

```
on_v3_0.xsd", xmlns:nei="http://www.e
elementFormDefault=
version="3.0">
<xsd:include schemaL
- <!--
KML 3.0 Start of Schema Header
-->
_ <xsd:annotation>
ngenetwork</xsd:documentation>
XML 3.0 Point data</xsd:documentation>
Available:http://www.e
documentation>
<xsd:documentation>
Environmental Protection input format</xsd:documentation>
encoding="UTF-8" ?
user</xsd:documentation>
ce="http://www.epa.gov/exchange
p://www.w3.org/2001/XMLSchema"
p://www.epa.gov/exchange
default="qualified" attributeFormDefault="unqualified"
chemaLocation="EN_NEI_Common_v3_0.xsd"
ader
chemaLocation
Schema Name: NEI XML 3.0
d:documentation>
tation>Current Version
http://www.epa.gov/exchange
n>
tation>Description: The NEI XML 3.0 Point
nat</xsd:documentation>
tation>Application: Varies by
:documentation>
tation>Developed By: Environmental Information
ng="UTF-8" ?>
http://www.epa.gov/exchange
www.w3.org/2001/XMLSchema"
www.epa.gov/exchange
="qualified" attributeFormDefault="unqualified"
Location="EN_NEI_Common_v3_0.xsd"
Schema Name: NEI XML 3.0
umentation>
n>Current Version
//www.epa.gov/exchange
>Description: The NEI XML 3.0 Point
t:documentation>
Application: Varies by
tation>
```

AQS Submission Flow Configuration Document

Version: 2.0

Revision Date: April 23, 2007

Prepared by: US EPA



ACKNOWLEDGEMENTS

This document was prepared with invaluable input and support from individuals at Tribal, State, local, and federal air pollution control agencies and the corporations that support them.

Table of Contents

Component Alignment and Change History.....	4
Flow Component Version History	4
Flow Component Versions Currently Supported.....	4
Business Rule Change History.....	4
Introduction.....	5
Background.....	5
Flow Configuration Document Scope	6
How to use this FCD.....	6
Implementation of the Header and Payload.....	8
Overview.....	8
Header	8
Payload.....	8
Configuration of the AQS Exchange	12
Submission Processing and Feedback	14
Appendix A - Other Issues Considered	16
Maintenance of Look-up Codes.....	16
Appendix B - XML Schema Users Guide	16

Component Alignment and Change History

Flow Component Version History

Component	Version	Date	Changed By	Description of Change
FCD	1.0	8.24.2005	US EPA	Original.
Schema	1.0	11.04.2004	US EPA	Original.
Schema Description /Users Guide	1.0	1.06.2005	US EPA	Original.
Submit Service	1.0	5.5.2005	US EPA	Original.
FCD	2.0	4.23.2007	US EPA	Make corrections to FCD version 1.0 and have release notes for schema version 2.0.
Schema	2.0	4.23.2007	US EPA	Make ESAR compliant and restructure for needs or state-to-state exchanges.
DET	2.0	4.23.2007	US EPA	Original. No DET published with version 1.0 of schema.

Flow Component Versions Currently Supported

Component	Version(s) Supported	Explanation (optional)
FCD	1.0, 2.0	
Schema	1.0, 2.0	
DET	2.0	
Submit Service	1.0	

Business Rule Change History

No flow business rules have changed.

Introduction

Background

AQS (the Air Quality System) is an information system constructed and maintained by EPA to collect and store measurements (and related information) obtained from the National Ambient Air Quality Monitoring Network. Data is loaded into the system by State, Tribal, and Local air quality control agencies. EPA headquarters and regional staff use the data to make Clean Air Act Non-Attainment designations, assess impacts to human health and welfare from air pollution, validate atmospheric pollution models, and other activities to gain insight into the management of the air program at the local, regional, and national levels.

AQS is composed of two main parts: an Oracle relational database and an Oracle web-forms application. AQS has almost 700 users and receives approximately 100,000,000 transactions per year in about 10,000 data files. It also delivers over 50,000 reports per year to users. All data in AQS undergoes quality assurance checking as part of the load process. In addition, each submitting agency must send a letter once per year that certifies their regulatory data is complete and correct for the year.

Currently, the process to submit to AQS consists of a user transferring a transaction file from their agency to the EPA servers via CDX (web or node-to-node). They then log onto the application and complete the remaining steps of loading the data into the AQS database.

This document represents the second version of the AQS Flow Configuration. The AQS infrastructure links to the Exchange Network (EN) are mature and this flow should be stable for some time. Additional improvements to automation will be introduced as policy and development time allows. Current issues with fully automating the flow relate to the fact that only AQS registered users can load data into the system. Therefore, node users that are not also AQS users can only transfer the data to EPA, and not load it into the AQS database.

AQS is also developing a publishing flow. Publishing flows make use of different methods and additional schemas and will therefore be documented in a separate FCD when they are complete. The current AQS report process requires a user to log onto the application, choose a particular report and output format, fill out forms with data selection criteria, and execute the report. The results can be sent to their screen, email address, or CDX mailbox.

EPA is considering approaches to automate more of the steps in the AQS load process. As these are developed and implemented, updates will be made to this FCD.

Flow Configuration Document Scope

A Flow Configuration Document (FCD) is intended to define the supported data services, the approaches and processes that are used to exchange information. In addition, the FCD serves as a guide for trading partners by describing the operational details and challenges associated with a specific flow.

The scope of this FCD is node-to-node submission of AQS data.

The primary focus of this FCD is the submission of data from State, local, and tribal agencies to AQS, with an emphasis placed on mechanisms that will simplify the exchange for submitters. Services which will facilitate node users also retrieving data from AQS (“publishing” flows) will be documented in a separate FCD.

The following modules/capabilities have been excluded from the scope of this FCD:

- Exchange of data between State, local, and tribal agencies (e.g., not involving the federal EPA). There will be separate FCDs (for example, the Air Quality Data Exchange, or AQDE, flow) released for other flows using the AQS Submission schema.
- EPA soliciting (“pulling”) data from State Nodes. It is assumed that agencies will continue to submit data to EPA.

How to use this FCD

AQS was developed to support a flat file submission process. This process was used as the basis upon which the AQS Network flow has been designed and configured. As a result this FCD is dependent on mechanisms employed in the current processes. This FCD does not re-state the information outlined in the AQS Data Coding Manual (explaining how to create a transaction set) or the AQS Users Guide located at <http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm>.

This FCD expands upon the current AQS documentation, notes instances where the Network Flow deviates from the “legacy” process, and provides guidance to implementing an XML/data service based model for processes which were originally designed for flat file processing.

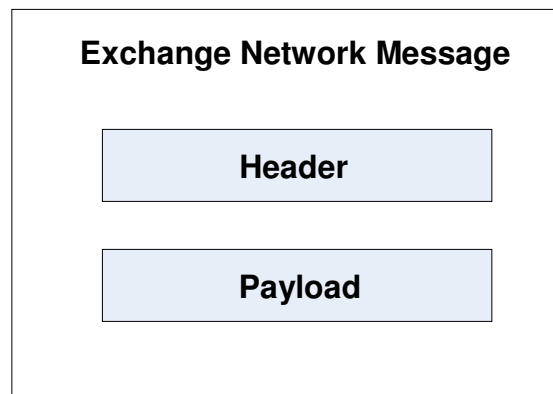
The structure and handling of data is discussed first in the section “Implementation of Header and Payload.” This discussion is at the business level, but contains important technical

information. The section “Configuration of the AQS Exchange” describes the key exchange variables, the submission steps, and presents an annotated architecture.

Implementation of the Header and Payload

Overview

A Network submission generally consists of a message containing a header document and at least one payload. The Network header document construct provides additional information to identify the contents of a message payload.



Header

The header is optional for Network exchanges and AQS does not need any information outside of an authentication token and the payload. For these reasons AQS does not require a header and does not allow one.

It is anticipated that headers will become required for network exchanges and that AQS will eventually need additional information to further automate data flow. Thus, AQS will likely add a header in the future, but for now does not accept them.

Payload

Due to the nature of AQS batch processing and error trapping, AQS messages should contain only one payload document. Thus, the AQS Network Exchange will support a document structure consisting of a single payload. AQS is a transaction based system with an input file consisting of a group of individual insert, update or delete transactions (a transaction set). AQS business rules do not allow for “total replacement” type submissions preferred by the Exchange Network. A payload must be an internally complete AQS transaction set. The transaction set

can be either a flat file or XML submission, however EPA does not consider a node flow to be fully implemented unless the payload is XML.

AQS allows data submissions in four formats. All of the data (transactions) remain the same, but different formats are allowed to accommodate various states of technology at the submitting agencies. The first format is a legacy text flat file that was used in the previous incarnation of the AQS system. This is still allowed so that submitting agencies did not have to change their data format when the re-engineered AQS came on line in 2002. The legacy format is not updated and does limit some types of data being submitted. The new AQS released in 2002 also had an updated text flat file format incorporating new reporting requirements and data standards. AQS released an XML schema (version 1.0) in 2004 for use with the Exchange Network. In 2007, AQS is releasing version 2.0 of the schema that incorporates the ESAR data standards and re-structures the schema to make interpretation of the data (e.g., using XPATH) easier. AQS has not retired any of these formats so as not to force any submitters to upgrade their processes or software. The preferred version for XML payloads is version 2.0.

The steps in processing an AQS submission using the node flow will not differ at all from the process for other methods of submission. Below is a simplified description and flow chart of the AQS submission business process. See the section entitled “Submission Processing and Feedback” on page 11 for a description of the processing steps and architecture. A short summary of the steps for error-free data is given here; for more detailed information, including error handling, please refer to the AQS Users Guide at <http://www.epa.gov/ttn/airs/airsaqs/manuals/AQSUserGuide.pdf>.

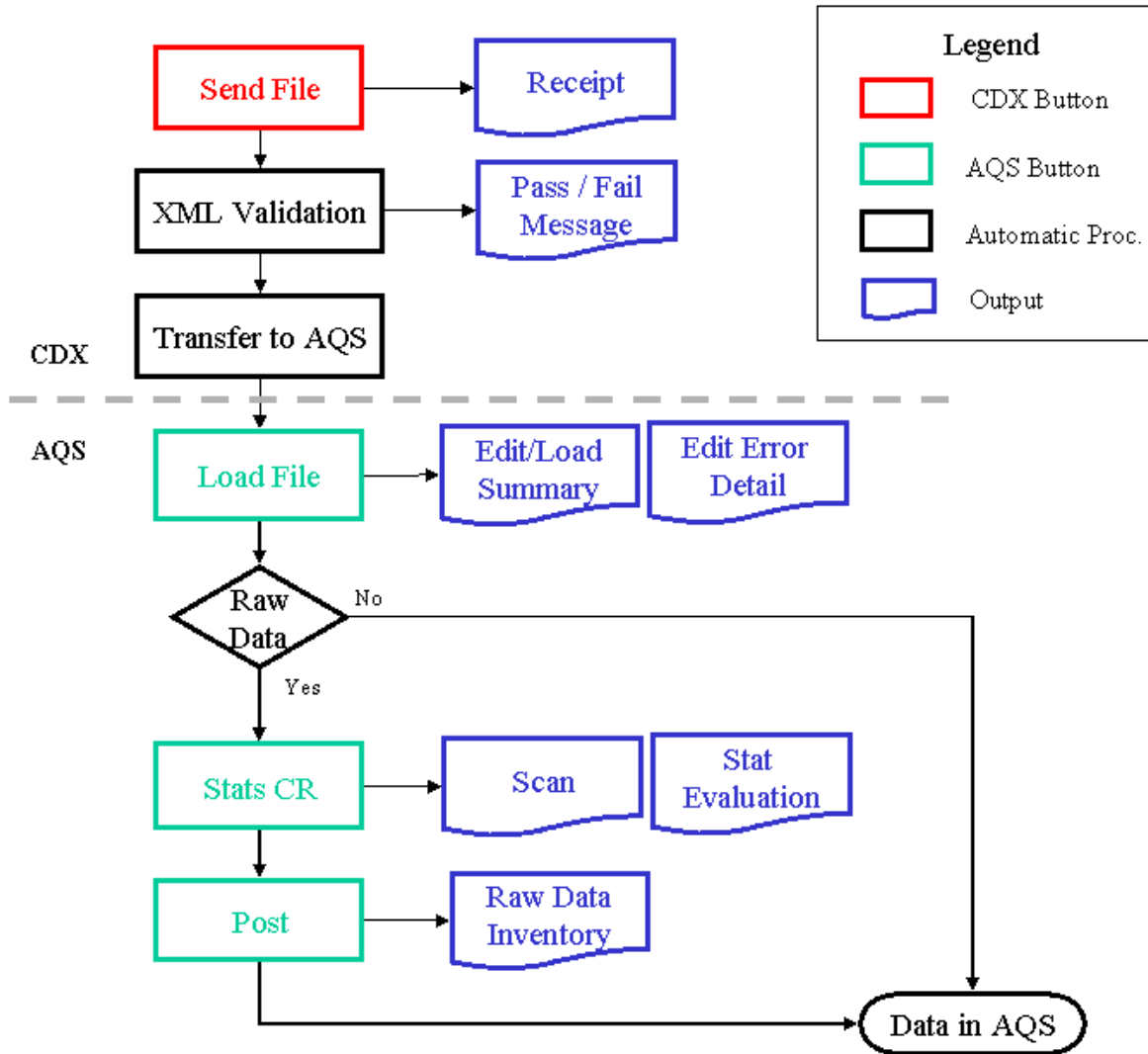
First, it is assumed that the user has valid AQS and CDX (NAAS) accounts. The user can use CDX-Web or their node to perform the steps above the dashed line (CDX steps).

To make a node-to-node submission to AQS, the user must first call the node help desk at 888-890-1995 and associate their NAAS account with their AQS account. This must be done because the AQS application must know which AQS user to associate the file with so it is accessible to them when they log on to complete the submission process.

When the NAAS account association has been made, a standard network submit method is used to send the message to AQS. The transaction ID will be returned. The get status method can be used to determine to what extent the file has been processed. A status of received means the file has been received and archived at CDX. If the file fails XML validation, the status will be failed. The validation error report (and all documents related to the submission) can be retrieved using a download method. A status of complete means that XML validation was passed and that a user has initiated processing at AQS. Note that XML validation is only performed on a file if the filename ends with a “.xml” file extension. That is, there is no attempt made to look “into the file” to see what the format is. The file will be loaded correctly into AQS no matter what the filename or extension are. Zipped files, with a “.zip” file extension can be submitted. They will

be decompressed at CDX before XML validation and passed decompressed to the AQS storage area. The file is then transferred to the AQS storage area where the user then can log onto AQS and complete the load processing. The node submission is now complete. All remaining processing is done on-line by an AQS user.

AQS Error-Free Data Submission Flow: Current



Once in the AQS storage area, the file appears in the application batch processing form on the ready-to-load list. The user selects the file and chooses “Load File”. AQS moves the data into staging tables and performs QA checking, generating two reports which the user can request to see. If there is no raw data in the submission (e.g., the file contains only site and monitor transactions) the data is then posted to production in the AQS database.

If there is raw data in the file (the usual case), the user runs the Statistical and Critical Review (“Stats CR”) process which performs additional QA checks on the data. Two more reports with the results of the checks are made available to the user. Since the data has no errors, the user then selects the “Post” process which moves the data to production and generates an inventory report of the data that was moved.

Remember that this processing is for error free data. If the data contains format, relational (e.g., foreign key or data dependency), or statistical errors, it will leave this data flow and enter an error correction and reprocessing data flow not described here.

Configuration of the AQS Exchange

One primary flow has been identified for the AQS Network Exchange, and is detailed in the following configuration chart. Table 1 outlines the configuration for the AQS Exchange.

Table 1

FCD Specification Area	Value	Notes
Flow Name	AQS	
Network Method/parameters	Submit Parameters <ul style="list-style-type: none"> ▪ securityToken: A security ticket issued by the service provider or a trusted service provider. ▪ dataflow: The name of target dataflow : “AQS” ▪ documents: An array of documents of type nodeDocument. Each nodeDocument structure describes a single attachment or payload. Node Submission will support one payload per document. Only one document will be provided, comprised of the payload.	
Payload Schema	EN_AQS_AirQuality Submission_v2.0	
Header Property	No header is allowed	
Payload Operation	N/A	
Payload Formatting/ Structure	Version 2.0 of the AQS Submission Schema does add a “version” attribute to the AirQualitySubmission (root) element that allows for specification of the schema version the instance document conforms to.	Can be either a flat file or XML AQS transaction set.
Payload File Naming Convention	No convention. If the file does not have a “.xml” extension, XML validation will not be performed.	
GetStatus Responses	All standard get status responses as defined in the Protocol Specification,	
Timing	As established in Trading Partner Agreements/ Expected to be a minimum of once per quarter.	
Authentication and User Ids mapping	All State Node users must be registered in NAAS and their AQS User IDs must be mapped to their NAAS IDs. Refer to CDX Help Desk for all the details regarding this process.	

FCD Specification Area	Value	Notes
NAAS Authorized User Accts	CDX must authorize Submit/AQS	

Submission Processing and Feedback

In order to engage to AQS Node submission the Node user must have an AQS user ID. This ID should be affiliated with AQS data flow. This user also must have a valid NAAS user ID. The CDX Node Help Desk representative will map NAAS user id to AQS user id. This will enable the user to view submission via AQS Status application and finalize the submission.

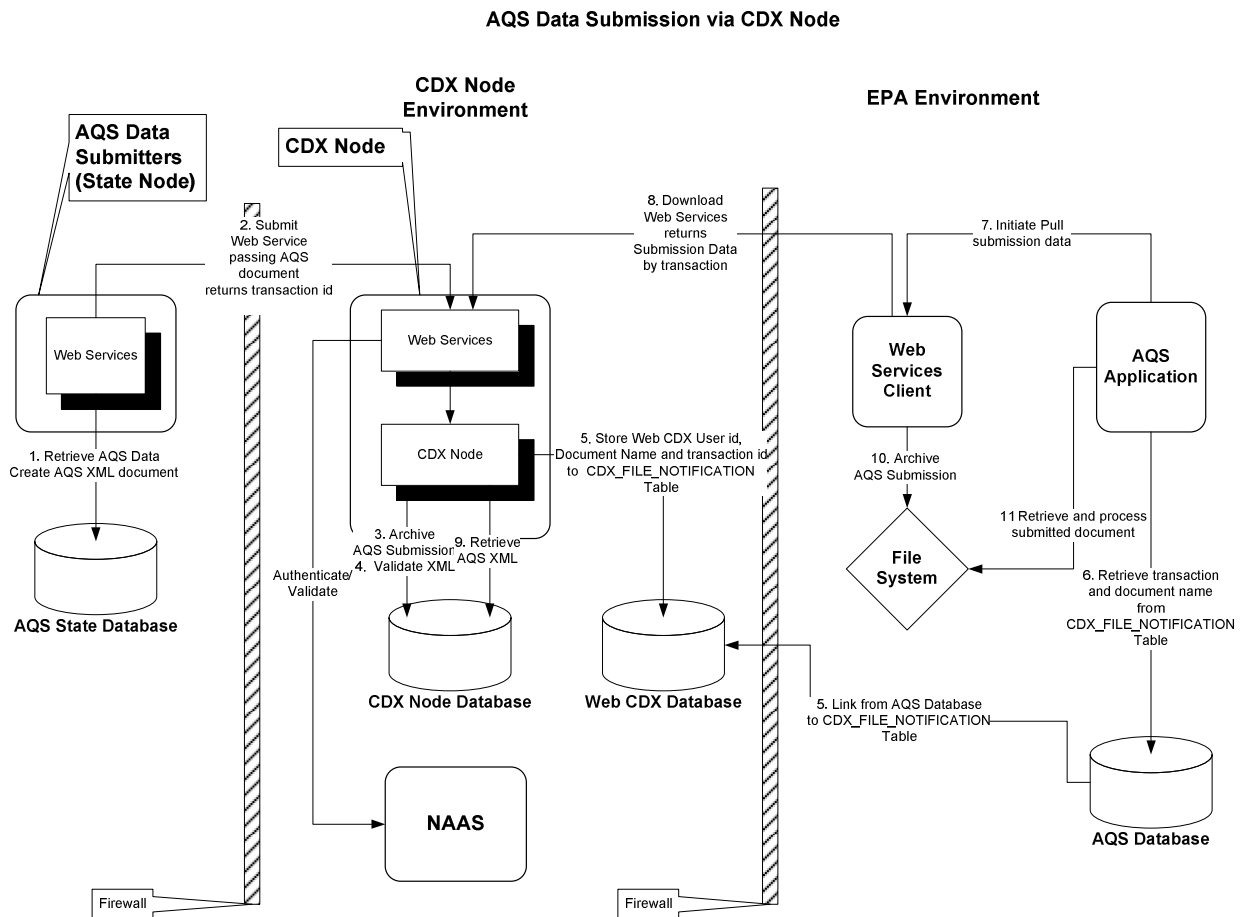
Submission of AQS Exchange Network Documents to AQS via the CDX Node will follow the following processing steps.

1. State / local / tribal Node executes a submit operation to EPA's CDX with a message containing a payload.
2. CDX Node receives the submit request and the payload is archived at CDX.
3. A unique transaction ID is generated at CDX and issued to the Node submitter indicating that the file transfer was received and archived at CDX.
4. The XML message files are validated against the AQS Submission Schema, where appropriate, for form and content. (Recall that flat file payloads are allowed.)
 - a. Note: no additional Schematron checks are performed beyond simple validation. (Schematron is an XML schema language used by CDX which permits the definition of complex business rule validation. Any relational or conditional checks would only be repeated at the AQS application and including them at CDX would add significant maintenance to the AQS process.)
 - b. If any XML file fails validation the submission is terminated and a GetStatus call with the transaction ID will return "failed". The error report can be retrieved by using a Download method with the transaction ID.
 - c. If all XML files pass validation, processing continues.
5. The CDX file notifications table will be updated with payload metadata will be transferred to the AQS load storage area. (This is the end of the "Node Submission" and further processing of the payload is performed by the AQS application. The initial steps of that processing are described in steps 6-10.)
6. The user of AQS application initiates the AQS document "load" processing from within the AQS application.
7. The AQS application retrieves the transaction ID from the CDX file notifications table and initiates the Web Services Client to download the document from CDX node storage.
8. Web Services Client performs Download web service to the CDX Node to download the document.
9. CDX Node retrieves the document by the transaction ID and returns it to the Web Services Client.
10. The document is stored in the AQS local file storage system.

11. The AQS application commences with loading the XML data into staging tables for further processing (e.g., error correction or raw data posting).

Prior to initiating a submit transaction with the CDX node for the AQS Exchange, partners are encouraged to locally pre-validate XML payload documents against the AQS Submission Schema. The latest version of the schema will always be available at the Exchange Network website.

The architecture is displayed below with the numbered steps indicated.



Appendix A - Other Issues Considered

Maintenance of Look-up Codes

The AQS Team has decided to remove most of the code lists from the schema definitions. This is because, with a few exceptions, all code lists in AQS can be amended at any time. Having a file fail schema validation because it was using the most up to date code lists is not acceptable. Also, EPA would be forced to release a new version of the schema each time a code list was updated, which is several times per year for AQS.

As resources allow, AQS plans to make the “live” code lists available via web services. Until then, a web page which dynamically queries the look up codes is available at: <http://www.epa.gov/aqspubl1/> under the heading “Reference Tables” near the bottom of the page.

Appendix B - XML Schema Users Guide

A description of the AQS Submission Schema and implementation suggestions can be found at the AQS section of the Exchange Network site:

<http://www.exchangenetwork.net/exchanges/air/aqs.htm>

at the link named “AQS Submission Guidance”.