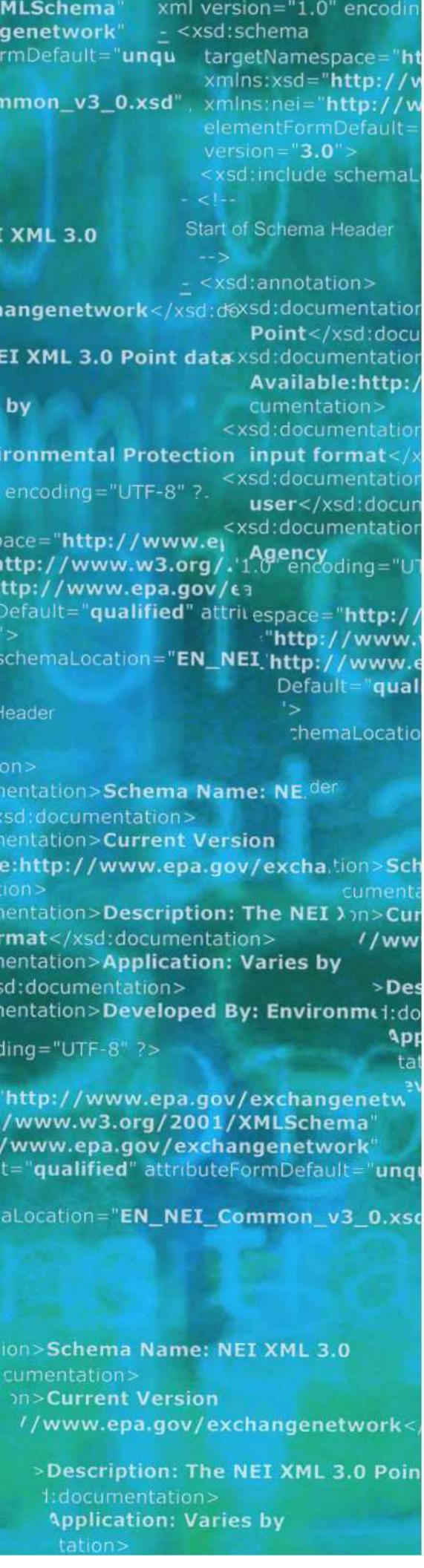

OpenNode2

AQS 2.06 Data Exchange Implementation Guide

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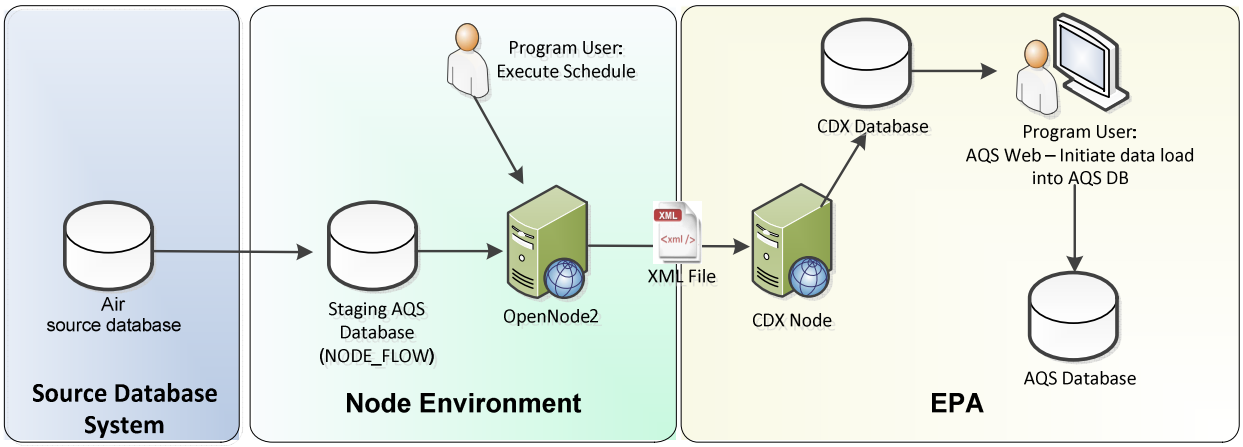
Data Exchange Overview

The purpose of this document is to provide detailed instructions for the installation and configuration of the Air Quality System (AQS) data exchange on the Java implementation of the Exchange Network OpenNode2 (OpenNode2). The AQS data exchange described in this document uses the plug-in developed by the Florida Department of Environmental Protection using Altova MapForce 2012.

The AQS Exchange involves a periodic submittal to EPA for the purposes of updating the EPA AQS database which manages air quality site locations and monitoring data. The frequency and content of each submission can be configured to meet each individual submitting organization/s needs.

The diagram below illustrates the basic steps involved in the AQS data exchange.



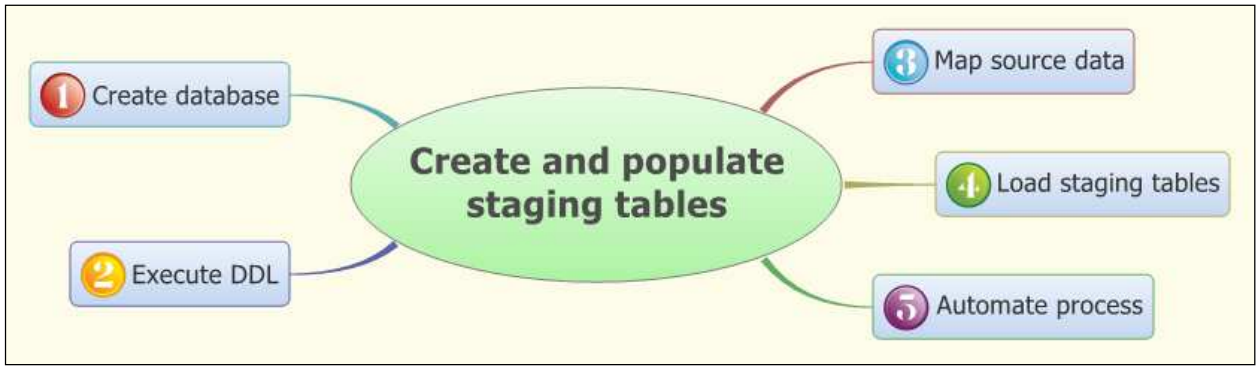
The AQS data exchange processing workflow can be briefly summarized as follows:

1. Data for a given reporting period is collected and validated by the submitting organization. Data is loaded into staging tables within the organization's node environment.
2. Using the OpenNode2 interface, the submitting organization schedules the data submission to the EPA's Central Data Exchange (CDX) and then initiates the data flow by executing the extract and XML generation data service. This service extracts the data from the staging tables based on Site ID (optional), start date and end date parameters. The XML submission data service automatically generates the XML file based on data stored in the staging database and submits the file to the EPA CDX environment.
3. The EPA CDX archives a copy of the submission, performs basic file validity checks, and initiates the AQS load processing. The data is then parsed and stored in the AQS database.
4. Upon successful validation, the submitting organization logs into the EPA AQS Web site to check the status of the submission from within the AQS application.
5. CDX sends an email to the submitter indicating success or failure.

Create and Populate the AQS Staging Tables

OpenNode2 uses a plugin-based architecture to support data exchanges with EPA and other Exchange Network partners. Data must first be loaded into a set of staging tables before it can be extracted by the plugin and shared through the AQS data exchange. This section outlines the steps required to set up the AQS data exchange database staging tables.

The following figure illustrates these steps:



1. The first step is to create the Oracle schema to host the staging tables. The schema must be named **CDX_CORE**.
2. Once the database schema is created, a series of Database Definition Language (DDL) scripts included in the OpenNode2 deployment package can be executed to create the staging tables that will be used to store the data being made available through the AQS data exchange.
3. With the staging environment established, data must now be mapped from the source database to the equivalent fields in the AQS staging tables. The staging tables closely reflect the structure and naming of the AQS XML schema, and it is recommended that the Data Exchange Template (DET) published at exchangenetwork.net be used to facilitate this mapping.
4. Once the mapping is complete, a database routine should be developed to populate the tables in the staging database using the mapping prepared during the earlier step. This should be a repeatable process that will empty and replace all of the data in the staging tables, or a procedure that will incrementally add, update and remove data as it changes in the source system.
5. Once the data extract process has been developed, it should be automated to execute on a regular schedule as appropriate to the needs of the organization for submissions to EPA.

Install Mapforce jar file on OpenNode2 Server

The OpenNode2 implementation for Java contains the jar file for MapForce 2010, which is incompatible with this version of the AQS plugin (developed using Mapforce 2012). After installing OpenNode2, you must replace the default jar file with the updated MapForce 2012 jar file as follows:

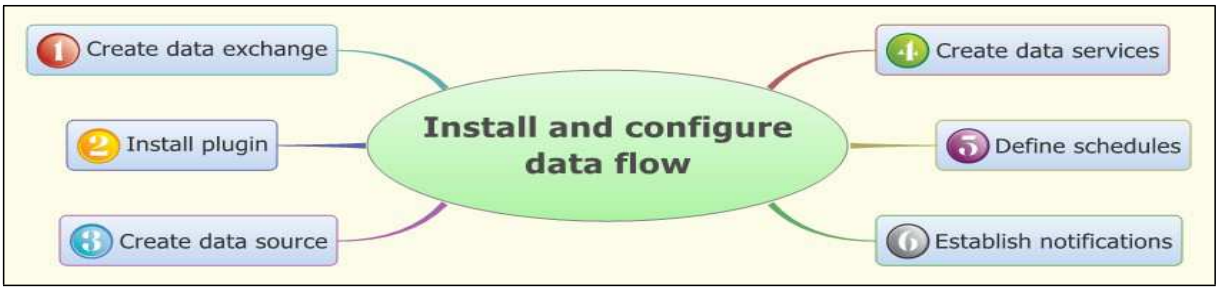
1. From your server's home directory, navigate to *webapps/wna/web-inf/lib* directory and locate *mapforce_base-mapforce_base_1.0. jar*.
2. Make a backup of the jar file
3. Replace the jar file with the new *mapforce_base-mapforce_base_1.0.jar*
4. Navigate to */wnos/web-inf/lib* directory and locate the *mapforce_base-mapforce_base_1.0.jar*

5. Make a backup of the jar file
6. Replace the jar file with the new *mapforce_base-mapforce_base_1.0.jar*
7. Restart the server.

Install and Configure AQS Data Flow

This section describes the steps required to install and configure the AQS data exchange on the Java implementation of the OpenNode2 using the Node Administration Web application (Node Admin). It assumes that appropriate data staging tables have been created within the State/Tribe organization's local environment and populated with data from the organization's source data system.

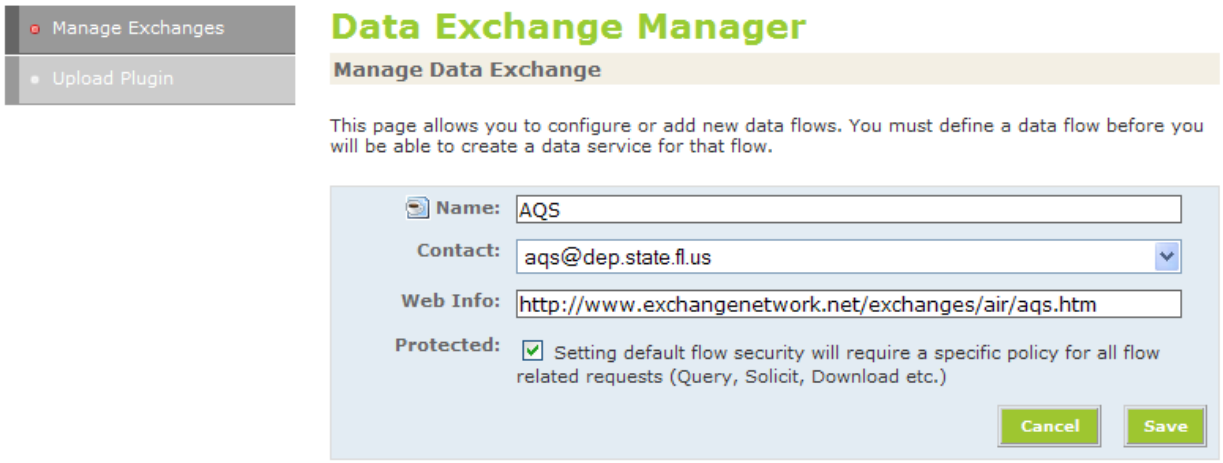
The following figure illustrates the process for installing and configuring the AQS data flow:



Create AQS Data Exchange

The first step to implement the AQS data exchange on the OpenNode2 is to create the data exchange using the Node Admin Data Exchange Manager.

1. After logging into the Node Admin, click the **Exchange** tab on the top navigation bar.
2. Click the **Add Exchange** button. The *Data Exchange Manager* screen will be displayed:

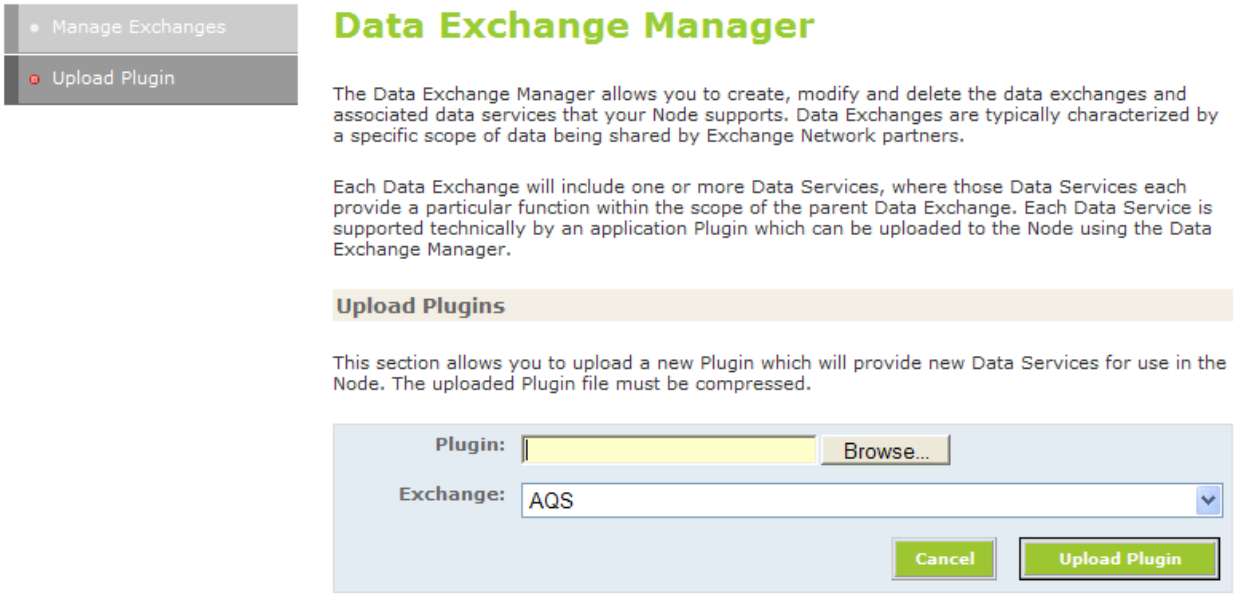


3. Type a name in the Name field. The name must match the name of the plug-in jar. In this example, the name is *AQS*.
4. Select a user account name from the **Contact** drop-down menu. Contacts are populated with all accounts that have been set up on the OpenNode2.
5. In the **Web Info** field, enter the URL for the location of the AQS FCD document: http://www.exchangenetwork.net/data-exchange/air-quality-system/.
6. Check the **Protected** box. This will limit external access to the AQS data services. External access is not required if the purpose of this flow is solely as a means of data submission to EPA's AQS System.
7. Click **Save** to save the data exchange.

Install AQS Plug-in

Once the AQS data exchange has been created upload the AQS plug-in into the OpenNode2 plug-in repository.

1. From the **Exchange** tab, click the **Upload Plug-in** button on the left side navigation block.

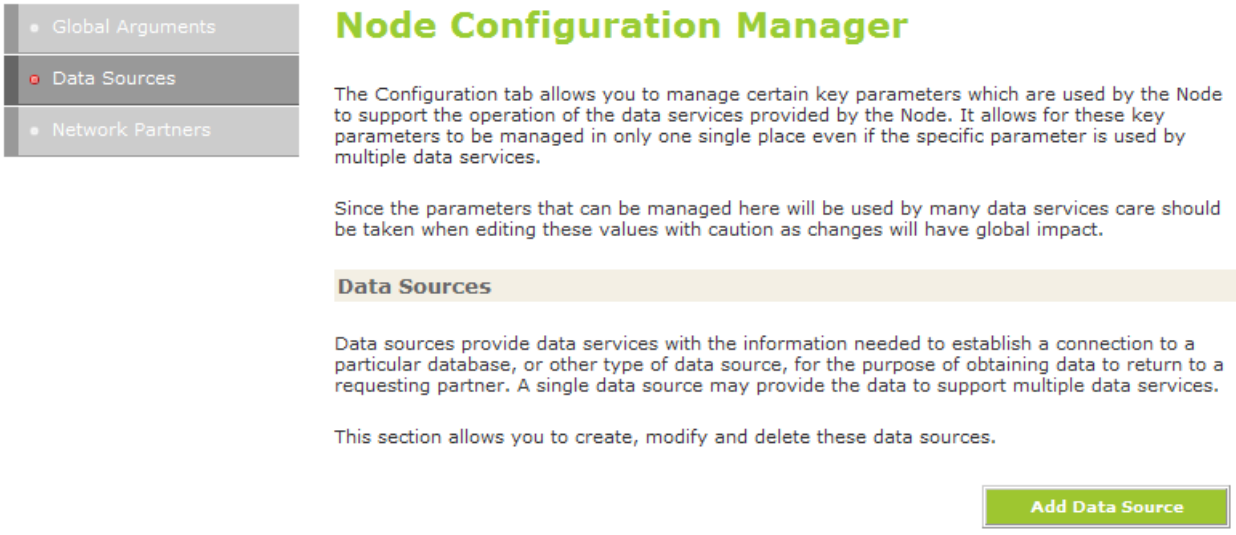


2. Click the **Browse** button located to the right of the **Plug-in** field.
3. Locate and select the compressed (zipped) file containing the code component for the AQS plug-in you downloaded from the OpenNode2 web site.
4. Select the Data Exchange that was created in the previous step from the **Exchange** drop-down menu. If none are available, ensure that the previous step was completed (*Create AQS Data Exchange*).
5. Click the **Upload** button to install the plug-in.

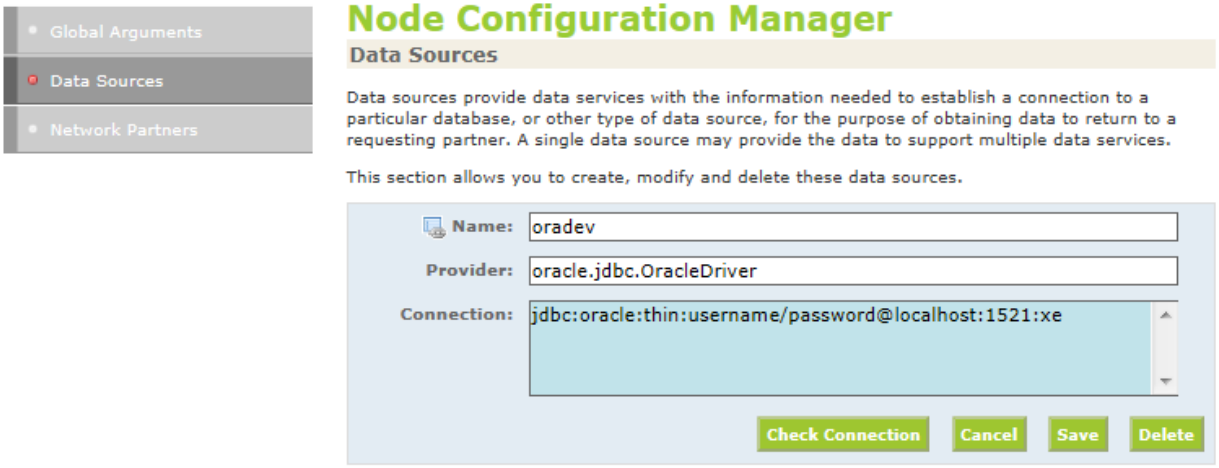
The newly uploaded plug-in code will be placed in the OpenNode2 plug-in repository. Any previous plug-in versions will be retained in the repository but won't be accessible through the Node Admin.

Create Data Source

1. After logging into the Node Admin, click the **Configuration** tab.
2. Select the **Data Sources** option at the top left corner.
3. If a Data Source has not been created, click **Add Data** Source. (If there is already a Data Source listed, confirm that it is correct for your flow. If so, then you may skip the remaining steps in this section.



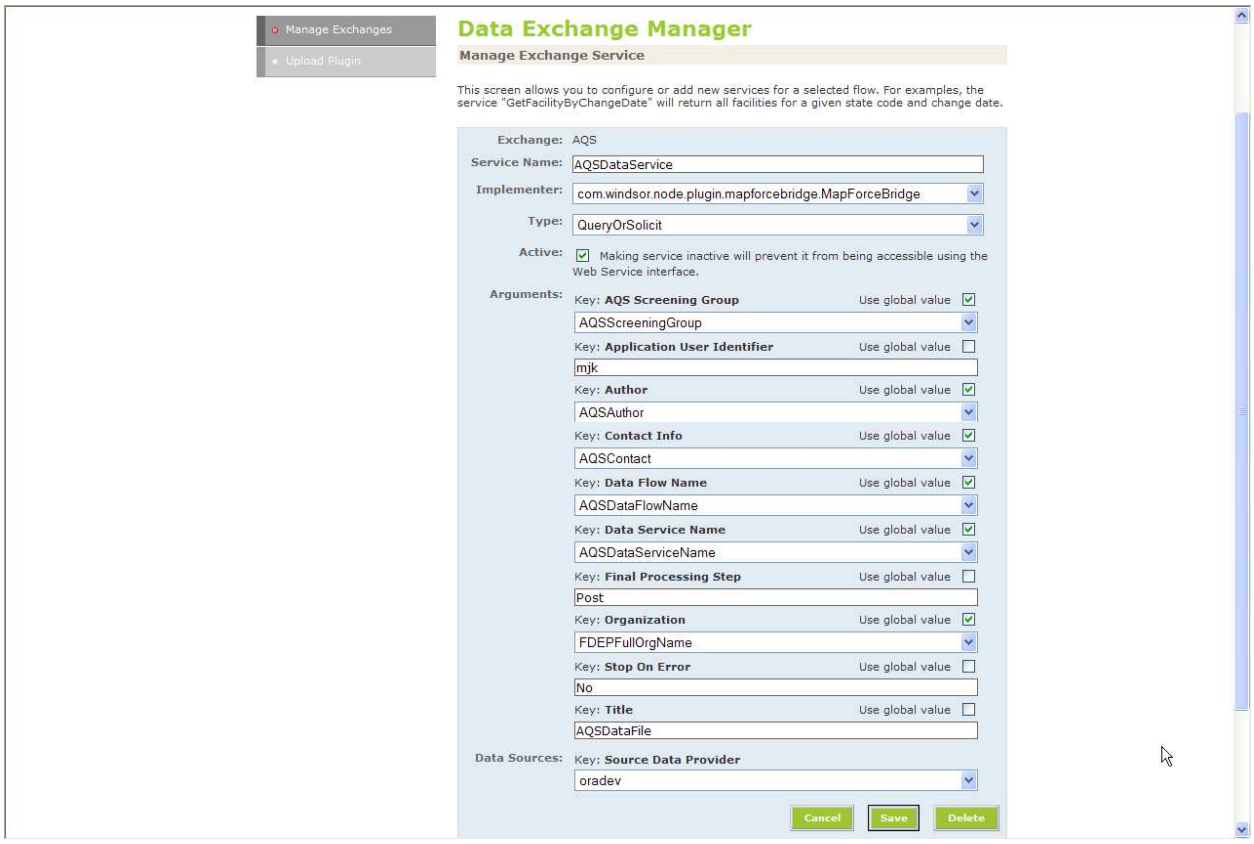
4. Enter the **Name** of the connection.
5. Enter the **Provider**.
6. Enter the Connection information.
7. Click **Check Connection** to make sure the connection is configured properly.
8. Click **Save**.



Create AQS Data Service

This data service combines two primary operations, including extracting the data to populate the staging tables and submitting the XML data to a specified endpoint.

1. From the Exchange tab, locate the AQS data exchange in the list of available exchanges.
2. Click the **Add Service** button located just beneath the AQS data exchange entry. The following page will be displayed to allow a new data service to be added:



3. In the **Service Name** field, enter "AQSDataService".
4. Select the implementer from the **Implementer** drop-down menu. This implementer provides the functionality for the AQS data services.

   Note: When the implementer is selected, several arguments and data sources will appear. The OpenNode2 application will obtain these properties directly from the AQS plug-in loaded previously.

5. From the **Type** drop-down menu select *QueryOrSolicit*. The options available will also be obtained by the Node Admin from the plugin itself.
6. Check the **Active** checkbox to enable the service.
7. Under the **Arguments** section, click the **Use Global Value** check box for each of the argument sections to fill in the arguments from the drop-down selection. The arguments are used to populate the document tag of the generated file.
8. From the **Data Sources** drop down, select the data source that was created in the previous steps.
9. Click **Save**.

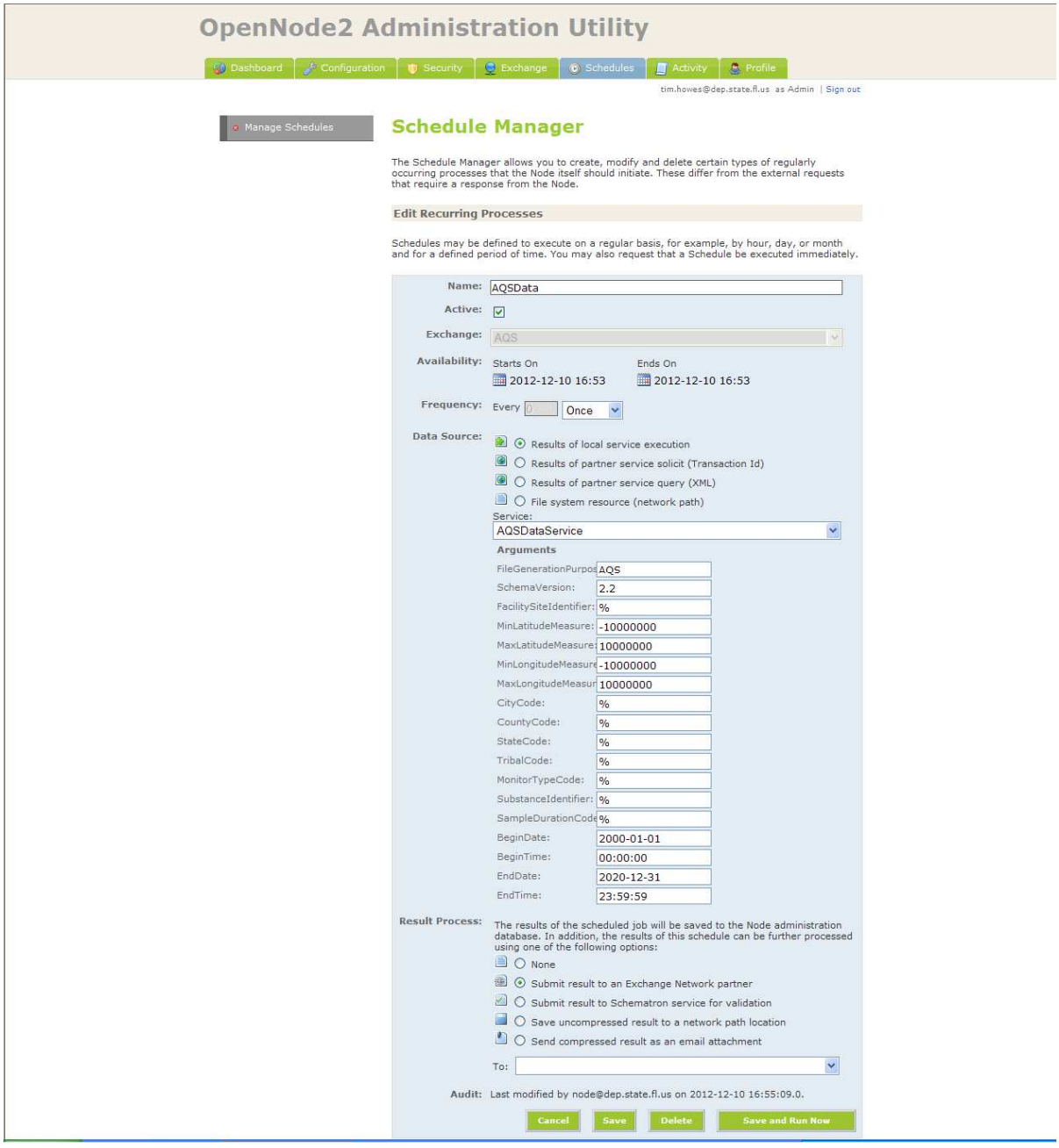
Define Data Exchange Schedules

Scheduled jobs can be configured to perform automated and manual tasks, such as submitting data to external partners or processing received files.

The AQS data exchange contains one schedule that extracts data from staging tables that have been pre-loaded with data from the source system. The schedule also creates and packages the data as an XML file that is then submitted to the CDX node and ultimately to the EPA AQS system.

Create AQS Schedule

1. From the **Schedules** tab, click the **Add** button. The Schedule Manager screen will display as follows:



1. Type a name in the **Name** field.
2. Enable the schedule by clicking the **Active** checkbox.
3. Select exchange created in previous steps from the Exchange dropdown list.
4. Set the **Start Date** to the first date when you wish the schedule to run. If the date is equal to the current or a past date, the schedule will execute immediately upon saving.
5. Set the **End Date** to the date when you wish the schedule to stop running.
6. Set the Frequency to "Once". This schedule will be run on request from the submitter one time only for each date period.
7. In the **Data Source** area, select the radio button labeled *Results of local service execution*.
8. In the **Service** dropdown box, select the service created in the previous steps. This informs the schedule to use the selected service as the data source for the submission. Once the service is selected the argument list is displayed.
9. In the **Arguments** area, fill in the eighteen (18) runtime parameter/arguments. Refer to Appendix A –Argument Values for Data Exchange Schedule for details on the parameter argument values.
10. In the **Result Process area**, select the radio button labeled *Submit Result to Exchange Network Partner*.
11. From the **To:** dropdown list, select the partner configuration value for the EPA production CDX Node
12. Click **Save** to save the schedule.

Refer to the OpenNode2 Administration User Guide for more information on scheduling data exchanges.

Contact CDX to Establish Data Exchange Settings

Once the AQS Data exchange is installed and configured, contact the EPA CDX Node helpdesk and request they perform the following tasks:

1. Authorize the OpenNode2 runtime (operator) Network Authentication and Authorization Server (NAAS) account to submit to the AQS data exchange on the EPA systems.
2. Map the OpenNode2 runtime NAAS account to the CDX Web user account that currently administers EPA AQS data for the organization.

The AQS flow requires the user to be authorized for both the AQS itself and the Exchange Network; i.e. the user needs both an AQS user-id and password, and an Exchange Network user-id and password.

User Registration

Persons needing to submit data to AQS can obtain the necessary User-IDs by completing the User Registration form, and agreeing to the AQS Security Guidelines, both of which are available on the AQS website at http://www.epa.gov/ttn/airs/airsaqs/registration.htm

Once approved, AQS Federal staff will process the creation of an AQS User-ID, the creation of an Exchange Network User-ID (if the user does not already have one), and the authorization of the EN User-ID to submit data via the AQS flow.

User Setup

The association between the AQS User-ID and the Exchange Network User-ID is maintained via the AQS user profile. (The AQS user profile is maintainable via the AQS Forms Application security form.) This form allows the AQS user to specify the EN User-ID that is allowed to submit for the AQS user. (In cases where a single EN User-ID is used to submit data for all flows from an agency EN Node, the AQS user profile can be configured to allow that EN User-ID to submit for the user, rather than the user's personal EN User-ID.). The setup process is as follows:

Log in to AQS with AQS User-ID with permissions to process submitted data.

1. Access the user profile via the Admin/Security menu pick.
2. On the form that comes up, enter in the EN User-ID field, the EN User-ID allowed to submit data.
3. Click the Save icon (disk image) or the File/Save menu pick.

Screening Groups

Within AQS, ownership of data and access control are associated with an entity named "Screening Group". Screening groups correspond roughly to real-world agencies. Each submitting agency will have one or more screening groups.

For agencies where all staff members may submit any type of data, there is typically one associated AQS screening group. For agencies where different departments may submit different types of data (e.g. gaseous pollutants like Ozone vs. particulate pollutants vs. Hazardous Air Pollutants (HSPS)) there are typically several screening groups. Screening groups are the AQS entities that own Monitors and the Monitor data. A user is allowed to submit data for a monitor only if they are assigned to the screening group that owns the monitor. Users are assigned to screening groups by the AQS Federal support staff.

Establish Email Notifications

If desired, a Node administrator can use the Node Admin to create NAAS accounts and set up email notifications for any OpenNode2 events related to the AQS data exchange. Please see the OpenNode2 Administration User Guide for more information on creating data exchange email notifications.

Monitor Flow Activity

The OpenNode2 will track all AQS data exchange activity and can be accessed to monitor and debug related flow activities. Please see the OpenNode2 Administration User Guide for more information on accessing and searching the available OpenNode2 activity reports.

Appendix A –Argument Values for Data Exchange Schedule

This table provides default argument values to use when defining the Data Exchange Schedules within the Schedule Manager. .

Argument	Required	Business Rule	Default Value/ Format
FileGenerationPurposeCode	Required	Reason for request. Must be "AQS", other options that you will see are "AIRNow", or "OTHER". This will be used to determine which pollutants and sites should be included in the data set.	AQS
SchemaVersion	Required	The schema version (currently 2.2)	2.2
FacilitySiteIdentifier	Optional	Site identifiers as defined by AQS.	Default Argument: % Example of Data: 9084652
MinLatitudeMeasure	Optional	Minimum latitude measure, in decimal degrees, from which to return raw data.	Default Argument: -10000000 Example of Data: 27.893103
MaxLatitudeMeasure	Optional	Maximum latitude measure, in decimal degrees, from which to return raw data.	Default Argument: 10000000 Example of Data: 27.926333
MinLongitudeMeasure	Optional	Minimum longitude measure (i.e. Western border), in decimal degrees, from which to return raw data.	Default Argument: -10000000 Example of Data: -82.53825
MaxLongitudeMeasure	Optional	Maximum longitude measure (i.e. Eastern border), in decimal degrees, from which to return raw data.	Default Argument: 10000000 Example of Data: -82.50501
CityCode	Optional	City code defined by AQS	Default Argument: % Example of Data: 71000

Argument	Required	Business Rule	Default Value/ Format
CountyCode	Optional	County code defined by AQS. NOTE: Though optional the default value of % needs to be entered	Default Argument: % Example of Data: 057
StateCode	Optional	State code defined by AQS.	Default Argument: % Example of Data: 12
TribalCode	Optional	This parameter/argument designates the tribal code for which the data is retrieved.	Default Argument: % Example of Data: 96
MonitorTypeCode	Optional	This parameter/argument designates the monitoring network from which to retrieve data. Examples are SLAMS and NAMS.	Default Argument: % Example of Data: SLAMS
SubstanceIdentifier	Optional	Enter the SubstanceIdentifier parameter/argument.	Default Argument: % Example of Data: 42401-1
SampleDurationCode	Optional	Enter SampleDurationCode value.	Default Argument: % Example of Data: 1
BeginDate	Required	Used to indicate the starting date for which data collection activities should be retrieved. This will be in the YYYY-MM-DD format.	Default Argument: 2000-01-01 Example of Data: 2012-01-01
BeginTime	Optional	Used to indicate the starting time (for the supplied Start Date) for which data collection activities should be retrieved. This will be in the HH:MM:SS format.	Default Argument: 00:00:00 Example of Data: 01:10:05
EndDate	Required	Used to indicate the ending date for which data collection activities should be retrieved. This will be in the YYYY-MM-DD format.	Default Argument: 2020-12-31 Example of Data: 2012-12-29
EndTime	Optional	Used to indicate the ending time (for the supplied End Date) for which data collection activities should be retrieved. This will be in the HH:MM:SS format.	Default Argument: 23:59:59 Example of Data: 20:30:00

When the default values are used all data in the AQS staging tables will be retrieved to produce the XML file. The FileGenerationPurposeCode must be AQS and the SchemaVersion must be 2.2 for this version of the plug-in. When any value is changed to something other than the default, and if the data is not present that satisfies the filter then no data file is generated.

Below is the mapping of the Data Exchange Schedule arguments to the respective columns in the AQS staging tables.

Argument Name	Table Name	Column Name
FileGenerationPurposeCode	AQS_AIRQUALITYSUBMISSION	FILEGENERATIONPURPOSECODE
SchemaVersion	AQS_AIRQUALITYSUBMISSION	VERSION
FacilitySiteIdentifier	AQS_SITEIDENTIFIERDETAILS	FACILITYSITEIDENTIFIER
MinLatitudeMeasure	AQS_GEOGRAPHICMONITORINGLOC	LATITUDEMEASURE
MaxLatitudeMeasure	AQS_GEOGRAPHICMONITORINGLOC	LATITUDEMEASURE
MinLongitudeMeasure	AQS_GEOGRAPHICMONITORINGLOC	LONGITUDEMEASURE
MaxLongitudeMeasure	AQS_GEOGRAPHICMONITORINGLOC	LONGITUDEMEASURE
CityCode	AQS_FACILITYSITEDETAILS	CITYCODE
CountyCode	AQS_SITEIDENTIFIERDETAILS	COUNTYCODE
StateCode	AQS_SITEIDENTIFIERDETAILS	STATECODE
TribalCode	AQS_SITEIDENTIFIERDETAILS	TRIBALCODE
MonitorTypeCode	AQS_MONITORTYPEINFORMATION	MONITORTYPECODE
SubstanceIdentifier	AQS_MONITORIDENTIFIERDETAILS	SUBSTANCEIDENTIFIER
SampleDurationCode	AQS_TRANSACTIONPROTOCOLDETAILS	DURATIONCODE
BeginDate	AQS_RAWRESULTS OR AQS_BLANKINFORMATION	SAMPLECOLLECTIONSTARTDATE
BeginTime	AQS_RAWRESULTS OR AQS_BLANKINFORMATION	SAMPLECOLLECTIONSTARTTIME

Argument Name	Table Name	Column Name
EndDate	AQS_RAWRESULTS OR AQS_BLANKINFORMATION	SAMPLECOLLECTIONSTARTDATE
EndTime	AQS_RAWRESULTS OR AQS_BLANKINFORMATION	SAMPLECOLLECTIONSTARTTIME