EPA's Water Quality Exchange (WQX)

What is WQX?

➢ Water Quality Exchange (WQX) Version 1.0 is a new system that facilitates the submission of water quality and related environmental monitoring data between EPA and its partners over the internet

➢ WQX Version 1.0 uses Extensible Markup Language (XML) and a common defined template (the WQX schema) to flow physical, chemical and fish tissue data from an EPA data partner's own database to the existing STORET Warehouse

EPA's Vision for WQX

➢ An integration of water monitoring data to improve national decisions

➢ Water quality data management and maintenance at the state level, data sharing and synthesis at the national level

➢ A standard data sharing template (schema) that multiple data partners can publish to (States, USGS, PNWX, others)

The Water Quality Vision

Permits

TMDLs

Listings

Assessments

Water Quality Standards

Water Quality Monitoring Data in STORET/WQX
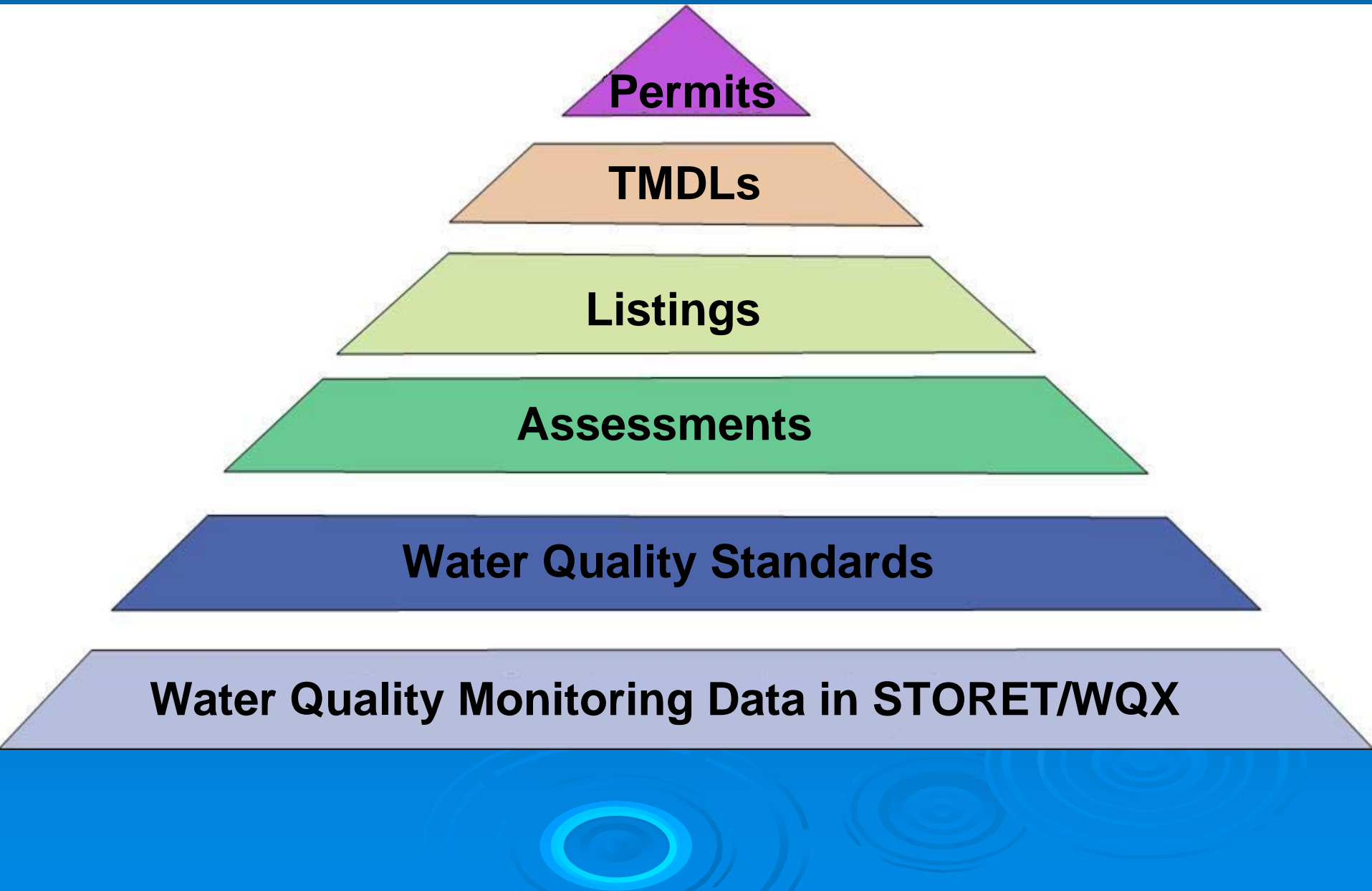
WQX and STORET

- WQX will serve as the next evolution of the distributed STORET system

- How data will be submitted is what will change

- With WQX, users will be able to submit data directly to the Warehouse instead of sending data to EPA Headquarters first

- STORET Warehouse is NOT going away

- STORET Warehouse will incorporate WQX and still have all data that has been submitted before
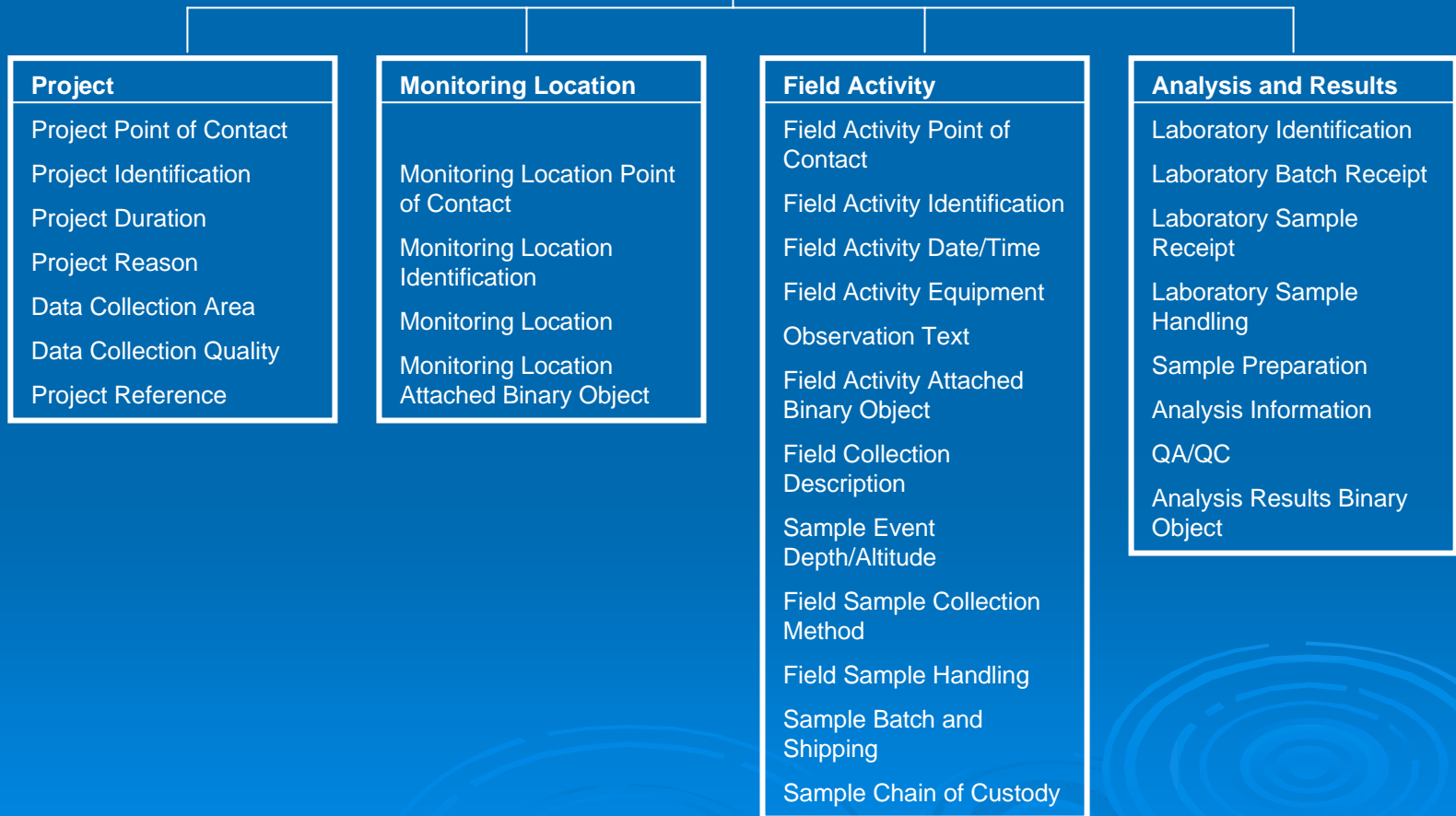
WQX and the Exchange Network

➢ WQX facilitates data submittal and exchange via the National Environmental Information Exchange Network

➢ WQX allows for data submittal via Exchange Network nodes and node clients

➢ Submittals are validated and processed through the Central Data Exchange (CDX)
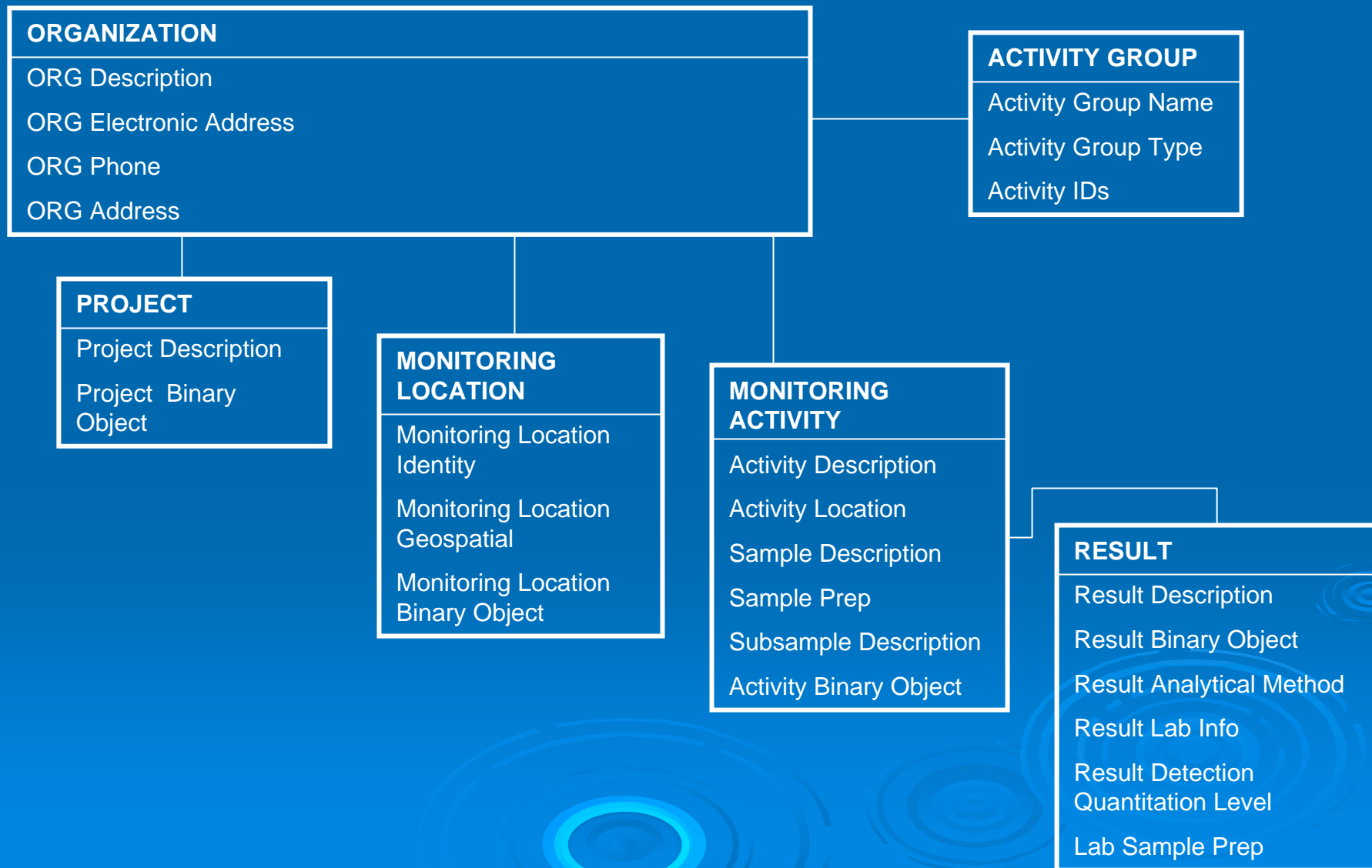
The WQX Schema

➤ The WQX schema is a definition of the structure and format that data must have to be submitted through WQX.

➤ The WQX schema is an implementation of the ESAR (Environmental Sampling, Analysis and Results) data standard

➤ Primary components: Organization, Project, Monitoring Location, Monitoring Activity, Samples, and Results

➤ Data elements currently accommodate physical, chemical, and fish tissue data

➤ Biological monitoring and habitat data flow will be incorporated in the future
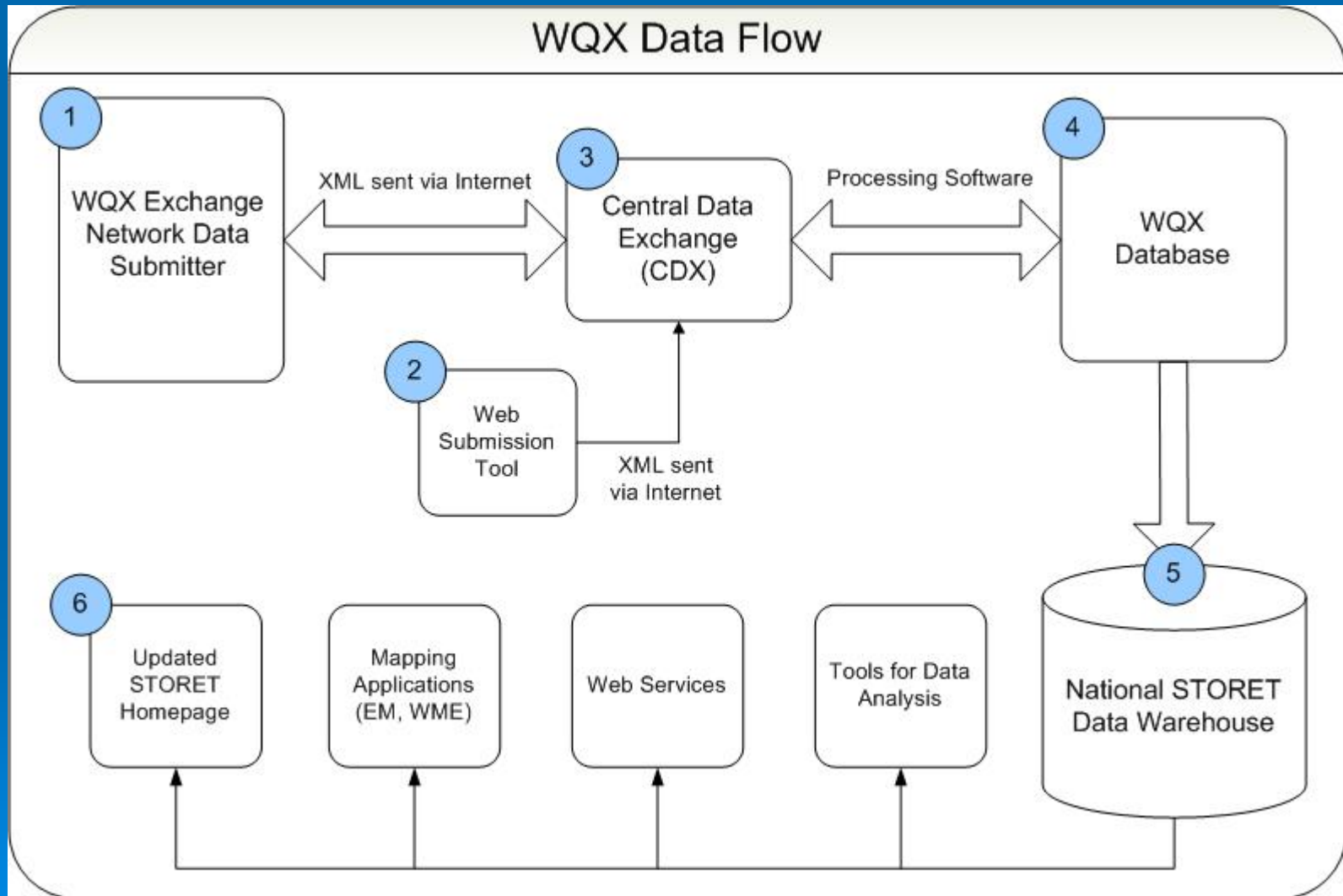
Overview of Core ESAR

Environmental Sampling, Analysis, and Results

Project
- Project Point of Contact
- Project Identification
- Project Duration
- Project Reason
- Data Collection Area
- Data Collection Quality
- Project Reference

Monitoring Location
- Monitoring Location Point of Contact
- Monitoring Location Identification
- Monitoring Location
- Monitoring Location Attached Binary Object

Field Activity
- Field Activity Point of Contact
- Field Activity Identification
- Field Activity Date/Time
- Field Activity Equipment
- Observation Text
- Field Activity Attached Binary Object
- Field Collection Description
- Sample Event Depth/Altitude
- Field Sample Collection Method
- Field Sample Handling
- Sample Batch and Shipping
- Sample Chain of Custody

Analysis and Results
- Laboratory Identification
- Laboratory Batch Receipt
- Laboratory Sample Receipt
- Laboratory Sample Handling
- Sample Preparation
- Analysis Information
- QA/QC
- Analysis Results Binary Object

WQX Schema Data Categories

ORGANIZATION

ORG Description

ORG Electronic Address

ORG Phone

ORG Address

ACTIVITY GROUP

Activity Group Name

Activity Group Type

Activity IDs

PROJECT

Project Description

Project Binary Object

MONITORING LOCATION

Monitoring Location Identity

Monitoring Location Geospatial

Monitoring Location Binary Object

MONITORING ACTIVITY

Activity Description

Activity Location

Sample Description

Sample Prep

Subsample Description

Activity Binary Object

RESULT

Result Description

Result Binary Object

Result Analytical Method

Result Lab Info

Result Detection Quantitation Level

Lab Sample Prep

How does WQX work?

WQX Data Flow

1. WQX Exchange Network Data Submitter
2. Web Submission Tool
3. Central Data Exchange (CDX)
4. WQX Database
5. National STORET Data Warehouse
6. Updated STORET Homepage

XML sent via Internet

Processing Software

XML sent via Internet

Mapping Applications (EM, WME)

Web Services

Tools for Data Analysis

Submitting Data using WQX

WQX Data Flow

1. **State, Tribe or other organization submits WQX data in the WQX schema format to EPA via the Exchange Network. This submission can be from a network node or node client. For more information about the Exchange Network, nodes and node clients, visit** www.exchangenetwork.net

Example Node Client Software

File   Help

Methods

Authenticate

Download

GetServices

GetStatus

Notify

Query

Solicit

Submit

Node Address

https://test.epacdxnode.net/cdx/services/NetworkNodePortType_V10

Account: smith.john@epa.gov

Credentials: **********

Help

Results

A user may use this example node client to submit a WQX file as well as interact with other WQX features using the standard methods and protocols of the Exchange Network.
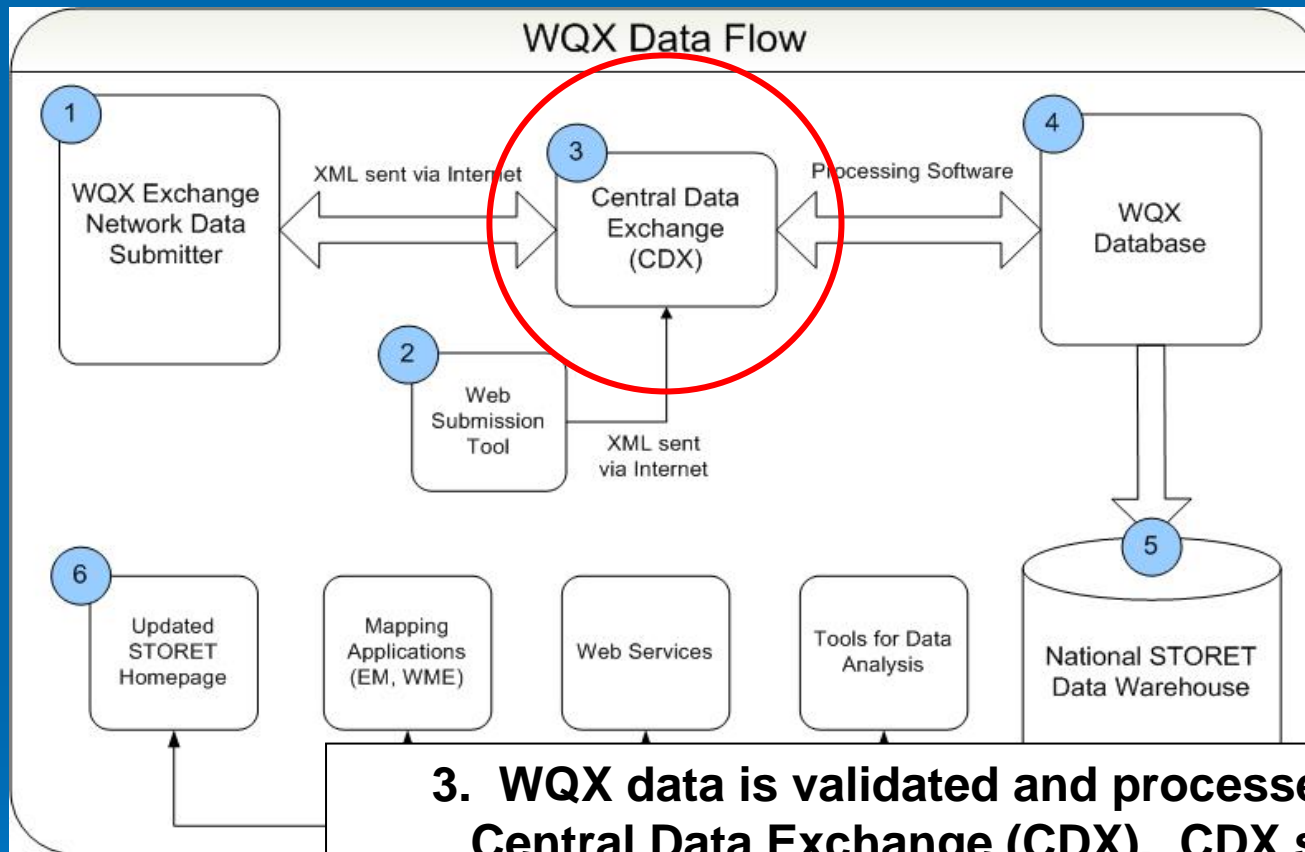
For detailed information about these processes, please see the WQX Flow Configuration Document at http://www.exchangenetwork.net/exchanges/water/wqx.htm

Submitting Data using WQX

WQX Data Flow
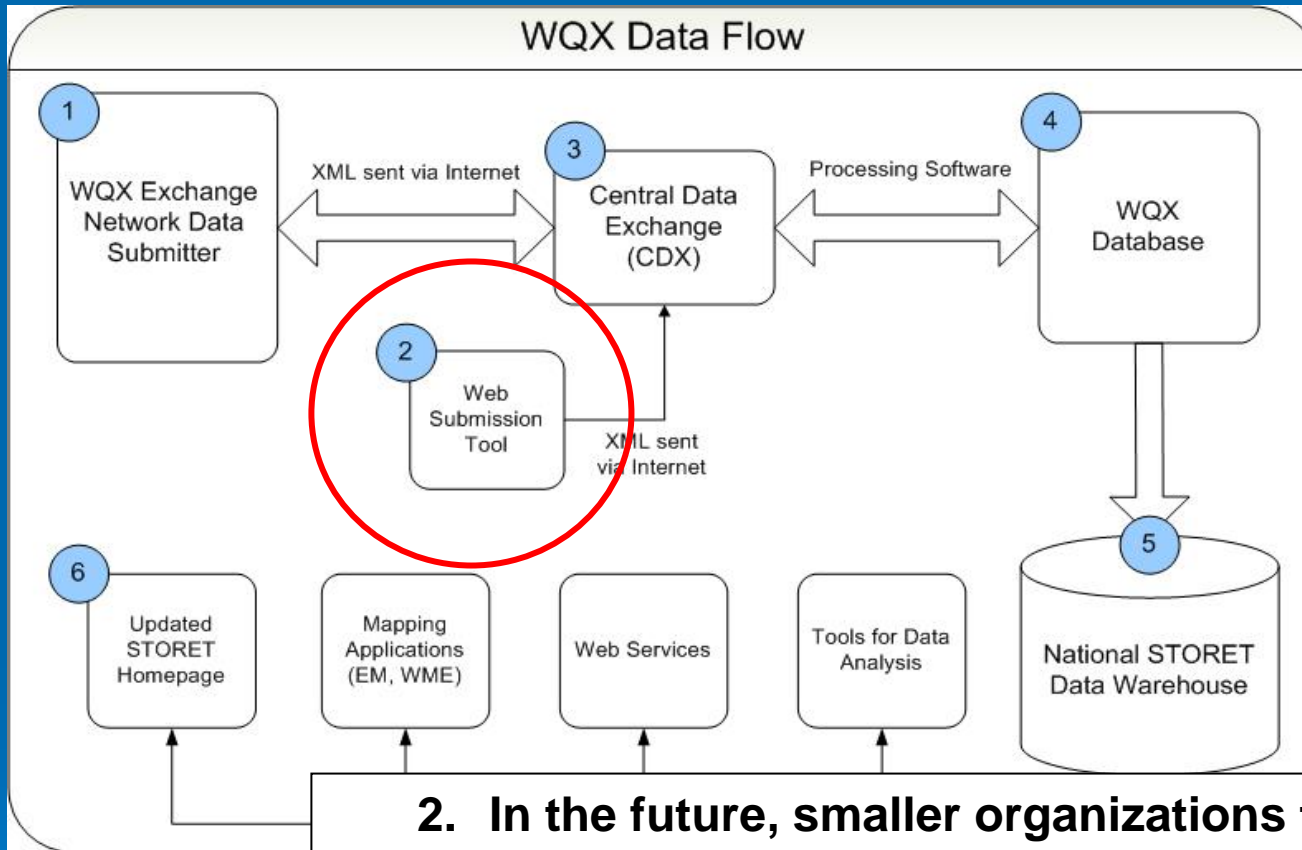
2. In the future, smaller organizations that have less capacity for submitting WQX (XML) data through a node or a node client may utilize a web submission tool that will assist users in creating WQX submission files. This web submission tool is scheduled for completion in July 2008.
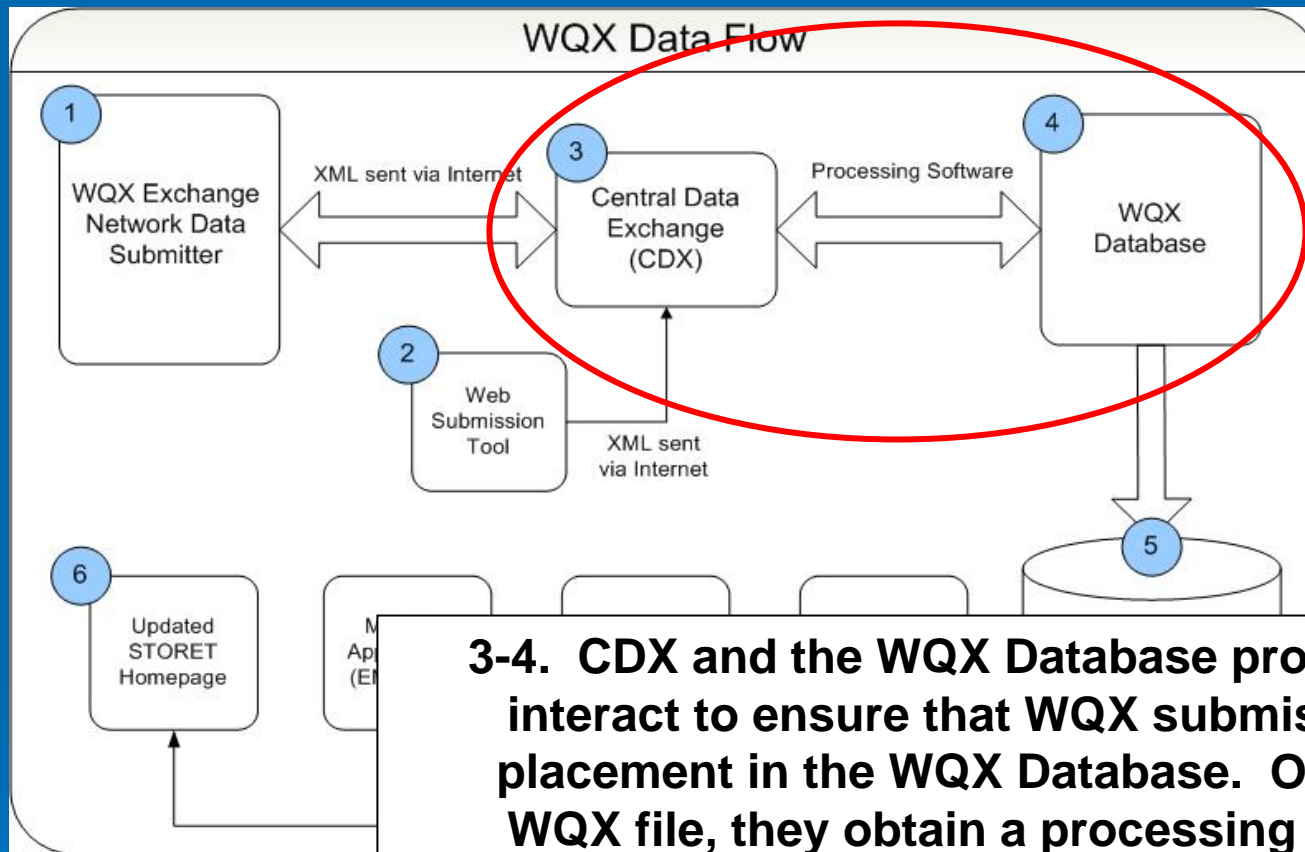
Submitting Data using WQX

WQX Data Flow

1. WQX Exchange Network Data Submitter
2. Web Submission Tool
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XML sent via Internet — Processing Software — XML sent via Internet

Mapping Applications (EM, WME) — Web Services — Tools for Data Analysis

3. WQX data is validated and processed through the Central Data Exchange (CDX). CDX serves as EPA's access point for all environmental data submitted to EPA on the Exchange Network. WQX users must obtain a CDX account in order to submit data through WQX. For more information about CDX, visit http://www.epa.gov/cdx

Submitting Data using WQX

WQX Data Flow

1. WQX Exchange Network Data Submitter
2. Web Submission Tool
3. Central Data Exchange (CDX)
4. WQX Database
5.
6. Updated STORET Homepage

XML sent via Internet

Processing Software

XML sent via Internet

3-4. CDX and the WQX Database processing software interact to ensure that WQX submissions are valid for placement in the WQX Database. Once users submit a WQX file, they obtain a processing report telling them whether the submission was completed or not.

For detailed information about these processes, please see the WQX Flow Configuration Document at http://www.exchangenetwork.net/exchanges/water/wqx.htm

Example Processing Report

Processing Report

Transaction ID: b33a248d-6d91-4989-92bf-2e44cb826d8c

Status: Completed

Software Information

Component Version

WQX Node	1.04
WQX Database	1.04

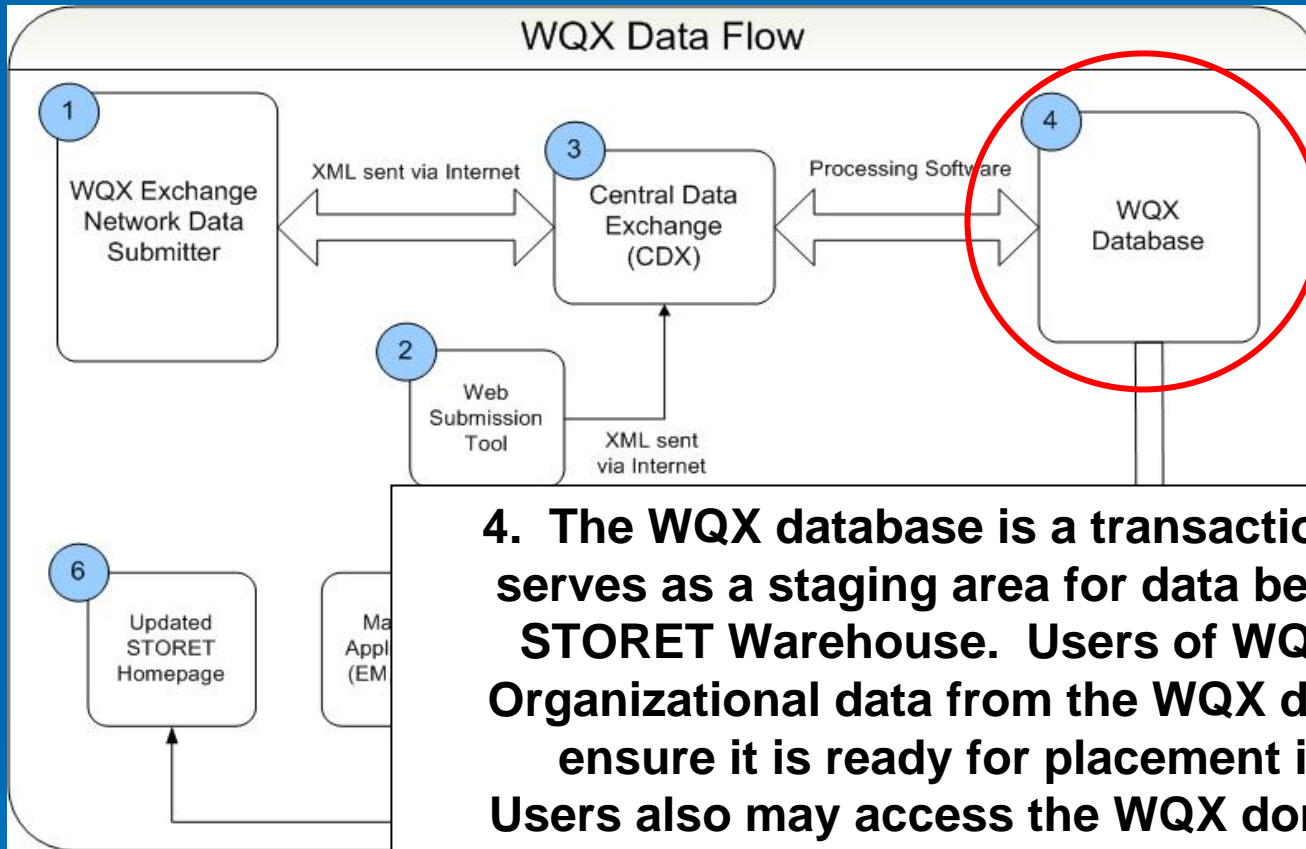### Summary Information

\# Errors: 0

\# Warnings: 0

Items Successfully Processed:

Projects

Delete   1

This processing report tells the user that the submission to WQX is completed. If errors were encountered during a submission, the processing report would say the submission failed, and would give a list of errors encountered.

Submitting Data using WQX

WQX Data Flow

1. WQX Exchange Network Data Submitter
   — XML sent via Internet →
3. Central Data Exchange (CDX)
   — Processing Software →
4. WQX Database

2. Web Submission Tool — XML sent via Internet

6. Updated STORET Homepage

4. The WQX database is a transactional database that serves as a staging area for data before it is put into the STORET Warehouse. Users of WQX may access their Organizational data from the WQX database, so they can ensure it is ready for placement in the Warehouse. Users also may access the WQX domain value lists from the WQX Database.

For detailed information about these processes, please see the WQX Flow Configuration Document at http://www.exchangenetwork.net/exchanges/water/wqx.htm

Getting data out

5-6. The National STORET Data Warehouse serves as the national repository for Modern STORET data as well as WQX data. Users may obtain data from the warehouse through the STORET home page : www.epa.gov/storet Web services providing direct access to warehouse data will also provide enhanced accessibility to the data.
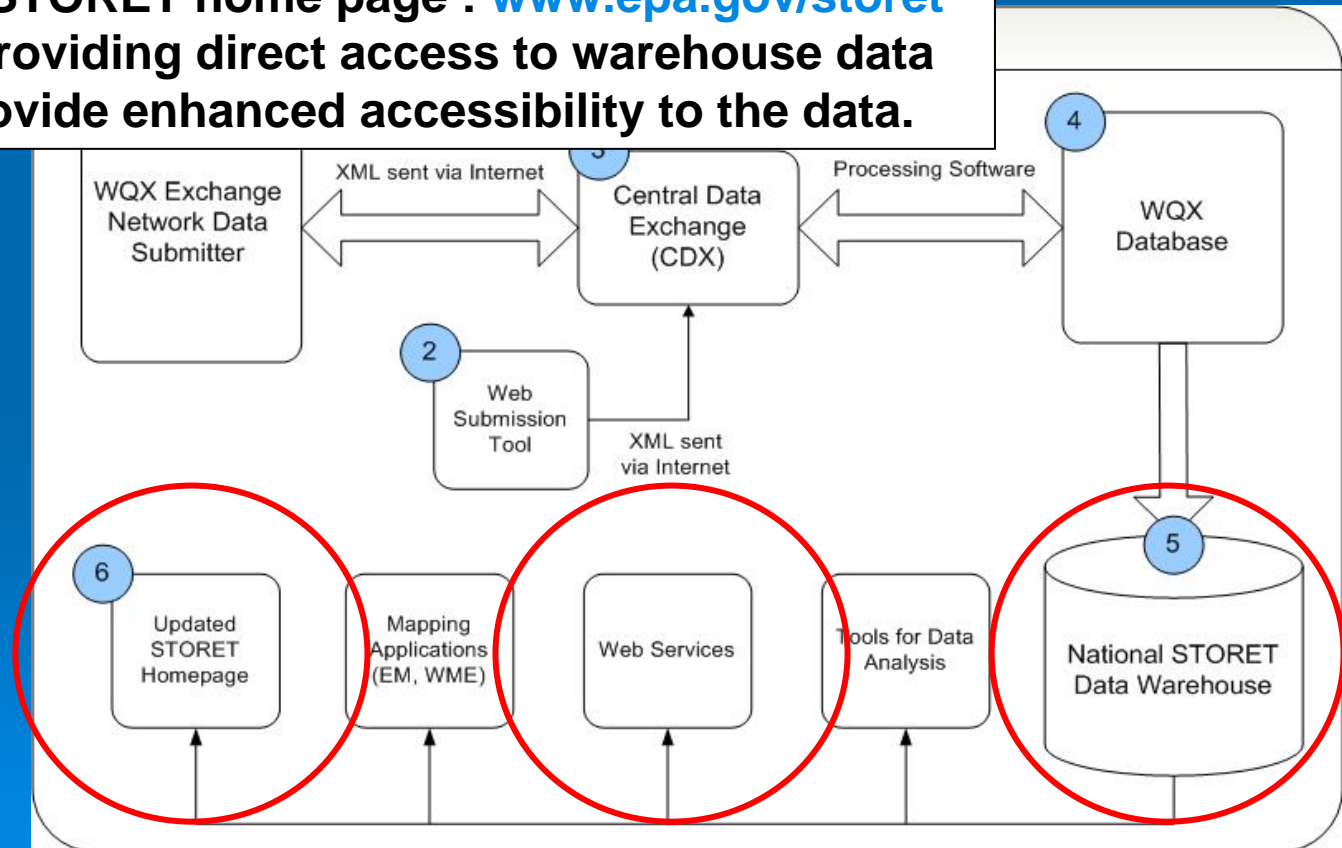
STORET Warehouse Updates: Getting Data Out

➤ The next stage of the warehouse will seek to improve the delivery of 'Information' as opposed to just 'Data'

- New Watershed Reports – Available February 2007

- New Web Services – Available May 2007

➤ Please visit the STORET website for more information : www.epa.gov/storet

WQX Schedule

- WQX Version 1.0 data flow in production (Jan 07)
  - Physical, chemical, microbiological, and fish tissue data only

- Add Biological/Habitat data to schema
  - Begin Bio/Habitat WQX pilot (Early 07)
  - Finalize WQX Bio/Habitat Schema (Jan 08)
  - Bio/Habitat WQX in production (May 08)

- Develop Web tool for XML Generation
  - Tool available for Phys/Chem data (Feb 08)
  - Final tool, including Bio/Habitat (Jul 08)

Schedule for Distributed STORET

➤ SIM 2.0.2 Release (May 2006)

➤ Transition from STORET system to new WQX system (2007-2008)

➤ No longer accept STORET data dumps (Sept 2009)

Question/Comments

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    Young.dwane@epa.gov
  - Kristen Gunthardt, EPA (202)566-1194
    gunthardt.kristen@epa.gov
- Or Visit: www.epa.gov/storet/wqx.html
- Join the STORET list serve for more information, including monthly conference calls about STORET and WQX: http://www.epa.gov/storet/listserv.html