGB01 KNES" | ALL
"^\TIGB02 KNES" | ALL
"^\TIGN01 KNES" | ALL
"^\TIGN02 KNES" | ALL
"^\TIGI01 KNES" | ALL
"^\TIGI02 KNES" | ALL
"^\TIGQ01 KNES" | ALL
"^\TIGQ02 KNES" | ALL

#-----
# LL Obs
#-----
"^\S[AP]US.. KWBC" | ALL
"^\S[AP]U[CEMW].. KWBC" | ALL

```

```

"^\$[AP]AK.. KWBC" | ALL
"^\$[AP]CN.. CWAO" | ALL
"^\$[AP]DR" | ALL
"^\$[AP]PA.. KWBC" | ALL
"^\$[AP]CA.. KWBC" | ALL
"^\$[AP]PQ.. KWBC" | ALL
"^\$[AP]MX.. MM.." | ALL
"^\$[AP]MX.. KWBC" | ALL
"^\$[AP]BA.. MYNN" | ALL
"^\$[AP]XX.. KWBC" | ALL
"^\$[AP]WK.. PWAK" | ALL
"^\$[AP]CU.. MUHA" | ALL
"^\$XUS4" | ALL
"^\$MV[DCE]" | ALL
"^\$IV[DCE]" | ALL
"^\$NV[DCE]" | ALL
"^\$SV[DX]" | ALL
"^\$XUS" | ALL
"^\$RUS" | ALL
"^\$MUS.. KWBC" | ALL
"^\$MCN.. CWAO" | ALL
"^\$MMX" | ALL
"^\$MAK.. KWBC" | ALL
"^\$RU[EMSW]" | ALL
"^\$RH.. PHFO" | ALL
"^\$.* KWAL" | !ALL
"^\$AGUS" | ALL
"^\$DUS4" | ALL
"^\$HAXA00 KWBC" | ALL
"^\$USUS" | ALL
"^\$USCA" | ALL
"^\$USHW" | ALL
"^\$USMX" | ALL
"^\$USCN" | ALL
"^\$USPA" | ALL
"^\$USA" | ALL
"^\$UAUM" | ALL
"^\$UAHW" | ALL
"^\$UAGM" | ALL
"^\$UMXX.. KAWN" | ALL
"^\$UKUS" | ALL
"^\$UKCA" | ALL
"^\$UKMX" | ALL
"^\$UKPA" | ALL
"^\$UKAK" | ALL
"^\$UMUS" | ALL
"^\$UMAK" | ALL
"^\$UMHW" | ALL
"^\$UKCN" | ALL
"^\$UMGM" | ALL
"^\$UJXX.. KAWN" | ALL
"^\$UJUS" | ALL
"^\$UXUS" | ALL
"^\$UXHW" | ALL
"^\$UXAK" | ALL
"^\$FUS41" | ALL

```

```

#-----
# MFR
#-----
"^\$PA[ACEGI-S]89 KWBH" | ALL

```

```

"YHA[ACEGI-S](99|85|70|50|30|25) KWBH" | ALL
"YTA[ACEGI-S](99|85|70|50|30|25) KWBH" | ALL
"YUA[ACEGI-S](99|85|70|50|30|25) KWBH" | ALL
"YVA[ACEGI-S](99|85|70|50|30|25) KWBH" | ALL
"YRA[ACEGI-S](99|85|70|50|30) KWBH" | ALL
"YUA[ACEGI-S]98 KWBH" | ALL
"YVA[ACEGI-S]98 KWBH" | ALL
"YRA[ACEGI-S]98 KWBH" | ALL
"YEA[CEGI-S]98 KWBH" | ALL
"YEA[CEGI-S]98 KWBH" | ALL
"YRA[ACEGI-S]00 KWBH" | ALL

#-----
# NC MAN Text
#-----
"WWUS" | ALL
"WAHW.. PHFO" | ALL
"FA" | ALL
"FAAK" | ALL
"FAHW.. PHFO" | ALL
"WSUS.. KMKC" | ALL
"WS" | ALL
"UAU.* KWBC" | ALL
"UAPA.. KWBC" | ALL
"UANT.. KWBC" | ALL
"UAXX.. KAWN" | ALL
"UAUS.. KWBC" | ALL
"UAHW.. KWBC" | ALL
"UBUS.. KWBC" | ALL
"UBUS.. KNKA" | ALL
"UBUS.. KWBC" | ALL
"FXUS07 KWBC" | ALL
"FXUS05 KWBC" | ALL
"FEUS06 KWBC" | ALL
"FXUS06 KWBC" | ALL
"AEUS41 KWBC" | ALL
"FXUS01 KWBC" | ALL
"FXUS04 KWBC" | ALL
"FOUS30 KWBC" | ALL
"FOUS11 KWBC" | ALL
"FXUS02 KWBC" | ALL
"FXUS10 KWNH" | ALL
"FXCA.. KWBC" | ALL
"ABXX.. KWBC" | ALL
"FXUS.. KWNH" | ALL
"FPUS.. KWNH" | ALL
"FGUS71 KWBC" | ALL
"AG.* KWNM" | ALL
"FZ.* KWNM" | ALL
"FX.* KWNM" | ALL
"ACUS01 KMKC" | ALL
"ACUS02 KMKC" | ALL
"ACUS03 KMKC" | ALL
"WWUS09 KWNS" | ALL
"WWUS40 KMKC" | ALL
"WWUS50 KWNS" | ALL
"WOUS50 KWNS" | ALL
"WWUS60 KMKC" | ALL
"WWUS61 KMKC" | ALL
"WJUS01 KMKC" | ALL
"WJUS02 KMKC" | ALL

```


"^FDUM.. KWBC" | ALL
"^FDUW.. KWBC" | ALL
"^FDAK.. KWBC" | ALL
"^FDHW.. KWBC" | ALL
"^FBHW.. PHFO" | ALL
"^FQUS.. KWBC" | ALL

Few Additions as requested by sites

"^BMBB91" | ALL
"^AEUS71" | ALL

Appendix I

Administrative Tips

Appendix I. Administrative Tips

Table of Contents

	<i>Page</i>
I.0 Introduction.....	1
I.1 Check to See Where the Packages Are Running	1
I.2 Check for Mandatory Processes on DX1F	1
I.3 Check for Mandatory Processes on DX2F	4
I.4 Check for Mandatory Processes on DX3/DX4.....	6
I.5 Check for Abnormal Processes on CP1F.....	8
I.6 Check for Abnormal Processes on CPSBN1/CPSBN2	9
I.7 Check for Abnormal Processes on AX	9
I.8 Check for Mandatory Processes on PX1	10
I.9 Check for Mandatory Processes on PX2	11
I.10 Check for Mandatory Processes on REP Servers (RFCs only)	14
I.11 Checklist for Servers and Workstations.....	14
I.11.1 Servers.....	14
I.11.2 Workstations	23
I.11.3 All Machines	24

I.0 *Introduction*

To monitor system performance, complete the following procedures in sequential order at least ONCE per day.

I.1 *Check to See Where the Packages Are Running*

To verify that the Red Hat Cluster Manager swap packages have been enabled for the **px1apps**, **px2apps**, **dx1apps**, **dx2apps** swap packages, as user **root** on the respective servers,

TYPE: **hb_stat**

I.2 *Check for Mandatory Processes on DX1F*

Log in to the Linux data server running the **dx1apps** package (normally DX1F).

1. Check what is mounted on the server. Verify the NAS is mounted.

TYPE: **df**

- Look for **/data/fxa** and the percentage used. Percentages larger than 70 percent could indicate a problem. Notify the Network Control Facility if this is the case.
- Also look for any directories that appear to be filling up (88 percent or higher).

2. Verify the fxa processes listed below are running.

TYPE: **ps -wef |grep fxa**

Example below.

```
dx1-tbw3{sridharb}48: ps -wef|grep fxa

awips 1556 15282 0 18:52 ? 00:00:00 postgres: awips fxatext 165.92.24.4(50940) idle
awips 1669 15282 2 18:52 ? 00:00:18 postgres: awips fxatext 165.92.24.3(53680) idle
awips 2958 15282 1 18:54 ? 00:00:09 postgres: awips fxatext 165.92.24.3(53748) idle
awips 6931 15282 0 18:58 ? 00:00:00 postgres: awips fxatext 165.92.24.4(43108) idle
awips 7046 15282 0 18:58 ? 00:00:00 postgres: awips fxatext 165.92.24.3(39801) idle
awips 8656 15282 0 19:00 ? 00:00:00 postgres: awips fxatext 165.92.24.4(43187) idle
awips 10330 15282 0 19:01 ? 00:00:00 postgres: awips fxatext 165.92.24.4(43239) idle
awips 11322 15282 0 19:02 ? 00:00:00 postgres: awips fxatext 165.92.24.4(43288) idle
awips 12229 15282 0 19:03 ? 00:00:00 postgres: awips fxatext 165.92.24.3(58755) idle
awips 12562 15282 0 19:04 ? 00:00:00 postgres: awips fxatext 165.92.24.4(36527) idle
awips 13620 15282 0 19:05 ? 00:00:00 postgres: awips fxatext 165.92.24.4(36586) idle
sridharb 14140 12993 0 19:06 pts/4 00:00:00 grep fxa
awips 15418 1 0 Jan21 ? 00:40:21 /awips2/java/bin/java -cp
/awips2/rmc/data/config/res:/awips2/rmc/lib/activation-1.1.jar:/awips2/rmc/lib/activeio-core-
3.1.2.jar:/awips2/rmc/lib/activemq-camel-5.3.0.jar:/awips2/rmc/lib/activemq-console-
5.3.0.jar:/awips2/rmc/lib/activemq-core-5.3.0.jar:/awips2/rmc/lib/activemq-jas-
```

```

5.3.0.jar:/awips2/rcm/lib/activemq-pool-5.3.0.jar:/awips2/rcm/lib/activemq-web-
5.3.0.jar:/awips2/rcm/lib/backport-util-concurrent-2.1.jar:/awips2/rcm/lib/backport-util-concurrent-
2.2.jar:/awips2/rcm/lib/bzip2.jar:/awips2/rcm/lib/commons-beanutils-
1.8.3.jar:/awips2/rcm/lib/commons-codec-1.4.jar:/awips2/rcm/lib/commons-collections-
3.2.jar:/awips2/rcm/lib/commons-lang-2.3.jar:/awips2/rcm/lib/commons-logging-
1.1.1.jar:/awips2/rcm/lib/geronimo-j2ee-management_1.0_spec-1.0.jar:/awips2/rcm/lib/geronimo-
jms_1.1_spec-1.1.1.jar:/awips2/rcm/lib/geronimo-jta_1.0.1B_spec-1.0.1.jar:/awips2/rcm/lib/jencks-
amqpool-2.0.jar:/awips2/rcm/lib/log4j-1.2.16.jar:/awips2/rcm/lib/log4j.extras-
1.0.jar:/awips2/rcm/lib/mina-core-1.1.7.jar:/awips2/rcm/lib/mina-filter-codec-netty-
1.1.7.jar:/awips2/rcm/lib/mina-filter-compression-1.1.7.jar:/awips2/rcm/lib/mina-filter-ssl-
1.1.7.jar:/awips2/rcm/lib/mina-integration-jmx-1.1.7.jar:/awips2/rcm/lib/mina-integration-spring-
1.1.7.jar:/awips2/rcm/lib/qpid-client-0.7.jar:/awips2/rcm/lib/qpid-common-
0.7.jar:/awips2/rcm/lib/quartz-all-1.6.1.jar:/awips2/rcm/lib/radarserver-mq.jar:/awips2/rcm/lib/slf4j-
api-1.6.1.jar:/awips2/rcm/lib/slf4j-log4j12-1.6.1.jar:/awips2/rcm/lib/spring-
beans.jar:/awips2/rcm/lib/spring-context-2.5.6-sources.jar:/awips2/rcm/lib/spring-
context.jar:/awips2/rcm/lib/spring-context-support.jar -
Dcom.raytheon.rcm.configDir=/awips2/rcm/data/config -
Dcom.raytheon.rcm.awips1.decompressRadarProducts=yes -
Dcom.raytheon.rcm.logDir=/awips2/rcm/data/logs -Dlog4j.configuration=log4j.properties -
Dqpid.dest_syntax=BURL -Dawips2_fxa= -
Dcom.raytheon.rcm.edexRadarEndpoint=/awips2/edex/data/sbn/radar
com.raytheon.rcm.mqsvr.MQServer
fxa 15844 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/notificationServer
fxa 16200 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/MhsServer
fxa 16228 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/MhsRequestServer
fxa 16255 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/NWWSProduct
fxa 16553 1 0 Jan21 ? 00:00:00 /usr/bin/perl /awips/fxa/bin/hwrTrans.pl
awips 21613 15282 0 18:36 ? 00:00:01 postgres: autovacuum worker process fxatext
awips 22904 15282 0 18:38 ? 00:00:02 postgres: awips fxatext 165.92.24.4(43510) idle
awips 27373 15282 6 18:44 ? 00:01:28 postgres: awips fxatext 165.92.24.3(44333) idle
awips 27496 15282 4 18:44 ? 00:01:05 postgres: awips fxatext 165.92.24.3(44341) idle
awips 27960 15282 1 18:03 ? 00:01:12 postgres: awips fxatext 165.92.24.3(34845) idle

```

- Look for abnormal CPU usage. Greater than 75 percent resourced by an individual process may cause problems.

TYPE: **top**

- Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
- A <CTRL> c will break out of the **top** command.

- Check the status of message handling.

TYPE: **dwb_smon**

If there are msgqueues, notify the NCF of your findings. If nothing is returned, MHS is not running and needs to be started.

- Ensure that the a2dx1 apps package is running

TYPE: **hb_stat**

6. Ensure the /awips2/data partition is mounted.

TYPE: `df /awips2/data`

Look for results similar to the following:

Filesystem	1024-blocks	Used	Available	Capacity	Mounted on
/dev/mapper/vg_aiidb-awipsiidb	154818540	17714020	129240200	13%	/awips2/data

7. Ensure that the /awips/edex/hdf5 partition is mounted locally.

TYPE: `df /awips2/edex/data/hdf5`

Look for results similar to the following:

Filesystem	1024-blocks	Used	Available	Capacity	Mounted on
/dev/mapper/vg_aiihdf5-awipsihdf5	583149656	139764968	413764544	26%	/awips2/edex/data/hdf5

8. Ensure that postgres is running.

TYPE: `ps -wef|grep postmaster`

Look at the most recent log in /awips2/data/pg_log.

TYPE: `ls -ltr /awips2/data/pg_log`

TYPE: `tail -f LOGFILE`

9. Ensure that RCM (Radar Server) is running.

TYPE: `ps -wef|grep rcm`

TYPE: `tail -f /awips2/rmc/data/logs/radarserver.log`

10. Ensure that Pypes is running.

TYPE: `ps -wef|grep pypes`

```

awips      599 15462  2 18:50 ?          00:00:30
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf

awips      602 15462  2 18:50 ?          00:00:22
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf

awips      603 15462  2 18:50 ?          00:00:30
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf

awips      717 15462  2 18:51 ?          00:00:27
/awips2/httpd_pypes/usr/sbin/httpd -f
/awips2/httpd_pypes/etc/httpd/conf/httpd.conf

```

11. Check for System Issues – Full partitions, load average, etc.

TYPE: `df -hP`

TYPE: `df /data_store`

12. Ensure that the directory is mounted from dx2f, as shown below, unless a2dx2apps is running on the same server as a2dx1apps.

```
[root@dx1-tbw3 ~]# df -hP /data_store
```

Filesystem	Size	Used	Avail	Use%	Mounted on
dx2-tbw3:/data_store	166G	54G	104G	34%	/data_store

13. Ensure that the partition is mounted from the nas1:/GFESuite2 share.

TYPE: `df /awips2/GFESuite`

14. Ensure that the partition is mounted from the nas1:/aiidata/utility share.

TYPE: `df /awips2/edex/data/utility`

15. Ensure that MHS is running properly.

TYPE: `ps -wef | grep mhs`

TYPE: `ypcat hosts | grep mhs`

TYPE: `ping dx1f`

TYPE: `ps -wef | grep sendmail`

TYPE: `msg_stats`

I.3 *Check for Mandatory Processes on DX2F*

Log in to the Linux data server running the **dx2apps** package (normally DX2).

1. Check what is mounted on the server. Verify the NAS is mounted.

TYPE: `df`

- Look for **/data/fxa** and the percentage used. Percentages larger than 70 percent could indicate a problem. Notify the NCF if this is the case.
- Also look for any directories that appear to be filling up (88 percent or higher).

2. Look for abnormal CPU usage. Greater than 75 percent resourced by an individual process may cause problems.

TYPE: **top**

- Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
- A <CTRL> c will break out of the **top** command.

3. Ensure that a2dx2apps is running.

TYPE: **hb_stat**

4. Ensure that /data_store is mounted locally from the DAS.

TYPE: **df /data_store**

Look for the partition mounted from aiildm.

```
dx1-tbw3{sridharb}50: df /data_store
Filesystem      1K-blocks    Used Available Use% Mounted on
dx2:/data_store   173396800  28973600 135615168  18% /data_store
```

5. Ensure that LDM software is running.

TYPE: **ps -fu ldm**

You should see two rpc.ldmd processes - a pqact process and an edexBridge -s cp1f process.

6. Ensure that data is coming in, and there are no ERROR messages.

TYPE: **tail -f ~ldm/logs/ldmd.log**

7. Check for System Issues – Full partitions, load average, etc.

TYPE: **df -hP**

TYPE: **top**

8. Ensure that the partition is mounted from the nas1:/GFESuite2 share.

TYPE: **df /awips2/GFESuite**

9. Ensure that the partition is mounted from the nas1:/aiidata/utility share.

TYPE: **df /awips2/edex/data/utility**

I.4 Check for Mandatory Processes on DX3/DX4

Log in to the Linux data server running the **dx3apps** package (normally DX3).

1. Check what is mounted on the server. Verify that the NAS is mounted.

TYPE: **df**

- Look for **/data/fxa** and the percentage used. Percentages larger than 70 percent could indicate a problem. Notify the NCF if this is the case.
- Also look for any directories that appear to be filling up (88 percent or higher).

2. Please make sure the EDEX CAMEL is up and running.

TYPE: **service edex_camel status**

```
EDEX Camel (ingest) is running (wrapper PID 20340)
EDEX Camel (ingest) is running (java PID 20342)
EDEX Camel (request) is running (wrapper PID 20532)

EDEX Camel (request) is running (java PID 20534)
```

3. Look for abnormal CPU usage. Greater than 75 percent resourced by an individual process may cause problems.

TYPE: **top**

- Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
- A <CTRL> c will break out of the **top** command.

4. Ensure that there are four EDEX processes running, one each of the following: ingest, ingestDat, ingestGrib and request:

```
[root@dx3-tbw3 ~]# ps -fu awips
```

awips	13458	1	0	17:51	?	00:00:00	/bin/bash
							/awips2/edex/bin/start
awips	13516	13458	0	17:51	?	00:00:00	
							/awips2/edex/bin/linux-x86-32/wr
awips	13518	13516	99	17:51	?	01:25:45	/awips2/java/bin/java
							-Dedex.run
awips	13570	1	0	17:51	?	00:00:00	/bin/bash
							/awips2/edex/bin/start
awips	13628	13570	0	17:51	?	00:00:00	
							/awips2/edex/bin/linux-x86-32/wr
awips	13631	13628	9	17:51	?	00:07:36	/awips2/java/bin/java
							-Dedex.run
awips	13671	1	0	17:51	?	00:00:00	/bin/bash
							/awips2/edex/bin/start
awips	13729	13671	0	17:51	?	00:00:00	
							/awips2/edex/bin/linux-x86-32/wr
awips	13732	13729	22	17:51	?	00:18:25	/awips2/java/bin/java
							-Dedex.run
awips	13775	1	0	17:51	?	00:00:00	/bin/bash
							/awips2/edex/bin/start
awips	13833	13775	0	17:52	?	00:00:00	
							/awips2/edex/bin/linux-x86-32/wr
awips	13835	13833	5	17:52	?	00:04:46	/awips2/java/bin/java
							-Dedex.run
awips	19231	1	0	19:00	?	00:00:00	ksh
							/awips2/edex/data/share/hydr

5. Ensure that the ingest logs are all updating in /awips2/edex/logs and have low processing and latency times.

```

TYPE:      tail -f edex-ingest-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingestGrib-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingestDat-$(date +%Y%m%d).log
TYPE:      tail -f edex-request-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingest-satellite-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingest-radar-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingest-shef-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingest-text-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingest-purge-$(date +%Y%m%d).log
TYPE:      tail -f edex-ingest-trigger-$(date +%Y%m%d).log
TYPE:      tail -f edex-shef-performance-$(date +%Y%m%d).log

```

TYPE: `tail -f edex-ingest-gen_areal_ffg-$(date +%Y%m%d).log`

6. Check for System Issues – Full partitions, load average, etc.

TYPE: `df -hP`

TYPE: `df /data_store`

7. Ensure that the directory is mounted from dx2f, as shown below, unless a2dx2apps is running on the same server as a2dx1apps.

[root@dx1-tbw3 ~]# df -hP /data_store

<i>Filesystem</i>	<i>Size</i>	<i>Used</i>	<i>Avail</i>	<i>Use%</i>	<i>Mounted on</i>
<i>dx2-tbw3:/data_store</i>	<i>166G</i>	<i>54G</i>	<i>104G</i>	<i>34%</i>	<i>/data_store</i>

8. Ensure that the partition is mounted from the nas1:/GFESuite2 share.

TYPE: `df /awips2/GFESuite`

9. Ensure that the partition is mounted from the nas1:/aiidata share.

TYPE: `df /awips2/edex/data`

10. Ensure that the clustering loopback device is up (ifconfig lo:0).

TYPE: `ifconfig lo:0`

<i>lo:0</i>	<i>Link encap:Local Loopback</i>
	<i>inet addr:165.92.24.61 Mask:255.255.255.255</i>
	<i>UP LOOPBACK RUNNING MTU:16436 Metric:1</i>

Repeat steps 1 – 10 for DX4

I.5 Check for Abnormal Processes on CP1F

1. Ensure that a2cp1apps is running.

TYPE: `hb_stat`

2. Ensure that QPID is running and processing.

TYPE: `ps -wef | grep qpid`

TYPE: `qpid-stat -q -Smsg -L10`

Make sure that queues are not high or lingering (the numbers in the msg column drop if they are high).

3. Ensure that Pulse/IPVS is running and has edex-request JVMs connected.

TYPE: `ps -wef|grep pulse`

TYPE: `ipvsadm --list`

4. Ensure that /awips2/qpid/messageStore is mounted from the nas1:qpid share.

TYPE: df /awips2/qpid/messageStore

```
[root@cpsbn1-tbw3 ~]# df /awips2/qpid/messageStore
Filesystem      1K-blocks      Used Available Use% Mounted on
nas1:/qpid        10058528    1977408   8081120  20%
/awips2/qpid/messageStore
```

I.6 Check for Abnormal Processes on CPSBN1/CPSBN2

1. Ensure that LDM (U) is running.

TYPE: ps -fu ldm

2. Ensure that four readnoaaport processes are running, as well as at least one rpc.ldmd process.

TYPE: ps -wef | grep dvbs_multicast

3. Ensure that four dvbs_multicast processes are running as user *root*.

TYPE: tail -f ~ldm/logs/nwstg.log

TYPE: tail -f ~ldm/logs/nwstg2.log

TYPE: tail -f ~ldm/logs/goes.log

TYPE: tail -f ~ldm/logs/oconus.log

4. Check for System Issues – Full partitions, load average, etc.

TYPE: df -hP

TYPE: top

I.7 Check for Abnormal Processes on AX

Log in to the AX server.

1. Check what is mounted on the AX. Look for any directories that appear to be filling up (88 percent or higher). Verify that the **/home**, **/data/fxa**, and **/data/local** directories are mounted from the NAS.

TYPE: df

2. Look for abnormal CPU usage. Any individual process using greater than 75 percent of the CPU may cause system problems.

TYPE: top

- Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
- A <CTRL> c will break out of the **top** command.

I.8 Check for Mandatory Processes on PX1

Log in to the server running the **px1apps** package (normally PX1).

1. Check what is mounted on PX1. Verify the NAS is mounted. Look for any directories that appear to be filling up (88 percent or higher).

TYPE: **df**

2. **TYPE:** **ps -wef |grep fxa**

Verify that the following **fxa** processes are running.

```
fxa 10139 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/asyncPilMsgServer
fxa 10142 1 0 Jan21 ? 00:01:15 /awips/fxa/bin/asyncScheduler
fxa 10160 10142 0 Jan21 ? 00:00:00 test2 25 23 2 test2 /dev/ttyn1b 9600 8
NONE 1 NONE
fxa 10165 1 0 Jan21 ? 00:00:00 /usr/bin/perl /awips/fxa/bin/asyncPollData.pl
fxa 10173 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/hmMonitorServer
fxa 10214 1 0 Jan21 ? 00:00:00 /awips/fxa/bin/NWWSSchedule
fxa 13878 1 0 Jan23 ? 00:00:00 /awips/fxa/bin/ladServer
fxa 16830 1 0 Jan21 ? 00:02:14 /awips/fxa/bin/purgeProcess -commit
ldad 19238 1 0 Jan23 ? 00:00:00 /awips/fxa/bin/CommsRouter
LDAD_ROUTER
ldad 19246 1 0 Jan23 ? 00:00:00 /awips/fxa/bin/DataController
LDAD_ROUTER LdadController.config
ldad 19249 19246 0 Jan23 ? 00:00:00 /awips/fxa/bin/routerLdadDecoder px1-
tbw3/38710/19246 149435464
ldad 19250 19246 0 Jan23 ? 00:00:00 /awips/fxa/bin/routerStoreNetcdf px1-
tbw3/38710/19246 149462176
ldad 19253 19246 0 Jan23 ? 00:00:00 /awips/fxa/bin/routerStoreTextEDEX px1-
tbw3/38710/19246 149471592
sridharb 19396 19122 0 19:14 pts/0 00:00:00 grep fxa
```

3. Look for abnormal CPU usage. Any individual process using greater than 75 percent of the CPU may cause system problems.

TYPE: **top**

- Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
 - A <CTRL>c will break out of the **top** command.
4. Ensure that a2px1apps is running.
- TYPE:** `hb_stat`
5. Ensure that rehosted applications are running.
- TYPE:** `ps -fu fxa`
- The following should be running on the server:
- ```
asyncPilMsgServer
asyncScheduler
asyncPollData.pl
hmMonitorServer
NWWSSchedule
```

6. Check for System Issues – Full partitions, load average, etc.

**TYPE:** `df -hP`

**TYPE:** `top`

**TYPE:** `df /data_store`

7. Ensure that the directory is mounted from dx2f, as shown below, unless a2dx2apps is running on the same server as a2dx1apps:

```
[root@dx1-tbw3 ~]# df -hP /data_store
```

| Filesystem           | Size | Used | Avail | Use% | Mounted on  |
|----------------------|------|------|-------|------|-------------|
| dx2-tbw3:/data_store | 166G | 54G  | 104G  | 34%  | /data_store |

8. Ensure that the directory is mounted from the nas1:aiidata/utility as shown below:

**TYPE:** `df /awips2/edex/data/manual`

| Filesystem    | 1K-blocks | Used    | Available | Use% | Mounted on        |
|---------------|-----------|---------|-----------|------|-------------------|
| nas1:/aiidata | 527556704 | 4751936 | 522804768 | 1%   | /awips2/edex/data |

## I.9 *Check for Mandatory Processes on PX2*

Log in to the server running the **px2apps** package (normally PX2).

1. Check what is mounted on PX1. Verify that the NAS is mounted. Look for any directories that appear to be filling up (88 percent or higher).

**TYPE:** `df`

2. **TYPE:** `ps -wef |grep fxa`

Verify that the `fxa` processes listed below are running.

```
ldad 760 1 0 Oct13 ? 00:00:05
/awips/fxa/bin/CommsRouter LDAD_ROUTER

ldad 768 1 0 Oct13 ? 00:00:05
/awips/fxa/bin/DataController LDAD_ROUTER LdadController.config

ldad 771 768 0 Oct13 ? 00:00:13
/awips/fxa/bin/routerLdadDecoder px2-tbw3/56457/768 136938768

ldad 772 768 0 Oct13 ? 00:00:31
/awips/fxa/bin/routerStoreNetcdf px2-tbw3/56457/768 136965408

ldad 773 768 0 Oct13 ? 00:00:19
/awips/fxa/bin/routerStoreEDEX px2-tbw3/56457/768 136974328

ldad 774 768 0 Oct13 ? 00:00:42
/awips/fxa/bin/routerShefEncoderEDEX px2-tbw3/56457/768 136974552

ldad 775 768 0 Oct13 ? 00:01:07
/awips/fxa/bin/routerStoreTextEDEX px2-tbw3/56457/768 136974856

sridharb 21780 21509 0 17:12 pts/0 00:00:00 grep fxa

fxa 28690 1 0 Oct10 ? 00:18:35
/awips/fxa/bin/purgeProcess -commit

fxa 31767 1 0 Oct13 ? 00:00:00
/awips/fxa/bin/ldadServer

fxa 31815 1 0 Oct13 ? 00:00:00 /bin/sh
/awips/fxa/FSIedex/bin/fsiWatchdog.sh

fxa 31817 31815 0 Oct13 ? 00:24:53
/awips/fxa/FSIedex/bin/FSIprocessorEDEX

fxa 31819 1 0 Oct13 ? 00:00:00
/awips/fxa/fsi/bin/rssd
```

3. Look for abnormal CPU usage. Any individual process using greater than 75 percent of the CPU may cause system problems.

**TYPE:** `top`

- o Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
- o A <CTRL> c will break out of the top command.

4. Ensure that a2px2apps is running.

**TYPE:** `hb_stat`

5. Ensure that rehosted applications are running.

**TYPE:** `ps -fu ldad`

The following should be running on the server:

| UID  | PID   | PPID  | C | STIME  | TTY | TIME     | CMD                              |
|------|-------|-------|---|--------|-----|----------|----------------------------------|
| ldad | 9736  | 19488 | 0 | 00:00: | ?   | 00:00:01 | /usr/bin/perl /awips/ldad/bin/po |
| ldad | 18819 | 1     | 0 | Jan23  | ?   | 00:00:00 | /awips/ldad/bin/listener         |
| ldad | 19238 | 1     | 0 | Jan23  | ?   | 00:00:00 | /awips/fxa/bin/CommsRouter LDAD_ |
| ldad | 19246 | 1     | 0 | Jan23  | ?   | 00:00:00 | /awips/fxa/bin/DataController LD |
| ldad | 19249 | 19246 | 0 | Jan23  | ?   | 00:00:00 | /awips/fxa/bin/routerLdadDecoder |
| ldad | 19250 | 19246 | 0 | Jan23  | ?   | 00:00:00 | /awips/fxa/bin/routerStoreNetcdf |
| ldad | 19253 | 19246 | 0 | Jan23  | ?   | 00:00:00 | /awips/fxa/bin/routerStoreTextED |
| ldad | 19488 | 1     | 0 | Jan23  | ?   | 00:00:02 | /bin/sh /awips/ldad/bin/watchDog |
| ldad | 23986 | 19488 | 0 | 19:17  | ?   | 00:00:00 | sleep 30                         |

6. Enter:                    ps -fu fxa

Look for the following processes running:

ldadServer  
fsiWatchdog.sh  
FSIprocessorEDEX  
rssd

7. Check for System Issues – Full partitions, load average, etc.

**TYPE:**        df -hP  
**TYPE:**        top  
**TYPE:**        df /data\_store

8. Ensure that the directory is mounted from dx2f, as shown below, unless a2dx2apps is running on the same server as a2dx1apps:

```
[root@dx1-tbw3 ~]# df -hP /data_store
Filesystem Size Used Avail Use% Mounted on
dx2-tbw3:/data_store 166G 54G 104G 34% /data_store
```

9. Ensure that the directory is mounted from the nas1:aiidata/utility as shown below:

**TYPE:**        df /awips2/edex/data/manual

| /Filesystem   | 1K-blocks | Used    | Available | Use% | Mounted on        |
|---------------|-----------|---------|-----------|------|-------------------|
| nas1:/aiidata | 527556704 | 4907264 | 522649440 | 1%   | /awips2/edex/data |

10. Ensure that the directory is mounted from the nas1:aiidata/share as shown below.

**TYPE:**        df /awips2/edex/data/share

| Filesystem    | 1K-blocks | Used    | Available | Use% | Mounted on        |
|---------------|-----------|---------|-----------|------|-------------------|
| nas1:/aiidata | 527556704 | 4875936 | 522680768 | 1%   | /awips2/edex/data |

### I.10 Check for Mandatory Processes on REP Servers (RFCs only)

Log in to rp1-<siteID> as user root.

1. Check what is mounted on RP1. Look for any directories that appear to be filling up (88 percent or higher). Verify that the REP NAS is mounted.

**TYPE:** `df`

2. Look for abnormal CPU usage. Any individual process using greater than 75 percent of the CPU may cause system problems.

**TYPE:** `top`

- o Check the idle time. Values less than 10 percent for the duration of the command may indicate a resource problem. Contact the NCF and report your findings.
- o A <CTRL> c will break out of the top command.

3. Repeat steps 1 and 2 on RP2.

### I.11 Checklist for Servers and Workstations

#### I.11.1 Servers

##### DX1

1. Check to see whether postgres is running.

**TYPE:** `ps -ef | grep postgres`

|       |      |       |           |          |                                                 |
|-------|------|-------|-----------|----------|-------------------------------------------------|
| awips | 1364 | 15282 | 0 18:52 ? | 00:00:00 | postgres: awips metadata 165.92.24.3(53649)     |
| idle  |      |       |           |          |                                                 |
| awips | 1556 | 15282 | 0 18:52 ? | 00:00:00 | postgres: awips fxatext 165.92.24.4(50940) idle |
| awips | 1617 | 15282 | 3 18:52 ? | 00:00:55 | postgres: awips maps 165.92.24.3(53667) idle    |
| awips | 2958 | 15282 | 0 18:54 ? | 00:00:12 | postgres: awips fxatext 165.92.24.3(53748) idle |
| awips | 4407 | 15282 | 0 18:14 ? | 00:00:05 | postgres: awips metadata 165.92.24.3(44624)     |
| idle  |      |       |           |          |                                                 |
| awips | 4409 | 15282 | 0 18:14 ? | 00:00:04 | postgres: awips metadata 165.92.24.3(44626)     |
| idle  |      |       |           |          |                                                 |
| awips | 4410 | 15282 | 0 18:14 ? | 00:00:05 | postgres: awips metadata 165.92.24.3(44627)     |
| idle  |      |       |           |          |                                                 |
| awips | 7601 | 15282 | 0 18:59 ? | 00:00:00 | postgres: awips metadata 165.92.24.3(39837)     |
| idle  |      |       |           |          |                                                 |

```

awips 15404 15282 0 Jan21 ? 00:00:01 postgres: logger process
awips 15455 15282 0 Jan21 ? 00:00:01 postgres: writer process
awips 15456 15282 0 Jan21 ? 00:00:00 postgres: wal writer process
awips 15457 15282 0 Jan21 ? 00:00:00 postgres: autovacuum launcher process
awips 15458 15282 0 Jan21 ? 00:00:42 postgres: stats collector process
awips 15952 15282 0 19:09 ? 00:00:00 postgres: awips hd_ob92oax
165.92.24.3(57044) idle
awips 15953 15282 0 19:09 ? 00:00:00 postgres: awips hd_ob92oax
165.92.24.3(57045) idle
awips 16061 15282 0 18:29 ? 00:00:01 postgres: awips metadata 165.92.24.3(43691)
idle

```

**Note:** Check the logs at /awips2/data/pg\_log.

**Note:** Check the logs at /awips2/rcm/data/logs.

2. Check to see whether any partitions are full.

| TYPE:                        | df   |      |       |      |                  |
|------------------------------|------|------|-------|------|------------------|
| Filesystem                   | Size | Used | Avail | Use% | Mounted on       |
| /dev/mapper/vg00-lvol01      | 1.2G | 479M | 578M  | 46%  | /                |
| /dev/mapper/vg00-lvol05      | 5.4G | 1.4G | 3.7G  | 28%  | /awips/fxa       |
| /dev/mapper/vg00-lvol06      | 1.4G | 82M  | 1.2G  | 7%   | /awips/ifps      |
| /dev/mapper/vg00-lvol07      | 1.1G | 85M  | 879M  | 9%   | /awips/ldad      |
| /dev/mapper/vg00-lvol08      | 285M | 125M | 145M  | 47%  | /awips/ops       |
| /dev/cciss/c0d0p1            | 104M | 25M  | 74M   | 26%  | /boot            |
| /dev/mapper/vg00-lvol09      | 11G  | 2.9G | 7.1G  | 29%  | /data/logs       |
| none                         | 3.2G | 0    | 3.2G  | 0%   | /dev/shm         |
| /dev/mapper/vg00-lvol02      | 1.1G | 27M  | 938M  | 3%   | /tmp             |
| /dev/mapper/vg00-lvol03      | 11G  | 7.4G | 2.3G  | 77%  | /usr             |
| /dev/mapper/vg00-lvol04      | 3.1G | 494M | 2.4G  | 18%  | /var             |
| /dev/mapper/vg00-lvol_awips2 | 43G  | 2.8G | 38G   | 7%   | /awips2          |
| nas1:awipsADAPT              | 1.1G | 742M | 285M  | 73%  | /awips/adapt     |
| nas1:awipsDEV                | 4.2G | 590k | 4.2G  | 1%   | /awips/dev       |
| nas1:awipsGFESuit            | 104G | 18G  | 86G   | 18%  | /awips/GFESuite  |
| nas1:awipsHYDRO              | 11G  | 964M | 9.4G  | 10%  | /awips/hydroapps |
| nas1:dataLOCAL               | 52G  | 27G  | 26G   | 51%  | /data/local      |
| nas1:dataX400                | 615M | 221M | 394M  | 36%  | /data/x400       |
| nas1:DSshared                | 1.6G | 410M | 1.2G  | 27%  | /DS_shared       |
| nas1:dataADAPT               | 2.7G | 433M | 2.3G  | 17%  | /data/adapt      |
| nas1:dataGFE                 | 17M  | 99k  | 17M   | 1%   | /data/GFE        |
| nas1:awipsHOME               | 118G | 71G  | 48G   | 60%  | /home            |
| nas1:dataFXA                 | 516G | 291G | 225G  | 57%  | /data/fxa        |

```

nas1:/aiidata/utility 541G 17G 524G 4%
/awips2/edex/data/utility
nas1:/storage 271G 43G 228G 16% /awips/storage
nas1:/GFESuite2 11G 852k 11G 1% /awips2/GFESuite
nas1:/localapps 52G 656k 52G 1% /localapps
/dev/mapper/vg_aiildm-awipsildm
 178G 56G 114G 33% /data_store

```

**Note:** Check to see if everything is mounted (/awips2, px2f:/data\_store, /awips2/db, /awips2/GFESuite).

3. Check to see whether the Heartbeat, a2dx1apps and dx1f up (ping dx1f) running.
4. Check to see whether MHS is running.

**TYPE:** `ps -ef | grep mhs`

```

root 15059 1 0 Jan21 ? 00:00:00 archive_msgreq -p/data/mhs/archive/req_pipe -
o/data/mhs/archive/req/processed
root 15062 1 0 Jan21 ? 00:00:00 archive_msgresp -p/data/mhs/archive/resp_pipe -
o/data/mhs/archive/resp/processed
root 15151 1 0 Jan21 ? 00:00:04 mdp_daemon -k 7789 -f /awips/ops/data/mhs/mdp-smtp.cfg
awipsmhs 15153 15151 0 Jan21 ? 00:04:05 smtp_send -eb -cz -k7789 -n0 -p/tmp/smtp0_send_fifo
awipsmhs 15263 1 0 Jan21 ? 00:00:04 smtp_recv -n0 -m0 -o/data/mhs/smtp_recv/output -
b/var/spool/mail/awipsmhs

```

**TYPE:** `ypcat hosts | grep mhs`

```

165.92.24.65 dx1f-tbw3 dx1f-tbw3.er.awips.noaa.gov
cpCfgHost mhs siteTime dx1f

```

5. Check to see whether sendmail is running.

**TYPE:** `ps -ef | grep sendmail`

```

fxa 7935 6688 0 13:50 ? 00:00:00 /usr/sbin/sendmail -
FCronDaemon -i -odi -oem -oi -t
sridharb 22665 14878 0 14:00 pts/15 00:00:00 grep sendmail

```

```

root 27298 1 0 Mar28 ? 00:06:37 sendmail: accepting
connections
smmsp 27306 1 0 Mar28 ? 00:00:03 sendmail: Queue
runner@00:00:10 for /var/spool/clientmqueue

```

**TYPE:** `msg_send -atbdr -c0`

TBW3-75458

## DX2

Check to see whether any partitions are full

**TYPE:** `df -h`

| Filesystem                       | Size | Used | Avail | Use% | Mounted on                |
|----------------------------------|------|------|-------|------|---------------------------|
| /dev/mapper/vg00-lvol01          | 1.2G | 479M | 578M  | 46%  | /                         |
| /dev/mapper/vg00-lvol05          | 5.4G | 1.4G | 3.7G  | 28%  | /awips/fxa                |
| /dev/mapper/vg00-lvol06          | 1.4G | 82M  | 1.2G  | 7%   | /awips/ifps               |
| /dev/mapper/vg00-lvol07          | 1.1G | 85M  | 879M  | 9%   | /awips/ldad               |
| /dev/mapper/vg00-lvol08          | 285M | 125M | 145M  | 47%  | /awips/ops                |
| /dev/cciss/c0d0p1                | 104M | 25M  | 74M   | 26%  | /boot                     |
| /dev/mapper/vg00-lvol09          | 11G  | 2.9G | 7.1G  | 29%  | /data/logs                |
| none                             | 3.2G | 0    | 3.2G  | 0%   | /dev/shm                  |
| /dev/mapper/vg00-lvol02          | 1.1G | 27M  | 938M  | 3%   | /tmp                      |
| /dev/mapper/vg00-lvol03          | 11G  | 7.4G | 2.3G  | 77%  | /usr                      |
| /dev/mapper/vg00-lvol04          | 3.1G | 494M | 2.4G  | 18%  | /var                      |
| /dev/mapper/vg00-lvol_awips2     | 43G  | 2.8G | 38G   | 7%   | /awips2                   |
| nas1:awipsADAPT                  | 1.1G | 742M | 285M  | 73%  | /awips/adapt              |
| nas1:awipsDEV                    | 4.2G | 590k | 4.2G  | 1%   | /awips/dev                |
| nas1:awipsgFESuite               | 104G | 18G  | 86G   | 18%  | /awips/GFESuite           |
| nas1:awipsHYDRO                  | 11G  | 964M | 9.4G  | 10%  | /awips/hydroapps          |
| nas1:dataLOCAL                   | 52G  | 27G  | 26G   | 51%  | /data/local               |
| nas1:dataX400                    | 615M | 221M | 394M  | 36%  | /data/x400                |
| nas1:DSshared                    | 1.6G | 410M | 1.2G  | 27%  | /DS_shared                |
| nas1:dataADAPT                   | 2.7G | 433M | 2.3G  | 17%  | /data/adapt               |
| nas1:dataGFE                     | 17M  | 99k  | 17M   | 1%   | /data/GFE                 |
| nas1:awipsHOME                   | 118G | 71G  | 48G   | 60%  | /home                     |
| nas1:dataFXA                     | 516G | 291G | 225G  | 57%  | /data/fxa                 |
| nas1:aiidata/utility             | 541G | 17G  | 524G  | 4%   | /awips2/edex/data/utility |
| nas1:/storage                    | 271G | 43G  | 228G  | 16%  | /awips/storage            |
| nas1:/GFESuite2                  | 11G  | 852k | 11G   | 1%   | /awips2/GFESuite          |
| nas1:/localapps                  | 52G  | 656k | 52G   | 1%   | /localapps                |
| /dev/mapper/vg_aieldm-awipsiildm | 178G | 56G  | 114G  | 33%  | /data_store               |

**Note:** Check to see if everything is mounted (/awips2, px2f:/data\_store, /awips2/db, /awips2/GFESuite)

**DX3/4**

1. Check to see whether edex ingest, ingestGrib and request running

**TYPE:** `ps -ef | grep edex`

**Note:** Make sure they are logging and ingesting data in /awips2/edex/logs.

2. Check to see whether any partitions are full

**TYPE:** `df -H`

| Filesystem                   | Size | Used | Avail | Use% | Mounted on        |
|------------------------------|------|------|-------|------|-------------------|
| /dev/mapper/vg00-lvol01      | 1.2G | 633M | 423M  | 60%  | /                 |
| /dev/mapper/vg00-lvol05      | 5.4G | 1.1G | 4.1G  | 21%  | /awips/fxa        |
| /dev/mapper/vg00-lvol06      | 1.4G | 82M  | 1.2G  | 7%   | /awips/ifps       |
| /dev/mapper/vg00-lvol07      | 1.1G | 144M | 820M  | 15%  | /awips/ldad       |
| /dev/mapper/vg00-lvol08      | 285M | 133M | 138M  | 50%  | /awips/ops        |
| /dev/sda1                    | 104M | 26M  | 74M   | 26%  | /boot             |
| /dev/mapper/vg00-lvol09      | 2.1G | 38M  | 1.9G  | 2%   | /data/logs        |
| none                         | 4.3G | 0    | 4.3G  | 0%   | /dev/shm          |
| /dev/mapper/vg00-lvol02      | 1.1G | 19M  | 945M  | 2%   | /tmp              |
| /dev/mapper/vg00-lvol03      | 11G  | 6.6G | 3.1G  | 68%  | /usr              |
| /dev/mapper/vg00-lvol04      | 3.1G | 505M | 2.4G  | 18%  | /var              |
| /dev/mapper/vg00-lvol_awips2 | 43G  | 14G  | 27G   | 35%  | /awips2           |
| nas1:awipsADAPT              | 1.1G | 742M | 285M  | 73%  | /awips/adapt      |
| nas1:awipsDEV                | 4.2G | 590k | 4.2G  | 1%   | /awips/dev        |
| nas1:awipsGFESuite           | 104G | 18G  | 86G   | 18%  | /awips/GFESuite   |
| nas1:awipsHYDRO              | 11G  | 964M | 9.4G  | 10%  | /awips/hydroapps  |
| nas1:dataLOCAL               | 52G  | 27G  | 26G   | 51%  | /data/local       |
| nas1:dataX400                | 615M | 221M | 394M  | 36%  | /data/x400        |
| nas1:DSshared                | 1.6G | 410M | 1.2G  | 27%  | /DS_shared        |
| nas1:dataADAPT               | 2.7G | 433M | 2.3G  | 17%  | /data/adapt       |
| nas1:dataGFE                 | 17M  | 99k  | 17M   | 1%   | /data/GFE         |
| nas1:awipsHOME               | 118G | 71G  | 48G   | 60%  | /home             |
| nas1:dataFXA                 | 516G | 291G | 225G  | 57%  | /data/fxa         |
| nas1:storage                 | 271G | 43G  | 228G  | 16%  | /awips/storage    |
| nas1:/localapps              | 52G  | 656k | 52G   | 1%   | /localapps        |
| nas1:/dvol/diagnostic        | 156M | 3.9M | 152M  | 3%   | /mnt/nas          |
| nas1:/GFESuite2              | 11G  | 852k | 11G   | 1%   | /awips2/GFESuite  |
| nas1:/aiidata                | 541G | 17G  | 524G  | 4%   | /awips2/edex/data |
| dx2f:/data_store             | 178G | 55G  | 114G  | 33%  | /data_store       |

**Note:** Check to see if everything is mounted (/awips2, px2f:/data\_store, /awips2/db, /awips2/GFESuite)

3. Check to see whether the clustering loopback device is up

**TYPE:** `ifconfig lo:0`

```
lo:0 Link encap:Local Loopback
 inet addr:165.92.24.61 Mask:255.255.255.255
 UP LOOPBACK RUNNING MTU:16436 Metric:1
```

**CPSBN**

- Check to see whether ldm is running on cpsbn1 and cpsbn2 on tbw3

**TYPE:** `ps -ef | grep ldm`

```
ldm 9268 1 0 17:57 ? 00:00:00 rpc.ldmd -I
165.92.24.50 -P 388 -q /usr/local/ldm/data/ldm.pq
/usr/local/ldm/etc/ldmd.conf

ldm 9274 9268 0 17:57 ? 00:00:15 readnoaaport -m
224.0.1.1 -n -u 3 -t mhs -r 1

ldm 9275 9268 0 17:57 ? 00:00:00 readnoaaport -m
224.0.1.2 -n -u 4 -t mhs -r 1

ldm 9276 9268 0 17:57 ? 00:00:02 readnoaaport -m
224.0.1.3 -n -u 5 -t mhs -r 1

ldm 9277 9268 0 17:57 ? 00:00:02 readnoaaport -m
224.0.1.4 -n -u 6 -t mhs -r 1

ldm 9673 9268 0 18:02 ? 00:00:21 rpc.ldmd -I
165.92.24.50 -P 388 -q /usr/local/ldm/data/ldm.pq
/usr/local/ldm/etc/ldmd.conf
```

- Check to see whether qpid is running on cpsbn1

**TYPE:** `ps -ef | grep qpid`

```
awips 14355 1 1 00:10 ? 00:19:32
/awips2/qpid/sbin/qpid --daemon --config /awips2/qpid/etc/qpid.conf
```

- Check to see whether IPVS running

**TYPE:** `ps -ef|grep pulse`

```
root 29652 1 0 Apr06 ? 00:00:00 pulse
```

**TYPE:** `ps -ef|grep ipvsadm`

```
root 4812 4803 0 Jan23 ? 00:00:00 /usr/sbin/nanny -c -h
165.92.24.3 -p 9581 -s GET / HTTP/1.0\r\n\r\n -x HTTP -a 15 -I
/sbin/ipvsadm -t 6 -w 1 -V 165.92.24.61 -M g -U none --lvs

root 4813 4803 0 Jan23 ? 00:00:01 /usr/sbin/nanny -c -h
165.92.24.4 -p 9581 -s GET / HTTP/1.0\r\n\r\n -x HTTP -a 15 -I
/sbin/ipvsadm -t 6 -w 2 -V 165.92.24.61 -M g -U none --lvs
```

- Check to see whether the partitions are full

**TYPE:** `df -H`

|                              |      |      |      |     |         |
|------------------------------|------|------|------|-----|---------|
| /dev/mapper/vg00-lvol01      | 1.1G | 317M | 166M | 66% | /       |
| /dev/mapper/vg00-lvol_awips2 | 1.1G | 524M | 440M | 55% | /awips2 |
| /dev/mapper/vg00-lvol08      | 260M | 42M  | 206M | 17% | /home   |
| /dev/mapper/vg00-lvol07      | 102G | 1.5G | 95G  | 2%  | /data   |

|                         |      |      |      |     |           |
|-------------------------|------|------|------|-----|-----------|
| /dev/mapper/vg00-lvol06 | 520M | 241M | 253M | 49% | /awips    |
| /dev/mapper/vg00-lvol03 | 16G  | 5.0G | 9.6G | 35% | /usr      |
| /dev/mapper/vg00-lvol04 | 3.1G | 1.1G | 1.8G | 38% | /var      |
| /dev/mapper/vg00-lvol02 | 520M | 20M  | 474M | 4%  | /tmp      |
| /dev/cciss/c0d0p1       | 208M | 20M  | 178M | 10% | /boot     |
| tmpfs                   | 3.2G | 0    | 3.2G | 0%  | /dev/shm  |
| /dev/ram0               | 1.6G | 1.1G | 493M | 68% |           |
| /data/lmd/data          |      |      |      |     |           |
| nas1:/dataFXA           | 516G | 450G | 66G  | 88% | /data/fxa |

**PX1**

1. Check to see whether the partitions are full

**TYPE:**      **df**

| Filesystem              | Size | Used | Avail | Use% | Mounted on        |
|-------------------------|------|------|-------|------|-------------------|
| /dev/mapper/vg00-lvol01 | 1.1G | 835M | 130M  | 87%  | /                 |
| /dev/mapper/vg00-lvol99 | 43G  | 1.6G | 39G   | 4%   | /awips2           |
| /dev/mapper/vg00-lvol06 | 5.1G | 1.5G | 3.4G  | 30%  | /awips/fxa        |
| /dev/mapper/vg00-lvol07 | 1.6G | 36M  | 1.5G  | 3%   | /awips/ifps       |
| /dev/mapper/vg00-lvol08 | 1.1G | 144M | 820M  | 15%  | /awips/laps       |
| /dev/mapper/vg00-lvol09 | 1.1G | 180M | 784M  | 19%  | /awips/ldad       |
| /dev/mapper/vg00-lvol10 | 305M | 86M  | 203M  | 30%  | /awips/ops        |
| /dev/sda1               | 104M | 25M  | 74M   | 26%  | /boot             |
| /dev/mapper/vg00-lvol11 | 2.1G | 540M | 1.4G  | 28%  | /data/logs        |
| none                    | 2.2G | 0    | 2.2G  | 0%   | /dev/shm          |
| /dev/mapper/vg00-lvol02 | 508M | 18M  | 465M  | 4%   | /tmp              |
| /dev/mapper/vg00-lvol03 | 9.2G | 7.7G | 1.1G  | 89%  | /usr              |
| /dev/mapper/vg00-lvol04 | 3.1G | 980M | 2.0G  | 34%  | /var              |
| nas1:/storage           | 271G | 43G  | 228G  | 16%  | /awips/storage    |
| nas1:/awipsADAPT        | 1.1G | 742M | 285M  | 73%  | /awips/adapt      |
| nas1:/awipsDEV          | 4.2G | 590k | 4.2G  | 1%   | /awips/dev        |
| nas1:/awipsGFESuit/ws   | 104G | 18G  | 86G   | 18%  | /awips/GFESuite   |
| nas1:/awipsHOME         | 118G | 71G  | 48G   | 60%  | /home             |
| nas1:/awipsHYDRO        | 11G  | 964M | 9.4G  | 10%  | /awips/hydroapps  |
| nas1:/dataGFE           | 17M  | 99k  | 17M   | 1%   | /data/GFE         |
| nas1:/dataADAPT         | 2.7G | 433M | 2.3G  | 17%  | /data/adapt       |
| nas1:/dataFXA           | 516G | 291G | 225G  | 57%  | /data/fxa         |
| nas1:/dataLOCAL         | 52G  | 27G  | 26G   | 51%  | /data/local       |
| nas1:/localapps         | 52G  | 656k | 52G   | 1%   | /localapps        |
| nas1:/verify            | 1.1T | 1.4G | 1.1T  | 1%   | /data/verify      |
| dx2f:/data_store        | 178G | 56G  | 114G  | 33%  | /data_store       |
| nas1:/aiidata           | 541G | 17G  | 524G  | 4%   | /awips2/edex/data |
| nas1:/GFESuite2         | 11G  | 852k | 11G   | 1%   | /awips2/GFESuite  |

2. Check to see whether everything is mounted on /awips2, /awips2/edex/data/hdf5, /data\_store
3. Check to see whether the heartbeat is running, a2px1apps running, px1f up (ping px1f).
4. Check to see whether the Rehosted apps running

**TYPE:**    **ps -ef | grep fxa**

```

fxa 17841 1 0 Oct10 ? 00:17:56
/awips/fxa/bin/purgeProcess -commit
fxa 23433 8715 0 17:42 ? 00:00:00 crond
fxa 23434 23433 0 17:42 ? 00:00:00 /bin/sh -c /bin/csh -
c '/usr/bin/perl /awips/laps/etc/awips2_satIngest.pl /awips/laps
/data/fxa/laps' > /dev/null 2>&1; /bin/csh -c '/usr/bin/perl
/awips/laps/etc/laps_driver.pl lvd_sat_ingest.exe /awips/laps
/data/fxa/laps' > /dev/null 2>&1
fxa 23435 23434 1 17:42 ? 00:00:00 /bin/csh -c
/usr/bin/perl /awips/laps/etc/awips2_satIngest.pl /awips/laps
/data/fxa/laps
fxa 23602 23435 0 17:42 ? 00:00:00 /usr/bin/perl
/awips/laps/etc/awips2_satIngest.pl /awips/laps /data/fxa/laps
fxa 23604 23602 1 17:42 ? 00:00:00 /bin/csh
/awips/fxa/bin/convertSat.csh 20111029_1730
fxa 24605 23604 0 17:42 ? 00:00:00 sleep 3
root 24610 24116 0 17:42 pts/0 00:00:00 grep fxa
fxa 31697 1 0 Oct13 ? 00:00:00
/awips/fxa/bin/asyncPilMsgServer
fxa 31700 1 0 Oct13 ? 00:12:11
/awips/fxa/bin/asyncScheduler
fxa 31930 31700 0 Oct13 ? 00:00:08 test1 23 20 1 test1
/dev/ttyn1a 9600 8 NONE 1 NONE
fxa 31954 1 0 Oct13 ? 00:00:02 /usr/bin/perl
/awips/fxa/bin/asyncPollData.pl
fxa 31962 1 0 Oct13 ? 00:00:00
/awips/fxa/bin/hmMonitorServer
fxa 32101 1 0 Oct13 ? 00:00:01
/awips/fxa/bin/NWWSSchedule
/awips/fxa/bin/ingProcMon.pl -c PX1

```

## PX2

1. Check to see whether any partitions are full

**TYPE:**    **df**

**Note:** Check to see if everything is mounted (/awips2, /data\_store,/awips2/edex/data/hdf5)

2. Check to see whether the Heartbeat, a2px2apps and px2f up (ping px2f) are running.
3. Check to see whether the Rehosted applications are running

**TYPE: ps -ef | grep ldad**

```

ldad 760 1 0 Oct13 ? 00:00:05
/awips/fxa/bin/CommsRouter LDAD_ROUTER
ldad 768 1 0 Oct13 ? 00:00:05
/awips/fxa/bin/DataController LDAD_ROUTER LdadController.config
ldad 771 768 0 Oct13 ? 00:00:13
/awips/fxa/bin/routerLdadDecoder px2-tbw3/56457/768 136938768
ldad 772 768 0 Oct13 ? 00:00:31
/awips/fxa/bin/routerStoreNetcdf px2-tbw3/56457/768 136965408
ldad 773 768 0 Oct13 ? 00:00:19
/awips/fxa/bin/routerStoreEDEX px2-tbw3/56457/768 136974328
ldad 774 768 0 Oct13 ? 00:00:42
/awips/fxa/bin/routerShefEncoderEDEX px2-tbw3/56457/768 136974552
ldad 775 768 0 Oct13 ? 00:01:07
/awips/fxa/bin/routerStoreTextEDEX px2-tbw3/56457/768 136974856
ldad 1207 1 0 Oct13 ? 00:00:37 /bin/sh
/awips/ldad/bin/watchDogInternal.sh
ldad 26284 1207 0 17:43 ? 00:00:00 sleep 30
root 26286 26159 0 17:43 pts/1 00:00:00 grep ldad
ldad 31217 1207 0 00:00 ? 00:00:01 /usr/bin/perl
/awips/ldad/bin/pollForData.pl Start
/awips/ldad/data/pollForData.conf
fxa 31767 1 0 Oct13 ? 00:00:00
/awips/fxa/bin/ldadServer
ldad 32762 1 0 Oct13 ? 00:00:01
/awips/ldad/bin/listener

```

**TYPE: ps -ef|grep fxa**

```

ldad 760 1 0 Oct13 ? 00:00:05
/awips/fxa/bin/CommsRouter LDAD_ROUTER
ldad 768 1 0 Oct13 ? 00:00:05
/awips/fxa/bin/DataController LDAD_ROUTER LdadController.config
ldad 771 768 0 Oct13 ? 00:00:13
/awips/fxa/bin/routerLdadDecoder px2-tbw3/56457/768 136938768
ldad 772 768 0 Oct13 ? 00:00:31
/awips/fxa/bin/routerStoreNetcdf px2-tbw3/56457/768 136965408
ldad 773 768 0 Oct13 ? 00:00:19
/awips/fxa/bin/routerStoreEDEX px2-tbw3/56457/768 136974328
ldad 774 768 0 Oct13 ? 00:00:42
/awips/fxa/bin/routerShefEncoderEDEX px2-tbw3/56457/768 136974552
ldad 775 768 0 Oct13 ? 00:01:07
/awips/fxa/bin/routerStoreTextEDEX px2-tbw3/56457/768 136974856
root 26327 26159 0 17:43 pts/1 00:00:00 grep fxa
fxa 28690 1 0 Oct10 ? 00:18:36
/awips/fxa/bin/purgeProcess -commit
fxa 31767 1 0 Oct13 ? 00:00:00
/awips/fxa/bin/ldadServer
fxa 31815 1 0 Oct13 ? 00:00:00 /bin/sh
/awips/fxa/FSIedex/bin/fsiWatchdog.sh
fxa 31817 31815 0 Oct13 ? 00:24:55
/awips/fxa/FSIedex/bin/FSIprocessorEDEX

```

```
fxa 31819 1 0 Oct13 ? 00:00:00
/awips/fxa/fsi/bin/rssd
```

4. To monitor the MHS queues at the site

| <b>TYPE</b>                  | <b>dwb_smon</b> |                |                 |               |                 |  |
|------------------------------|-----------------|----------------|-----------------|---------------|-----------------|--|
| <b>Server</b>                | <b>PID</b>      | <b>User ID</b> | <b>Group ID</b> | <b>Length</b> | <b>Status</b>   |  |
| <hr/>                        |                 |                |                 |               |                 |  |
| msgreq_svr<br>13:05:29 2011  | 24495           | root           | root            | 0             | UP @ Fri Feb 11 |  |
| (nfe/11030)<br>13:05:29 2011 | 24496           |                |                 |               | UP @ Fri Feb 11 |  |
| (worker)<br>13:05:29 2011    | 24498           |                |                 |               | UP @ Fri Feb 11 |  |
| (worker)<br>13:05:30 2011    | 24741           |                |                 |               | UP @ Fri Feb 11 |  |
| (worker)<br>13:05:31 2011    | 24872           |                |                 |               | UP @ Fri Feb 11 |  |
| (worker)<br>13:05:32 2011    | 25164           |                |                 |               | UP @ Fri Feb 11 |  |
| msgrcv_svr<br>13:05:29 2011  | 24511           | root           | root            | 0             | UP @ Fri Feb 11 |  |
| (nfe/11040)<br>13:05:29 2011 | 24514           |                |                 |               | UP @ Fri Feb 11 |  |
| (worker)<br>17:18:59 2011    | 23741           |                |                 |               | UP @ Fri Feb 11 |  |
| (worker)<br>17:28:03 2011    | 29667           |                |                 |               | UP @ Fri Feb 11 |  |

### I.11.2 Workstations

1. Check for System Issues – Full partitions, load average, etc.

**TYPE:** df -hP

**TYPE:** top

**TYPE:** df /awips2/edex/data/share

2. Ensure that the directory is mounted from the nas1:aiidata/share as shown below:

```
[root@px1-tbw3 ~]# df /awips2/edex/data/share
Filesystem 1K-blocks Used Available Use% Mounted on
nas1:/aiidata/share 527556704 4756032 522800672 1%
/awips2/edex/data/share
```

**TYPE:** df /data/verify

3. Ensure that the directory is mounted from the nas1:verify as shown below:

```
[root@px1-tbw3 ~]# df /data/verify
Filesystem 1K-blocks Used Available Use% Mounted on
nas1:/verify 1006233440 519968 1005713472 1%
/data/verify
```

4. Ensure that AlertViz launches and does not ask for localization server.
5. Ensure that CAVE launches and products load.
6. Ensure that GFE launches within CAVE and grids are available.
7. Ensure that WarnGen launches and templates are available.
8. Ensure that AvnFPS launches and data is available.
9. Ensure that Text Workstation launches on the XT.
10. Ensure that you can issue a textdb -r command from a terminal window.

### ***I.11.3 All Machines***

1. Ensure that DNS is working.

**TYPE:**      **dig as3-ancf**

2. Ensure that NIS is working.

**TYPE:**      **ypcat hosts**

3. Ensure that NTP working.

**TYPE:**      **ntpq**

**TYPE:**      **pe**

You should see an entry for as3f-ancf with a \* next to it.

## **Appendix J**

### **WarnGen Templates**

## Appendix J. WarnGen Templates

### Table of Contents

|                                                                         | <i>Page</i> |
|-------------------------------------------------------------------------|-------------|
| J.0 WarnGen Templates .....                                             | 1           |
| J.1 How to Access the Data Contained in a Value Inside a Template ..... | 15          |
| J.2 Modifying/Editing Templates.....                                    | 15          |
| J.3 Modifying WarnGen Templates .....                                   | 19          |
| J.4 Troubleshooting WarnGen Startup .....                               | 35          |

### List of Tables

|                                                             |    |
|-------------------------------------------------------------|----|
| Table J-1. Baseline WarnGen Templates.....                  | 1  |
| Table J-2. Velocity .xml Template Configuration Values..... | 2  |
| Table J-3. Variables Passed to WarnGen Templates .....      | 10 |

## J.0 WarnGen Templates

Note: This Chapter will be updated in the March OB12.3.1 release.

WarnGen templates can be used on a user, site, or base level. Base templates should never be edited, and are stored on the EDEX localization server in the following directory:

`$EDEX_HOME/data/utility/common_static/base/warngen`

In order to localize a baseline template, the .cfg and .vm files should be copied to the site-specific directory and edited there. To copy the files, the following commands can be used:

Log into an EDEX server as user *root*:

```
ssh -q -l root $EDEX1
```

Change directories to the site-specific WarnGen template directory:

```
cd $EDEX_CONFIG/common_static/site/XXX/warngen
```

Using Table J-1 as a reference, use the localization perspective of CAVE to create SITE level versions of the desired templates (Right Click, Copy To --> SITE), or copy the desired .xml and .vm files into place:

```
cp -a ../../base/warngen/template.(xml|vm) .
```

**Note:** Replace the word TEMPLATE above with one of the file names in **Table J-1**. Note the case of the file name and copy appropriately.

**Table J-1. Baseline WarnGen Templates**

| File Name              | Description                                    |
|------------------------|------------------------------------------------|
| dambreak.cfg           | Flash Flood Warning configuration              |
| dambreakffs.cfg        | Flash Flood Warning configuration              |
| eww.cfg                | Extreme Wind Warning configuration             |
| ewws.cfg               | Extreme Wind Warning followup configuration    |
| ffs.cfg                | Flash Flood Statement configuration            |
| ffw.cfg                | Flash Flood Warning configuration              |
| fla.cfg                | Areal Flood Advisory configuration             |
| flas.cfg               | Areal Flood Advisory configuration             |
| fls.cfg                | Flood Statement configuration                  |
| flw.cfg                | Flood Warning configuration                    |
| marinestateMENT.cfg    | Areal Flood Advisory configuration             |
| severethunderstorm.cfg | Severe Thunderstorm Warning configuration      |
| shortterm.cfg          | Short Term Forecast configuration              |
| smw.cfg                | Special Marine Warning configuration           |
| smws.cfg               | Marine Wx Statement - follow SMW configuration |
| SVS.cfg                | Severe Weather Statement configuration         |
| swws.cfg               | Special Weather Statement configuration        |

| File Name   | Description                   |
|-------------|-------------------------------|
| tornado.cfg | Tornado Warning configuration |

Use the localization perspective to make the necessary or desired changes.

WarnGen templates are created using velocity template language (VTL) with supporting configurations in an xml formatted file with an .xml extension. More information on this can be found at:

[http://svn.apache.org/repos/asf/velocity/engine/tags/V\\_1\\_0\\_1/docs/vtl-reference-guide.html](http://svn.apache.org/repos/asf/velocity/engine/tags/V_1_0_1/docs/vtl-reference-guide.html)

<http://click.sourceforge.net/docs/velocity/vtl-reference-guide.html>

Site-level templates and product configuration files will be stored in the following location on the EDEX localization server:

\$EDEX\_HOME/data/utility/common\_static/site/XXX/warngen

Where XXX is a site's localization ID. Site-specific templates should also be named in the following manner, substituting the site ID for XXX:

<templateName>\_XXX

For example: dambreak\_OAX

Each warning velocity template will have a corresponding configuration xml file. This configuration will set different variables that can dynamically change how WarnGen acts depending on the warning type. It is important to note that each configuration must start and end with a <warnConfig> and </warnConfig> tag. Also, comments can be maintained with <!-- comment -->. Table J-2 describes fields that can be used in velocity template .xml files.

**Table J-2. Velocity .xml Template Configuration Values**

| Value                  | Description                                                                                                                                                                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <maps>                 | Maps contained within <map></map> will get loaded with this template. Refer to 'Maps' menu in CAVE. The various menu items are also the different maps that can be loaded with each template.                                                                              |
| <follow-ups>           | Each associated follow-up should be contained within <followup></followup>. Each follow-up will become available when the appropriate time range permits.                                                                                                                  |
| <phenoms>              | Each associated phenom should be contained within <phenom></phenom>.                                                                                                                                                                                                       |
| <enableRestart>        | Enables/disables user from selecting the Restart button on the GUI. This is usually set to false for follow-up configuration files. Because this variable is usually set to false for follow-ups, this also controls if the 'Drag me to storm' text will become available. |
| <enableDamBreakThreat> | Enables/disables the 'Dam Break Threat Area' button. This is mainly used for dam break templates.                                                                                                                                                                          |
| <autoLockText>         | Enables/disables the system to lock text based on various patterns. Refer to Locking Text section of this appendix for more information.                                                                                                                                   |

| Value                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <includeWatches>     | Each watch to be included should be contained within <includedWatch></includedWatch>. The only two possible values are 'torWatches' and 'svrWatches'. Refer to includeWatchAreaBuffer in the Area Configuration for more information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <durations>          | Each available duration should be contained with <duration></duration>. The default duration should be contained with <defaultDuration></defaultDuration>. However, default duration should not be included within <durations></durations>.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <bulletActionGroups> | <p>The bullet action group maintains all bulletActionGroups and should be contained with &lt;bulletActionGroups&gt;&lt;/bulletActionGroups&gt;. Within the bulletActionGroup is a &lt;bulletActionGroup&gt;&lt;/bulletActionGroup&gt; which contains all the available bullets for the associated action, phen, and sig.</p> <p>Example:</p> <pre data-bbox="551 699 1383 1153">&lt;bulletActionGroups&gt;   &lt;bulletActionGroup action="NEW" phen="TO" sig="W"&gt;     &lt;bullets&gt;       &lt;!-- List of bullets for a NEW, Tornado Warning --&gt;     &lt;/bullets&gt;   &lt;/bulletActionGroup&gt;   &lt;bulletActionGroup action="COR" phen="TO" sig="W"&gt;     &lt;bullets&gt;       &lt;!-- List of bullets for a COR, Tornado Warning --&gt;     &lt;/bullets&gt;   &lt;/bulletActionGroup&gt; &lt;/bulletActionGroups&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <bullets>            | <p>The bullets populate the selection list in the WarnGen dialog. Each bullet should be contained in a &lt;bullet&gt; tag. The following are the different parameters available to a bullet:</p> <ul data-bbox="551 1284 1432 1607" style="list-style-type: none"> <li>bulletName: An id that is passed to the template when a bullet is selected. This name should be unique as it can be used as an identifier with the velocity files. However, 'siteimminent' and 'sitefailed' are reserved bullet names for dam breaks.</li> <li>bulletText: The text presented to the user in the selection list.</li> <li>bulletGroup: Only one bullet can be selected per bulletGroup.</li> <li>bulletType: 'title' is unselectable.</li> <li>parseString: If this string MATCHES a phrase in the follow-up warning, then the associated bullet will automatically be highlighted in the selection list for a follow-up.</li> </ul> <p>If there are multiple strings that need to be tested, the escape character '&amp;quot;' needs to be placed before and after the phrase to be matched. For example, parseString="&amp;quot;LINE OF SEVERE THUNDERSTORMS&amp;quot;&amp;quot;SQUALL&amp;quot;". If the warning text contains "LINE OF SEVERE THUNDERSTORMS" and "SQUALL", then the associated bullet will be highlighted.</p> <p>Furthermore, if a phrase begins with '-' and is not in the warning text, then the associated bullet will always be highlighted. For example, parseString="-&amp;quot;-</p> |

| Value            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <p>SQUALL&amp;quot;”.</p> <ul style="list-style-type: none"> <li>• loadMap: Refer to ‘Maps’ menu in CAVE. The various menu items are also the different maps that can be load with each template.</li> <li>• floodSeverity: Used to highlight the correct severity on a correction.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <damInfoBullets> | <p>The bullets populate the selection list in the WarnGen dialog. Each bullet should be contained in a &lt;damInfoBullet&gt; tag. The following are the different parameters available to a bullet:</p> <ul style="list-style-type: none"> <li>• bulletName: An id that is passed to the template when a bullet is selected. This name should be unique as it can be used as an identifier with the velocity files.</li> <li>• bulletText: The text presented to the user in the selection list.</li> <li>• bulletGroup: Should use either ‘dam’ or ‘scenario’.</li> <li>• bulletType: ‘title’ is unselectable.</li> <li>• Cords: The lat/lon coordinates in the format usually found at the bottom of the warnings (i.e., LAT ... LON 3981 7868 3980 7861 3972 7862 3972 7874)</li> </ul> <p>1.1     <b>Include:</b> &lt;include file=”filename.txt”/&gt;</p> <p>The include allows an external file to be inserted in the configuration file. This functionality is useful when a user wants to list dam info bullets in a separate file. The format of the include tag is &lt;include file=”filename.txt”/&gt; where filename is the name of the file including the extension of the file (i.e., .txt). The file to be included will follow the rules of localization: user, site, then base.</p>                                                                                                                                                                                                                                                                                                                                                                                         |
| <areaConfig>     | <p>Specifies how the area portion of the warning is generated. This configuration is mainly used for determining the impacted counties in the 1st bullet. The following are the different parameters available to the areaConfig:</p> <ul style="list-style-type: none"> <li>• inclusionPercent: If an area greater than this percentage of area is covered, include it in the warning.</li> <li>• inclusionAndOr: AND – both inclusionPercent and inclusionArea must pass in order to be included. OR – either inclusionPercent or inclusionArea can pass to be included.</li> <li>• inclusionArea: If an area greater than this is covered, include it in the warning (square kilometers).</li> <li>• areaField: The column name of the areaSource that contains the name of the area (i.e., COUNTYNAME, NAME).</li> <li>• parentAreaField: The column name of the parentSource that contains the name of the parent (i.e., NAME).</li> <li>• areaNotationField: The column in the areaSource that contains the key used to map to the correct area notation. Look at countTypes.txt.</li> <li>• areaNotationTranslationFile: Translation file to look up an area notation. File located in /edex/data/utility/common_static/base/warngen.</li> <li>• fipsField: The name of the attribute that retrieves the fips.</li> <li>• pointField: The column name in the pointSource that contains the name of the point.</li> <li>• sortBy: Can sort by ‘name’, ‘parent’, ‘size’, partOfArea, partOfParent, areaNotation, fips.</li> <li>• pointFilter: Controls that point to include based on the WARNGENLEV of the point. WARNGENLEV is a value from 1 to 3 where 1 is the highest</li> </ul> |

| Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>priority:</p> <ul style="list-style-type: none"> <li>○ key WARNGENLEV (column name in the pointSource)</li> <li>○ value 1, 2, or 3 (can only be a single value), 0 does nothing</li> <li>○ type: INCLUSIVE – include only points that match the value<br/>EXCLUSIVE-exclude only points that match the value</li> </ul> <p>For example, INCLUSIVE 1, will only include points that are WARNGENLEV 1, EXCLUSIVE 3, will only include points that are WARNGENLEV 1 and 2.</p> <ul style="list-style-type: none"> <li>• includeWatchAreaBuffer: The number of MILES the warning polygon will be increased to include nearby watches</li> <li>• otherPoints: <ul style="list-style-type: none"> <li>○ maxCount: The max number of points to be returned</li> <li>○ includeAreaPoints: true/false, don't add name if already available for the 1st bullet</li> <li>○ includeClosestPoints: true/false, don't add name if already available for the 3rd bullet</li> <li>○ sortBy: Can sort by 'distance', 'name', 'warngenlev', 'population', 'lat','lon','area','parentArea'</li> </ul> </li> </ul> <p>Example:</p> <pre> &lt;areaConfig&gt; &lt;inclusionPercent&gt;0.00&lt;/inclusionPercent&gt; &lt;inclusionAndOr&gt;AND&lt;/inclusionAndOr&gt; &lt;inclusionArea&gt;10&lt;/inclusionArea&gt; &lt;maxCount&gt;20&lt;/maxCount&gt; &lt;areaField&gt;COUNTYNAME&lt;/areaField&gt; &lt;parentAreaField&gt;NAME&lt;/parentAreaField&gt; &lt;areaNotationField&gt;STATE&lt;/areaNotationField&gt; &lt;areaNotationTranslationFile&gt;countyTypes.txt&lt;/areaNotationTranslationFile&gt; &lt;fipsField&gt;FIPS&lt;/fipsField&gt; &lt;pointField&gt;NAME&lt;/pointField&gt; &lt;sortBy&gt;     &lt;sort&gt;parent&lt;/sort&gt; &lt;/sortBy&gt; &lt;pointFilter&gt;     &lt;key&gt;WARNGENLEV&lt;/key&gt;     &lt;value&gt;1&lt;/value&gt;     &lt;type&gt;INCLUSIVE&lt;/type&gt; &lt;/pointFilter&gt; &lt;includedWatchAreaBuffer&gt;25&lt;/includedWatchAreaBuffer&gt; &lt;otherPoints&gt;     &lt;maxCount&gt;50&lt;/maxCount&gt;     &lt;includeAreaPoints&gt;false&lt;/includeAreaPoints&gt;     &lt;includeClosestPoints&gt;false&lt;/includeClosestPoints&gt;     &lt;sortBy&gt;         &lt;sort&gt;warngenlev&lt;/sort&gt;     &lt;/sortBy&gt; &lt;/otherPoints&gt;</pre> |

| Value                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <pre>&lt;sort&gt;population&lt;/sort&gt; &lt;/sortBy&gt; &lt;/otherPoints&gt; &lt;/areaConfig&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <closestPointsConfig> | <p>This configuration determines how the closest points to the storms are generated. This configuration is usually applied to the 3rd bullet. The following are the different parameters:</p> <ul style="list-style-type: none"> <li>• <b>numberOfPoints</b>: Number of the closestPoints to generate</li> <li>• <b>unitDistance</b>: The output unit. Refer to the API javax.measure.unit.NonSI and javax.measure.unit.SI for Length notations</li> <li>• <b>unitSpeed</b>: The output speed. Refer to the API javax.measure.unit.NonSI and javax.measure.unit.SI for Velocity notations</li> <li>• <b>pointField</b>: The field out of the pointSource that is used for naming the point</li> <li>• <b>pointFilter</b>: Controls which point to include based on the WARNGENLEV of the point. WARNGENLEV is a value from 1 to 3 where 1 is the highest priority. <ul style="list-style-type: none"> <li>◦ key WARNGENLEV (column name in the pointSource)</li> <li>◦ value 1, 2, or 3 (can only be a single value), 0 does nothing</li> <li>◦ type: INCLUSIVE – include only points that match the value<br/>EXCLUSIVE-exclude only points that match the value</li> </ul> For example, INCLUSIVE 1, will only include points that are WARNGENLEV 1, EXCLUSIVE 3, will only include points that are WARNGENLEV 1 and 2 </li> <li>• <b>sortBy</b>: Can sort by 'distance', 'name', 'warngenlev', 'population', 'lat','lon','area','parentArea'</li> </ul> <p>Example:</p> <pre>&lt;closestPointsConfig&gt; &lt;numberOfPoints&gt;2&lt;/numberOfPoints&gt; &lt;unitDistance&gt;mi&lt;/unitDistance&gt; &lt;unitSpeed&gt;mph&lt;/unitSpeed&gt; &lt;pointField&gt;NAME&lt;/pointField&gt; &lt;pointFilter&gt;     &lt;key&gt;WARNGENLEV&lt;/key&gt;     &lt;value&gt;0&lt;/value&gt;     &lt;type&gt;EXCLUSIVE&lt;/type&gt; &lt;/pointFilter&gt; &lt;sortBy&gt;     &lt;sort&gt;warngenlev&lt;/sort&gt; &lt;/sortBy&gt; &lt;/closestPointsConfig&gt;</pre> |
| <pathcastConfig>      | <p>This configuration indicates that a track product is generated to determine the areas the storm will pass under. This is mainly for the 4<sup>th</sup> bullet and used if type 1 is selected. Refer to the macros contained in the VM_global_library.vm. The following are the different parameters:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>: 0 to disable path cast, 1 to enable path cast.</li> <li>• <b>defaultSpeedKt</b>: Default speed in knots to generate the storm track if a recent track was not issued or if there is not STI data.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <ul style="list-style-type: none"> <li>• defaultDirection: Default direction (0 degrees is South) to generate the storm track if a recent track was not issued or if there is not STI data.</li> <li>• nearThreshold: Specifies a distance in miles that indicates how close a storm can be to a location to be included in the path cast.</li> <li>• interval: The interval to round the time of each path cast to.</li> <li>• maxCount: The max number of points to include in each path cast.</li> <li>• pointFilter: Controls which point to include based on the WARNGENLEV of the point. WARNGENLEV is a value from 1 to 3 where 1 is the highest priority. <ul style="list-style-type: none"> <li>◦ key WARNGENLEV (column name in the pointSource)</li> <li>◦ value 1, 2, or 3 (can only be a single value), 0 does nothing</li> <li>◦ type: INCLUSIVE – include only points that match the value<br/>EXCLUSIVE-exclude only points that match the value<br/>For example, INCLUSIVE 1, will only include points that are WARNGENLEV 1, EXCLUSIVE 3, will only include points that are WARNGENLEV 1 and 2</li> </ul> </li> <li>• areaField: The column name in the areaSource table that contains the name of the area.</li> <li>• parentAreaField: The column name in the areaSource that contains the parent of the area (i.e., State).</li> <li>• areaNotationField: The column name in the areaSource that contains the key used to map to the correct areaNotation. Look at countyTypes.txt.</li> <li>• areaNotationTranslationFile: Translation file to look up an area notation. File located in /edex/data/utility/common_static/base/warngen.</li> <li>• sortBy: Can sort EACH path cast by 'distance', 'name', 'warngenlev', 'population', 'lat','lon','area','parentArea'.</li> </ul> <p>Example:</p> <pre data-bbox="556 1142 1416 1805">&lt;pathcastConfig&gt;   &lt;enabled&gt;1&lt;/enabled&gt;   &lt;defaultSpeedKt&gt;20&lt;/defaultSpeedKt&gt;   &lt;defaultDirection&gt;45&lt;/defaultDirection&gt;   &lt;nearThreshold&gt;8.0&lt;/nearThreshold&gt;   &lt;interval&gt;5&lt;/interval&gt;   &lt;maxCount&gt;4&lt;/maxCount&gt;   &lt;pointField&gt;Name&lt;/pointField&gt;   &lt;pointFilter&gt;     &lt;key&gt;WARNGENLEV&lt;/key&gt;     &lt;value&gt;0&lt;/value&gt;     &lt;type&gt;EXCLUSIVE&lt;/type&gt;   &lt;/pointFilter&gt;   &lt;areaField&gt;COUNTYNAME&lt;/areaField&gt;   &lt;parentAreaField&gt;STATE&lt;/parentAreaField&gt;   &lt;areaNotationField&gt;STATE&lt;/areaNotationField&gt;    &lt;areaNotationTranslationFile&gt;countyTypes.txt&lt;/areaNotationTranslationFile&gt;   &lt;sortBy&gt;     &lt;sort&gt;distance&lt;/sort&gt;   &lt;/sortBy&gt; &lt;/pathcastConfig&gt;</pre> |

| Value              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <geospatialConfig> | <p>This configuration maintains global variables (i.e., pointSource, areaSource, parentAreaSource) used by area configuration, closest points configuration, and path cast configuration. This configuration also initializes WarnGen to gather all the areas within the CWA. The following are the different parameters:</p> <ul style="list-style-type: none"> <li>• pointSource: The name of the table that reads the points from (i.e. City, MarineSites).</li> <li>• areaSource: The name of the table that reads the areas from (i.e County, MarineZones).</li> <li>• parentAreaSource: The name of the table that reads the parent areas from (i.e., States).</li> <li>• timezoneSource: The name of the time zone table (i.e., TIMEZONES)</li> <li>• timezoneField: The name of the column in the timezoneSource that contains the time zones.</li> <li>• maskSource: The name of the table that will determine if the warning area should be hatched (i.e. CWA, MarineZones).</li> <li>• maskFilter : Upon initialization this will gather all the areas that have a WFO that matches that CAVE is localized to: <ul style="list-style-type: none"> <li>◦ key WFO</li> <li>◦ value \$warnGenCWAFilter</li> <li>◦ type: INCLUSIVE/EXCLUSIVE</li> </ul> </li> </ul> <p>Example:</p> <pre>&lt;geospatialConfig&gt;   &lt;pointSource&gt;City&lt;/pointSource&gt;   &lt;areaSource&gt;County&lt;/areaSource&gt;   &lt;parentAreaSource&gt;States&lt;/parentAreaSource&gt;   &lt;timezoneSource&gt;TIMEZONES&lt;/timezoneSource&gt;   &lt;timezoneField&gt;TIME_ZONE&lt;/timezoneField&gt;   &lt;maskSource&gt;CWA&lt;/maskSource&gt;   &lt;maskFilter&gt;     &lt;key&gt;WFO&lt;/key&gt;     &lt;value&gt;\$warnGenCWAFilter&lt;/value&gt;     &lt;type&gt;INCLUSIVE&lt;/type&gt;   &lt;/maskFilter&gt; &lt;/geospatialConfig&gt;</pre> |
| <localConfigs>     | <p>This configuration is to be used if a user wants to add extra points that are not available in the City table. Each local config should be contained within &lt;localConfig&gt;&lt;/localConfig&gt;. Refer to importMarkersInfo.sh and/or importPointsInfo.sh on how to import local points. The following are the different parameters:</p> <ul style="list-style-type: none"> <li>• pointSource:</li> <li>• pointField:</li> <li>• variable:</li> <li>• pointFilter:</li> <li>• maxCount</li> <li>• sortBy:</li> </ul> <p>Example:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Value              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <pre data-bbox="551 255 1171 772">&lt;localConfigs&gt;   &lt;localConfig&gt;     &lt;pointSource&gt;i180mm&lt;/pointSource&gt;     &lt;pointField&gt;Name&lt;/pointField&gt;     &lt;variable&gt;i180mm&lt;/variable&gt;     &lt;pointFilter&gt;       &lt;key&gt;WARNGENLEV&lt;/key&gt;       &lt;value&gt;0&lt;/value&gt;       &lt;type&gt;EXCLUSIVE&lt;/type&gt;     &lt;/pointFilter&gt;     &lt;maxCount&gt;50&lt;/maxCount&gt;     &lt;sortBy&gt;       &lt;sort&gt;Name&lt;/sort&gt;     &lt;/sortBy&gt;   &lt;/localConfig&gt; &lt;/localConfigs&gt;</pre> |
| <riverBasinConfig> | <p>This configuration will make available the basinSource to allow basin names to be retrieved if they intersect the warning polygon.</p> <p>Example:</p> <pre data-bbox="567 925 1139 1214">&lt;riverBasinConfig&gt;   &lt;basinSource&gt;basins&lt;/basinSource&gt;   &lt;nameField&gt;name&lt;/nameField&gt;   &lt;maskFilter&gt;     &lt;key&gt;cwa&lt;/key&gt;     &lt;value&gt;\$warngenCWAFilter&lt;/value&gt;     &lt;type&gt;INCLUSIVE&lt;/type&gt;   &lt;/maskFilter&gt; &lt;/riverBasinConfig&gt;</pre>                                                  |

WarnGen passes various Java objects to the velocity templates that can contain various information or be a utility object that can be used in generating a warning. Some Java objects have their API available on the internet, which can provide more information on the available methods the objects provide. It is important to understand that some objects derive information for tables that are set in the associated configuration file.

### Header

It is **very important** that the first two lines of your template is the WMO Header and the PIL information as this information will be parsed by the text workstation and placed in the header block of a text editor.

`${WMOId} ${vtecOffice} 000000 ${BBBId}`

`TOR${siteId}`

### **VM\_global\_library.vm**

VM\_global\_library.vm contains various macros that can be referenced by all templates. Therefore, it is **highly recommended** that this file NOT be modified. Each macro performs common functions that can be used in calculating and generating text. However, a user does not necessarily have to use the macros to produce text (i.e., fourthbullet), but can develop his or her own printing algorithm. The function name is referenced by the first parameter of the macro while the following parameters are the required parameters. For example, the macro#macro(direction \$d) is called by direction(90). The appropriate macro will be recognized and produce the appropriate text based on the parameters.

#### **#parse**

The #parse macro is function Velocity supported function that can be used to import a file into a .vm file. The important thing to note is that imported files have to be saved in the **base** directory.

**Table J-3** describes variables from the Java WarnGen plug-in code that are passed to the velocity templates for WarnGen products

**Table J-3. Variables Passed to WarnGen Templates**

| Value          | Description                                                                                                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| vtecOffice     | The 4-letter id that generated the warning (i.e. KOAX); Usually used in the VTEC                                                                                               |
| siteId         | A String:<br>The 3-letter WFO set in Localization used for creating the PIL.                                                                                                   |
| officeShort    | String set in site localization config.xml by “warngenOfficeShort”.                                                                                                            |
| officeLoc      | String set in site localization config.xml by “warngenLocation”                                                                                                                |
| backupSite     | The back up site selected in the 'Backup' selection area.                                                                                                                      |
| BBBId          | A string that keeps track of the number of corrections performed on a warning. (i.e. CCA)                                                                                      |
| localtimezone  | Time zone derived when calculating the areas. Commonly used when using the secondBullet macro.<br><br>This is a required field. Refer to the secondBullet macro for more info. |
| secondtimezone | If the Warning spans multiple time zones, the second Time Zone is stored here. Will only become available if the path cast has an additional timezone.                         |
| stormType      | Used to indicate if the warning is for a single storm or a line of storms.<br><br>If the value is “line” then it is a line of storms or “single” if it is a single storm.      |
| now            | Date object of the current time.                                                                                                                                               |
| start          | Date value representing the start time of the warning.                                                                                                                         |
| expire         | Date value representing the expiration time of the warning.                                                                                                                    |
| event          | Date value representing the time of occurrence of the warning.                                                                                                                 |
| ugcline        | A list of the ugc or zones of each affected area. This variable depends on the affected areas (i.e. county or marine zones).                                                   |
| ugclinecan     | A list of the ugc or zones of each county or zone that was canceled.                                                                                                           |

| Value                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| areaPoly                 | An array of Coordinates of the warning polygon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| movementSpeed            | Double representing the speed of the storm based on the track. The speed units can defined in the closestPointsConfig.unitSpeed configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| movementDirectionRounded | <p>Double representing the rounded direction of the storm track in degree where 0 is south.</p> <p>The possible values are 0, 90, 135, 180, 225, 270, 315. This variable is commonly used with the macro direction to give a general description if the storm is moving NORTH, NORTHEAST, WEST, etc.</p>                                                                                                                                                                                                                                                                                                                                                |
| movementDirection        | Double representing direction of the storm track in degrees where 0 is South.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| movementInKnots          | Double representing the movement speed in Knots. This is mainly used when generating the TML line of the warning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| action                   | The action the warning is performing: NEW, COR, EXT, CON, CAN, and EXP. CANCON is an action indicating there were canceled areas and continued areas. This action is mainly used to help rendering both.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| etn                      | Event Tracking Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| phenomena                | String representing the two letter VTEC pp field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| WMOid                    | <p>WarnGen automatically sets this variable to TTAAii.</p> <p>When the text is sent to text workstation, text workstation replaces it with the appropriate WMO header retrieved from the afos_to_awips table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| bullets                  | An array of Strings that contain all the bullets that were selected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| eventLocation            | <p>The coordinate of the event. This is commonly used in the 3<sup>rd</sup> bullet</p> <p>Array of Point2D values (java.awt.geom.Point2D):</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| otherPoints              | <p>Array of ClosestPoint objects.</p> <p>This array is used when type 2 or 3 is passed to the fourthBullet. Refer to areaConfig.otherPoints to sort the array.</p> <p>A ClosestPoint object has the following members:</p> <ul style="list-style-type: none"> <li>name</li> <li>population</li> <li>warngenlev</li> <li>distance</li> </ul>                                                                                                                                                                                                                                                                                                             |
| pathCast                 | <p>An array of PathCast objects.</p> <p>Each PathCast object is grouped by 'time' in ascending order. This array is only used when type 1 is passed to fourthBullet. The following are members:</p> <ul style="list-style-type: none"> <li>• points: All the points (i.e. Cities) that are listed for the path cast in the form of an array of ClosestPoint objects.</li> <li>• Area: Refer to pathCastConfig.areaField.</li> <li>• areaNotation: Can be either COUNTY, PARISH, ZONE. Refer to countyTypes.txt.</li> <li>• parentArea: Refer to pathCastConfig.parentAreaField.</li> <li>• timeZone.</li> <li>• time: Time of the path cast.</li> </ul> |

| Value           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| closestPoints   | <p>An array of ClosestPoint objects closest to the event. A ClosestPoint object has the following members:</p> <ul style="list-style-type: none"> <li>• Name: Name of the point, such as the city name or marine site name.</li> <li>• Area: The name of the area, such as the county name.</li> <li>• parentArea: The name of the parent area, such as the state.</li> <li>• point: Coordinate of the point.</li> <li>• distance: Distance from point to the event.</li> <li>• roundedDistance: Distance as a rounded integer without any decimals.</li> <li>• azimuth: The angle of point from the event. In other words, the point is relative to the event. Because the event is the reference, the azimuth needs 180 subtracted in order for the city to become the reference for the event.</li> <li>• roundedAzimuth: Azimuth to the closest 45 degree intervals.</li> <li>• oppositeAzimuth: 180 degrees from the azimuth.</li> <li>• oppositeRoundedAzimuth: 180 degrees from the roundedAzimuth.</li> <li>• population: Population in the city. This variable is not available for marine sites or locally added cities or markers.</li> <li>• Warngenlev: Priority level where 1 is the highest.</li> </ul> |
| areas           | <p>An array of AffectedAreas object. This object is usually used in the 1<sup>st</sup> bullet. An AffectedAreas object has the following members:</p> <ul style="list-style-type: none"> <li>• Name: The name of the area affected. Refer to areaConfig.areaField.</li> <li>• partOfArea: NORTH, NORTHEAST, EAST, etc.</li> <li>• areaNotation: The notation of the area affected (COUNTY, PARISH, etc.). Refer to countyTypes.txt.</li> <li>• partOfParentRegion: NORTH, NORTHEAST, EAST, etc.</li> <li>• parentRegion: The name of the parent region that is affected. Refer to areaConfig.parentAreaSource.</li> <li>• fips: fips county number.</li> <li>• stateabbr: State abbreviation (i.e., NE for Nebraska).</li> <li>• points: If applicable, a list of the points that are affected.</li> <li>• timezone.</li> <li>• size: Size of the area.</li> </ul>                                                                                                                                                                                                                                                                                                                                                     |
| cancelareas     | <p>An ArrayList of AffectedAreas objects that are canceled from the original warning. This is commonly used in follow up velocity files.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| pointComparator | <p>Allows two closest point array objects to be combined and sorted. The key method to use is combine. The first two parameters are the two closest point object arrays to be combined. The following parameters can be an N number of Strings that the newly combined array will be sorted by ('distance', 'name', 'warngenlev', 'population', 'lat','lon','area','parentArea').</p> <p>For example,<br/> <code> \${pointComparator.combine(\${otherPoints}, \${i80mm}, "warnlev")}</code> .</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Value         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------|--------|-----------------------|-------|--------------|-------|--------------|---------|-----------------|--------|--------|------|------|
| TimeFormat    | <p>Used along with the dateUtil object. The following are all the possible variables. Refer to the Java API SimpleDateFormat for more information.</p> <table border="1" data-bbox="559 318 1318 587"> <thead> <tr> <th data-bbox="572 318 943 361">Hashtable Key</th><th data-bbox="943 318 1318 361">Hashtable Value</th></tr> </thead> <tbody> <tr> <td data-bbox="572 361 943 403">header</td><td data-bbox="943 361 1318 403">hmm a z EEE MM d yyyy</td></tr> <tr> <td data-bbox="572 403 943 445">plain</td><td data-bbox="943 403 1318 445">hmm a z EEEE</td></tr> <tr> <td data-bbox="572 445 943 487">clock</td><td data-bbox="943 445 1318 487">hmm a z EEEE</td></tr> <tr> <td data-bbox="572 487 943 530">ydmthmz</td><td data-bbox="943 487 1318 530">yyMMdd'THHmm'Z'</td></tr> <tr> <td data-bbox="572 530 943 572">ddhhmm</td><td data-bbox="943 530 1318 572">ddHHmm</td></tr> <tr> <td data-bbox="572 572 943 614">Time</td><td data-bbox="943 572 1318 614">HHmm</td></tr> </tbody> </table>                                                                                               | Hashtable Key | Hashtable Value | header | hmm a z EEE MM d yyyy | plain | hmm a z EEEE | clock | hmm a z EEEE | ydmthmz | yyMMdd'THHmm'Z' | ddhhmm | ddHHmm | Time | HHmm |
| Hashtable Key | Hashtable Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| header        | hmm a z EEE MM d yyyy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| plain         | hmm a z EEEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| clock         | hmm a z EEEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| ydmthmz       | yyMMdd'THHmm'Z'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| ddhhmm        | ddHHmm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| Time          | HHmm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| list          | <p>ListTool object.<br/>Refer to API for org.apache.velocity.tools.generic.ListTool for more information.</p> <p>Method use examples:</p> <pre>\$primes is an array of integers containing {2, 3, 5, 7} \$lists.size(\$primes) -&gt; 4 \$lists.get(\$primes, 2) -&gt; 5 \$lists.set(\$primes, 2, 1) -&gt; (primes[2] becomes 1) \$lists.get(\$primes, 2) -&gt; 1 \$lists.isEmpty(\$primes) -&gt; false \$lists.contains(\$primes, 7) -&gt; true</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |
| mathUtil      | <p>WarnGenMathTool<br/>(extends org.apache.velocity.tools.generic.MathTool).</p> <p>Used for rounding to the nearest 5 or 10, for example, of a specific value.</p> <p>For instance, wind speeds in the third bullet should be rounded to the nearest 5 MPH so they should call this method with the arguments (windSpeed, 5). There are two available methods for this object aside from the methods in MathTools:</p> <ul style="list-style-type: none"> <li>roundToInt(value, multiple) -</li> <li>roundTo5(value) – calls roundToInt(value,5)</li> </ul> <p>Methods:</p> <p>(<a href="http://velocity.apache.org/tools/devel/javadoc/org/apache/velocity/tools/generic/MathTool.html">http://velocity.apache.org/tools/devel/javadoc/org/apache/velocity/tools/generic/MathTool.html</a>)</p> <pre>\$mathUtil.roundTo5(num) \$mathUtil.roundToInt(num, multiple) \$mathUtil.abs(num) \$mathUtil.add(num1, num2) \$mathUtil.ceil(num1) \$mathUtil.div(num1, num2) \$mathUtil.floor(num1) \$mathUtil.getAverage(nums) \$mathUtil.getRandom() \$mathUtil.Total(nums) \$mathUtil.matchType(num1, num2)</pre> |               |                 |        |                       |       |              |       |              |         |                 |        |        |      |      |

| Value           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | <pre>\$mathUtil.max(num1, num2) \$mathUtil.min(num1, num2) \$mathUtil.mod(num1, num2) \$mathUtil.mul(num1, num2) \$mathUtil.pow(num1, num2) \$mathUtil.random(num1, num2) \$mathUtil.round(num1) \$mathUtil.roundTo(decimals, num2) \$mathUtil.sub(num1, num2) \$mathUtil.toDouble(num1) \$mathUtil.toInteger(num1) \$mathUtil.toNumber(num1)</pre>                                                                                                                                                                                              |
| dateUtil        | <p>A DateUtil object can format a Date object (i.e. start) into a particular display string based on the passed timeFormat. Refer to timeFormat to see the all the possible types. The most useful method to use is format(date, timeFormat, interval, timezone).</p> <p>dateUtil (com.raytheon.viz.warngen.util.DateUtil).</p> <p>Methods:</p> <pre>\$dateUtil.format(Date, \$dateUtil.format(Date, \$dateUtil.format(Date,TimeZone) \$dateUtil.format(Date,DateFormat) DateFormat, Interval) DateFormat, Interval, DateFormat, TimeZone)</pre> |
| productClass    | <p>The single letter indicating if the warning is in operational mode (O) or test mode (T).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| floodseverity   | <p>This is usually used in follow up hydro products. The value is derived from the HTEC of the initial warning. The flood severity is set in the velocity template using conditional logic based on the bullets selected in the dialog. Minor flood = 1, moderate flood = 2, major flood = 3.</p>                                                                                                                                                                                                                                                |
| floodic         | <p>The immediate cause from the initial warning. This is commonly used in follow ups.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ic              | <p>The immediate cause used in the HTEC. Common values are ER, DR, GO, IJ, RS, SM, DM.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| includedWatches | <p>An array of the included watches mentioned in the config.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| riverdrainages  | <p>An array of the names of the basins that are included in the warning polygon. Refer to River Basin Configuration for more info</p>                                                                                                                                                                                                                                                                                                                                                                                                            |
| specialCorText  | <p>The raw message of the record to be corrected without the WMO header line and the the PIL line.</p> <p>The VTEC in the raw message is updated to have a COR action.</p> <p>This variable is made available if there is no change in the storm track</p>                                                                                                                                                                                                                                                                                       |
| stationary      | <p>True or false if there are no time points (i.e. only a single frame)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| user            | <p>Username</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Value     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| watches   | <p>A WatchUtil object that can gather tornado and/or severe thunderstorm watches within the watch area.</p> <p>The areaConfig.includedWatchAreaBuffer is used to determine whether to include the watch or not. The WatchUtil has two useful methods:</p> <ul style="list-style-type: none"> <li>• getTorWatches</li> <li>• getSvrWatches</li> </ul> <p>These methods return an array list of WeatherAdvisoryWatch objects that have the available variables: phenSig, endTime, parentRegion, partOfParentRegion. It is important to note that the endTime is set to the latest time in the array list.</p> |
| zoneslist | Similar to ugcline but contains the zones instead of counties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

### ***J.1 How to Access the Data Contained in a Value Inside a Template***

In general, any String, primitive type method, or attribute can be accessed directly within the WarnGen template using the following syntax:

```
String or primitive type: ${myStringValue}
```

In the above context, myStringValue was a String passed directly into the template:

```
String method: ${dateUtil.format(${pc.time},
 ${timeFormat.clock}, ${localtimezone})}
```

In the above context:

dateUtil is a com.raytheon.viz.warngen.util.DateUtil Object that contains the method format, which accepts 3 arguments.

\${pc.time} (a date value from the pathCast) is replaced by the time attribute of the pc object.

\${timeFormat.clock} is replaced by the SimpleDateFormat addressed in the timeFormat Hashtable by “clock”; \${localtimezone} is replaced by the localtimezone object.

### ***J.2 Modifying/Editing Templates***

WarnGen templates should be accessed and modified through the Localization perspective within CAVE.

**Note:** It is potentially dangerous to alter any line that begins with a pound (#) symbol or any variable surrounded by \${ }.

#### **Time Ranges**

A table of the time ranges in which actions will become available follows. 'Start Time' and 'End Time' reflect the start and end times of the warning, respectively.

| Action        | Start                 | End                     |
|---------------|-----------------------|-------------------------|
| NEW (Reissue) | End Time – 20 minutes | End Time + 30 minutes   |
| CON           | Start Time            | End Time – 5 minutes    |
| CAN           | Start Time            | End Time – 10 minutes   |
| EXP           | End Time – 10 minutes | End Time + 10 minutes   |
| EXT           | Start Time            | End Time – 5 minutes    |
| COR           | Start Time            | Start Time + 10 minutes |

### Locking Text

Lock texts appear as blue text in the text workstation and cannot be modified. Locked text is defaulted to certain strings. However, additional lines in the template can also be locked by surrounding it with the tags <L> and </L>. If the pattern used to auto lock the text does not satisfy the user, auto lock can be turned off in the .cfg files. A list of strings that automatically get locked follows:

UGC LIST ( NEC053-021-177-212215-)  
VTEC (/O.NEW.KOAX.TO.W.0001.110221T2143Z-110221T2215Z/)  
HTEC  
Bulletin (BULLETIN – EAS ACTIVATION REQUESTED)  
Warning Type (TORNADO WARNING)  
Site (NATIONAL WEATHER SERVICE OMAHA/VALLEY NE)  
Date (343 PM CST MON FEB 21 2011)  
First Bullet Header (\* TORNADO WARNING FOR...)  
County Names (DODGE COUNTY)  
Second Bullet (\* UNTIL 415 PM CST)  
Cancel/Expire line  
CTA Start Marker (PRECAUTIONARY/PREPAREDNESS ACTIONS...)  
CTA End Marker (&&)  
Polygon Coordinates (LAT...LON 4144 9663 4155 9677 4174 9657 4174 9655  
4182 9649 4163 9624 4144 9657)  
Time Motion Location (TIME...MOT...LOC 2143Z 225DEG 20KT 4153 9662 )  
Segment Terminator (\$\$)

### SUPPRESS COUNTIES

If a user wants to suppress this part of areas description for an area, such as (NORTH SARPY), the user can create a file named 'counties.suppress'. The file should be placed in the localized WarnGen directory (i.e., the same directory where localized template files are placed). Each line in the file will correspond to a particular county. For example, 'NEC177' is for the Nebraska county 177. However, if the user only wants to suppress the areas NORTH and SOUTH, the user can add ':ns' to end of the line. The same will hold true if the user only wants to suppress EAST and WEST with ':ew'.

## Wrapping Text

WarnGen has an internal algorithm that will wrap the text. However, the process will also indent bullet sublines (i.e., not the first line of the bullet). A bullet is indicated by the asterisks (\*). There may be a time when a path cast may be too long, forcing it to wrap. However, in a follow-up there are no asterisks. Therefore, a path cast line, if too long, will not indent.

## Adding Bullets

Bullets can be added to WarnGen by editing or creating a site- or user-level .xml configuration file.

Look at the <bullets> tag in an existing template. Note that it contains several existing bullets, and that additional bullets can be added by following the basic pattern <bullet bulletName="x" bulletText="y"> in the proper order.

After the bullet has been successfully added to .cfg file, the associated .vm file must be modified to take that bullet into account.

## Adding “Call To Actions”

When adding a Call To Action statement, Example #4 in this appendix should be followed.

First, check to see if the list containing the bulletName is using an if statement. Insert the text for the Call To Action on the following line, followed by an empty line. Finally, finish the if statement with a #end.

## Examples

The following VTL examples are taken directly from the severethunderstorm.vm template:

### *Example #1*

```
#if(${mode}=="test" || ${mode}=="practice")
TEST...SEVERE THUNDERSTORM WARNING...TEST
#else
SEVERE THUNDERSTORM WARNING
#end
```

Example #1 is a typical if statement. If the mode is set to test or practice, then “TEST...SEVERE THUNDERSTORM WARNING...TEST” is printed to the SVR product; otherwise, “SEVERE THUNDERSTORM WARNING” is printed.

***Example #2***

```
${officeLong} HAS ISSUED A
```

Example #2 will output “THE NATIONAL WEATHER SERVICE IN OMAHA HAS ISSUED A” if officeLong is set correctly in the com.raytheon.viz.warngen/config.xml.

***Example #3***

```
#if(${list.contains($bullets, "doppler")})
 #if(${stormType} == "line")
 #set ($report = "NATIONAL WEATHER SERVICE DOPPLER RADAR
INDICATED A LINE OF SEVERE THUNDERSTORMS")
 #else
 #set ($report = "NATIONAL WEATHER SERVICE DOPPLER RADAR
INDICATED A SEVERETHUNDERSTORM")
 #end
#end
```

Example #3 shows a compound control structure.

If the bullets list sent from WarnGen contains the “doppler” bullet (as indicated by the bulletName in severethunderstorm.cfg), the inner if statement is reached.

At that point, if the stormType is equal to line, then the report text is set to a message indicating a line of storms. Otherwise, the report text is set to a message indicating a single storm. Finally, the first #end completes the stormType if statement, and the second #end completes the list.contains if statement.

***Example #4***

```
#if(${list.contains($bullets, "torWatchRemainsInEffect")})
 ${testMessage}A TORNADO WATCH REMAINS IN EFFECT FOR THE WARNED
AREA. IF A TORNADO IS SPOTTED... ACT QUICKLY AND MOVE TO A PLACE
OF SAFETY IN A STURDY STRUCTURE...SUCH AS A BASEMENT OR SMALL
INTERIOR ROOM.
#end
```

This example is a typical Call To Action line and should be replicated for any additional Call To Action lines.

The line beginning with #if determines if the torWatchRemainsInEffect bullet is highlighted in WarnGen. If it is, the contents of the testMessage variable are printed, followed by the next three lines of text. The #if statement ends at the #end line.

***Example #5***

```
#foreach (${city} in ${pc.points})
#if(${city.roundedDistance} < 3)

close enough to not need azran, considered OVER the area
${city.name}##

#else

needs azran information

${city.roundedDistance} MILES #direction(${city.roundedAzimuth})
OF ${city.name}##

#end

#end
```

This example shows a “foreach” loop.

pc.points is an array of cities affected by the pathcast of the storm. These objects should not be modified, but they can be used and displayed.

The loop covers the first line until the fine line of the example for each item in the array pc.points. Each item in this array is temporarily renamed to “city” when it goes through the rest of the template. The #if statement checks if the roundedDistance of the city (which determines how far the city is from the pathcast) is less than 3 miles. If this is true, the city’s name is printed. Otherwise, the roundedDistance is printed to indicate in the warning that the storm is roundedDistance miles in roundedAzimuth direction of the city.

### **J.3    *Modifying WarnGen Templates***

**Please Note:** Sections J.3 and J.4 contain exercises that will help users to get familiar with AWIPS II WarnGen through CAVE set-up..

The following exercise is designed to familiarize you with the basics of modifying WarnGen templates.

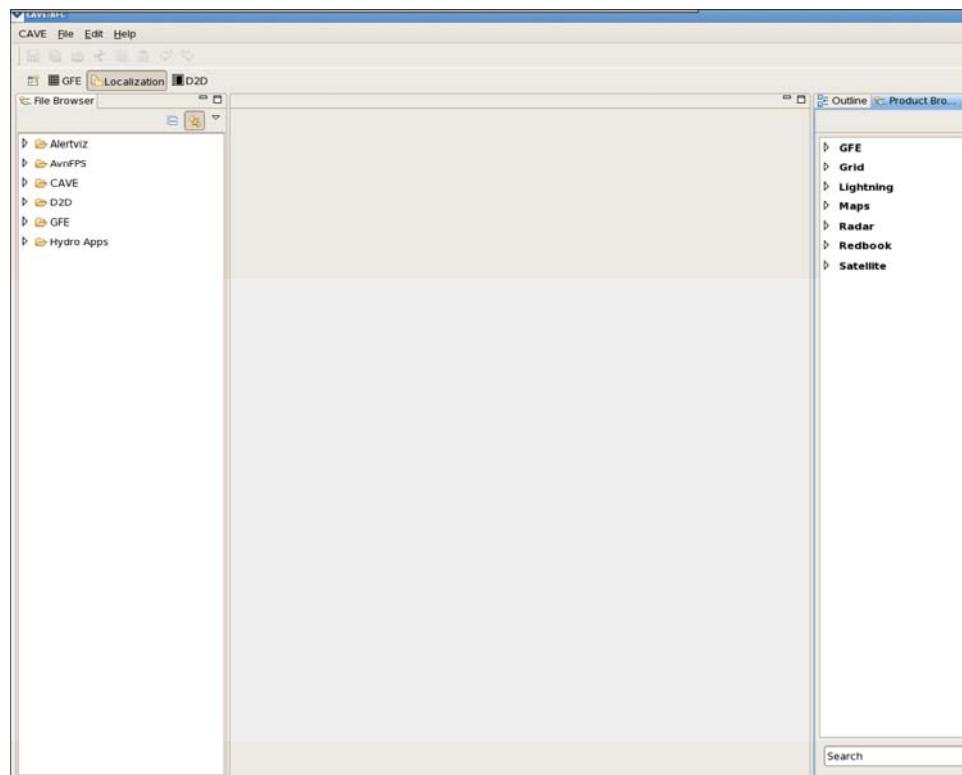
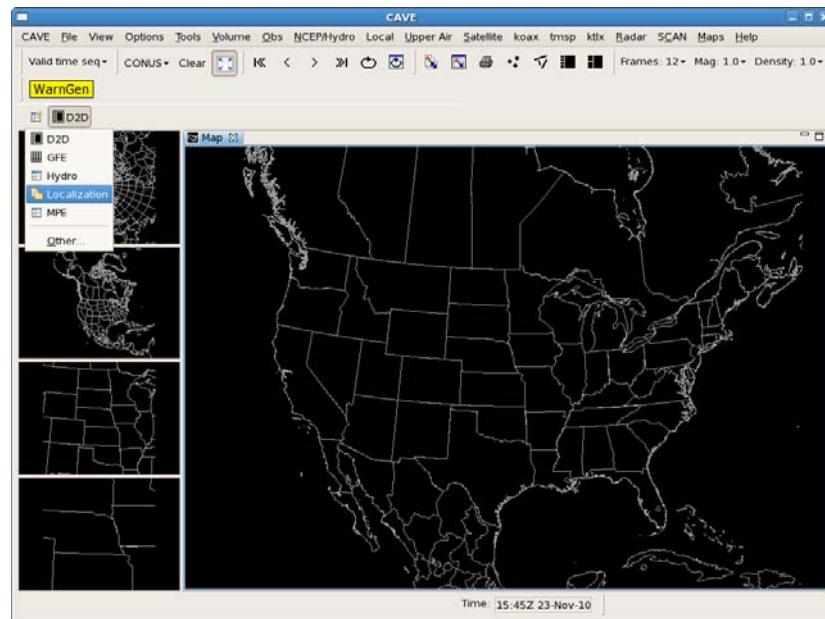
#### **Procedure:**

The format of WarnGen templates has changed in AWIPS II, so sites will need to configure their templates either from scratch or by creating site overrides to the base-level templates. Begin this exercise by logging into the LX workstation and associated XT. AlertViz should start on the LX workstation, and the TextWS should start on the XT. If they do not, use the left click menu to start them.

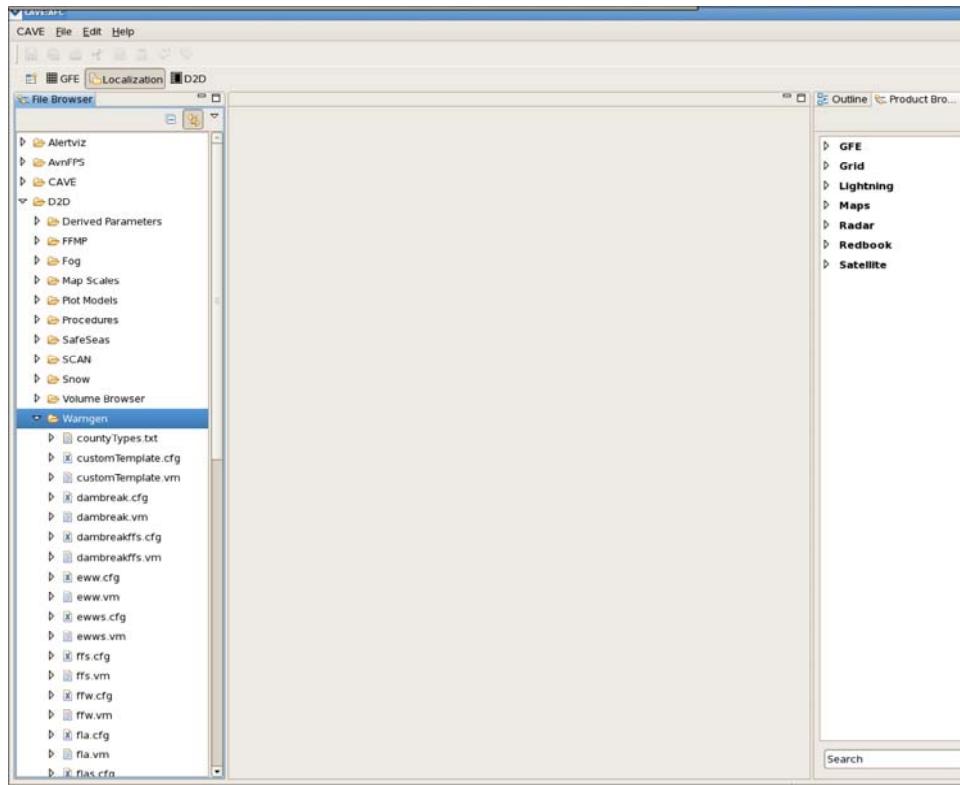
1. Once logged into the LX workstation, start CAVE using the left click menu.



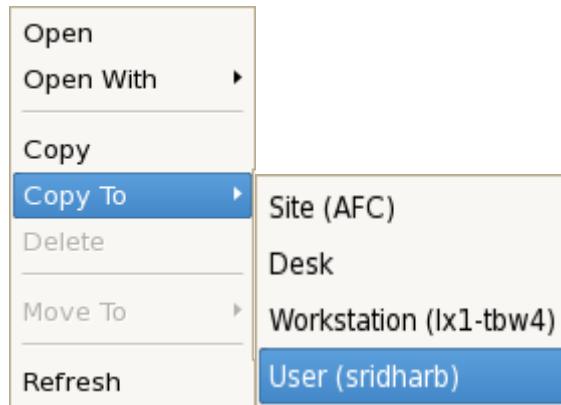
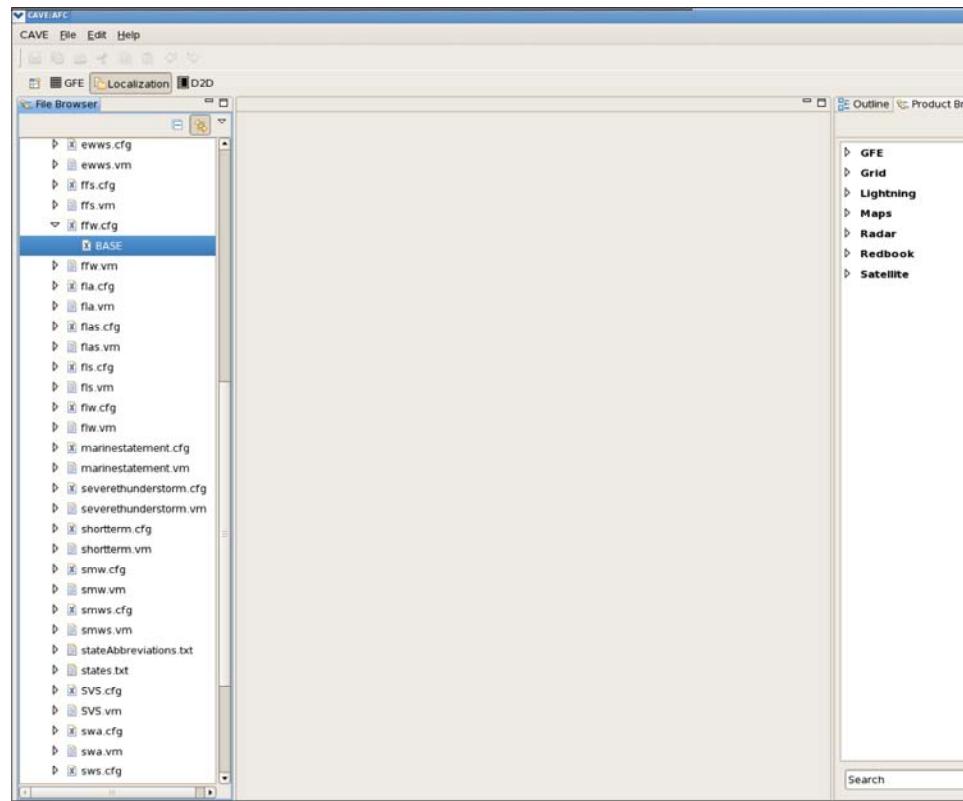
2. Launch the Localization Perspective from the perspectives tab.



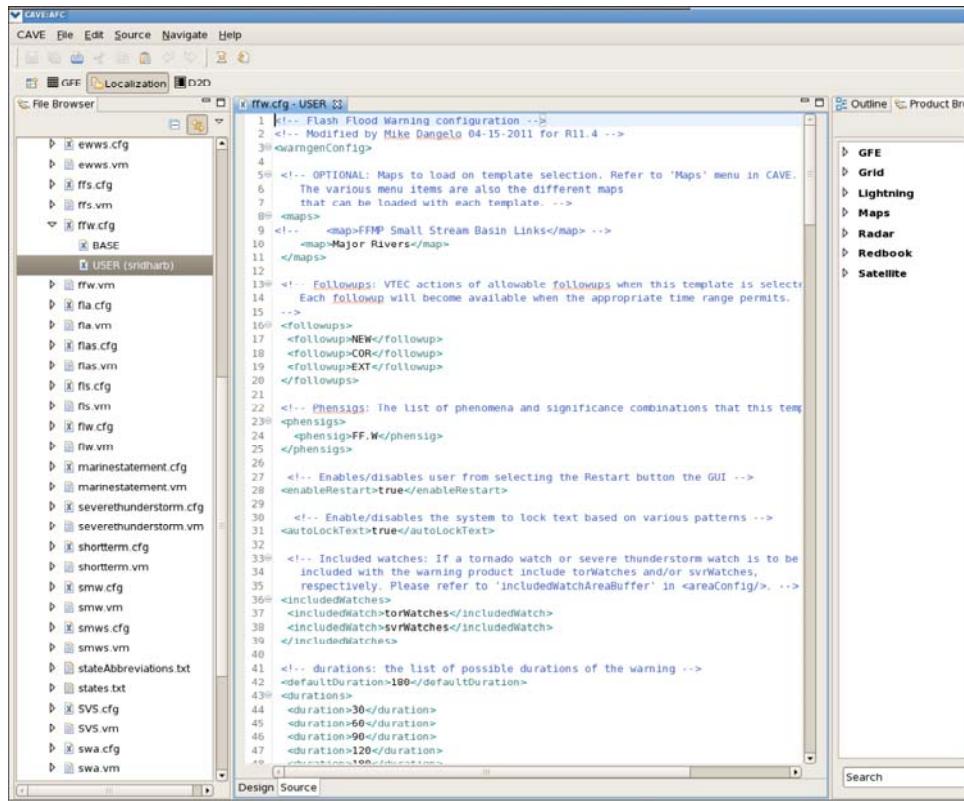
3. In the file browser, expand the D2D folder. Then expand the WarnGen folder.



4. Find the file ffw.cfg (Flash Flood Warning), and expand using the triangle next to the name. Then right click on 'BASE' and select 'Copy To → User (xxxxxx)' where 'xxxxxx' is your user name.



5. Double click on 'USER (xxxxxx)', which is now listed under the ffw.cfg file in the file browser.



6. According to the exhibit in step 5, you should now be looking at the configuration file for the Flash Flood Statement. If you do not see the source view, click the tab at the bottom of the screen.
  7. Add a map that will load on template selection. Create a new line on line 11 by placing your cursor after the </map> on line 10 and hitting the ‘Enter’ key. Then type the following on the new line 11:

Enter: <map>Cities

Notice after you complete the tag <map> that it automatically creates the closing </map> for you.

You have now configured so that the Cities will display when this template is selected from the WarnGen GUI. You can use any of the maps available in the Maps menu of the D2D perspective.

```

1 <!-- Flash Flood Warning config
2 <!-- Modified by Mike Dangelo 0
3<warnGenConfig>
4
5<!-- OPTIONAL: Maps to load on
6 The various menu items are
7 that can be loaded with each
8<maps>
9 <!--
10 <map>FFMP Small Stream
11 <map>Major Rivers</map>
12 <map>Cities</map>
13 </maps>

```

8. Change the default duration of the warning from 180 minutes to 90. Navigate to line 43 of the file, where you should see the line:

```
<defaultDuration>180</defaultDuration>
```

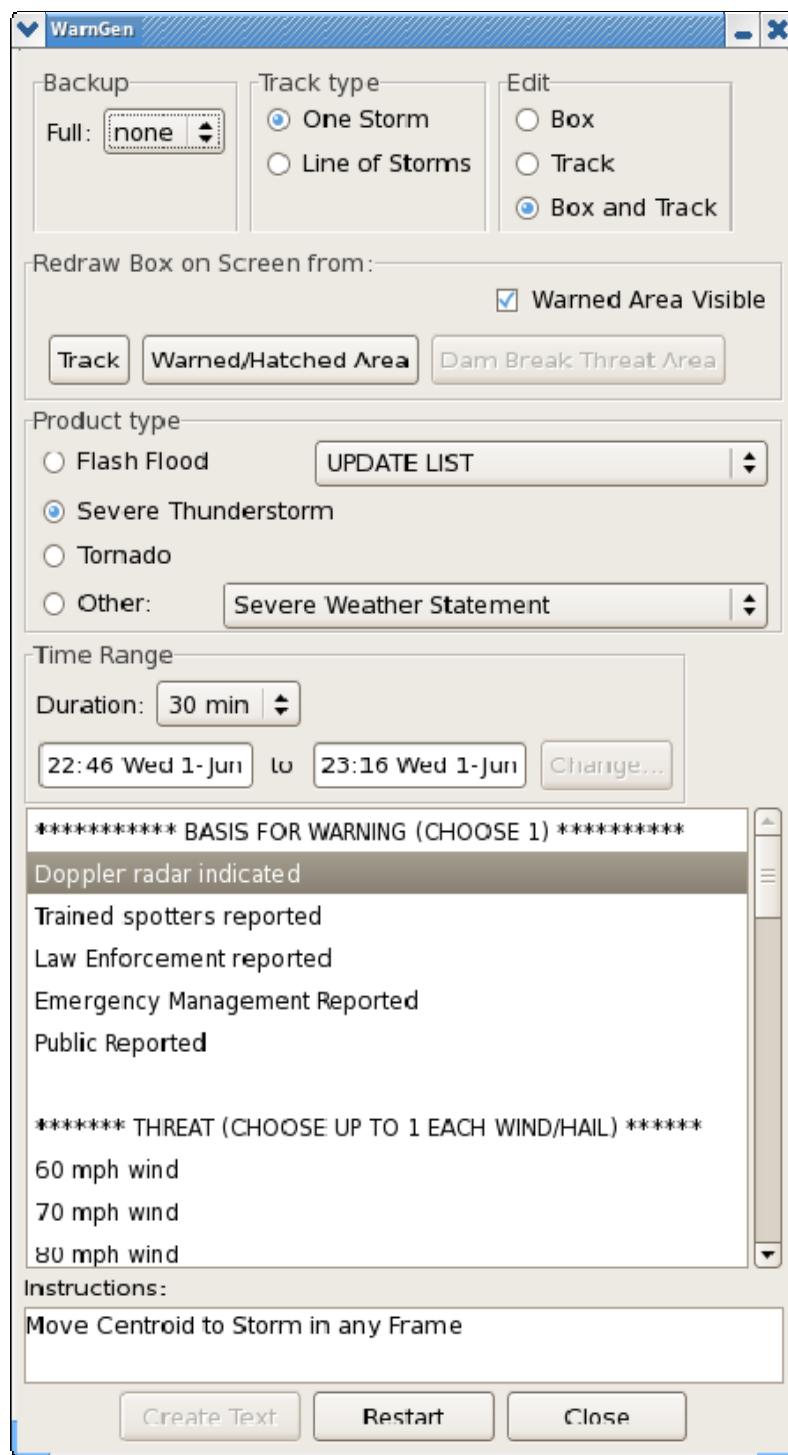
Change the 180 in this line to 90.

```

28 <!-- Enables/disables user from selecting
29 <enableRestart>true</enableRestart>
30
31 <!-- Enable/disables the system to lock
32 <autoLockText>true</autoLockText>
33
34<!-- Included watches: If a tornado watch
35 included with the warning product inclu
36 respectively. Please refer to 'included
37<includedWatches>
38 <includedWatch>tornWatches</includedWatch>
39 <includedWatch>svrWatches</includedWatch>
40 </includedWatches>
41
42 <!-- durations: the list of possible dura
43 <defaultDuration>90</defaultDuration>
44<durations>
45 <duration>30</duration>
46 <duration>60</duration>
... ...

```

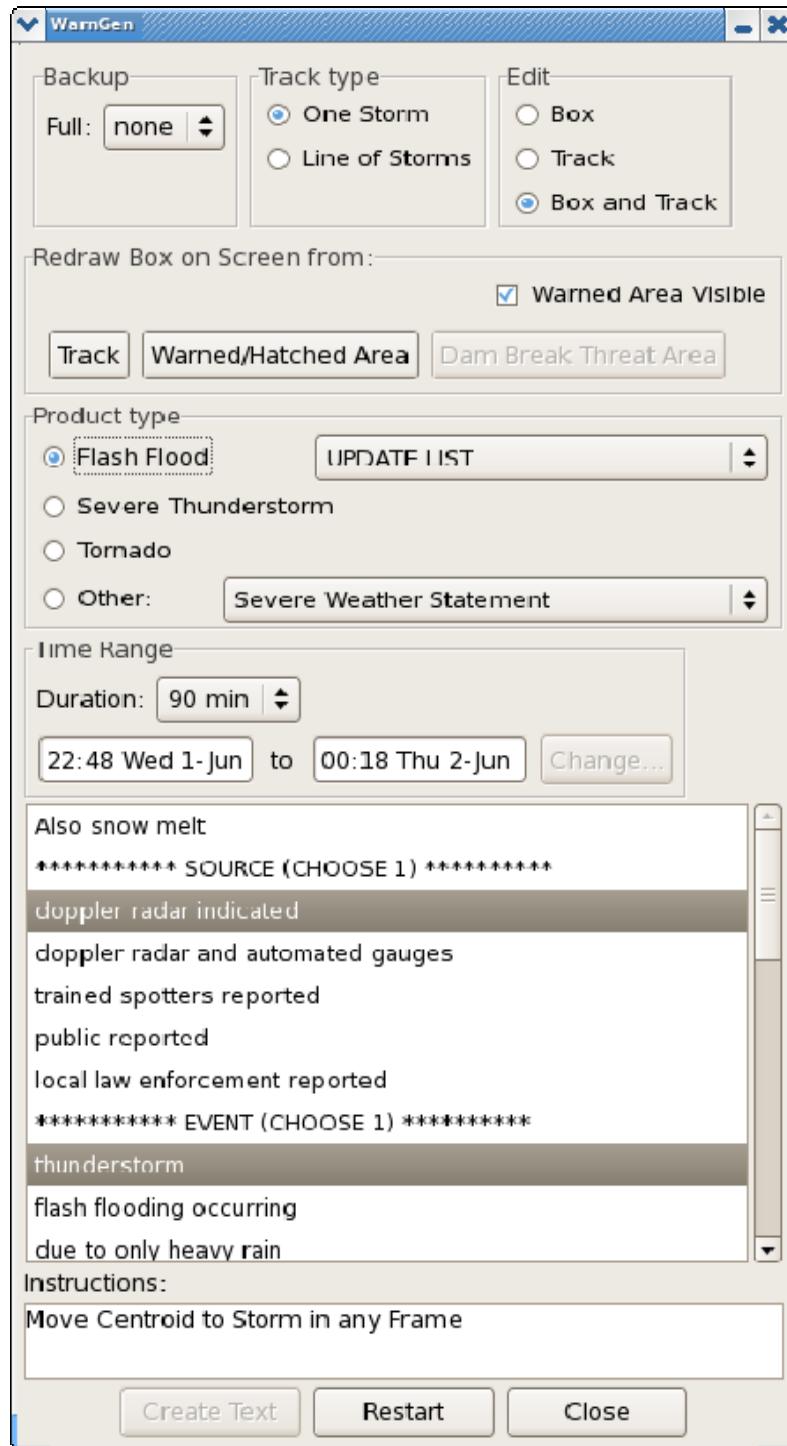
9. Save the ffw.cfg – USER by selecting the disk icon in the upper left corner of the Localization perspective, right below the CAVE menu.
10. Switch back to the D2D perspective and check the changes you have made. Change the scale to WFO from the scale selector pulldown. Press the ‘WarnGen’ button to launch the GUI.

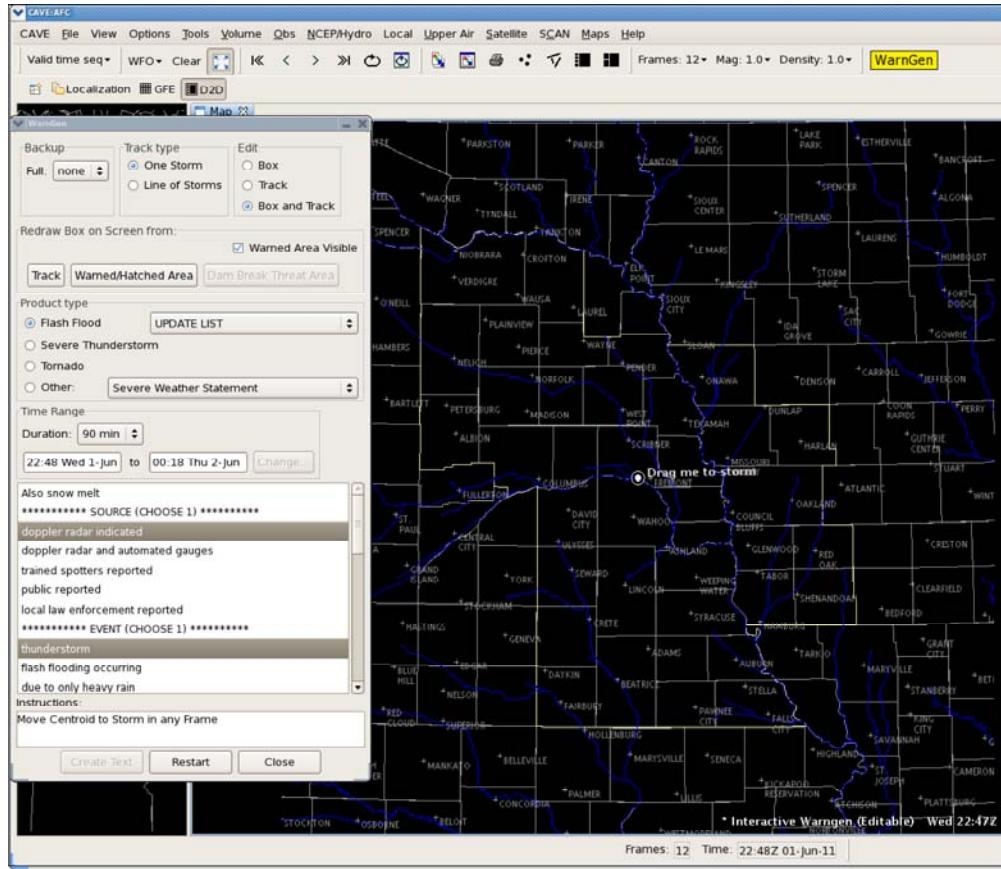


11. From the WarnGen GUI, use the radio button to select ‘Flash Flood’. If the option is not one of those with a radio button, select ‘Other’ and select ‘Flash Flood’ from the dropdown box. Note the following:

- Did the cities appear automatically when you selected ‘Flash Flood’? (They should have displayed.)

- What is the Duration in the Time Range portion of the GUI? (It should be 90 minutes.)





12. Clear the screen by hitting the 'Clear' button.
13. Return to the Localization perspective by pressing the 'Open' tab next to the depressed D2D tab.
14. Now, add a selectable bullet to the template configuration. You will add a selectable CALL TO ACTION item for the Flash Flood template. Lines 64 through 99 configure the selectable bullets in this specific template. Place your cursor at the beginning of line 99, which currently reads </bullets>, and hit the 'Enter' key to create a blank line on line 99.

```

98 <bullet bulletName="reportFloodingCTA"
99
100 </bullets>
101
102<!-- areaConfig: specifies how the ar
103 for determining the impacting count
104 - inclusionPercent: If an area

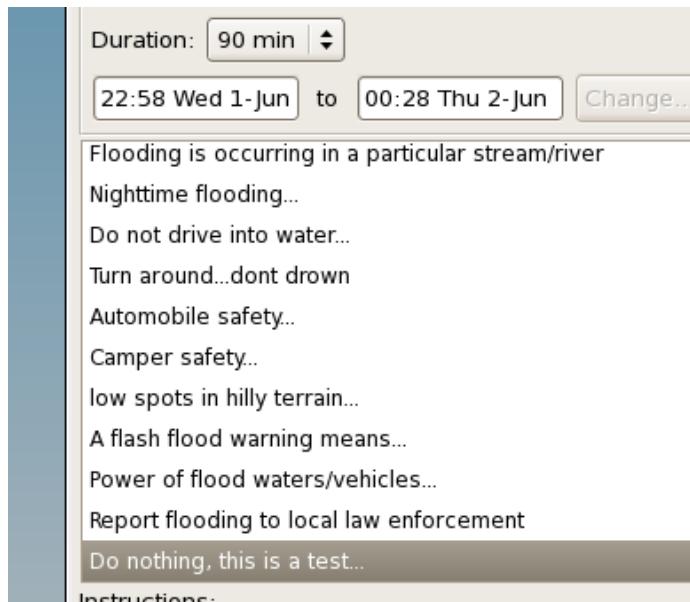
```

15. Hit the SPACE bar on the keyboard twice to line up the cursor with the preceding <bullet> XML tags and enter the following all on one line:

```
<bullet bulletName="labTestCTA" bulletText="Do nothing, this is a test..." parseString="DO NOT TAKE ACTION ON THIS PRODUCT! IT IS A TEST, AND ONLY A TEST!" />
```

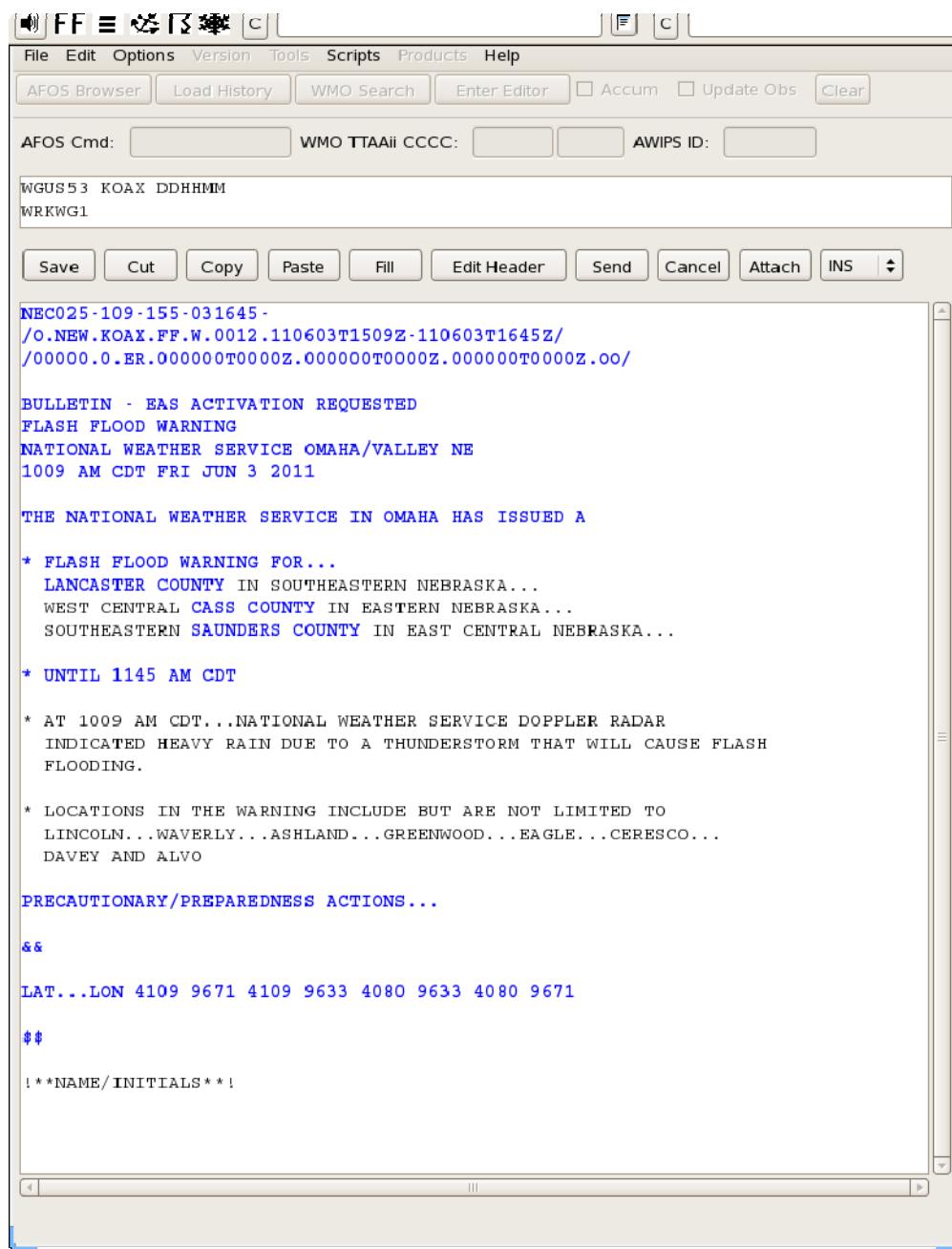
```
95 low spots in hilly terrain... parseString="DO NOT TAKE ACTION ON THIS PRODUCT! IT IS A TEST, AND ONLY A TEST!" />
96 ext="A flash flood warning means..." parseString="A FLASH FLOOD WARNING MEANS..."
97 tText="Power of flood waters/vehicles..." parseString="DO NOT UNDERESTIMATE THE POWER OF FLOOD WATERS/VEHICLES"
98 bulletText="Report flooding to local law enforcement" parseString="HAVE THE LOCAL LAW ENFORCEMENT REPORT FLOODING"
99 xt="Do nothing, this is a test..." parseString="DO NOT TAKE ACTION ON THIS PRODUCT! IT IS A TEST, AND ONLY A TEST!" />
100
101
102portion of the warning is generated. Mainly used
```

16. Save the ffw.cfg – USER once more by using the same ‘save’ button as before on the perspective, and switch back to the D2D perspective.
17. Select the ‘WarnGen’ button on the D2D perspective and select ‘Flash Flood’, either with a radio button or by selecting ‘Other’ and choosing ‘Flash Flood’ from the drop down list.
18. Use your mouse and left click on the ‘Drag me to storm’ dot so that a polygon appears.
19. Use the scroll bar on the WarnGen GUI to scroll to the bottom of the selector. You should see the new entry at the bottom.



20. Select the ‘Do nothing, this is a test...’ entry and hit ‘Create Text’. The warning should pop up on your Text Workstation. Peruse the text for the string “DO NOT TAKE ACTION ON THIS PRODUCT! IT IS A TEST, AND ONLY A TEST!”

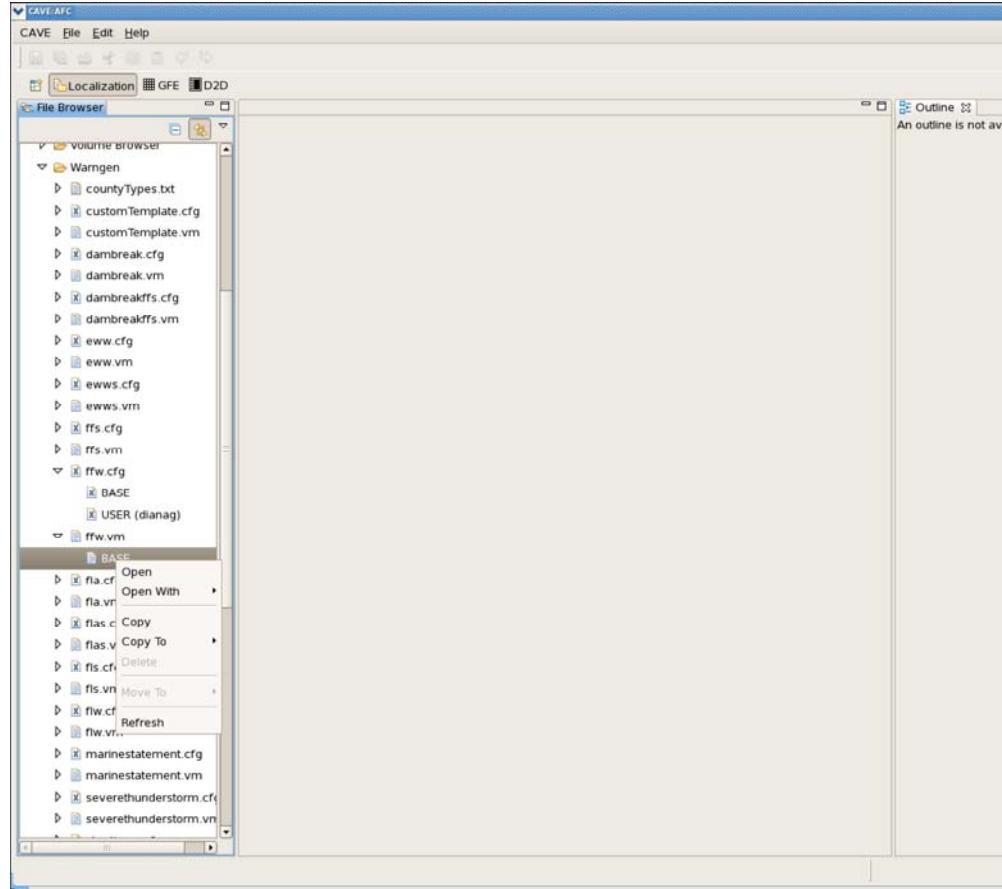
You should not see the text, because you still need to make a change to the corresponding .vm file for this template.



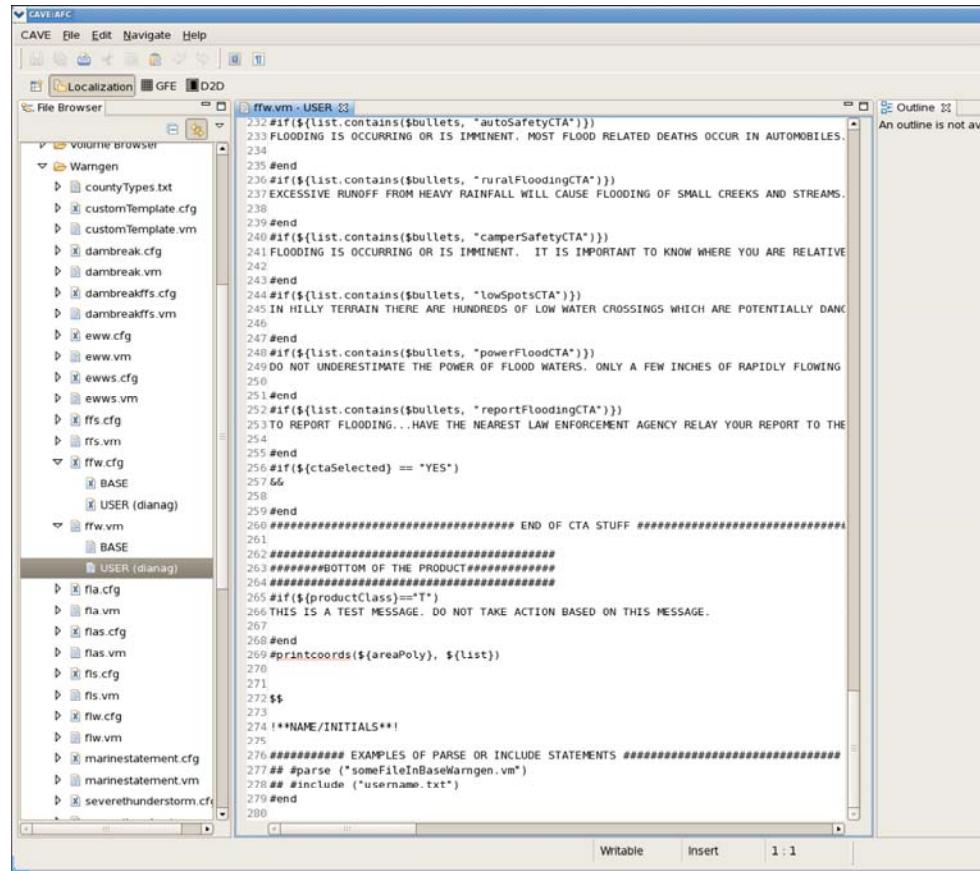
21. Hit 'Cancel' on the text editor that was opened on the XT, and exit the Text WarnGen window as well.

On your LX, close WarnGen and navigate back to the Localization perspective.

22. Navigate in the File Browser to the ffw.vm file; expand using the triangle next to the name. Then right click on ‘BASE’ and select ‘Copy To → User (xxxxxx)’ where xxxxxx is your user name.



23. Double click on ‘USER (xxxxxx)’, which is now listed under the ffw.cfg file in the file browser.
24. You should now be looking at the file responsible for building the text for the Flash Flood Statement. If you do not see the source view, click the tab at the bottom of the screen.



25. Scroll to line 189 of the ffw.vm – USER file and note that this is where the “Call to Actions” portion starts. Note line 194, which activates a variable if the bullet name ends with CTA, which is why this example bullet is named labTestCTA. You need to add a line to this file to add text to your product.

```
183 $bullet->addContent($bulletContent, "drainages");
184 #drainages(${daminfodrainages} ${riverdrainages});
185
186 #end
187 ##### END OF ADDITION #####
188 ##### CALL TO ACTIONS #####
189 #####
190 #####
191 ##Check to see if we've selected any calls to act.
192 ##we ended each CTA bullet ID with "CTA" for this
193 #foreach ($bullet in $bullets)

191 ##Check to see if we've selected
192 ##we ended each CTA bullet ID wi
193 #foreach ($bullet in $bullets)
194 #if($bullet.endsWith("CTA"))
195 #set ($ctaSelected = "YES")
```

26. Put your cursor at the end of line 255, which reads **#end**, and hit the ‘Enter’ key, starting a new line.

```
254
255 #end
```

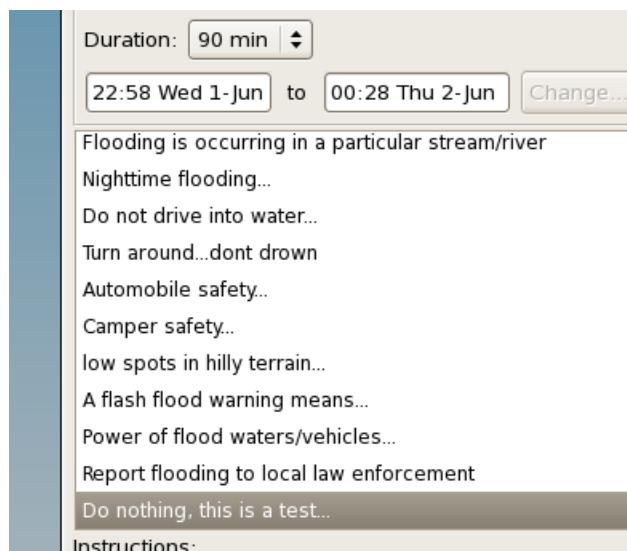
27. Now, on line 256, type in these lines:

```
#if(${list.contains($bullets, "labTestCTA")})
TEST TEST TEST... TEST TEST TEST... LAB TEST

#end
```

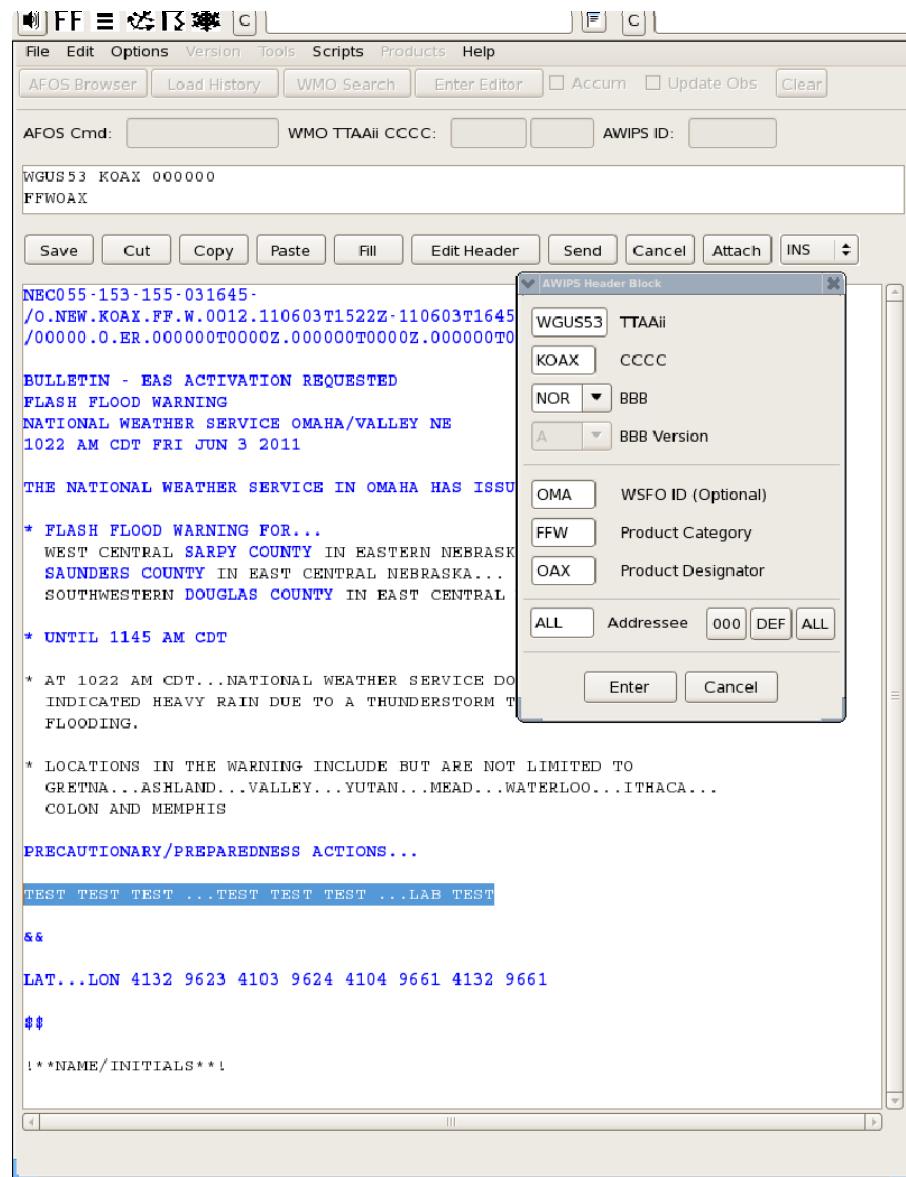
Be sure to note the blank line in between the text and the **#end** above.

28. Your new entries should now be on lines 256 through 259. Save the ffw.vm – USER, and switch back to the D2D perspective.
29. Select the WarnGen button on the D2D perspective and select ‘Flash Flood’, either with a radio button or by selecting ‘Other’ and choosing ‘Flash Flood’ from the dropdown list.
30. Use your mouse and left click on the ‘Drag me to storm’ dot so a polygon appears.
31. Use the scroll bar on the WarnGen GUI to scroll to the bottom of the selector. You should see the new entry at the bottom.



32. Select the ‘Do nothing, this is a test...’ entry and hit ‘Create Text’. The warning should pop up on your Text Workstation. Peruse the text for the string “TEST TEST TEST ... TEST TEST TEST ... LAB TEST”

You should see the text now just below “PRECAUTIONARY/PREPAREDNESS ACTIONS...”



\* LOCATIONS IN THE WARNING INCLUDE BUT ARE NOT LIMIT  
GRETN...ASHLAND...VALLEY...YUTAN...MEAD...WATERLC  
COLON AND MEMPHIS

#### PRECAUTIONARY/PREPAREDNESS ACTIONS...

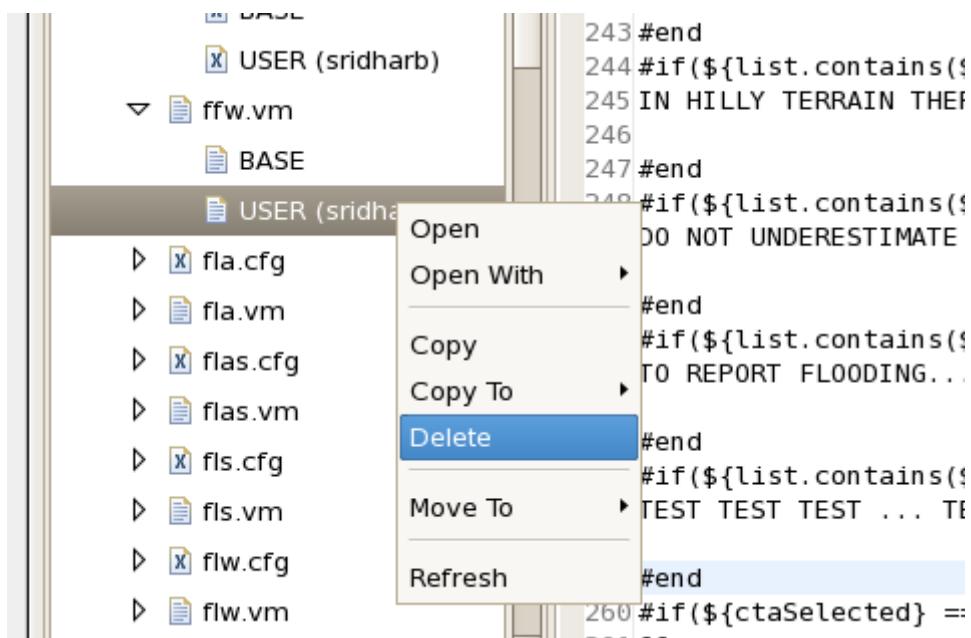
TEST TEST TEST ... TEST TEST TEST ... LAB TEST

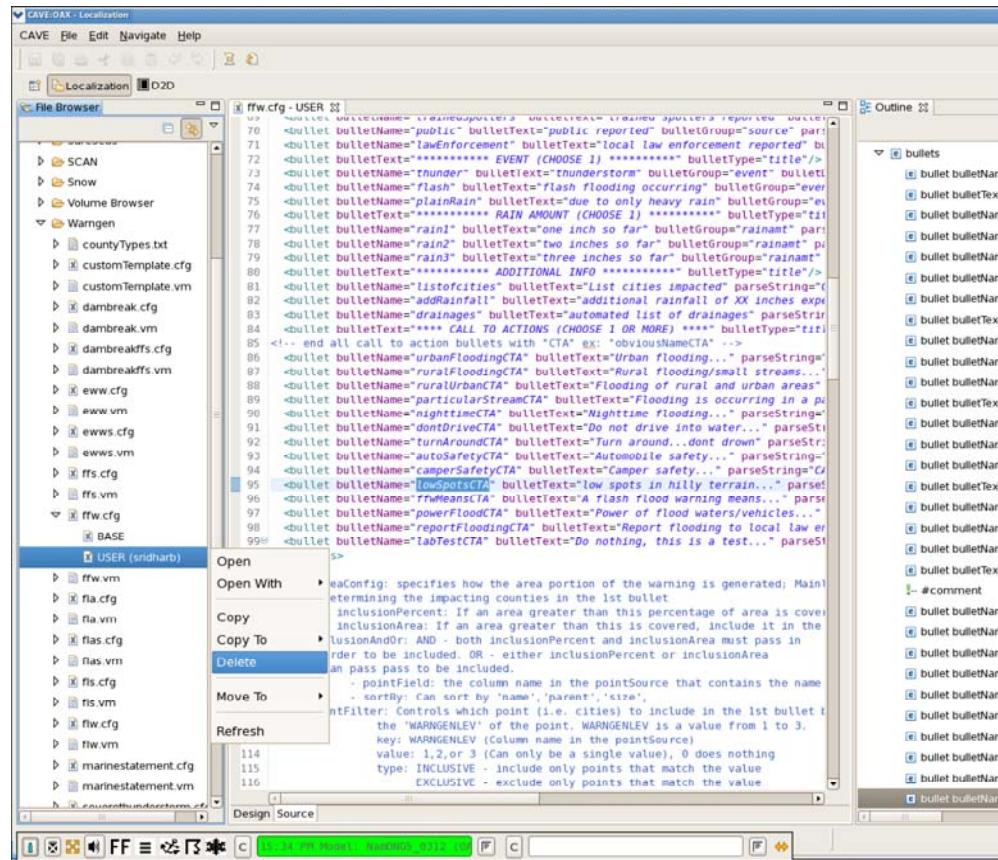
&&

LAT...LON 4132 9623 4103 9624 4104 9661 4132 9661

\*\*\*

33. Hit the ‘Cancel’ button on the Text WarnGen window, and answer ‘Yes’ when prompted to exit and not save changes. Then, exit the Text WarnGen window.
34. Close WarnGen by hitting the ‘Close’ button on the GUI.
35. Switch to the Localization perspective, and clean up the USER WarnGen templates by right clicking on the USER (xxxxxx) version of the ffw.vm and selecting ‘Delete’, then doing the same for the USER (xxxxxx) version of the ffw.cfg. Answer ‘Yes’ to both when asked to confirm the deletion.





### 36. Exit CAVE and log off the workstation.

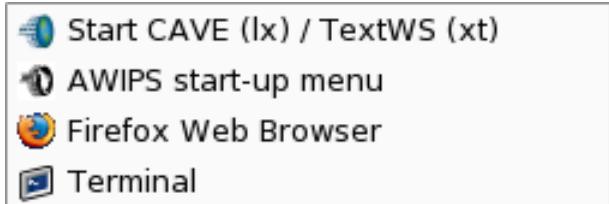
#### J.4 Troubleshooting WarnGen Startup

This exercise is designed to familiarize you with troubleshooting CAVE applications by launching via the command line and searching through logs.

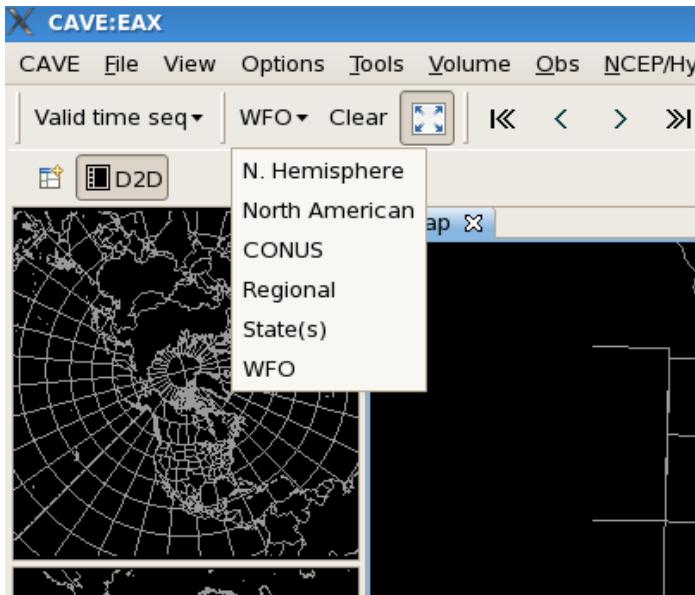
##### Procedure:

AWIPS II has reengineered the WarnGen application into CAVE. While launching the GUI is the same as it is in AWIPS I, the mechanics behind the processes are different. There are configuration files for the GUI, as well as the templates. This exercise will walk through identifying a problem in site data configuration and then correcting the problem.

1. Log into your AWIPS workstation. AlertViz should start automatically.
2. Use the left mouse button to open the AWIPS menu, and select ‘Start CAVE (LX) / TextWS (XT).



3. Change scales by selecting ‘WFO’ from the “Map Scale” pulldown menu.



4. Start WarnGen by selecting the “Yellow” button in the upper right corner of the CAVE D2D Perspective.
5. You should have received an AlertViz popup after depressing the “WarnGen” button. The error inside the message should be “Failed to initialized map tool”.



6. Select the ‘Show Log’ button so that the message log appears below the AlertViz popup and double click on the line with the failure message shown in the screen capture in step 5.
7. You should see an additional window appear on the AlertViz popup with the following text. Review the java exception error on your screen.

```
Failed to initialized map toolcom.raytheon.uf.viz.core.exception.VizException:
Failed to initialize a Tool Resource
 at
com.raytheon.viz.awipstools.ui.display.AwipsToolsResourceData.construct(Awips
ToolsResourceData.java:132)
 at
com.raytheon.viz.awipstools.ui.action.AbstractMapToolAction.getResource(Abstr
actMapToolAction.java:103)
 at
com.raytheon.viz.warngen.gui.WarngenAction.getResource(WarngenAction.java:82)
 at
com.raytheon.viz.warngen.gui.WarngenAction.getResource(WarngenAction.java:1)
 at
com.raytheon.viz.awipstools.ui.action.AbstractMapToolAction.execute(AbstractM
apToolAction.java:75)
 at
org.eclipse.ui.internal.handlers.HandlerProxy.execute(HandlerProxy.java:293)
 at
org.eclipse.core.commands.Command.executeWithChecks(Command.java:476)
 at
org.eclipse.core.commands.ParameterizedCommand.executeWithChecks(Parameterize
dCommand.java:508)
 at
org.eclipse.ui.internal.handlers.HandlerService.executeCommand(HandlerService
.java:169)
 at
org.eclipse.ui.internal.handlers.SlaveHandlerService.executeCommand(SlaveHand
lerService.java:241)
 at
org.eclipse.ui.menus.CommandContributionItem.handleWidgetSelection(CommandCon
tributionItem.java:820)
 at
org.eclipse.ui.menus.CommandContributionItem.access$19(CommandContributionIte
m.java:806)
 at
org.eclipse.ui.menus.CommandContributionItem$5.handleEvent(CommandContributio
nItem.java:796)
 at org.eclipse.swt.widgets.EventTable.sendEvent(EventTable.java:84)
 at org.eclipse.swt.widgets.Widget.sendEvent(Widget.java:1258)
 at org.eclipse.swt.widgets.Display.runDeferredEvents(Display.java:3540)
 at org.eclipse.swt.widgets.Display.readAndDispatch(Display.java:3161)
 at org.eclipse.ui.internal.Workbench.runEventLoop(Workbench.java:2640)
 at org.eclipse.ui.internal.Workbench.runUI(Workbench.java:2604)
 at org.eclipse.ui.internal.Workbench.access$4(Workbench.java:2438)
 at org.eclipse.ui.internal.Workbench$7.run(Workbench.java:671)
 at
org.eclipse.core.databinding.observable.Realm.runWithDefault(Realm.java:332)
 at
org.eclipse.ui.internal.Workbench.createAndRunWorkbench(Workbench.java:664)
 at org.eclipse.ui.PlatformUI.createAndRunWorkbench(PlatformUI.java:149)
 at
com.raytheon.viz.ui.personalities.awips.VizApplication.start(VizApplication.j
ava:233)
 at
org.eclipse.equinox.internal.app.EclipseAppHandle.run(EclipseAppHandle.java:1
96)
 at
org.eclipse.core.runtime.internal.adaptor.EclipseAppLauncher.runApplication(E
clipseAppLauncher.java:110)
 at
```

```

org.eclipse.core.runtime.internal.adaptor.EclipseAppLauncher.start(EclipseApp
Launcher.java:79)
 at
org.eclipse.core.runtime.adaptor.EclipseStarter.run(EclipseStarter.java:369)
 at
org.eclipse.core.runtime.adaptor.EclipseStarter.run(EclipseStarter.java:179)
 at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
 at
sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:39)
 at
sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.
java:25)
 at java.lang.reflect.Method.invoke(Method.java:597)
 at org.eclipse.equinox.launcher.Main.invokeFramework(Main.java:619)
 at org.eclipse.equinox.launcher.Main.basicRun(Main.java:574)
 at org.eclipse.equinox.launcher.Main.run(Main.java:1407)
Caused by: java.lang.reflect.InvocationTargetException
 at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native
Method)
 at
sun.reflect.NativeConstructorAccessorImpl.newInstance(NativeConstructorAccess
orImpl.java:39)
 at
sun.reflect.DelegatingConstructorAccessorImpl.newInstance(DelegatingConstruct
orAccessorImpl.java:27)
 at java.lang.reflect.Constructor.newInstance(Constructor.java:513)
 at
com.raytheon.viz.awipstools.ui.display.AwipsToolsResourceData.construct(Awips
ToolsResourceData.java:113)
 ... 36 more
Caused by: java.lang.NullPointerException
 at
com.raytheon.viz.warngen.gui.WarngenLayer.<init>(WarngenLayer.java:219)
 ... 41 more

```

8. Click the ‘Acknowledge All’ button, and minimize CAVE. The WarnGen GUI is configured through site data configuration with an XML file. Perhaps something went wrong? The file would have been transferred to your caveData when you localized, so take a look there first. Open a terminal window by left clicking and selecting ‘terminal’, and, from the prompt, change into the following directory.

Enter: **cd caveData/configuration/site/LLL/com.raytheon.viz.warngen**

Remember to replace LLL in the above command with the SITE ID of the system you are using for the exercise.

9. Note the path of the directory you changed to in step 8. It is in a configuration directory, at a site level, and has to do with “viz” and “warngen”. Take a look at the config.xml file that is in this directory.

Enter: **cat config.xml**

10. XML syntax is a series of tags, which start with an opening tag and, at some point, have a closing tag. The closing tag is different from the opening tag only in that it has a “/” character before the name of the tag. For example:

<name> Kevin Johnson </name>

Scour the text on your screen now and see if you can find any errors in the XML.

11. You should have noted that the <siteNode> XML tag has no closing </siteNode> tag. You will need to fix this in order for WarnGen to start. Use the *vi* editor.

Enter: **cp -a config.xml BAD-config.xml**

Enter: **vi config.xml**

Navigate to the line that starts <siteNode> and add the string </siteNode>, as shown below, after the three letter site node. Now, save the file.

<siteNode>OAX</siteNode>

Enter: **Esc :wq!**

12. Now, maximize your CAVE by selecting it from your task bar list. Once maximized, try to start WarnGen once more.

13. Success! WarnGen will now start! That was the problem. However, you just edited a file in caveData to test the change. You know that the file originates in the EDEX Localization Store. It needs to be fixed there in order to handle the site data configuration change properly.

14. Change focus to the terminal window that should be behind the CAVE display. Secure shell into the DX3 or DX4 as user *root* and change into the Localization Store.

Enter: **ssh root@dx3**

Enter: **cd /awips2/edex/data/utility/cave\_config/**

15. The problem file is actually in **site/LLL/com.raytheon.viz.warngen**; however, for the purposes of this exercise you are going to create a user-level file to fix the problem. In a normal situation, a user would not have his, or her, own version of this file. It is important to note that this user version file is only for the purposes of this exercise.

Enter: **mkdir -p user/YOURUSERNAME/com.raytheon.viz.warngen**

Enter: **chown -R awips:awips user**

Enter: **cp -a site/LLL/com.raytheon.viz.warngen/config.xml  
user/YOURUSERNAME/com.raytheon.viz.warngen/**

Enter: **cd user/YOURUSERNAME/com.raytheon.viz.warngen**

**Note:** Substitute your user name for YOURUSERNAME above. For example:  
**mkdir -p user/kevinj/com.raytheon.viz.warngen.**

Notice the similarities to the path in caveData that you originally looked into for the file.

16. Use the *vi* editor to edit the config.xml and fix the <siteNode> tag as done above.
17. Once the file has been fixed, notify the other students on the same platform, and all should return to their workstations within the terminal window.

Enter: **exit**

18. You need to make sure that the file gets downloaded properly now, so remove the config.xml in your caveData and re-launch CAVE to see if WarnGen will start. In your terminal window, change into the user-level directory to which your file will be downloaded.

Enter: **cd**

**~/caveData/configuration/user/YOURUSERNAME/com.raytheon.viz.warngen**

19. Exit CAVE, by selecting ‘CAVE → Exit...’.

The reason that CAVE must be restarted is that it has already read the corrected file from when you made the local change in step 11. By restarting, you are ensuring a proper file is re-downloaded from EDEX Localization Store.

20. Re-launch CAVE through your left click menu, and once again change scales and start WarnGen via the button. (Reference steps 3 and 4 above.)

WarnGen should have started successfully. In your terminal window, check to see if the file was downloaded.

**Enter: ls -l**

You should see that the file has now been downloaded from the EDEX Localization Store. If this was not an exercise, and the site-level file was changed, it would have been downloaded correctly to the site-level directory to ensure that the next forecaster to launch WarnGen would not see the error.

**Appendix K**  
**NCF Trouble Ticket Worksheet and**  
**Instructions**

## Appendix J. WarnGen Templates

### Table of Contents

	<i>Page</i>
K.0      Introduction.....	<b>Error! Bookmark not defined.</b>
K.1      NCF Trouble Ticket Worksheet.....	<b>Error! Bookmark not defined.</b>
K.2      AWIPS Workstation Performance (Slowness) During Severe Weather	<b>Error! Bookmark not defined.</b>
K.2.1      AWIPS Tips for Improved System Performance.....	<b>Error! Bookmark not defined.</b>

## K.0 *Introduction*

From time to time, you will need to contact the Network Control Facility (NCF) in Silver Spring, Maryland, to report a problem at your site. This appendix is provided to help you give the NCF engineers the information needed to resolve your incident.

The appendix has two sections:

- K.1, which includes a copy of the NCF Trouble Ticket Worksheet and instructions for its use; and
- K.2, which provides additional guidelines for working with the NCF to resolve issues during severe weather.

The NCF Trouble Ticket Worksheet is a tool designed for your use in reporting a problem at your site. Please keep copies of the worksheet on hand and have the information requested on the worksheet available when you call the NCF to report your problem. Missing or incomplete information may negatively affect the resolution process, and can increase the time it takes to diagnose and resolve the problem.

A copy of the NCF Trouble Ticket Worksheet, and instructions for completing the worksheet, appear on the following pages.

### NCF Trouble Ticket Worksheet

**Note:** The NCF will determine the Severity Code depending on site supplied weather situation (#3) and the problem type encountered (#10)

1. Date: \_\_\_\_\_ Time: \_\_\_\_\_ Trouble Ticket Number: \_\_\_\_\_
2. Site Identification: \_\_\_\_\_ (e.g., TSA for WFO Tulsa, OK)  
(Use ONLY standard NWS office IDs, Emphasize RFC or WFO.)
3. Weather Situation: Critical/Watches/Warnings: \_\_\_\_\_ Busy: \_\_\_\_\_ Quiet/Benign: \_\_\_\_\_
4. NWS Operational Impact Assessment:  
Immediate Fix: \_\_\_\_\_ Routine Fix: \_\_\_\_\_  
Do Not Fix UNTIL NWS Calls Back: \_\_\_\_\_
5. NWS Person Calling: \_\_\_\_\_
6. NWS Senior Forecaster/Senior Hydrologist on Duty: \_\_\_\_\_
7. NCF Contact (Name of NCF Person on Telephone): \_\_\_\_\_
8. NWS Call Back Telephone Number: \_\_\_\_\_
9. NWS Brief Summary of Problem/Symptoms: \_\_\_\_\_  
\_\_\_\_\_
10. Problem Type:

<u>Data Quality or Availability</u>	A. Radar E. ALL	B. Model F. NWSTG	C. Satellite G. Text products	D. LDAD H. Other
<u>Software</u>	A. CAVE/D2D E. SCAN I. AVNFPS M. APS	B. Text Editing F. WHFS J. LDAD N. Localization	C. OH application G. EDEXdecoder K. CLIMATE O. Archive	D. CAVE/GFE H. WarnGen L. HWR P. Other
<u>Hardware</u>	A. Monitor E. Terminal Server I. PXs	B. Workstations F. Tape Drive J. DXs	C. Multiple Workstations G. LDAD Servers K. Other	D. Printer H. CPs
<u>Site Cannot</u>	A. Prepare/issue watch/warning/forecasts and/or advisories B. Collect/distribute mission critical observations			
<u>Network Issues</u>	A. Impacts AWIPS Functionality C. Other	B. Doesn't result in "blackout"		
<u>Other Issues</u>	A. Site customization problem, such as localization or product modification. B. Customization issue, such as problems arising from development outside the AWIPS baseline C. Administrative support (e.g., Government-furnished software usage questions; routine reports; ad hoc reports). D. Questions on how to use software.			
11. Problem Frequency:	_____ _____ _____ _____	First Time Occurrence Intermittent - Occurred _____ times over _____ Hours Constant - Cannot use to do work		
12. NCF Estimated Time to Diagnose/Troubleshoot/Resolve:	_____			
13. NCF Actual Time to Restore:	_____			
14. NWS Initial customer service rating: 1 2 3 4 5				
15. Rating after NCF resolved problem/restored system: 1 2 3 4 5 (NCF rating scale: 1-poor, 2-fair, 3-average, 4-good, 5-excellent.)				

**NCF Trouble Ticket Worksheet Instructions**

1. Dates and times should be in universal time coordinate (UTC)/Z.
  2. Always ask for a Trouble Ticket number.
  3. Use the standard NWS office IDs and emphasize whether you are calling from an RFC or WFO.
  4. Indicate your office work situation due to weather. An office may
    - Have benign/quiet weather;
    - Be involved with critical weather, warnings, watches, and related issues; or
    - Be very busy because of past or anticipated significant weather.
- Note:** The NCF will determine the Severity Code depending on site supplied weather situation (No. 3) and the problem type encountered (No. 10)
5. Your impact assessment indicates a priority of attention required. For example, some problems SHOULD NOT be worked on by the NCF until the ESA, SOO, DOH, AWIPS Focal Point or office manager has been contacted or is present. In this case, the initial call is to alert the NCF that there is a problem that is pending.
  6. The NWS caller's name.
  7. The name of the senior person on duty—lead forecaster, senior forecaster, or senior hydrologist. This is especially critical during hours when the ESA, SOO, or AWIPS Focal Point are not available. This references the office POC during nonstandard hours.
  8. Name of NCF engineer handling the call. You or the senior duty person may receive a call from another NCF person—please enter the second name.
  9. The NCF will verify the NWS number for return calls. Please give the NCF the appropriate number to ensure communication between the NCF and your office is not delayed.
  10. Please briefly comment about the problem, describing the symptoms.
  11. Problem type should be checked or circled so it can be read to the NCF engineer.

Your responses to questions as to the performance (slowness) of your CAVE/D2D perspective or your workstation will help the NCF resolve performance problems, especially during severe weather or emergency situations. Please be ready to answer the following questions:

- Is the slowness occurring with a specific display in D2D, or with the workstation as a whole?
- Did your site run through a pre-severe weather checklist?

If the problem is affecting just one display:

- Do you have the Local & Regional Warning Display loaded?
- Do you have the Local Warning Display loaded?
- About what time did the slowness start?
- On which monitor is the pane loaded?
- Does anyone else have this loaded on another CAVE/D2D? If so, are they having problems?
- Is the slowness mainly with restoring a pane that has been put into a side-panel?

If the entire workstation is affected:

- Do you have FSI running? If so, does stopping it help?

Prior to anticipated severe weather, actions can be performed to ensure that your AWIPS system is operating at optimum performance. A checklist of actions is available at:

<https://www.ops1.nws.noaa.gov/Secure/awipsnew/install/SvrWxHealthOB9.pdf>

## **Appendix L**

### **LDAD Configuration Samples and Firewall Architecture**

## **Appendix L. LDAD Configuration Samples and Firewall Architecture**

### **Table of Contents**

	<i>Page</i>
L.0 LDAD Wiring List .....	1
L.1 LDAD Terminal Server Port Configuration .....	2
L.2 LDAD Modem Configurations .....	3
L.3 Environment Variables .....	6
L.4 AWIPS Firewall Architecture and Configuration .....	7
L.4.1 Purpose .....	7
L.4.2 AWIPS Firewall Architecture .....	8
L.4.3 Netscreen Configuration.....	8
L.4.4 LDAD LAN (DMZ) Configuration.....	9
L.4.5 AWIPS LAN Reconfiguration .....	9
L.4.6 Interconnectivity and Policies/FW Rules .....	9
L.4.7 LDAD FAX Troubleshooting.....	12
L.4.8 LDAD Firewall Site Configuration Management .....	13
L.4.9 Csportd: Configuration and Setup .....	13

### **List of Tables**

Table L.0-1. LDAD Physical Wiring List .....	1
Table L.0-2. LDAD Firewall Wiring List.....	2
Table L.1-1. Port Assignments .....	2
Table L.2-1. LDAD Modem Configurations .....	3
Table L.3-1. Environment Variables .....	6
Table L.4.6-1. Standard Firewall Ruleset .....	10

## L.0 LDAD Wiring List

Table L.0-1 provides the LDAD physical wiring list. Table L.0-2 provides the AWIPS LDAD firewall wiring list.

**Table L.0-1. LDAD Physical Wiring List**

Category	Cable Type	End Point 1	End Point 2
Network	CAT5 UTP	Terminal Server Ethernet 10/100 Base T	SMC 8024 Port 3
Network	CAT5 UTP	External Gateway Ethernet Plaintree	1018 Port 4
Network	CAT5 UTP	SMC 1080 Port 8	Firewall exp1
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 1	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 2	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 3	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 4	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 5	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 6	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 7	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 8	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 9	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 10	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 19	DTMF Converter 1
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 20	DTMF Converter 2
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 21	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 22	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 23	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 24	Modem Chassis Modem x
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 30	LDAD FAX Modem
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 31	LDAD LS2 Console Port
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 32	LDAD LS3 Console Port
Serial	RJ45-DB25 Male RS232 DTE-DCE	Terminal Server Port 29	LDAD LAN Switch Console Port

**Table L.0-2. LDAD Firewall Wiring List**

Source Device	Source Identifier	Destination Device	Destination Identifier
FW 1	LAN 1	FW/SW1	Port 4
FW 2	LAN 3	LDAD LSW	Port 5
FW/SW 1	Port 1	AWIPS HSW 1	Port 21
FW/SW 2	Port 2	AWIPS HSW 2	Port 21
FW/SW 2	Port 1	AWIPS HSW 1	Port 22
FW/SW 2	Port 2	AWIPS HSW 2	Port 22
FW 1	Console	M & C	Port 38
FW 2	Console	M & C	Port 29
Terminal Server	Port 19	DTMF 1	Port RS232
Terminal Server	Port 20	DTMF 2	Port RS232
FW 1	LAN 4	FW 2	Lan 4

### **L.1 LDAD Terminal Server Port Configuration**

The LDAD Terminal Server is a Cyclades Alterpath ACS32, which provides an Ethernet interface for connection to the LDAD LAN Switch and 32 serial ports for connections to communication devices, such as the modems in the Modem Nest, and Console Management ports such as the LS2/3 Servers.

The terminal server in an average configuration is used to connect 10 dial-in/dial-out modems (including MicroART, RRS, and ASOS), four dedicated modems, a fax modem, and various console connections. Port assignments are shown in Table L.1-1.

**NOTE:** The LDAD D270 server and the LDAD LAN Switch are not included in the table.

**Table L.1-1. Port Assignments**

Port	Function
1	Used to dial-out to devices configured for 7 bits, even parity
2	Used to dial-out to devices configured for 8 bits, no parity
3	First dial-in line, 8 bits, no parity
4	Second dial-in line, 8 bits, no parity
5	Third dial-in line, 8 bits, no parity
6	Fourth dial-in line, 8 bits, no parity
7	Fifth dial-in line, 8 bits, no parity
8	Sixth dial-in line, 8 bits, no parity
9	MicroART Modem
10	ASOS Modem
21	First Dedicated Modem
22	Second Dedicated Modem
23	Third Dedicated Modem
24	Fourth Dedicated Modem
30	Fax Modem

The LDAD terminal server is configured with a minimum of 15 IP addresses that must be assigned in the address space in which the site LDAD resides. First, a single IP address is used to address the terminal server as a whole. Next, an individual and unique IP address is used to address each individual port from Port 1 through Port 10 and Port 21 through Port 24. There is an additional IP address required for the LDAD rack WaveSwitch.

For Port 1, the IP address is named “7e1out” within the LDAD site and is used to access a dial-out port configured properly for communications with older devices that utilize 7 bit even parity communications configurations. An example of such communications is LARC gauge communications.

The IP address assigned to Port 2 within the LDAD site is named “8n1out” and is used in much the same way as the Port 1 address. In this case, the modem connected to Port 2 is configured for 8 bit no parity communications. Current modem communications equipment is usually configured in this manner. An example of such communications is Campbell gauge communications.

The IP addresses assigned to Ports 3 through 10 are used by dial-in users who wish to establish direct TCP communications via PPP to the LDAD LAN.

## **L.2 LDAD Modem Configurations**

LDAD modem configurations are presented in Table L.2-1.

**Table L.2-1. LDAD Modem Configurations**

Category	Option	Default Setting	7e1out	8n1out	csportd	PPP/Interactive
Test	Test	End Test	Default	Default	Default	Default
	Accept Redial	On	*	*	*	*
	LAL Busy Out	Off	On	On	On	On
	Line Select	Dial	Default	Default	Default	Default
	Mode	V.34 Auto	Default	Default	Default	Default
	Auto Type	CCITT	Default	Default	Default	Default
	Low Speed	Bell	Default	Default	Default	Default
Modulation	Max Rate	33.6	Default	Default	Default	Default
	Min Rate	300	Default	Default	Default	Default
	Asymmetric Rate	On	Default	Default	Default	Default
	Fast Call	Off	Default	Default	Default	Default
	Adaptive Rate	On	Default	Default	Default	Default
	Mode Select	Originate	Default	Default	Answer	Answer
	Clock Select	Internal	Default	Default	Default	Default
	Retrain	High BER	Default	Default	Default	Default
	Longspace Disconnect	Off	Default	Default	Default	Default
	PSTN Disconnect	On	Default	Default	Default	Default
Restoral	Guard Tone	Off	Default	Default	Default	Default
	Hold Dial Line	Off	Default	Default	Default	Default
	Data Transfer Mode	Spd Auto Reliable	Default	Default	Default	Default
	EC Buffer	Regular	Default	Default	Default	Default
	Error Correction	V.42	Default	Default	Default	Default

**Table L.2-1. LDAD Modem Configurations**

Category	Option	Default Setting	7e1out	8n1out	csportd	PPP/Interactive
EC/DC	Data Compression	Enabled	Default	Default	Default	Default
	Break	Destruct	Default	Default	Default	Default
	Modem Flow	On	Default	Off	Off	Off
	Disconnect Buffer Delay	Off	Default	Default	Default	Default
	Error Correction Identifier	Default MNP ID	Default	Default	Default	Default
	Select	AT	*	*	*	*
	At Data Format	Async	Default	Default	Default	Default
	V25 Format	Bitsync	*	*	*	*
	NoACU Format	Async	*	*	*	*
	Default Dial	Off	Default	Default	Default	Default
	Manual/Auto Answer	Using S0	Default	Default	Ring #1	Ring #1
	Async Echo	On	Default	Default	Default	Default
ACU	Char Length	10	*	*	*	*
	V25 Char	ASCII	*	*	*	*
	Sync Idle	Char	*	*	*	*
	V25 Response	V25bis	*	*	*	*
	Parity	V25	Even	Space	Space	Space
	AT Msg	Before CD	After CD	After CD	After CD	After CD
	Result Code	Enabled	Orig	Orig	Disable	Disable
	Result Code Format	Verbose	Verbose	Verbose	Verbose	Verbose
	DCE/DTE Rate Display	DTE rate	comm msg	comm msg	comm msg	comm msg
	EC Reliable Msg	Off	Long	Long	Long	Long
	LPDA2 Address	ff	*	*	*	*
	LPDA2 ID	326x	*	*	*	*
	LPDA2 Detection	ff	*	*	*	*
	Call Progress Verbose	4	Default	Default	Default	Default
	DTE rate	auto	57.6	57.6	300/57600	57.6
	Flow Control	XON/XOFF	RTS/CTS	RTS/CTS	RTS/CTS	RTS/CTS
	Speed Conversion	On	Default	Default	Default	Default
	DTR Control	High	Reset	Reset	Reset	Reset
	RTS Control	High	Normal	Normal	Normal	Normal
	CTS Control	Async	High	High	Normal	Normal
	RTS/CTS Delay	0	Default	Default	Default	Default
	DCD Control	High	Wink	Wink	Wink	Normal
Terminal	RTS/DCD Remote Signaling	Codex	Default	Default	Default	Default
	DCD Loss Disconnect	S10	Default	Default	Default	Default
	DSR	High	Drop on disconnect	Drop on disconnect	Drop on disconnect	Drop on disconnect
	Overspeed	1%	Default	Default	Default	Default
	DTR delay	S25	Default	Default	Default	Default
	Circuit 140 Remote Digital Loopback	Off	Default	Default	Default	Default
	Circuit 141 Local	Off	Default	Default	Default	Default

**Table L.2-1. LDAD Modem Configurations**

Category	Option	Default Setting	7e1out	8n1out	csportd	PPP/Interactive
	Analog Loopback					
	DTE pin 25	Busy	Test	Test	Test	Test
	External Option Set Select	Off	Default	Default	Default	Default
	External Control	Pin 14	Default	Default	Default	Default
	Inactivity Timeout	S30	10 Mins	10Mins	10 Mins	10 Mins
	Jack Type	RJ11C	Default	Default	Default	Default
	DL Tx Level	0	*	*	*	*
	LL Tx Level	0	*	*	*	*
Telco	Line Compensation	Off	On	On	On	On
	Speaker Control	Dialing	Default	Default	Default	Default
	Speaker Volume	Medium	Default	Default	Default	Default
	Network Compensation	Off	Default	Default	Default	Default
	Pause Delay	3 Seconds	Default	Default	Default	Default
	Dial Wait	S7	Default	Default	Default	Default
	Dial Control	Tone	Default	Default	Default	Default
Dialing	Call Timeout	60	Default	Default	Default	Default
	Blind Dial	S6	Default	Default	Default	Default
	Pulse Cycle	40%	Default	Default	Default	Default
	Tone Length	72 msecs	Default	Default	Default	Default
Front Panel Security	Password	Disable	Default	Default	Default	Default
	Password Verify	Disable	Default	Default	Default	Default
	Callback	Off	Default	Default	Default	Default
	Remote Num Required	Off	Default	Default	Default	Default
Access Security	Group Password	Disable	*	*	*	*
	Tone	None	Default	Default	Default	Default
	Sim Ringback	Disable	Default	Default	Default	Default
	Dial Restricted	Off	Default	Default	Default	Default
	Override mode	Off	Default	Default	Default	Default
	NC Address	000	Default	Default	Default	Default
Network Control	NC Port Rate	75	Default	Default	Default	Default
	Pass Through	option1	Default	Default	Default	Default
	NC Line Disconnect	Off	Default	Default	Default	Default
Remote Configuration	Remote Access	Enabled	Disable	Disable	Disable	Disable
	Dial Restricted	Off	Default	Default	Default	Default
	Ring Count to Answer On	0:0	Default	Default	Default	Default
	Ring Count	1:0	Default	Default	Default	Default
	Escape Code Character	2:43	Default	Default	Default	Default
	Carriage Return Character	3:13	Default	Default	Default	Default
	Line Feed Character	4:10	Default	Default	Default	Default
	Back Space Character	5:8	Default	Default	Default	Default
	Wait for Dialtone	6:2	Default	Default	Default	Default
	Wait for Data Carrier	7:30	Default	Default	Default	Default

**Table L.2-1. LDAD Modem Configurations**

Category	Option	Default Setting	7e1out	8n1out	csportd	PPP/Interactive
S Register	Pause Delay Value	8:2	Default	Default	Default	Default
(RegNum:Default Val)	Carrier Loss Disconnect Delay	10:15	Default	Default	Default	Default
	DTMF Tone Duration	11:72	Default	Default	Default	Default
	Escape Code Guard Time	12:50	Default	Default	Default	Default
	Test Timer	18:0	Default	Default	Default	Default
	DTR Before Looking For DTR	25:5	Default	Default	Default	Default
	RTS/CTS Delay	26:1	Default	Default	Default	Default
	DTE Inactivity Disconnect	30:0	Default	Default	Default	Default
	Disconnect Buffer Delay	38:5	Default	Default	Default	Default
	Access Security Tone Duration	45:5	Default	Default	Default	Default
	Access Security Lead Digit Delay Timeout	46:12	Default	Default	Default	Default
	AC Detect	98:0	Default	Default	Default	Default
	V.32 Training Time	99:0	Default	Default	Default	Default

### L.3 Environment Variables

The LDAD environment variable values in Table L.3-1 use the Honolulu WFO for site-specific variables such as DEFAULT\_WFO and are valid for user **ldad** on PX2.

**Table L.3-1. Environment Variables**

Variable Name	Value
APPS_DEFAULTS_USER	/awips/hydroapps/.Apps_defaults
CLASSPATH	/awips/ldad/classes
DEFAULT_RFC	ANC
DEFAULT_SITE	HNL
DEFAULT_STATE	HI
FILE_SERVER_DEFAULT_PATHS	+/awips/ldad/data/
FXA_DATA	/data/fxa
FXA_HOME	/awips/fxa
FXA_LOCAL_SITE	HFO
FXA_NATL_CONFIG_DATA	/awips/fxa/data/localization
LDAD_DATA	/data/fxa/LDAD
LDAD_DECODED_DATA	/data/fxa/LDAD/decoded
LDAD_DECODER_SOURCE_DIR	/awips/ldad/src/decoder
LDAD_EXTERNAL_BIN	/ldad/bin
LDAD_EXTERNAL_DATA	/data/ldad
LDAD_EXTERNAL_DATA_REPOSITORY	/data/ldad/hmIngest
LDAD_EXTERNAL_HOME	/ldad
LDAD_EXTERNAL_HOST	ls1
LDAD_EXTERNAL_LOGDIR	/data/logs/ldad
LDAD_EXTERNAL_PUBLIC	/data/ldad/public
LDAD_GATEWAY_SOURCE_DIR	/awips/ldad/src/gateway

**Table L.3-1. Environment Variables**

Variable Name	Value
LDAD_HOME	/awips/ldad
LDAD_INCOMING	/data/Incoming
LDAD_INTERNAL_BIN	/awips/ldad/bin
LDAD_INTERNAL_CRONTABFILE	/awips/ldad/bin/ldad.crontab
LDAD_INTERNAL_CRONTABS	/awips/ldad/bin/crontabs
LDAD_INTERNAL_DATA	/awips/ldad/data
LDAD_INTERNAL_HOME	/awips/ldad
LDAD_INTERNAL_HOST	PX
LDAD_INTERNAL_LOGDIR	/awips/ldad/logs
LDAD_INTERNAL_SOURCE_DIR	/awips/ldad/src
LDAD_INTERNAL_SYSTEM_CRONTABFILE	/usr/spool/cron/crontabs/ldad
LDAD_LOCAL_TZ	HST10
LDAD_RAWDATA	/data/fxa/LDAD/Raw
LDAD_STORAGE_SOURCE_DIR	/awips/ldad/src/decoder/storage
LOG_DIR	/data/logs/ldad
LOG_PREF	/awips/ldad/.logPref
NEWGATEWAY_DB	ldadgateway
SQLEXEC	sqlrm
UDUNITS_PATH	/awips/ldad/data

## L.4 AWIPS Firewall Architecture and Configuration

AWIPS has upgraded the Local Data Acquisition and Dissemination (LDAD) network firewalls with redundant Juniper SSG320M “Netscreen” firewalls to enhance the network security for the AWIPS network. Each AWIPS site will have two firewalls controlled by central configuration manager servers. The central configuration management servers are located at the Network Control Facility (NCF) and the Backup NCF. The Netscreen Security manager (NSM) clients are located at the NCF and the Raytheon engineering facility in Silver Spring, MD to support the deployment. As part of the deployment, each regional headquarters will also receive an NSM client. The regional NSM clients will allow the regions to view the configurations of the firewalls at each of their AWIPS sites. The control over the firewall configurations is tiered with the central configuration management server having ultimate control; the regional NSM clients view their sites but are managed from the central server. Individual AWIPS sites (forecast offices) will not have direct control over their own configurations.

The Netscreens are stateful inspection firewalls, not proxy firewalls. The Netscreens use Network Address Translation (NAT) to prevent AWIPS IP addresses from being advertised outside of the AWIPS network.

### L.4.1 Purpose

This document describes the architecture and functionality of the new AWIPS LDAD Netscreen firewalls.

#### L.4.2 AWIPS Firewall Architecture

The new AWIPS Site Firewall architecture sets up three zones:

- Trusted – inside the AWIPS network
- Untrusted – outside AWIPS
- DMZ – LDAD server – 1pair- (ls1)

The DMZ zone is an additional zone where the NOAA ls1 server will be placed. The addition of the DMZ zone solves many issues and adds network security to the architecture.

A limitation of the Netscreen is that for each internal host on the site AWIPS LAN requiring rlogin/rcp/rsh to the ls1, a policy rule must be created on the firewall. Each such rule for a Trust to DMZ host pair uses a unique DMZ IP address for source address translation. This need for a 1:1 address translation from internal AWIPS hosts to the ls1 to handle r-commands would have depleted the pool of available IP addresses in the site local LAN had we chosen not to design a DMZ. By creating a DMZ using private addresses, the IP address pool is virtually unlimited (nearly 255 available IP addresses) and the site's local LAN address space is not affected. Additionally, by moving the ls1 server to the DMZ, the ls1 is made potentially more secure from attacks emanating from the site LAN Untrusted zone.

#### L.4.3 Netscreen Configuration

This section describes how the new firewalls are configured at AWIPS sites.

- Ethernet Port 1 on the Netscreen connects to the Trust zone (165.92.x.x)
- Ethernet Port 2 connects to the DMZ zone (192.168.1.x)
- Ethernet Port 3 connects to the Untrust zone (site local LAN)
- Ethernet Port 4 connects both firewalls for High Availability (failover).
  - ls1-<siteid> IP is a new IP address 192.168.1.10  
3/21/06 B-4
  - Source NAT for all **Trust to DMZ** traffic using **DIPs** (dynamic IP address).
  - Destination NAT for **DMZ to Trust** (high-port tcp).
  - Destination NAT for **Untrust to DMZ** using **MIPs** (mapped IP addresses). [MIPs are similar to proxy arp rules. The Untrust to DMZ interface will proxy arp for the old (original) ls1 IP address, so when ls1 traffic arrives at that interface, the destination address is translated to the new ls1 192.168.1.10 address. Proxy arping is a common technique used on firewalls or routers to make a host (ls1) on one side of the firewall/router appear to be part of the same network as hosts on the other side (site local LAN) of the firewall/router.]

- The MIP is bi-directional so outgoing traffic (DMZ to Untrust) will be handled similarly (192.168.1.10 is translated to the original ls1 IP address).

#### **L.4.4 LDAD LAN (DMZ) Configuration**

1. Change ls1 IP to 192.168.1.10.
2. Change gateway to 192.168.1.1.
3. Reconfigure EMDS web server IP address.
4. Add new 192.168.1.x IP addresses to /etc/hosts table for each DIP assigned to an internal 165.92 host. (Needed for rsh/rlogin.)
5. Add 192.168.1.50 for “ds-<siteid>” in hosts table. Needed by MIP rule for DMZ to Trust tcp high-port communication.
6. For each internal AWIPS host that is permitted to rsh/rlogin to the ls1, we must add the hostname to root’s and ldad’s rhosts file on ls1.
7. Remove all 165.92 addresses from ls1 hosts table and routing table.
8. Aside from ls1, nothing else on the LDAD LAN will be reconfigured during the initial firewall deployment. The LDAD terminal server and modems will function normally.

#### **L.4.5 AWIPS LAN Reconfiguration**

New ls1 IP address added to dx1 hosts table and then pushed out for NIS.

On all internal hosts that access ls1, replace the old route to ls1 with a new route to the DMZ (new ls1 DMZ IP address).

#### **L.4.6 Interconnectivity and Policies/FW Rules**

This section focuses on the connectivity between the firewall zones and the security policies (FW rules) implemented on the firewall.

Because there are three different zones, there are six sets of policies used for the connectivity between zones:

- **Trust to DMZ**

- Two rules for high-port tcp traffic from DX1 to ls1 (one rule for dx1 and dx2). Uses fixed-port DIP for source address (165.92) translation.
- One rule for ftp/telnet/ssh/http from all internal AWIPS hosts to ls1 (uses egress interface for source address translation).
- For each internal AWIPS host that requires rsh/rcp/rlogin to ls1, there is one rsh/rcp/rlogin rule for that host to the ls1. Uses dedicated fixed-port DIP for source address translation. For example, if the site AWIPS LAN has 20 such

hosts, then 20 DIPS are needed for 20 policy rules.

- **Trust to Untrust**
  - One rule: All internal hosts can perform outgoing ftp/telnet/ssh. Uses egress
- **DMZ to Untrust**
  - One rule: All DMZ (ls1) to Untrust traffic is allowed.
- **Untrust to DMZ**
  - One rule: MIP rule used for destination translation of old (original) ls1 IP address to the new 192.168.1.10 DMZ address. Proxy arp rule. Standard Firewall Ruleset

Table L.4.6-1 illustrates the default firewall ruleset.

**Table L.4.6-1. Standard Firewall Ruleset**

Policy	From Zone	To Zone	Source	Destination	Service	Action	Details	Modified for OB8.1
1	Trust	Untrust	\$AWIPS_NET/\$ SITE	Any	FTP/Telnet/SSH /HTTP	permit	nat src permit log count	
51	Trust	Untrust	\$AWIPS_NET/\$ SITE	Any	LDM	permit	nat src permit log count	
52	Trust	Untrust	\$AWIPS_NET/\$ SITE	Any	Terminal Server	permit	nat src permit log count	
2	Trust	Untrust	Any	Any	ANY	deny	deny log alert count	
3	Untrust	Trust	Any	Any	ANY	deny	deny log alert count	
4	DMZ	Trust	ls1-dmz	MIP(192.168.1.50)	tcp15008	permit	permit log count	
49	DMZ	Trust	ls1-servers-dmz	MIP(192.168.1.51)	tcp15008	permit	permit log count	✓
5	DMZ	Trust	Any	Any	ANY	deny	deny log count	
6	Trust	DMZ	dx1-\$SITE	ls1-dmz	tcp15007	permit	nat src dip-id 31 permit log count	
7	Trust	DMZ	dx2-\$SITE	ls1-dmz	tcp15007	permit	nat src dip-id 32 permit log count	
53	Trust	DMZ	\$SITE px Servers	ls1-servers-dmz	tcp15007	permit	nat src dip-id 41 permit log count	✓
8	Trust	DMZ	\$AWIPS_NET/\$ SITE	ls1-servers-dmz	FTP/Telnet/SSH /HTTP	permit	nat src permit log count	✓
9	Trust	DMZ	dx1-\$SITE	ls1-dmz	NTP	permit	nat src dip-id 40 permit log count	
10	Trust	DMZ	dx2-\$SITE	ls1-dmz	NTP	permit	nat src dip-id 40 permit log count	
11	Trust	DMZ	dx1-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 4 permit log count	
12	Trust	DMZ	dx2-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 5 permit log count	
13	Trust	DMZ	dx1-\$SITE	ls1-servers-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 6 permit log count	✓
14	Trust	DMZ	dx2-\$SITE	ls1-servers-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 7 permit log count	✓

**Table L.4.6-1. Standard Firewall Ruleset**

Policy	From Zone	To Zone	Source	Destination	Service	Action	Details	Modified for OB8.1
54	Trust	DMZ	dx3-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 42 permit log count	
55	Trust	DMZ	dx4-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 43 permit log count	
15	Trust	DMZ	px1-\$SITE	ls1-servers-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 8 permit log count	✓
16	Trust	DMZ	px2-\$SITE	ls1-servers-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 9 permit log count	✓
17	Trust	DMZ	ax-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 10 permit log count	
19	Trust	DMZ	lx1-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 11 permit log count	
20	Trust	DMZ	lx2-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 12 permit log count	
21	Trust	DMZ	lx3-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 13 permit log count	
22	Trust	DMZ	lx4-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 14 permit log count	
23	Trust	DMZ	lx5-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 15 permit log count	
24	Trust	DMZ	lx6-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 16 permit log count	
40	Trust	DMZ	lx7-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 17 permit log count	
41	Trust	DMZ	lx8-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 18 permit log count	
42	Trust	DMZ	lx9-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 19 permit log count	
43	Trust	DMZ	lxa-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 20 permit log count	
44	Trust	DMZ	lx b-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 21 permit log count	
25	DMZ	Untrust	\$DMZ_NET/dmz	Any	ANY	permit	permit log count	
26	Untrust	DMZ	Any	MIP(\$LS1)	ANY	permit	permit log count	
55	DMZ	Untrust	\$DMZ_NET/dmz	Any	csportd	permit	permit log count	
27	Untrust	DMZ	Any	Any	ANY	deny	deny log count	
28	DMZ	Untrust	Any	Any	ANY	deny	deny log count	
29	Trust	DMZ	xt1-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 22 permit log count	
30	Trust	DMZ	xt2-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 23 permit log count	
31	Trust	DMZ	xt3-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 24 permit log count	
32	Trust	DMZ	xt4-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 25 permit log count	
33	Trust	DMZ	xt5-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 26 permit log count	
34	Trust	DMZ	xt6-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 27 permit log count	

**Table L.4.6-1. Standard Firewall Ruleset**

Policy	From Zone	To Zone	Source	Destination	Service	Action	Details	Modified for OB8.1
35	Trust	DMZ	xt7-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 28 permit log count	
36	Trust	DMZ	xt8-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 29 permit log count	
37	Trust	DMZ	xt9-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 30 permit log count	
38	Trust	DMZ	xta-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 33 permit log count	
39	Trust	DMZ	xtb-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 34 permit log count	
45	Trust	DMZ	px3-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 35 permit log count	
46	Trust	DMZ	px4-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 36 permit log count	
47	Trust	DMZ	rp1-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 37 permit log count	
48	Trust	DMZ	rp2-\$SITE	ls1-dmz	RSH/RCP/RLO GIN	permit	nat src dip-id 38 permit log count	
50	Trust	DMZ	Any	Any	ANY	deny	deny log count	
56								
57								
58								
59								
63	DMZ	Trust	ls1-servers-dmz	dx1-dmz	RSHD	permit	nat dst DX1IP permit log count	✓
64	DMZ	Trust	ls1-servers-dmz	dx2-dmz	RSHD	permit	nat dst DX2IP permit log count	✓
65	DMZ	Trust	ls1-servers-dmz	px1-dmz	RSHD	permit	nat dst PX1IP permit log count	✓
66	DMZ	Trust	ls1-servers-dmz	px2-dmz	RSHD	permit	nat dst PX2IP permit log count	✓

#### L.4.7 LDAD FAX Troubleshooting

If there seems to be a problem with the fax queue filling up with unsent faxes, run the faxstat command on the active LS. It's a good sign if the fax queue status is "Running and idle" or "Initializing server" something like "Sending job 13...". However, it's likely a bad sign if the fax queue status is "Waiting for modem to come ready..."

Sometimes even in normal operation the "Waiting for modem to come ready" message appears, but if the status line continues to say that for several minutes without any change, the modem should be re-seated. From the front of the LDAD modem nest, open the panel and locate modem 14; then press on the top and bottom tabs. Once the modem is ejected, firmly press the modem board back into the slot.

#### **L.4.8 LDAD Firewall Site Configuration Management**

All the sites except for Raytheon Testbed Silver Spring (ANCF) and Raytheon Testbed Silver Spring (BNCF) are equipped with AWIPS LDAD Firewall Juniper SSG 320M.

- ANCF Raytheon Testbed Silver Spring AWIPS LDAD Firewall Juniper NSM BASE LIC
- BNCF Raytheon Testbed Silver Spring AWIPS LDAD Firewall Juniper NSMXPRES HA.

#### **L.4.9 Csportd: Configuration and Setup**

In order to make the LDAD server send and receive data through the terminal server, csportd has been used to serve as a utility that gives users connectivity between LDAD server and terminal server ports. csportd reads data from stdin, a pseudo terminal, and sends the data to the terminal server port. Likewise, data can be read from the terminal server port and sent to the pseudo terminal.

You will find the csportd executable in /usr/bin, but to start up csportd properly, you need to configure it.

Follow these instructions, based on /ldad/bin/ltsConfig.<siteID> using ports 5 and 7 for ASOS and port 30 for fax:

Example of ltsConfig.wncf

```
Filename: ltsConfig.template
#
Example configuration file for site WNCF.
#
#
fqdn: ltserver-wncf.wncf.noaa.gov
ipaddress: 10.201.6.220
subnetMask: 255.255.255.0
broadcastAddress: 10.201.6.255
gateway: 10.201.6.4
dns: 10.201.6.1
rloginServer: 10.201.6.216
radiusServer: 10.201.6.216
```

Port	IfType	Misc
---	-----	----
1	7elout	10.201.6.228
2	8nlout	10.201.6.229
# 3	csportd	ASOS
# 4	pppInteractive	10.201.6.231
5	<b>csportd</b>	<b>uArt</b>
6	pppInteractive	10.201.6.230
7	<b>csportd</b>	<b>ASOS</b>
# 8	csportd	ASOS

```

9 csportd ASOS
#10 csportd ASOS
#11 csportd ASOS
#12 csportd ASOS
#13 csportd ASOS
#14 csportd ASOS
#15 csportd dtmf
#16 csportd dtmf
#17 csportd dtmf
#18 csportd dtmf
#19 csportd dtmf
#20 csportd dtmf
#21 pppInteractive ASOS
#22 pppInteractive uArt_DTE
#23 pppInteractive DirectASOS
#24 csportd PCROSA
#25 csportd LDAD_Sw_Pnl
#26 csportd llsw-wncf
#27 csportd fax
28 console ls2-wncf
29 console ls3-wncf
30 csportd
31 console ls2-wncf
32 console ls3-wncf

```

1. Stop csportd on the LS, as user root.

```
/etc/ha.d/resource.d/csportd stop
```

2. Configure /ldad/csportd\_control file.

Example:

```

csportd -d1 -T/dev/faxmodem -s -i ltserv 30 &
sleep 1
chown uucp:uucp /dev/faxmodem
chwrdev /dev/faxmodem

csportd -d1 -T/dev/suamodem1 -s -i -D ltserv 5 &
sleep 1
chwrdev /dev/suamodem1

csportd -d1 -T/dev/suamodem2 -s -i -D ltserv 7 &
sleep 1
chwrdev /dev/suamodem2

echo "Done."
exit 0
;;

```

3. Configure /ldad/data/asosMart.config file.

Example:

```
wncf 5 7
```

**Note:** There should only be one uncommented line in this file, specifying the site ID and LTS ports associated to csportd interfaces (ASOS or uART). The csportd interface for the fax does not need to be specified here.

4. Configure /usr/local/src/csportd/devices.txt file.

Example:

```
faxmodem suamodem1 suamodem2
```

**Note:** The pseudo devices listed in this file need to match up with the ltsserv ports in the /ldad/data/csportd\_control file.

After updating the csportd config files, the LDAD processes will need to be restarted, as well:

```
su - ldad
stopLDAExternal.sh
exit
```

as user **root**,

```
/etc/ha.d/resource.d/csportd start
su - ldad
startLDAExternal.csh
```

## **Appendix M**

### **Acceptable Formats for Importing Climate Data**

## **Appendix M. Acceptable Formats for Importing Climate Data**

### **Table of Contents**

	<i>Page</i>
M.0 Data Formats Accepted.....	1
M.1 General Format .....	1
M.2 Contents of File.....	2
M.2.1 Daily Data .....	2
M.2.2 Station Data.....	3
M.2.3 Monthly Data.....	4

### **List of Exhibits**

Exhibit M.1-1. Example 1—Acceptable General Format for Climate Data .....	1
Exhibit M.1-2. Example 2—Acceptable General Format for Climate Data .....	1
Exhibit M.2.1-1. Example of Bad Format for Daily Climate Data.....	2
Exhibit M.2.1-2. Climate Error Message for Invalid Data .....	2
Exhibit M.2.2-1. Example 1—Acceptable Format for Multiple Station Names .....	3
Exhibit M.2.2-2. Example 2—Acceptable Format for Multiple Station Names .....	3
Exhibit M.2.2-3. Example of Acceptable Format for Single Station Name .....	4
Exhibit M.2.3-1. Examples of Acceptable Format for Single and Multiple Months of Data.....	5
Exhibit M.2.3-2. Example of Acceptable Format for Multiple Months of Data in MM/DD Format .....	5
Exhibit M.2.3-3. Acceptable Format for Single Month Data .....	5
Exhibit M.2.3-4. Acceptable Month First Format .....	5
Exhibit M.2.3-5. Various Acceptable Month First Combinations.....	6
Exhibit M.2.3-6. Various Acceptable Day First Combinations.....	6

## **M.0 Data Formats Accepted**

When importing existing climatology data files into the Daily Normals, Means, and Extremes database, it is important to know the format of the import file(s). **Climate** will only recognize the limited variety of file formats that are specified below. If the format for the import file is not listed, the **Import Climate** routine will not execute properly.

## **M.1 General Format**

### **Headers**

The data file can contain any number of text headers or text lines within the body of the data. Headers between sections of the data are acceptable as well.

### **Columns and Rows**

The data portion must be arranged in columnar format with one record per row. A record refers to a row of meteorological variables along with a corresponding date. The date can appear anywhere within the row, and rows can continue as long as needed. Exhibits M.1-1 and M.1-2 display acceptable formats.

Date	nh	nl	rh	rl
01	63	45	78	12
02	63	45	83	14
03	62	44	80	10
04	62	44	79	21

**Exhibit M.1-1. Example 1—Acceptable General Format for Climate Data**

or

rh	rhd	rl	rld	pcp	date
78	1979	12	1933	0.14	01
83	1883	14	1965	0.14	02
80	1982	10	1967	0.14	03
79	1945	21	1993	0.14	04

**Exhibit M.1-2. Example 2—Acceptable General Format for Climate Data**

### **Delimiters**

Delimiters within the data rows can be any symbol except dashes (-), periods (.), or tabs. The program assumes three default delimiters: spaces, asterisks (\*), and slashes (/). Any other delimiters must be entered by the user.

## M.2 Contents of File

### M.2.1 Daily Data

The data file should contain only daily data or only monthly data. In a case where a file contains both, the program is still capable of importing the type of data (daily or monthly) that the user has specified. When it reaches a line that does not match the format, an error is generated. Exhibit M.2.1-1 is an example of a day and month data within the same file.

day	rec max	rec min	avg pre	rec pre
30	79	42	0.24	1.36
31	81	38	0.25	1.15
<b>Monthly totals</b>				
<b>Avg Max</b>		<b>Avg Min</b>		<b>Avg Precip</b>
70.6		49.8		3.29

Exhibit M.2.1-1. Example of Bad Format for Daily Climate Data

Exhibit M.2.1-2 shows the error message window resulting from the file above that contains both daily and monthly data. If the user chooses “daily” for data type, the file properly reads data for Days 30 and 31 and the data are stored in the database. The error message is a result of having both the day and month data in the file.

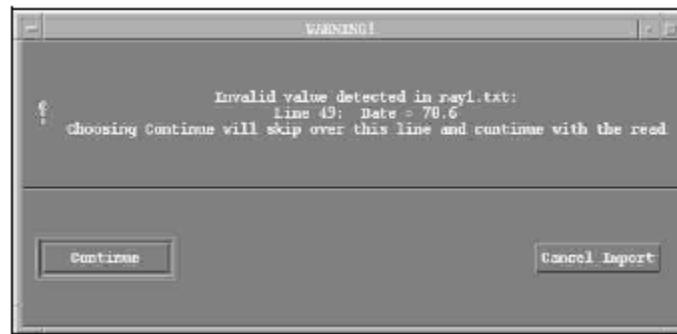


Exhibit M.2.1-2. Climate Error Message for Invalid Data

The program recognizes that the particular data in the file is not as specified and warns the forecaster of the discovery. Choosing **Continue** at this point simply allows the reading of this file to continue (if lines remain to be read). **Cancel Import** breaks the read of this file and continues to the next file in the import list, if other files exist.

### **M.2.2 Station Data**

The data file may contain data for any number of stations contained in the station list. All stations in the data file must be in the station database.

#### **Multiple Stations**

If there is more than one station in the file, the station names or their four-letter ICAO IDs must either appear in the text headers separating each station's data or within the data rows themselves. Exhibits M.2.2-1 and M.2.2-2 display acceptable formats regarding the station names.

<b>PITTSBURGH</b>		<b>Data</b>		
<b>JANUARY</b>				
<b>date</b>		<b>nh</b>	<b>nl</b>	<b>rh</b>
30		35	26	63
31		35	26	71
<b>Charleston</b>				
30		36	27	72
31		36	37	75

**Exhibit M.2.2-1. Example 1—Acceptable Format for Multiple Station Names**

or

<b>January</b>				
<b>station</b>		<b>nh</b>	<b>hl</b>	<b>rh</b>
Pittsburgh		35	26	63
Pittsburgh		35	26	71
Charleston		36	27	72
Charleston		36	27	75

**Exhibit M.2.2-2. Example 2—Acceptable Format for Multiple Station Names**

If the data file is comparable to Exhibit M.2.2-1, the user should choose Pittsburgh and Charleston in the station list, and the **Station Name(s) in Header(s)** box is automatically selected.

If the data file is comparable to the Exhibit M.2.2-2, the user should select the **Station Name(s) in Data box**.

#### **Single Station**

If a file contains data for one station only, the station name does not necessarily have to appear anywhere within the file.

In Exhibit M.2.2-3, the data will be saved for the station for 29 January and 30 January.

JAN				
date	nh	nl	rh	rl
29	35	26	59	0
30	35	26	63	-3

**Exhibit M.2.2-3. Example of Acceptable Format for Single Station Name**

### General

If **Station Name(s) in Header(s)** is selected, either the complete station name (in all capital letters) or the four-letter ICAO station ID **must** appear in the header(s). Difficulties reading the station name might occur when the station name is abbreviated in the station list, the station ID contains more than one word, or more than one station exists for a city. If these difficulties arise, the forecaster should edit the data file by adding the station name (in all capital letters) or the four-letter ICAO ID to the header. Examples are:

Pittsburgh	or	KPIT
Charleston	or	KCRW

If **Station Name(s) in Data** is selected, either the complete station name (in all capital letters) or the four-letter ICAO station ID **must** appear in the data. In addition, when arranging the columnar order of the data in the **Import Daily or Monthly Climatological Data** GUI, station name must be chosen or the data will not be saved into the database.

### **M.2.3 Monthly Data**

The data file can contain data for any number of months.

#### **Multiple Months**

If there is more than one month in the file, the months must appear either in the text headers separating the monthly data blocks or within the data rows themselves.

If the data file is comparable in format to Exhibit M.2.3-1, the user should choose January and February from the month list, and the **Month located in header(s)** button is automatically chosen.

<b>JAN</b>				
<b>Date</b>	<b>nh</b>	<b>nl</b>	<b>rh</b>	<b>rl</b>
30	39	28	61	-4
31	39	28	58	-10
<b>FEB</b>				
27	43	30	72	0
28	43	31	68	-1

**Exhibit M.2.3-1. Examples of Acceptable Format for Single and Multiple Months of Data**

If the data file is comparable in format to Exhibit M.2.3-2, the user should select the **Month located in Date Field** button and choose the **Month/Day format** in the file. See below for a further description on these options.

<b>Date</b>	<b>nh</b>	<b>nl</b>	<b>rh</b>	<b>rl</b>
01/30	39	28	61	-4
01/31	39	28	58	-10
02/27	43	30	72	0
02/28	43	31	68	-1

**Exhibit M.2.3-2. Example of Acceptable Format for Multiple Months of Data in MM/DD Format**

If a file contains a single month of data, the user should choose the month from the list. If the month appears within the data, the user must select the **Month Located in Data Field** box and choose the appropriate **Month/Day format**.

The forecaster chooses a single month from month list if the following file format in Exhibit M.2.3-3 is comparable to the import file.

<b>Date</b>	<b>nh</b>	<b>nl</b>	<b>rh</b>	<b>rl</b>
01	35	26	59	0
02	35	26	63	-3
03	35	26	71	-7

**Exhibit M.2.3-3. Acceptable Format for Single Month Data**

The forecaster chooses **Month Located in Date Field** and **Month First** format if the following file format in Exhibit M.2.3-4 is comparable to the import file.

<b>Date</b>	<b>nh</b>	<b>nl</b>	<b>rh</b>	<b>rl</b>
Jan/01	35	26	59	0
Jan/02	35	26	63	-3
Jan/03	35	26	71	-7

**Exhibit M.2.3-4. Acceptable Month First Format**

If **Month Name(s) in Header(s)** is selected, at least the first three characters of the month (in CAPS) must appear in the text. The following month names are acceptable:

JAN  
JANUARY

FEB  
FEBRUARY

MAY

If **Month Located in Date Field** is selected, there are several acceptable date formats. Single-digit months or days are not dependent on a preceding zero. The month and day may be in two separate, successive fields (separated by one of the defined delimiters). When arranging the order of the data for a file with the date in two separate fields, choose date once in the column order list.

- **Month First** option. The month appears before day in date file. Exhibit M.2.3-5 displays the acceptable combinations for month first options.

Mar-23	03/23	MAR 23
MAR-23	3/23	mar 23
mar-23	03 23	MAR/23
03-23	3 23	mar/23
3-23	Mar 23	Mar/23

**Exhibit M.2.3-5. Various Acceptable Month First Combinations**

- **Day First** option. The day appears before month in data file. Exhibit M.2.3-6 displays the acceptable combinations for day first options.

23-Mar	23/03	23 MAR
23-MAR	23/3	23 mar
23-mar	23 03	23/MAR
23-03	23 3	23/Mar
23-3	23 Mar	23/mar

**Exhibit M.2.3-6. Various Acceptable Day First Combinations**

- **Julian Days**. Starting at the beginning of the year, days are numbered numerically (1–365). In this case 29 February either is not counted at all or is equal to 366.
- **Julian Days (Feb29=60)**. Starting at the beginning of the year, days are numbered numerically (1–366). In this case 29 February is assigned day 60.

**NOTE:** In either Julian Days option, 29 February is not stored to the database.

## **Appendix N**

### **AWIPS National Datasets**

***AWIPS National Datasets***

This appendix contains the 17 February 2012 listing of the AWIPS National Datasets (NDM files), maintained by the Support Branch of SEC/OST (W/OST33). This listing is updated daily; refer to <http://www.nws.noaa.gov/ndm/> for the most current listing and any updated instructions associated with updating the AWIPS national data sets. The data sets are available to AWIPS via sftp to NOAA1 pub/ndm. The URL for the ListServer is <http://infolist.nws.noaa.gov/read/login> (login with your email address and listserver password).

Dataset	How to Update	Node	Location to Install	File Description/Metadata
afos2awips.080624 EXAMPLE ONLY Go to NOAA1 for current version.  <b>Note:</b> Review before using a2a on NOAA1 /awips/fxa/data. It may not be correct for your products.	Instructions updated 11/04/05	All devices	/awips/fxa/data	This maps AFOS ID to WMO data designator and AWIPS CCCC. Updated by OSO to match NWSTG switching directory. Most accesses are not via a binary search, so this can be time consuming. It is unknown what the <b>afos2awips.realIds</b> , and <b>afos2awips.testIds</b> files are used for. <b>wanMsgHnd</b> reads the whole table at initialization; <b>handleOUP.pl</b> validates AWIPS ID using this file every time it is invoked.
afos_lookup_table.dat 05/05/08	Instructions updated 11/09/05	DX1 (DX2 for failover)	/awips/fxa/data	This file maps AWIPS CCCC to AFOS CCC for use by the <b>StdDBDecoder</b> process to build AFOS PILS for text product storage. (Used to decode standard text product). While there are cases where an AWIPS CCCC is associated with multiple AFOS CCCs, the nature of this table means that each CCCC may map to only one CCC. (An AFOS CCC may be associated with many AWIPS CCCCs.)
afosMasterPIL.txt 01/20/12	Instructions updated 11/09/05	All lx's.	/awips/fxa/nationaldata	This file is processed by localization ( <b>-text</b> option) to create <b>/awips/fxa/data/localizationDataSets/LLL/afosMasterPIL.CCC</b> , which is used to build the text workstation browser contents.
awips2afos.txt 12/06/10	Instructions updated 11/07/05	DX1 (DX2 for failover)		This file is used by the program that handles the RSS ingest into AWIPS. It first uses <b>awips2afos.txt</b> to get the nine letter ID from the KxxxNNNXXXX on the incoming product. Later it calls <b>distributeProduct.pl</b> to send out the product to the world - <b>distributeProduct</b> looks up the nine letter ID in <b>afos2awips.txt</b> to get the WMO header.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
awipsPriorities.txt 06/20/05				PENDING awipsPriorities.txt description.
bit_table.dat with AWC additions with AWC additions 10/22/09	Instructions updated 11/09/05	DX1	/awips/fxa/data	The entries in this table indicate the NNNs of those IDs that are stored “with the national bit set” (an AFOS term meaning that the user can call up the product without using the CCC because it is always stored under the local CCC). The <b>StdDBDecoder</b> substitutes the local CCC for AAA.
BUOY.goodness 02/07/00 (no longer needed per FSL)		LX's	/awips/fxa/data/localization/nationalData	This file lists all fixed buoy station locations and their plotting desirability relative to surrounding stations; used for progressive disclosure. Localization (-station) creates <b>/awips/fxa/data/localizationDataSets/LLL/BUOY.spi</b> , which is used to construct the fixed buoy stations map. <b>Note:</b> Any <b>maritimeStationInfo.txt</b> not found in <b>BUOY.goodness</b> will be added to <b>BUOY.spi</b> with an appropriate declutter factor.
collective_table.dat 08/09/10	Instructions updated 10/20/08	DX1 (PX1 for failover)	/awips/fxa/data	Maps WMO data designators of collective products with AFOS ID. An entry in this table directs the product to the <b>CollDBDecoder</b> vice the <b>StdDBDecoder</b> . Both decoders read the file. Many entries are of the form AAAXXX; the AAA will be replaced by the local CCC. Other entries use CCCXXX where XXX is determined from the product contents and CCC is obtained from the product contents and the CCC is obtained from the national category table.
GoesImagerInfo.txt. 01/09/07 See NOAA1pub/ndm/  How to update when satellite changes		DX3	/data/fxa/nationalData	Used by satellite decoder GOESImagerInfo.txt requires updating when a new satellite becomes operational.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
gribModelsECMF_ed1.txt 10/14/03  <b>Note:</b> No longer NDM - was returned to baseline Nov 2003		PX1 (PX2 for failover)	/awips/fxa/data	
ispan_table.template 06/01/11	Instructions updated 12/16/06	DX1	/awips/fxa/data/localization/nationalData	Maps WMO header (data descriptor + origin) for noncollective products with AFOS ID. This file is processed by localization ( <b>-text</b> option) to produce <b>/awips/fxa/data/localizationDataSets/LLL/is pan_table.dat</b> . The latter is used by the <b>StdDBDecoder</b> as a “last resort” to create the AFOS PIL, particularly in cases where the product origin does not map directly to a CCC (e.g., KWBC). The file is a list of those IDs that cannot be created from the data and their corresponding WMO IDs, and is generally based on the NWSTG switching directory.
locationIDs (09/24/10) See NOAA1 pub/ndm				This file contains reference points for aviation advisories and change is required, effective April 15, 2008 (see TIN 07-83)
maritimeStationInfo.txt 02/08/12 See NOAA1 pub/ndm	Instructions updated 11/09/05	DX1 (DX2 for failover) and LX's	/awips/fxa/data	This file contains station information for fixed buoy and for CMAN sites. It is read by the <b>MaritimeDecoder</b> , which logs if it doesn't find a station. This is also used by localization ( <b>-station</b> option) to complete <b>BUOY.spi</b> (station plot info), for those stations that do not in <b>BUOY.goodness</b> , allowing them to be plotted.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
metarStationInfo.txt 02/17/12 See NOAA1 pub/ndm	Instructions updated 02/04/09	DX3	/awips/fxa/data	This file contains station information for METAR and SAO sites. It is read by the METAR decoder, which reports in its log if it does not find a station (but stores the decoded report anyway). This data set is also used by localization (-station option) to complete <b>MTR.spi</b> (station plot info), for those stations that do not appear in <b>MTR.goodness</b> , allowing data to be plotted.
MTR.goodness 02/17/12 See NOAA1 pub/ndm	Instructions updated 02/04/09	LX's	/awips/fxa/data	Used to control plotting. This file lists METAR and SAO station locations and their plotting desirability relative to surrounding stations; used for progressive disclosure. Localization (-station) creates <b>/awips/fxa/data/localizationDataSets/LLL/MTR.spi</b> , which is used to construct the METAR stations map.
modelBufrStationInfo.txt 04/15/10 See NOAA1 pub/ndm	Instructions updated 04/11/08	DX1 (DX2 for failover) and Workstations	/awips/fxa/data	Description pending.
national_category_table.template 02/17/12 See NOAA1 pub/ndm	Instructions updated 03/10/11	DX2 (DX1 for failover)	/awips/fxa/data/localization/nationalData	Localization (-text) produces <b>/awips/fxa/data/localizationDataSets/LLL/national_category_table.dat</b> , which is used by the <b>CollDBDecoder</b> to map XXX or XXXX station ID to AFOS PIL CCC. There is no longer a limit to the number of entries (had been 3500). This is also used for METAR plot sampling.
pirepsTable.txt 09/21/11	Instructions updated 02/24/10	DX3 (DX4 for failover)		
profiler.goodness 09/03/02 See NOAA1 pub/ndm		All devices		Description pending.
profilerStationInfo.txt 09/03/02 See NOAA1 pub/ndm		All devices		Description pending.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
Radar – NDM Files asrRadars.txt 6/10/08 arsrRadars.txt 6/10/08 prodList.txt 01/10/11	SST updates all sites when needed	dx1 (dx2 for failover)	/awips/fxa/data  /data/fxa/nationalData	<b>prodList.txt</b> entries force the <b>radarStorage</b> process to transmit the radar product to the NCF under the WMO heading.  rps-RPGOP-tcp.clear-air 01/10/11 see NOAA1 pub/ndm
rps-RPGOP-tcp.clear-air 01/10/11 see NOAA1 pub/ndm			data/fxa/nationalData	rps-RPGOP-tcp.clear-air specifies the WSR-88D radar products which should always be included in the RPS lists when radar is in clear air mode so that they can be centrally collected.
<a href="#">rps-RPGOP-tcp.storm</a> 01/10/11 see NOAA1 pub/ndm			data/fxa/nationalData	rps-RPGOP-tcp.storm specifies the WSR-88D radar products which should always be included in the RPS lists when radar is in storm mode so that they can be centrally collected.
<a href="#">dual pol rps-RPGOP-tcp.storm</a> 08/30/11 see NOAA1 pub/ndm/dualpol			data/fxa/nationalData	Includes Mesocyclone MD141 product.
<a href="#">rps-SPGOP-tcp.storm</a> 05/21/08 see NOAA1 pub/ndm /data/fxa/nationalData			data/fxa/nationalData	rps-SPGOP-tcp.storm specifies the TDWR radar products which should always be included in the RPS lists so that they can be centrally collected. This file was introduced in OB9.
radarInfoMaster.txt is no longer an NDM file				radarInfoMaster.txt is created by localization from fs1-w88d (.shp,.shx,.dbf) during localization
wmoSiteInfo.txt 09/20/11 See NOAA1 pub/ndm	9/23/08	dx2	/awips/fxa/data	

Dataset	How to Update	Node	Location to Install	File Description/Metadata
Radars – TDWR and FAA Radars-NDM Files				
tdwrFsiScanOrder.txt 8/25/08			/data/fxa/nationalData	tdwrFsiScanOrder.txt contains the modified order of the elevation cuts for every TDWR radar for both Hazard and Monitor modes. This file is used by FSI and was introduced in OB9
tdwrProdList.txt 06/10/10			/awips/fxa/data	tdwrProdList.txt specifies which TDWR radar product should be sent to the WAN for central collection and what WMO header should be used for that product. This file was introduced in OB9.
tdwrElevations.txt 08/07/08			/data/fxa/nationalData	tdwrElevations.txt contains the elevation cuts for every TDWR radar for both Hazard and Monitor modes.
How to update tdwrRadars.txt 07/30/07				tdwrRadars.txt contains the TDWR radar IDs currently being used in AWIPS.
<a href="#">wmoSiteInfo.txt</a> 09/20/11 see NOAA1 pub/ndm dx2 (dx1 for failover)	9/23/08		awips/fxa/data	wmoSiteInfo.txt associates the radar RPG/SPGs to each WFO site and the flag of each RPG/SPG indicates which WFO site sends the radar data to the WAN for central collection.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
RAOB Datasets  raob.goodness 09/12/11  raobDataKeys.txt 12/23/11  raobDepictKeys.txt 12/23/11  raobMenus.txt 12/23/11  raobProductButtons.txt 12/23/11 See NOAA1 pub/ndm  raobStationInfo.txt 12/23/11 See NOAA1 pub/ndm	Instructions updated 12/20/06		/data/fxa/nationalData  /awips/fxa/data	In raob.goodness, the very last (sixth) column is the progressive disclosure hint, as described in staticProgDisc.html or va_driver.doc.html. In this file, it is also used to say whether a given station participates in making pop-up skewTs and geographic station selection for the VB. Stations with a progressive disclosure hint greater than zero will participate in pop-up skewTs and geographic station selection for the VB.
redbookPurgeInfo.txt 09/15/11		DX3	/data/fxa/nationalData	Refer to Redbook description link
redbookDataKeys.txt 09/15/11		All devices	/data/fxa/nationalData	Refer to Redbook description link
redbookDepictKeys.txt 09/15/11		All devices	/data/fxa/nationalData	Refer to Redbook description link
redbookLegends.txt 11/30/05		All devices	/data/fxa/nationalData	Refer to Redbook description link
redbookProductButtons.txt 09/15/11		All devices	/data/fxa/nationalData	Refer to Redbook description link
redbookCPCMenus.txt 09//15/11; redbookHPCMENUS.txt 09/12/08; redbookNCOMenus.txt 03/16/09 redbookHazardMenus.txt 03/27/07 redbookMarineMenus.txt 06/21/05 redbookUpperAirMenus.txt 03/13/09		All devices	/data/fxa/nationalData	Refer to Redbook description link
satSpecificInfo.txt 04/14/10 See NOAA1 pub/ndm  How to Update	Instructions pending	DX3	/data/fxa/nationalData	This file is used by satellite decoder and the fog monitor, satSpecificInfo.txt requires updating when a new satellite becomes operational.
selsAnchors.txt 10/25/05 See NOAA1 pub/ndm		LX's	/awips/fxa/data	This file is used to plot SPC watch boxes. The anchor points used in the “public” line (not the aviation line) on SAW products are listed here.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
station_locations table for climate  Bob Morris, MDL				Contains the list of METAR, TAF, and SCD stations “known” to the Climate Reports Formatter and AWIPS VER program. Only stations contained in this master list can be set up in these applications. Stations not in this list will be rejected by the application setup user interfaces. The master list is contained in a data table in the <b>hmdb</b> database, is nationally configured, and is not to be modified by users.
station_table.dat 12/06/10		dx3	/awips/fxa/data	Used to create the AFOS ID for upper air (UA) products. Maps a five-digit UA station number to XXXX, which in turn is passed through <b>national_category_table.dat</b> to build an AFOS PIL (in <b>CollDBDecoder</b> ).
synopticStationTable.txt 08/17/10		dx3	/awips/fxa/data	
tdwrElevations.txt 11/15/05  OB81.1 tdwrElevations.txt	Instructions updated 07/30/07		/data/fxa/nationalData	
textCategoryClass.txt 02/17/12	Instructions updated 11/09/05	LX's	/awips/fxa/data	This file is used to map NNN to one or more classes for menu assignment in the text browser. The list of classes is found in the <b>textBrowser.tcl</b> , procedure classCode. The designated NNN will appear in the browser menus for each listed class.
textCCHelp.txt 02/17/12	Instructions updated 11/09/05	LX's	/awips/fxa/data	This file contains help strings associated with CCC or XXX entries in the text browser.
textNNNHelp.txt 02/17/12	Instructions updated 11/09/05	LX's	/awips/fxa/data	This file contains help strings associated with NNN entries in the text browser.
textOriginTable.txt 10/20/11	Instructions updated 11/09/05	LX's	/awips/fxa/data	This file contains information on which CCCs appear in which Origin list on the text browser. Local sites will need to modify the “R” section, which is set up for Colorado and is not hit by localization.
<a href="#">UGClookup_changes.txt</a> 09/21/11  nfs mounted  /awips/adapt/NWRWAVES/	<a href="#">How to Update - 6/30/09</a>			This file describes what changes have been made in the UGClookup.table file.

Dataset	How to Update	Node	Location to Install	File Description/Metadata
upair_table.dat 08/19/09			/awips/fxa/data	Maps the WMO data designator of the upper air products with the AFOS ID. Similar to <b>collective_table.dat</b> , an entry in this table directs the product to the <b>CollDBDecoder</b> instead of the <b>StdDBDecoder</b> . (Both decoders read the file.) Entries are in the format CCC(nnn)XXX, where XXX is determined from the product contents (via <b>station_table.dat</b> ) and CCC is obtained from <b>national_category_table.dat</b> .
dataInfo.manual OB81 dataInfo.manual OB82 dataInfo.manual OB83 dataInfo.manual OB9	Instructions updated 09/05/01			Description pending
depictInfo.manual OB81 depictInfo.manual OB82 depictInfo.manual OB83 depictInfo.manual OB9	Instructions updated 09/05/01			Description pending
UGClookup_changes.txt 07/18/11 nfs mounted /awips/adapt/NWRWAVES/				This file describes what changes have been made in the UGClookup.table file.
UGClookup.table 07/18/11 nfs mounted /awips/adapt/NWRWAVES/bin/ How to Update - 6/30/09				This file contains counties/zones information and is used by the NWRWAVES scripts.
productButtonInfo.txt OB81 redbookHPCMenus.txt OB82 productButtonInfo.txt OB83 productButtonInfo.txt OB9	Instructions updated 09/05/01			Description pending

Dataset	How to Update	Node	Location to Install	File Description/Metadata
Radar Datasets maintained by ROC dialRadars.txt radarsInUse.txt radarsOnMenu.txt orpgDedicated.txt orpgOTRs.txt orpgBackups.txt	WSR-88D Hotline			The WSR-88D Hotline and ROC, acting as agents for the respective Regions and NWSH, maintain and distribute AWIPS system-specific "radar files" for WSR-88D and TDWR/SPG access. Routine requests for changes to existing radar access permissions should be coordinated through Regional Focal Points. Emergency requests for changes to existing radar access permissions can be requested to the Hotline directly and will be subsequently coordinated with the respective Regional Focal Point by the Hotline.

**NOTES:**

1. The following files are maintained by FSL:
  - radarDataKeys.template
  - radarDataMenus.template
  - radarDepictKeys.template
  - radarImageStyleInfo.template
2. The rcv\_handler.tbl file will be delivered with releases when appropriate and has been removed from this list of national datasets.

**Appendix O**  
**NWRWAVES User's Manual**  
**& Documentation**

# NWRWAVES

## (NOAA Weather Radio With All-Hazards VTEC Enhanced Software)

### User's Manual & Documentation

#### TABLE OF CONTENTS

<b>1. SOFTWARE SPECIFICS.....</b>	<b>2 -</b>
<b>2. INTRODUCTION.....</b>	<b>2 -</b>
<b>3. INSTALLATION OF NWRWAVES.....</b>	<b>3 -</b>
<b>4. NWRWAVES SETUP UTILITY .....</b>	<b>3 -</b>
<b>Tab 1 – Transmitter Configuration .....</b>	<b>6 -</b>
<b>SPECIAL NOTE ABOUT ROUTINE VS. NON-ROUTINE BSA'S .....</b>	<b>8 -</b>
<b>SPECIAL NOTE ABOUT CORE COUNTY/CORE ZONE LOGIC .....</b>	<b>10 -</b>
<b>Tab 2 – Product Configuration .....</b>	<b>11 -</b>
<b>SPECIAL NOTES ABOUT VTEC &amp; SHORT-FUSE WATCHES/WARNINGS .....</b>	<b>12 -</b>
<b>SPECIAL NOTES FOR SITES WITH MARINE RESPONSIBILITIES .....</b>	<b>12 -</b>
<b>SPECIAL NOTES ON CONVECTIVE WATCH PRODUCT PREPARATION.....</b>	<b>22 -</b>
<b>SPECIAL NOTES ON NON-WEATHER EMERGENCY MESSAGES (NWEM) .....</b>	<b>22 -</b>
<b>Tab 3 – Summary Message/Miscellaneous Settings Configuration .....</b>	<b>23 -</b>
<b>Tab 4 – Marine/Tropical Product Configuration .....</b>	<b>26 -</b>
<b>Marine VTEC Processing .....</b>	<b>28 -</b>
<b>Hurricane Local Statement .....</b>	<b>28 -</b>
<b>Tropical Cyclone Product (TCP) .....</b>	<b>28 -</b>
<b>Great Lakes Forecasts .....</b>	<b>29 -</b>
<b>5. SETTING AWIPS TEXT DATABASE TRIGGERS.....</b>	<b>30 -</b>
<b>SPECIAL NOTES REGARDING TEXT DATABASE TRIGGERS.....</b>	<b>31 -</b>
<b>NWEM messages: .....</b>	<b>31 -</b>
<b>Convective watches: .....</b>	<b>32 -</b>
<b>Selectively specify transmission status based on issuing WFO in OB9: .....</b>	<b>34 -</b>
<b>6. NWRWAVES AND YOUR CRS DATABASE.....</b>	<b>35 -</b>
<b>TRANSMITTER SPECIFIC MESSAGE TYPES.....</b>	<b>35 -</b>
<b>GENERIC MESSAGE TYPES .....</b>	<b>36 -</b>
<b>SETTING UP MESSAGE TYPES IN YOUR CRS DATABASE .....</b>	<b>38 -</b>
<b>SETTING UP TRANSMITTER SPECIFIC MESSAGE TYPES.....</b>	<b>38 -</b>
<b>SETTING UP GENERIC MESSAGE TYPES .....</b>	<b>40 -</b>
<b>IMPORTANT NOTES ABOUT CRS MESSAGE TYPES AND YOUR CRS DATABASE .....</b>	<b>42 -</b>
<b>7. NWRWAVES OPERATIONS.....</b>	<b>43 -</b>
<b>NWRWAVES BROWSER.....</b>	<b>43 -</b>
<b>8. NWRWAVES PROGRAM EXECUTION (LOGGING, TROUBLESHOOTING) .....</b>	<b>47 -</b>
<b>9. WORD/PHRASE REPLACEMENT CAPABILITY .....</b>	<b>50 -</b>
<b>10. SWAPS Capability.....</b>	<b>51 -</b>
<b>11. OPTIONS TO PARSE CALL-TO-ACTION IN NWS ALERT MESSAGES .....</b>	<b>51 -</b>
<b>12. LESSONS LEARNED AND RESOURCES AVAILABLE .....</b>	<b>54 -</b>
<b>APPENDIX A – COMPLETE NWRWAVES FILE LISTING .....</b>	<b>55 -</b>
<b>APPENDIX B – EXAMPLE OF EAX siteTrigger.template FILE FOR NWRWAVES .....</b>	<b>57 -</b>
<b>APPENDIX C – NWRWAVES Cron Jobs .....</b>	<b>59 -</b>
<b>APPENDIX D – Instructions for implementing MWW Watch/Warnings/Advisories .....</b>	<b>60 -</b>

APPENDIX E – A List of Product Identifier in OB9 with the new Instruction (CTA) Markers .....	64 -
APPENDIX F – New features to support HLS products and operations .....	64 -
APPENDIX G – NWRWAVES NWEM Processing .....	82 -

## 1. SOFTWARE SPECIFICS

<b>Version</b>	AWIPS II
<b>Programming Language</b>	Tcl/Tk
<b>Design Team</b>	Evan Bookbinder – WFO Pleasant Hill, MO Brian Walawender – Central Region Headquarters Kansas City, MO Michael Hudson – Central Region Headquarters Kansas City, MO Peter Browning – Central Region Headquarters Kansas City, MO
<b>Maintenance Lead</b>	Warrick Moran – NWR Headquarter Silver Spring, MD
<b>Maintenance Support</b>	Nancy Helderman – NWR Headquarter Silver Spring, MD
<b>Maintenance Programmers</b>	NWRWAVES: Sung Vo and Peter Wu (OPS23) 301 713-0191

## 2. INTRODUCTION

NWRWAVES is a comprehensive formatter for NOAA Weather Radio (NWR) products. Its purpose is three fold. First, it is designed to replace all existing formatter capabilities found in the AWIPS WWA program and also the capabilities found in CAFÉ. Second, NWRWAVES utilizes VTEC coding found in an increasing suite of NWS products to better identify, produce and manage outbound CRS Weather Messages. The use of the Message Reference Descriptor (MRD) number will allow sites to better automate their CRS Broadcast Cycle management. Third, NWRWAVES is designed for better sustainability over the numerous scripts used in the CAFÉ approach.

As a new site preparing to use NWRWAVES, there are three basic steps necessary to configure the software for your local area after installation (**Section 2 – INSTALLATION OF NWRWAVES**).

A) The first is to configure your local settings in NWRWAVES. These include your transmitters or broadcast programs, the products that can be processed through NWRWAVES, summary message settings and marine/tropical product settings. NWRWAVES has powerful local configuration tools for product-by-product settings, adding local Listening Area Codes (LACs) and local products, and a customizable word/phrase replacement capability (similar to CAFÉ). Instructions on how to configure these settings can be found in **Section 3 – NWRWAVES SETUP UTILITY**.

B) The second step is to establish triggers from the AWIPS database, which will send products through NWRWAVES. NWRWAVES does feature a test mode, allowing the formatter program to run in conjunction with existing CAFÉ formatters in order to facilitate side-by-side comparisons of output prior to formal activation (by product) of NWRWAVES. Instructions on how to establish AWIPS text database triggers are located in **Section 4 – SETTING AWIPS TEXT DATABASE TRIGGERS**.

C) The third step (and a necessary one before you transition NWRWAVES to operational mode) is to ensure that your CRS database is structured to accept inbound Weather Messages from NWRWAVES. NWRWAVES uses an approach where each transmitter/broadcast program receives a unique Message Type naming scheme. An explanation of how NWRWAVES generates Weather Messages, along with suggestions on an approach to the structure of the local CRS database, is located in **Section 5 – NWRWAVES AND YOUR CRS DATABASE**.

### 3. INSTALLATION OF NWRWAVES

If your site has never installed and configured NWRWAVES prior to the installation of OB9, you must first grant permission for users in your office to access the NWRWAVES Setup Utility. This will allow you to configure the software in your office. In the /awips/adapt/NWRWAVES/browser directory, there is a file called “admin.list”. You will need to edit this file and add any AWIPS user accounts that you want to have access to the setup utility. All other users will be blocked.

To edit this file from any AWIPS workstation:

- Open a shell with a user account that has fxalpha group privileges. In this shell, change directories into the NWRWAVES Browser directory:

**cd /awips/adapt/NWRWAVES/browser**

- Edit the “admin.list” file:

**nedit admin.list**

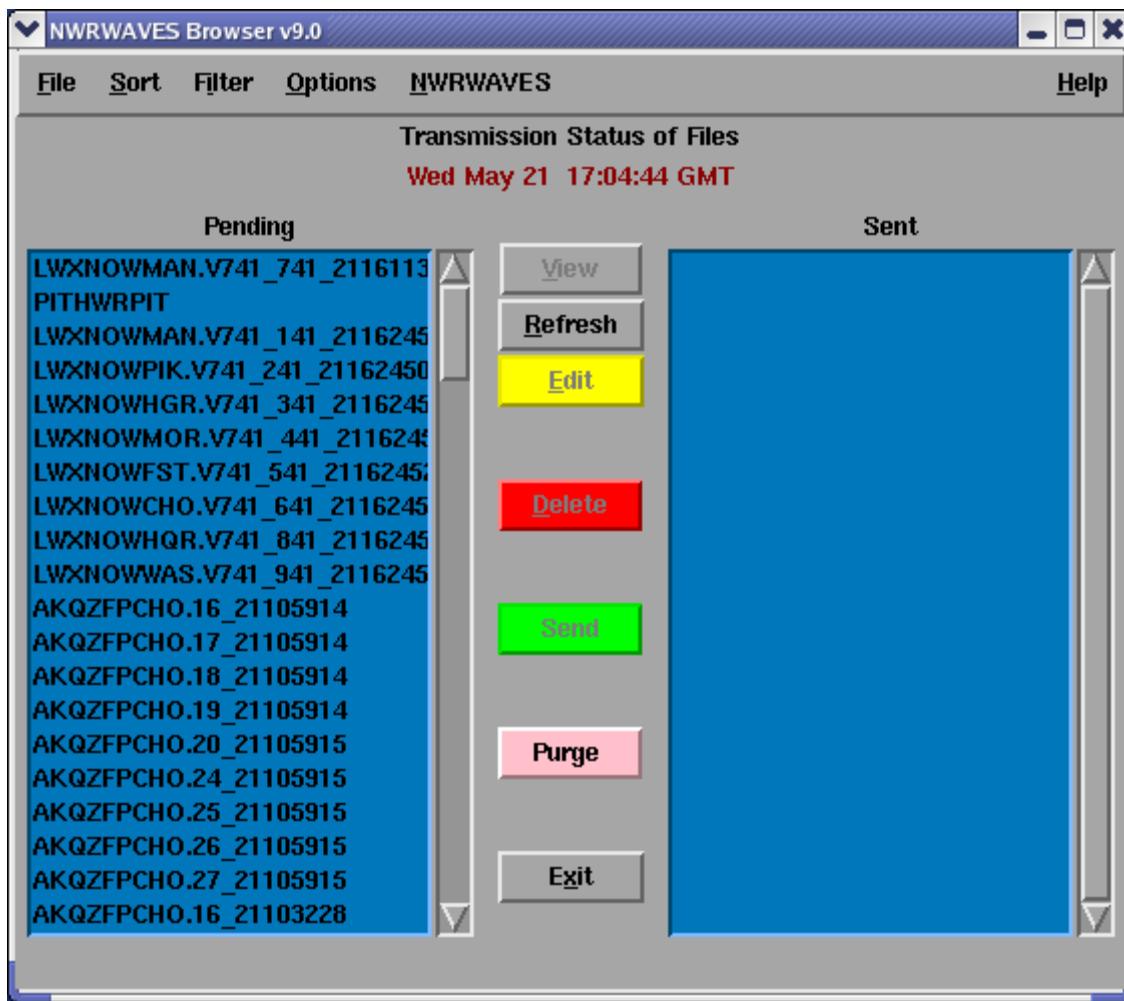
- Add your local AWIPS user accounts as needed, and delete any existing entries from the default list. Make sure there is only one user account on each line.
- When you are done, save the file and then exit from the editor. Exit from the shell.

You are now ready to run the NWRWAVES setup utility. This utility will allow you to configure NWRWAVES for your local site.

### 4. NWRWAVES SETUP UTILITY

The next two steps require that you are an AWIPS user whose AWIPS user account is listed in the “admin.list” file as described above.

- A) Open the NWRBrowser on any AWIPS workstation. You will be greeted by the NWRWAVES Browser (Figure 1).



**Figure 1 – NWRWAVES Browser**

The NWRWAVES Browser functionality mirrors that of the NWR Browser, and there are also added capabilities. Details on NWRWAVES Browser operation can be found in **Section 6 – NWRWAVES OPERATION**.

- B) From the “NWRWAVES” pull-down menu, select the option “NWRWAVES Setup”. You will see the NWRWAVES Setup GUI pop-up on your AWIPS screen (Figure 2). The initial display will start on the first of four tabs, which is the transmitter/broadcast program configuration tab

**NOTE:** If you get an error message that a version is already open somewhere else, but you are confident that there is not a version open anywhere on your AWIPS, perform the following steps:

- Open a shell on any AWIPS workstation as a user with ‘fxalpha’ group privileges.
- Type **cd /awips/adapt/NWRWAVES**
- Type **rm -f setup.lock**
- Exit from the shell



**Figure 2 – NWRWAVES Setup GUI**

There are four tabs on the NWRWAVES Setup GUI. Each one governs a unique section of NWRWAVES configuration. You can cycle to each one by simply clicking on the tab label located at the top of the interface. There is a pull-down menu, “File”, which will allow you to ‘Save and Exit’ or simply ‘EXIT WITHOUT SAVING’ the program. The “Help” pull-down menu contains information on the product version.

On each tab, there are buttons labeled with question marks. Each of these buttons contains information on what you need to do for that particular configuration item. Be sure to make liberal use of these question boxes for hints and help.

**NOTE:** When you make adjustments to NWRWAVES configuration data, the current version of your configuration files are saved off into the /awips/adapt/NWRWAVES/BACKUP directory. Details on these file names are in the different 'Tab' sections below. When they are saved off into the /BACKUP directory, the naming scheme used is the file name, followed by a date/time stamp. This will allow you to quickly restore from any mistakes made in configuring different components of NWRWAVES.

To configure NWRWAVES, you will work from left to right on these tabs to establish your office configuration. The first tab is our first tab – establishing your transmitter information.

## Tab 1 – Transmitter Configuration

To configure your transmitter (broadcast program) information, complete the following steps:

- 1) At the top of the interface there is a box for you to enter the number of transmitters (number of broadcast programs) you have in your office. Left click in this box, enter in the number of transmitters in your CWA and press the "Enter" key. NWRWAVES will create a list of transmitters (over several rows) for your use. By default, the names of these transmitters will be a default ID of NWx (where x is 1 to the number of transmitters). For transmitters over 10, the naming scheme is Nxx.
- 2) Select a transmitter by clicking on the radio button by its label "NWx" with the left mouse button. For the first transmitter, this will be the one labeled "NW1".
- 3) Click the "**Change Transmitter Name**" button to set a 3-letter ID for that transmitter. NOTE: the 3-letter ID will be used to create the PIL when generating CRS messages (a transmitter called MCI would produce products like STLNOWMCI, STLSVAMCI, etc). The first three letters of the CRS message is your legacy state AFOS identifier. **NOTE: Be sure to make note of the three letter mnemonic used for each transmitter. This will be important as the naming scheme must match how your CRS database is configured** (see **Section 5** for information on CRS Database configuration).
- 4) If you desire to assign a preamble phrase for your transmitter, enter in a preamble for that transmitter (if desired) in the appropriate box. **NOTE: Clicking on the "?" button located past the "Preamble For XXX" data entry box provides a good example of preamble text.**
- 5) Repeat steps 2 through 4 for each transmitter. Each transmitter must have a unique three letter mnemonic, and this three letter mnemonic will be used for the creation of unique Weather Messages for each transmitter. The preamble phrase is strictly optional.

The next step is to create the list of counties (parishes)/independent cities, and public zones/marine zones/fire weather zones which represent the service area for each transmitter.

- 6) Click on the radio button representing the first transmitter. Left-click in the box to the right of the label "Selected WFO/Center Site ID". Your office ID should default as the entry for this box. If it is missing for any reason, enter in your office's three letter identifier into this box, then hit the 'Enter' key.
- 7) You will see a list of county/parish/independent cities appear in the left hand column. There are two radio buttons next to the box you entered your site ID into in (6) above. The default radio button set is "**Select Counties/Independent Cities for XXX**", where "XXX" is your site ID. You will assign county (FIPS)

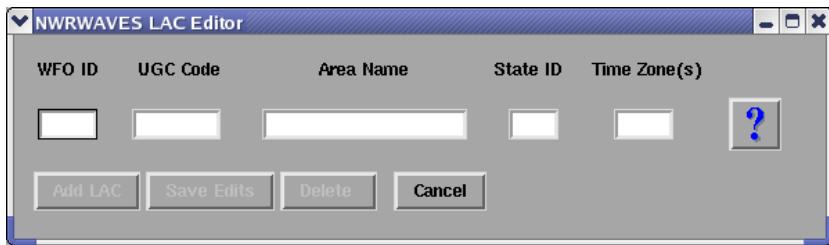
codes and zone (Z) codes separately for each transmitter. This will allow maximum flexibility for unique circumstances in managing your service area.

- 8) The list of county (parish)/independent cities and zones is kept in a default distribution file in the /awips/adapt/NWRWAVES/bin directory and is called “UGClookup.table”. This file was derived from AWIPS shape files and is as complete as possible. **Sites will not modify the UGClookup.table file!** If you note errors in the names of your counties (parishes) or zones, please post them to the NWRWAVES listserver, so they can be fixed. This file is now (from OB9.2) part of the National Datasets Maintenance (NDM) files on NOAA1 baseline file. See the following URL for details (close to the bottom): <http://www.weather.gov/ndm/>. Sites with marine zones may want to pay close attention, as some of the marine zone names are somewhat verbose in the default file.

Your transmitter configuration tab will initialize with your WFO identifier's list of counties (parishes)/zones.

There may be instances where a county/zone is missing, or where your office uses a local “dummy” county or zone code on your transmitters. You can add any missing or custom listening area Codes (LAC’s) into NWRWAVES. Likewise, you can also edit or delete any existing local LAC’s. To do this:

- a) Click on the pink button labeled, “Edit Local LAC”.
- b) A pop-up GUI will appear, and you will be prompted to enter data into it (Figure 2a).



**Figure 2a – Add a local listening area code (LAC)**

- c) From left to right, enter the associated WFO (likely yours), the six-character UGC code (i.e., MOC998, KSZ999), the name of your new LAC (i.e., Generic County), a two-letter state ID (i.e., KS) and the time zone of this new LAC. **Note that in the Help Message of this LAC Editor, the word “MARINE” is suggested to be used to specify a marine zone. This feature is now available in version OB9.**

For the time zone, the primary option is a capital letter for the appropriate time zone (**E**-Eastern, **C**-Central, **M**-Mountain, **P**-Pacific, **A**-Alaskan, **H**-Hawaiian, **g**-Guam, **a**-Virgin Islands/Atlantic Time). If an LAC doesn’t observe Daylight Savings Time, use a lower case letter from the ones listed above in lieu of the capital letter. For example, an entry of “**c**” represents that this LAC observes Central Time and does not observe Daylight Time.

If an LAC is large enough to encompass two time zones, the use of a two-letter code is appropriate. For example, “**eC**” would be used for an LAC that covers part of the Eastern Time zone that doesn’t observe DST, but also one that covers part of an area in the Central Time zone that does observe DST).

If you enter the same data as an existing local LAC, you will see the buttons for ‘Save Edits’ and ‘Delete’ become usable. If the data is new, you will only be given the option to ‘Add LAC’.

- d) Click the appropriate button for the action needed when you have finished entering in your local LAC.

Repeat step 8 as necessary to add all local FIPS and zone codes for this transmitter. Any local LAC’s will be added into the /awips/adapt/NWRWAVES/bin directory in the file “localUGClookup.table”.

- 9) To select counties (zones) for inclusion in a transmitter’s service area, left-click on any applicable county names in the left blue list box. This list will include all baseline counties (zones) as well as any local entries you have entered. You can select multiple counties all at once simply by clicking on the county names (there is no need to hold the “SHIFT” or “CTRL” buttons to multi-select counties). Once you have them selected, you can assign them to either the Routine Broadcast Service Area (BSA) or the Non-Routine Broadcast Service Area (NBSA) by clicking the appropriate → button. Likewise, you can remove counties back to the master list by highlighting them in the right blue list boxes and clicking the ← button.

#### **SPECIAL NOTE ABOUT ROUTINE VS. NON-ROUTINE BSA’S**

Each transmitter has a separate list for Routine Counties/Zones and Non-Routine Counties/Zones. In the context of NWRWAVES, this is not necessarily a one-to-one relationship with the routine service area of your CRS transmitters. Establish your lists by using any county/zone for which you routinely broadcast information (tone alerts for warnings, etc.) in your Routine BSA. Users would then include county/zone entries that reside outside a normal reception area in the Non-Routine BSA. This is useful as you can include counties in your Non-Routine BSA for which you do unique tone-alert settings by product, counties that are out of your transmitter’s coverage area but for which you carry WRSAME bursts for an area radio station, or to set a county from a distant office to carry a product such as an HLS (where you are an inland office but wish to broadcast information about a land falling tropical system from a nearby coast).

Once you have selected all the counties within your CWA, you can select county/counties from other CWA’s if your transmitter overlaps another office’s CWA. To do this, go back to step (6), and change the office ID from yours to the other office, then hit “ENTER”. **NOTE:** to access counties (parishes)/zones from another office, type that office’s 3-letter ID into the box next to the label “Select WFO/Center Site ID” to populate that office’s list. To enable a list of off-shore marine zones, type “OPC” into this box to access the off-shore zones that the Ocean Prediction Center uses for the OFF products.

- 10) Repeat steps 7, 8 and 9 for counties from that office. Repeat step (10) for all offices that affect the service area of this transmitter.
- 11) **CORE COUNTY SETTINGS (NEW):** Once you have established your set of routine/non-routine counties (parishes/independent cities), you may assign one of these to the transmitter’s core county. To do this, right click on the label of one of your counties/parishes/independent cities (in either the Routine or Non-Routine BSA lists), and you will see its appropriate LAC code listing appear in the box above labeled “Core County”. This is your core county for this transmitter.

- 12) Once you have assigned the county (parish)/independent cities for this transmitter, click on the radio button labeled “**Select Zones for XXX**”. This will allow you to assign the “Z” or zone codes for this transmitter.
- 13) Repeat steps (6) through (10) to select all zones applicable to this transmitter. The zone listings are inclusive to all forecast, marine and fire weather zones.
- 14) **CORE ZONE SETTINGS (NEW):** Once you have established your set of routine/non-routine zones, you may assign one of these as the transmitter’s core zone. To do this, **right click on the label** of one of your selected zones (Routine or Non-Routine), and you will see the appropriate LAC code listing appear in the box labeled “Core Zone”. This is your core zone for this transmitter.
- 15) Click the green “Save Transmitter Edits” button to save off the configuration data for this transmitter.
- 16) Left-click on the radio button for the next transmitter in your configuration list.
- 17) Repeat steps (6) through (15) for each transmitter.

Once you complete these steps, you will have selected county (parish)/independent cities and zones listings for all of your transmitters. Each transmitter will have a unique three-letter mnemonic, and (if applicable), you will have assigned each transmitter with an optional preamble phrase **and an optional core county (parish)/independent city and core zone.**

The transmitter configuration settings are stored in the /awips/adapt/NWRWAVES directory in the file “**transmitter\_cfg.XXX**”, where ‘XXX’ is your AWIPS site identifier. **You should not hand-edit this file!** Any changes required must be made through the NWRWAVES Setup GUI.

Once you have configured the transmitters, your “Transmitter Configuration” tab should look similar in format to Figure (3). The next step is to configure products for processing through NWRWAVES.



**Figure 3 – an example of a complete Transmitter Configuration tab**

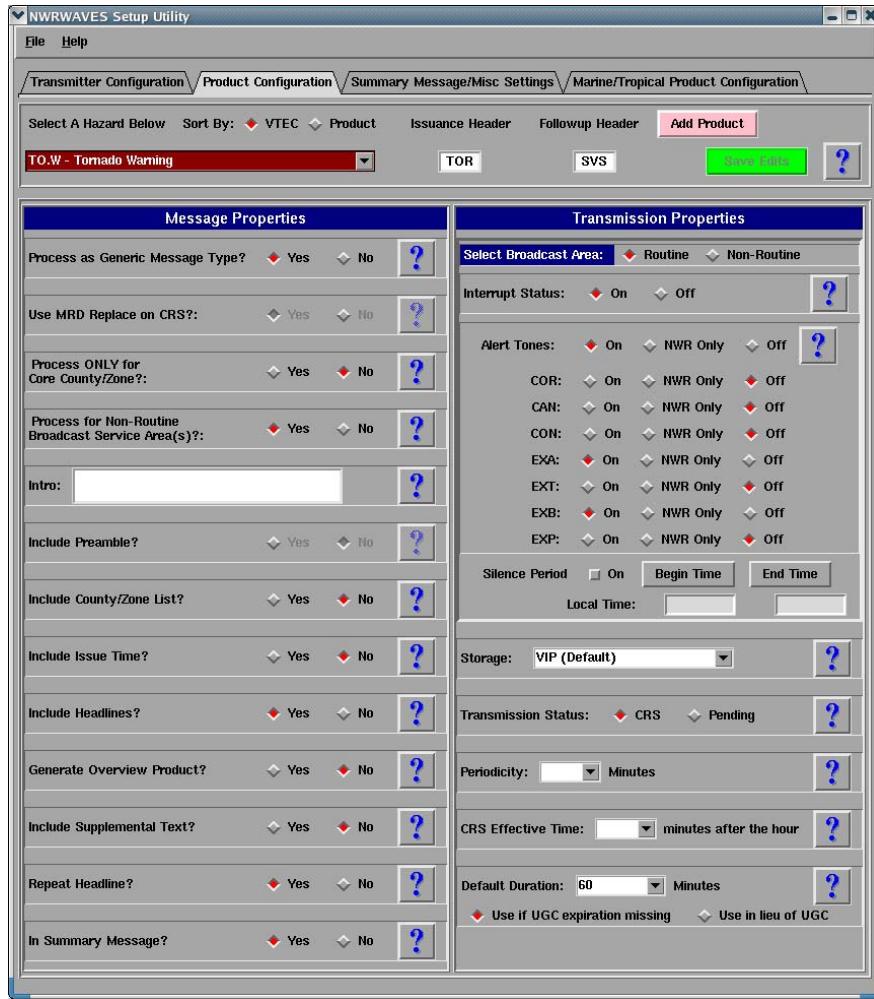
### SPECIAL NOTE ABOUT CORE COUNTY/CORE ZONE LOGIC

Sites have the ability to assign a core county and/or a core zone to each of their individual transmitters. The logic behind a “core county/core zone” is that for certain products, only the segment which contains this core LAC will be processed and sent to that transmitter. Furthermore, only the core LAC will be used in message assembly; therefore, Identical Message Type/Identical LAC replace will occur dependably. Most sites will use core county/core zone for legacy products such as the ZFP, NOW, HWO, etc. **Use of the core county/core zone is not appropriate for watch/warning products.**

The core county and core zone are global by transmitter. In other words, you only have one of each for every unique transmitter. You do not have the ability to use one ‘core zone’ for the ZFP, and a second for the NOW. If you followed instructions in v2.4 to assign counties/zones to the Routine vs. Non-Routine BSA’s to replicate a core county/zone functionality, you should reassign these lists to take advantage of process/no process and unique tone alert capabilities.

## Tab 2 – Product Configuration

After you are done configuring your transmitters, click the **Product Configuration** tab (Figure 4)



**Figure 4 – Product configuration GUI**

This tab is used to set all the configuration items for each NWRWAVES product type. Those used to WWA or CAFÉ formatters should note some similarities, but many new features will also allow for extensive customization of CRS messages.

In the top left corner you will see a red pull-down menu which contains a list of all of the baseline product types that can be formatted to CRS using this software. The list is arranged alphabetically by a leading three letter identifier. Some of these products have a period in them (i.e., SV.W) which indicates a VTEC product code. Others do not (i.e., LEW) which indicate a non-VTEC product.

VTEC products listed do not at times correspond directly to their AWIPS product identifier (i.e., HS.W is issued in AWIPS as a WSW). *When you think about products and configuring them for NWRWAVES, think of them in terms of their VTEC code and not their AWIPS product identifier.* There are legacy AWIPS product identifiers in

the product configuration list (i.e., **SV.W** is there for a Severe Thunderstorm Warning, and **SVR** is also listed as a Severe Thunderstorm Warning). NWRWAVES will use the VTEC phenomena and significance codes as its primary lookup, so the entry for SVR is redundant and only used if for any reason the VTEC line was somehow corrupt or missing from a Severe Thunderstorm Warning.

Both product types (VTEC and non-VTEC) share many common configuration settings. VTEC products have additional unique configuration settings for alert tone settings, based on the VTEC action code. VTEC products are also tracked internally by NWRWAVES, and the advanced feature of MRD Replace is used to facilitate better automation of information replacement in the CRS Broadcast Cycle. **In the NWRWAVES distribution file, all these configuration settings are set to “No” and the product dissemination is set to the “Pending” side of the NWRWAVES Browser (as they are shown in Figure 4 above).** Sites will need to adjust these settings \*by product\* to meet their local needs.

### **SPECIAL NOTES ABOUT VTEC & SHORT-FUSE WATCHES/WARNINGS**

In the VTEC sense, a tornado watch is defined as a TO.A, a severe thunderstorm watch a SV.A, a tornado warning as a TO.W, and a severe thunderstorm warning as an SV.W. When you begin to configure products in NWRWAVES, you must think of these products as their VTEC hazard, and not their AWIPS product. For example, you would configure all options for tornado warnings under the “TO.W” option in the product list in NWRWAVES. If you wish to have the follow-up SVS statement’s headlines read, you will need to turn the “Include Headlines” option to “On” under the “TO.W”. Why? The AWIPS product does come out as an SVS, but it has the “TO.W” VTEC code in it, which is what NWRWAVES will use to determine what to do with the inbound tornado warning follow-up.

There are legacy AWIPS product identifiers in the NWRWAVES product list (e.g. TOR, SVR, NPW, etc...), just in case a product is inadvertently sent without VTEC coding. You should also configure these just in case.

VTEC coded short fuse watch and warning products are as follows:

*SV.A – Severe Thunderstorm Watch*

*TO.A – Tornado Watch*

*TO.W – Tornado Warning*

*SV.W – Severe Thunderstorm Warning*

### **SPECIAL NOTES FOR SITES WITH MARINE RESPONSIBILITIES**

Marine products such as the Near Shore Forecast (NSF) and Coastal Waters Forecast (CWF) (and soon by directive to include the Offshore Forecast (OFF) and Great Lakes Forecast (GLF)) have numerous VTEC possibilities. You have the option in NWRWAVES to enable/disable VTEC use for these products (settings are established in Section 3 – Tab 4 below), as VTEC can lead to some complicated processing of segments and messages on the air.

If you decide to have NWRWAVES track VTEC, you will need to configure NWRWAVES for each of these VTEC event and significance codes (each is considered a unique product). You will be able to tone alert (by VTEC phenomenon). You will not be able to set a default under the NWRWAVES product types of NSH and CWF (as appropriate) and see the products process. These VTEC event codes are as follows:

*CF.A – Coastal Flood Watch*

*CF.S – Coastal Flood Statement*

*CF.W – Coastal Flood Warning*

*CF.Y – Coastal Flood Advisory*

*GL.W – Gale Warning*

*HF.W – Hurricane Force Wind Warning*

*LO.Y – Low Water Advisory*

*LS.A – Lakeshore Flood Watch*

*LS.W – Lakeshore Flood Warning*

*LS.S – Lakeshore Flood Statement*

*LS.Y – Lakeshore Flood Advisory*

*MA.F – Routine Marine Forecast*

*MA.S – Special Marine Statement*

*MA.W – Special Marine Warning*

*RB.Y – Small Craft Advisory for Rough Bar*

*SC.Y – Small Craft Advisory*

*SE.Y – Hazardous Seas Advisory*

*SI.Y – Small Craft Advisory for Wind*

*SR.W – Storm Warning*

*SU.W – High Surf Warning*

*SU.Y – High Surf Advisory*

*SW.Y – Small Craft Advisory for Hazardous Seas*

*TS.A – Tsunami Watch*

*TS.W – Tsunami Warning*

If you disable VTEC tracking for these marine products, NWRWAVES will treat them as non-VTEC products, and the settings under the NWRWAVES product types of “NSH” and “CWF” (also “OFF” and “GLF”) will be used universally regardless of the VTEC hazards contained in each segment. You will not be able to assign tone alerts by VTEC phenomenon. You would only need to configure these four NWRWAVES product entries (as applicable to your office):

*CWF – Coastal Waters Forecast*

*NSH – Near Shore Forecast*

*OFF – Offshore Waters Forecast*

*GLF – Great Lakes Forecast*

Starting August 2007, many Weather Forecast Offices (WFO)s have started issuing experimental Marine Weather Warning (MWW) bulletins. The MWW is intended to better inform mariners of adverse marine weather hazards and serve as a dedicated long duration marine Watch, Warning and Advisory product. The MWW bulletin will provide the marine community with more specificity and vital marine hazard information, patterned after the winter weather watch/warning/advisory (WSW) bulletin and the non-precipitation watch/warning/advisory (NPW) bulletin. A complete VTECs support listing of MWW and sample instructions for implementing Small Craft Advisory (SC.Y) is included in Appendix D.

To begin modifying product parameters:

- 1) Select a product from the drop down menu. (**NOTE:** These items can be arranged alphabetically by VTEC phenomena or by product type by clicking the appropriate radio button).
- 2) The settings for this particular product are displayed.
- 3) Each configuration item on the GUI has a question mark box to its right. Click on that question mark box to see more information on what that particular item governs. Referencing Figure 4 above, here is a breakdown of the interface:
  - a) Starting to the immediate right of the product drop-down list, there are two boxes labeled “Issuance Header” and “Followup Header”. Assign the CRS product identifier (middle three letters) into these boxes. **These entries can differ from the VTEC phenomena/significance codes or the AWIPS product identifier!** For example, a Severe Thunderstorm Warning has a VTEC phenomena/significance code “SV.W”, an EAS product issuance code of “SVR” and a follow-up code of “SVS”. You want to ensure that the “Issuance Header” and “Followup Header” are consistent with EAS codes (and resultant CRS Weather Messages). You will see this with much of your winter weather, non-precipitation and severe weather product suite.

**NOTE:** Where appropriate, the default NWRWAVES distribution file will contain EAS codes for various watch and warning as mandated by directive. Sites should not change the issuance or follow-up headers for warning or watch products without first checking the applicable directives.

Down the left-hand side of the product configuration interface, you will see yes/no selectable options for the following items labeled “Message Properties”:

- b) **Process as Generic Message Type:** This option, if selected “Yes”, instructs NWRWAVES to assemble a single generic message for each VTEC line/product segment versus the default transmitter specific messages. CRS would then sort the generic weather message on the LAC list assigned to that message. Specific details regarding generic message versus transmitter specific message assembly is discussed in **Section 5 – NWRWAVES And Your CRS Database**.
- c) **Use MRD Replace on CRS:** This option is grayed out (not selectable) and set to “Yes” by default for all VTEC coded products. The option is also grayed out (non-selectable) for all non-VTEC products with the exception of those listed for exclusion from this rule in the file `/awips/adapt/NWRWAVES/NONVTECMRD.txt`. If a three letter non-VTEC product is listed in this file, then you can choose the option of using MRD Replace for those non-VTEC products.

The content of the NONVTECMRD.txt file follows the following example:

NOW,N  
SPS,Y  
HWO,N

The NOW, SPS and HWO products can be configured by the local site to use non-VTEC product MRD Replace. Only the SPS will use the MRD Replace in the above configuration. The NOW,

SPS and HWO are the only products listed in the baseline distribution of NWRWAVES, due to somewhat unpredictable behavior that can occur in the absence of VTEC.

More information on what MRD replace is, and how it functions within NWRWAVES, can be found in **Section 6 – NWRWAVES OPERATION**.

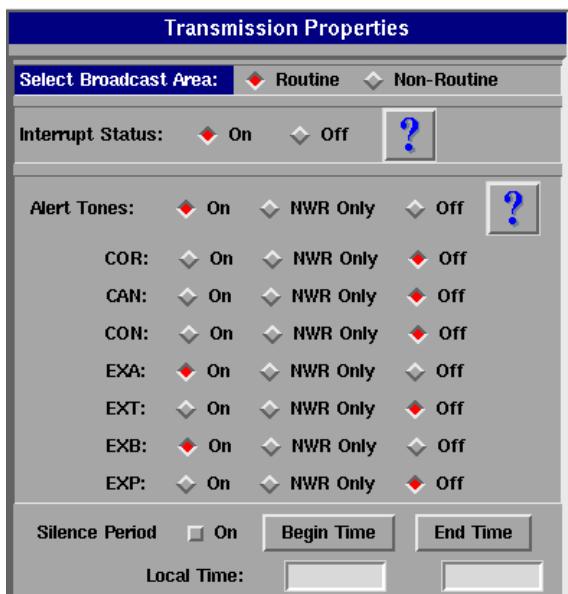
- d) **Process Only for Core County/Zone:** If “Yes” is selected, NWRWAVES will process only those product segments whose UGC listings contain the core county (parish/independent city) or core zone as established for each transmitter. This option would be effective for products such as the ZFP where an office may only want to broadcast a specific zone segment for each transmitter on NOAA Weather Radio. Core county/zone settings are global per transmitter, so the same core zone would be used on transmitter ‘ABC’ for the NOW as well as the ZFP.
- e) **Process for Non-Routine Broadcast Service Area(s):** If set to “No”, then an inbound product/segment will not be processed if the UGC line contains only non-routine BSA counties/zones for a given transmitter. If set to “Yes”, then the inbound product will be processed if it contains UGC codes found only in the non-routine BSA settings for that transmitter. Any alarm/alert settings used will be governed by the non-routine BSA alert settings (covered later).
- f) **Intro:** An optional text box where you can type in an intro phrase for this product. For example, “NOW HERE IS YOUR SHORT TERM FORECAST” could be used for the “NOW” product. The intro phrase can be used in combination with the transmitter preamble phrase (set in Section 3 above) and also with a county (parish), zone and independent city listing to create lead-ins for your CRS products. **NOTE: you must have an Intro phrase to include the county/zone list in (f) below. Otherwise, you would not get radio-ready text from NWRWAVES for these two sections.**
- g) **Include preamble:** If set to “Yes”, the preamble you defined per transmitter in Section 3 will be used as part of the lead-in for this product. You will want to use this option with the Intro or County/Zone list, as the wording will not turn out very cleanly. An example preamble might read, “In the K I D 77 listening area”.
- h) **Include County/Zone list:** If set to “Yes”, this will return a listing of counties, parishes, independent cities or zones affected on this transmitter by this product. An example phrase might be, “for the following counties, in Missouri, Bates, Jackson and Johnson. This also includes the following Virginia independent cities, Alexandria and Richmond.” **NOTE: This feature will only work if you define in Intro in (d) above.**
- i) **Include Issue Time:** If set to yes, the time the product was run through NWRWAVES will be included. An example phrase would be, “Issued at 3:15 pm CDT”.

If you have options (f) through (i) set to yes in these examples, an intro phrase for the Short Term Forecast (example given in f) might read as follows:

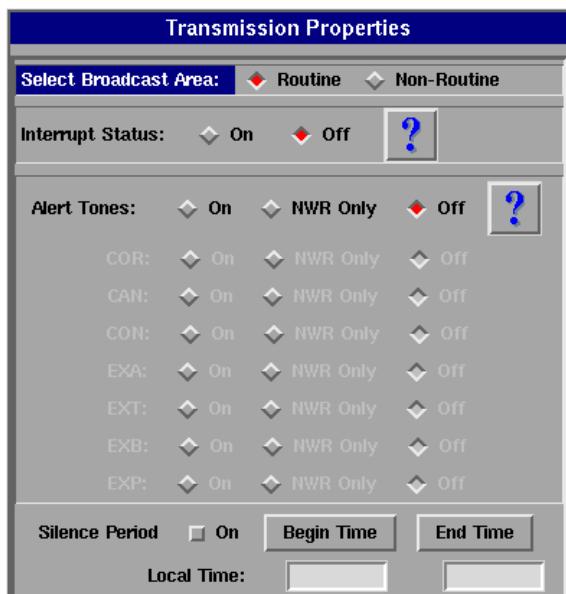
*“HERE IS YOUR SHORT TERM FORECAST, for the following counties In the K I D 77 listening area, in Missouri, Bates, Jackson and Johnson”.*

- j) **Include Headlines:** If set to “Yes”, headlines contained in the inbound product will be formatted correctly and included in the CRS product, otherwise they will be omitted. You will likely want to set this feature to “Yes” for most products that could contain headlines. **NOTE: You may wish to disable headlines for products produced from GHG, as they duplicate the headline in the attribution statement. This will give you two headlines on the air.**
- k) **Include Overview:** If set to “Yes”, NWRWAVES will generate a separate overview product, containing the overview and any overview headlines contained in the product. This outbound message will be generated under the CRS ID -- CCCOVRXXX where CCC is the issuing office, OVR is literal, and XXX is the AWIPS Product ID. For example, if product STLWSWEAX contained an overview and this option is set to YES for any of the VTEC phenomena it contains, NWRWAVES would generate a separate overview product under the CRS ID EAXOVRWSW. Since the OVR is a separate message, offices can configure this product as well by modifying the settings in this section under the “OVR - Overview” product from the pull down list.
- l) **Include Supplemental Text:** Offices can use the “&&” delimiter to separate the main body of text from a supplemental text section in products. If this is set to “Yes”, then the CRS product will include any text below the “&&” and before the “\$\$” that signifies the end of the segment (product). Otherwise, anything below the “&&” will be omitted from the CRS product.
- m) **Repeat Headline:** If set to “Yes”, then the event headline will be repeated at the end of the text captured from the product. If set to “No”, then the hazard headline will not be repeated. This is useful in the case of a Tornado Warning. The resultant text added would read like this example, “Repeating, a tornado warning has been issued for Jackson County, Missouri, effective until 4:45 PM CDT.” **NOTE: This functionality exists only for VTEC encoded products.**
- n) **In Summary Message:** If set to “Yes”, then this particular product (hazard) will be tracked as a summarized hazard, depending on your Summary Message settings that you establish in Tab 3 later. For now, if you wish this hazard to be summarized on your transmitters, set it to “Yes”, otherwise leave it set as “No”.

The right hand side of the GUI interface contains the “Transmission Properties” section of settings (Figure 4a and 4b) for both VTEC and non-VTEC products.

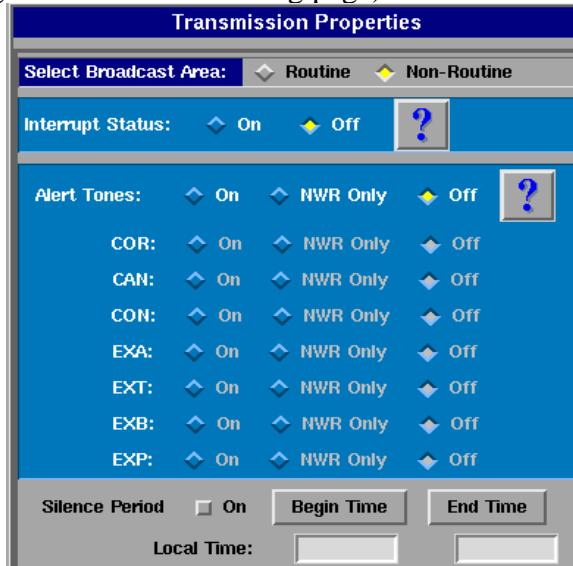


**Figure 4a – VTEC transmission properties**



**Figure 4b – non-VTEC transmission properties**

- o) For all products, you can toggle between the settings for your routine BSA and your non-routine BSA listening areas. Click the radio button between the two to switch between them. When you are configuring your non-routine BSA settings, the background of this section will switch from grey to an aqua-blue (Figure 4c on the following page).



**Figure 4c – non-routine BSA color background**

- p) For both VTEC and non-VTEC products, you can toggle ‘Interrupt’ status to “On” or “Off”. If set to “On”, all instances of this product that are sent to CRS will interrupt the routine broadcast.

For the ‘**Alert Tones**’ setting for both product types, you have three options: “On”, “NWR Only” and “Off”. If set to “On”, then the 1050Hz and WRSAME tones will be sent with this product.

**IMPORTANT NOTE: For all short fuse watches and warnings, including Tornado Watches/Warnings, Severe Thunderstorm Watches/Warnings, and Flash Flood Warnings,**

**leave the default settings of “On” for the “Alert Tones” option, and for the VTEC options of “EXA” and “EXB” as shown on the left-hand side of Figure 4a.** By default, for all short-fuse warning products listed in Directive 10-1710, alert tones come in NWRWAVES set to “On” for initial issuance, as well as for extensions in area (EXA), and extensions in both area and time (EXB).

The “Off” setting will generate no tones at all.

The “NWR Only” setting will allow you to use your CRS Message Type settings to govern whether to include just the SAME tones and/or the 1050 Hz tone (if defined under unique properties).

**IMPORTANT NOTE: Take special care when using the “NWR Only” option for alert tones. Unless you’ve specifically assigned the 1050 Hz tone \*by transmitter\* under the ‘Transmitter Specific’ blue button on the CRS Message Type GUI, the “NWR Only” option will simply check for any SAME settings in your Message Type to use. If you haven’t done anything special to assign the 1050 Hz tone by product, you can think of the “NWR Only” option as a ‘SAME-only (if configured)” option.**

For the VTEC coded product, this setting only governs the “NEW” action code within the VTEC line. You can then set alert tones settings for additional VTEC action codes shown on the GUI interface. These can be quite powerful in configuring alert tones for your warning suite. For example, a “TO.W” Tornado Warning product would have the “Alert Tones” set to “On” for initial issuance. As follow-up SVS products are issued, you could set the “CON” action code to “NWR Only” (and your SVS Message Type set to WRSAME only in your CRS database) to send only SAME tones for follow-up SVS statements that continue the Tornado Warning. Your setting for “EXP” and “CAN” could be set to “No”, so that no tones of any kind are sent for an expired or cancelled warning.

For non-VTEC products, the “Alert Tones” setting governs any issuance of the product (governed by AWIPS product identifier). An example of this is the “FFW” (non-VTEC coded product).

While the follow-up product for an FFW is an FFS, “FFS” has its own product identifier listed in the NWRWAVES product database, therefore the alert tone settings of the FFW will not be used for the FFS. When this product becomes VTEC coded, the product identifier “FF.W” in the NWRWAVES product list will then be used, and the alert settings for follow-up statements will be those you assign.

- q) **Silence period:** If this box is checked, you can override the “Alert Tones” settings for specific periods during the day. You set these by clicking on the boxes labeled “Begin Time” and “End Time”. Figure 4d shows the GUI used to set these times.

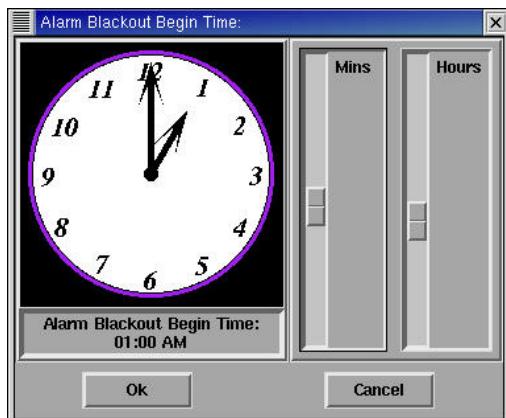


Figure 4d – Silence period time setting

If this **Silence period** box is selected and the silence period is specified, NWRWAVES will send a Red Banner (See Figure 4d.1) when the silence period is ended to alert the forecasters to use the CRS system to resend the product with Alert/Interrupt if required.

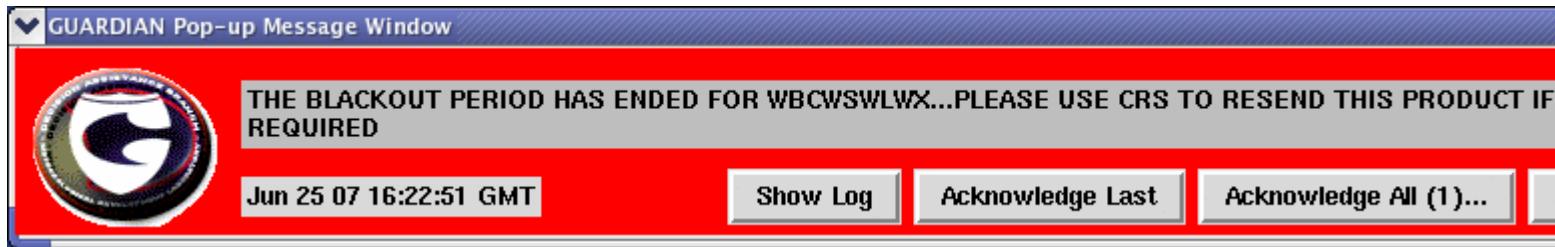
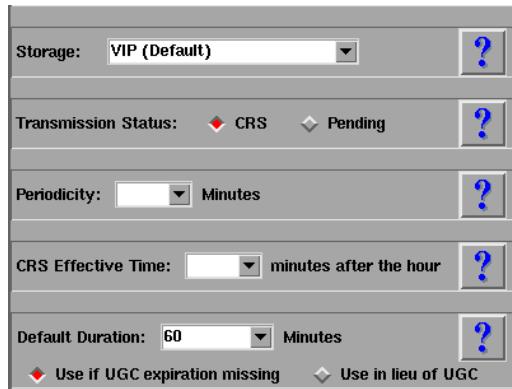


Figure 4d.1 – Red Banner when Blackout period has ended

The last section of the “Transmission Settings” GUI sets the disposition, periodicity and disposition of CRS messages (Figure 4e).



**Figure 4e – final transmission settings**

- r) **Storage:** From the pull-down menu, you can select from ‘Active’, ‘Inactive’, ‘Synthetic Speech Override’, or ‘VIP (Default)’. By default, every product in the baseline NWRWAVES distribution is set to ‘VIP (Default)’.
- s) **Transmission Status:** If set to ‘CRS’, this product will be sent directly to CRS for airplay. If set to ‘Pending’, the outbound product(s) will be placed in the Pending side of the NWRWAVES Browser. Every product in the NWRWAVES distribution is set to ‘Pending’.

**NOTE:** Sites should leave the disposition of CRS products to ‘Pending’ for every product until they are ready to begin active use of NWRWAVES. At that time, products can be converted from ‘Pending’ to ‘CRS’ one-by-one to ensure a smooth transition.

- t) **Periodicity:** You can type in a number (in minutes) or select a number from the drop-down menu, to assign to this product. If you wish to remove a periodicity setting, you can left-click in the text box next to the triangle, backspace over the number, then left-click in the gray area to reset it to a blank.
- u) **CRS Effective Time:** This setting allows you to establish the minute (00-59) at which you’d like an outbound message to begin broadcast. From an automated standpoint, this feature is best used with the periodicity setting above to establish set times for message broadcasting. For example, setting a product’s effective time to 00 and the periodicity to 15 minutes would cause that message to play with predictability “on the 15’s” (provided the message is not in a Message Group in your Broadcast Suite on CRS).
- v) **Default duration:** You can type in a number (in minutes) or select one from the drop-down menu to set a default duration for any product that is missing a UGC line. If you have a UGC coded product but do not wish to play it for an extended time, you can click the “Use in lieu of UGC” radio button to force the default duration time no matter what the UGC expiration time is in the product.

- w) When all these settings have been configured for this product, click the green “Save Edits” button at the top of the interface.
- 4) Repeat steps 1, 2, and 3a through 3w for every product in the drop down list that your office processes for CRS.
- 5) You may find that a local product issued by your office is missing from the product configuration file, or that a regional/national product is also missing. You can also add products locally to your product configuration file. In the case of the regional/national product in scope, you will want to add it but also post it as a future addition for the baseline to the NWRWAVES list server.

To add a local product to the Product Configuration list:

- a) Click on the pink “Add Product” button found towards the top right of the Product Configuration tab GUI.
- b) A pop-up GUI interface will display (Figure 4f). In the text boxes provided, fill in the basic information of the new product, similar to what is displayed below.

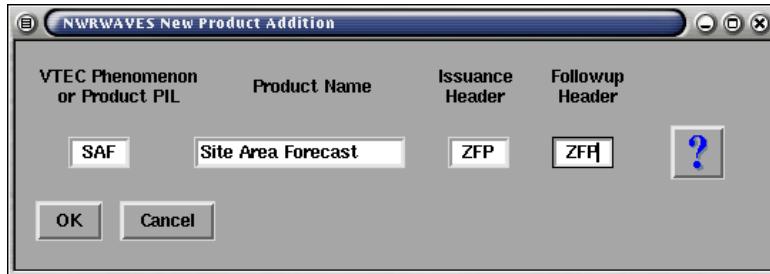


Figure 4f – Add a new product to NWRWAVES

- c) If the product is VTEC encoded, be sure to include a period between the second and third letter of the VTEC Phenomenon or Product PIL entry. Otherwise, just enter the three letter identifier of the CRS Product PIL.
- d) Click the ‘OK’ button once these entries are complete.
- e) You will be returned to the Product Configuration Tab GUI. Complete step 3 in its entirety to finish configuration of this new product. When done, click the green “Save Edits” button to save your new product. NWRWAVES will double-check to ask if you really want to save this new product to your product configuration list.

Product configuration data is stored in /awips/adapt/NWRWAVES in the file **product.cfg**. **Sites will not hand-edit this file!** It is comma delineated, and there is a significant risk of messing up critical NWRWAVES configuration data by hand-editing the file. Sites will use the NWRWAVES Setup GUI to make adjustments to product configuration. Your local product.cfg file will be restored every time you upgrade to a newer version of NWRWAVES.

## SPECIAL NOTES ON CONVECTIVE WATCH PRODUCT PREPARATION

NWRWAVES functions similarly to CAFÉ with respect to convective watch message generation. CAFÉ would process either the WOU or WCN bulletins, and through the use of VTEC, CAFÉ would then generate an output message customized for NWR internally, using VTEC phenomenon/significance codes and VTEC action codes to govern tone alert settings (CAFÉ WBC4CRS formatter).

For CONUS sites, NWRWAVES begins with the WOU(x) issued by the SPC for all convective watches. The WOU(x) includes all affected land FIPS codes and marine zones (regardless of state and CWA), VTEC, with the VTEC phenomenon and significance codes, the VTEC action code (NEW, CON, CAN, etc.), and an event tracking number. The WOU(x) product makes a perfect vehicle from which to prepare all convective watch bulletins. NWRWAVES will build a watch message from the decoded elements of the WOU (FIPS/marine zone codes, VTEC) through internal code and phrasing. No part of the actual WOU(x) bulletin is included in the outbound CRS Weather Message. WOU update and cancellation products are ignored. **NOTE:** For OCONUS sites where the SPC does not issue convective watches, NWRWAVES will use the initial WCN for tone alerting purposes. This setting is governed by your OCONUS global variable sourced from the AWIPS operating environment.

For both CONUS and OCONUS sites, NWRWAVES will then use any \*followup\* WCNxxx messages to track the status of a convective watch. NWRWAVES will internally create a message/call-to-action for all affected areas, with CRS Weather Message attributes (SVA, TOA) based on the hazard. No part of the actual WCN bulletin is included in the outbound CRS Weather Message.

Alert tones will be sent/not-sent based on the VTEC action code customized by each office under Tab 2 above. By default settings (per directive 10-1710), the only VTEC action codes that would trigger a new tone alerted SV.A/TO.A product from a WCN would be the codes "EXA" and "EXB", which add new counties to a watch through the WCN.

**NOTE:** You will need text database triggers for all WOU statements (WOU0 through WOU9), your local office WCN, and any other surrounding office's WCN's that apply to areas covered by your transmitters. Text database triggers are covered in Section 4.

## SPECIAL NOTES ON NON-WEATHER EMERGENCY MESSAGES (NWEM)

NWRWAVES will be fully compatible with the new HazCollect system slated for operational status in 2006. NWRWAVES will replace the NWEM CAFÉ formatter formally in **OB9.2**. In anticipation of this switch in 2007, all the NWEM CRS Weather Messages are included in the default product configuration, with EAS PILS (issuance header and followup header) that are consistent with 10-1710. **OB9.1 or older**, HazCollect is still calling the legacy NWEM CAFÉ formatter. **NOTE:** In the pre and post-OB9.2 environment, sites will not establish text database triggers for any NWEM messages! HazCollect calls its NWR formatter internally, so there is no need to duplicate the call in a separate trigger. No action is required prior to OB9.1 to configure NWRWAVES for NWEM messages.

After installation of OB9.2 NWRWAVES will become the default NWR formatter for NWEM products. This migration will provide logic to place "test products" into the NWRWAVES pending directory and software defect support by the OPS23 CRS Staff. Another enhanced capability of NWRWAVES is that a site can change the

EAS PILS (issuance header and followup header) if state or local broadcaster policy is to not use the new EAS PILS. For example, the Missouri Broadcasters Association has asked the NWS to use the EAS PIL “CEM” for all these new hazards until further notice, as many member stations have not upgraded their EAS equipment. All these NWEM hazards can be set to convert their AWIPS product identifier to a “CEM” CRS Weather Message.

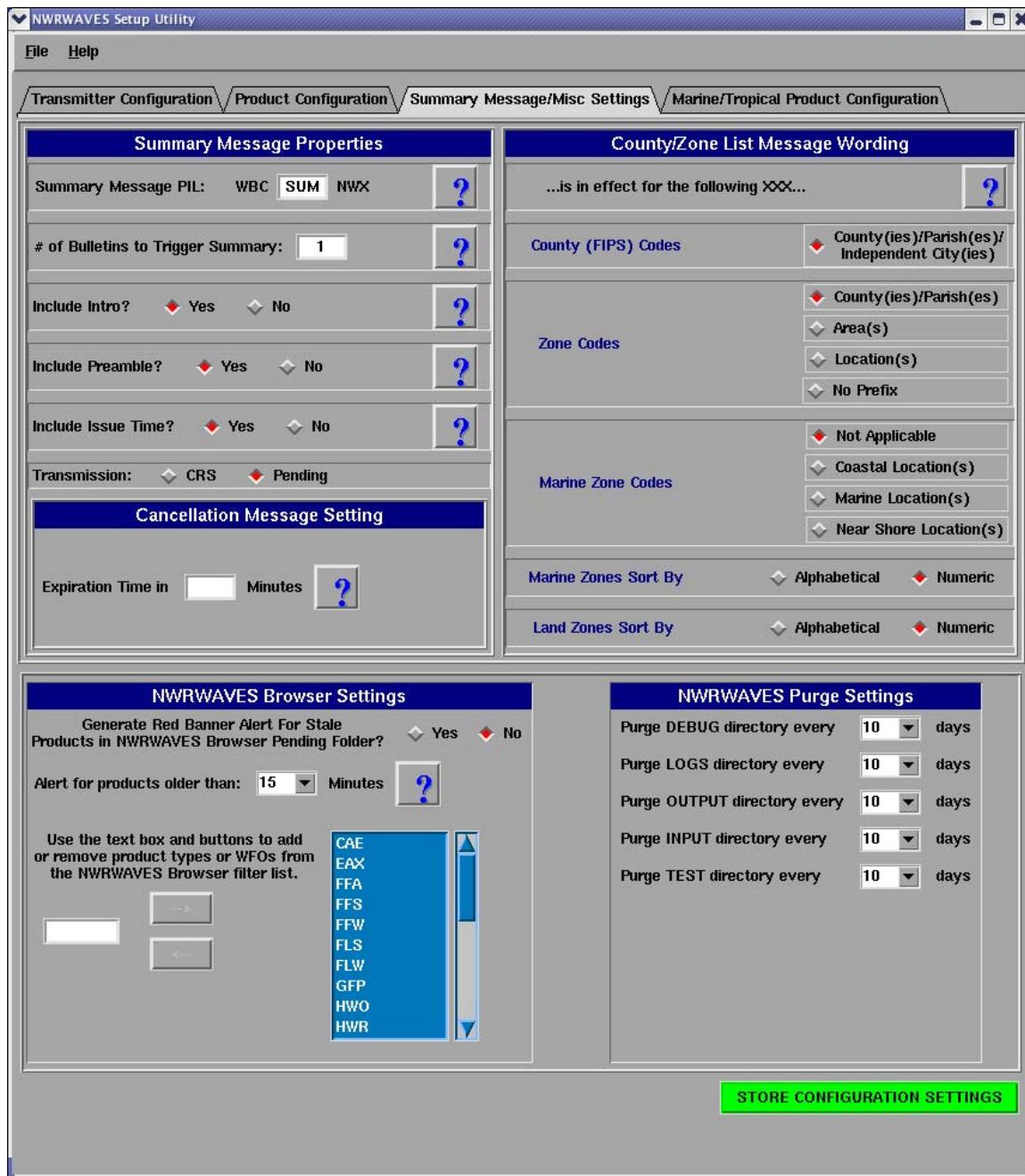
Once all products have been configured for your site as needed, you are ready to move on to the Summary Message Configuration tab.

### **Tab 3 – Summary Message/Miscellaneous Settings Configuration**

After you have set properties for all your products, the next step is to configure summary message settings. The summary message can be a powerful addition to your CRS product suite. Generating a summary of active hazards was a function of the WWA NWR formatters.

The basic function of the NWRWAVES summary message function is as follows: sites can configure their product configuration settings to select which (if any) product types are tracked by NWRWAVES for summarization purposes. Once a local threshold is exceeded, NWRWAVES will generate a message summarizing any applicable hazards. The summary message can be used within a regular Broadcast Suite to bring a periodic short summary of these hazards, or the summary message can itself be used to trigger a higher suite on your CRS, thus shortening a lengthy broadcast if many hazards are in effect.

In the NWRWAVES Setup GUI, click on the third tab, which is labeled **Summary Message/Misc. Settings**



**Figure 5 – Summary Message Configuration Tab**

Under this tab you can select the following options:

- 1) **Summary Message PIL:** Your AWIPS legacy state node will make up the first three letters of the summary PIL, and the last three letters (labeled ‘NWX’ on the GUI) will be the unique three-letter mnemonic that you gave each of your transmitters. You can select the middle three letters of the summary message type (from the GUI above) would be ‘STLSUMMCI’.

- 2) **# of Bulletins to Trigger Summary:** This is the minimum number of active hazards (with the summary message option set to “YES” in the product configuration) that are required before NWRWAVES begins to generate a summary message.
- 3) **Include intro (yes/no):** If “Yes” is selected, NWRWAVES will include the text, “The following watches (warnings) (and advisories) is/are in effect” as an intro phrase for its summary of active hazards.
- 4) **Include Preamble (yes/no):** The same as the Product Configuration setting, if this is set to “Yes”, then NWRWAVES will include the preamble in its intro phrase for the summary message.
- 5) **Include Issue Time? (yes/no):** Identical to the Product Configuration setting, if this is set to “Yes”, then NWRWAVES will include the time the summary message was prepared in the intro phrase of the summary message.
- 6) **Transmission:** You can set whether the summary message is sent directly to CRS for airplay, or whether it gets placed in the ‘Pending’ side of the NWRWAVES Browser. The default setting is set to ‘Pending’.

The top right hand side of the GUI contains settings that affect the wording of the summary message, as well as the wording of the optional lead-in and county/zone listing phrases by transmitter (that you established under Tab 1 earlier):

- 7) **County (FIPS) Codes:** If this radio button is selected, NWRWAVES will include the words ‘county’, ‘parish’, ‘counties’, ‘parishes’, or ‘independent city(ies)’ after its summary phrase “for the following”. Proper wording will be used for whether the FIPS code is for a county, a parish, or an independent city.
- 8) **Zone codes:** You can govern (by selecting the appropriate option) whether for UGZ codes NWRWAVES follows its summary phrase “for the following” with the word ‘county (parish), counties (parishes)’, ‘area(s)’, ‘location(s)’, or simply nothing at all.
- 9) **Marine zones codes:** Functions like #8 but for marine zones. Options are to follow the phrase “for the following” with nothing, ‘coastal location(s)’, or ‘marine location(s)’.
- 10) **Marine Zones Sort By:** Options are **Alphabetical** or **Numeric**.
- 11) **Land Zones Sort By:** Options are **Alphabetical** or **Numeric**.

The bottom left hand side of the GUI contains settings that affect the NWRWAVES Browser:

- 12) **Generate Red Banner Alert for Stale Products in NWRWAVES Browser Pending Folder:** the NWRWAVES Browser provides an optional D2D red banner alert when products have become stale in the Pending side of the browser. This option is designed to prompt the forecaster/HMT to take an action on these messages -- transmit or delete them. To turn this feature on, simply check the “Yes” option box and then set the time duration at which products in the Pending side of the browser will become “stale” and generate the red banner alert.
- 13) The NWRWAVES Browser also provides a means of allowing a user to filter the Sent list by one or more products. Previously the default list of available products could be modified by editing a text file. This has been integrated into the GUI. To Add/Remove product types from the NWRWAVES Browser filter list, simply use the GUI provided. To Add a product, enter its ID into the text box and click the right arrow. To Remove a product, select it with the left mouse from the list and click the left arrow button.

The bottom right hand side of the GUI contains settings that affect NWRWAVES purging capabilities.

- 14) On the bottom right hand side of the GUI, you can change the number of days that NWRWAVES will store output and debug related files in the following directories: DEBUG, LOGS, OUTPUT, INPUT and TEST. It is recommended that you keep this number at least 10 days for troubleshooting purposes, but not more than 15 days. A cron task will automatically purge files older than the number of days established in this section.

When you are satisfied with the summary settings, click the green “**STORE CONFIGURATION SETTINGS**” to save them.



You have now configured the first three tabs of the NWRWAVES Setup GUI. If your site is not a coastal site, and you have no marine responsibilities, you have completed the software configuration, and you may exit the NWRWAVES Setup GUI (File pull-down menu, click “Save and Exit”). You may proceed directly to [Section 4 – Setting AWIPS Text Database Triggers](#), to configure AWIPS to send products through NWRWAVES.

If you do have marine responsibilities or are a coastal office, you must complete Tab 4 – Marine/Tropical Product Configuration before you are done.

## **Tab 4 – Marine/Tropical Product Configuration**

Most marine products will play through NWRWAVES with little customization needed for the individual products. Extensive work in the word replacement dictionary (Section 6) or VIP will be needed to replace acronyms and abbreviations with full word phrases, to render a quality NWR product.

There are four main sections under the Marine/Tropical Product Configuration Tab (Figure 6), **Marine VTEC Processing, Hurricane Local Statement, Tropical Storm Product and Great Lakes Forecast**.

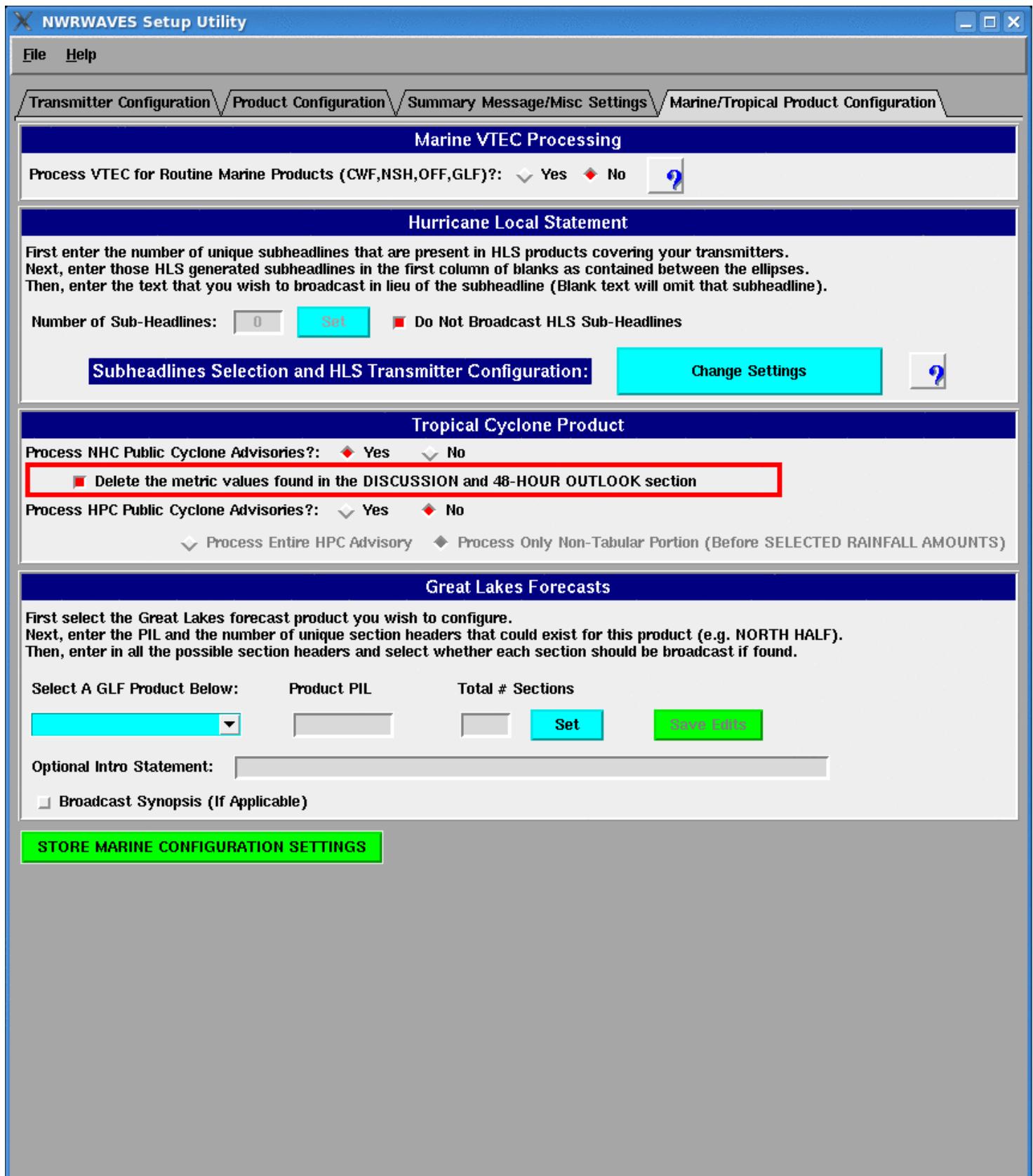


Figure 6 – Marine/Tropical Product Configuration GUI

## **Marine VTEC Processing**

Next to the label “Process VTEC for Routine Marine Products (CWF, NSH, OFF, GLF)?” is a ‘yes/no’ option. Check ‘yes’ to enable VTEC usage in your marine products. Check ‘no’, and NWRWAVES will process all marine products but ignore any VTEC lines. **NOTE: see pages 11 and 12 of NWRWAVES documentation for details on whether you choose to use or not use VTEC with your marine product suite.**

## **Hurricane Local Statement**

The Hurricane Local Statement (HLS) Section is used to configure how the HLS is formatted for airplay. NWRWAVES can be configured to replace the section headlines from the HLS with more radio friendly text. An example of this can be seen in figure 6. You can also omit a section headline individually by leaving the **REPLACED CRS PHRASE** section blank.

To configure this section:

- 1) If you do not want any of the sub-headlines broadcast from your office’s (or an adjacent office’s) HLS, simply check the box next to the label “Do Not Broadcast HLS Sub-headlines”.
- 2) If you do wish to broadcast these sub-headlines, left-click in the box labeled, “Number of sub-headlines”, enter the number of sub-headlines your office (or an adjacent office) uses as their standard HLS format, and then left-click the blue ‘Set’ button. Sub-headlines are those phrases within the HLS that look like this: “...WATCHES/WARNINGS...”
- 3) A number of boxes will appear in the HLS section, which will match the number you just entered.
- 4) For each sub-headline, enter its original text from the HLS product, and then list its CRS replacement phrase to the right of the original phrase. For example, you might want to replace the phrase “...WATCHES/WARNINGS” with “watches and warnings in effect” to enhance airplay.

In OB9, a couple of new features related to the processing of the HLS products have been introduced. Please refer to the Appendix- F for details.

## **Tropical Cyclone Product (TCP)**

From the 2010 hurricane season on, only the “DISCUSSION AND 48-HOUR OUTLOOK” text section of the TCP products (see Figure-6 highlighted in red) will be processed by the NWRWAVES. The other sections of the TCP text will be discarded in order to reduce the broadcast cycles in the NWR.

There are two options you can configure in this section that affect processing of the TCP product from TPC and HPC.

- 5) Process NHC Public Cyclone Advisories? (yes/no): if this is set to ‘No’, then NWRWAVES will **not** process the TCPAT(x) bulletins issued by the Tropical Prediction Center, even if you have the text database trigger set to send the TCPAT(x) bulletin to NWRWAVES. **If the answer is set to “Yes”, you also have additional option to delete the metric values found in the DISCUSSION AND 48-HOUR OUTLOOK section. All the metric speed (in KM/HR) or distance (in KM) values can be filtered out.** **NOTE: The administrator must select this option from the GUI first since the default is not to delete the metric values.**
- 6) Process HPC Public Cyclone Advisories? (yes/no): this flag tells the software whether to ignore or process the TCPAT(x) issued by the HPC once a tropical system has made landfall. If the answer is

set to “Yes”, you also have additional flags to either read the entire advisory as written, or to filter out any tabular data (such as inland rainfall totals) that HPC may include in the product.

## SPECIAL NOTES ON TROPICAL CYCLONE PRODUCT PREPARATION

NWRWAVES functions much differently than CAFÉ with respect to its tropical cyclone message generation. CAFÉ would process the TPC TCPAT(x) bulletins, and through the use of phrase searches and key wording, CAFÉ would then generate an output message customized by a latitude/longitude box, and where the storm was with respect to this box. If it met certain phrase and location criteria, the inbound CRS Weather Message would be assigned the proper EAS code (TRA, TRW, HUA, HUW) for alert on NWR.

NWRWAVES treats the TCP just like the HLS, as a regular product that contains information on the storm.

**NOTE:** A strong recommendation for sites is that they should invoke Generic Message Type assembly for the TCP product in NWRWAVES, so as to minimize the delay of producing transmitter specific output. The product suite needed to process hurricane watch/warning and tropical storm watch/warning bulletins is the new HLS instead of the TCV or TCVAT(x) suite issued by the TPC since the HLS is carrying the same VTEC. If a site has both HLS and TCV, there will be failures of the HLS.

**NOTE:** You will need text database triggers for HLS to properly prepare and disseminate tropical watches and warnings. Text database triggers are covered in Section 4.

### *Great Lakes Forecasts*

The Great Lakes Forecast (GLF) section is used to configure how the GLF is formatted for airplay. These capabilities replace the customized settings found in the CAFÉ GLF formatter. Effectively October 2007, all GLF would change from the non-segmented format to a new segmented format that would allow WFOs issuing the GLF products to be more area-specific. For example, the geographic divisions used in the GLF such as “NORTH HALF” will be replaced by smaller marine zones grouped in segments by similar weather conditions. The old non-segmented format will be completely removed in OB9 release.

To configure (if needed) the Great Lakes Forecast options, complete these steps:

- 2) Choose a Great Lake from the **Select a GLF Product Below** dropdown list.
- 3) Enter the AWIPS product identifier for the GLF (example CHIGLFLM).
- 4) Enter total number of possible breakpoint sections in the GLF (usually, this is denoted within the text of the product such as “NORTH HALF”, “SOUTH HALF”, etc.) This should include all possible breakpoints.
- 5) Click the **Set** button
- 6) Edit the **Optional Intro Statement** if desired. Any text entered will be used as an intro phrase for the GLF output.
- 7) Click the **Broadcast Synopsis (If Applicable)** button if desired. If this is checked, the “.SYNOPSIS” section of the GLF will be included in the CRS output, otherwise it will be omitted.
- 8) Fill in the **SECTION HEADERS** entry boxes to reflect the break points used in the GLF. Again, an example would be phrases such as “NORTH HALF” and “SOUTH HALF”.
- 9) For each SECTION HEADER, click each transmitter checkbox that you wish to have formatted for airplay. (This feature allows WFO’s to assign certain GLF sections to certain transmitters).

In Figure 6 above, the configuration settings for the GLF are as follows:

- Process the AWIPS product (if triggered) CLEGLFLE for Lake Erie
- Do not include any intro statement
- Broadcast the “.SYNOPSIS” section within the output of the CRS GLF forecast
- Section headers (as defined) would only play for those transmitters checked for each header. .

When you have completed all applicable sections of this tab, click the green **STORE MARINE CONFIGURATION SETTINGS** button to save your settings. You can also establish periodicity and/or effective time settings for the GLF under the product configuration tab. **NOTE: if you checked the option “No” for using VTEC for marine products, the “GLF” entry is the option you’ll need to configure. Otherwise, you will need to configure for each individual VTEC header to accomplish this task.**

You have now completed customization of NWRWAVES for your office. Proceed to [Section 4 – Setting AWIPS Text Database Triggers](#), to configure AWIPS to send products through NWRWAVES.

## 5. SETTING AWIPS TEXT DATABASE TRIGGERS

NWRWAVES software is executed as an automated response to an AWIPS text database trigger (Informix OB5 and earlier, Postgres after OB6). Offices that have used CAFÉ will notice some degree of familiarity in the establishment of database triggers.

You can, and should, run triggers for both your CAFÉ and NWRWAVES formatters during the transition period between CAFÉ and NWRWAVES. You can run NWRWAVES in a test mode, which is what you will need to do in this transition period to ensure a smooth switch between the two formatters. Once you decide to switch a product/products over to NWRWAVES in an operational mode, you would need to remove the legacy CAFÉ triggers. To establish a suite of triggers needed for NWRWAVES operation, perform the following steps:

- 1) Log into an AWIPS workstation with a user account that has fxalpha group privileges and open up a terminal window.
- 2) Change directories to the trigger directory.

**`cd /data/fxa/siteConfig/textApps`**

- 3) Make a backup copy of your site trigger information, in case you need to revert back to it.

**`cp siteTrigger.template siteTrigger.template.mmddyyyy`**

where ‘**mmddyyyy**’ is the numeric current date

- 4) Edit your site trigger configuration.

**`gedit siteTrigger.template &`**

When you view this file, you will see a listing of AWIPS product identifiers, along with an action that is to be completed upon receipt of that product identifier into the text database. If you are a CAFÉ site, there will be several entries that call CAFÉ scripts to format data. An example of a CAFÉ entry in your site trigger configuration will look something like the following:

**STLSVREAX      /home/CRS/SVR/n      wrsvr.csh STLSVREAX**

**Do not change or remove these CAFÉ text database triggers!** Your initial configuration will be to set NWRWAVES into test mode, so you can monitor its performance and ensure that it will work successfully with your CRS database prior to making the switch over to operational mode. The WWA NWR formatters do not use text database triggers.

- 5) For each text product that you wish to be formatted by NWRWAVES, you will need to add a line to the siteTrigger.template file using the following syntax (CCCNNNXXX is the 8/9 letter product PIL):

**CCCNNNXXX      /awips/adapt/NWRWAVES/nwrwavetest.csh**

The script '*nwrwavetest.csh*' is used by NWRWAVES to execute the formatter in TEST mode.

You will need an entry for each product that you wish to send through NWRWAVES. This entry (the CCCNNNXXX field) is the exact AWIPS product identifier for each product you wish to process! **An example of text database triggers set at WFO Pleasant Hill for NWRWAVES execution can be found in Appendix B.**

## SPECIAL NOTES REGARDING TEXT DATABASE TRIGGERS

### NWEM messages:

Sites **do not need** to add any triggers for their NWEM messages. In OB9.1 or older NWEM messages are formatted out of HazCollect, and HazCollect will call its own **Café NWEM formatter** internally.

**Starting with AWIPS OB9.2 NWRWAVES will automatically become the default** formatter for processing all NWEM messages. The old standalone Café NWEM formatter will cease to be used for HazCollect NWEM products. The purpose of the switch is to provide HazCollect with Spanish support and to resolve issues that existed in the legacy Café formatter. It should be noted that installation of OB9.2 is the preferred manner to migrate from the Café NWEM formatter to NWRWAVES. If sites are unable to install AWIPS OB9.2 due to emergency circumstances and would like to **MANUALLY** migrate Café NWEM to NWRWAVES for HazCollect, the following instructions should be executed:

1. log in as fxa username
2. cd /awips/fxa/bin
3. cp /awips/fxa/bin/transmitHazardWarnings.pl /awips/fxa/bin/transmitHazardWarnings.plORG
4. make the following changes

In the send to CRS section of the **transmitHazardWarnings.pl** script change

from

```
my $formatter = "/home/CRS/NWEM/nwrnwem.csh $product_id $crs_section $trans_file";
```

to

```
my $formatter = "/awips/adapt/NWRWAVES/nwrwaves.csh $product_id";
```

5. Save of the **transmitHazardWarnings.pl** script
6. ls -lart transmitHazardWarnings.pl

Make sure the permission, owner and group should look like the below example

```
-r-xr-xr-x 1 fxa fxalpha 29964 Aug 10 2009 transmitHazardWarnings.pl
```

### **Convective watches:**

CONUS sites will need to include all ten WOU(x) products issued by the Storm Prediction Center, along with all WCN products that apply to your CRS broadcast service areas. OCONUS sites only need the WCN products. For the WCN products, these will include your WCN, and any WCN's issued by surrounding offices. For the WOU(x) products, a section of your siteTrigger.template will need to include these entries:

<b>CCCWOU0</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU1</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU2</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU3</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU4</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU5</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU6</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU7</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU8</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWOU9</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>
<b>CCCWCNXXX</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwavestest.csh</b></a>

**CCC** should be set to your legacy state node for all WOU products and for your **WCNXXX** product.  
**CCC** should be set to the legacy state node for all other office **WCNXXX** products that you need to cover your broadcast service areas.

For tropical cyclone products needed to generate Tropical Storm Watches/Warnings, and Hurricane Watches/Warnings, you will need to include HLS products issued by the WFOs. If your site is a coastal office, for the HLS product, a section of your siteTrigger.template file will need to include these entries:

<b>CCCHLSXXX</b>	<a href="#"><b>/awips/adapt/NWRWAVES/nwrwaves.csh</b></a>
------------------	-----------------------------------------------------------

**NOTE:** The current OB9 version does not support the TEST mode for HLS product.

6) After you have finished adding in the suite of triggers, we will need to save the file and re-localize for these new text database triggers.

7) **If your site is on AWIPS II software, log onto the DX3 or DX4.**

**su – fxa ( or as root)**

**cd /data/fxa/sdc**

**./config\_awips.sh trigger XXX (where XXX is the 3 characters siteID)**

8) Change user to fxa and type the following commands:

**su – fxa**

**cd /awips/fxa/data/localization/scripts**

**./mainScript.csh –trigger**

The end result of completing steps (1) through (8) is that NWRWAVES will begin to process products in TEST mode for your site. In TEST mode, generated CRS output will be placed in the /awips/adapt/NWRWAVES/TEST directory instead of being sent to CRS or the ‘Pending’ side of the NWRWAVES Browser. You can use your favorite editor, viewer or browser to review the output over time, to ensure that NWRWAVES is processing inbound data and producing correctly formatted outbound CRS products.

The end result of completing steps (1) through (8) is that NWRWAVES will begin to process products in TEST mode for your site. In TEST mode, generated CRS output will be placed in the /awips/adapt/NWRWAVES/TEST directory instead of being sent to CRS or the ‘Pending’ side of the NWRWAVES Browser. You can use your favorite editor, viewer or browser to review the output over time, to ensure that NWRWAVES is processing inbound data and producing correctly formatted outbound CRS products.



**Having completed Sections 1 through 4 through this point, you have successfully configured NWRWAVES for your local site. You have established transmitters (broadcast programs) with the appropriate listing of county (parish), independent cities and zone codes. You have customized your product list for processing, and you have established the AWIPS products from your text database that are to be processed through NWRWAVES.**

**NWRWAVES is now running on your AWIPS in TEST mode.**

The end result of your work to date will be visible in the /awips/adapt/NWRWAVES/TEST directory, where NWRWAVES will place its output for your review. You will need to run in TEST mode until you have the opportunity to properly configure your CRS database in Section 5, and you also have the chance to review NWRWAVES output and validate that it is working properly. Do not plan to transition to an operational mode until both of these have been accomplished and the results are acceptable to you.

**Perform steps 9 through 15 below only when you are ready to begin operational use of NWRWAVES.  
TRANSITIONING PRODUCTS TO OPERATIONAL MODE**

When you are ready to begin transitioning NWRWAVES to operational status, you can do this on a product-by-product basis. **Do not plan to move from TEST to OPERATIONAL mode in NWRWAVES until you ensure**

your CRS is correctly configured to accept the format of Weather Messages from NWRWAVES. **Section (5) – NWRWAVES AND YOUR CRS DATABASE** gives you the information you need to ensure your CRS is ready to accept NWRWAVES output.

The steps necessary to transition a product or products to operational mode are as follows:

- 9) Repeat step (1) through step (7) above in Section 4. For all instances of a product in step (5) that you wish to transition to operational status, replace the call:

**/awips/adapt/NWRWAVES/nwrwavestest.csh**

**with**

**/awips/adapt/NWRWAVES/nwrwaves.csh**

- 10) Remove the associated CAFÉ trigger for this product.

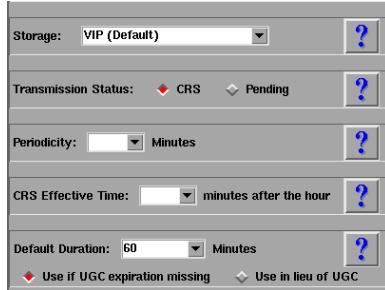
**NOTE:** There may be multiple AWIPS product identifiers for this product if you format other WFO AWIPS products for this CRS product type. Be sure to remove all applicable CAFÉ product triggers for this product or you will see duplicate CRS Weather Messages!

**NOTE:** If you are a site that uses the WWA NWR formatters, you will need to go into the WWA Admin GUI and disable NWR formatting for this product type. Alternatively, you can use GHG in lieu of WWA, as the WWA NWR formatter only works for products actually prepared through WWA.

- 11) Repeat steps (7) and (8) to re-localize your new triggers to establish this set of new products to operational mode.

Once you have set the products to process operationally, the resultant CRS output will (by default) be placed in the ‘Pending’ side of the NWRWAVES Browser. This is because your Product Configuration was set to place the output there in your original configuration. To facilitate automated transmission to CRS:

- 12) Go back to Section 3 – Tab 2.
- 13) Repeat steps (1), (2) and (3r) under the ‘Product Configuration’ tab. You will be switching the “Transmission Status” section from ‘Pending’ to ‘CRS’ (Figure 7).
- 14) Click the green “SAVE EDITS” button to save the product configuration
- 15) Repeat steps (13) and (14) above for all products you are transitioning to operational mode and automated CRS broadcast.



**Figure 7 – example of Transmission Status set to automated relay to CRS**

**Selectively specify transmission status based on issuing WFO in OB9:**

In OB9, The local WFO will have the capability to place specified products particularly for other offices' products to go to the Pending window for further review/editing if necessary. A new input argument (e.g. – EXTERNAL with 2 dashes) can be passed to the nwrwaves.csh to redirect the output to the Pending directory as follow:

**CC CZFPXXX /awips/adapt/NWRWAVES/nwrwaves.csh -- EXTERNAL**

The example CCCZFPXXX product will appear in the ‘Pending’ side of the NWRWAVES Browser. Manual intervention through the browser will be required to send the output to CRS.

## 6. NWRWAVES AND YOUR CRS DATABASE

NWRWAVES was initially designed to produce transmitter (broadcast program) specific output, to best focus the content of Weather Messages on the listening area of that transmitter. In this paradigm, unique CRS Weather Messages would be produced for each product, or each segment within a segmented product, using a standardized naming scheme.

After NWRWAVES deployment, issues were noted regarding the volume of messages produced by NWRWAVES, and the subsequent affect that multiple transmitter-specific messages were having on the CRS architecture (specifically the VIP processor). As a result of these issues, **NWRWAVES allows an office to opt for transmitter specific –OR- “generic” message assembly**. If a site opts for generic Message Type assembly, only one Weather Message will be produced for CRS per each valid product segment; its ultimate destination on your CRS Broadcast Cycles will be governed by the LAC’s assigned to the message.

**NOTE:** Generic message type assembly is **STRONGLY** recommended for all short-fuse warning products (**SV.W, TO.W, FFW, FFS, FE.W**) so as to minimize delays in VIP processing and subsequent alert tone broadcast. Generic message type assembly should also be invoked for products that yield identical output on each transmitter (i.e., RWS/SWS, PNS type products) and anything else that an office feels comfortable in switching.

The assembly of both types of messages is as follows:

### TRANSMITTER SPECIFIC MESSAGE TYPES

The standard nomenclature for a CRS Message Type is **CCCNNNXXX**. This format is very similar to AWIPS product identifiers. NWRWAVES prepares its transmitter specific Weather Messages for the three components (**CCC**, **NNN**, **XXX**) using the following logic:

**CCC** – derived from your AWIPS legacy state node environmental variable. This is sourced from the file /awips/fxa/data/localizationDataSets/XXX/AFOS\_CCC\_Name.txt. ‘XXX’ is your AWIPS site identifier.

**NNN** – the middle three letters will come from your settings for each product in the Product Configuration settings. Remember, the term ‘product’ is not just inclusive as a one-to-one relationship to an AWIPS product identifier. ‘Product’ refers to the combination of VTEC phenomenon and significance code when appropriate (several AWIPS product identifiers can have multiple VTEC phenomenon/significance code combinations such as the AWIPS WSW product). The middle three letters are either the “Initial Header” or “Followup Header” entries (based upon VTEC and follow-up statements) as you assigned back in Section 3 – Tab 2 (Figure 8).



**Figure 8 – an example of NWRWAVES product SV.W and it's unique NNN codes assigned by this product type**

**XXX** – the last three letters used in Weather Message assembly are the three-character mnemonics you assigned unique to each transmitter back in Section 3 – Tab 2.

In the case of the Kansas City/Pleasant Hill office, our AFOS state node identifier is STL. We have eight transmitters (MCI, STJ, IRK, MIA, CRL, CLN, MYV, TTN). Therefore, for the NWRWAVES product SV.W (Severe Thunderstorm Warning) as shown above in Figure 8, an inbound AWIPS product of STLSVREAX for all of our CWA would yield the following Weather Messages (depending on the VTEC action code):

#### Initial Issuance (/O.NEW.KEAX.SV.W)

STLSVRMCI  
STLSVRSTJ  
STLSVRIRK  
STLSVRMIA  
STLSVRCRL  
STLSVRCLN  
STLSVRMYV  
STLSVRTTN

#### Follow-up Issuance (/O.CON.KEAX.SV.W)

STLSVSMCI  
STLSVSSTJ  
STLSVSIRK  
STLSVSMIA  
STLSVSCRL  
STLSVSCLN  
STLSVSMYV  
STLSVSTTN

For non-VTEC coded products, the only header that will be used by NWRWAVES will be the “Issuance Header” entry, as there is no way to accurately determine if the product is an initial issuance or a follow-up. Thus, you will only need to ensure the presence of the list under the “Issuance Header” in your CRS database.

Therefore, in your CRS database, you will need to ensure that for every product you produce through NWRWAVES, you have a unique Message Type defined that matches this naming scheme, for both VTEC and non-VTEC products. In the case of the Pleasant Hill office where we have eight (8) transmitters, every VTEC encoded product will yield a maximum of **16 unique Message Types**, and a **maximum of eight unique Message Types** for every non-VTEC product (or VTEC product where the two headers are the same).

#### GENERIC MESSAGE TYPES

In generic message type assembly, NWRWAVES makes extensive use of the inbound AWIPS product identifier (PID) for assembling its equivalent Message Type). **For all inbound AWIPS PID's that are nine characters in length (i.e., “STLRWSEAX”), the resulting outbound CRS Message Type used will match the inbound product's identifier exactly (STLRWSEAX). If the inbound AWIPS PID is an eight character identifier (i.e., “STLRWSMO”), NWRWAVES will yield a nine character Message Type using the logic below (in this case, STLRWSSMO).**

NWRWAVES prepares its transmitter specific Weather Messages for the three components (**CCC**, **NNN**, **XXX**) using the following logic:

**CCC** – derived from the first three letters of the AWIPS Product Identifier (PID) from the inbound product.

**NNN** – the middle three letters will come from your settings for each product in the Product Configuration settings. Remember, the term ‘product’ is not just inclusive as a one-to-one relationship to an AWIPS product identifier. ‘Product’ refers to the combination of VTEC phenomenon and significance code when appropriate (several AWIPS product identifiers can have multiple VTEC phenomenon/significance code combinations such as the AWIPS WSW product). The middle three letters are either the “Initial Header” or “Followup Header” entries (based upon VTEC and follow-up statements) as you assigned in Section 3 – Tab 2 above (Figure 8).

**XXX** – the last three letters used in Weather Message assembly are the last three characters of the AWIPS PID.

In the case of the Kansas City/Pleasant Hill office, our AFOS state node identifier is STL. We have eight transmitters (MCI, STJ, IRK, MIA, CRL, CLN, MYV, TTN). Therefore, for the NWRWAVES product SV.W (Severe Thunderstorm Warning) issued from Pleasant Hill, an inbound AWIPS product of STLSVREAX for all of our CWA would yield the following Weather Messages (depending on the VTEC action code):

**Initial Issuance (/O.NEW.KEAX.SV.W)**  
STLSVREAX

**Follow-up Issuance (/O.CON.KEAX.SV.W)**  
STLSVSEAX

For the NWRWAVES product SV.W (Severe Thunderstorm Warning) issued from Des Moines, an inbound AWIPS product of DSMSVRDMX would yield the following Weather Messages (depending on the VTEC action code):

**Initial Issuance (/O.NEW.KDMX.SV.W)**  
DSMSVRDMX

**Follow-up Issuance (/O.CON.KDMX.SV.W)**  
DSMSVSDMX

For the NWRWAVES product RWS (Regional Weather Synopsis) issued from Wichita, an inbound AWIPS product of TOPRWSKS would yield the following Weather Message:

**Any Issuance (non-VTEC coded product)**  
TOPRWSSKS

**NOTE:** since the inbound AWIPS PID was only eight characters, NWRWAVES assembles its last three characters of the Generic Message Type from the last three characters (SKS) of the AWIPS PID.

For non-VTEC coded products, the only header that will be used by NWRWAVES will be the “Issuance Header” entry, as there is no way to accurately determine if the product is an initial issuance or a follow-up. Thus, you will only need to ensure the presence of the list under the “Issuance Header” in your CRS database.

Therefore, in your CRS database, you will need to ensure that for every product you produce through NWRWAVES using Generic Message Type, you have a unique Message Type defined that matches this naming scheme, for both VTEC and non-VTEC products. In the case of the Pleasant Hill office where we cover seven (7) different offices and ourselves, we would have **8 unique Message Types per NWRWAVES product (16 for each product if the Issuance/Follow-Up headers are different like the TOR/SVS)**; one for each office’s AWIPS PID of their issuing product.

## SETTING UP MESSAGE TYPES IN YOUR CRS DATABASE

The preferred method to adjust and configure your CRS database is through the GUI system on your CRS MP workstation. Sites are discouraged from hand-editing a copy of their ASCII database, unless the site focal point has a thorough knowledge of its structure. Sites that have run the WWA NWR formatters in the past will already have many of these unique Message Types defined in their database, as WWA produced transmitter-specific output. CAFÉ users will likely find a mix of unique and global Message Types depending on the AWIPS product identifier type.

The following is a recommended methodology to use in ensuring your CRS database is ready to accept output from NWRWAVES. It will work well in preparing CRS for NWRWAVES on a product-by-product basis.

**NOTE: Before you begin making any changes to your CRS database, use the 0MP Database backup utility to make a good backup copy of your existing database before you begin! This way, if you need to revert back to the original database, you can do so.**

- 1) Choose a unique product that you wish to prepare and/or ensure your CRS database to accept.
- 2) Make note of the “Issuance Header” and “Followup Header” of that product in the NWRWAVES Product Configuration GUI (Section 3 – Tab 2). **NOTE: If this is a non-VTEC product such as the HWO, NOW, etc., you only need to note the “Issuance Header”.**
- 3) In the CRS Message Type GUI (on your MP), you can find the “Message Types” GUI under the ‘Messages’ pull-down menu. You have two options on how to proceed, preparing place holders for either transmitter specific or generic message types. **NOTE: If you already have transmitter-specific message types, you are advised to leave them be and only add those generic message types you need on a case basis.**

## SETTING UP TRANSMITTER SPECIFIC MESSAGE TYPES

For those that will involve tone alerts (WRSAME, or WRSAME and 1050Hz), you want to be sure that the only transmitter that has a red ‘check mark’ next to its label in the “SAME Transmitters” column is **the one that matches the last three letters of the Message Type**. If all the boxes are checked, then the inbound NWRWAVES product will tone alert multiple times, on multiple transmitters, in instances where an LAC overlaps multiple transmitters. Ensure that only one “SAME Transmitters” option is selected for each Message Type to prevent this from occurring.

Also, you will likely also want to **\*not\*** include these unique Message Types (if they are applicable watch/warning/advisory type products) in your Emergency Override product list. The list in Emergency Override can get quite lengthy, and the process of initiating multiple EO sessions can lead to too much work and a delay in getting a broadcast completed for multiple transmitters.

- a) If you already have unique CRS Message Types defined per transmitter, and these Message Types begin with your state node CCC and end in the three-character combinations you have set in your NWRWAVES transmitter configuration, you have the correct naming scheme for transmitter-specific products, and you can complete this step (3a). Otherwise, proceed to step (3b) below.

Ensure that **only one** ‘SAME Transmitters’ transmitter is checked as described above, if this Message Type is one that involved alert tones of any type. Make sure the ‘Emergency Override’ checkbox is not selected for this unique Message Type. Your Message Groups, Broadcast Suites (and triggers) will already contain these Message Types, and no additional work will be needed to facilitate NWRWAVES output from being scheduled on your CRS. Save the Message Type and proceed to step (4).

- b) If you already have unique CRS Message Types defined per transmitter, and these Message Types begin with your state node CCC but **\*do not\*** end in the three-character combinations you have set in your NWRWAVES transmitter configuration (say you have a scheme such as “NW1, NW2”, etc., and you wish to change these last three letters), complete this step (3b). Otherwise, proceed to step (3c) below.

Perform the following steps:

1. Call each Message Type up through the GUI.
2. Edit the Message Type XXX for each individual product (in the CCCNNNXXX format), and change the last three characters to match that of your transmitter.
3. Ensure that only one ‘SAME Transmitters’ transmitter is checked as described above, if this Message Type is one that involved alert tones of any type.
4. Make sure the ‘Emergency Override’ checkbox is not selected for this unique Message Type.
5. Save the Message Type.
6. Repeat (1.), (2.), and (3.) for all other existing Message Types of this particular product category.

The CRS software will take your changes to these existing Message Types and will propagate the adjusted Message Type identifiers through all existing Message Groups and Broadcast Suites (including triggers). Proceed to step (4).

- c) If you do not have unique CRS Message Types defined for each transmitter (say you have a global Message Type such as CCCSVRXXX such as in CAFÉ), you will need to add them to your CRS database. To do this:

1. Through the CRS Message Type GUI, create a new Message Type for a transmitter.
2. Establish its baseline attributes.
3. Ensure that only one ‘SAME Transmitters’ transmitter is checked as described above, if this Message Type is one that involved alert tones of any type.
4. Save the Message Type.
5. Repeat (1.), (2.), (3.) and (4.) to create Message Types of this particular product category for all transmitters.
6. You will then need to add these Message Types to any applicable Message Groups and/or Broadcast Suites for each transmitter.
7. Once the new Message Types have been assigned to a Broadcast Suite in some fashion, be sure to re-download the applicable Broadcast Programs to each transmitter. Proceed to step (4) below.

## SETTING UP GENERIC MESSAGE TYPES

For those that will involve tone alerts (WRSAME, or WRSAME and 1050Hz), you want to be sure that all applicable transmitters have a red ‘check mark’ next to their labels in the “SAME Transmitters” column. Since you’re opting to use Generic Message Type, LAC’s assigned to the product will govern which transmitter(s) are affected. Unlike the transmitter-specific product assembly, there is no danger of the inbound NWRWAVES product tone alerting multiple times, on multiple transmitters, in instances where an LAC overlaps multiple transmitters.

You will likely **\*want\*** to include only one of these Generic Message Types (if they are applicable watch/warning/advisory type products) in your Emergency Override product list. The one you’ll likely want to include will be the one for the product issued from your office (as it will be included in every transmitter’s Broadcast Suites).

- d) If you already have generic CRS Message Types defined in your database, and these Message Types mirror the issuing office’s AWIPS PID for those particular products (i.e., the old CAFÉ configuration for much of your short-fuse warning products), you have the correct naming scheme for generic products, so you can complete this step (3d). Otherwise, proceed to step (3e) below.

Ensure that all applicable ‘SAME Transmitters’ transmitter buttons are checked as described above, if this Message Type is one that involved alert tones of any type. Make sure the ‘Emergency Override’ checkbox is not selected for this unique Message Type. Your Message Groups, Broadcast Suites (and triggers) will already contain these Message Types, and no additional work will be needed to facilitate NWRWAVES output from being scheduled on your CRS. Save the Message Type and proceed to step (4).

- e) If you already have generic CRS Message Types defined in your database, but these Message Types do not match the naming scheme invoked by NWRWAVES, complete this step (3e). Otherwise, proceed to step (3f) below.

Perform the following steps:

1. Call each Message Type up through the GUI.
2. Edit the Message Type XXX for each individual product (in the CCCNNNXXX format), and change the first and/or last three characters to match the naming scheme used by NWRWAVES.
3. Ensure that all applicable ‘SAME Transmitters’ transmitters are checked as described above, if this Message Type is one that involved alert tones of any type.
4. Make sure the ‘Emergency Override’ checkbox is not selected for this unique Message Type.
5. Save the Message Type.
6. Repeat (1.), (2.), and (3.) for all other existing Message Types of this particular product category.

The CRS software will take your changes to these existing Message Types and will propagate the adjusted Message Type identifiers through all existing Message Groups and Broadcast Suites (including triggers). Proceed to step (4).

- f) If you do not have global CRS Message Types defined, you will need to add them to your CRS database. To do this:
1. Through the CRS Message Type GUI, create a new Message Type for a transmitter. Remember that the naming scheme will mirror the AWIPS PID of the inbound office's product if it is nine characters in length; if it is eight characters, the last three characters of the CRS Message Type will be the right three characters of the AWIPS PID.
  2. Establish its baseline attributes.
  3. Ensure that all applicable 'SAME Transmitters' transmitters are checked as described above, if this Message Type is one that involved alert tones of any type.
  4. Save the Message Type.
  5. Repeat (1.), (2.), (3.) and (4.) to create Message Types of this particular product category for all transmitters.
  6. You will then need to add these Message Types to any applicable Message Groups and/or Broadcast Suites for each transmitter.

Once the new Message Types have been assigned to a Broadcast Suite in some fashion, be sure to re-download the applicable Broadcast Programs to each transmitter. Proceed to step (4) below

- 4) Once you have established any needed Message Types for this particular hazard, it is recommended that you also create (if you don't have one already as in the generic message type assembly) a generic Message Type for this NWRWAVES product. The generic Message Type would have the format CCCNNNXXX, where the 'XXX' in this case would be your office AWIPS identifier. At Pleasant Hill, we used the format **STLNNNEAX** for all our generic Message Types. **NOTE: if you have defined generic message types in steps 3(d) through 3(f), you can simply use the one for your office's product for your manual recording needs.**

For the generic message type that matches your offices issuing AWIPS PID, ensure that **all applicable** 'SAME Transmitters' transmitters are checked as described above, if this Message Type is one that involved alert tones of any type. Also, **use this one (if needed) as the ONLY one set to appear in your Emergency Override GUI (this is a check box on the Message Type GUI).**

In addition to CRS/VIP loading issues through NWRWAVES, the generic Message Type is quite useful for manual recordings, should NWRWAVES fail for any reason. Since the Message Type is assigned to all transmitters and can be scheduled for any transmitters, if an office has to send a warning via EO, the operator only has to make the one 'live' broadcast and then have the message go into all applicable transmitter programs. If a site uses the specific Message Types for their EO entries, the NWR Operator will have to send the 'live' warning multiple times, once for each specific Message Type.

- 5) Repeat steps (1) through (4) for the “Followup Header” settings if the AWIPS product for this hazard is a VTEC product, and this entry is different from the “Issuance Header”. If both are the same, you can skip step (5).
- 6) Repeat steps (1) through (5) for NWRWAVES products as you are ready, to ensure they are ready for transition into an operational NWRWAVES environment.

## IMPORTANT NOTES ABOUT CRS MESSAGE TYPES AND YOUR CRS DATABASE

Some helpful hints as you transition from existing NWR formatters (WWA NWR, CAFÉ) to NWRWAVES:

- a) If you opt to use the approach of having transmitter-specific Message Types in your database for NWRWAVES, also have a generic Message Type for that same NWRWAVES product to create an optimal CRS operating environment. For the NWRWAVES product WS.W (Winter Storm Warning) in the Pleasant Hill CRS database (we have eight transmitters), we have nine different Message Types. We include the generic STLWSWEAX Message Type in our Emergency Override GUI for manual recording purposes. Any warning or update for any transmitter can be broadcast through EO; then it can be scheduled on any applicable transmitter with nominal work.
- b) Utilize the generic Message Type for all short-fuse warning products (SV.W, TO.W, FFW, FFS, FF.W) so as to minimize the amount of time it takes to process a warning through VIP and ultimately to the air on CRS. Sites should also look to maximize the use of generic Message Type wherever possible for messages that will feature the same content regardless of approach (RWS, PNS, RER).
- c) **Do not delete, change or remove any existing Message Types that are used by your operational NWR formatter until you have fully switched that product to operational status in NWRWAVES!** Once you make the full transition to NWRWAVES for this particular product, you can safely remove any legacy Message Types through the CRS GUI interface.
- d) Make sure that for any transmitter-specific Message Type that is used for tone-alert products, that the only ‘SAME Transmitter’ checked in the list is the one whose three-character mnemonic matches that of the last three letters of the Message Type. This will prevent multiple alerts being sent for products that involved LAC(s) shared amongst more than one transmitter. Make sure any generic Message Type used for alert purposes has all applicable ‘SAME Transmitters’ checked on the Message Type GUI.
- e) A suggested transition is to make the switch on a product-by-product basis. This will avoid wholesale changes to your CRS database at one time. Also, after each NWRWAVES product is configured with the Message Types needed in your CRS database (or a small subset of products), make a backup copy of that CRS database (through the OMP database backup utility) in case you need to revert back to a previous version.
- f) Remember, if you add new Message Types to your CRS database, you also need to add them to any applicable Broadcast Suites, and adjust any triggers as necessary to ensure proper broadcast of information.

## 7. NWRWAVES OPERATIONS

This section of documentation will describe the NWRWAVES Browser, NWRWAVES program execution, and detail the logging performed by NWRWAVES to assist in troubleshooting procedures.

### NWRWAVES BROWSER

The main interface that users will notice as they use NWRWAVES is the NWRWAVES Browser. This new browser will be linked during the install such that it can be launched using the standard “**NWRBrowser**” entry in the AWIPS workstation applications menu. The overall look and feel of the NWRWAVES Browser is similar to the original NWRBrowser, however there are a number of new features and enhancements that are noted below.

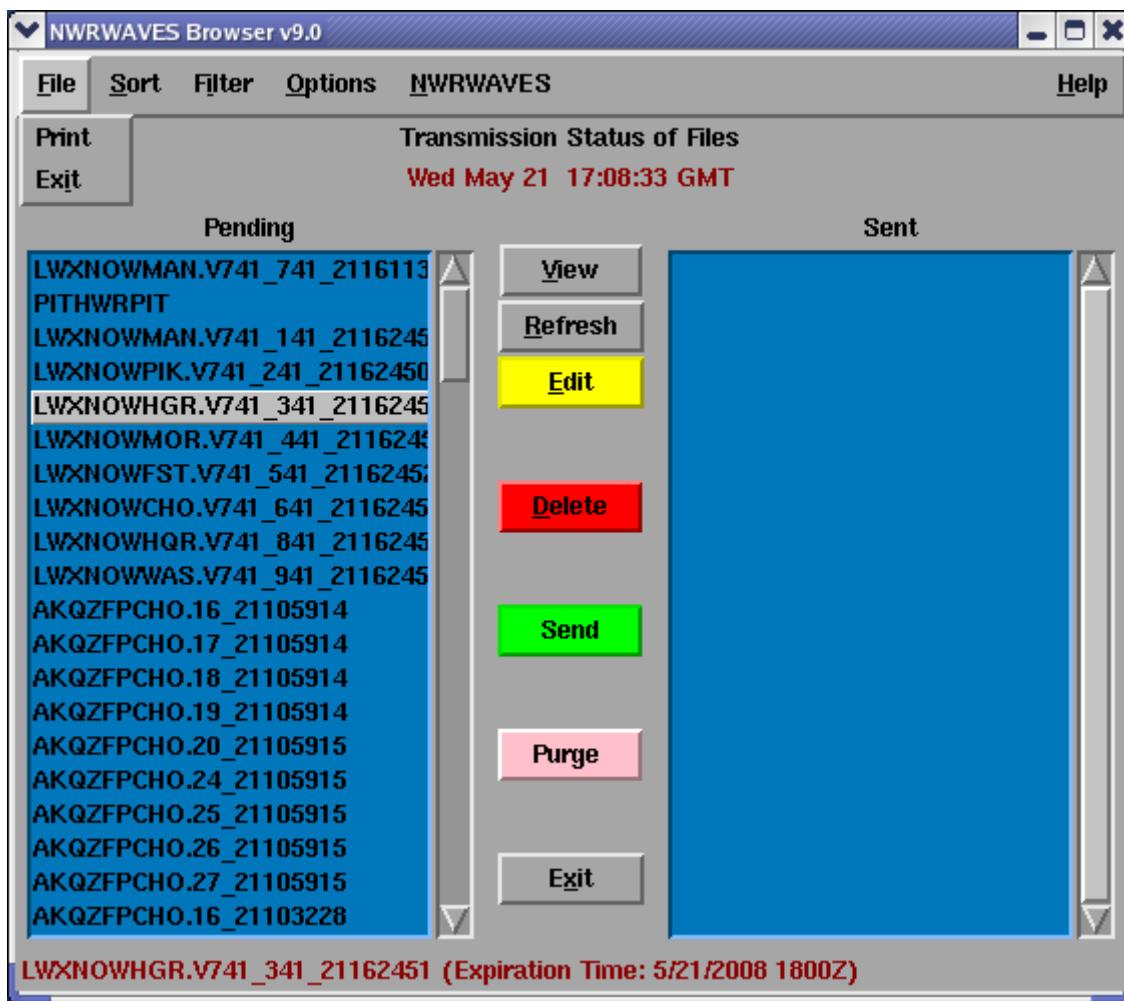


Figure 9 – NWRWAVES Browser (front-end application to NWRWAVES)

There are a series of pull-down menus across the top of the NWRWAVES interface:

- 1) **File** Menu (Keyboard Shortcut Alt-F)
  - a. Print – Print highlighted items from Pending/Sent lists (see Figure 9)
  - b. Exit – Used to close the browser

- 2) **Sort Menu** (Keyboard Shortcut Alt-S) – Because the number of items in the browser list boxes can become quite lengthy, a number of sorting capabilities were added to allow users to quickly locate outbound or transmitted CRS messages.
  - a. None – No sorting is done and the browser will function similar to the old NWR Browser.
  - b. Alphabetical (Default) – Files in the Pending and Sent list boxes will be sorted in alphabetical order.
  - c. Expiration Time – Files in the Pending and Sent list boxes will be sorted in the order in which CRS messages are scheduled to expire.
  - d. Applying the “**Decreasing Sort**” checkbox will sort the list boxes in either reverse alphabetical order (alphabetical sort applied) or in the reserve order in which CRS messages are scheduled to expire (Expiration Time sort).
- 3) **Filter Menu** (Keyboard Shortcut Alt-i) – The ability to filter items in the NWR Browser was added as another means to quickly located products in the Pending and Sent list boxes
  - a. **Filter by Transmitter** – If you have configured your transmitters as in Section 1, you should see your list of transmitters present. Clicking any of the transmitter mnemonic radio buttons will cause the NWRWAVES browser to display only those outbound/transmitted products which are applicable to the selected transmitter.
  - b. **Filter by Product Type/WFO** – The NWRWAVES Browser filter function for products contains a vast list of the most widely used products. This list can be modified under the Summary Message/Miscellaneous Configuration Tab back in Section 3, Item 11. Clicking on any product type radio button will filter the display to only show those product types.

**NOTE:** The “output” item is used to filter the AWIPS climate program CRS messages

**NOTE:** You can apply a “combined” filter by selecting an item under both the Filter by Transmitter and Filter by Product Type menus.

- 4) **Options Menu** (Keyboard Shortcut Alt-O)
  - a. **Clear Old Products** (and its equivalent **Purge** button on the main browser display) will allow a user to delete files whose CRS message expiration time has expired. The user will be prompted to remove products from both the Pending and Sent directories. This feature can be quite helpful in eliminating dead products from an extensive file listing, but be wary that there may be instances when a user may want to maintain an expired product for later retransmission.
  - b. **Update Expiration Time** – This option will become selectable once a user highlights a product in the Sent list box with the left mouse button. This feature allows a user to modify the expiration time of a product and retransmit it to CRS. This method is a great way to allow a forecaster/HMT to remove a product from the CRS broadcast cycle without having to physically remove it at the CRS console.
  - c. **Auto Refresh (Default On)** – This selection tells the NWRWAVES browser to auto update the Pending and Sent list boxes.
  - d. **Set Refresh Interval...** - The refresh interval can be changed from the default of 30 seconds by clicking on this menu item and entering a new number (in seconds) into the box.
  - e. **Highlight Warnings (Default On)** – This selection will cause the NWRWAVES browser list boxes to briefly change from a blue to a purple/pink background color when a short-fuse warning has been issued.

**NOTE:** Previous versions of NWRWAVES allowed sites to switch between three other LINUX editors available for use. After complications of sites using other editors and having corrupt CRS output, the baseline NWR Browser editor is now the only editor called by NWRWAVES.

5) **NWRWAVES Menu** (Keyboard Shortcut Alt-N)

- a. **NWRWAVES Setup** – Refer to Section 3 for launching the NWRWAVES Setup Utility. **This option is administratively restricted by AWIPS user accounts.** Most NWRWAVES users will not have access to the Setup Utility.

**NOTE:** You will only be allowed to open one version of the Setup GUI on your AWIPS at one time. This is controlled by a lock file which is created when the Setup GUI is launched, and is removed when you exit the Setup GUI.

If you get an error message that a version is already open somewhere else, but you are confident that there is not a version open anywhere on your AWIPS, perform the following steps:

- Open a shell on any AWIPS workstation as a user with ‘fxalpha’ group privileges.
- Type **cd /awips/adapt/NWRWAVES**
- Type **rm -f setup.lock**
- Exit from the shell
  
- b. **View/Edit VTEC\_Summary File** – For offices using the summary message capabilities described in Section 3 – Tab 3 (page 17), users can manually edit/delete specific product summary messages should the automated VTEC replacement method fail. The pop-up GUI which appears when there are active hazards being tracked for summarization (Figure 10) is a simple interface. You select the hazard you want to modify from a list of buttons, and then you can either clear all LAC(s) at once or selected LAC(s) through their individual radio buttons. Sites will rarely (if ever) need to use this interface, since active hazards are tracked through VTEC action codes in follow-up statements. This will be a useful interface though, if you track a non-VTEC hazard such as an FFW in the interim period before full VTEC implementation.

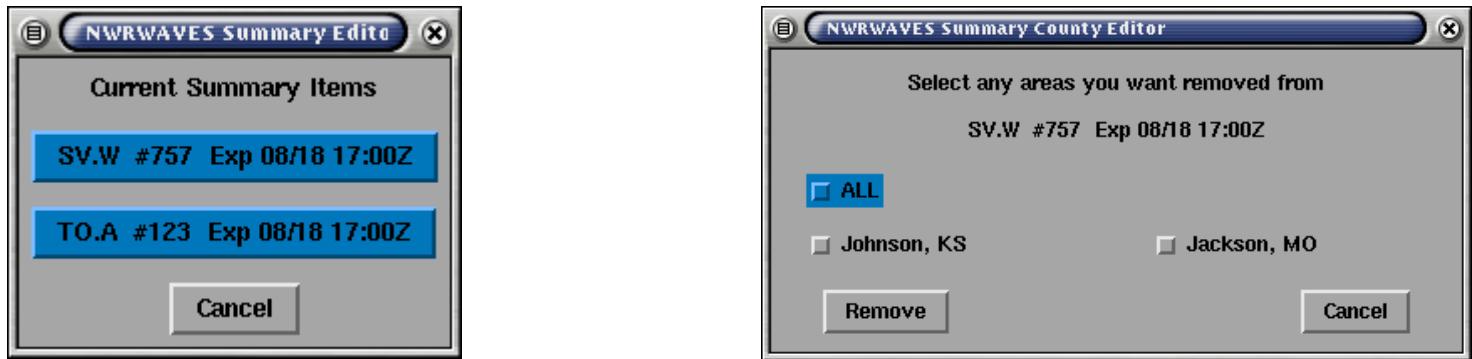


Figure 10 – NWRWAVES summary message editing GUI interfaces

- c. **Regenerate a CRS message** – Allows a user to call an AWIPS PIL from the text database and reprocess the product through the NWRWAVES formatter. When this option is selected, the user is prompted to enter an AWIPS product identifier then click ‘OK’. The latest version of the

product will appear in the ‘Regenerate Product’ GUI (Figure 11). Sites can toggle between database versions of the product type by using the “Previous Version” or “Latest Version” buttons. Once you have the product you wish to re-transmit in the viewer, click the “Send to NWRWAVES” button to re-process this product.

**NOTE:** If you use the “Include Issue Time” lead-in option for a product, the time that will be used is the time that the AWIPS product is processed by NWRWAVES, and not the time it was issued in its Mass Media header (MND date/time line). If you re-transmit a product, the time mentioned as the issuance time on the air will be the time you requested its retransmission.

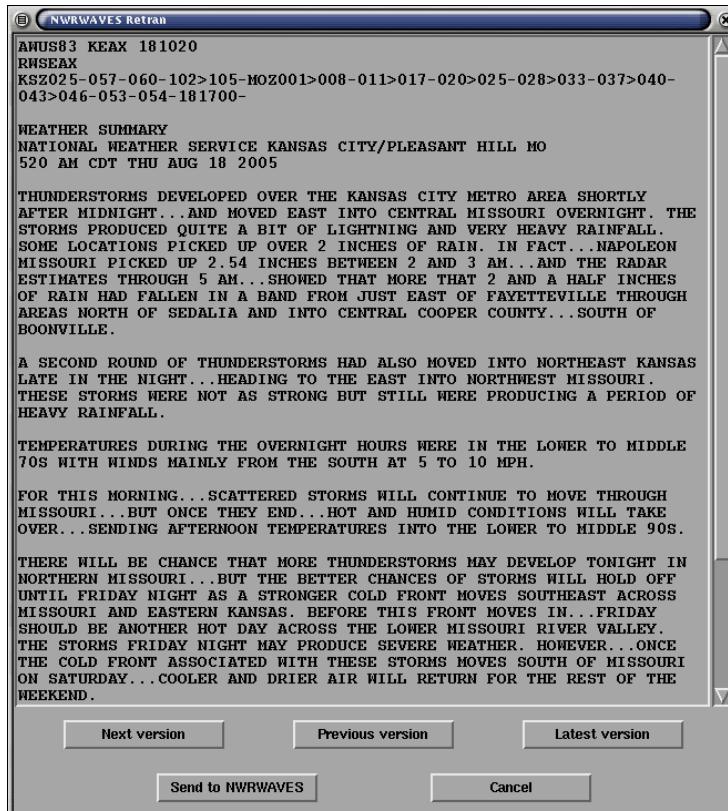


Figure 11 – NWRWAVES Retransmit product GUI interface

There are also a series of buttons down the middle of the interface. Some have been mentioned above, and there are a few additional buttons as well:

- d. **View button:** If a user left-clicks on a product (in either the ‘Pending’ or ‘Sent’ side of the NWRWAVES browser) and clicks this button, it will bring up the product in a viewer. This function is identical to the legacy NWRBrowser. Starting in version OB8.3, the user can also print the product in the viewer via the pull-down menus across the top left (under File->Print option).
- e. **Refresh button:** If clicked, it will force a manual auto-refresh of the NWRWAVES Browser.
- f. **Delete button:** If a user left-clicks on a product or products on either side of the browser and then clicks this button, these NWRWAVES products will be deleted from the browser. The user is prompted to confirm the delete (yes/no/yes to all). An improvement over the NWRBrowser is that a user can select multiple products at the same time.

- g. **Send button:** If a user left-clicks on a product or products on either side of the browser and clicks the ‘Send’ button, these product(s) will be sent to CRS. An improvement over the NWRBrowser is that a user can select multiple products at the same time.
- h. **Exit button:** This button exits the NWRWAVES Browser.

## 8. NWRWAVES PROGRAM EXECUTION (LOGGING, TROUBLESHOOTING)

NWRWAVES is called through the use of AWIPS text database triggers. You can call for NWRWAVES to run manually two different ways: you can ‘Regenerate a CRS Message’ or edit the summary message. Both of these methods are detailed above.

Here is a breakdown of the execution of NWRWAVES for the receipt of a product:

- 1) An inbound product is received into the AWIPS database.
- 2) A text database trigger is executed to initiate NWRWAVES for the inbound AWIPS product.  
Depending on your settings in your siteTrigger.template file, you will either call the c-shell script that runs NWRWAVES in TEST mode (/awips/adapt/NWRWAVES/nwrwavestest.csh) or the c-shell script that runs NWRWAVES in operational mode (/awips/adapt/NWRWAVES/nwrwaves.csh).
- 3) These c-shell scripts perform the following functions:
  - a) The script takes the inbound product and ‘cleans’ it up for use.
  - b) The inbound product is moved from /data/fxa/trigger to the /awips/adapt/NWRWAVES/QUEUE directory for processing.
  - c) A check is performed to ensure that only one version of NWRWAVES is running. If one is currently active, this iteration will sleep for 30 seconds before checking again. If the same version is still running after 30 seconds, these scripts will assume a hung process, kill the original one so that this one can begin. Thorough testing has indicated that a time period much less than 30 seconds is all that NWRWAVES requires for proper execution.
  - d) These scripts perform a ‘checksum’ on the main program (nwrwaves.tcl) and write this checksum to the product’s debug file.

**NOTE:** The ‘checksum’ value is a fixed value of the nwrwaves.tcl code as prepared and released into AWIPS baseline software. If your site has trouble with NWRWAVES, support staff will ask for this value. If it is anything other than the baseline value, it is an indication that someone at your site has made edits to the baseline software. **SITES WILL NOT MAKE ANY LOCAL CHANGES TO THE NWRWAVES SCRIPTS AS DELIVERED!!** Making local changes to the baseline software may introduce unintended instability to the program, and it will be impossible to troubleshoot your problem if you have made local changes. Off-site troubleshooting will likely be denied until you restore the baseline version of ‘nwrwaves.tcl’, and the debug log file reflects the same ‘checksum’ value as the baseline value.

**NOTE: An extensive debug and operational logging scheme is used in NWRWAVES, to assist in local and off-site troubleshooting. This scheme is detailed in (5) below.**

- e) These scripts call the main formatter program ‘nwrwaves.tcl’. The ‘TEST’ argument is the only difference between the two c-shell scripts. The AWIPS PID (file name) of the product being processed is also passed as an argument.
- 4) The main file ‘nwrwaves.tcl’ is executed next. All processing related to product preparation, assembling and formatting is performed by this script. This script does utilize three additional scripts at different points during message preparation and assembly. These are located in the /awips/adapt/NWRWAVES/bin directory and are as follows:
  - a) **UGC\_VTEC\_Decoder.tcl:** This module is called by nwrwaves.tcl to decode the UGC and VTEC lines (as appropriate) from an inbound AWIPS product. If there is no UGC (UGZ) line in the inbound product (such as an RER), then this module will assign the product a ‘dummy list’ which is one county from each transmitter. NWRWAVES will use the first county (alphabetically) from each transmitter. There is no way to control a non-UGC (UGZ) coded product by transmitter. Every transmitter will receive a copy of the product, with an assigned default expiration time of 360 minutes.
  - b) **UGCLookup.table:** This is the master baseline lookup table for all counties/parishes/independent cities and zones/fire weather zones/marine zones. Sites will not modify this file! If an area is missing, you do have the ability to add it manually through the Transmitter Configuration GUI (Section 3 – Tab 1: Page 7). Any local LAC’s added will be placed in the file localUGCLookup.table in this same /bin directory. NWRWAVES will source both lookup tables (if applicable) when it searches for UGC/UGZ codes.

**NOTE: If you do find missing counties/zones that should be in the baseline file, please post them to the NWRWAVES list server (Section 7) to ensure they do get added in a future build release of NWRWAVES.**

- c) **WordFile.txt:** This file is a legacy from CAFÉ, and you can add words, phrases or wild card entries. NWRWAVES will make substitutions from the AWIPS product to the outbound CRS products as needed. The WordFile.txt file is detailed below.
- d) **WordFile\_SPN.txt:** This optional file operations exactly in the same manner as the WordFile.txt above, but allows offices that broadcast separate Spanish products to develop a separate word/phrase replace file for Spanish phrases.
- 5) Debugging and logging information: NWRWAVES makes extensive use of logging to assist in troubleshooting. Unless mentioned specifically, the files below are placed in the directory listed which can be found under the root NWRWAVES directory (/awips/adapt/NWRWAVES).

Here is a breakdown of available resources to you:

- a) INPUT directory: NWRWAVES will archive every AWIPS product that is sent through NWRWAVES. The product will be named with the 8-9 letter AWIPS Product Identifier, followed by the date/time stamp of the product when it was processed. This date/time stamp will match the stamp assigned to its associated ‘debug’ and ‘output’ files, so that you have the input and output that can be easily matched, along with additional debug information.
- b) OUTPUT directory: Similar to (a) above, but this directory contains all the output (CRS Weather Messages) prepared by NWRWAVES from the files stored in the INPUT directory.
- c) LOGS directory: NWRWAVES keeps a daily log of all its activity. These log files are named using this scheme: [nwrwaves.mmddyy.log](#). These daily logs will track the major processing points of NWRWAVES for every product processed on that day. The ‘checksum’ value is also written here.
- d) DEBUG directory: NWRWAVES will create a unique ‘debug’ file for each product processed in this directory. The debug file naming scheme is: [CCCNXXXX\\_yymmddhhmmssdebug.txt](#) where the CCNNXXXX is the inbound AWIPS product identifier. You will be able to match this file with its corresponding entries in the INPUT and OUTPUT directories. The debug file contains a log of the major and minor processing points of NWRWAVES execution for this particular product.
- e) SUMMARY directory: Any summary messages generated by NWRWAVES are kept in this directory.
- f) ERROR directory: If NWRWAVES crashes for any reason, the core dump of the tcl/tk interpreter, along with a copy of the inbound AWIPS product are placed in this directory. There is also a file kept in the /awips/adapt/NWRWAVES directory called ‘errorout.txt’. This file will exist, and its size will be zero, if NWRWAVES has run successfully for any product.

**NOTE:** The contents of these directories are scoured by an automated cron at the intervals established under Section 3, item 12 of this document under the Summary Message/Miscellaneous Configuration settings. These files contain activity logs of everything sent into, and that comes out of, NWRWAVES.

**NOTE:** NWRWAVES has robust error trapping capabilities built into the software. Should NWRWAVES fail, the operational staff will be alerted by a red-banner message (fxaAnnounce) that the program failed, and they will be directed as to why it failed. Examples of some common failure conditions include: expired UGC time in a product, corrupt product configuration file (hand editing), and corrupt VTEC or UGC lines (hand editing). If a product fails to transmit, sites will at least be able to recognize what didn’t process, then take appropriate action to ensure that the data is broadcast.

- 6) When ‘nwrwaves.tcl’ has finished, it will take appropriate action with its output file(s) for CRS. If you called this file with the ‘nwrwavestest.csh’ file, all output files will be copied to the /awips/adapt/NWRWAVES/TEST directory. If you used the ‘nwrwaves.csh’ file, then the output will be copied to one of two locations:

- a) If your transmission status is set to “CRS” for this NWRWAVES product type, the output will be copied to the ‘/data/fxa/workFiles/nwr/ready’ directory. Baseline AWIPS processes that monitor this directory will then take the output files and send them to CRS.
- b) If your transmission status is set to “Pending” for this NWRWAVES product type, the output will be copied to the ‘/data/fxa/workFiles/nwr/pending’ directory. They will appear in the ‘Pending’ side of the NWRWAVES Browser. Manual intervention through the browser will be required to send the output to CRS.

A complete listing of the NWRWAVES file structure is included in Appendix A.

## 9. WORD/PHRASE REPLACEMENT CAPABILITY

The use of the Voice Improvement Processor (VIP) pre-processor and dictionary capabilities is encouraged to handle most word replacements, but there are some instances where you may want to make corrections before a product is transmitted to CRS. A number of such features are already built into NWRWAVES, including the correction of punctuation, removal of ellipses, etc. However a **WordFile(\_SPN).txt** file is provided with NWRWAVES. Instructions are provided at the top of this file, along with a number of examples within. There are two word replacement files: WordFile.txt (used for all but inbound AWIPS products that end in “SPN”), and WordFile\_SPN.txt (used for Spanish inbound products that have an AWIPS PID that ends in “SPN”).

To modify the word replacement file:

- 1) Open a shell on any AWIPS workstation, with a user account that has ‘fxalpha’ group privileges.
- 2) Type **cd /awips/adapt/NWRWAVES/bin**.
- 3) Type **gedit /awips/adapt/NWRWAVES/bin/WordFile.txt**.
- 4) Add any words or phrases that you want in the prescribed format.
- 5) **Save** and **exit** from the editor when you are done
- 6) Close the active shell.

Some hints and guidelines as to the structure of this file (**NOTE: It is similar to the CAFÉ WordFile.txt file. You should be able to easily port any local changes you have made there into NWRWAVES**):

- a) Use a double pipe (||) to separate the original string from the replacement string.
- b) All white space will be ignored.
- c) Do not use punctuation in the original phrase. NWRWAVES will automatically replace the original phrase even if it is followed by a comma, period, dash, new line or space.
- d) Phone numbers do not require any special entries for replacement, if they are included in your AWIPS text products in a traditional phone number format #‐###‐#### or ###‐###‐####. These formats will be handled correctly in NWRWAVES. If a site formats phone numbers differently in their actual text products, it may not be necessary to do so anymore, as they might get unexpected results.
- e) Related to (d), sites that typically use ranges with a dash (NORTH WINDS 7-11 MPH, HIGHS 77-82) will not get correct wording in an outbound CRS product. These ranges will need to be coded up differently in AWIPS text products.
- f) For advanced users, the use of regular expressions is allowed and encouraged. Do not surround any regular expressions with quotes or braces {}.

An excellent reference to how regular expressions can be crafted can be found in the black Tcl/Tk Welch Book, "Practical Programming in Tcl and Tk". Pages 121-126 are most insightful. Examples of some common regular expressions are:

**[0-9][0-9][0-9][0-9]Z ||**

Replaces UGC time references in products such as '1200Z'

**[HPMCEA][DS]T ||**

For time zone replacement, you can use this regular expression to take out time zone references in a product. In the baseline WordFile.txt, this line is commented out. Uncomment the line (take out the leading # symbol) if you want to filter out all time zones. If your office has multiple time zones, you may want to modify this to take out the most common one (i.e., take out C in the first bracketed area to mention Central Daylight/Standard Time but mention Mountain Time.

**SEE LAKE ONTARIO OPEN LAKES FORECAST FOR [^/n]+ ||**

This is an example of how to code up a replacement for a common phrase, where wording may vary at the end such as the end of the week. The following phrase might be commonly found in a Near Shore Forecast: SEE LAKE ONTARIO OPEN LAKES FORECAST FOR FRIDAY THROUGH THURSDAY.

- g) Do not duplicate entries here with those that already exist in your VIP dictionary. This file is ideal for overriding CRS generalities such as:
- FT to be read as FEET
  - Stripping the time zones off of time stamps in products (see (d) above)
  - Pausing long phrases

## 10. SWAPS Capability

SWAPS capability is another level of word replacement within the lead-in's for different NWRWAVES products. This feature allows the forecasters to substitute/replace the wordings for 2 or more or a group of counties by a simple phrase. See example in the `localswaps.txt` of how to use the SWAPS option.

## 11. OPTIONS TO PARSE CALL-TO-ACTION IN NWS ALERT MESSAGES

In OB9 release, AWIPS warning generation tools such as WarnGen, GFE/GHG, and RiverPro will add a pair of unique markers between the Call-To-Action (CTA) Statements in many of the text products (see Appendix-E). It is part of the capabilities specified in OSIP #07-024 project - Formatting NWS Alert Messages in CAP. The current proposed solution for the CTA markers is:

(blank line)

PRECAUTIONARY/PREPAREDNESS ACTIONS...

(blank line)

(single- or multi-line text content of call-to-action, instructions, etc. here)

(blank line)

&&

(blank line)

In OB9 release, AWIPS warning generation tools such as WarnGen, GFE/GHG, and RiverPro will add a pair of unique markers between the Call-To-Action (CTA) Statements in many of the text products (see Appendix-E). It is part of the capabilities specified in OSIP #07-024 project - Formatting NWS Alert Messages in CAP. The current proposed solution for the CTA markers is:

For the NWR purpose, NWRWAVES will remove the markers. Also, based on the particular hazard, NWRWAVES will provide the WFOs the option to either broadcast the corresponding CTAs or not (i.e., turn on/off the broadcast of the CTAs). In AWIPS OB8.3 release, an experimental option was added in the NWRWAVES GUI to allow the WFOs to turn on/off the CTAs for all the Marine Weather Warnings (MWW) products. The option applied globally for all the MWW products but not the individual VTEC phenomena/significance. In OB9 release, this MWW CTA GUI selection has been removed and a site-level (non-GUI base) configuration file would be used to control the CTA statements.

In OB9, all CTAs will NOT be removed by default unless the WFO NWRWAVES focal point would enter an entry or entries of configuration data in a newly created ASCII configuration file /awips/adapt/NWRWAVES/bin/NO\_CTA.ini. The only way to filter out the CTA is to enter both the Product Type AND the corresponding VTEC entry or a VTEC entry with action codes separate by a comma.

The following is an example of the CTA configuration file:

```
#####
NWRWAVES Call-To-Action related config FILE: NO_CTA.ini
#####
By default, all the CTA statements will be part of
the warning products. The only way to remove the CTA
statements is by creating the following entries:
#####
(1) Product type e.g. NPW AND (2) either a VTEC event
code e.g. TO.W (apply for all action codes)
or a VTEC phenomena/significance plus action codes
separate by a comma.
#####
The following are two examples of removing the CTA
statements associate with wind advisory and Lake wind
in the NPW product type:
#####
NPW
WI.Y
LW.Y,NEW,CON
#####
These three entries combination will instruct the
NWRWAVES to remove the CTA statements from the NPW
product output.
#####
In the case of mutiple VTECs within a given segment, if
one or more VTEC(s) is not specified in this file, then
all the CTA statements will be output automatically for
#####
```

```
that particular segment.
#####
There are 2 exceptions that user can turn off the OVR
overview products without CTA by entering the following
entry(ies):
FLWOVR
FLSOVR
The FLW or FLS (hydro) products are the only two with
the CTA in the overview section being removed from the
OVR product.
#####
Base on product type and VTEC phenomena/significance e.g. NPW and WI.
NPW
WI.Y

Base on product type and VTEC phenomena/significances plus selected actions
MW
SC.Y,CON,EXA

EndOfFile
```

To completely remove all the CTAs for the VTEC phenomena/significance such as "SV.W" for example, the user needs to enter two product types (e.g. SVR and SVS) in the configuration file-

SVR  
SVS  
SV.W,NEW,CON,EXP,CAN

or

SVR  
SV.W,NEW  
SVS  
SV.W,CON,EXP,CAN

Say if the user removes the "SVR" line from the configuration file:

SVS  
SV.W,NEW,CON,EXP,CAN

Then, the CTA associates with the action code of "NEW" will never be removed from the output since only the "SVR" products can have the "NEW" action. Or specifically, NWRWAVES skips the code to process CTA since the product type "SVR" is not specified in the configuration file.

When there are multiple VTEC events described within the same product or product segment, there may be more than one CTA. If one or more of the VTEC events are not specified in the CTA configuration file in a given product or product segment, then the entire CTA section between the CTA markers shall be broadcast. In other words, more than one CTA may be broadcast. If only the start CTA marker exists in a product without the end CTA marker (&&), NWRWAVES would broadcast the text that follows the start CTA marker regardless of any WFO-level CTA option configuration.

## 12. LESSONS LEARNED AND RESOURCES AVAILABLE

An NWRWAVES resource web site has been created for support purposes. This site is located under the CRS web site maintained by NWS Headquarters (<http://www.weather.gov/ops2/crs/nwrwaves.htm>). This web site contains an FAQ list, various documentation for NWRWAVES, and a link to the NWRWAVES listserver.

NWRWAVES support is administered through the NCF. Sites experiencing difficulties with NWRWAVES should call the NCF and open a trouble ticket. The NCF will provide Tier 1 support for offices using NWRWAVES. If the NCF believes that Tier 2 support is necessary, they will contact the appropriate Tier 2 support group. **Tier 2 support is now the CRS Operations Group at NWSHQ.**

General support questions can and should be referred to the NWRWAVES Listserver. If you're in need of general support or just have a question regarding NWRWAVES (no imminent problem or NCF support needed for a failure), the best mechanism for support is as follows:

- a. If the problem you're experiencing is impacting operational use, contact the NCF and open a trouble ticket.
- b. If it is not an imminent issue, check your question against the FAQ list on the NWRWAVES web site. If your question has been encountered before, you will find the solution posted here.
- c. If the question is not readily visible on the FAQ list, post it to the list server. This way, everyone who has been working with the software can see your situation, and you can get help from other NWRWAVES users. Operational questions, configuration issues and questions should be submitted to the NWRWAVES list server to ensure the quickest response possible.

To sign up for the NWRWAVES list server, go to the following URL: <http://infolist.nws.noaa.gov/read/login/> Input your e-mail address and e-mail password, then select the All Forums Tab. Scroll down to NWRWAVES and click on subscribe. You will receive information back from the listserver concerning use of the forum

# APPENDIX A – COMPLETE NWRWAVES FILE LISTING

## MAIN INSTALL DIRECTORY LISTING

```

drwxrwxrwx 2 fxa fxalpha 28672 Apr 27 16:47 BACKUP
drwxrwxrwx 2 fxa fxalpha 4096 Apr 23 11:29 bin
drwxrwxrwx 2 fxa fxalpha 4096 Apr 24 13:35 browser
drwxrwxrwx 2 fxa fxalpha 139264 Apr 28 21:14 DEBUG
drwxrwxrwx 2 fxa fxalpha 4096 Apr 15 22:10 ERROR
-rw-rw-r-- 1 fxa fxalpha 0 Apr 28 21:14 errorout.txt
-rw-rw-r-- 1 fxa fxalpha 37 Apr 28 21:14 FILENAME.LAST
drwxrwxrwx 2 fxa fxalpha 73728 Apr 28 21:14 INPUT
drwxrwxrwx 2 fxa fxalpha 4096 Apr 28 01:40 LOGS
-rw-rw-rw- 1 fxa fxalpha 18 Apr 5 19:49 NONVTECMRD.txt
-rwxrwxr-x 1 fxa fxalpha 4265 Apr 9 17:47 nwrwaves.csh
-rwxrwxrwx 1 fxa fxalpha 1026 Feb 23 18:48 NWRWAVESpurge.sh
-rw-rw-r-- 1 fxa fxalpha 4 Apr 2 16:22 NWRWAVES_RELEASE_ID
-rwxrwxr-x 1 fxa fxalpha 212320 Mar 24 23:45 nwrwaves_setup.tcl
-rwxrwxr-x 1 fxa fxalpha 160858 Apr 9 18:10 nwrwaves.tcl
-rwxrwxr-x 1 fxa fxalpha 4270 Apr 9 18:21 nwrwavestest.csh
drwxrwxrwx 2 fxa fxalpha 49152 Apr 28 21:14 OUTPUT
-rwxrwxrwx 1 fxa fxalpha 788 Feb 18 15:16 pendingDirCheck
-rw-rw-r-- 1 fxa fxalpha 14738 Apr 26 19:37 product.cfg
-rw-rw-r-- 1 fxa fxalpha 14375 Apr 2 16:22 product.cfg.V2.4
-rw-rw-rw- 1 fxa fxalpha 15 Apr 27 17:01 purge.cfg
drwxrwxrwx 2 fxa fxalpha 4096 Apr 28 21:14 QUEUE
-rwxrwxrwx 1 fxa fxalpha 1467 Feb 23 18:48 removeExpiredNWR.sh
drwxrwxrwx 2 fxa fxalpha 4096 Apr 16 01:21 SUMMARY
drwxrwxrwx 2 fxa fxalpha 4096 Mar 24 16:32 TEST
-rw-rw-rw- 1 fxa fxalpha 4704 Mar 25 00:03 UGClookup_changes.txt
-rwxrwxr-x 1 fxa fxalpha 2941 Feb 18 15:17 updateSUMMARY.csh

```

## NWRWAVES bin DIRECTORY LISTING

```

-rwxrwxr-x 1 fxa fxalpha 9039 Feb 18 15:17 clocktime.tcl
-rwxrwxr-x 1 fxa fxalpha 15098 Feb 18 15:17 color_msgbox.tcl
-rwxrwxr-x 1 fxa fxalpha 64430 Feb 18 15:17 combobox.tcl
-rwxrwxr-x 1 fxa fxalpha 2211 Feb 18 15:17 dialog.tcl
-rw-rw-rw- 1 fxa fxalpha 44 Dec 2 08:52 localUGClookup.table
-rwxrwxr-x 1 fxa fxalpha 5104 Feb 18 15:17 notebook.tcl
-rwxrwxr-x 1 fxa fxalpha 923 Feb 18 15:17 pkgIndex.tcl
-rwxrwxrwx 1 fxa fxalpha 1545 Feb 18 15:17 relinkNWRWAVESBrowser.sh
-rw-rw-rw- 1 fxa fxalpha 230042 Mar 25 00:06 UGClookup.table
-rwxrwxr-x 1 fxa fxalpha 27118 Mar 14 16:51 UGC_VTEC_Decoder.tcl
-rw-rw-rw- 1 fxa fxalpha 751 Feb 18 15:17 VTECrank.ini
-rw-rw-rw- 1 fxa fxalpha 1715 Feb 15 19:32 WordFile_SPN.txt
-rwxrwxrwx 1 fxa fxalpha 3315 Jan 24 19:47 WordFile.txt
-rw-rw-rw- 1 fxa fxalpha 717 DEC 13 13:01 localSWAPS.txt
-rw-rw-rw- 1 fxa fxalpha 717 Apr 13 13:01 NO_CTA.ini
-rw-rw-rw- 1 fxa fxalpha 717 Apr 13 13:01 NWEM.cfg

```

NWRWAVES BROWSER DIRECTORY LISTING

-rw-r--r--	1	fxa	fxalpha	57	Apr 24	13:33	admin.list
-rw-rw-rw-	1	fxa	fxalpha	1118	Mar 24	22:36	browser.cfg
-rw-rw-rw-	1	fxa	fxalpha	267	Mar 24	22:36	browser.ini
-rwxrwxr-x	1	fxa	fxalpha	66988	Mar 24	23:42	browser.tcl
-rw-rw-rw-	1	fxa	fxalpha	5	Apr 27	17:01	pending.cfg
-rw-rw-rw-	1	fxa	fxalpha	95	Apr 27	17:01	pils.list
-rwxrwxr-x	1	fxa	fxalpha	12788	Mar 24	22:36	update.tcl

## APPENDIX B – EXAMPLE OF EAX siteTrigger.template FILE FOR NWRWAVES

```

STLSVREAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLSVRLSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLSVRSGF /awips/adapt/NWRWAVES/nwrwaves.csh
TOPSVRTOP /awips/adapt/NWRWAVES/nwrwaves.csh
DSMSVRDMX /awips/adapt/NWRWAVES/nwrwaves.csh
CHISVRDVN /awips/adapt/NWRWAVES/nwrwaves.csh
OMASVROAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLTORREAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLTORLSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLTORSGF /awips/adapt/NWRWAVES/nwrwaves.csh
TOPTORTOP /awips/adapt/NWRWAVES/nwrwaves.csh
DSMTORDMX /awips/adapt/NWRWAVES/nwrwaves.csh
CHITORDVN /awips/adapt/NWRWAVES/nwrwaves.csh
OMATOROAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFWEAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFWLSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFWSGF /awips/adapt/NWRWAVES/nwrwaves.csh
TOPFFWTOP /awips/adapt/NWRWAVES/nwrwaves.csh
DSMFFWDMX /awips/adapt/NWRWAVES/nwrwaves.csh
CHIFFWDVN /awips/adapt/NWRWAVES/nwrwaves.csh
OMAFFWOAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFAEAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFALSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFASGF /awips/adapt/NWRWAVES/nwrwaves.csh
TOPFFATOP /awips/adapt/NWRWAVES/nwrwaves.csh
DSMFFADMX /awips/adapt/NWRWAVES/nwrwaves.csh
CHIFFADVN /awips/adapt/NWRWAVES/nwrwaves.csh
OMAFFAOAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFSEAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFSLSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFFSSGF /awips/adapt/NWRWAVES/nwrwaves.csh
CHIFFSDVN /awips/adapt/NWRWAVES/nwrwaves.csh
DSMFFSDMX /awips/adapt/NWRWAVES/nwrwaves.csh
TOPFFSTOP /awips/adapt/NWRWAVES/nwrwaves.csh
OMAFFSOAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFLWEAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFLWLSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFLWSGF /awips/adapt/NWRWAVES/nwrwaves.csh
CHIFLWDVN /awips/adapt/NWRWAVES/nwrwaves.csh
TOPFLWTOP /awips/adapt/NWRWAVES/nwrwaves.csh
OMAFLWOAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFLSEAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFLSLSX /awips/adapt/NWRWAVES/nwrwaves.csh
STLFLSSGF /awips/adapt/NWRWAVES/nwrwaves.csh
CHIFLSDVN /awips/adapt/NWRWAVES/nwrwaves.csh
TOPFLSTOP /awips/adapt/NWRWAVES/nwrwaves.csh
OMAFLSOAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLWSWEAX /awips/adapt/NWRWAVES/nwrwaves.csh
STLWSWLSX /awips/adapt/NWRWAVES/nwrwaves.csh
TOPWSWTOP /awips/adapt/NWRWAVES/nwrwaves.csh
OMAWSWOAX /awips/adapt/NWRWAVES/nwrwaves.csh

```

CHIWSWDVN	/awips/adapt/NWRWAVES/nwrwaves.csh
DSMWSWDMX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLWSWSGF	/awips/adapt/NWRWAVES/nwrwaves.csh
STLNOWEAX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLNOWLSX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLNOWSGF	/awips/adapt/NWRWAVES/nwrwaves.csh
CHINOWDVN	/awips/adapt/NWRWAVES/nwrwaves.csh
DSMNOWDMX	/awips/adapt/NWRWAVES/nwrwaves.csh
TOPNOWTOP	/awips/adapt/NWRWAVES/nwrwaves.csh
OMANOWOAX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLNPWEAX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLNPWLX	/awips/adapt/NWRWAVES/nwrwaves.csh
CHINPWDVN	/awips/adapt/NWRWAVES/nwrwaves.csh
DSMNPWDMX	/awips/adapt/NWRWAVES/nwrwaves.csh
OMANPWOAX	/awips/adapt/NWRWAVES/nwrwaves.csh
TOPNPWTOP	/awips/adapt/NWRWAVES/nwrwaves.csh
STLNPWSGF	/awips/adapt/NWRWAVES/nwrwaves.csh
STLPNSEAX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLHWOEAX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLSPSEAX	/awips/adapt/NWRWAVES/nwrwaves.csh
STLRWSEAX	/awips/adapt/NWRWAVES/nwrwaves.csh

## APPENDIX C – NWRWAVES Cron Jobs

NWRWAVES has four background cron jobs. All the cron jobs run on dx2 as user fxa, except during a failover when they will run on dx1. The cron jobs are listed below:

```
Crontab file for starting dx2apps NWRWAVES purge processes.

Any entry that needs to use ${FXA_HOME} or ${FXA_DATA} should use "csh -c"
to run the command. The command and any output redirection to a file must
all be include in single quotes after the "-c". The output redirection
will then be done by the csh so it must use csh syntax.

PURGER/SCOUR...
Run NWRWAVESpurge.sh daily to clean DEBUG LOGS OUTPUT INPUT
and TEST Directories
45 0 * * * csh -c '/awips/adapt/NWRWAVES/NWRWAVESpurge.sh >& /dev/null'

Run removeExpiredNWR.sh twice an hour to remove any expired or
corrupt files from pending and sent side of NWRWAVESBrowser
20,40 * * * * csh -c '/awips/adapt/NWRWAVES/removeExpiredNWR.sh >& /dev/null'

OTHER NWRWAVES Cron jobs
Summary Update Script, updateSUMMARY.csh, four times an hour to
update the summary message
00,15,30,45 * * * * csh -c '/awips/adapt/NWRWAVES/updateSUMMARY.csh >& /dev/null'

Run the Pending Directory Check Script, pendingDirCheck, every ten minutes
to check for old messages in the pending directory
00,10,20,30,40,50 * * * * csh -c '/awips/adapt/NWRWAVES/pendingDirCheck >& /dev/null'
```

**NWRWAVESpurge.sh** – Runs once a day 00:45Z. It purges files in the DEBUG, LOGS, INPUT, OUTPUT and TEST directories. Purge settings are contained in the file /awips/adapt/NWRWAVES/purge.cfg and are modified by using the NWRWAVES Setup GUI.

**removeExpiredNWR.sh** – Runs twice an hour at 20 and 40 minutes past. It removed expired and corrupt messages from the /data/fxa/workFiles/nwr/pending and /data/fxa/workFiles/nwr/sent directories.

**updateSUMMARY.csh** – Runs four times an hour at 00, 15, 30, and 45 minutes past. It forces an update of any active NWRWAVES Summary messages.

**pendingDirCheck** – Runs six times an hour at 00, 10, 20, 30, 40, and 50 minutes past. It checks for stale messages in the /data/fxa/workFiles/nwr/pending directory. If a stale message is detected, then an fxaAnnounce Red Banner message is sent. The time a messages needs to sit in the pending directory before it is considered stale is configured in the NWRWAVES Setup GUI. This script can also be disabled in the NWRWAVES Setup GUI.

## APPENDIX D – Instructions for implementing MWW Watch/Warnings/Advisories

The following is a list of the applicable Watches, Warnings and Advisories that can be issued with the Marine Weather product (MWW) along with the associated V-TEC code, Issuance and Followup headers.

<b>Marine Watches</b>			
<b>Products</b>	<b>VTEC</b>	<b>Issuance Header</b>	<b>Followup Header</b>
Hurricane Force Wind Watch	HF.A	MWW	MWW
Storm Watch	SR.A	MWW	MWW
Gale Watch	GL.A	MWW	MWW
Hazardous Seas Watch	SE.A	MWW	MWW
Heavy Freezing Spray Watch	UP.A	MWW	MWW

<b>Marine Warnings</b>			
<b>Products</b>	<b>VTEC</b>	<b>Issuance Header</b>	<b>Followup Header</b>
Hurricane Force Wind Warning	HF.W	HUW	HUW
Storm Warning	SR.W	MWW	MWW
Gale Warning	GL.W	MWW	MWW
Hazardous Seas Warning	SE.W	MWW	MWW
Heavy Freezing Spray Warning	UP.W	MWW	MWW

<b>Marine Advisories</b>			
<b>Products</b>	<b>VTEC</b>	<b>Issuance Header</b>	<b>Followup Header</b>
Ashfall Advisory	AF.Y	NPW	NPW
Brisk Wind Advisory	BW.Y	MWW	MWW
Dense Fog Advisory	FG.Y	NPW	NPW
Dense Smoke Advisory	SM.Y	NPW	NPW
Freezing Spray Advisory	UP.Y	MWW	MWW
Low Water Advisory	LO.Y	MWW	MWW
Small Craft Advisory	SC.Y	MWW	MWW
Small Craft Advisory for Hazardous Seas	SW.Y	MWW	MWW
Small Craft Advisory for Rough Bar	RB.Y	MWW	MWW
Small Craft Advisory for Winds	SI.Y	MWW	MWW

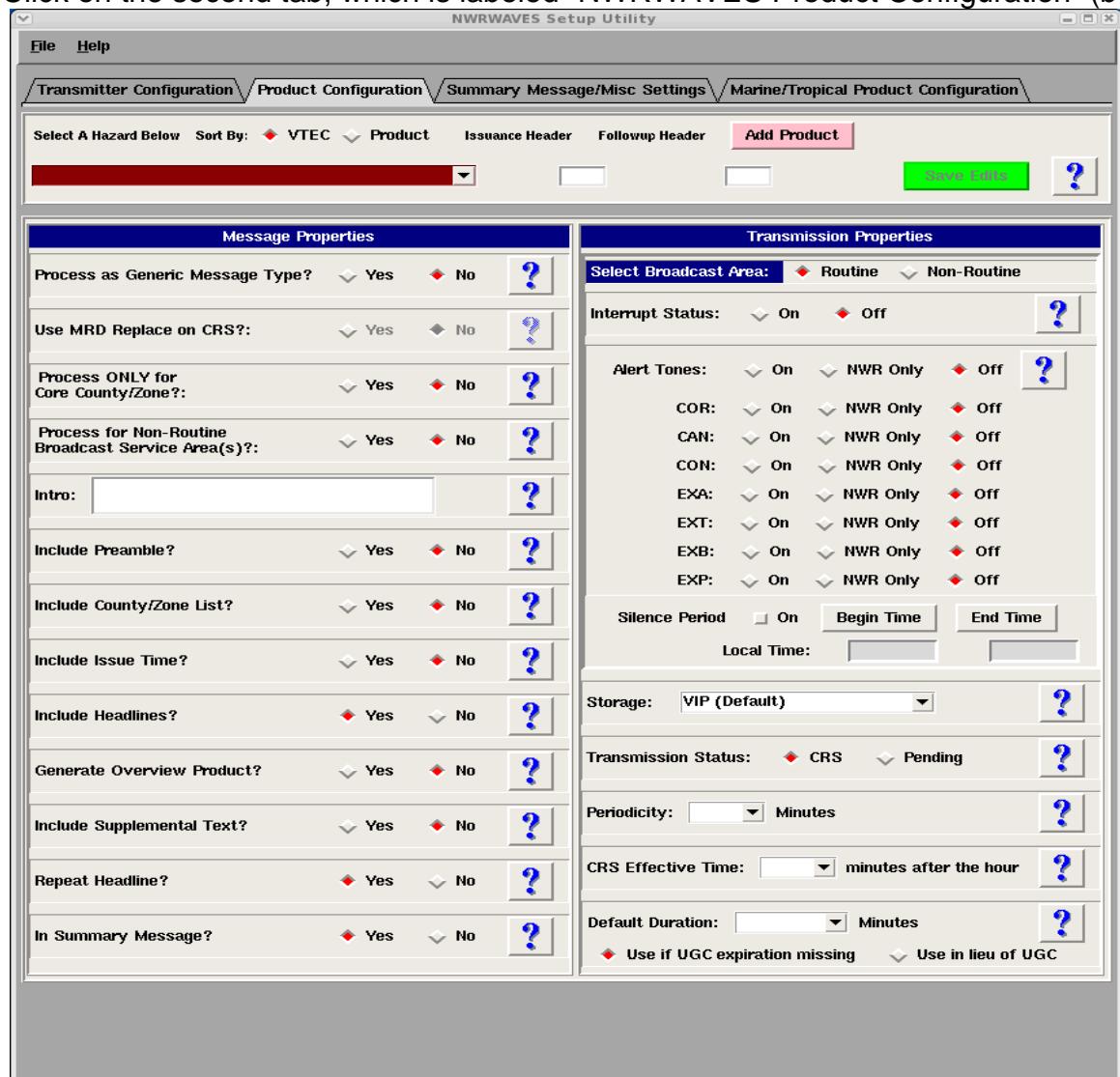
Each of the marine sites will have to configure the MWW entries according to their needs. The following is an example of how to configure an MWW for Small Craft Advisory (SC.Y).

## Instructions for implementing Small Craft Advisory (SC.Y) NWRWAVES (OB8.2 and older)

There are two basic steps needed to implement SC.Y products into NWRWAVES. The first is to create the product and configure it within NWRWAVES, and the second is to create the textdb trigger for the new MWW AWIPS product.

### 1. Create the SC.Y product within NWRWAVES

- From the NWRBrowser on AWIPS, launch the NWRWAVES Setup GUI.
- Click on the second tab, which is labeled “NWRWAVES Product Configuration” (below).

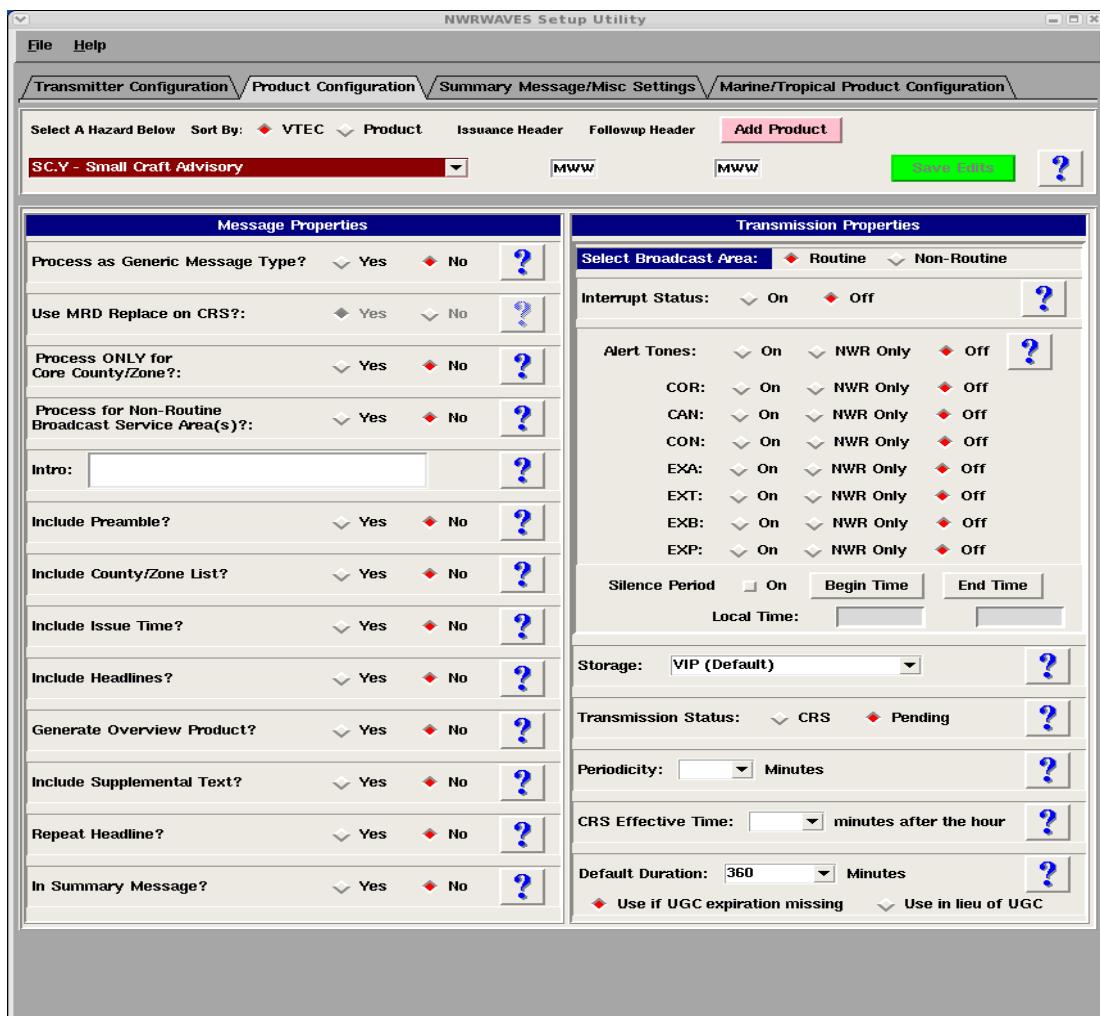


- Click the pink ‘Add Product’ button.

- d) In the new GUI that pops up, enter in the text boxes exactly what you see in the example below.



- e) Click OK, then click the green 'Save Edits' button in the NWRWAVES Setup GUI.  
f) Confirm your settings: from the NWRWAVES product dropdown menu, select the product "SC.Y – Small Craft Advisory". Your GUI should match the one below; if it doesn't make adjustments to the appropriate fields and then save those changes. Don't forget to ensure your alert settings for the Non-Routine Broadcast Area!



You are done configuring the SC.Y product in NWRWAVES. Since the SC.Y uses the CWF code for

EAS activation (and for simplicity sake we'll use the MWW follow-up header), your CRS database is already configured to accept the new SC.Y products.

2. Configuring your textdb triggers to execute NWRWAVES for the new MWW product(s). For a complete explanation of setting up text database triggers for NWRWAVES, please refer to the NWRWAVES User Documentation, pages 28-29:

- a. Log into an AWIPS workstation with a user account that has fxalpha group privileges and open up a terminal window.
- b. Change directories to the trigger directory.

**cd /data/fxa/siteConfig/textApps**

- c. Make a backup copy of your site trigger information, in case you need to revert back to it.

**cp siteTrigger.template siteTrigger.template.mmddyyyy**

where 'mmddyyyy' is the numeric current date

- d. Edit your site trigger configuration.

**gedit siteTrigger.template &**

When you view this file, you will see a listing of AWIPS product identifiers, along with an action that is to be completed upon receipt of that product identifier into the text database. Enter the following line into your trigger

- a. file:

**CCCMWWXXX /awips/adapt/NWRWAVES/nrwaves.csh**

Be sure to include every local office MWW product that you need for your NWR coverage areas. "CCC" refers to the legacy state node, while "XXX" is the 3-character WFO identifier.

- e. Save and exit your siteTrigger.template file

- f. Log onto dx1

**ssh dx1**

- g. Change user to fxa and type the following commands:

**su – fxa**

**cd /awips/fxa/data/localization/scripts**

**./mainScript.csh**

## APPENDIX E – A List of Product Identifier in OB9 with the new Instruction (CTA) Markers

AVA, AVW, CAE, CDW, CEM, CWF, EQW, EVI, FFA, FRW, HLS, HMW, LAE, LEW, MWS, MWW, NPW, NUW, RFW, RHW, SPW, TOE, VOW, WSW, FFA, FLS, FLW, EWW, FFS, FFW, SMW, SVR, SVS, TOR

NOTE: Some products, namely the stand-alone MWS (MWS that does not follow-up a SMW) and Non-Weather Emergency Message (NWEM) products that originate in HazCollect, initially will not contain CTA Markers.

## APPENDIX F – New features to support HLS products and operations

Since June 2008, the Hurricane Local Statement (HLS) products issued by the sites are segmented products with VTEC containing the Tropical Storm/Hurricane Watch/Warnings. During the 2008 tropical season, NWRWAVES created HLS radio products that were very lengthy and essentially unreadable on NWR. The resulting radio products made cycles upwards of 30 minutes long which is unacceptable for a severe weather event. A small enhancement was made in OB9 release to allow sites to choose overview and to reduce the HLS sub-headlines sent to the NWR. Instead of formatting the incoming HLS messages without user's attention, the NWRWAVES is now requires some user's interaction by sending a series (total of 3) of HLS related Guardian banners to alert users to run the HLS Setup GUI to make sub-headline selections when a new HLS message arrives. See Figure 1 for samples. This will require even more interaction for sites with multiple HLS products. From the HLS operation perspective, the NWRWAVES software now requires the support of two separate roles - administrators to set up the HLS configuration and regular users to make sub-headline selections when a new HLS message arrives.

This is the 1<sup>st</sup> call message (priority is set to 3):



This 2<sup>nd</sup> message sends with an audio alarm (priority is set to 2):



This is the 3<sup>rd</sup> or last call or 2 minutes warning (priority is set to 1):



Figure 1 – Three examples of Guardian messages alert users to launch the HLS GUI.

To set up the HSL banners in AWIPS II, the NWRWAVES administrators may need to logon to the graphic workstation(s) where you want the HLS banners show up and perform the following steps:

- 1) Right click on the AlertViz icon , and select “Configuration...”
- 2) At the top left box under Category, clicked on New button and added TROPICAL (as shown in Figure 1-a below).
- 3) Select “Save” to save and exit.

Users should consult the AWIPS II Alert Visualization Configuration related documentation for details.

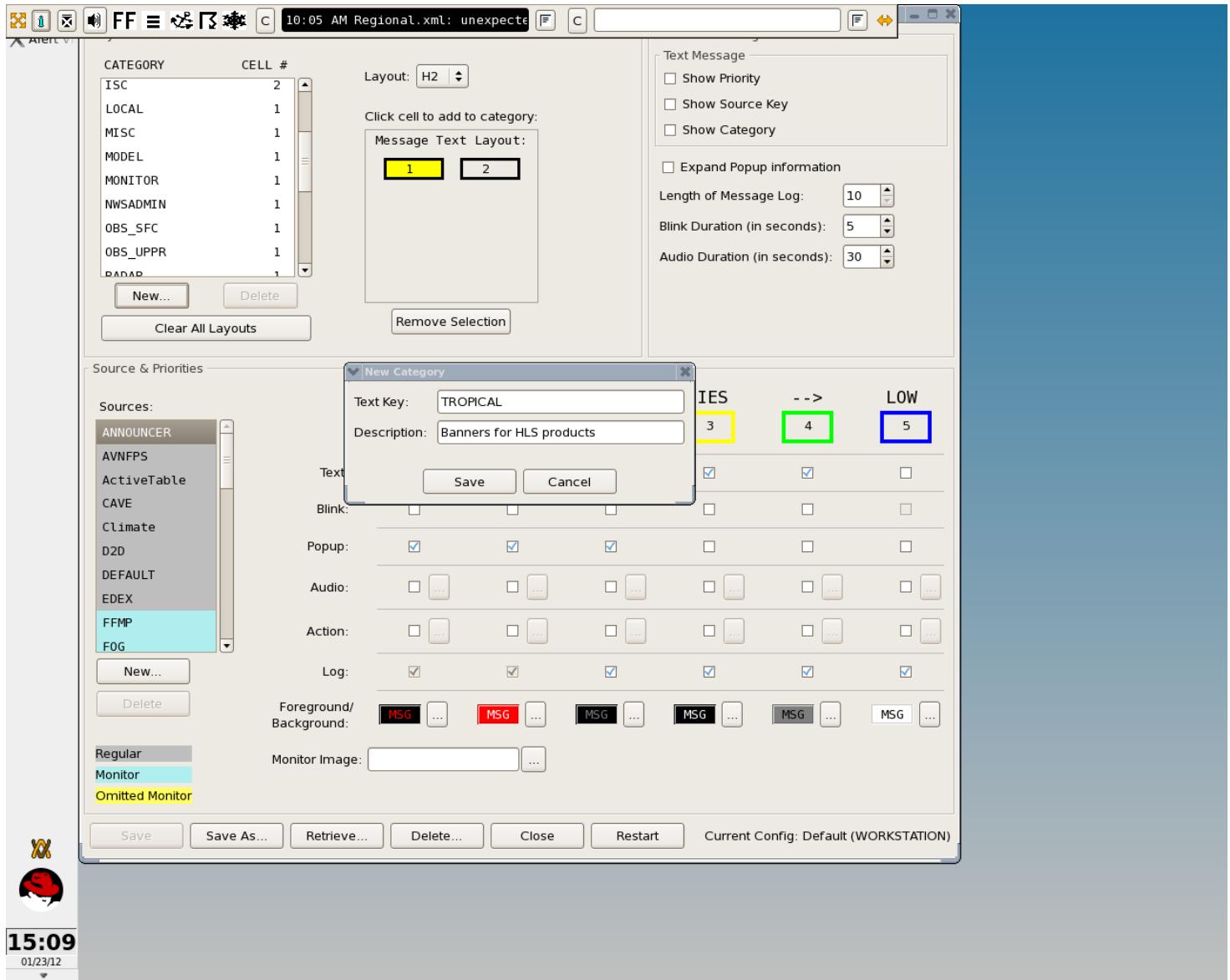


Figure 1-a – Define banners for HLS in AWIPS II via the AlertViz GUI.

### Part I - Administrator's Role: (must be performed in-advance)

The NWRWAVES administrators will need to set up the AWIPS text database triggers in order to process the HLS products automatically (see section 5 of this User's Guide).

The following are the procedures to launch the HLS Setup GUI for the administrator:

From the AWIPS graphical workstation, select NWRBrowser via the appLauncher.

Go to the “NWRWAVES” pull-down menu, select the option “NWRWAVES Setup” (Figure 2). You will see the NWRWAVES Setup GUI pop-up on your AWIPS screen.

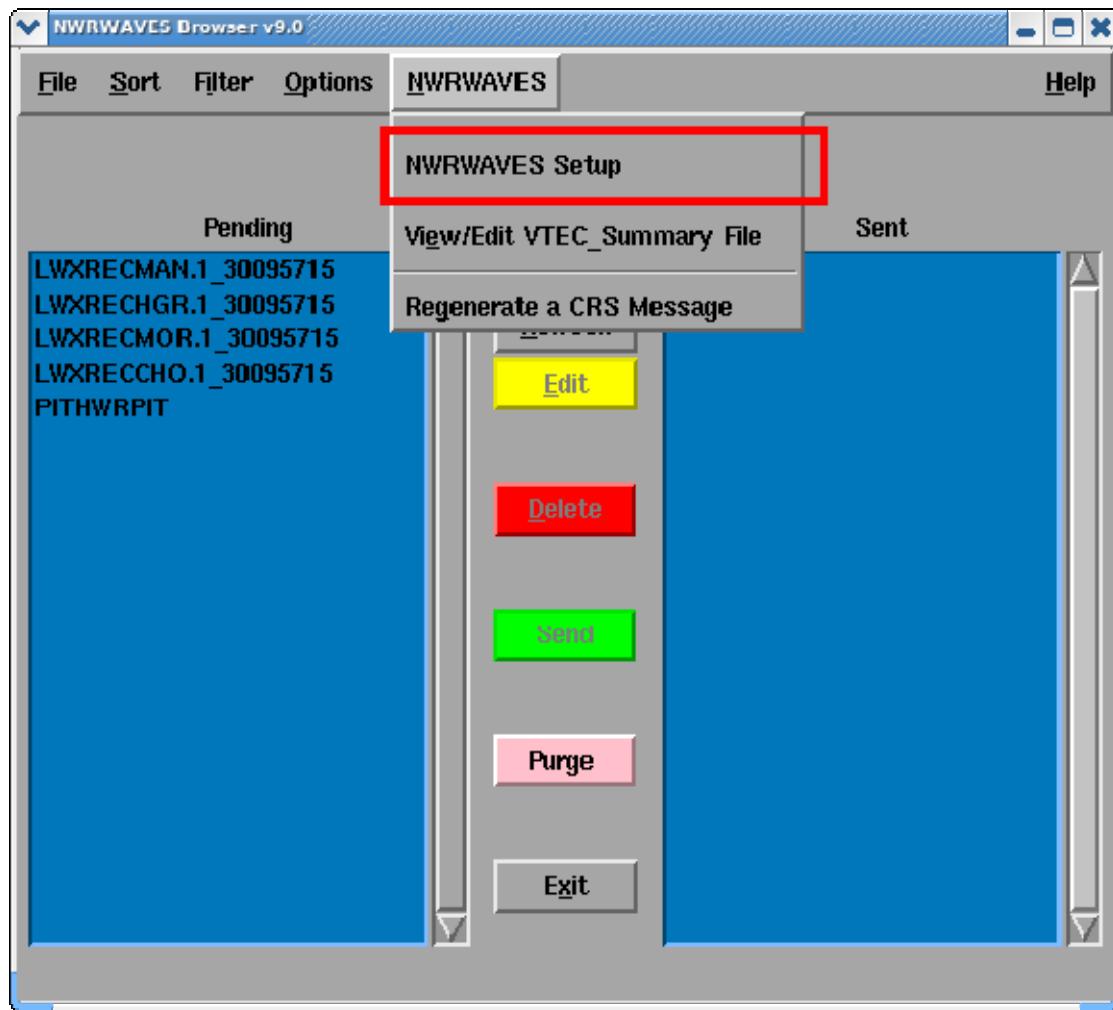


Figure 2- Launching the HLS Setup GUI for administrators via the NWRBrowser

Select the 4<sup>th</sup> “Marine/Tropical Product Configuration” tab (see Figure 3). Under the “Hurricane Local Statement” section, you should see the label “Subheadlines Selection and HLS Transmitter Configuration” and click on the new “**Change Settings**” button (CYAN color) to activate the HLS Setup GUI.

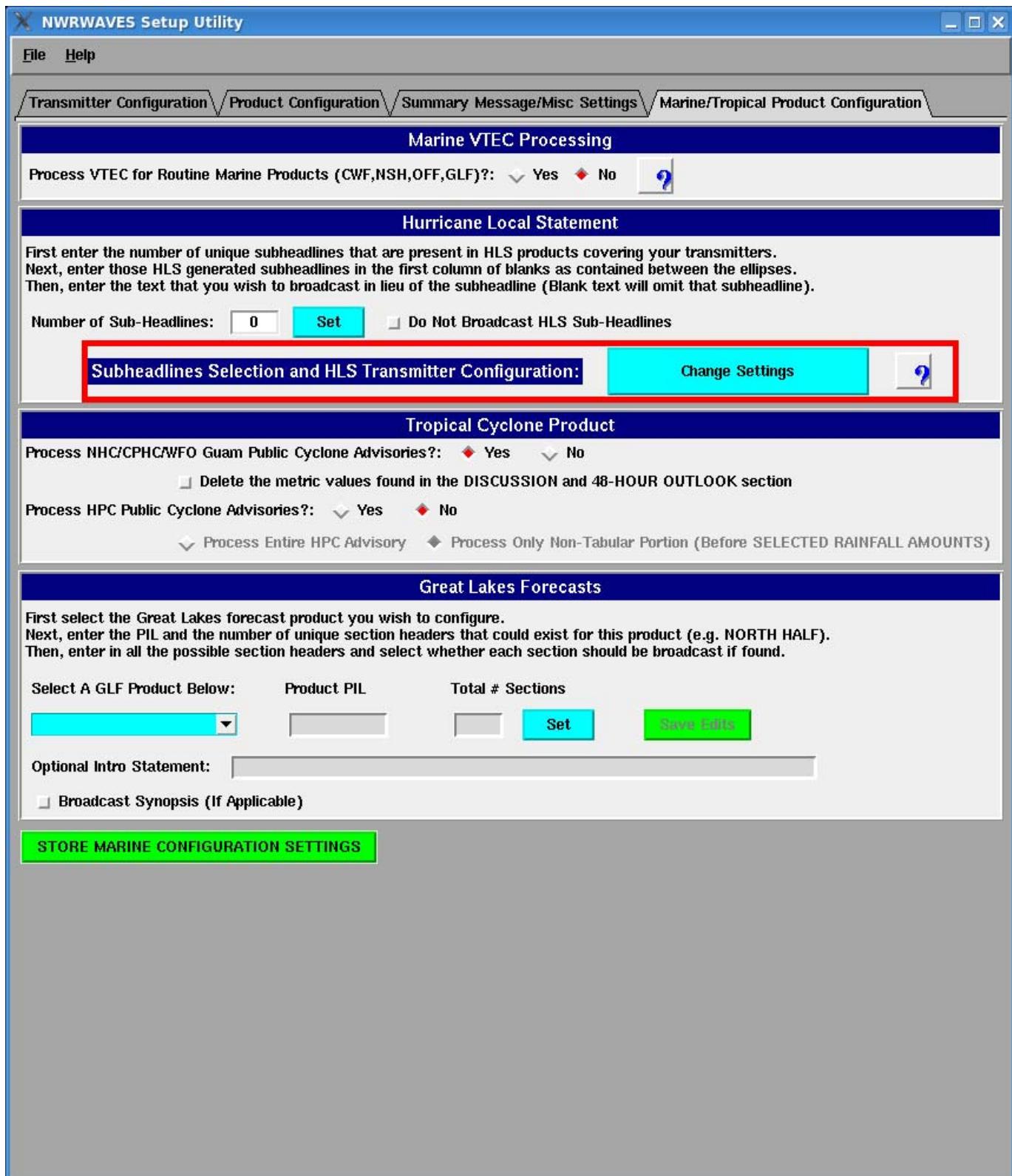


Figure 3- A new button is added to run HLS Setup from the NWRWAVES Setup GUI

Upon the selection of “Change Settings” button, the new HLS Setup Utility GUI should pop up as shown in Figure 4. For sites that only have a local HLS product set up, you will not see the File->“Open … Site ID” (highlighted in red).

ATAN 991 was delivered to address a deficiency of not being able to support multiple HLSs found in the OB9 version. Many sites want to have the capability to make subheadline selections customizable for different sites. For example, Sterling, Va WFO Office (LWX) also process the neighbors’ HLS messages (e.g. WBCHLSAKQ and PHLHLSPHI) in addition to the local HLS (e.g. WBCHLSLWX). In order to support the subheadline selections for multiple HLSs, the administrator can create (via your favorite editor) an ASCII file “hls\_sites.list” (all lower case) in the NWRWAVES directory (/awips/adapt/NWRWAVES on dx1 or dx2 machines) with a 3 characters neighbor site ID per line. For example (LWX Office), the file contains the following 2 lines:

akq  
phi

Once the “hls\_sites.list” file is created, the HLS Setup GUI should be able to create and read a site dependent configuration file (e.g. “hls\_cfg.XYZ, where XYZ is the site ID) for the HLS users.

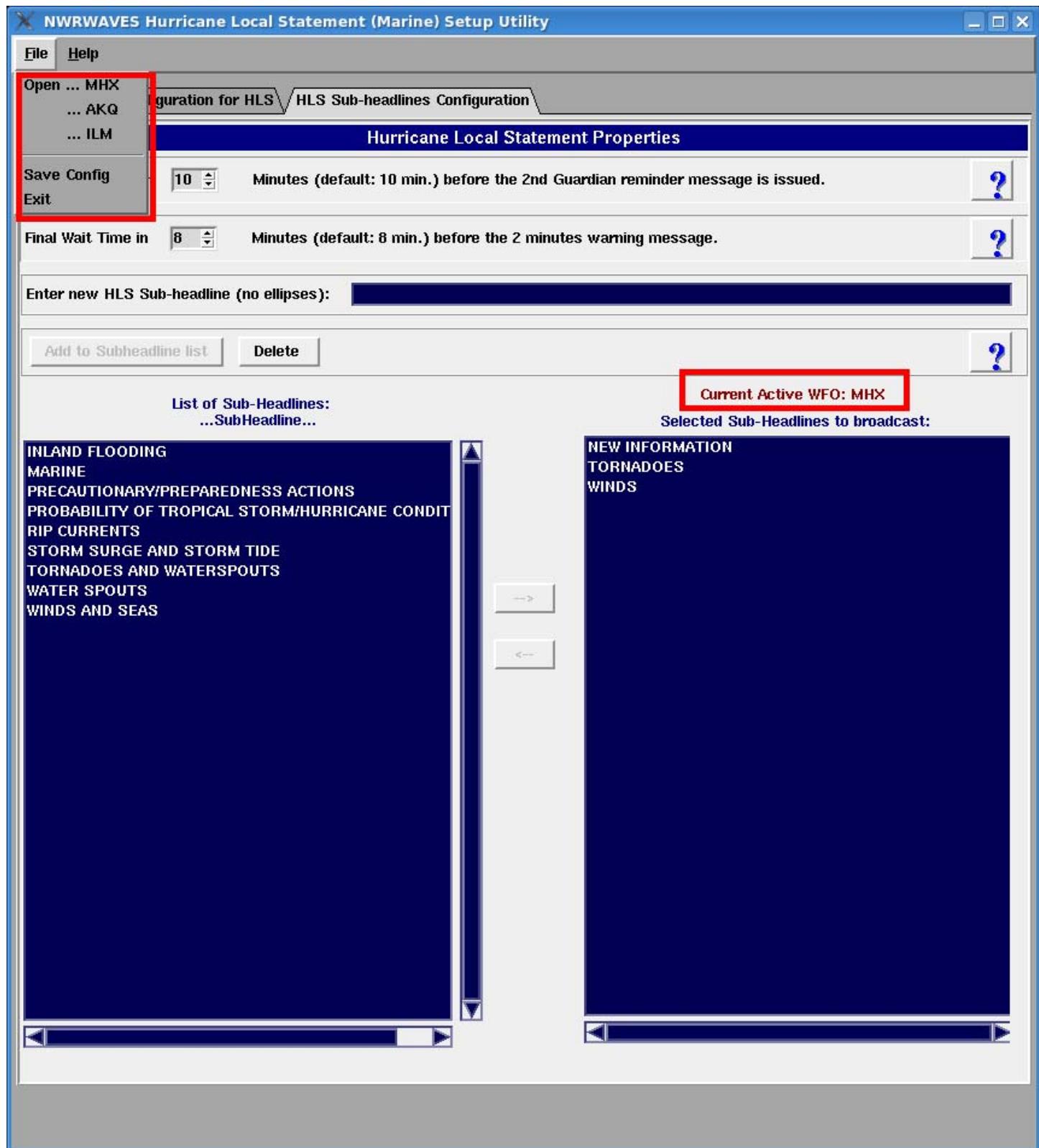


Figure 4 – A new HLS Setup GUI for Sub-headlines configuration for multiple HLSs

The administrators (and also users as well) will be able to set up and control the First Wait time and Final Wait times, and an automatic TWO minutes warning will be issued if no user's respond after the 2 waits. If no further response, the NWRWAVES will go on to parse the input HLS message using the previous HLS configuration. The First and Second Wait times are recommended and set to be 10 and 8 minutes by default respectively. If no user edits (touches) the HLS configuration file after the 3 Guardian banners, the HLS input will be processed after 20 minutes (First wait Time plus Final wait Time and the TWO minutes warning) elapsed.

One of the major duties of the administrator is to create or to delete any additional local sub-headlines for the users to select. This will occur well in advance of the event or after the software installation is completed. Note that the following 9 standard sub-headlines will be created in alphabetical order and cannot be deleted:

- NEW INFORMATION
- PRECAUTIONARY/PREPAREDNESS ACTIONS
- PROBABILITY OF TROPICAL STORM/HURRICANE CONDITIONS
- WINDS
- WINDS AND SEAS
- STORM SURGE AND STORM TIDE
- INLAND FLOODING
- TORNADOES
- TORNADOES AND WATERSPOUTS

To populate additional sub-headlines, the administrator would input the new sub-headline one at a time via the “Enter new Sub-headlines (no ellipses):” entry. After completing a new sub-headline entry, click on the “Add to Subheadline list” button, and the new sub-headline entry will show up as a new sub-headline list on the left scroll window. Likewise, to delete the entry, just highlight the entry on the left scroll window and click on the “Delete” button to remove the selected sub-headline(s). Again, you cannot remove those eleven standard sub-headlines. Be sure to save the configuration before exiting.

Another major task required by an administrator is to assign counties/zones mapping to the transmitters for only the HLS products. This is an experimental feature introduced particularly for the HLS product in OB9. By selecting the 1<sup>st</sup> tab of “Transmitter Configuration for HLS” in the HLS Setup GUI (see Figure 5), the administrator can select the transmitters’ counties/zones relationship for only the HLS product without impacting all other products. This GUI is identical and operated the same way as the old familiar NWRWAVES Setup GUI does with the exception of the new “**Excluding marine zones**” radio buttons (see the RED oval). Also consult section 4 – NWWAVES Setup Utility (Tab 1- Transmitter Configuration) of this User’s Guide for details operations.

For the first time when the administrator brings up this HLS Setup GUI, an exact duplicate of the regular NWRWAVES transmitters’ configuration data file will be copied over for this newly created HLS transmitters’ configuration. It is important to know that whatever the changes made here will only impact the HLS product and not any other products.

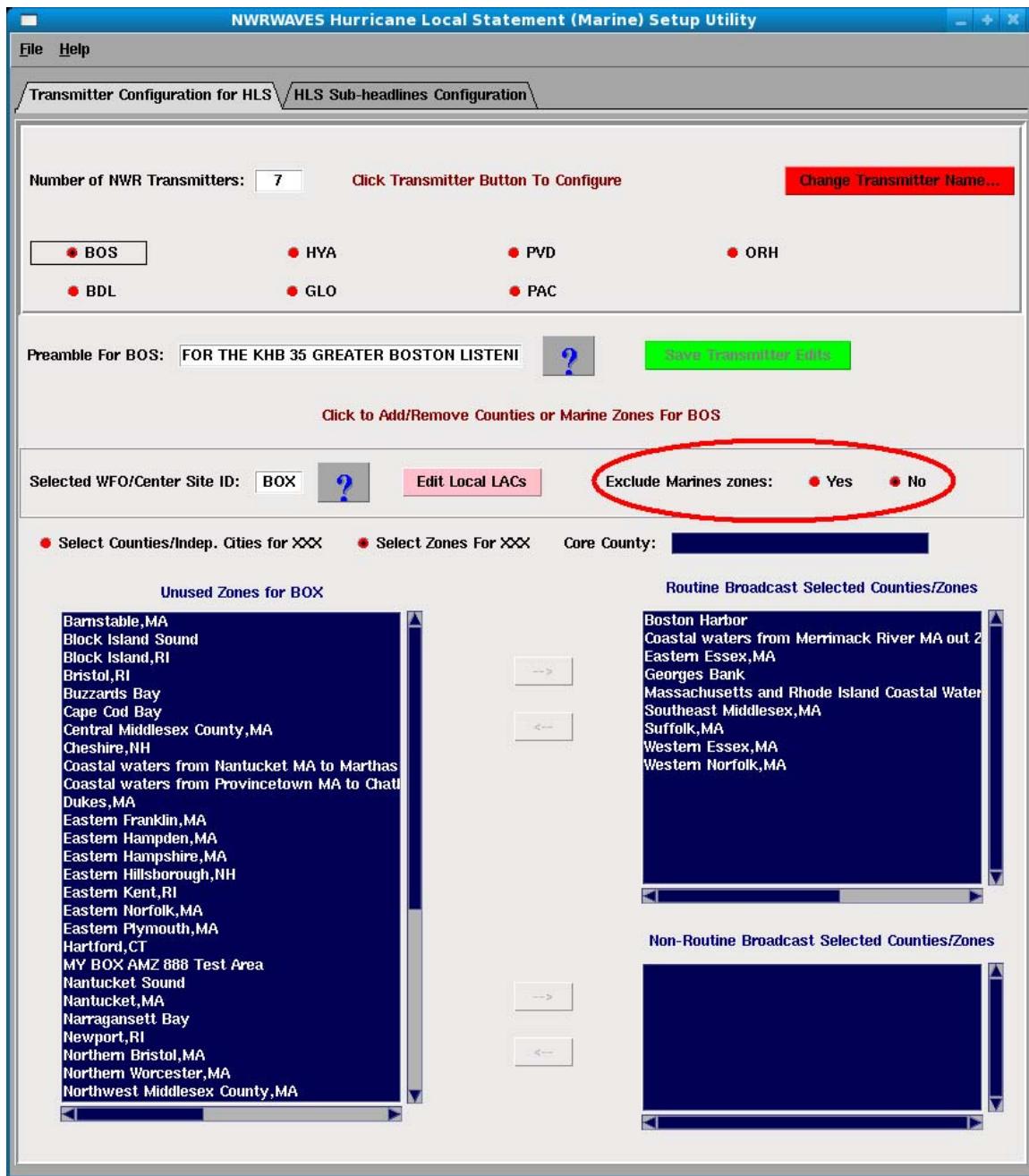


Figure 5- A new GUI to configure transmitters for HLS product.

The following is for those sites with multiple HLSs configuration set up:

Unlike the multiple HLS sub-headline configuration files for neighbor sites, there is only one (single) copy of this HLS transmitters file for the local WFO purpose. If the current Active WFO is one of your neighbors (e.g. via the Open ...site ID), you will be warned by some red colored frames (see Figure 6) that there is really only one HLS transmitters file designated for your local site. The proper way to assign zones to transmitters mapping is to select your local WFO as the current active WFO.

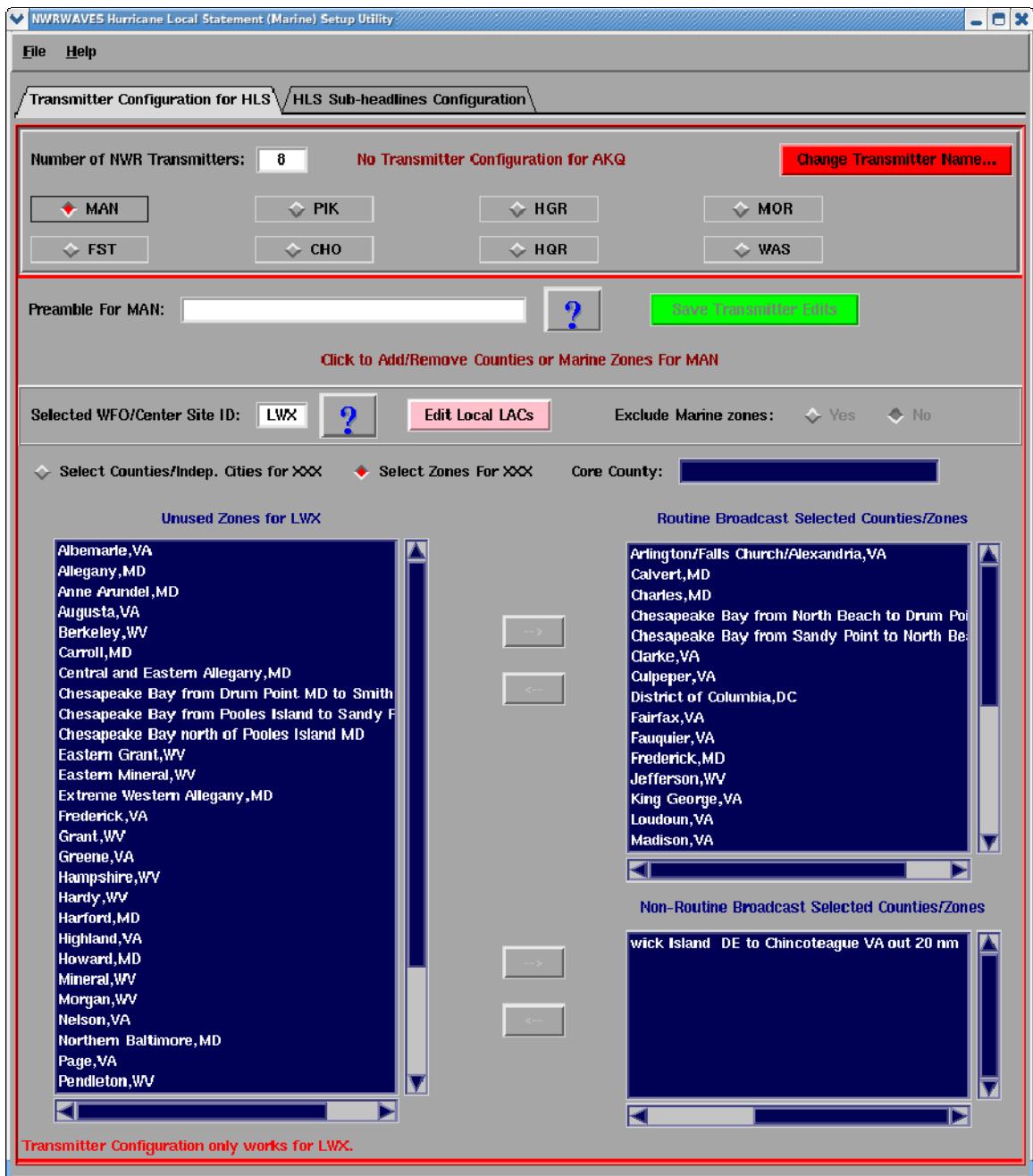
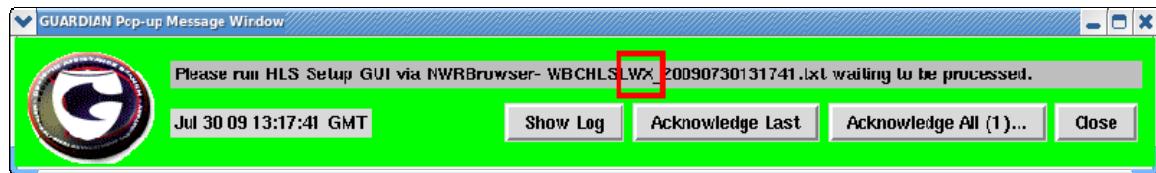


Figure 6- A warning example of transmitter configuration when the current active site is not your local site.

## Part II - User's Role:

Once the administrator completes the required HLS configuration in Part I, the users should be able to run the HLS GUI. Normally, the HLS users will not run the HLS GUI unless a new HLS message has just arrived and triggers the Guardian banners to alert them to run the HLS GUI.

When a new HLS message arrives, a Guardian banner will alert the HLS users. For multiple HLS sites, the user will need to watch out the 3 characters (see below e.g. LWX in this case) site ID that is issuing the HLS:



The following are the procedures to launch the HLS Setup GUI for the general users:

Upon alerting by the 1<sup>st</sup> Guardian banner from the AWIPS graphic workstations, the HLS user should login to any of the AWIPS graphic workstation.

From the AWIPS graphical workstation, select NWRBrowser via the appLauncher.

Go to the NWRBroser pull-down menu, select 4<sup>th</sup> option entry “HLS Subheadlines Selection” (Figure 7). If you don’t see this option, this means that the administrator has not activated the HLS Setup GUI yet. Upon the selection, user will see the HLS Setup GUI pops up on his/her AWIPS screen (Figure 8) along with the incoming HLS message displays in the File viewer window.

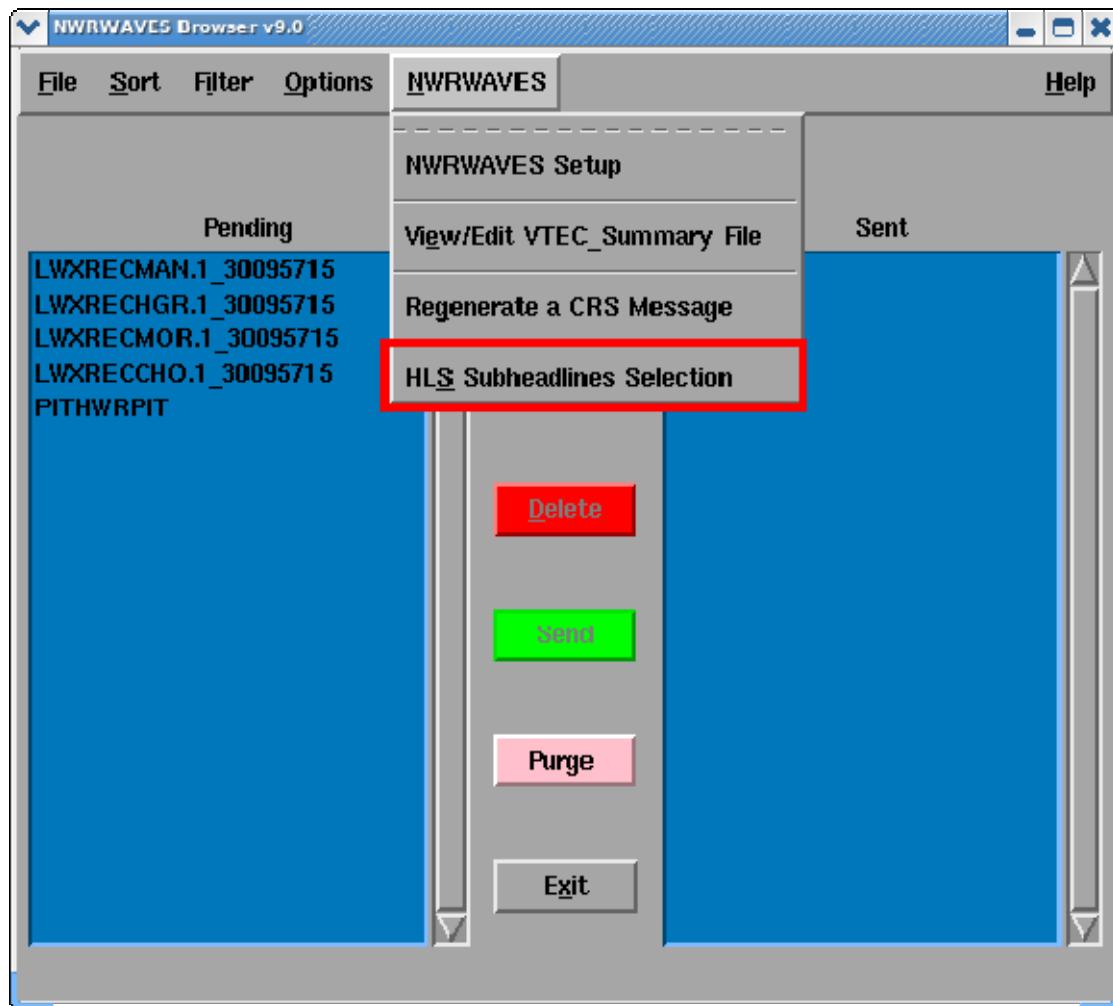


Figure 7- Launching the HLS Setup GUI for HLS users via the NWRBrowser

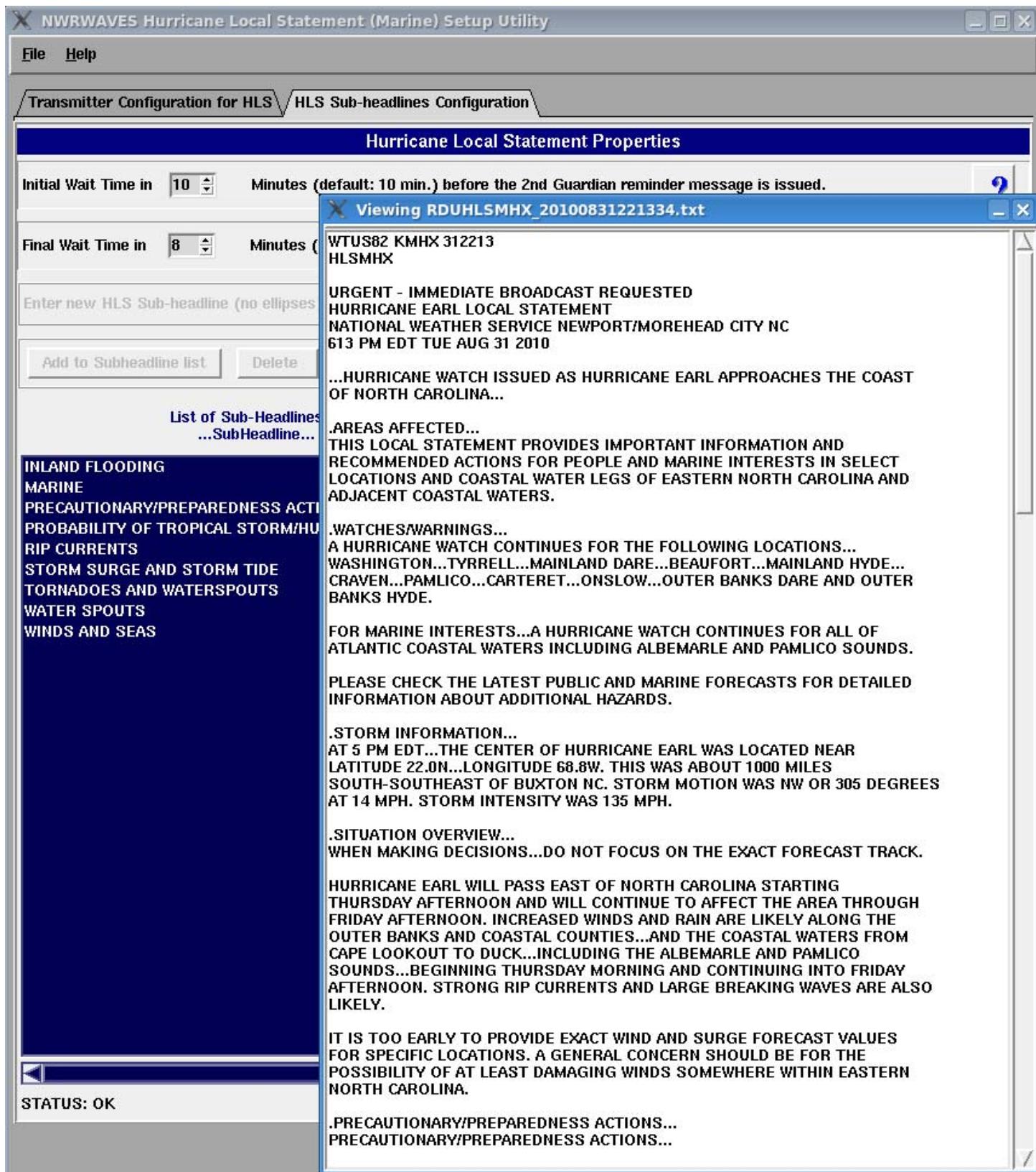


Figure 8 – HLS Setup GUI (user mode) with a File viewer option turn on

Briefly, the main functional steps for the HLS users are summarized below:

- Open the **active WFO** as indicated by the Guardian message (for multiple HLSs sites only)
- View the incoming HLS message from the File viewer window for subheadlines if desirable
- Choose the option (Y/N) for “**Include Overview**”
- Make selections of which subheadlines to process using “→” or “←” buttons
- Hit File->“**Save Config**” when done
- Select File->“**Exit**” to quit the HLS GUI.

ATAN 989 fix was delivered to fix a time delay problem. The NWRWAVES parsing script should now run within 10 seconds after users select a “**Save Config**” option.

User must select and save the sub-headlines to be used when a new HLS product arrives each time. By highlighting the sub-headline(s) on the left scroll window (see Figure 9), the user then clicks on the “→” button to select the desired sub-headline(s). This selected sub-headline(s) should show up on the right scroll window and eventually will be used by the NWRWAVES formatting script. Note that the NWRWAVES script does not process the sub-headlines in alphabetical order as shown on the right scroll window as indicated. The HLS output ordering should match the pre-fix order of the input HLS product. Likewise, you can unselect the sub-headlines by highlight the items on the right scroll window for broadcast and click on the “←” button to unselect the sub-headlines. Notice that users (only administrators can) do not have the role to add any new sub-headlines (all the associated buttons or entry are disabled). The last important step is to save the new configuration by selecting the “File” menu-> “**Save Config**” option to save the changes before the “**Exit**”.



Figure 9 – A new HLS Setup GUI for Subheadlines configuration.

If users do not see the separate File viewer window pops up along with the HLS GUI, they can request the administrator to create a blank (an empty) flag file “hls\_show\_input” in the NWRWAVES’s bin directory (/awips/adapt/NWRWAVES/bin). If the users don’t want this option, the administrator can rename or remove the file.

**New changes for the 2011 hurricane season (AWIPS OB9.3 delivery)**

- 1) By default, the overview product (OVR) will be generated for each transmitter for the HLS (see Figure 10 which is set to YES) - set for each hazard it contains (HU.A/W, TR.A/W, TY.A/W)**
- 2) The OVR toggle option would be turn on as default but the site can elect to turn it off.**
- 3) The “Include Overview?” radio button from HLS Subheadline selection gui has been removed.**
- 4) The tropical hazards of HI.A, HI.W, TI.A and TI.W have been removed from the product configuration file.**
- 5) Made TR.A, HU.A and TY.A as default to not trigger 1050 Hz or SAME code (no change to tropical warnings)**
- 6) The new Subheadline selections in the GUI have the following selectable choices:**
  - NEW INFORMATION**
  - PRECAUTIONARY/PREPAREDNESS ACTIONS**
  - PROBABILITY OF TROPICAL STORM/HURRICANE CONDITIONS**
  - WINDS**
  - WINDS AND SEAS**
  - STORM SURGE AND STORM TIDE**
  - INLAND FLOODING**
  - TORNADOES**
  - TORNADOES AND WATERSPOUTS**

**NWRWAVES Setup Utility**

**File Help**

**Transmitter Configuration \ Product Configuration \ Summary Message/Misc Settings \ Marine/Tropical Product Configuration**

Select A Hazard Below Sort By: ♦ VTEC ♦ Product      Issuance Header      Followup Header      Add Product

TR.A - Tropical Storm Watch      TRA      TRA      Save Edits      ?

<b>Message Properties</b>		<b>Transmission Properties</b>	
Process as Generic Message Type?	♦ Yes      ♦ No	Select Broadcast Area:	♦ Routine      ♦ Non-Routine
Use MRD Replace on CRS?:	♦ Yes      ♦ No	Interrupt Status:	♦ On      ♦ Off
Process ONLY for Core County/Zone?:	♦ Yes      ♦ No	Alert Tones:	♦ On      ♦ NWR Only      ♦ Off
Process for Non-Routine Broadcast Service Area(s)?:	♦ Yes      ♦ No	COR:	♦ On      ♦ NWR Only      ♦ Off
Intro: Tropical Storm Watch	?	CAN:	♦ On      ♦ NWR Only      ♦ Off
Include Preamble?	♦ Yes      ♦ No	CON:	♦ On      ♦ NWR Only      ♦ Off
Include County/Zone List?	♦ Yes      ♦ No	EXA:	♦ On      ♦ NWR Only      ♦ Off
Include Issue Time?	♦ Yes      ♦ No	EXT:	♦ On      ♦ NWR Only      ♦ Off
Include Headlines?	♦ Yes      ♦ No	EXB:	♦ On      ♦ NWR Only      ♦ Off
Generate Overview Product?	♦ Yes      ♦ No	EXP:	♦ On      ♦ NWR Only      ♦ Off
Include Supplemental Text?	♦ Yes      ♦ No	Silence Period	<input type="checkbox"/> On      Begin Time      End Time
Repeat Headline?	♦ Yes      ♦ No	Local Time:	Local Time
In Summary Message?	♦ Yes      ♦ No	Storage:	VIP (Default)      ?
		Transmission Status:	♦ CRS      ♦ Pending
		Periodicity:	Minutes
		CRS Effective Time:	minutes after the hour
		Default Duration:	480 Minutes
		♦ Use if UGC expiration missing      ♦ Use in lieu of UGC	

Figure 10 – The “Generate Overview Product?” button is set to “Yes” by default and Alert Tones set to “Off” for tropical watches (not warnings).

#### **How to test the HLS products at the field sites?**

The best way to test the HLS products using NWRWAVES (no user interaction/ Guardian banners) is to set up the text trigger via the “nwrwavestest.csh” script (see section 5 of User’s Guide). The output will go to the NWRWAVES’s /TEST subdirectory instead. Be sure to put the “nwrwaves.csh” back in the text triggers for operation when you are done with the testing.

#### **Routine Cleaning of some of the NWRWAVES directories**

This is just a reminder that there are several NWRWAVES subdirectories (e.g. /BACKUP and /ERROR) that require manual clean up after a long period of time. Remember that every time when the administrator brings up the HLS GUI, a back up copy of the HLS configuration file will be saved in the /BACKUP subdirectory.

## APPENDIX G – NWRWAVES NWEM Processing

### Non-Weather Emergency Product Information

Event Code	AWIPS Priority	Event (Product) Name
AVW	Warning/Exclusive	Avalanche Warning
CDW	Warning/Exclusive	Civil Danger Warning
CEM	Warning/Exclusive	Civil Emergency Message
EQW	Warning/Exclusive	Earthquake Warning
EVI	Warning/Exclusive	Immediate Evacuation Warning
FRW	Warning/Exclusive	Fire Warning
HMW	Warning/Exclusive	Hazardous Materials Warning
LEW	Warning/Exclusive	Law Enforcement Warning
NUW	Warning/Exclusive	Nuclear Power Plant Warning
RHW	Warning/Exclusive	Radiological Hazard Warning
SPW	Warning/Exclusive	Shelter In Place Warning
VOW	Warning/Exclusive	Volcano Warning
AVA	Watch/High	Avalanche Watch
CAE	Watch/High	Child Abduction Emergency
LAE	Watch/High	Local Area Emergency
TOE	Watch/High	911 Telephone Outage Emergency
ADR	Other/General	Administrative Message/Follow up Statement
DMO	Configurable	Practice/Demo Warning
NIC*	Other/General	National Information Center
NPT*	Configurable	National Periodic Test
RMT**	Configurable	Routine Monthly Test
RWT**	Configurable	Routine Weekly Test

\* not yet defined and not implemented in HazCollect at this time.

\*\* not implemented in HazCollect at this time.

### Ensure county code “000” in the localUGClookup.table and product.cfg file

All National and state-wide NWRWAVES will use “000” in the UGC rather than individual county Listening Area Codes (LACs). For example, a statewide message for Kentucky would be encoded as “KYC000-” rather than “KYC007-035-039-” for the three counties in the state. The “KYC000” code needs to map to every transmitter which will broadcast to any part of Kentucky.

The following is the procedure for adding county “000” in NWRWAVES:

1. Create an entry of county code “000” for localUGClookup.table

- a. Select *NWRWAVES setup utility* window from *NWRWAVE browser*
- b. The first tab of “Transmitter Configuration” should be displayed
- c. The first transmitter (BLF in Paducah case) will be selected by default
- d. Click on the “Edit Local LACs” button

- e. Enter each entry accordingly (see Figure 1) for creating “KYC000”
- f. Select “Save Edits”
- g. Repeat steps d. to f. if the site involves multiple states (e.g. “ILC000” and “MOC000” for Paducah).
- h. When completed, the localUGClookup.table file in /awips/adapt/NWRWAVES/bin directory should contain:

```
#LOCAL UGC LOOKUP TABLE CREATED BY NWRWAVES
ALL Kentucky (AMBER ONLY), KY, PAH, C, KYC000
ALL Missouri (AMBER ONLY), MO, PAH, C, MOC000
ALL Illinois (AMBER ONLY), IL, PAH, C, ILC000
```

2. Assigning the county code for a transmitter (a minimal of one will do)

- i. Locate the lower left scroll window for “Unused Counties/Indep. Cities for SiteID (e.g. PAH)”
- j. Left click on the “000” county code (e.g. KYC000)
- k. Hit the “→” button associates with the “Routine Broadcast Selected Counties/Zones” on top right scroll window.
- l. Repeat steps j. to k. if the site involves multiple states. (see Figure 2)
- m. Select “Save Transmitter Edits” (Green button)
- n. Select File menu ->Save & Exit option.

Once the county code of “000” is defined and configured, the NWRWAVES should be able to locate the newly defined UGC code (e.g. KYC000, ILC000 and MOC000).

### **Basic checklist for testing HazCollect with NWRWaves**

1. Check /awips/adapt/NWRWAVES/product.cfg via NWRWAVES setup utility GUI. From the NWRWAVES setup utility GUI select Product Configuration (second tab) and for each NWEM product, select the following options and save it when it is done.

- Process as Generic Message Type: **\*Yes\***
- Process Only for Core County/Zone: **\*No\***
- Process for Non-Routine Broadcast Service Area(s): **\*Yes\***
- Include Country/Zone List: **\*Yes\***
- Include Issue Time: **\*No\***
- Include Headlines: **\* Yes\***
- Generate Overview Product: **\*No\***
- Include Supplemental text: **\*No\***
- Storage: **\*VIP (Default)\***
- Transmission Status: **\*CRS \***
- Use if UGC expiration missing: **\*Yes\***

2. Check /awips/fxa/postgres/fxatextTriggerActions.txt file and make sure NWEM products in this the trigger file, for example,

SFDADRPAH | /awips/fxa/bin/startTransmitHazWarnings.csh GEN

...

...

## **AWIPS Software Modification**

- Changes to /awips/fxa/bin/transmitHazardWarnings.pl

In the sendToCRS() section of the script make the following changes.

Modify the following line from:

```
my $formatter = "/home/CRS/NWEM/nwrnwem.csh $product_id $crs_section$trans_file";
```

to

```
my $formatter = "/awips/adapt/NWRWAVES/nwrwaves.csh $product_id";
```

## **Appendix P**

### **Diagnosing System Health**

## Appendix P. Acceptable Formats for Diagnosing System Health

### Table of Contents

	<i>Page</i>
P.0    Introduction.....	1
P.1    AWIPS II Communications Review .....	1
P.1.1    SBN Ingest.....	2
P.1.2    ORPG Ingest.....	4
P.1.3    LDAD Ingest.....	5
P.1.4    Product Retrieval .....	7
P.1.5    CAVE Communication.....	8
P.2    Diagnostic Tools .....	8
P.3    AWIPS II SYSTEM MONITOR .....	12
P.3.1    System Monitor Main Configuration File.....	16

### List of Exhibits

Exhibit P.1-1. High-Level Communications Flow in AWIPS II.....	2
Exhibit P.1.2-1. RPG Ingest Data Flow .....	4
Exhibit P.1.3-1. High-Level LDAD Ingest Data Flow .....	5
Exhibit P.3-1. AWIPS II System Monitor .....	13
Exhibit P.3-2. Radar.xml Configuration File.....	14
Exhibit P.3-3. Radar Product .....	15

### List of Tables

Table P.1.1-1. LDM(U) Processes, Users, Log Files.....	3
Table P.1.3-1. LDAD Router Processes in AWIPS II .....	6
Table P.2-1. Tools Pertinent to AWIPS II .....	9
Table P.2-2. Log Locations for AWIPS II Components.....	10
Table P.2-3. Specific Information for Log Files .....	11
Table P.3-1. AWIPS II System Monitor Cron Entries.....	14
Table P.3-2. AWIPS II System Monitor Configuration Files.....	14
Table P.3-3. AWIPS II System Monitor Configuration Files Tags .....	15
Table P.3.1-1. AWIPS II System Monitor params.xml XML Definition.....	17

## **P.0    *Introduction***

This appendix provides an overview of tools that can be used to diagnose system health. The focus is on those components that are changed or completely new in the AWIPS II architecture. A brief overview is provided to help define the flow of some of the diagnostic tools.

AWIPS II introduces a number of new processes, and with those processes come a new set of log files to monitor. Also, the move to a load-balanced clustered suite of software (Environmental Data Exchange (EDEX)) introduces a new processing paradigm in which the server that is not tied up with other tasks performs the next one. Because of this, it is worth noting that there is no guarantee that one server's software will process a specific piece of data; administrators need to become comfortable with checking two sets of logs.

The flow of data within the AWIPS II system (as described in Chapter 4) differs from the way AWIPS I stores and retrieves data. This will affect how certain scenarios will be diagnosed in comparing similar situations with AWIPS I.

Finally, the change in data storage paradigm that heavily relies on a combination of metadata and Hierarchical Data Format – 5 (HDF5) flat file storage was the catalyst for redesigning the AWIPS System Monitor. The new tool will provide information similar to that provided by the AWIPS I version in diagnosing system health.

## **P.1    *AWIPS II Communications Review***

AWIPS II relies heavily on communication between processes in storing and retrieving products. A high-level diagram of process communication within AWIPS II is provided in Exhibit P.1-1.

A brief, high-level review of specific communications within AWIPS II follows.

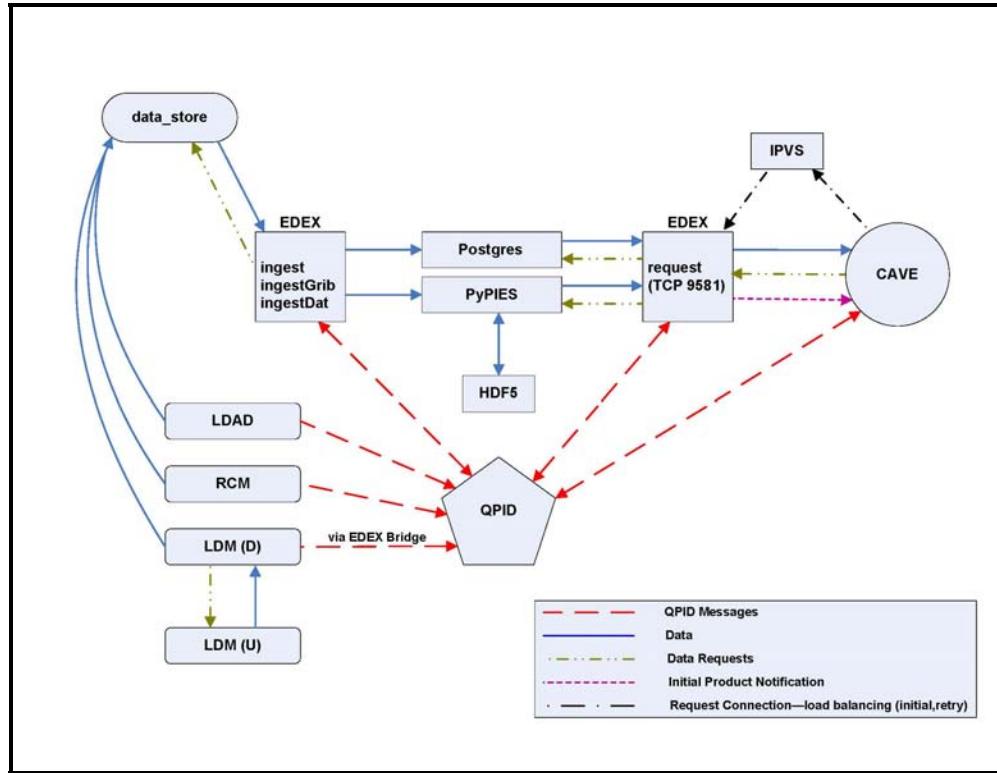


Exhibit P.1-1. High-Level Communications Flow in AWIPS II

### P.1.1 SBN Ingest

Data is received via the Satellite Broadcast Network (SBN) Digital Video Broadcaster (DVB)s and multicast over a private Local Area Network (LAN) to the Communications Processor – Satellite Broadcast Network (CPSBN) processors where it is captured by the dvbs\_multicast process. This process creates identifiable products and puts them into shared memory, from which the *readnoaaport* process reads and inserts the products into a Local Data Manager (LDM) queue.

Separately, the downstream LDM instance connects to the upstream instance running on the CPSBN, which has access to the product queue, and is populated by the *readnoaaport* process. The LDM Downstream (LDM(D)) requests whichever products it is configured to ingest from the LDM Upstream (LDM(U)) and waits for those products to become available, at which time they are sent to the LDM(D) instance for insertion into that instance's product queue.

Depending on how the LDM(D) is configured with pqact.conf, it writes the product to physical storage on a filesystem in /data\_store, and sends a message into the Queue Processor Interface Daemon (Apache AMQP Message Broker) (QPID) Java Messaging Service (JMS) external.dropbox queue that a product is available for decoding. The message contains the first 100 characters of the product, which includes the World Meteorological Organization (UN) (WMO) header for product identification, as well as the file path and file name under which the product was stored.

The next available EDEX process read from the JMS queue will act on the next available message, and then initiate the proper plugins to work on the data based on the information contained in the JMS message. The EDEX process identifies the products using the WMO header contained in the message to a pattern in the distribution eXtensible Markup Language (XML).

Data storage by EDEX is done by sending messages to the PostgreSQL engine and to Python Process Isolated Enhanced Storage (PyPIES) running on dx1f. PostgreSQL stores necessary data into the proper tables and PyPIES is charged with HDF5 file storage.

**Potential Things to Check: Note:** The following is not an all-inclusive list; rather, it is a list of common things to check when troubleshooting SBN ingest issues.

- Are all the ingest processes running on the LDM(U) host? Table P.1.1-1 shows a list of processes and which user(s) run(s) each process for checking via the *ps* command.

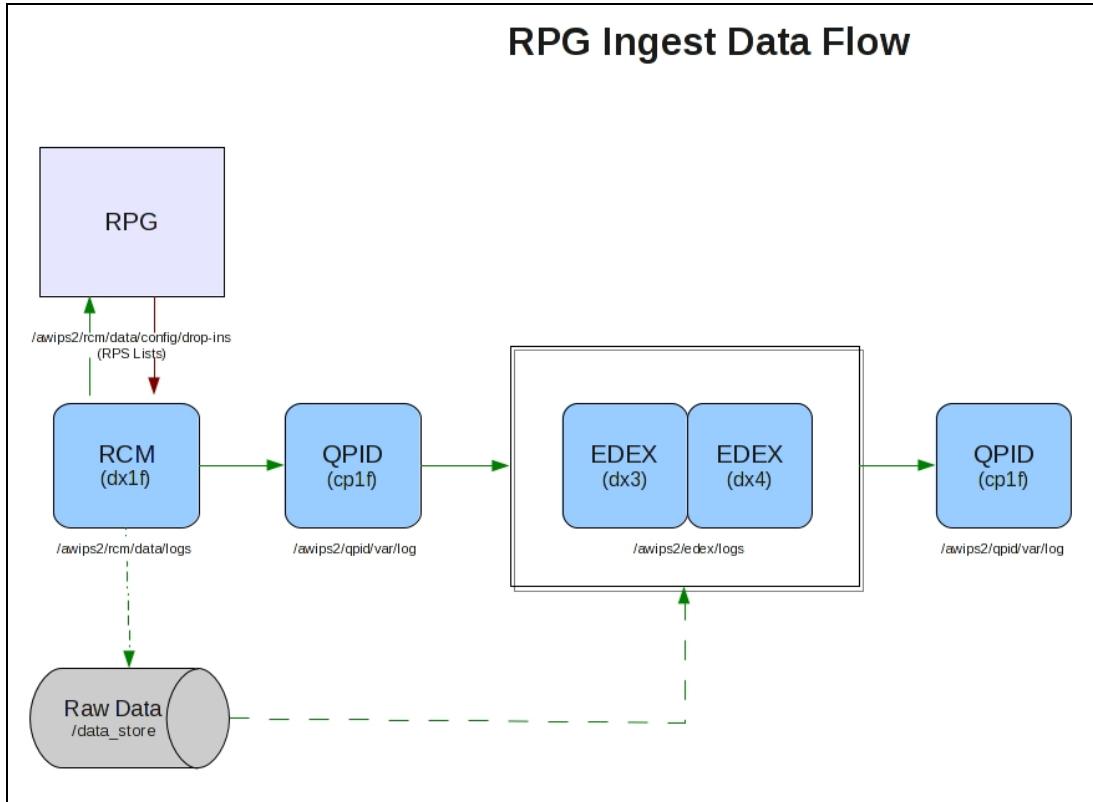
**Table P.1.1-1. LDM(U) Processes, Users, Log Files**

Process	User	Log
readnoaaport -m 224.0.1.1 -n -u 3 -r 1 -t mhs	ldm	~ldm/logs/nwstg.log
readnoaaport -m 224.0.1.2 -n -u 4 -r 1 -t mhs	ldm	~ldm/logs/goes.log
readnoaaport -m 224.0.1.3 -n -u 5 -r 1 -t mhs	ldm	~ldm/logs/nwstg2.log
readnoaaport -m 224.0.1.4 -n -u 6 -r 1 -t mhs	ldm	~ldm/logs/oconus.log
rpc.ldmd	ldm	~ldm/logs/ldmd.log
dvbs_multicast -m 224.0.0.1	root	~ldm/ldmd.log
dvbs_multicast -m 224.0.0.2	root	~ldm/ldmd.log
dvbs_multicast -m 224.0.0.3	root	~ldm/ldmd.log
dvbs_multicast -m 224.0.0.4	root	~ldm/ldmd.log

- Does the LDM(U) process have an ALLOW line in the /usr/local/ldm/etc/ldmd.conf configuration file that is allowing LDM(D) to connect?
- Is the LDM(D) process configured to REQUEST products from an upstream host? This is configured in the /usr/local/ldm/etc/ldmd.conf configuration file.
- Check to ensure the LDM(D) process is configured properly to act on a product based on its WMO header as configured in the /usr/local/ldm/etc/pqact.conf file.
- Check to ensure that the /data\_store directory is mounted on the dx2f server; it must not be mounted as read-only.
- Check to ensure that QPID is running and it is not having problems accepting connections. Look in the LDM(D) ldmd.log file for the string “*Cannot connect to remote EDEX instance*” and check to make sure qpidd is running on the cp1f host.
- Check to ensure the EDEX processes are running on DX3 and DX4, and are not processing slowly. Check the latency and processing times in the EDEX logs.
- Check to ensure the /data\_store directory is mounted on the DX3 and DX4 so EDEX can access the files it is supposed to decode. You may see a lot of “file not found” messages inside of large java stack trace error messages in the EDEX logs.

### P.1.2 ORPG Ingest

Data is received via the Transport Control Protocol (TCP) connection between the AWIPS II Radar Configuration Manager (RCM), also known as the AWIPS II Radar Server, and the Open Radar Product Generator (ORPG). As products are received, the RCM process will write to physical storage and place a message in the QPID JMS queue. From this point on, the path is the same as SBN Ingest. Exhibit P.1.2-1 provides a high-level overview of the ingest flow from the radar product generator (RPG).



**Exhibit P.1.2-1. RPG Ingest Data Flow**

**Potential Issues / Things To Check:** Note: The following is not an all-inclusive list; rather, it is a list of common things to check when troubleshooting ORPG ingest issues.

- A network path to the ORPG must be in place. *Ping* is a good utility to check this path.
- RCM must be configured with the correct Internet Protocol (IP) of the ORPG, as well as the port and password. Check the config.xml in /awips2/edex/data/config/persist.
- The RCM process must be running. Use the *ps* command and tail the log in /awips2/rcm/data/logs to check for the status of the RCM process.
- The /data\_store mount must be mounted from DX2 on the server running the a2dx1apps package (where RCM runs).
- QPID must be running and must not be having problems accepting connections.
- The EDEX processes must be running on DX3 and DX4, and must not be processing slowly. Check the latency and processing times in the EDEX logs.

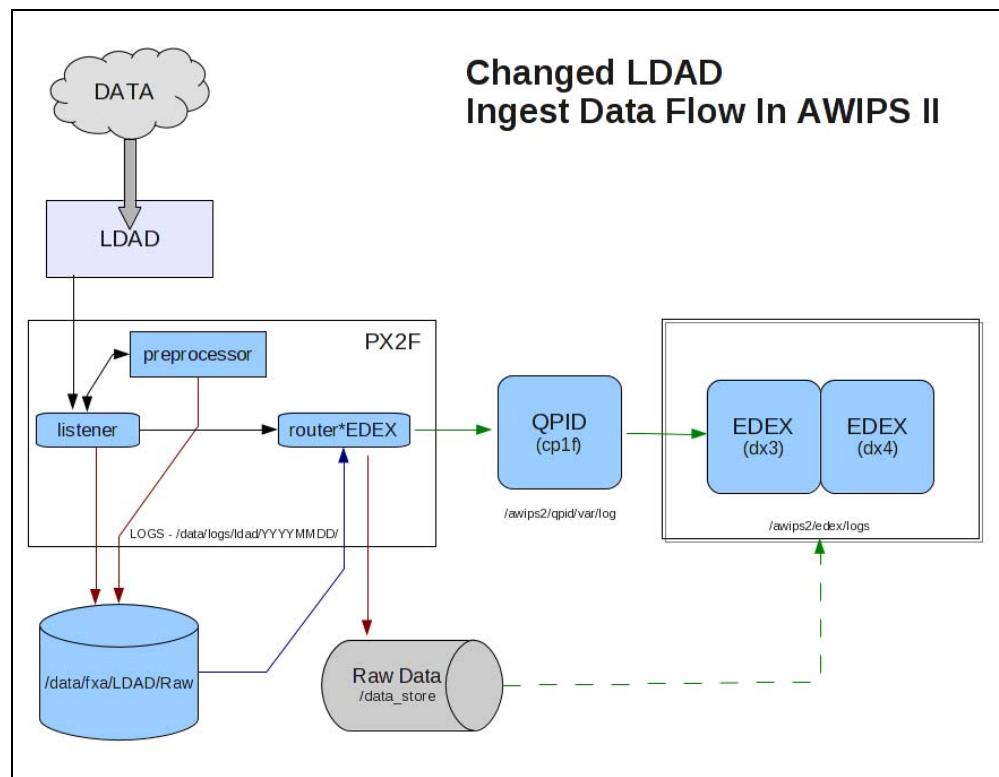
- The /data\_store directory needs to be mounted on the DX3 and DX4 so EDEX can access the files it is supposed to decode. You might see a lot of “file not found” messages inside of large java stack trace error messages in the EDEX logs.

### P.1.3 LDAD Ingest

The ingest of Local Data Acquisition and Dissemination (LDAD) into the LDAD Servers (LS) and across the firewall has not changed. In fact, up to the point of preprocessing, ingest has not changed in AWIPS II. So the following steps still occur in AWIPS II:

1. Data is placed into /data/Incoming on LS1.
2. The listener process on px2f is notified of new products by the newLDADdataNotification and CO\_Serv processes on the LS1.
3. The listener process SCPs the data file over to px2f into /data/fxa/LDAD/tmp on px2f and the newLDADdataNotification moves the product into /data/ldad/Processed on LS1.
4. The listener process checks the LDADinfo.txt file to see if preprocessing is needed. If needed, it runs the appropriate preprocessor where the data is reformatted and placed into /data/fxa/LDAD/Raw. If no preprocessing is needed, it puts the data directly into /data/fxa/LDAD/Raw.

At this point the routing paradigm is different. Rehosted LDAD processes will write to raw data storage and place a message in the QPID JMS external.dropbox queue. From this point on, the path is the same as the SBN Ingest. Exhibit P.1.3-1 presents a high-level visual depiction of the changed portion of the process.



**Exhibit P.1.3-1. High-Level LDAD Ingest Data Flow**

There is potential for data to come in which is not handled by a router process in AWIPS I or in AWIPS II. For instance, raw Gridded Binary (GRIB) or GRIB2 data, which is ingested through LDAD, needs to be put somewhere for processing. That data can be placed into /awips2/edex/data/manual, which is an ingest endpoint that EDEX monitors for new products. When found, it attempts to decode the data based on the same rules it uses if it is notified of a raw product storage via the QPID JMS queue, with one extra step. If no WMO header is found in the product, then it will attempt to use the file name when matching regular expressions within distribution XML files.

**Potential Issues / Things To Check: Note:** The following is not an all-inclusive list; rather, it is a list of common things to check when troubleshooting LDAD ingest issues.

- All current processes that run on LS1 should be running and configured as they are today. Normal troubleshooting techniques apply.
- The file LdadPatterns.txt must be rehosted to the AWIPS II version of the file, which allows execution of the new router\*EDEX processes. Table P.1.3-1 lists the router processes that should be running in AWIPS II and whether or not they are modified for use in AWIPS II or the exact same process as in AWIPS I. Use a *ps* command to check to see if they are all running. Note that only the modified, rehosted applications are ones which put messages on the QPID queue for EDEX decoding.

**Table P.1.3-1. LDAD Router Processes in AWIPS II**

Process Name	Modified or Legacy
routerLdadDecoder	Legacy
routerStoreTextEDEX	Modified
routerStoreNetcdf	Legacy
routerStoreEDEX	Modified
routerShefEncoderEDEX	Modified
routerStoreAkBlpEDEX	Modified

- The proper libraries need to be installed for the rehosted router\*EDEX processes to put messages on the QPID queue. Use *rpm -q awips2-notification* to check for this rpm.
- The file /awips/fxa/data/edex-info.txt must exist and must have the proper host running QPID in the first line, which should look as shown below:

**edex.msg amqp:tcp:cp1f:5672**

- The /data\_store mount must be mounted from dx2f on the server running the a2px1apps package.
- The /awips2/edex/data/manual directory needs to be mounted from the Network Attached Storage (NAS) to place files that are not handled by one of the rehosted router\*EDEX processes listed in Table P.1.3-1.
- The EDEX processes need to be running on DX3 and DX4, and you need to ensure they are not processing slowly. Check the latency and processing times in the EDEX logs.

- The /data\_store directory needs to be mounted on the DX3 and DX4 so EDEX cannot access the files it is supposed to decode. You might see a lot of “file not found” messages inside of large java stack trace error messages in the EDEX logs.
- Not all the data that comes in via the LDAD system has WMO headers; therefore, the EDEX distribution XML files need to be properly configured to notify the proper decoding plugin based on the file name stored into the /data\_store directory.

#### P.1.4 Product Retrieval

CAVE is the main interface between a user and the data in AWIPS II. It first connects to EDEX through Internet Protocol Virtual Server (IPVS) when it starts. The product retrieval itself is performed through communications with the EDEX request server.

When a menu is first displayed, CAVE is requesting the most recent product time from the metadata database for each of those configured menu items. This request is sent through the connection with EDEX request process. While the request is being sent, and before a reply is received, the menu will show ??..... for the product time. Once a reply is received, the question marks will change to the product time of the most recent product for that menu item; or, if the product has no recent time in the metadata database, it will display as ------

If the question marks stay (i.e., they do not change to product times or to the dashed notation) because no product stored matched that menu item, there could be a problem with the communication to the EDEX request process, or from the EDEX request process to the metadata database.

Once a product is loaded to a perspective’s display in CAVE, the product itself is updated by a broadcast to a specific topic to which CAVE is listening housed within QPID. When the successful product store is broadcast, the data should update, as well as the time, for the most recent product on the menus that have been previously displayed.

All product time retrievals go through an EDEX request process. However, in accessing the information within HDF5, CAVE communicates directly to PyPIES.

**Potential Issues / Things To Check: Note:** The following is not an all-inclusive list; rather, it is a list of common things to check when troubleshooting product retrieval issues.

- Ensure IPVS is running, and that it detects at least one EDEX request server running on either DX3 or DX4.
- Ensure that there is a network path to the floating IP managed by IPVS from each Linux Workstation (LX) or Linux Text Workstation (XT). Using *ping ec* is a good start. If a user gets a banner when starting Alert Visualization (AlertViz) (or when it automatically starts when the user logs in to the desktop environment) asking for localization preferences, and the box for the localization server is red, then the path to the server is broken.
- Ensure that the user is configured to use *ec* as the localization server, and not DX3, DX4 or any other server.

- Ensure that at least one EDEX request process is running on either DX3 or DX4. Look in the /awips2/edex/logs if there are problems starting the EDEX request process.
- Ensure that the PostgreSQL database is running on dx1f.
- Ensure that PyPIES is running on dx1f.
- Ensure that the /awips2/edex/data/hdf5 mount from the Direct Attached Storage (DAS) is mounted on dx1f.

### **P.1.5 CAVE Communication**

Different applications integrated within the CAVE have need to communicate among themselves – for example, the WarnGen application within the D2D perspective and the TextWS application. When WarnGen is running, and a polygon and associated warning attributes have been established to the forecaster's liking, the Create Text button is pressed. At this point, the Text Workstation application running on the configured host will display the text message for editing and transmission. This inter-application communication is done through a QPID JMS queue. There is no direct traffic to the XT from the LX in terms of communication between the AWIPS II programs.

CAVE also needs to communicate in order to disseminate products. This process is completed by sending a message to the EDEX request server to which it was connected via IPVS. The EDEX server, once it receives a transmission request, uses an application developed to transmit the product using the AWIPS I Message Handling System (MHS) code already installed on the system.

**Potential Issues / Things To Check:** Note: This is not an all-inclusive list; rather, it is a list of common things to check when troubleshooting inter-CAVE communication issues.

- Ensure that the Text Workstation host setting under the Text Workstation preferences is set to the accompanying XT to the LX which is being used. Access the preferences by opening CAVE → Preferences, then selecting ‘Text Workstation’ from the selection list to the left.
- Ensure that there is a network path to the floating host of cp1f, where QPID runs. Using *ping cp1f* is a good test of this path.
- Ensure that QPID is running along with the a2cp1apps package, and that there are no errors in the qpid logs.

## **P.2 Diagnostic Tools**

With the introduction of some new software, a few new diagnostic tools can be introduced. Most of the tools that are useful in AWIPS I at a system level can be used in AWIPS II to help diagnose system issues. These include, but are not limited to:

- top (CPU monitoring)
- vmstat, free (memory monitoring)
- iostat (disk Input/Output (IO) monitoring)
- df (disk usage monitoring)
- tail, grep, less (log viewers and parsers)

However, a few new tools, or lesser known tools, can be of use as well. Table P.2-1 organizes and describes some of the new tools pertinent to AWIPS II.

**Table P.2-1. Tools Pertinent to AWIPS II**

Tool	Description
<b>LDM</b>	<b><i>ldmadmin watch</i></b>  <b><i>ldmadmin watch -f FEEDTYPE</i></b> Running as system user <i>ldm</i> on either the host running the LDM(D) or LDM(U), one can issue this command to watch the most recent data products to arrive in the queue (successful inserts).  Can be used with optional –f FEEDTYPE arguments where FEEDTYPE is a valid LDM feedtype.  This utility can also be used to monitor the latency of the data coming from the LDM(U) host.  Note that this does not indicate a successful action taken by pqact process.
	<b><i>ldmadmin pqactcheck</i></b> Utility run as system user <i>ldm</i> that checks the syntax of the pqact.conf file.
	<b><i>ldmadmin pqactHUP</i></b> Utility run as system user <i>ldm</i> which will force the LDM system to re-read the active pqact.conf file(s) and begin using the new rules, assuming the file is correctly formatted.
	<b><i>ldmadmin tail</i></b> This utility, run as system user <i>ldm</i> , tails the LDM log file for easy monitoring without being in the logs directory. Useful for seeing which products have matched an entry in the pqact.conf file.
	<b><i>ldmping</i></b> Run as system user <i>ldm</i> . Specifically designed to check the availability of an LDM(U) server.
	<b><i>notifyme</i></b> <b><i>notifyme -vl- -h cpIf -p 'REGEX'</i></b> Run as system user <i>ldm</i> . This utility connects to an LDM(U) instance and issues a specific REQUEST to see if a product can be requested. Can be used with the optional –p argument which allows a regular expression pattern to be sent.  Useful for testing regular expressions that can be used in the pqact.conf file.
	<b><i>pqmon</i></b>  <b><i>pqmon -i X</i></b> Utility that monitors the LDM queue file on the disk. The following are useful columns in the output of the utility: <ul style="list-style-type: none"><li>• <i>nprods</i> – Number of products in the queue</li><li>• <i>maxprods</i> – Maximum number of products in the queue so far</li><li>• <i>age</i> – The age, in seconds, of the oldest product in the product queue</li></ul> This can be used with an optional -i argument to iterate a new line of information every X number of seconds.
<b>Database</b>	<b><i>pgadmin3</i></b> Graphical tool which allows a user to explore the database structure and table schema in a visual way.  Database queries can be made to extract data.  <b>Exercise caution</b> when using this tool, as it has the ability to change rows in the database if care is not taken.  Utility is available in AWIPS I; however, the database user name has changed. It should now be <i>awips</i> and not <i>pguser</i> .
	<b><i>psql</i></b> Command line tool which allows a user to test a connection to, and peruse the data within, a PostgreSQL database engine.  Utility is available in AWIPS I; however, the database user name has changed. It should now be <i>awips</i> and not <i>pguser</i> .

Tool		Description
<b>QPID</b>	<b><i>qpid-stat -q</i></b>	Command line tool run on the host which is running QPID that allows a user to see the status of individual JMS queues and topics which are housed by QPID. Optional command line arguments allow for sorting by column name (-S <i>colname</i> ) and limiting the number of queues returned (-L <i>NUM</i> ).
<b>HDF5</b>	<b><i>hdfview</i></b>	Graphical user interface for looking in HDF5 files.
	<b><i>h5stat</i></b>	Command line utility which can provide information about an HDF5 file. This can provide the number of datasets in a file, and other information about the HDF5 file itself.
	<b><i>h5ls</i></b>	Command line tool which can list the information in each of the datasets. The –r option is a powerful recursive option that will list all data in all groups of the HDF5 file. Or a user can view group-by-group.
	<b><i>h5dump</i></b>	Command line utility which can be used to view the contents of an HDF5 file.
<b>IPVS/Pulse</b>	<b><i>ipvsadm</i></b>	Command line tool that can be used to query how many downstream EDEX Request servers IPVS/Pulse has registered, and to see how many connections to each EDEX Request server currently are made.

The newly available logs are shown in Table P.2-2.

**Table P.2-2. Log Locations for AWIPS II Components**

Server	Process	Log Directory
dx1f	Radar Server	/awips2/rcm/data/logs/radarserver.log
	PostgreSQL DBMS	/awips2/data/pg_log/postgresql-YYYY-MM-DD_HHMSS.log
	PyPIES	/awips2/pypes/logs/pypes.log.YYYY-MM-DD /awips2/http_pypes/var/log/httpd/access_log /awips2/http_pypes/var/log/httpd/error_log /tmp/pypesLoggingService.log
dx2f	LDM(D)	/usr/local/lsm/logs
	scour	/usr/local/lsm/logs
DX3/DX4	EDEX	/awips2/edex/logs
CPSBN1/ CPSBN2	QPID	/awips2/qpid/var/log /var/logs <b>Note:</b> Logs to message log.
	LDM(U)	/usr/local/lsm/logs
LX/XT	AlertViz	~/caveData/logs
	CAVE	~/caveData/etc/user/\${USER}/logs

The logs identified in Table P.2-3 provide specific information.

**Table P.2-3. Specific Information for Log Files**

Server	Log	Description
DX3/DX4	edex-ingest-YYYYMMDD.log	General Ingest and Operations Log
DX3/DX4	edex-ingestDat-YYYYMMDD.log	DATIngest and processing log
	edex-ingest-gen_areal_ffg-YYYYMMDD.log	FFG Ingest and processing log
	edex-ingest-gen_areal_qpe-YYYYMMDD.log	QPE Ingest and processing log
	edex-ingestGrib-YYYYMMDD.log	Grib data ingest and processing log
	edex-ingest-purge-YYYYMMDD.log	Data purge log
	edex-ingest-radar-YYYYMMDD.log	Radar data ingest and processing log
	edex-ingest-satellite-YYYYMMDD.log	Satellite data ingest and processing log
	edex-ingest-shef-YYYYMMDD.log	Shef data ingest and processing log
	edx-ingest-shef-performance-YYYYMMDD.log	Shef performance log
	edex-ingest-smartInit-YYYYMMDD.log	GFE SmartInit processing log
	edex-ingest-unrecognized-files-YYYYMMDD.log	All data which does not match a distribution pattern XML shows up in this log
	edex-request-YYYYMMDD.log	EDEX Request server log
	start-edex-ingest-YYYYMMDD.log	Log created from running service edex_camel start
	start-edex-ingestGrib-YYYYMMDD.log	Log created from running service edex_camel start
	start-edex-ingestDat-YYYYMMDD.log	Log created from running service edex_camel start
	start-edex-request-YYYYMMDD.log	Log created from running service edex_camel start
	start-edex-trigger-YYYYMMDD.log	Trigger log
dx1f	radarserver.log	RCM process log
	postgresql-YYYY-MM-DD-HHMMSS.log	PostgreSQL log (new log started on new day and on server restart).
	access_log	httpd-popies access log
	error_log	httpd-popies error log
	popies.log	popies process log
dx2f	ldmd.log	LDM(D) log
CPSBN1/2	ldmd.log	LDM(U) log
	nwstg.log	readnoaaport for NWSTG feed log
	nwstg2.log	readnoaaport for NWSTG2 feed log
	goes.log	readnoaaport for GOES feed log
	oconus.log	readnoaaport for Outside Conterminous United States (OCONUS) feed log
	qpidd.log	QPID
LX/XT	\$(hostname).alertviz.log	AlertViz Start Log
	\$(hostname)_caveConsole.log	CAVE stdot messages that would normally be seen in the console window if you ran cave.sh

**Known Error Messages.** Not all error messages can be listed ahead of the time that they will be seen, nor can it be foretold that one will show up when you are expecting it. However, a list of previously identified messages and what they mean follows.

## PostgreSQL Errors

```
FATAL: no pg_hba.conf entry for host "165.92.24.3", user "awips", database "dc_ob7mhx"
```

This error indicates that some process is attempting to make a database connection from host 165.92.24.3 to database dc\_ob7mhx as database user *awips*. The rules for defining this access are in the /awips2/data/pg\_hba.conf. If this file does not have an entry granting host access to this IP address, the error will be seen.

```
FATAL: the database system is starting up
```

This error indicates that some process is attempting to make a connection to the database engine while it is starting and before it is ready. This may happen if the engine was not stopped cleanly, and is in the process of replaying transactions logs to recover lost data.

## LDM(D)

```
ERROR: Could not connect to the remote EDEX instance.
```

This error shows that the LDM(D) processes could not connect to the QPID JMS server through the edexBridge executable.

## EDEX

```
[EDEXMain] GFESiteActivation: GFE: GFESiteActivation - OAX Error activating site OAX due to configuration
```

This error shows that GFE activation failed on the server side, meaning that no GFE clients will be able to connect for the failed site. This particular error shows the problem to be with the configuration, which would be the siteConfig.py or localConfig.py file.

```
RPGEnvironmentalDataManager: RPGEvndata - Error connecting to RadarServer
```

The EDEX processes are those that will send the necessary environmental data to the ORPG. This operation is performed through the RCM process running on dx1f. If EDEX cannot connect to the RCM process, this error will show in the EDEX logs.

### P.3 AWIPS II SYSTEM MONITOR

The AWIPS II system monitor has been changed as a result of the changes made in how data is stored and retrieved with AWIPS I. In order to keep the two separate, the AWIPS II system monitor will run from the apache default /etc/httpd directory on the server hosting the a2px1apps package. Note that the location of the http server will not change. Also staying the same will be the URL to the system monitor, <http://px1f>. This means that the AWIPS I bookmark will still be used. The look, however, has been changed to a more readable design as shown in Exhibit P.3-1.

The screenshot shows the AWIPS II System Monitor page in Mozilla Firefox. The title bar reads "AWIPS II System Monitor - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The address bar shows "http://px1/index.php". The main content area features the AWIPS logo and the text "SystemMonitor". On the right, there are logos for the National Weather Service and NOAA. A navigation bar at the top has tabs for MONITOR, DATA (which is selected), LDAD, SCAN, FFMP, and EXTRAS. A message says "For problems call NCF @ 301-713-9344". Below this are links for "Contract All" and "Expand All". The main list contains seven items: Satellite Data (red X icon), Radar Data (green checkmark icon), Point Data (green checkmark icon), Grid Data (green checkmark icon), Redbook Data (green checkmark icon), Disk Usage Monitoring (green checkmark icon), and CPU Utilization Monitoring (green checkmark icon). At the bottom, a note says "Auto-refresh is ON (120 seconds). Page last refreshed 2012-01-17 14:38:39".

**Exhibit P.3-1. AWIPS II System Monitor**

The AWIPS II system monitor leverages the notion that each data piece has a metadata entry within the database. It works on a timed refresh, which means it is no longer dependent on individual collection processes. This benefits the system because individual processes could fail or crash, causing data not to update. It is also a good indication of how things are behaving within the system. For example, CAVE also uses the metadata to populate the most recent product time for each of the menu entries. So, if the AWIPS II System Monitor is showing stale or missing data, it should be showing stale or missing information in the CAVE menus as well. One difference between how the system monitor and CAVE get these times is that the AWIPS II System Monitor page pulls directly from the database, while CAVE uses requests through EDEX. This is a good troubleshooting tool to use in order to isolate any problems with CAVE's connection to EDEX, or problems with the underlying backend.

While data monitoring is no longer dependent on individual processes, disk and CPU monitoring are still done via script, which kicks off via the root crontab associated with the a2px1apps package. The cron jobs are set up in the a2px1cron file which will be active in the /etc/cron.d directory when the package is started. Table P.3-1 lists the cron entries.

**Table P.3-1. AWIPS II System Monitor Cron Entries**

cron to update disk monitor portion of the AWIPS II System Monitor
*/20 * * * * root /data/fxa/A2_SysMonitor/scripts/diskMon.sh >> /dev/null
*/20 * * * * root /data/fxa/A2_SysMonitor/scripts/ldad_diskMon.sh >> /dev/null
cron to update CPU monitor portion of the AWIPS II System Monitor
*/20 * * * * root /data/fxa/A2_SysMonitor/scripts/cpuMon.sh >> /dev/null
*/20 * * * * root /data/fxa/A2_SysMonitor/scripts/ldad_cpuMon.sh >> /dev/null

The scripts shown in Table P.3-1 create an actual php file which is viewable through a link on the system monitor page. This will show the CPU utilization on the various devices. Notice that the stdout of the scripts is sent to /dev/null, which means if the disk or CPU Utilization is not working it might be useful to run one of these scripts via the command line to see if there is extra information provided to stdout which might help isolate any problems.

Configuration files that help customize the data monitoring and refresh are xml files stored in /data/fxa/A2\_SysMonitor/config. Each piece of the system monitor can be configured by manipulating the delivered xml files. These files are listed in Table P.3-2.

**Table P.3-2. AWIPS II System Monitor Configuration Files**

Data Set	Configuration File Name
Grids for FFMP	ffmp_grids.xml
Radar data used for FFMP	ffmp_radar.xml
Redbook Graphics Monitoring	graphic.xml
Grid Data Monitoring	grid.xml
LDAD Acquisition Data	ldad_acq.xml
LDAD Dissemination	ldad_dissem.xml
LDAD Processes	ldad.xml
General System Monitor Parameters	params.xml
Point Data Monitoring	point.xml
Radar Data Monitoring	radar.xml
Satellite Data Monitoring	satellite.xml
Radar Data In SCAN Monitoring	scan_radar.xml

Exhibit P.3-2 illustrates an example of one of the configuration files, radar.xml. It is noted that there is site-specific data that should be filled in during the installation of the AWIPS II software.

```
<radar>
<data>
 <productname>KOAX Base Reflectivity (Z) elev0_5</productname>
 <sqltxt>SELECT inserttime FROM radar WHERE productcode = '19' AND
location_rda_id = 'KOAX' ORDER BY inserttime DESC LIMIT 1</sqltxt>
 <warnthresh>720</warnthresh>
 <errorthresh>1440</errorthresh>
</data>
</radar>
```

**Exhibit P.3-2. Radar.xml Configuration File**

In the case of the radar file in Exhibit P.3-1, the text in the <productname> </productname> tags are what is shown in the Radar Product portion as seen in Exhibit P.3-3.

Radar Data		
Radar Product	Last Update	Status
KOAX Base Reflectivity (Z) elev0_5	2011-05-31 20:39:45.038	✓

**Exhibit P.3-3. Radar Product**

The <sqltxt> </sqltxt> tags enclose the SQL (Structured Query Language) statement used to pull the most recent product from the appropriate metadata table. In this case, it is selecting from the radar table.

The <warnthresh> is the time in seconds before the yellow  is shown in the Status column. In this example, 12 minutes old.

The <errorthresh> is the time in seconds before the red  is shown in the Status column. In this example, 24 minutes old.

To add a new entry, a full new <data> </data> section between <radar> and </radar> tags will need to be added. The way the xml is configured, however, provides added flexibility into which data products are monitored and what each threshold will be for the alarms.

Similarly, data can be configured and added in the other configuration files listed in Table P.3-2. Table P.3-3 describes the tags used in each.

**Table P.3-3. AWIPS II System Monitor Configuration Files Tags**

XML Tag	Tag Description
<i>ffmp_grids.xml</i>	
<rfc>	A valid 3-letter River Forecast Center (RFC) AWIPS Identifier
<errorthresh>	The number of seconds before the data is shown as missing
<i>ffmp_radar.xml</i>	
<rda>	A valid 4-letter radar identifier
<errorthresh>	The number of seconds before the data is shown as missing
<i>graphic.xml</i>	
<productname>	Text to describe the product being monitored
<sqltxt>	A valid SQL query which returns the most recent inserttime of the product being monitored
<warnthresh>	The number of seconds before the data is shown as late
<errorthresh>	The number of seconds before the data is shown as missing
<i>grid.xml</i>	
<productname>	Text to describe the product being monitored
<sqltxt>	A valid SQL query which returns the most recent inserttime of the product being monitored

XML Tag	Tag Description
<warnthresh>	The number of seconds before the data is shown as late
<errorthresh>	The number of seconds before the data is shown as missing
<i>ldad_acq.xml</i>	
<productname>	Text to describe the product being monitored
<filename>	The full path, including file name, of the file to be monitored for punctuality on the LDAD server
<warnthresh>	The number of seconds before the data is shown as late
<errorthresh>	The number of seconds before the data is shown as missing
<i>ldad_dissem.xml</i>	
<productname>	Text to describe the product being monitored
<filename>	The full path, including file name, of the file to be monitored for proper dissemination on the LDAD server
<warnthresh>	The number of seconds before the data is shown as late in being disseminated
<errorthresh>	The number of seconds before the data is shown as missing
<i>ldad.xml</i>	
<processname>	The name of a process to monitor
<host>	Where the process normally runs
<i>point.xml</i>	
<productname>	Text to describe the product being monitored
<sqltxt>	A valid SQL query which returns the most recent reftime of the product being monitored
<warnthresh>	The number of seconds before the data is shown as late
<errorthresh>	The number of seconds before the data is shown as missing
<i>radar.xml</i>	
<productname>	Text to describe the product being monitored
<sqltxt>	A valid SQL query which returns the most recent inserttime of the product being monitored
<warnthresh>	The number of seconds before the data is shown as late
<errorthresh>	The number of seconds before the data is shown as missing
<i>satellite.xml</i>	
<productname>	Text to describe the product being monitored
<sqltxt>	A valid SQL query which returns the most recent inserttime of the product being monitored
<warnthresh>	The number of seconds before the data is shown as late
<errorthresh>	The number of seconds before the data is shown as missing
<i>scan_radar.xml</i>	
<rda>	A valid 4-letter radar identifier
<errorthresh>	The number of seconds before the data is shown as missing

### P.3.1 System Monitor Main Configuration File

The AWIPS II System Monitor has one main configuration file which also resides in the /data/fxa/A2\_SysMon/config directory structure. The name of the file is param.xml and is shown in Exhibit P.3.1-1.

```

<params>
 <config>
 <dbserver>dx1f</dbserver>
 <primary_edex>dx3</primary_edex>
 <client_edex>dx4</client_edex>
 <dbuser>awips</dbuser>
 <dbpass>awips</dbpass>
 <refresh>120</refresh>
 <ldad_refresh>600</ldad_refresh>
 <scan_refresh>120</scan_refresh>
 <ffmp_refresh>120</ffmp_refresh>
 <edex_home>/awips2/edex</edex_home>
 <common_base>/data/utility/common_static/base</common_base>
 <monitor_plugin>/monitoring/MonitorPluginState.xml</monitor_plugin>
 <has_ldad>yes</has_ldad>
 <root_dir>/data/fxa/A2_SysMonitor</root_dir>
 </config>
</params>

```

**Exhibit P.3.1-1. Param.xml Configuration File**

The values shown in the exhibit are the ***baselined*** configuration values. They should not change very often, if at all. It is not recommended that this file be changed by the sites; however, a description of the XML tags is provided in Table P.3.1-1.

**Table P.3.1-1. AWIPS II System Monitor params.xml XML Definition**

XML Tag	Description
<dbserver>	The server upon which the PostgreSQL database engine runs
<primary_edex>	The hostname of a server running EDEX
<client_edex>	OBE parameter
<dbuser>	The database user as whom to connect to the PostgreSQL database
<dbpass>	The password for the configured <dbuser>
<refresh>	How often, in seconds, the main page auto-refreshes
<ldad_refresh>	How often, in seconds, the LDAD page auto-refreshes
<scan_refresh>	How often, in seconds, the SCAN page auto-refreshes
<ffmp_refresh>	How often, in seconds, the FFMP page auto-refreshes
<edex_home>	The directory into which the EDEX software is installed
<common_base>	The base directory into which the common configuration localization tree is stored
<monitor_plugin>	The path under common_base to find the plugin state of EDEX
<has_ldad>	yes if the site has an LDAD, no if it does not
<root_dir>	The root directory of the AWIPS II System Monitor

## **Appendix Q**

### **AWIPS Applications and Version Numbers**

The following table identifies the AWIPS applications and their correct version numbers. Please refer to Appendix U for the component categorization.

### AWIPS Applications and Version Numbers

AWIPS Application	Version for FOT&E Release	Description
<b>Aviation Forecast Preparation System (AvnFPS)</b>	<b>FOT&amp;E – 12.2.1</b>	AvnFPS is designed to ease monitoring, improve production, and facilitate Quality Control (QC) of Terminal Aerodrome Forecasts (TAF) and Transcribed Weather Enroute Broadcasts (TWEB). The AvnFPS monitoring capability gives forecasters quick and continuous feedback on TAFs as well as associated observations. This monitoring capability consists of a color-coded scheme and is site configurable. The TAFs, surface observations, and guidance are easily accessible in text or graphical form and can be enhanced to alert forecasters to weather significant to aviation operations.
<b>AWIPS Decision Assistance and Production Preparation Tools (ADAAPT)</b>	<b>FOT&amp;E – 12.2.1</b>	ADAPPT Foundation software is composed of the foundation routines that support the IFPS, LAMP, Pre-LAMP, and SCAN.
<b>CLIMATE</b>	<b>FOT &amp; E – 12.2.1</b>	The CLIMATE software provides the capability to automatically initiate (three times daily) daily, monthly, seasonal, and annual climate reports. It also formats these reports for dissemination (similar to HWR).  CLIMATE also provides review and edit capability for products prior to dissemination.
<b>Dam Catalog Reviewer and Estimating Tool (DamCREST)</b>	<b>OB9</b>	A Graphical User Interface application available on both Linux and Windows operating platforms.
<b>Distributed Hydrologic Modelling (DHM)</b>	<b>OB9</b>	DHM is the set of features integrated into NWSRFS for distributed hydrologic modeling.
<b>Flash Flood Monitoring Program: Advanced (FFMPA)</b>	<b>FOT&amp;E – 12.2.1</b>	An integrated suite of multi-sensor applications that detects, analyzes, and monitors precipitation and generates short-term warning guidance for flash flooding automatically within AWIPS.

AWIPS Application	Version for FOT&E Release	Description
<b>Fog Monitor (FM).</b>	<b>FOT&amp;E – 12.2.1</b>	<p>An AWIPS application that applies various algorithms to visible and infrared satellite images in order to identify potential areas of fog. At night, the application primarily uses the well-known infrared “Fog Product” (the difference of the 10.7 micron and 3.9 micron brightness temps) to highlight potential fog areas. During the daytime, several algorithms attempt to discern fog areas by brightness, shape, and other characteristics.</p> <p>Also applied are filters that help to distinguish fog from possible false signal features such as snow cover and mid-level clouds.</p>
<b>Four-dimensional Stormcell Investigator (FSI)</b>	<b>0.4</b>	<p>An innovative base radar data 4-panel display application that is based on the National Severe Storms Laboratory Warning Decision Support System - Integrated Information GUI. FSI allows users to create and manipulate dynamic cross-sections (both vertical and at constant altitude), so that they can "slice and dice" storms and view these cross-section data in three-dimensions and across time.</p>
<b>General User Alert Display Panel (GUARDIAN)</b>	<b>FOT&amp;E – 12.2.1</b>	<p>An AWIPS utility that works as a communicator, primarily from software to human. All communication traffic once funneled through the Announcer (Red-Banner pop-ups, text messages in the D2D) and through the D2D Decision Assistance Monitor Buttons now goes through Guardian. And, via Guardian’s powerful and flexible configurations, users can now decide how they want Guardian to communicate to them.</p>
<b>Gridded Forecast Environment Suite (GFE Suite)</b>	<b>FOT&amp;E – 12.2.1</b>	<p>A series of programs that provide an interactive gridded forecast preparation capability. Components derive surface sensible weather elements from model data, manage the forecast data and metadata in a database, and generate forecast products in a variety of formats.</p>

AWIPS Application	Version for FOT&E Release	Description
<b>Hourly Weather Roundup (HWR)</b>	<b>Version 05/18/05</b>	HWR automatically receives and processes METAR surface observations, Satellite Cloud Products (SCP), Supplementary Climatological Data (SCD), and marine observations. It also formats a text portion of the data for dissemination over NWR, a text portion for the Console Replacement System (CRS), and a tabular product for dissemination over NWWS. Furthermore, the HR CSCI provides review and edit capability for products prior to dissemination.
<b>Hydro Database Manager (HydroBase)</b>	<b>FOT&amp;E – 12.2.1</b>	HydroBase is the component of the AWIPS system that permits the management of the reference portion of the database. Adding, deleting, and editing of hydrometeorological data collection and river forecast data locations are handled within this application. It consists of a series of pull-down menus that allow for interacting with the information within the reference database.
<b>HydroGen</b>	<b>OB9</b>	HydroGen is a suite of software programs that collect data from the Integrated Hydrologic Forecast System (IHFS) database and prepare eXtensible Markup Language (XML) files and hydrograph graphics (or simply “hydrographs”) for the web.
<b>HydroView</b>	<b>HydroView: FOT&amp;E – 12.2.1</b>	HydroView and MPE Editor have been reengineered into a CAVE perspectives and other CAVE plug-ins.
<b>MPE_Editor</b>	<b>MPE_Editor: FOT&amp;E – 12.2.1</b>	
<b>Interactive Forecast Preparation System (IFPS)</b>	<b>FOT&amp;E – 12.2.1</b>	IFPS enables the forecaster to generate and manipulate a digital database of observed and forecasted meteorological variables, which then can be used to automatically generate various products with different formats.

AWIPS Application	Version for FOT&E Release	Description
<b>Localized Aviation MOS Program (LAMP)</b>	<b>OB8.2</b>	A statistical system that provides forecast guidance for sensible weather elements. The GFS-LAMP guidance currently runs operationally at NCEP. Guidance is available from the following cycles: 0000, 0300, 0600, 0900, 1200, 1500, 1800, and 2100 UTC
<b>Local Analysis and Prediction System (LAPS)</b>	<b>OB9</b>	Reads METAR, mesonet, satellite, radar, and profiler data stored at the WFO and performs an analysis and generates forecasts.
<b>Local Data Acquisition and Dissemination (LDAD)</b>	<b>OB9</b>	The LDAD software system acquires and integrates data available from automated systems and human observers in the local WFO area. It also disseminates critical and non-critical AWIPS weather information to local users, particularly state and local government emergency management agencies.
<b>Local Storm Report (LSR)</b>	<b>FOT&amp;E – 12.2.1</b>	A stand-alone AWIPS application designed to provide forecasters with an easy and quick way to create, manage, and send the LSR public text product. This text product contains noteworthy weather events for which the forecaster has either received or sought real-time observations.
<b>NOAA Weather Radio With All-Hazards VTEC Enhanced Software (NWRWAVES)</b>	<b>Browser: Version: OB9(12/15/2008)</b>	Developed to replace all the existing formatter capabilities in WWA and CAFE. NWRWAVES utilizes VTEC coding found in an increasing suite of NWS products to better identify, produce and manage outbound CRS Weather Messages.
<b>NWS River Forecast System (NWSRFS)</b>	<b>OB9</b> <b>OB8.3(01/02/08)</b> <b>OB8.3(01/02/08)</b> <b>OB8.3(01/02/08)</b>	A comprehensive set of hydrologic techniques used by the RFCs to perform their forecast functions.

AWIPS Application	Version for FOT&E Release	Description
<b>RFC Archive Server (RAX)</b>	<b>OB6</b>  <b>OB8.3 (02/01/08)</b> <b>OB8.3 (02/01/08)</b> <b>OB8.3 (02/01/08)</b> <b>OB8.3 (02/01/08)</b> <b>OB8.3 (02/01/08)</b>	The RAX CSCI is a member of the Data Server (DS) family but is a stand-alone Linux PC at the RFCs. The RAX CSCI is dedicated to providing additional disk storage capability and processing power to the RFCs for hydrological data.
<b>River Product Formatter (RiverPro)</b>	<b>OB9(5/15/2008)</b>	RiverPro application, which generates text products for the National Weather Service Hydrology program.
<b>RiverMonitor</b>	<b>OB8.3 (03/18/2007)</b>	Used to provide automatically updated tabular information summarizing river conditions. Delivered in part for RiverPro VTEC monitoring; provides general monitoring of river data.
<b>System for Convection Analysis and Nowcasting (SCAN)</b>	<b>FOT&amp;E – 12.2.1</b>	An integrated suite of multi-sensor applications that detects, analyzes, and monitors convection and generates short-term probabilistic forecast and warning guidance for severe weather automatically within AWIPS.
<b>System for Nowcasting of Winter Weather (SNOW)</b>	<b>FOT&amp;E – 12.2.1</b>	An AWIPS application suite that continuously monitors surface observations for winter weather hazards. SNOW automatically alerts the forecasters whenever such conditions are detected, and provides capabilities to display observed winter weather threats in ways that help forecasters focus on what they consider most important.
<b>System on AWIPS for Forecasting and Evaluation of Seas and Lake (SAFESEAS)</b>	<b>FOT&amp;E– 12.2.1</b>	A set of AWIPS applications that continuously monitor marine and adjacent overland conditions for specific marine weather hazards. SAFESEAS automatically alerts the forecasters whenever such conditions are detected, and provides capabilities to display observed marine threats in ways that help forecasters focus on what they consider most important.

AWIPS Application	Version for FOT&E Release	Description
<b>Warning Generation (WarnGen)</b>	<b>FOT&amp;E – 12.2.1</b>	WarnGen enables you to issue flash flood, severe thunderstorm, tornado, and other short-term warnings for a single storm or a line of storms. In addition, you can issue text products (follow-up statements) that update the progress of the storm, cancel the warning if conditions change, re-issue another warning on the same storm, or note the expiration of the warning. WarnGen also enables you to provide warning backup support to neighboring sites.
<b>WFO Archive Server (WAX)</b>  fcinit fcst DHM IFP_Map ifp_nwsrfs parse_mods_by_segment ICP (Interactive Calibration Program)	<b>OB6</b>  <b>OB8.3 (10/24/07)</b> <b>OB8.3 (10/24/07)</b> <b>OB8.3 (02/28/08)</b> <b>OB8.3 (02/28/08)</b> <b>OB8.3 (02/28/08)</b> <b>OB8.3 (02/28/08)</b> <b>OB8.3 (02/28/08)</b>	The WAX CSCI is a member of the Data Server (DS) family but is a stand-alone Linux PC at the WFOs. It has Level IV archiving functionality and supports the Weather Event Simulator at the WFOs.
<b>NMAP</b>	<b>OB9</b>	NMAP displays and animates different types of meteorological data on a geographic background. The current version supports overlay of satellite, radar, model, METAR, MOS, and upper-air data. A Motif graphical user interface controls the program functions.
<b>Site Specific Hydrologic Prediction System (SSHPS)</b>	<b>OB8.2 (9/21/2007)</b>	A local hydrologic model provided to allow the WFO forecaster to supplement RFC river forecast guidance by generating forecast river stages for fast-response headwater and river basins.

AWIPS Application	Version for FOT&E Release	Description
<b>Hydro Time Series</b>	<b>FOT&amp;E – 12.2.1</b>	A subset of data within an Arc Hydro geodatabase that includes measurement values and the time they were collected. Also includes a description of the properties for a particular type of time series. Tools for visualizing time series have been developed. The tools allow the user to query the Arc Hydro database for time series records related to a particular feature, and plot one or more types of time series related to one or more spatial feature.
<b>Precipitation Processing (PP)</b>	<b>OB9</b>	This is collection of OHD applications which comprise a sub-system. RFC applications and WHFS (WFO Hydrologic Forecast System) applications require precipitation totals for station locations and grids. It is one of the prime considerations used in forecasting river stage. It is also a key indicator of flash flood potential. The processing applications ingest and process station precipitation reports and gridded precipitation data from radar and satellite sensors. The data are stored in the Integrated Hydrologic Forecast System (IHFS) database. They include 10+ applications that are non-interactive. The primary functional areas are the Gage Precipitation Pre-Processor (GPP), Multi-sensor Precipitation Estimator (MPE), and the Hi-Resolution Precipitation Estimator (HPE).

AWIPS Application	Version for FOT&E Release	Description
<b>WFO Hydrologic Forecast System (WHFS) and Integrated Hydrologic Forecast System (IHFS) Database</b>	<b>FOT&amp;E – 12.2.1</b>	This is a collection of OHD applications which comprise a sub-system. The WHFS/IHFS applications incorporate a comprehensive set of data ingest, data quality, and data processing operations. Associated with each observed and forecast value in the database is a quality control code which indicates the quality of the value based on external and internal tests of the value. Depending on the value of the quality code, the data are handled in different ways within the IHFS data flow and applications may or may not use the data. They contain 10+ applications that are non-interactive, including the SHEF decoder, the database purger, the rate-of-change checker, alert/alarm report generator, observed-forecast monitor, HydroGen data extractor, and SiteSpecific data handling operations.
<b>High-resolution Precipitation Estimator (HPE)</b>	<b>FOT&amp;E – 12.2.1</b>	HPE provides frequent (by default every 5minutes) high resolution (~1km x 1km) rain rate and 1-hour rain accumulations covering a Weather Forecast Office's (WFO) (or River Forecast Center's (RFC)) area of responsibility. These gridded datasets can then be used by the Flash Flood Monitoring and Prediction Advanced (FFMP-A) system or can be displayed on D2D. The mosaicking uses data from multiple radars minimizing the distance from each radar. As a result, HPE reduces the need to run multiple instances of FFMP when convection covers more than one radar. HPE is an entirely separate program from the Multi-sensor Precipitation Estimator (MPE) and will not replace it. HPE uses different data, produces different output grids more frequently and at higher resolution, and runs with little user interaction.

## **Appendix R**

### **System Architecture Diagrams**

## **Appendix R: System Architecture Diagrams**

### **List of Exhibits**

	<i>Page</i>
Exhibit R.0-1. CONUS WFO Architecture (AWIPS II Components Deployment Concept) .....	2
Exhibit R.0-2. OCONUS WFO Architecture (AWIPS II Components Deployment Concept) .....	3
Exhibit R.0-3. RFC Architecture (AWIPS II Components Deployment Concept) .....	4
Exhibit R.0-4. Draft NCEP Architecture (AWIPS II Components Deployment Concept) .....	5

This appendix graphically represents the AWIPS software components associated with the various AWIPS hardware components.

- Exhibit R.0-1 depicts the CONUS WFO architecture.
- Exhibit R.0-2 depicts the OCONUS WFO architecture.
- Exhibit R.0-3 depicts the RFC architecture.
- Exhibit R.0-4 depicts the Draft NCEP architecture.



# CONUS WFO Architecture

AWIPS II Components Deployment Concept

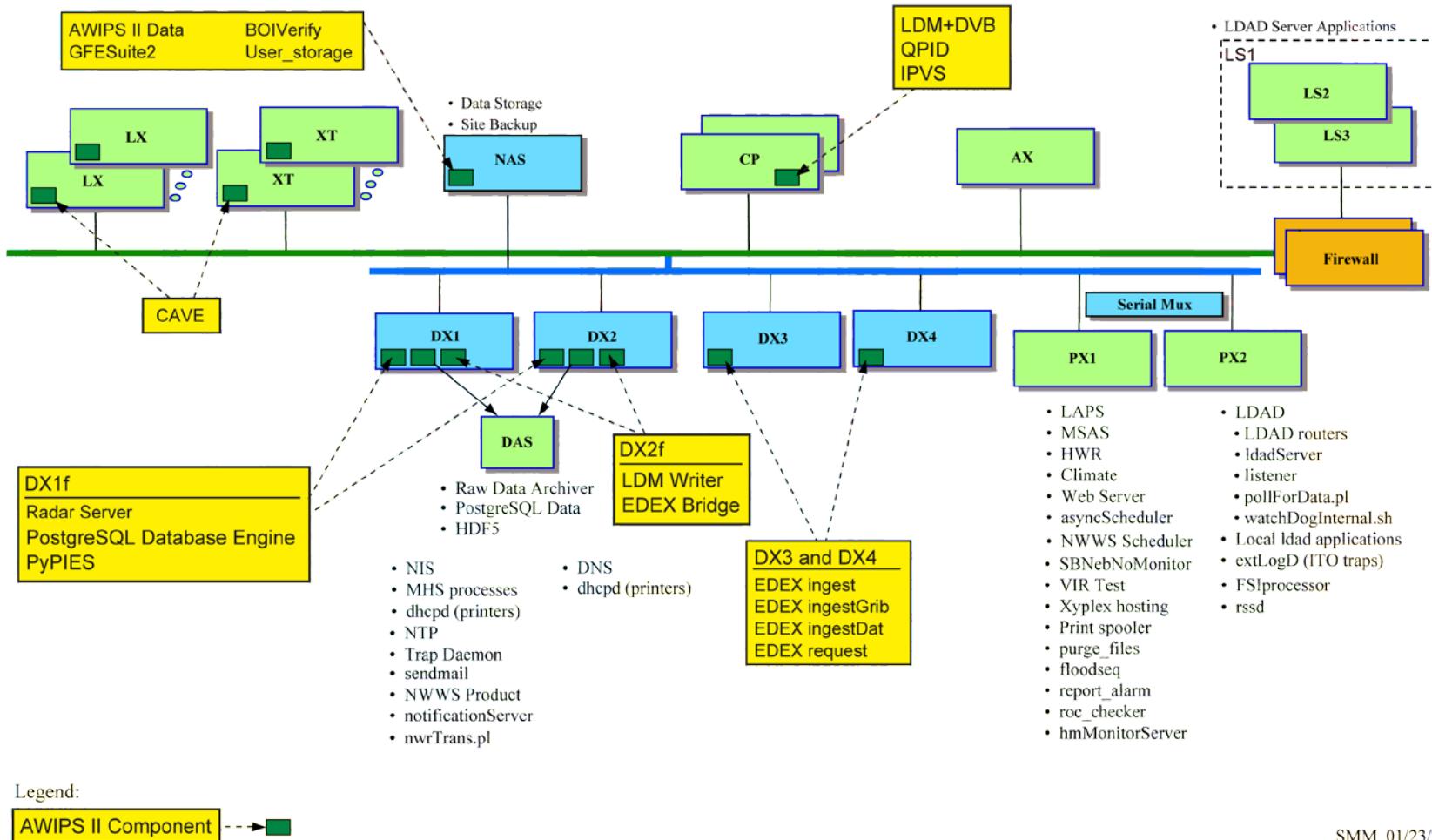


Exhibit R.0-1. CONUS WFO Architecture (AWIPS II Components Deployment Concept)



# OCONUS WFO Architecture

AWIPS II Components Deployment Concept

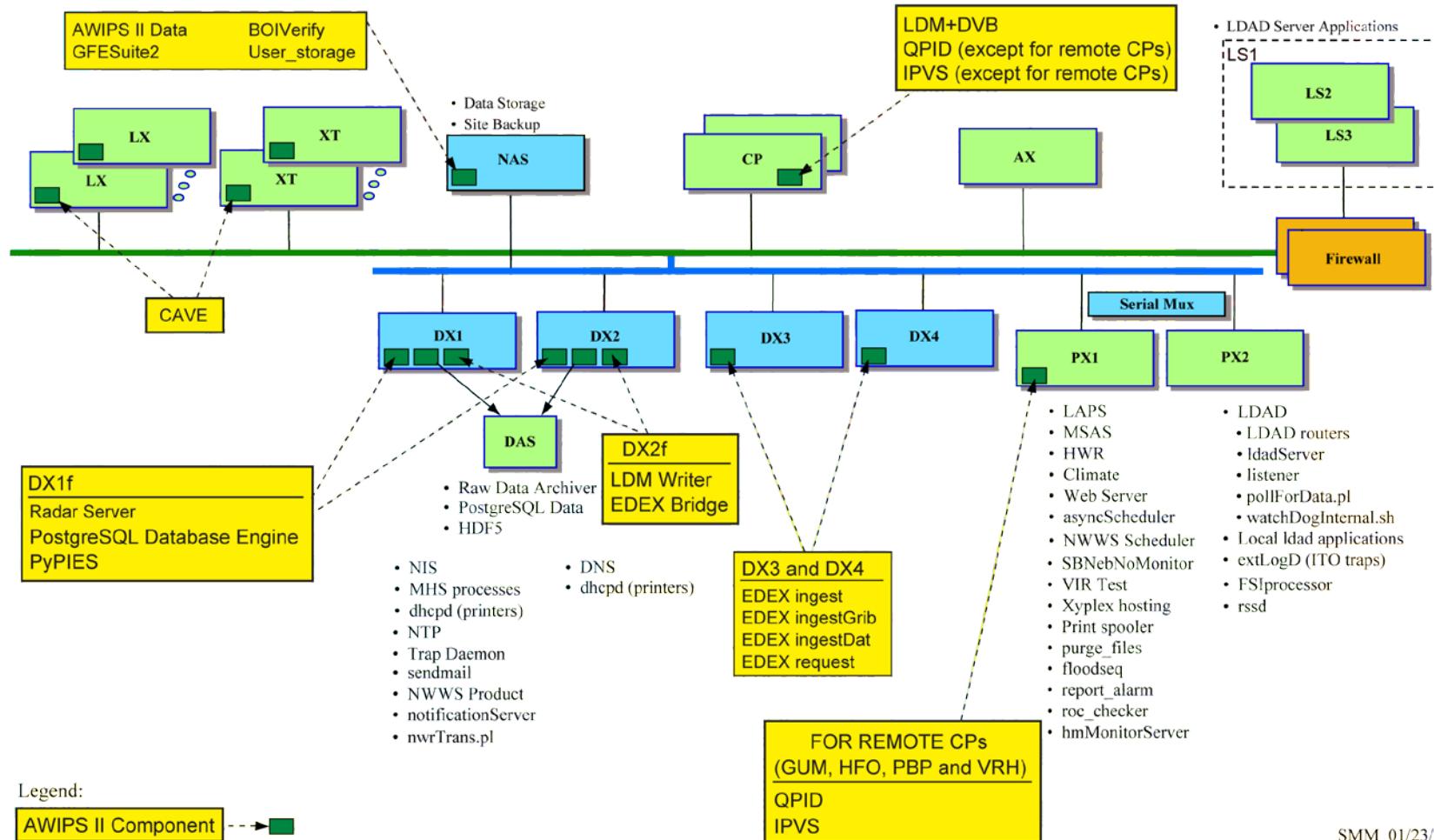
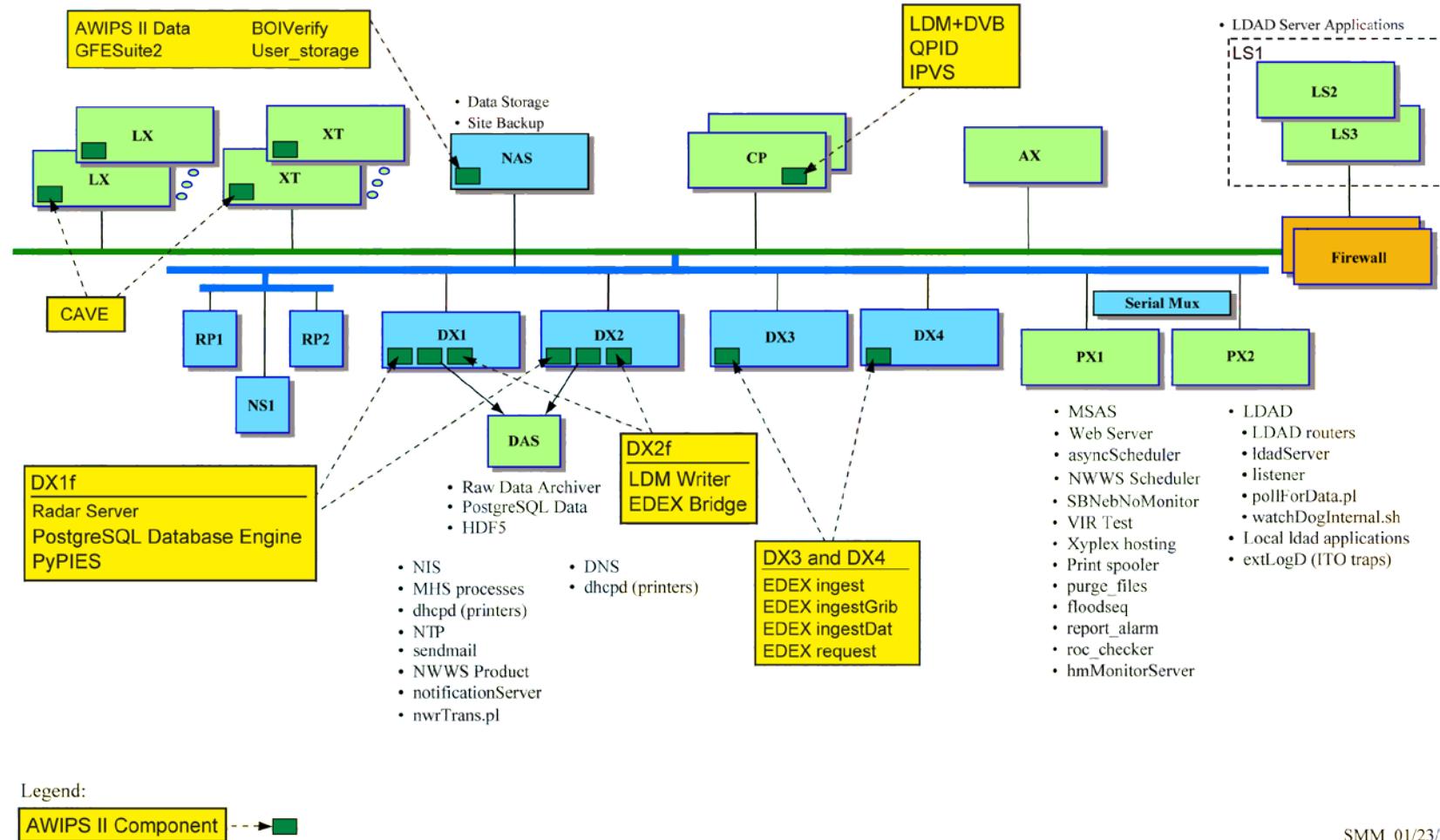


Exhibit R.0-2. OCONUS WFO Architecture (AWIPS II Components Deployment Concept)



# RFC Architecture

## AWIPS II Components Deployment Concept



**Exhibit R.0-3. RFC Architecture (AWIPS II Components Deployment Concept)**

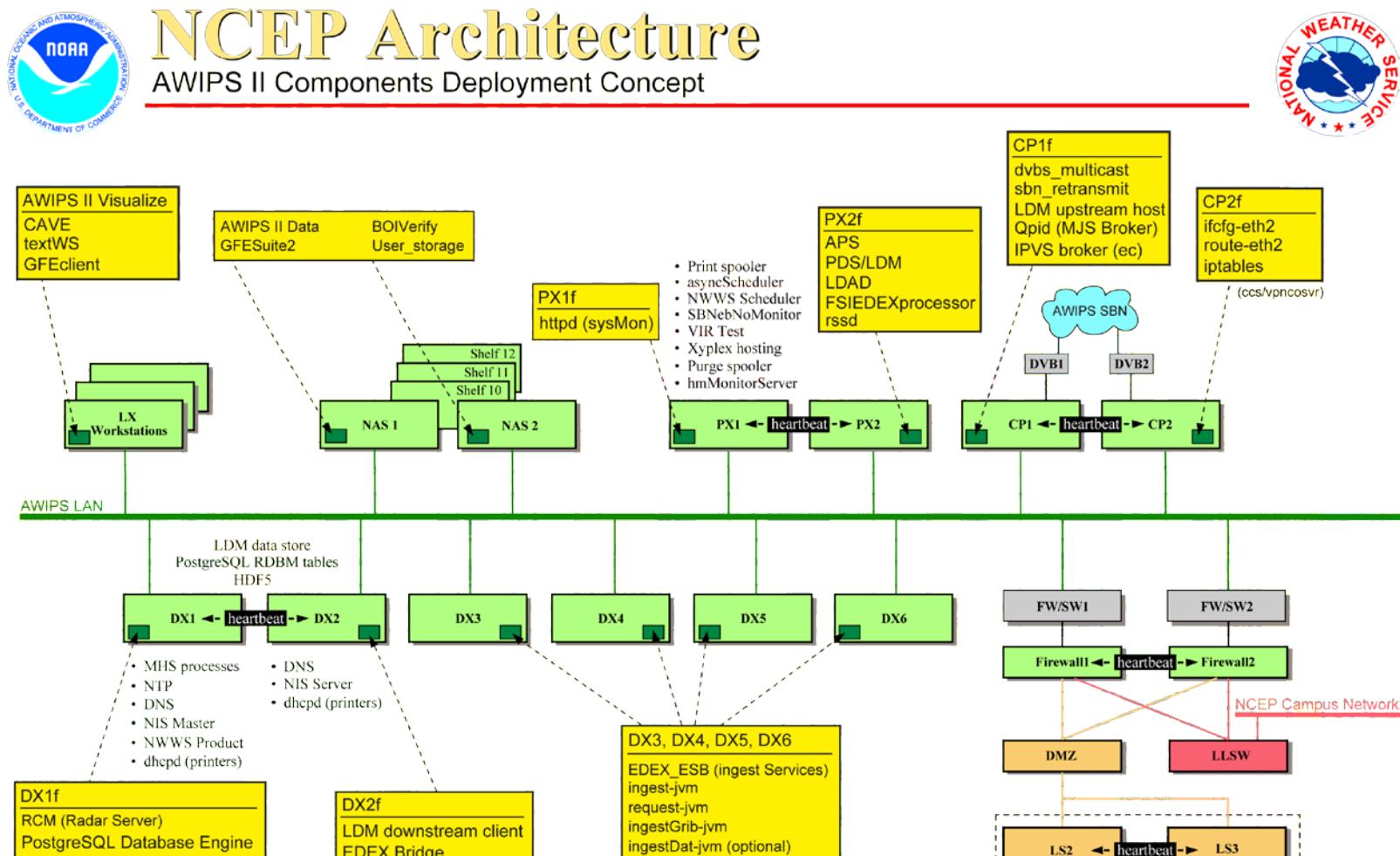


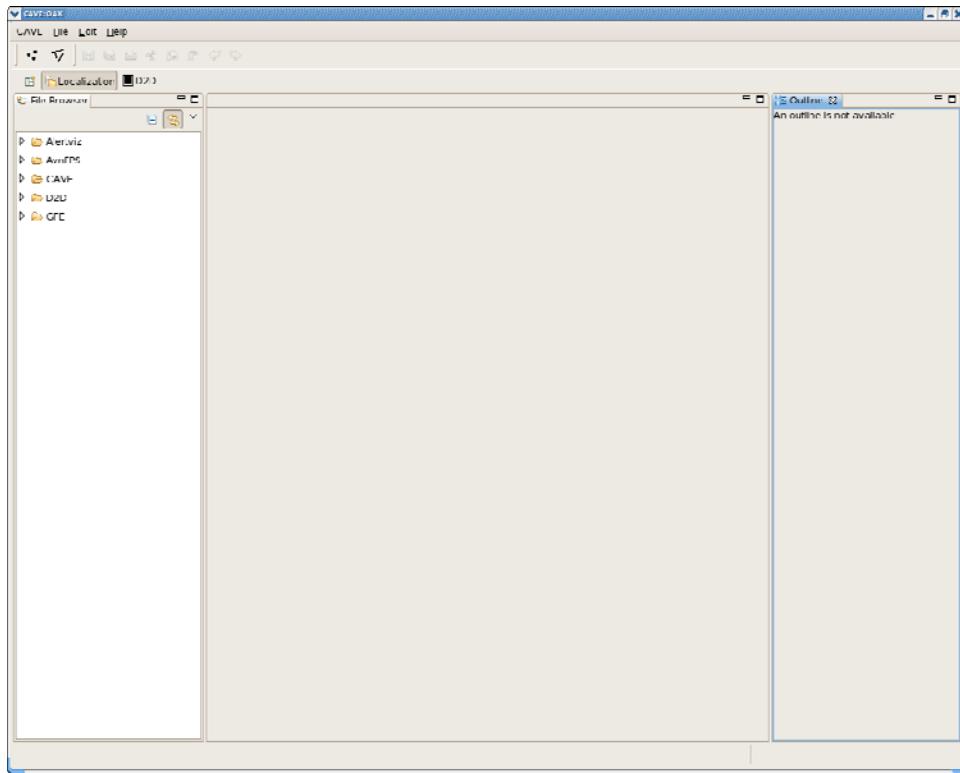
Exhibit R.0-4. NCEP Architecture (AWIPS II Components Deployment Concept)

## **Appendix S**

### **CAVE Localization Perspective**

AWIPS II supports a base/site/user localization pattern similar to AWIPS I. In AWIPS II, the localization data is preserved in a Localization Store that is physically mounted on the NAS and is accessible via the EDEX Request process running on the DX3/4 servers. The Localization Store includes configuration for both CAVE and EDEX.

The CAVE Localization Perspective provides a graphical interface to access to the CAVE localization data. This perspective provides a familiar file browser interface for locating configuration files. The Localization Perspective also shields the user somewhat from the physical structure of the Localization Store, providing a logical grouping of files by application/perspective (D2D, GFE, etc.), and it enforces access restrictions for editing certain files.



The Localization Perspective contains three views: the *File Browser* view; the *File Editor* view; and the *File Outline* view.

1. The *File Browser* view provides a familiar tree approach to locating a specific configuration file. The configuration files are organized by application (CAVE, D2D, GFE, etc.) and then by function and file name. In AWIPS II, there may be several versions of each file, including BASE, CONFIGURED (GFE only), SITE, WORKSTATION, and USER. Each of these is listed as a separate entry under the actual file name.
2. The *File Editor* view provides an editor for the selected file. When a configuration file is selected, it opens in an appropriate editor; for example, a Python file is opened in the Python editor, and an XML file is opened in an XML editor.

3. The *File Outline* view provides a hierarchical view of certain files. When available, you can click on an element in the File Outline to select that element in the file.

CAVE is installed on the LX and XT workstations, and is normally started via the desktop application launcher mechanism. On the LX workstations, CAVE is launched in full visualization mode, which allows access to the Localization Perspective; on the XT workstations, CAVE is launched as the Text Workstation, which does not allow access to the Localization Perspective.

This exercise provides basic procedures for using the Localization Perspective.

**Note:** AlertViz must be running on the LX workstation before you can start CAVE; normally AlertViz starts when the user logs into the LX workstation.

1. Open the CAVE Localization Perspective.

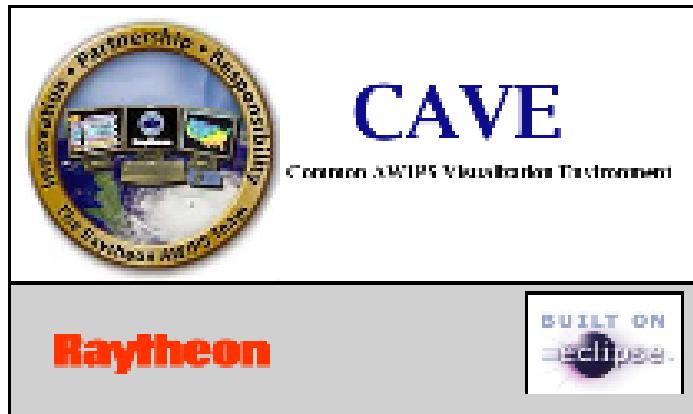
CAVE is normally started from the popup Start Menu on the LX workstation. This procedure walks you through the initial startup of CAVE and opening the Localization Perspective.

**Note:** This procedure provides the basic steps for accessing the localization perspective. These steps should be used at the start of each of the remaining procedures. If you are working the full exercise in a single session, you can leave CAVE running at the end of each procedure.

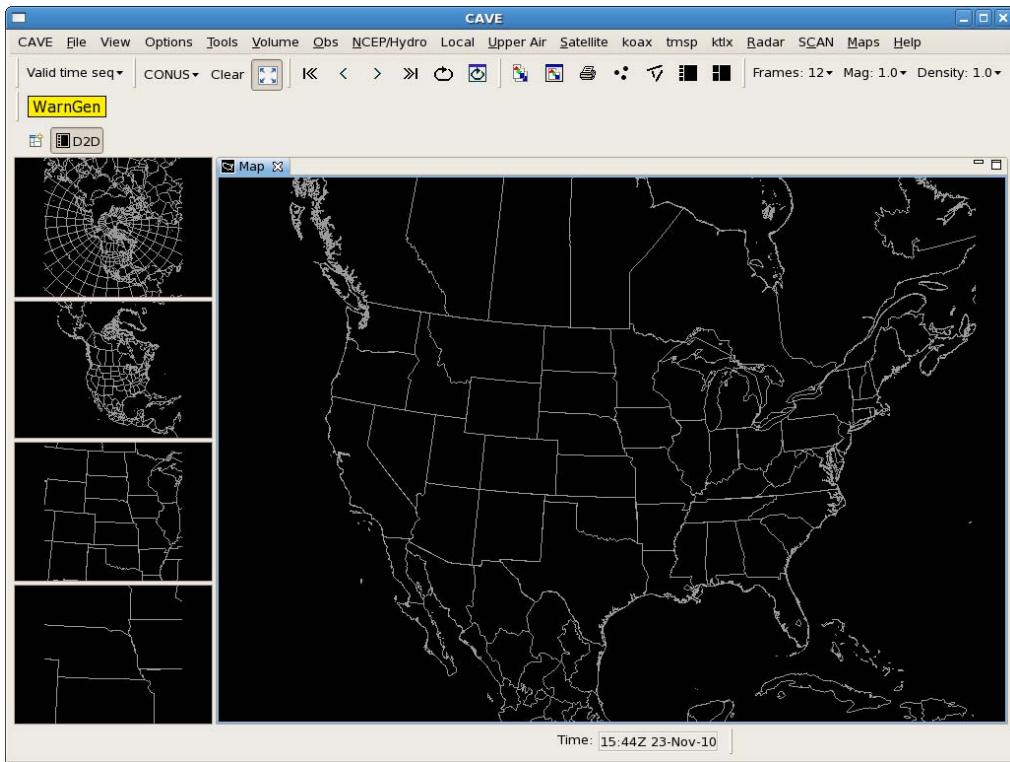
- a. Log into the LX workstation using your student login.
- b. Start CAVE. First, left click on the LX desktop to display the *Start Menu*.



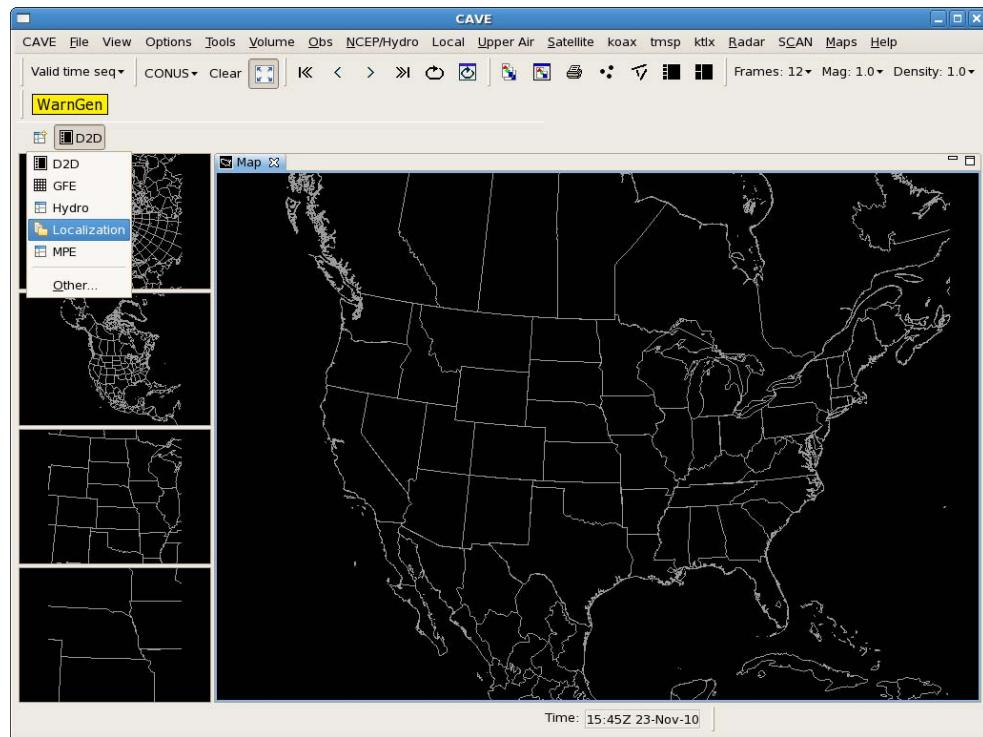
- c. Select 'Start CAVE'.
- d. If CAVE starts correctly, a splash screen will be displayed as CAVE starts.



After a short pause, the main CAVE window will display:



- Open the Localization Perspective. First, click the ‘perspective’ button (to the left of the D2D tab) to display the list of available perspectives.



- f. Select ‘Localization’.

**Note:** If *Localization* is not listed, select ‘Other...’ to open the *Open Perspective* dialog.

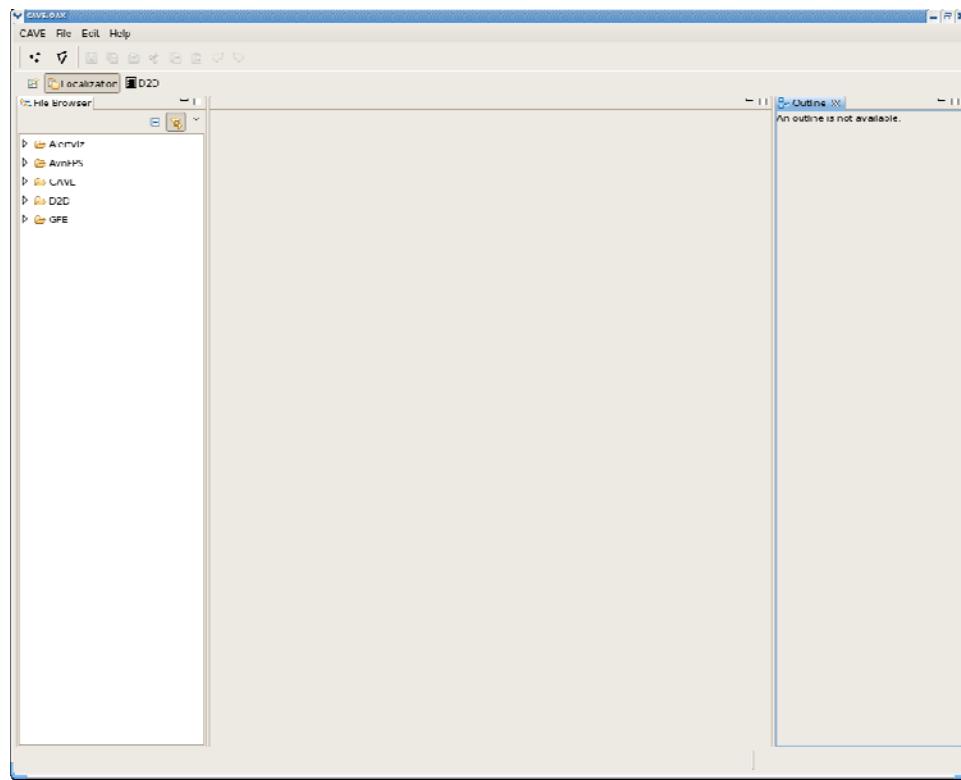


Once the *Open Perspective* dialog is displayed, select ‘Localization’ and click ‘OK’.

- g. The *Localization Perspective* will open. As part of the process, you will be prompted for your GFE login.



- h. After selecting your GFE role by clicking ‘OK’, the *Localization Perspective* opens.

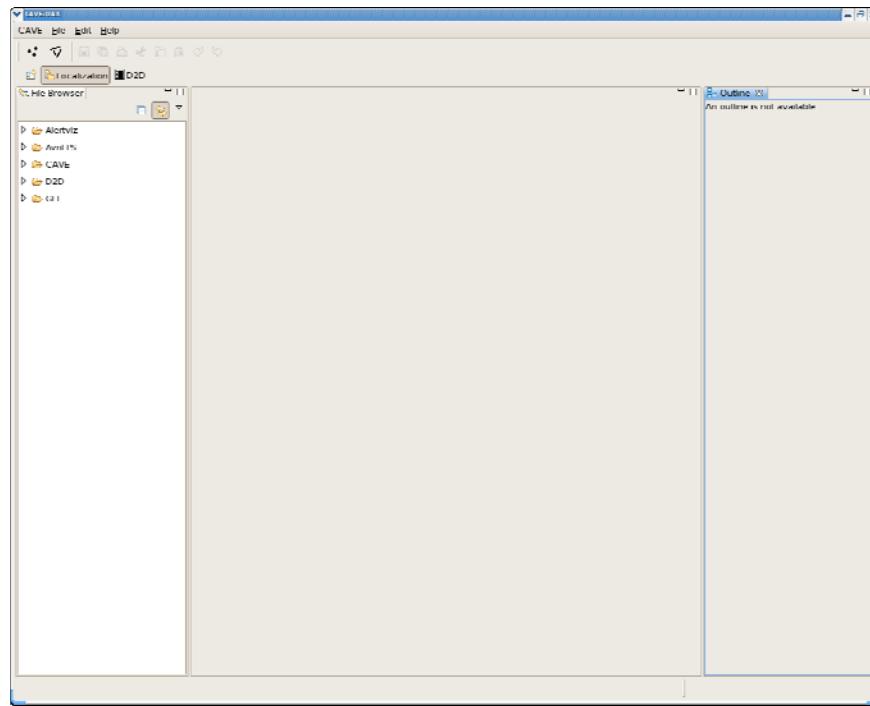


2. Edit configuration files in the Localization Perspective.

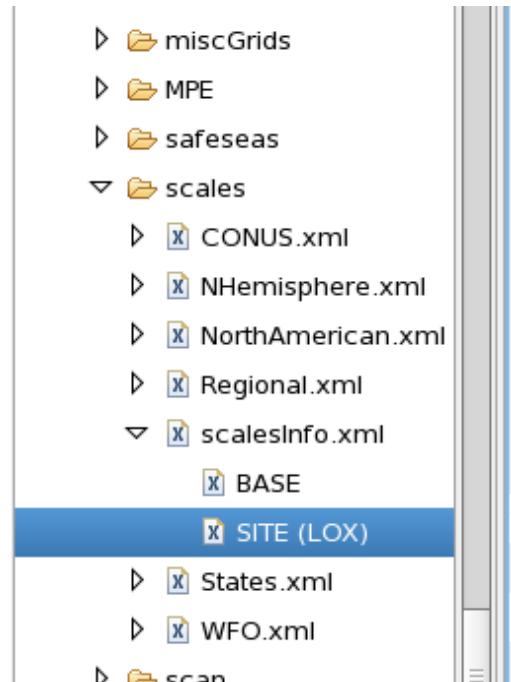
Once the *Localization Perspective* has been opened, specific configuration files are located using the *File Browser* located at the left of the window.

In this procedure, you will locate and open two files using the *Localization Perspective*: an XML file and a Python code file.

- If CAVE is not running on your workstation, follow the steps in Procedure 1 to start CAVE; once CAVE is running, open the *Localization Perspective*.

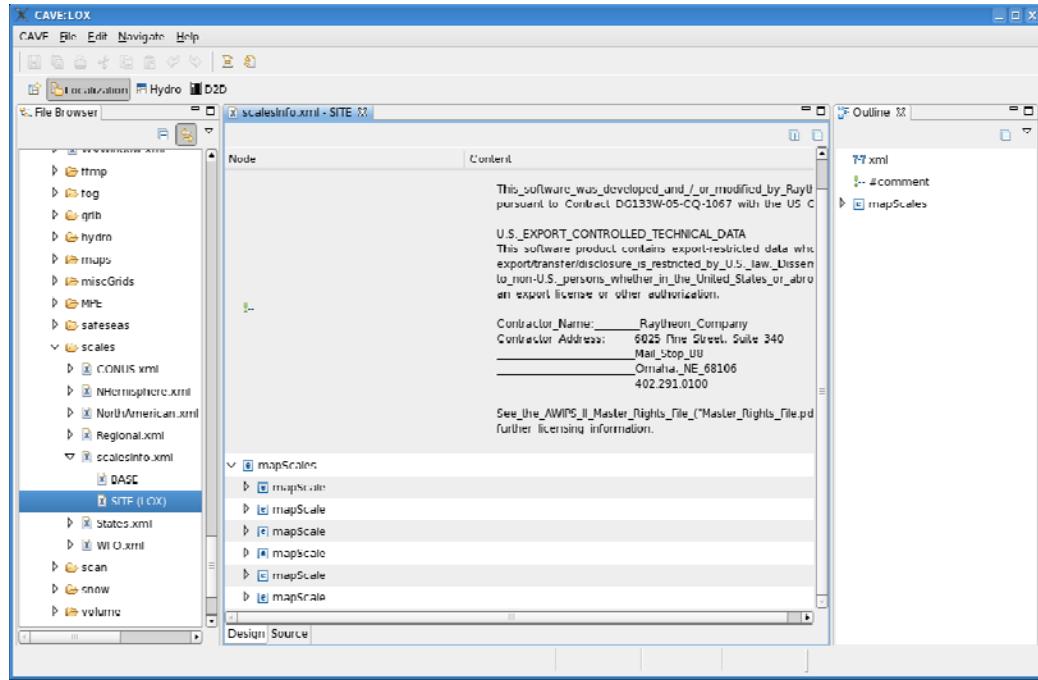


- b. The *File Browser* on the left is used to locate various configuration files. Expand *CAVE*→*Bundles*→*scales*→*scalesInfo.xml* to locate the file that controls the scale selector drop-down in the D2D perspective of CAVE.



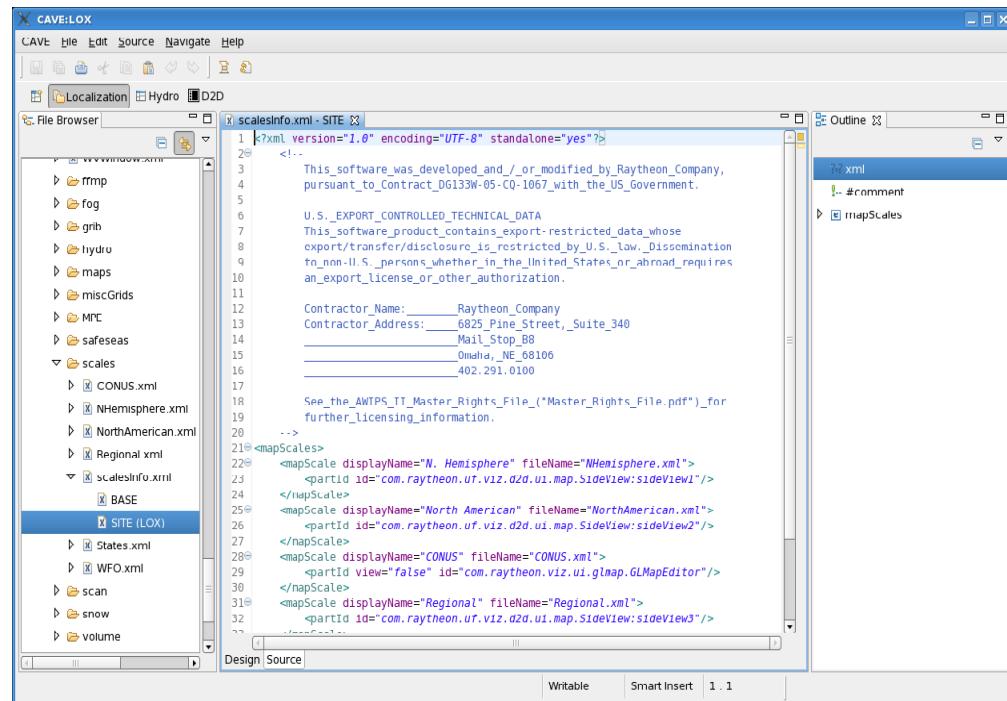
Note that there is a SITE level and BASE level version of this file.

- c. Double click on ‘SITE’ to open the site-level version in the XML editor.



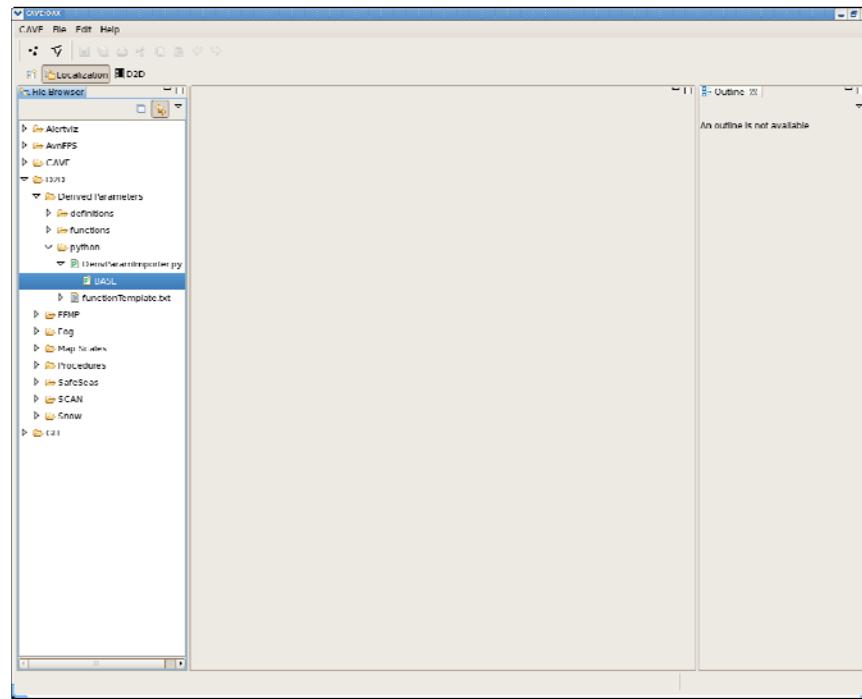
**Note:** The XML Editor has two display options; *Design* and *Source* (as noted at the bottom of the scalesInfo.xml-SITE window). By default, the file is opened in *Design* mode. Design mode provides a tree-like view of the XML file. In design mode, existing values may be modified without directly editing the XML.

- d. To view the actual XML, click the ‘Source’ tab at the bottom of the editor.



Close the editor by clicking the ‘X’ on the tab at the top of the editor.

- Expand *D2D*→*Derived Parameters*→*python*→*DerivParamImporter.py* to locate the Derived Parameters Python Importer script.



Note that there is only a single version of this file, the BASE version.

- Double click on ‘BASE’ to open the BASE version of the file in the editor.

```

This software was developed and / or modified by Battelle Company.
It is licensed to Contract Number DE-AC07-05OR22725 with the US Government.
#
THIS SOFTWARE PRODUCT CONTAINS EXPORT-RESTRICTED DATA WHICH
EXPORT/TRANSFER/REPRODUCTION IS RESTRICTED BY U.S. LAW. REPRODUCTION
IS TO NON-U.S. PERSONS WHETHER IN THE UNITED STATES OR ABROAD REQUIRES
AN EXPORT LICENSE OR OTHER AUTHORIZATION.
#
Contractor Name: Battelle Company
Contractor Address: 6825 Pine Street, Suite 340
Mail Stop 88
Seattle, WA 98103
Phone: 425.291.6100
#
See the AWIPS II Master Rights File ("Master Rights File.pdf") for
further licensing information.
#
Python import hook (PIL 2.0) for providing inheritance to derived parameters.
This enables an individual to override one of the methods of a derived
parameter function while still retaining the base versions of the other
methods.
#
$Id: DerivParamImporter.py,v 1.1 2018/02/17 17:20:18 jadams Exp $
#
Initial HISTORY
Date Ticket# Engineer Description
.....
17/20/18 JADAMS Initial creation
#
import os, types, sys, imp, inspect
#
class DerivParamImporter:
def __init__(self, userDir, safeDir, baseDir):
self.baseDir = baseDir
self.safeDir = safeDir
self.userDir = userDir
#
def _buildPath(self, dir, name):
return dir + os.sep + name + ".py"

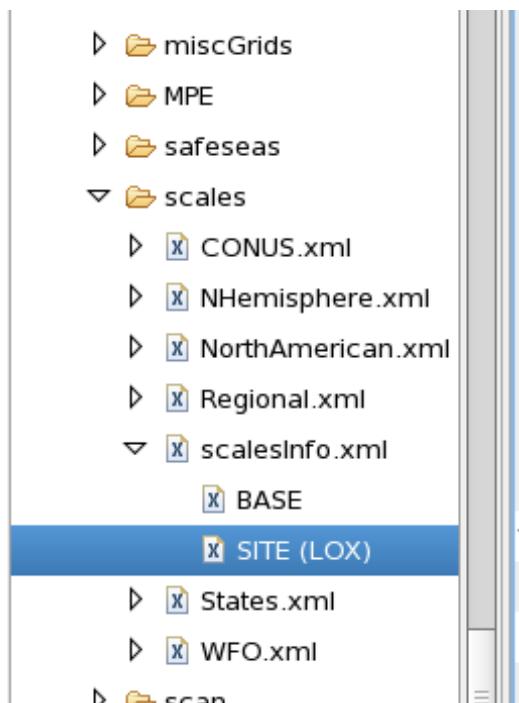
```

- Note:** For the Python file, a Python language enabled file editor is provided.
- g. Close any open editors.

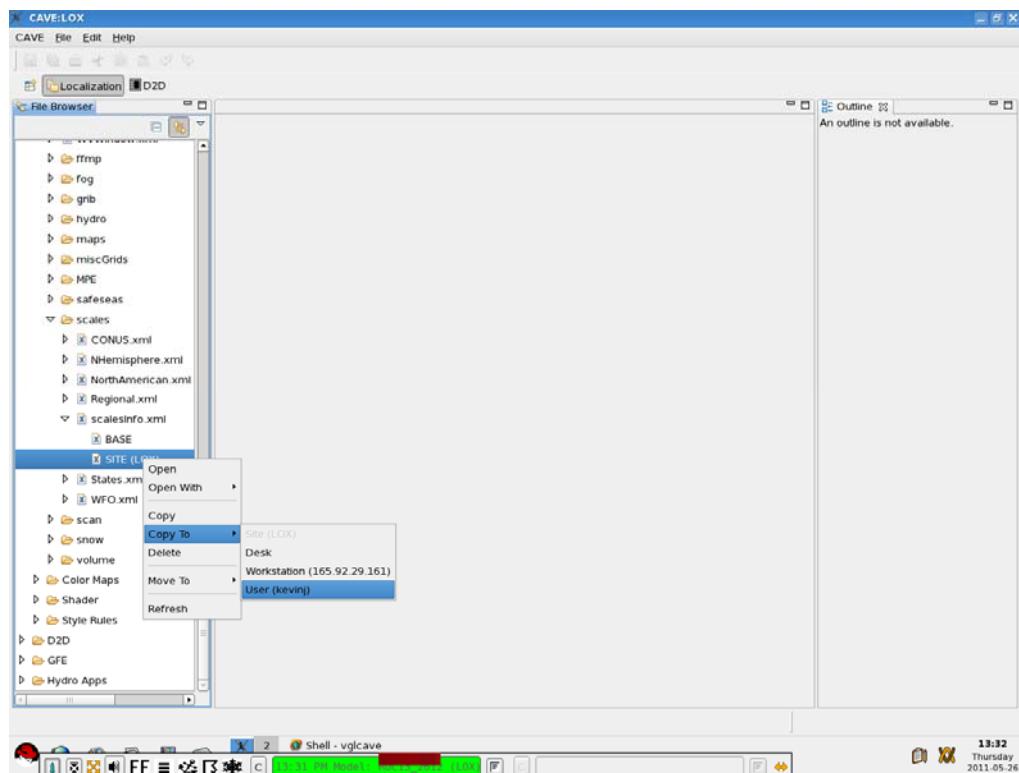
3. Use the perspective to make a change to a file that can be seen in CAVE.

This procedure steps through the creation of a local (USER) version of a site-level file. Once created, the file may be modified and saved. Finally, the file system on DX3 is checked to verify the file modification. The file you will copy is the *scalesInfo.xml* menu dropdown file that you opened earlier in this exercise.

- a. If CAVE is not running on your workstation, follow the steps in Procedure 1 to start CAVE; once CAVE is running, open the *Localization Perspective*. Once the *Localization Perspective* is open, locate scalesInfo.xml in the *File Browser*.

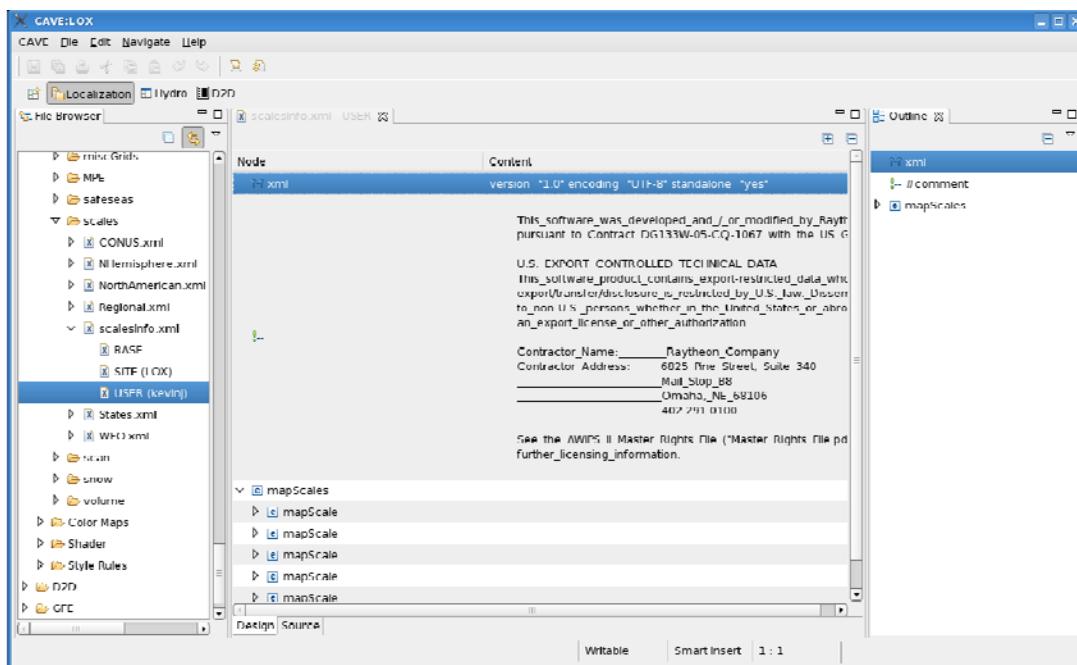


- b. Right click on 'SITE' and select 'Copy to→User ("xxxxx")' from the popup menu. This will make a copy of the file into the selected site localization.

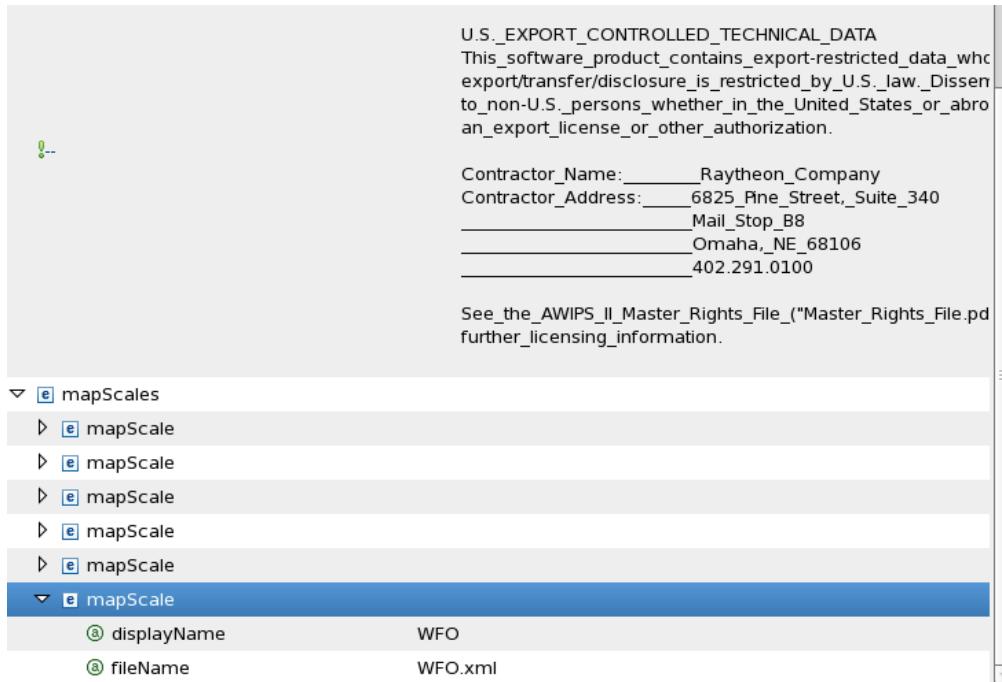


Replace xxxxx with your user name on the system.

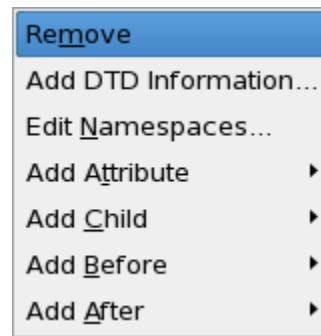
- Double click 'USER (xxxxx)' to open scalesInfo.xml for editing.



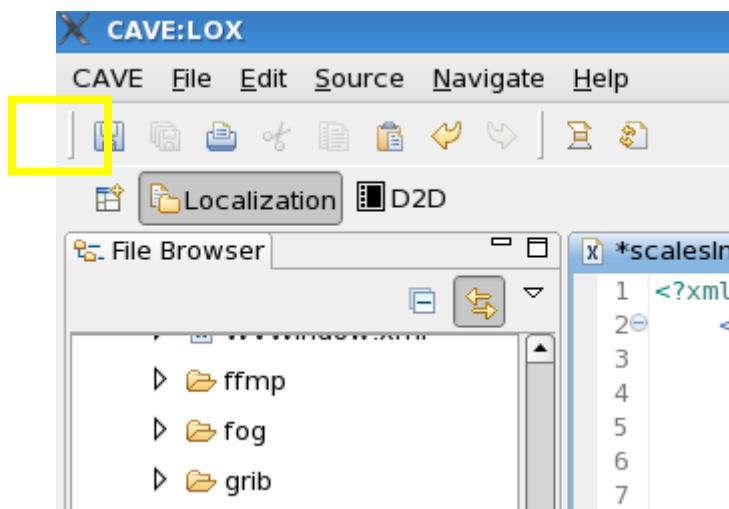
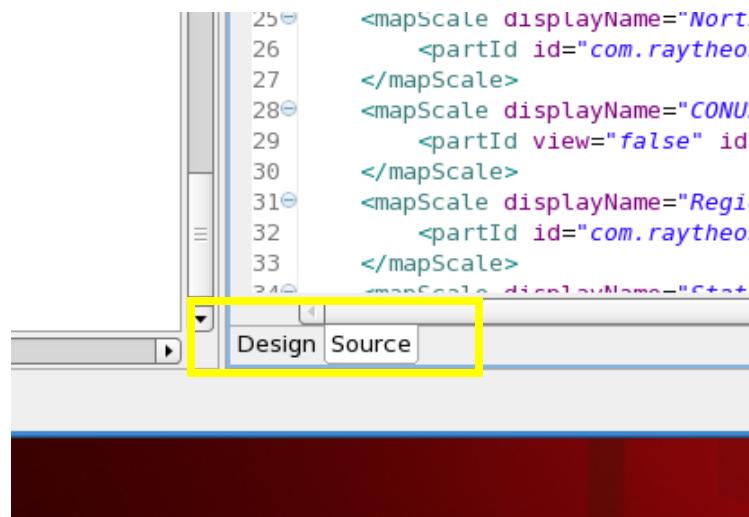
- d. Use the arrow next to the last mapScale in the editor to expand down the field. Notice that it is the entry for the WFO scale.



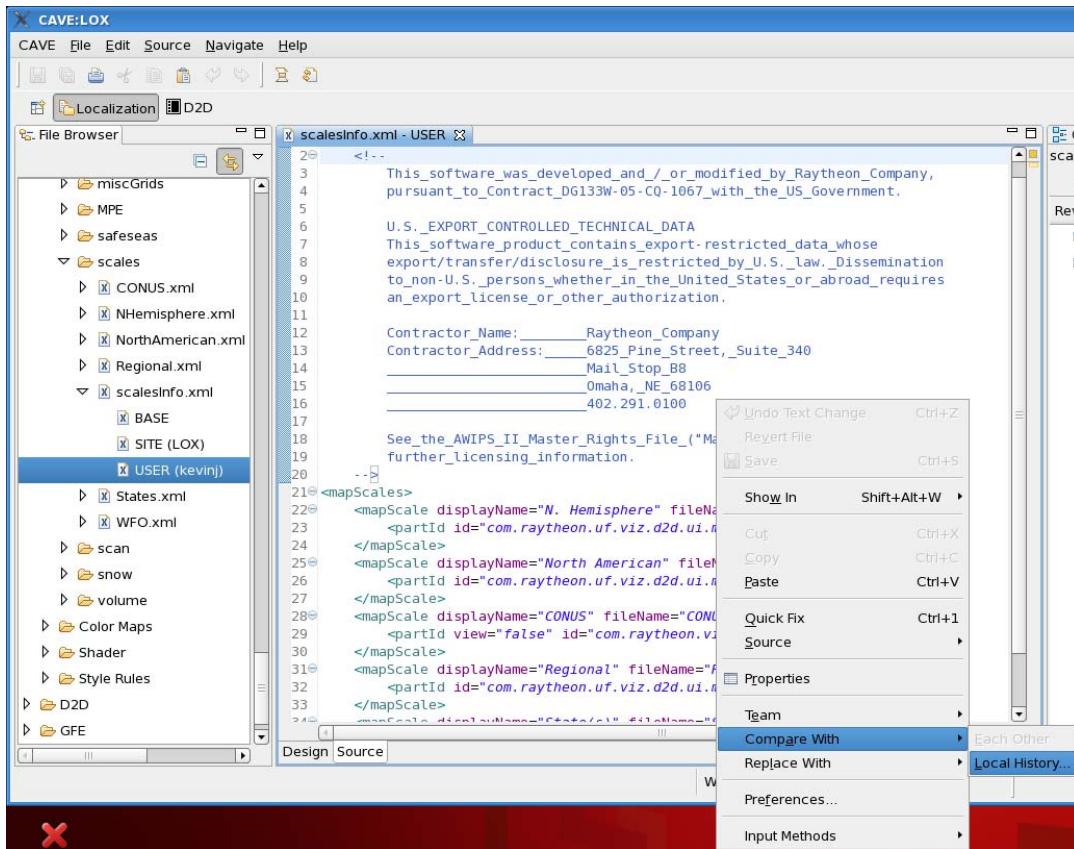
See what happens when this scale is deleted! Right click on the “mapScale” and select ‘Remove’.



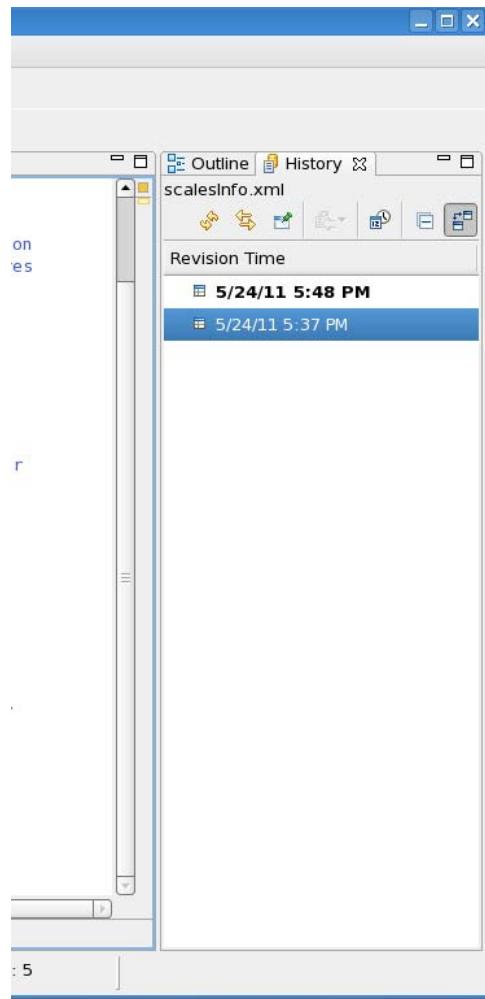
- e. Click on the ‘Source’ tab at the bottom of the middle window and view the XML syntax. Notice that there is no <mapScale> for WFO now. Click the ‘Save’ button in the upper left corner of CAVE (under the CAVE menu).



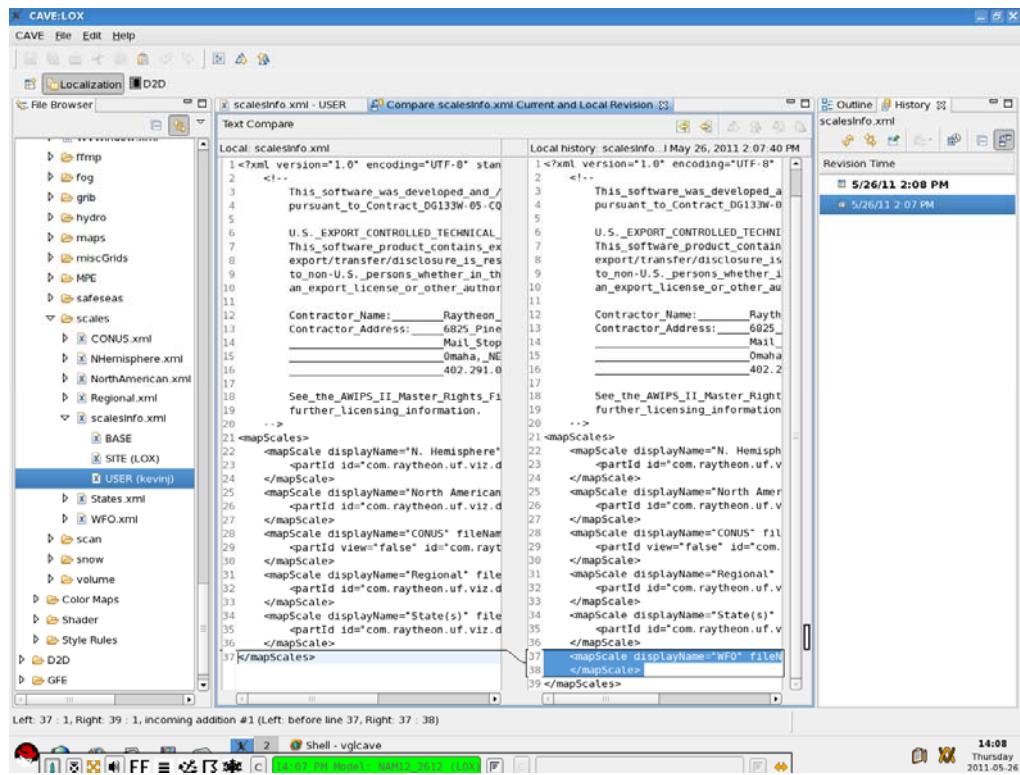
- f. Use the perspective-switching tabs at the top to go back to the D2D perspective. Use the menu dropdown selector, and try to switch to WFO scale. It should not be available!
- g. Switch back to the localization perspective by clicking on the tab. Click the 'Source' tab at the bottom of the window if scalesInfo is open in Design mode. Then hold down the right mouse button over the XML itself and navigate to 'Compare With → Local History'.



You will notice that a History tab appears on the right side of the perspective.

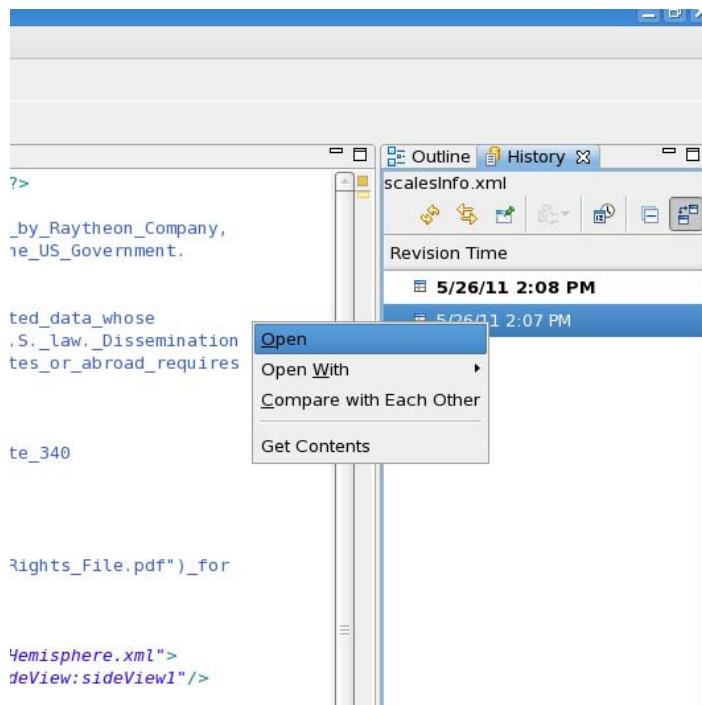


- h. Double click on the previous version and note that a comparison tab appears in the middle portion of the window. Note that the righthand side of the file shows the WFO entry present and highlighted.



Close the ‘Compare scalesInfo.xml Current and Local Revision’ tab by using the “x” in the title bar

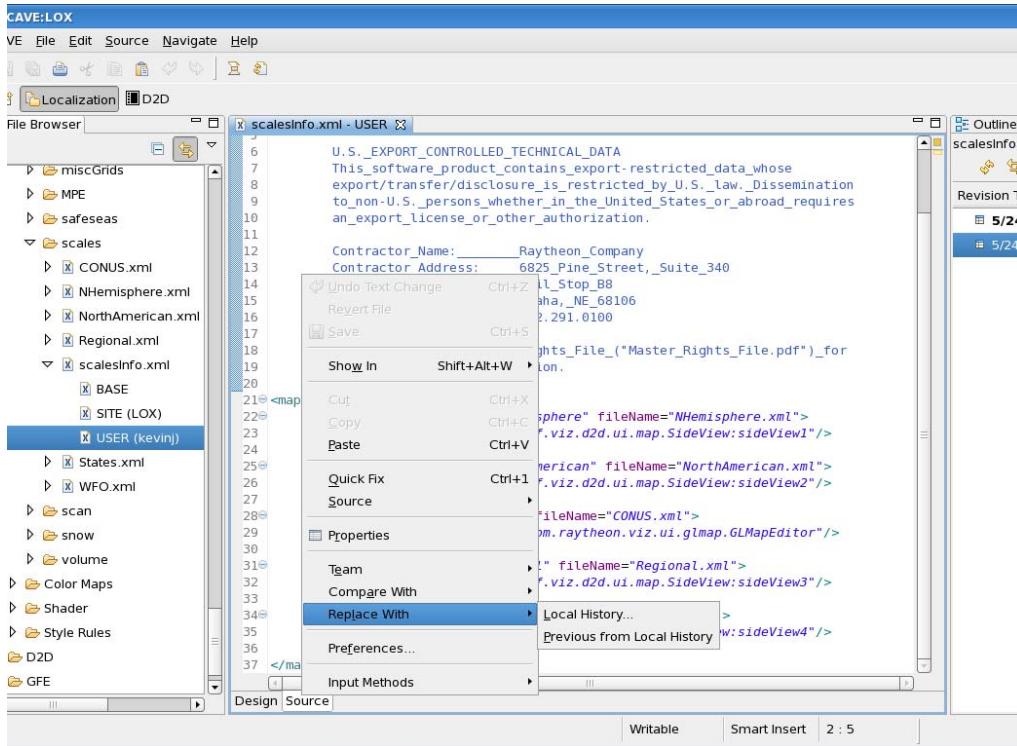
- i. Use the right mouse button to select the older version in the History browser, taking note to hold down the button until a menu appears. Select ‘Open’.



Note that a new tab has opened, which has the XML of the old version of the file. It does not have the string “USER” in the tab’s title and the WFO entry is present.

Close the tab by using the “x” in the tab title bar.

- j. Hold down the right mouse button in the XML of the scalesInfo.xml – USER tab and select ‘Replace With → Previous From Local History’.



Note that the file now shows the WFO entry present.

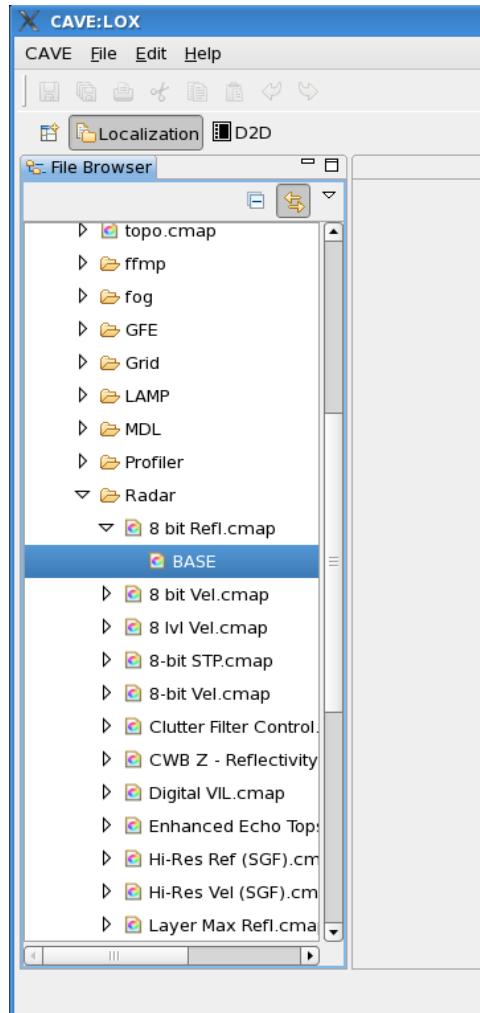
- k. Use the perspective-switching tabs at the top to go back to the D2D perspective. Use the menu dropdown selector, and try to switch to WFO scale. It is now available again!
- l. Switch back to the localization perspective and right click on the USER (xxxxx) version of scalesInfo.xml in the leftmost column (File Browser). Select ‘Delete’. You will receive a confirmation dialog, to which you should answer ‘OK’.
4. Look at a file that is not in XML format.

There are other types of files accessible via the Localization Perspective, and this procedure will show a few of them.

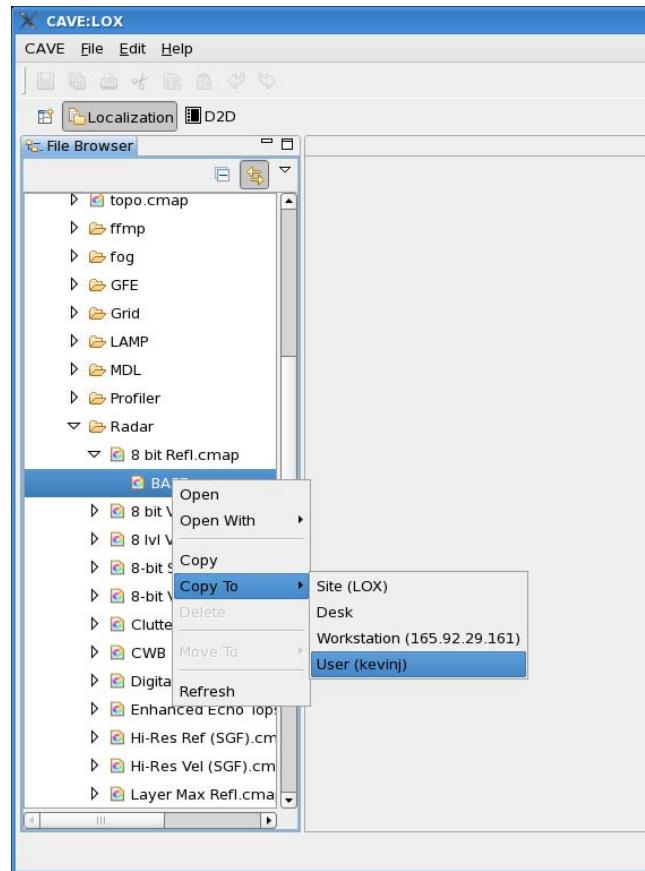
- a. If CAVE is not running on your workstation, follow the steps in Procedure 1 to start CAVE; once CAVE is running, open the *Localization Perspective*. Once the *Localization Perspective* is open, do the following to find *8 bit Refl.cmap*
  - Expand CAVE in the File Browser by clicking the ►
  - Expand Color Maps in the File Browser by clicking the ►

- Expand Radar folder by clicking the ►
- Expand 8 bit Refl.cmap by clicking the ►

**Note:** cmap files are color map files.

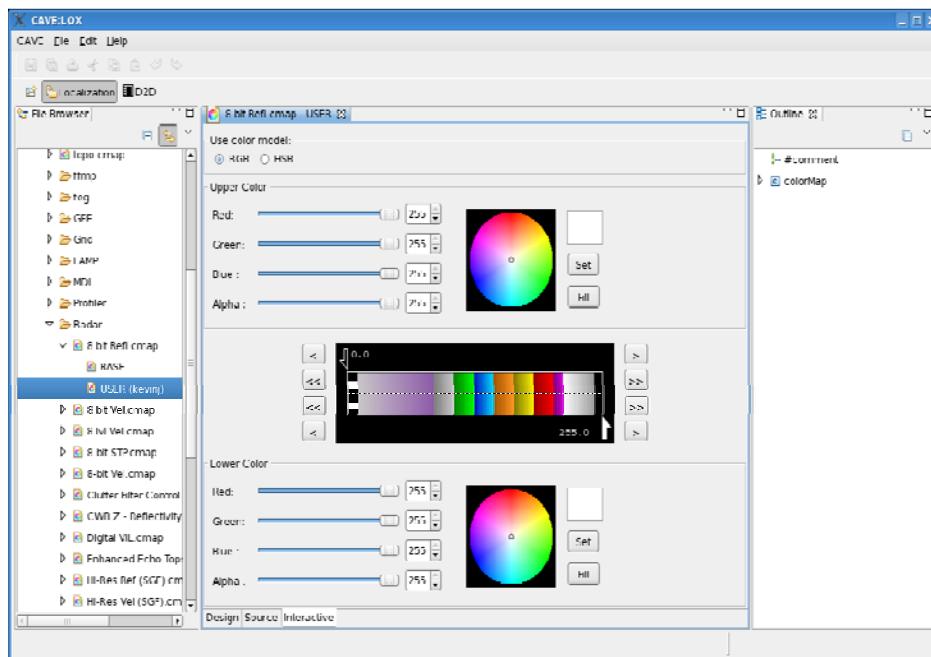


- b. Right click on 'BASE' and select 'Copy to→User(xxxxx)' from the popup menu.  
This will make a copy of the file into the selected site localization.



Replace **xxxxx** with your user name.

- Double click 'User (xxxxx)' to open the color map for editing.



Note that the color wheel launches within the Localization Perspective to allow for easy editing of the color map.

- d. Close the color wheel editor by clicking the ‘x’ in the tab titled “8 bit Refl.cmap – USER”.

- e. Open a terminal window on your workstation.

- f. Log into DX3 using your student login.

Enter: **ssh dx3**

- g. Change directory to the EDEX Localization Store.

Enter: **cd /awips2/edex/data/utility/cave\_static/user/xxxxx/colormaps/Radar**

- h. Perform a file listing to show the file has been copied to the EDEX Localization Store.

Enter: **ls -l**

- i. Log off DX3.

Enter: **exit**

- j. Expected results: Your terminal session should be similar to that shown below.

```
8 bit Refl.cmap 8 bit Refl.cmap.md5
```

- k. Use the already-open CAVE Localization Perspective to remove the user-level color map by holding down the right mouse button while selecting the USER (xxxxx) file in the File Browser and selecting ‘Delete’.

5. Edit a location plot information file to add a new location.

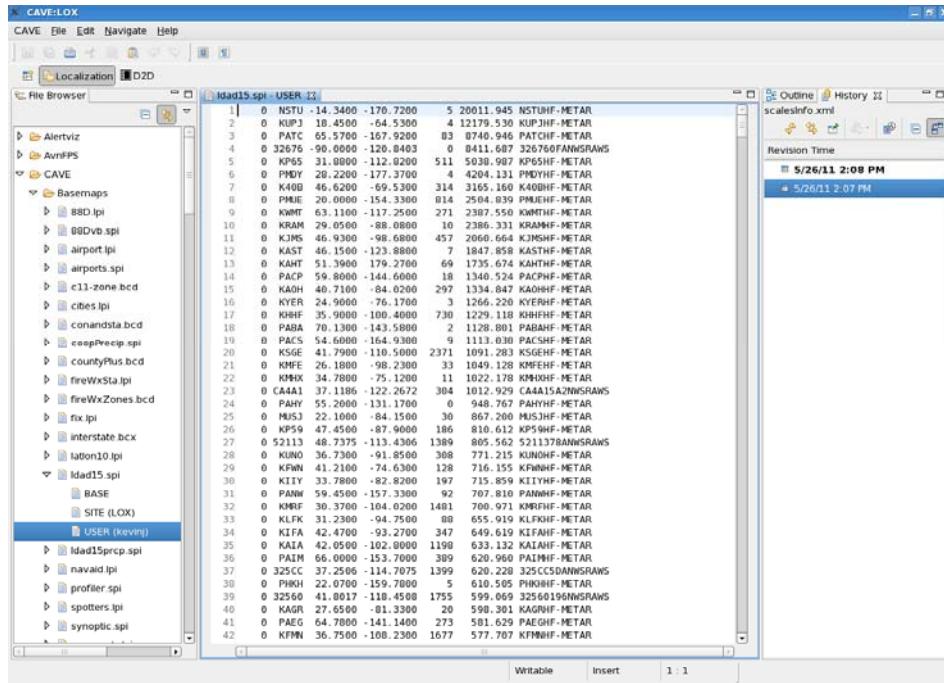
Location plot information (.lpi) can also be edited via the localization perspective to add or remove stations.

- a. If CAVE is not running on your workstation, follow the steps in Procedure 1 to start CAVE; once CAVE is running, open the *Localization Perspective*. Once the *Localization Perspective* is open, do the following to find *8 bit Refl.cmap*

- Expand CAVE in the File Browser by clicking the ►
- Expand Basemaps in the File Browser by clicking the ►
- Expand ldad15.spi folder by clicking the ►

- b. Right click on the SITE (XXX) file and select Copy To → User (xxxxx).

- c. Double click on the file and note that it opens in plain text format in the middle pane. Add a line at the top of the file that looks like the other entries. **Note:** Use spaces and not TABs in this file. Use the following to decide what to add:



If on LX1:

0 PRESIDENT 38.9000 -77.0000 9999 30000.000 PRES-METAR

If on LX2:

0 RUSHMORE 43.72 -102.78 9999 30000.000 RUSH-METAR

If on LX3:

0 LIBERTY 40.68 -74.03 9999 30000.000 LIBERTY-METAR

If on LX4:

0 GRANDCANYON 35.25 -112.76 9999 30000.000 CANYON-METAR

If on LX5:

0 SPACENEEDLE 47.43 -112.67 9999 30000.000 NEEDLE-METAR

Save the file using the button at the top left of the CAVE window.

- d. Switch over to the D2D perspective and load “Maps → LDAD Stations” and look for your new station!
- e. Switch back to the Localization perspective and delete the USER (xxxxx) file by holding down the right menu button while selecting the file in the File Browser and selecting ‘Delete’.
- f. Confirm the delete by clicking ‘OK’.

## **Appendix T**

### **Service Backup**

## Appendix T. Service Backup

### Table of Contents

	<i>Page</i>
T.0 Introduction .....	1
T.1 Scope .....	1
T.2 AWIPS I Service Backup .....	1
T.3 AWIPS II Service Backup.....	2
T.3.1 Service Backup Design and Configuration.....	3
T.3.1.1 Service Backup Web Interface.....	5
T.3.1.1.1 Export Configuration.....	6
T.3.1.1.2 Export Digital Data .....	7
T.3.1.1.3 Import Configuration.....	8
T.3.1.1.4 Import Digital Data .....	10
T.3.1.1.5 Export Digital Data To Failed Site.....	10
T.3.1.1.6 Export Digital Data To Central Server.....	11
T.3.1.1.7 Activate Site .....	12
T.3.2 Initiating Service Backup.....	13
T.4 Intrasite Coordination in AWIPS II.....	14
T.5 EDEX Service Backup Service .....	15
T.6 IFPS Service Backup in AWIPS II.....	15
T.7 WarnGen in AWIPS II .....	16
T.8 AvnFPS in AWIPS II .....	17
T.9 RiverPro in AWIPS II .....	17

### List of Exhibits

Exhibit T.2-1. AWIPS I Service Backup GUI.....	1
Exhibit T.3-1. AWIPS II Service Backup Web Interface .....	2
Exhibit T.3.1-1. AWIPS II Service Backup Directory Structure.....	3
Exhibit T.3.1.1-1. Service Backup Web Page .....	6
Exhibit T.3.1.1.1-1. Configuration Exported Table Item .....	6
Exhibit T.3.1.1.1-1. Service Backup Web Interface with Additional Site.....	1
Exhibit T.3.1.1.2-1. Digital Data Exported Table Item .....	7
Exhibit T.3.1.1.1-2. Export Configuration Execution .....	1
Exhibit T.3.1.1.3-1. Configuration Imported Table Item .....	8
Exhibit T.3.1.1.2-2. Export Digital Data Execution .....	1

Exhibit T.3.1.1.3-2. Import Configuration Execution .....	1
Exhibit T.3.1.1.4-1. Digital Data Imported Table Item .....	10
Exhibit T.3.1.1.5-1. Grids Exported Table Item .....	10
Exhibit T.3.1.1.4-2. Import Digital Data Execution .....	1
Exhibit T.3.1.1.5-2. Export Data to Failed Site - Sender.....	1
Exhibit T.3.1.1.5-3. Export Data to Failed Site - Receiver.....	1
Exhibit T.3.1.1.6-1. Grids Exported to Central Server Table Item.....	12
Exhibit T.3.1.1.7-1. Operation Table Item .....	12
Exhibit T.3.1.1.6-2. Export Digital Data To Central Server Execution .....	1
Exhibit T.6-1. AWIPS II App Launcher.....	16
Exhibit T.6-2. AWIPS II Service Backup Web Application .....	16
Exhibit T.7-1 CAVE WarnGen Backup Mode .....	17

## **List of Tables**

Table T.4-1. ISC Configuration Files .....	14
--------------------------------------------	----

**Note:** This appendix will be updated for Release OB12.3.1.

## T.0 Introduction

The AWIPS service backup capability is designed to allow one WFO to assume the functions of another site that has failed in order to retain high availability of services and products. Therefore, an effective method of transferring configuration and forecast data was incorporated into the AWIPS system. AWIPS II seeks to incorporate this capability into the new architecture.

## T.1 Scope

This document describes the service backup capabilities present in the AWIPS II system. The major functions present in the AWIPS service backup component have been incorporated into the AWIPS II architecture. There are several important differences between the existing AWIPS service backup component and the service backup component present in AWIPS II. These differences are described in this chapter, and the new procedure for initiating and using service backup in AWIPS II is explained in detail.

## T.2 AWIPS I Service Backup

The AWIPS I service backup (see Exhibit T.2-1) component exposes 10 operations to the user via a graphical user interface for executing service backup.



**Exhibit T.2-1. AWIPS I Service Backup GUI**

These operations are:

1. Emergency GFE
2. Import Configuration Data
3. Import Failed Site's Digital Data
4. Export Grids to Failed Site
5. Export CCC's Configuration to the Central Server
6. Export CCC's Digital Forecast to the Central Server
7. Export a Failed Site's Digital Data to the Central Server
8. Start GFE
9. Exit Service Backup
10. Clean Up Service Backup

### **T.3 AWIPS II Service Backup**

AWIPS I uses a stand-alone graphical user interface for executing service backup operations. AWIPS II has replaced the stand-alone GUI with a web interface for controlling service backup operations. (See Exhibit T.3-1.)

<b>NONE</b>	<b>Operation</b>	<b>Last Executed</b>
<input type="button" value="Export"/>	Export Configuration	----- --:-:-
<input type="button" value="Export"/>	Export Digital Data	----- --:-:-

<b>NONE</b>	<b>Operation</b>	<b>Last Executed</b>
<input type="button" value="Start"/>	Start Service Backup	-
<input type="button" value="Import"/>	Import Configuration	----- --:-:-
<input type="button" value="Import"/>	Import Digital Data	----- --:-:-
<input type="button" value="Export"/>	Export Grids To NONE	----- --:-:-
<input type="button" value="Export"/>	Export Grids to Central Server	----- --:-:-
<input type="button" value="Enable"/>	Site State: <b>Disabled</b>	-

Current Operation: None

**Exhibit T.3-1. AWIPS II Service Backup Web Interface**

The website is located at: <http://awips-dev1:8080/uEngineWeb/GfeServiceBackup/ServiceBackup.html>

A fundamental difference between the AWIPS I and AWIPS II architectures is that AWIPS II can run as 2 or more WFOs simultaneously. The primary site is your site. Any additional sites that are currently running on your EDEX server are listed under the SERVICE BACKUP STATUS heading.

### **T.3.1 Service Backup Design and Configuration**

AWIPS II reuses many of the scripts from AWIPS I.

These scripts are included in the AWIPS II installer and are placed in the appropriate directories upon successful installation of AWIPS EDEX.

The service backup scripts are installed to {INSTALL\_DIR}/GFESuite. The directory structure of the GFESuite directory is shown in Exhibit T.3.1-1.

```

GFESuite/
|-- ServiceBackup
| |-- Xdefaults
| |-- adapt
| | `-- ifps
| | |-- bin
| | | |-- hp
| | | | `-- ifps-main.env
| | | |-- Linux
| | | |-- Ifcw_message
| | | |-- do_imprt_grd_proc
| | | |-- export_bksite_grid_data
| | | |-- import_files_for_svcbkup
| | | |-- import_svcbkup
| | | |-- import_svc_backup_data.bat
| | | |-- proc_imprt_config_data
| | | |-- proc_import_grd_data
| | | |-- process_export_svc_backup_data
| | | |-- process_import_svc_backup_data
| | | |-- retrieve_svc_backup_data
| | | |-- start_imprt_grd
| | | |-- start_imprt_grd_frm_bksite
| | |-- config
| | |-- locks
| | |-- data
| | |-- logs
| | |-- adapt
| | | `-- ifps
| | | |-- svcbu_export_elements.dmx
| | | |-- svcbu_export_elements.oax
| | |-- help
| | |-- localbin
| | |-- ifps-dmx.env
| | |-- ifps-oax.env
| |-- backup_config
| |-- data
| |-- adapt
| |-- ifps
| |-- products
| | |-- TEXT
| | |-- tdlfs
| |-- logs
| |-- adapt
| |-- ifps
| |-- ifps
| |-- primary
| |-- bin
| |-- call_export_bksite_grid_data
| |-- export_GFEmconfig_for_svcbkup
| |-- export_bksite_grid_data_to_central_server
| |-- export_localbin_for_svcbkup
| |-- export_grid_data
| |-- export_localbin_for_svcbkup
| |-- export_svc_backup_data.bat
| |-- import_GFEmconfig_for_svcbkup
| |-- import_config_and_grids.bat
| |-- import_localbin_for_svcbkup
| |-- lib
| |-- ifpnetCDF
| |-- ischMosaic
| |-- exportgrids
| |-- exportgrids2
| |-- primary
| |-- bin
| |-- svcbu
```

```

Exhibit T.3.1-1. AWIPS II Service Backup Directory Structure

The main environment file (ifps-main.env) is installed to ServiceBackup/adapt/ifps/bin/hp. The IFPS_HOME and IFPS_LOCALHOME variables have been modified slightly to conform to the AWIPS II directory layout. Some AWIPS I specified lines have been commented out due to differences between AWIPS I and AWIPS II.

Two example local environment files have been included and reside in the ServiceBackup/adapt/localbin folder. These files contain the local environment settings for a particular site. Several modifications have been made to these files so as to conform with the AWIPS II directory hierarchy. These are:

- IFPS_SITE variable is changed to your site (oax as in the preceding paragraph).
- SVCBU_HOST variable needs to be changed to the name of the main EDEX server.
- CDSHOST variable needs to be changed to the name of the main EDEX server.
- PYTHONPATH should not be set as it is already configured by EDEX.

Two sample svcbu_export_elements files have also been included. This file lists the weather elements that are to be packaged when transmitting digital data back to the central server. These are svcbu_export_elements.oax and svcbu_export_elements.dmx. They reside in the ServiceBackup/adapt/ifps/data folder. Additional files may be added to this directory for different sites.

The scripts used for executing the service backup operations are included in the folder ServiceBackup/ifps/primary/bin and ServiceBackup/adapt/ifps/linux. They are a subset of the scripts used in AWIPS I for service backup and contain several modifications for use with AWIPS II. The changes include:

- ***Removal of ProgressBar.py and showProgress.py.*** The use of the web interface for service backup makes these files unnecessary. The progress bar and status were updated via a socket. The socket references have been removed in favor of using the progress messages on the Service Backup web interface.
- ***Removal of the tcl scripts.*** Tcl is not used in AWIPS II service backup for GUIs. The web interface is used instead.
- ***Removal of cron script.*** The cron script that executes the export digital data operation has been removed. In AWIPS II, this task is executed from a quartz timer defined in the gfe-server.xml file in the EDEX GFE plug-in.
- ***Modifications to export and import configuration scripts.*** Several modifications were made to the export and import configuration scripts. AWIPS II now bundles the information in {EDEX_HOME}/data/utility/common_static/site/{site} {EDEX_HOME}/data/utility/edex_static/site/{site}, and {EDEX_HOME}/data/utility/cave_static/site/{site} into the tarball to be exported. The import configuration scripts also expect these directories to be present. Upon receipt, the configuration tarball is unpacked and the site configuration is placed into the appropriate localization directories

The operations available on the front end delegate the real work back to EDEX, specifically to a class called GfeServiceBackup through the use of Direct Web Remoting (DWR). GfeServiceBackup then fires the appropriate script based on the operation the user has selected.

The scripts are executed from a class called SvcBackupUtil. SvcBackupUtil sets several environment variables necessary for successful execution of the service backup scripts. These environment variables are:

- **LOCALIZATION_PATH:** The LOCALIZATION_PATH variable specifies the root of the localization directory hierarchy. The localization root is specified in the base environment.xml file with a value of
`<utilityDir>${env:edex.home}/data/utility</utilityDir>` This variable is necessary to execute importing and exporting of configuration data.
- **AWIPS_HOME:** This variable is the install location of AWIPS. Because AWIPS II uses a dynamic directory hierarchy rather than relying on a static directory structure, the service backup scripts need to know where AWIPS was installed to for dynamic path construction. The AWIPS_HOME variable is used when exporting and importing digital data.
- **IFPS_LOCALBIN:** The GFESuite directory is located in the base environment.xml file with a value of `${env:edex.home} /.../GFESuite/` The IFPS_LOCALBIN variable uses this value as the root and extends the path to be `${env:edex.home} /.../GFESuite/ServiceBackup/adapt/ifps/localbin`. This value must also be specified due to AWIPS II's dynamic directory structure.

Upon startup, EDEX adds the bin directories contained in the ServiceBackup directory structure to the PATH variable (see start.sh located in edex/bin directory). The directory structure containing the executables is the same as those found in AWIPS I, except that it is contained in the GFESuite/ServiceBackup directory. Since AWIPS II supports the idea of defining a dynamic install location, these files are not placed in the root of the system.

T.3.1.1 Service Backup Web Interface

The Service Backup web interface handles seven operations critical to service backup. These are:

1. Export configuration
2. Export digital data
3. Import configuration
4. Import digital data
5. Export digital data to failed site
6. Export failed site's grids to central server
7. Activate site.

The Export configuration and Export digital data operations are for use by your site. The remaining five operations operate on data used for backing up the failed site. Upon completion of the selected operation, a pop-up message will appear notifying the user of the success or failure of the operation. Upon successful completion of the selected operation, the entry in the table for that operation will be updated with the date and time of the last successful execution. The following sections describe the available operations.

The service backup web page is shown in Exhibit T.3.1.1-1.

| SERVICE BACKUP | | |
|---|----------------------|----------------------|
| Exit Service Backup
Clean Up | | |
| BACKUP SITE | | |
| OAX | Operation | Last Executed |
| Export | Export Configuration | :-:-:- |
| Export | Export Digital Data | 2010-07-01 13:10:05 |

| FAILED SITE | | |
|--------------------|--------------------------------|----------------------|
| DMX | Operation | Last Executed |
| Import | Import Configuration | :-:-:- |
| Import | Import Digital Data | :-:-:- |
| Export | Export Grids From OAX | :-:-:- |
| Export | Export Grids to Central Server | :-:-:- |
| Enable | Site State: Disabled | :-:-:- |

Current Operation: None

Exhibit T.3.1.1-1. Service Backup Web Page

T.3.1.1.1 Export Configuration

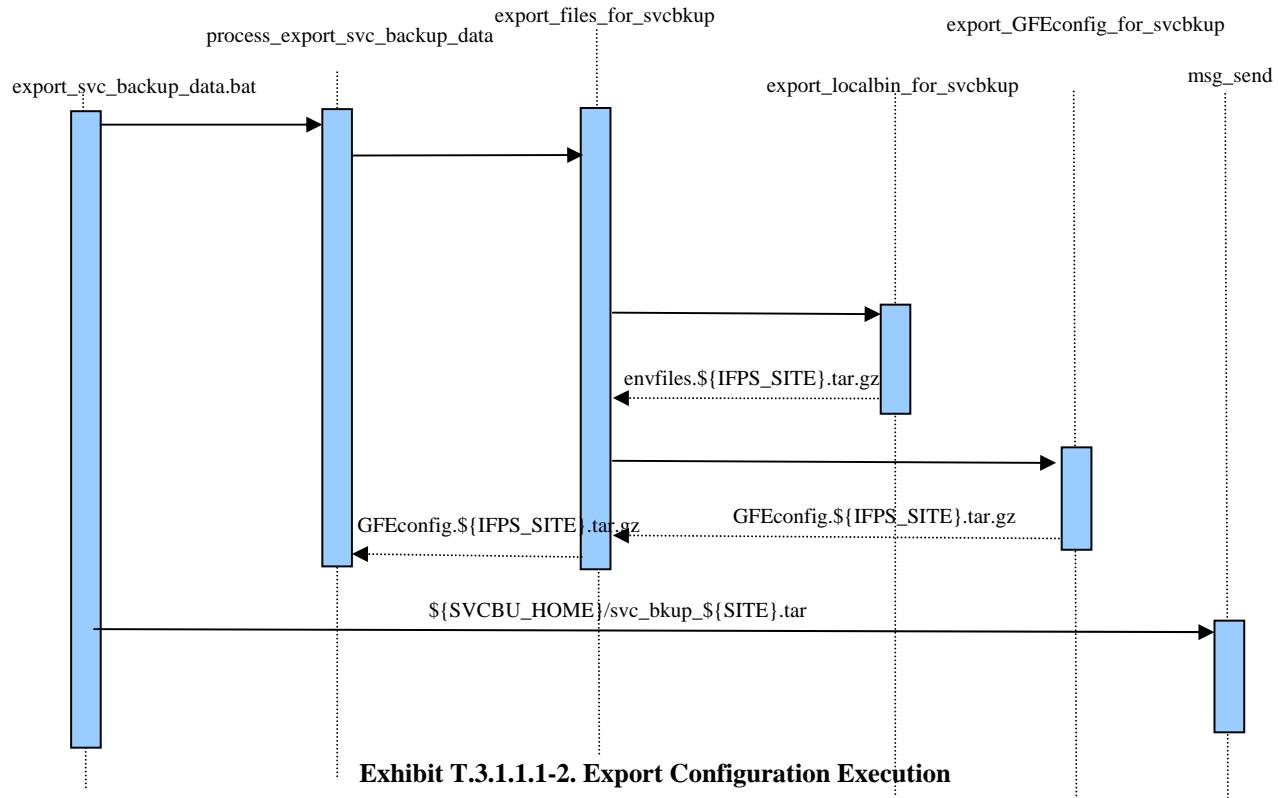
The export configuration operation packages your site's configuration information and transmits it to the central server. This operation is executed by clicking the Export button in the Configuration Exported heading. (See Exhibit T.3.1.1.1-1.)

| Configuration Exported | |
|-------------------------------|----|
| Export | NO |

Exhibit T.3.1.1.1-1. Configuration Exported Table Item

Exporting a configuration consists of packaging up the site configuration for your site from the common_static, edex_static, and cave_static directories from the localization directory and transmitting them via msg_send to the central server.

Exhibit T.3.1.1.2 illustrates the flow of execution.



Upon successful execution of the export configuration operation, the time at which the configuration was exported will be populated in the table.

T.3.1.1.2 Export Digital Data

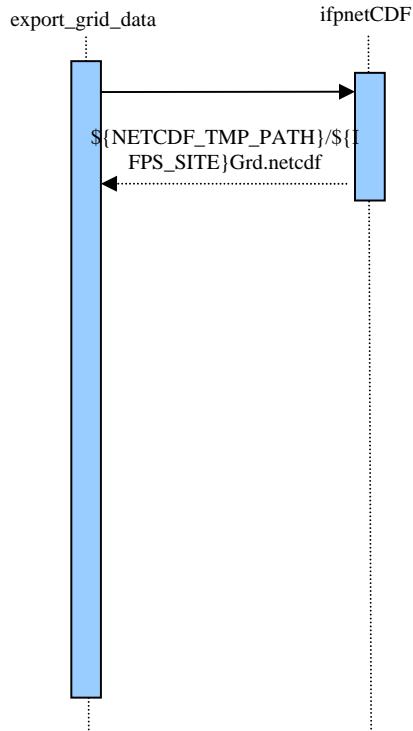
The export digital data operation exports your site's digital data to the central server. This operation is executed by clicking the Export button in the Digital Data Exported heading (See Exhibit T.3.1.1.2-1).

| Digital Data Exported | |
|---------------------------------------|----|
| <input type="button" value="Export"/> | NO |

Exhibit T.3.1.1.2-1. Digital Data Exported Table Item

Exporting digital data consists of packaging up the site grids using ifpnetCDF and placing them in the export grids directory located at {AWIPS_HOME}/GFESuite/exportgrids. The grids placed in the exportgrids directory get uploaded to the central server via the rsync process.

Exhibit T.3.1.1.2-2 shows the flow of execution for exporting digital data.

**Exhibit T.3.1.1.2-2. Export Digital Data Execution**

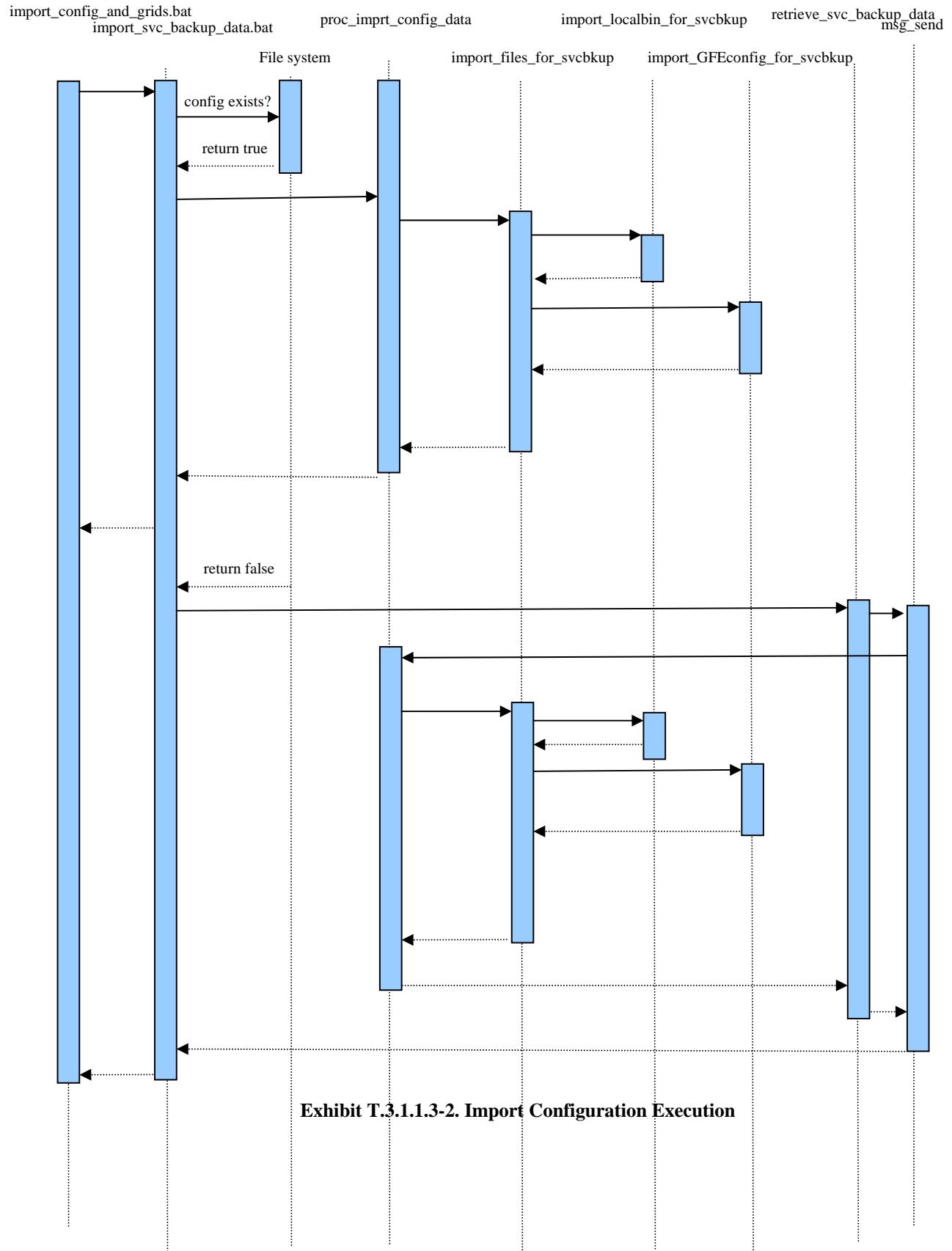
T.3.1.1.3 Import Configuration

The import configuration operation imports the configuration information for a site so service backup can be initiated. This operation is executed by clicking the Load button under the Configuration Imported heading in the table entry for the site for which the configuration is being requested. (See Exhibit T.3.1.1.3-1.)

| Configuration Imported | |
|-------------------------------|----|
| Load | NO |

Exhibit T.3.1.1.3-1. Configuration Imported Table Item

This operation communicates with the Message Handling System (MHS) to retrieve the configuration for the desired site. Once the configuration data has arrived, the MHS kicks off a script called process_import_svc_backup_data. This script unpacks the retrieved data and places the configuration information in the appropriate localization directories for the requested site. The scripts also unpack the localbin directory for that site as well. Exhibit T.3.1.1.3-2 shows the flow of execution for importing a configuration.



T.3.1.1.4 Import Digital Data

The import digital data operation imports the configuration information for a site so service backup can be initiated. This operation is executed by clicking the Load button under the Digital Data Imported heading in the table entry for the site for which the digital data is being requested. (See Exhibit T.3.1.1.4-1.)

| Digital Data Imported | |
|------------------------------|----|
| Load | NO |

Exhibit T.3.1.1.4-1. Digital Data Imported Table Item

This operation sends a request message to the MHS via the msg_send application. The MHS requests the data and places it into MHS x400 directory. The MHS then kicks off a script that integrates the data into the data stores via iscMosaic. After this operation is completed, service backup is ready to use for backing up a failed site. Exhibit T.3.1.1.4-2 shows the flow of execution for importing digital data.

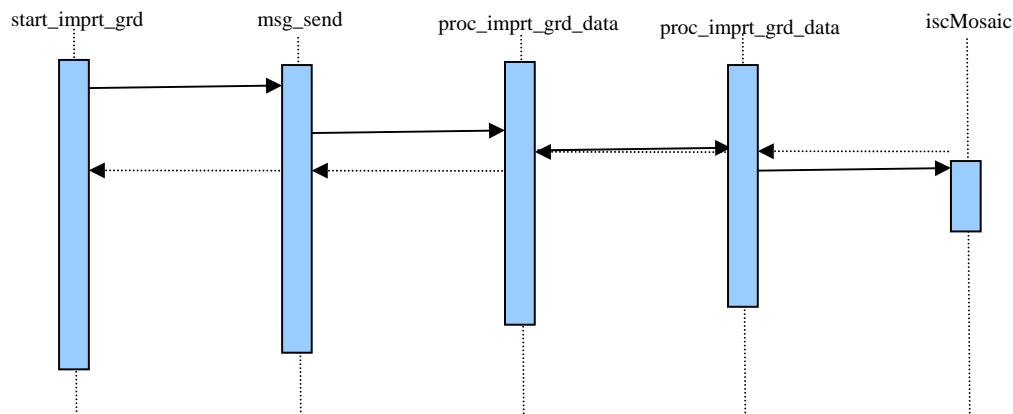


Exhibit T.3.1.1.4-2. Import Digital Data Execution

T.3.1.1.5 Export Digital Data To Failed Site

The “export digital data to failed site” operation exports the digital data from your site back to the failed site. This operation is executed by clicking the Export button under the Grids Exported from OAX heading in the table entry for the site to which the digital data is being sent back. (See Exhibit T.3.1.1.5-1.)

| Grids Exported from OAX | |
|--------------------------------|----|
| Export | NO |

Exhibit T.3.1.1.5-1. Grids Exported Table Item

Executing this operation kicks off a sequence of execution on both the sender side and the side receiving the data. The sending side packages the grids in netCDF format and sends a message to the MHS via msg_send, which sends the grids back to the failed site. The MHS at the receiving site kicks off a script to unpack and place the received grids in the RESTORE database using iscMosaic.

Exhibit T.3.1.1.5-2 shows the flow of execution on the sending side when the export to failed site operation is initiated.

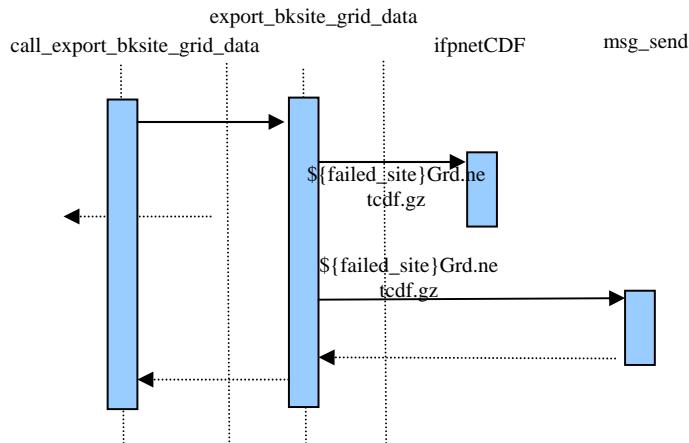


Exhibit T.3.1.1.5-2. Export Data to Failed Site - Sender

Exhibit T.3.1.1.5-3 shows the flow of execution on the receiving side when the export to failed site operation is initiated.

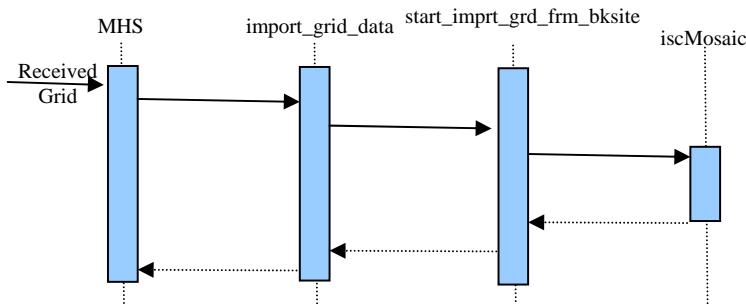


Exhibit T.3.1.1.5-3. Export Data to Failed Site - Receiver

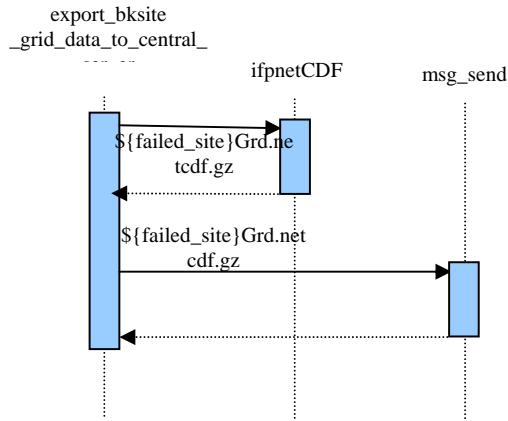
T.3.1.1.6 Export Digital Data To Central Server

This operation exports the digital data from your site to the central server. The operation is executed by clicking the Export button under the Grids Exported to Central Server heading in the table entry for the site to which the digital data is being sent back. (See Exhibit T.3.1.1.6-1.)

| Grids Exported to Central Server | |
|---|----|
| Export | NO |

Exhibit T.3.1.1.6-1. Grids Exported to Central Server Table Item

This operation packages the digital data for the failed site and sends it to the central server via the MHS. Exhibit T.3.1.1.6-2 shows the flow of execution for sending grids to the central server:

**Exhibit T.3.1.1.6-2. Export Digital Data To Central Server Execution**

T.3.1.1.7 Activate Site

The “activate site” operation enables the EDEX server to handle data and operations for an additional site. This operation can be executed by clicking the Enable button under the Operational heading in the table for the site you wish to activate. (See Exhibit T.3.1.1.7-1.)

| Operational | |
|--------------------|----|
| Enable | NO |

Exhibit T.3.1.1.7-1. Operation Table Item

In order for a site to be activated, the configuration data for that site must be present in the localization directory (see Section T.3.1.1.3). This operation executes the activateSite method in the com.raytheon.edex.plugin.gfe.config.GFESiteActivation class passing in the site ID of the site being activated. A pop-up message will appear notifying the user of the success or failure of the operation.

T.3.2 Initiating Service Backup

Service backup for a failed site is initiated through the web interface described above. Before a site can be backed up, that site must be activated on the running EDEX server. A new site is activated from the web interface as follows:

- 1) Enter the failed site's site ID in the text box and click the Enable button:

SERVICE BACKUP

Primary Site: OAX

| Configuration Exported | Digital Data Exported |
|--|--|
| <input type="button" value="Export"/> NO | <input type="button" value="Export"/> NO |

Configure Service Backup for:

SERVICE BACKUP STATUS:

| Site | Configuration Imported | Digital Data Imported | Grids Exported from OAX | Grids Exported to Central Server | Operational |
|------|--|--|--|--|--|
| DMX | <input type="button" value="Load"/> NO | <input type="button" value="Load"/> NO | <input type="button" value="Export"/> NO | <input type="button" value="Export"/> NO | <input type="button" value="Enable"/> NO |

- 2) Import the configuration data for the new site (DMX in this case). If the configuration files are already present on your system, this step is not necessary. If the configuration data for that site is not present on your system, it needs to be retrieved. Under the Configuration Imported heading, click the Load button. EDEX will communicate with the MHS and retrieve the configuration data for that site. If the configuration is successfully retrieved, a pop-up message will appear and the date at which the configuration was loaded will be placed in the table.
- 3) Now that the configuration information has been retrieved, EDEX can activate that site. Under the Operational heading, click the Enable button. This will enable that site on the EDEX server. Another pop-up will appear informing the user of the success of the operation, and the text will change from NO to YES.
- 4) Assuming the configuration was imported successfully and the site was activated successfully, the digital data may now be imported. Click the Load button under the “Digital Data Imported” heading. EDEX will contact the MHS and retrieve the digital data for that site.

SERVICE BACKUP

Primary Site: OAX

| Configuration Exported | Digital Data Exported |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> Export NO | <input type="checkbox"/> Export NO |

Configure Service Backup for:

SERVICE BACKUP STATUS:

| Site | Configuration Imported | Digital Data Imp | Connected to Central Server | Operational |
|------|---|----------------------------------|--|--|
| DMX | <input type="button" value="Load"/> 2010-01-25 19:56:02 | <input type="checkbox"/> Load NO | <input type="checkbox"/> Connected to Central Server | <input type="checkbox"/> Operational YES |

The page at <http://localhost:8080> says:

Site [DMX] successfully activated

- 5) Service backup is now ready for use for the selected site. CAVE can now be started localized to the failed site.

T.4 Intrasite Coordination in AWIPS II

ISC has been incorporated into the EDEX Request Processes that run on DX3 and DX4. The EDEX Request process performs ISC routing tasks based on configuration in two configuration files:

1. **localConfig.py**. Defines ISC transmission information.
2. **siteConfig.py**. Defines ISC server information.

Both of these files are converted from the existing AWIPS I files at software installation; In AWIPS II, these files are located in the AWIPS II Localization Store on DX3/4. The file locations are shown in Table T.4-1.

Table T.4-1. ISC Configuration Files

| File | Location (Relative to /awips2/edex/data/utility) |
|----------------|--|
| localConfig.py | edex_static/site/XXX/config/gfe |
| siteConfig.py | edex_static/site/XXX/config/gfe |

In Table T.4-1, XXX represents the site identifier, e.g., OAX.

It is important to recognize that ISC operation remains essentially unchanged. As grids are modified and/or published in the CAVE GFE perspective, they are forwarded to the ISC server. Depending on the configuration values in localConfig.py, this may be automatic or it may be by forecaster action.

T.5 EDEX Service Backup Service

The server side applications (ifpServer, etc.) supporting Service Backup have been reengineered as EDEX Services. Operationally, there is little change in AWIPS II.

The configuration location for Service Backup has changed. The primary configuration file, located in /awips2/GFESuite/ServiceBackup/configuration, is svcbu.properties.

The EDEX Service Backup Service is part of the EDEX request process. It is activated by a Quartz trigger that fires at 15 minutes after each hour. Service Backup events are logged in two places: 1) in the EDEX request log in /awips2/edex/logs; and 2) in the Service Backup log in /awips2/GFESuite/ServiceBackup/logs/yyyymmdd, where yyyyymmdd is the date stamp for the logs.

The rsync process is still used to send exported grids to the Central Server. Those grids are rsync'ed from the /awips2/GFESuite/exportgrids directory.

T.6 IFPS Service Backup in AWIPS II

For AWIPS II, GFE has been reengineered into the GFE perspective in CAVE; as previously discussed, the GFE server applications have been reengineered as EDEX plug-ins. The AWIPS I Interactive Forecast Preparation System (IFPS) Service Backup Graphical User Interface (GUI) application has been reengineered as a web-based application for AWIPS II.

The web-based application is available at the following URL:

<http://dx3:8080/uEngineWeb/GfeServiceBackup/ServiceBackup.html>. (If DX3 EDEX is down, then the web page will not load; DX4 can be substituted for DX3 in this URL.) On the LX workstation, this page is accessed from the AWIPS II App Launcher, shown in Exhibit T.6-1 as ‘Start IFPS Service Backup GUI.’



Exhibit T.6-1. AWIPS II App Launcher

When this web page is opened in Firefox, the display is similar to Exhibit T.6-2

GFE Service Backup Web Interface - Mozilla Firefox

YOU ARE NOT IN SERVICE BACKUP

Enter Failed Site:

| My Site: DMX | Status |
|--|--------|
| <input type="button" value="Export"/> Export Configuration | |
| <input type="button" value="Export"/> Export Digital Data | |
| Failed Site: None | |
| <input type="button" value="Start"/> GHG Service Backup | |
| <input type="button" value="Start"/> Start GFE | |
| <input type="button" value="Import"/> Import Configuration | |
| <input type="button" value="Import"/> Import Digital Data | |
| <input type="button" value="Export"/> Export Grids To Failed Site | |
| <input type="button" value="Export"/> Export Grids to Central Server | |
| <input type="button" value="Exit"/> Exit Service Backup | |

```

>>>2011-04-27 17:15:03 Removing /var/tmp/ifps2/mbcf/ //GPFSSuite/exportgrids/tmp/ifps2/cdrcf.ncdf
>>>2011-04-27 17:15:03 All done. Export Grids data has completed
>>>2011-04-27 17:15:03 Success. Export Digital Data to Central Server
>>>2011-04-27 18:15:00 Starting export grids...
>>>2011-04-27 18:15:00 Running ifpsnetCDP...
>>>2011-04-27 18:15:01 Running ifpsnetCDP...
>>>2011-04-27 18:15:01 OAK_GHG_CDM_00000000.ncdf
>>>2011-04-27 18:15:01 export_grid_data was not able to find /var/tmp/ifps2/cdrcf //GPFSSuite/Service/Backup/localservice/export_elements.ncdf
>>>2011-04-27 18:15:01 Without this file, ifpsnetCDP will not know how to trim for needed weather elements
>>>2011-04-27 18:15:02 exportGridsDT will run without doing any trimming
>>>2011-04-27 18:15:02 Copying /var/tmp/ifps2/cdrcf //GPFSSuite/exportgrids/tmp/excDircdcf to /var/tmp/ifps2/cdrcf //GPFSSuite/exportgrids/excDircdcf
>>>2011-04-27 18:15:02 Running ifpsnetCDP...
>>>2011-04-27 18:15:02 Success. Export Grids data has completed
>>>2011-04-27 18:15:02 Success. Export Digital Data to Central Server
>>>2011-04-27 19:15:00 Starting export grids...
>>>2011-04-27 19:15:00 Running ifpsnetCDP...
>>>2011-04-27 19:15:00 OAK_GHG_CDM_00000000.ncdf
>>>2011-04-27 19:15:01 export_grid_data was not able to find /var/tmp/ifps2/cdrcf //GPFSSuite/Service/Backup/localservice/export_elements.ncdf
>>>2011-04-27 19:15:01 Without this file, ifpsnetCDP will not know how to trim for needed weather elements
>>>2011-04-27 19:15:02 exportGridsDT will run without doing any trimming
>>>2011-04-27 19:15:02 Copying /var/tmp/ifps2/cdrcf //GPFSSuite/exportgrids/tmp/excDircdcf to /var/tmp/ifps2/cdrcf //GPFSSuite/exportgrids/excDircdcf
>>>2011-04-27 19:15:02 Removing /var/tmp/ifps2/mbcf/ //GPFSSuite/exportgrids/tmp/excDircdcf.ncdf
>>>2011-04-27 19:15:02 Success. Export Grids data has completed
>>>2011-04-27 19:15:02 Success. Export Digital Data to Central Server

```

Exhibit T.6-2. AWIPS II Service Backup Web Application

T.7 WarnGen in AWIPS II

For AWIPS II, WarnGen has been engineered into CAVE as part of the Display 2-Dimensional (D2D) perspective. The basic operation of D2D and WarnGen is unchanged for AWIPS II. As a result, the WarnGen “Backup” option may be used as in AWIPS I. In this scenario, your configuration and templates are used to create products as your backup site. Exhibit T.7-1 illustrates the CAVE WarnGen Backup Mode.

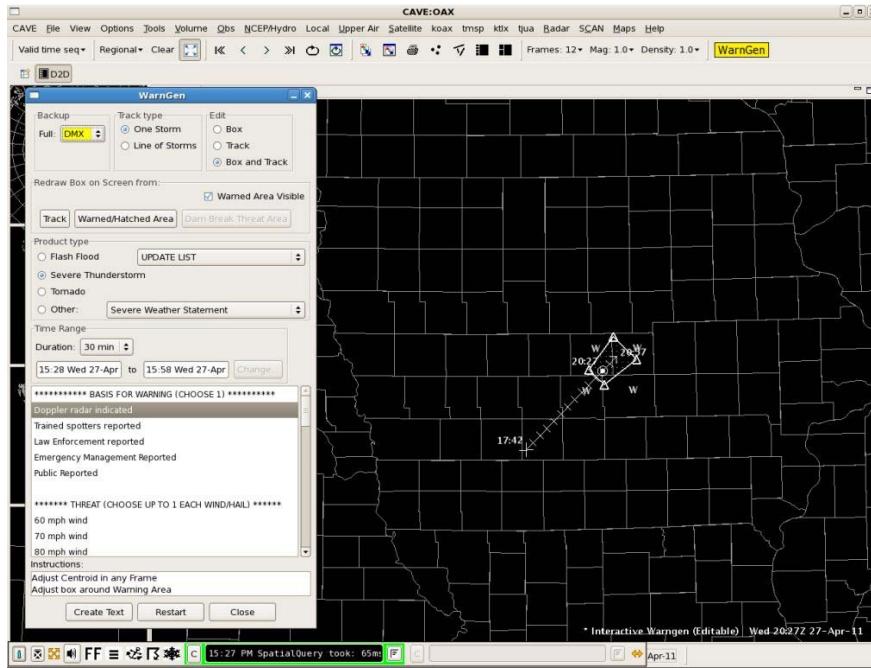


Exhibit T.7-1 CAVE WarnGen Backup Mode

In addition to using the WarnGen backup capability, CAVE can be started as a backup site without changing the EDEX localization. Prior to making the switchover, the site configuration data must be pulled from your backup site. While you can launch CAVE as any site, if the appropriate configuration is not in place, then baseline defaults will be used and CAVE will not operate as expected. You also may need to format templates for the appropriate format. These templates are on DX3/4 under /awips2/edex/data/utility/common_static/site/XXX/warnen.

T.8 AvnFPS in AWIPS II

AvnFPS Service Backup is performed in the same way it is performed in AWIPS I. While the GUI has been reengineered into CAVE, the procedures for performing Service Backup are identical. Configuration can still be done using AvnFPS tools. The configuration files for Service Backup are the same, but they are in a new location. They are found on the EDEX servers under /awips2/edex/data/utility/cave_static/site/XXX/aviation.

T.9 RiverPro in AWIPS II

RiverPro is a rehosted application for AWIPS II. Nothing has changed in regard to running or configuring RiverPro for Service Backup. The executable and configuration files are still accessed from the AWIPS I /awips/hydroapps directory.

Appendix U

AWIPS II Component Categorization

Appendix U. AWIPS II Component Categorization

Table of Contents

| | <i>Page</i> |
|---|-------------|
| U.1 Introduction..... | 1 |
| U.2 Component Categorization | 1 |

U.1 Introduction

AWIPS II provides for migration of a portion of AWIPS functionality into a new component-based structure. Some AWIPS software applications have been reengineered into CAVE, EDEX, and the Radar Server for AWIPS II, while others have been rehosted. Others have been wrapped, and others needed no modification.

U.2 Component Categorization

This appendix identifies AWIPS II software applications and categorizes them according to their migration paths. Applying the following definitions, most can be categorized as reengineered, rehosted, wrapped, or untouched:

- **Reengineered.** A *reengineered* application is an application or functionality that has been rewritten from top to bottom. Alternatively, replacing existing functionality with a FOSS (free and open source software) solution is also considered reengineering. Reengineered applications have generally been incorporated into CAVE, EDEX, and the Radar Server. Some data ingest functionality has been replaced by the Local Data Manager (LDM).
- **Rehosted.** A *rehosted* application is one that has been packaged for delivery with the AWIPS II software; it may be executed from CAVE or EDEX, or from an operating system launching mechanism. As a general rule, a rehosted application runs as an independent process; the application being executed is obtained from the latest Operational Build. Rehosted applications generally utilize their own configuration and log files although the configuration files are usually contained in the AWIPS II localization store.
- **Wrapped.** A *wrapped* application or functionality represents functionality that has been incorporated into AWIPS II via a bridge, such as the JEPP Java-Python bridge, between AWIPS II code and pre-AWIPS II code.
- **Untouched.** An *untouched* application (also known as an *unmodified* application) is one that has not been touched. In a few cases, primarily for interactive hydro applications, the application has also been relocated into the EDEX data directory structure. In that case, the configuration has been moved into the AWIPS II localization store.

AWIPS II Migration and Component Categorization

| AWIPS Application | Acronym | Migration Path to AWIPS II |
|---------------------|---------|--|
| Hydro | | |
| Metar2shef | HF/MS | Reengineered into a endpoint transformer to the Shef Plug-In |
| ShefDecoder | HF/SHEF | Reengineered into Shef Plug-In |
| DPA Processing | HF/DPA | Wrapped into a SOA service end point |
| GagePP | HF/GPP | Reengineered into Shef Plug-In |
| FloodEvent Archiver | HF/FEA | Rehosted |

AWIPS II Migration and Component Categorization

| AWIPS Application | Acronym | Migration Path to AWIPS II |
|------------------------------------|-------------|---|
| ReportAlarm | HF/RA | Wrapped into a SOA service and end point activated by Quartz |
| Data Alert/Alarm Checker | HF/AAC | Reengineered into Shef Plug-In |
| MPE FieldGenerator | HF/FG | Wrapped into an SOA component activated by Quartz or MPE Editor |
| File Purge | HF/PF | Wrapped and activated by Quartz |
| Database Purge | HF/PDB | Wrapped and activated by Quartz |
| Hydro Point Data Control | HF/PDC | Reengineered into CAVE HydroView Perspective |
| WHFS Utilities | HF/WU | Wrapped into a library |
| HydroGen | HF/HG | Rehosted |
| HydroBase | HF/HB | Reengineered into CAVE HydroView Perspective |
| HydroView | HF/HV | Reengineered into CAVE HydroView Perspective |
| TimeSeries | HF/TS | Reengineered into CAVE HydroView Perspective |
| RiverPro | HF/RPF | Rehosted |
| Site Specific Hydrologic Predictor | HF/SSHP | Untouched except to activate from CAVE |
| DamCrest | HF/DC | Untouched except to activate from CAVE |
| River Monitor/Precip Monitor | HF/RM | Untouched except to activate from CAVE |
| MPE Editor | HF/MED | Reengineered into MPE CAVE Perspective |
| Database schema | HY/DBS | Unchanged |
| Database access | HY/DBA | Added Hibernate Object to relational mapping and access |
| WHFS support functions | HY/UF | Wrapped into Library |
| Calb | RF/CALB | Rehosted |
| Distributed Hydrologic Modeling | RF/DHM | Rehosted |
| Ensemble ENS | RF/ENS | Rehosted |
| Flash Flood Guidance (FFG) | RF/FFG | Reengineered into CAVE-EDEX plug-ins. |
| Gribit application | RF/GRIB | Rehosted |
| Historical Data Browser | RF/HDB | Rehosted |
| Interactive Calibration Program | RF/ICP | Rehosted |
| Interactive Double Mass Analysis | RF>IDMA | Rehosted |
| Interactive Forecast Program | RF/IFP | Rehosted |
| Operational Forecast System | RF/OFS | Rehosted |
| OSFDE | RF/OFSDDE | Rehosted |
| Send_RFC | RF/Send_RFC | Rehosted |
| Util | RF/Util | Rehosted |
| Verification | RF/VERIF | Rehosted |
| XDAT | RF/XDAT | Reengineered into CAVE HydroView Perspective |
| XNAV | RF/XNAV | Rehosted (RFC only application) |
| XSETS | RF/XSETS | Rehosted |
| SHEF Decoder for RAX | RAX/SHEF | Rehosted |
| RAXUM | RAX/RAXUM | Rehosted |
| GFE | | |
| ifpServer | GF | Reengineered into EDEX Plug-In and EDEX service |

AWIPS II Migration and Component Categorization

| AWIPS Application | Acronym | Migration Path to AWIPS II |
|----------------------------------|---------|--|
| IFPS Data Server | GF | Reengineered into EDEX Plug-In and EDEX service |
| GFE Graphical Forecast Editor | GF | Reengineered into CAVE Perspective |
| Common Libraries | GF | Reengineered |
| Smart Tools | GF | Ported Baseline Tools to run in CAVE |
| Text Formatters | GF | Ported Baseline Formatters to run in CAVE including auto testing |
| Other GFESuite Program | GF | Reengineered (iscNetCDF, ifpImage, ...) |
| Data | GF | Stored in HDF5 |
| WFO-A | | |
| GEO Datasets | WF | Reengineered into postgisSQL tables |
| InteractiveDepict | WF | Reengineered into CAVE resources |
| Monitoring/Control | WF | Replaced with JMX |
| CommsRouter | CO | Replaced with EDEX ESB |
| Data Controller | CO | Replaced with EDEX ESB |
| Data Mgmt Message | CO | Replaced with EDEX ESB |
| Monitor | CO | Replaced with EDEX ESB |
| Notification Server | CO | Replaced with EDEX ESB |
| Radar Ingest | RD | Replaced with Java Radar Server |
| Radar Applications | RD | Reengineered into CAVE D2D Perspective |
| Radar Display | RD | Reengineered into CAVE D2D Perspective |
| WarnGen | WG | Reengineered into CAVE D2D Perspective with velocity templates |
| Graphic Workstation | GW | Reengineered into CAVE D2D Perspective |
| WFO Archive Server | WAX | Replaced with NAS raw archive |
| Local Storm Reporting | LR | Reengineered into CAVE |
| BUFR Model Output Statistics MOS | BM | Reengineered into EDEX Plug-In |
| NWR Editor | NE | Rehosted |
| Web Dissemination | WD | No longer part of AWIPS |
| IFPS | IF | Reengineered into EDEX Plug-In |
| ADAPPT Foundation Software | MN | Reengineered into EDEX |
| Climate Software | CL | Rehosted |
| Hourly Weather Roundup (HWR) | HR | Rehosted |
| NWWS | | Rehosted |
| LDAD Software | LD | Reused with added interfaces to AWIPS-II |
| NCF Enterprise Management | EI | Untouched |
| AWIPS Foundation Software | AF | Overcome by EDEX ESB |
| Freeware Software | PS | New AWIPS-M set |
| Commercial Off-the Shelf (COTS) | CS | Unchanged |
| Asynchronous Scheduler | ASY | Untouched except to reconfigure and interface to AWIPS-M |
| Text Database System | DB | Reengineered into EDEX Plug-In |
| Decoding | DE | Reengineered into EDEX Plug-In |
| Hydro Point Data Control | HPD | Reengineered into CAVE HydroView Perspective |

AWIPS II Migration and Component Categorization

| AWIPS Application | Acronym | Migration Path to AWIPS II |
|--|----------|--|
| Localization | LOC | Reengineered to be dynamic rather than defined at install time |
| Message Handling System (MHS) | MH | Untouched with new Java interface API |
| Satellite Decoding and Display | ST | Reengineered into EDEX Plug-In and CAVE Plug-In |
| Text Workstation | TW | Reengineered into EDEX Plug-In and CAVE Plug-In |
| WAN Msg Handling | WMH | Untouched with new Java interface API |
| NWS Site Specific Forecasts | NWS SPOT | Untouched |
| Legal Archiver | LGL | Untouched |
| FXA file system | | Controlled by install but internal structure unchanged |
| IFPS Service Backup Central Server | ISB | Untouched |
| Chatserver - 12Planet | | Unchanged |
| Test Mode Control Program (tmcp) | | Reengineered |
| AvnFPS | AV | Reengineered into EDEX Plug-In and CAVE Plug-In |
| Flash Flood Monitoring FFMP | FF | Reengineered into EDEX Plug-In and CAVE Plug-In |
| WWA to NWR | WW | Removed from AWIPS |
| Local MOS (LAMP) | LM | Removed from AWIPS |
| Pre-LAMP Subsystem | PL | Removed from AWIPS |
| SCAN | SC | Reengineered into EDEX Plug-In and CAVE Plug-In |
| SNOW | SN | Reengineered into EDEX Plug-In and CAVE Plug-In |
| SAFESEAS | SS | Reengineered into EDEX Plug-In and CAVE Plug-In |
| LAPS | LS | Rehosted by GSD to run with AWIPS-M interfaces |
| MSAS | | Rehosted by GSD to run with AWIPS-M interfaces |
| FOG (Fog Monitor) | FOG | Reengineered into EDEX Plug-In and CAVE Plug-In |
| Rapid SCAN | RSC | Reengineered into EDEX Plug-In and CAVE Plug-In |
| NWRWAVES | NW | Rehosted |
| 4D Stormcell (FSI) | FSI | Untouched |
| HazCollect | | Rehosted and send notifications to AlertViz |
| Guardian | GDN | Reengineered into AlertViz |
| Digital Mesocyclone Display | DMD | Reengineered into CAVE and RadarServer |
| Marine Weather Warning (MWW) | MWW | Port to AWIPS-M |
| Degrib | | Reengineered into EDEX Plug-In with NCEP decoder |
| NDFD | | Unchanged |
| D2D Station OBS Viewer, Point Data Control | | Reengineered into CAVE hydroview perspective |
| Time of Arrival | TOA | Reengineered into CAVE D2D perspective tool |
| GFE ISC | ISC | Reengineered into EDEX GFE plug-in and CAVE plug-in |