Weather Monitor System (WMS) –

Communication Protocols

# 1 Overview

WMS includes four different kinds of processes: Weather Stations (WS), Data Servers (DS), Forecast Servers (FS), and Weather Client (WC). This document defines how these processes communicate with each other. Table 1 provides a summary list all the protocol that govern and the remaining sections define these in more detail.

**Table 1 – Protocol List**

| Purpose | Initiator | Other Processes | Pattern |
| --- | --- | --- | --- |
| Discovery of Data Servers | WS, FS, WC, DS | DS | Multicast with Point-to-Point reply |
| Publish Weather Measurement | WS | DS |  |
| Get Weather Data | FS, WC | DS | Request Reply with 2nd Data Channel |
| Get Forecast | WC | FS | Request Reply with Immediate State Pattern |
| Weather Data Sync | DS | DS |  |
| Discovery of Forecast Servers | WC | FS | Multicast with Point-to-Point reply |

# 2 Messages and Shared Objects

*(Describe of messages and any shared objects that they might contain. Use UML Class Diagrams and table to help describe their structure and content.)*

Message Types to Describe:

Weather Data Request

Data Channel Info

# 3 Communication Patterns

The protocol for WMS will make use of the following Application Communication Protocol (ACP) idioms and patterns, as defined by CommDP at http://commdp.serv.usu.edu

Point-to-Point Send (P2P)

Multicast (MC)

Request Reply (RR)

Intermediate State Message (ISM)

Second Channel (2C)

# 4 Communication Protocols

**4.1 Discovery of Data Servers**

**4.2 Publish Weather Measurement**

**4.3 Get Weather Data**

Any FS or WC can request a slice of weather from any DS using this protocol, which leverages both the RR and 2C ACP patterns. A RR exchange of message take place on a UDP-based channel to start the conversation and exchange information about how the setup the second channel. The DS will transmit the weather data on the second channel.

Message Sequence and process behaviors:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Seq #** | **Sending Process(es)** | **Receiving Process** | **Transport Protocol / Communication Channel** | **Message** | **Process Behavior** |
| 1 | A = any FS or WC | B = any DS | UDP, port 5000 | Weather Data Request | Process B creates a TCP communication channel and begin listen or a connection on that channel. Process A wait for a Data Channel Info message in response to the request. |
| 2 | B | A | UDP, using endpoint from when sent the first message | Data Channel Info | Process A connect to the B using a TCP socket. On connection, B processes original request. Specifically, if the request is not a recent duplicate message, B should compute the requested data slice. If the request is a recent duplicate, B lookup the results previous request. |
| 3 | B | A | TCP, on 2nd channel | Weather Data | Process B sends as many Weather Data messages as need to communicate the entire data slice. |
|  |  |  |  |  | After sending all the necessary Weather Data messages, B closes the 2nd channel and ends the conversation. Process A should catch the closure event and treat that as the end of the conversation. |

**4.4 Get Forecast**

**4.5 Weather Data Sync**

**4.6 Discovery of Forecast Servers**