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Water Quality Exchange (WQX) Flow Implementation Guide

The Water Quality Exchange (WQX) is an Exchange Network data flow that enables States, Tribes, and territories to report water quality data to EPA

BENEFITS

Fully automated flows save time and money

Data publishing services from EPA systems allows data reuse and data integration by partners

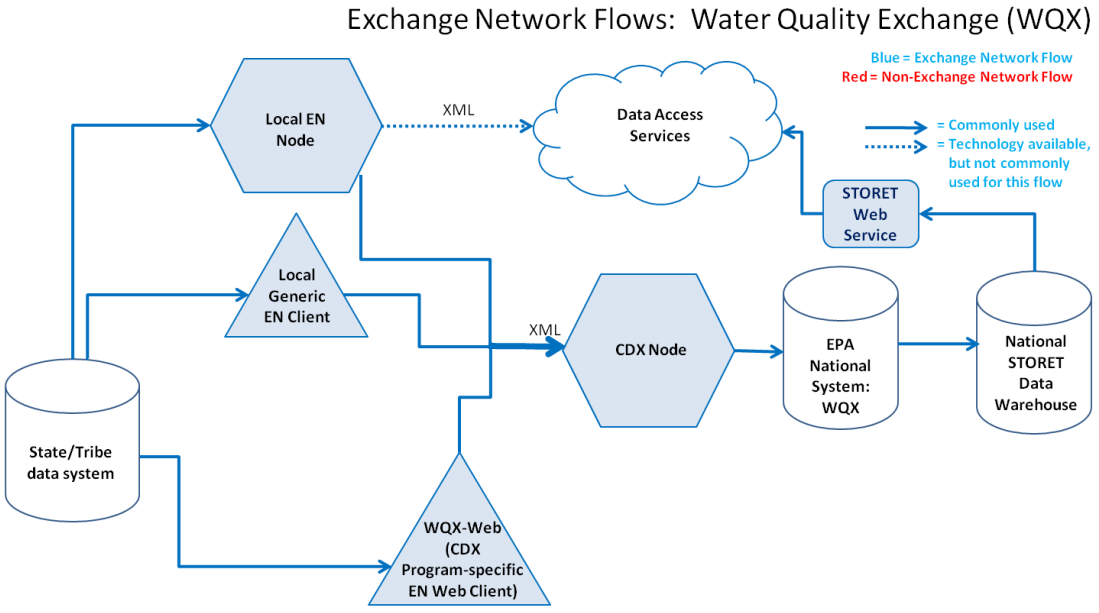
Consistent data format and protocols encourage sharing and reuse of water data analysis and access tools

Practical Implementation Advice

- WQX is a valuable data flow for programs, and it is stable and ready to implement. Partners not already flowing WQX data via the Exchange Network are encouraged to implement the flow through an EN Node or EN client.
- Institutions that do not already have a data management system for water quality data may want to focus on developing such a system before focusing on flowing data via the Exchange Network. There are various approaches that partners can implement.
- Plugins are available for both open node 2.0 and the EN node for the WQX flow. Dataflow plugins can help with the mapping process and make data flow implementation much more efficient.

WQX Data Flow Options

The graphic below shows the current options for flowing WQX data. Exchange Network (EN) flow options are shown in blue and non-EN options are shown in red. (Terms are explained in Attachment 1).



EXCHANGE NETWORK (EN) OPTIONS:

- Submit an XML file using a local EN Node—this method is typically used by larger states with large WQX data volumes
- Submit an XML file via WQX-Web (a program-specific EN Web Client)--this is the most common method of submitting data, especially for smaller partners
- Submit an XML file via a local Generic EN Client—this method is less common than either submission via WQX-Web or EN node, but it is used by some partners

NON-EXCHANGE NETWORK OPTIONS:

- There are no non-EN flow options

More information on this and other Exchange Network flows is available in the "data exchanges" section of the Exchange Network website: http://exchangenetwork.net/.

Summary of Current Practice

Starting in 2009, WQX replaced the use of the distributed database STORET for reporting water quality data. STORET was cumbersome for States and Tribes to use and costly for EPA to maintain. As a result many partners did not report water quality data prior to the deployment of WQX.

WQX is now the only method for reporting water quality data. Submission of water quality data can be a completely automated node-to-node flow. For partners who do not have a node or are not ready for a completely automated flow, the Office of Water has deployed WQX web, which is an EN web client. A few partners use their own EN local clients to submit XML data as well

WQX Flow Status and Milestones

WQX is stable and ready to implement. The main focus of the Office of Water over the near term will be developing specifications for data access services to encourage sharing of water quality data among the user community.

The WQX data flow has been developed to be fully automated, and is conducive to institutions ranging from small entities like Tribes to larger States like California.

The table below shows institutional responsibilities and target completion dates for EPA activities.

Criteria:	Status	Actions	Primary Responsibility	Completion Period
Automation Ready	Done			
Solutions for all partners	Done			
Access to transaction status	Done			
Accessible and stable flow documentation	Done			
Specifications for Data Access Services	Attention Required	1. Document and make available via the EN a standard specifications for data access services based on existing EN and/or public facing services that meet the needs of the user community	OW, with stakeholder input and NOB support	Q4 2012
Clear path to eliminate alternatives	Done			

Attachment 1: Terms

Node: A partner's point of presence on the EN consisting of a server (hardware and software) enabled with web services that allow partners to automatically provide and receive information via the Network and to publish data for use by other EN partners.

EN Client: A stand-alone application (i.e., software code) that lets partners submit data, request data, and receive results from an EN request. Clients differ from nodes in that they cannot respond to queries from other nodes and so cannot publish data. Clients also need more manual (vs. automated) steps, for example, to extract data and generate and review reports before submission.

CDX: EPA's Central Data Exchange. It serves as EPA's centralized electronic report receiving system. It receives data from partners and directs the data to EPA's program-specific National Systems (e.g., AQS, WQX, etc.).

CDX Node: CDX Node is EPA's node on the EN, allowing EPA to receive, send, and provide information via the Network. CDX Node can also publish EPA data for use by other EN partners.

CDX EN Web Clients:

- **Generic**: A client at CDX which receives XML-based data via standard web browsers for many different flows using Exchange Network protocols.
- **Program-Specific**: A client customized for a single National System with an intuitive user interface specific to the business process. Implemented at CDX, the client receives program-specific data in XML format via standard web browsers using Exchange Network protocols (e.g., for authorization and authentication, etc.)

CDX Web (non-EN) Application: A legacy CDX application that receives data (flat file or XML format) via standard web browsers. CDX Web applications are not consistent with EN protocols (e.g., they have a separate authentication and authorization service from the EN) and typically involve more manual steps than a node-to-node exchange of data.

Data Access Services: Using web services to make data available to Network users by querying nodes and returning environmental data in the form of XML documents. Published data can be accessed using a node or clients. Published data can be used in a number of ways, such as populating Web pages, synchronizing data between sites, viewing data in a Web service client, or building new sources of data into an integrated application.

Direct User: A partner entering data directly into a National Data System through a system-specific interface (manual entry).

EPA National Data System: Program-specific data systems at EPA that can receive and publish data via CDX.

Local Data System: A partner's database or series of databases in which environmental data is stored, managed, and manipulated.

XML: e**X**tensible **M**arkup **L**anguage is a flexible language for creating common information formats and sharing both the format and content of data over the Internet and elsewhere. The electronic language that expresses and transports data standards and transaction sets. XML uses an extensible set of tags to describe the meaning of data.

Attachment 2: National System Flow "Ready to Use" Criteria

A focus of Exchange Network (EN) governance has been developing the National System Flows to help partners take advantage of the Network's business value. Governance has identified six criteria for each flow to meet to make these flows "ready to use" by partners:

- Automation-ready flows. Support fully automated node-to-node flows.
- Access to transaction status. Support a fully automated process for reporting transaction status, processing results, and QA results from receipt by CDX through final processing in the National System.
- Accessible and stable flow documentation. Develop and make accessible stable documentation that describes all flow requirements. This includes a complete Flow Configuration Document (FCD) that is in compliance with EN procedures for version management.
- Solutions for all partners. Provide appropriately scaled EN solutions for partners of all sizes, needs, and capabilities. Some partners such as tribes and local clean air authorities may not need a fully functional node. A customized EN client or EN web client should be available to these users.
- Publishing interface. Provide a national standard set of query/solicit services defined in the FCD whether or not data are currently published. Implement a publishing interface where published data are critical to partner business processes (such as NPDES permit information for NetDMR).
- Clear path to eliminate alternatives. Have a clear path to eliminate legacy system alternatives to EN exchanges, including transition support for partners.