

# Using Exchange Network and CDX Services: Key Steps for Exchanging Emissions Inventory Data

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US Environmental Protection Agency  
Office of Environmental Information





# Topics

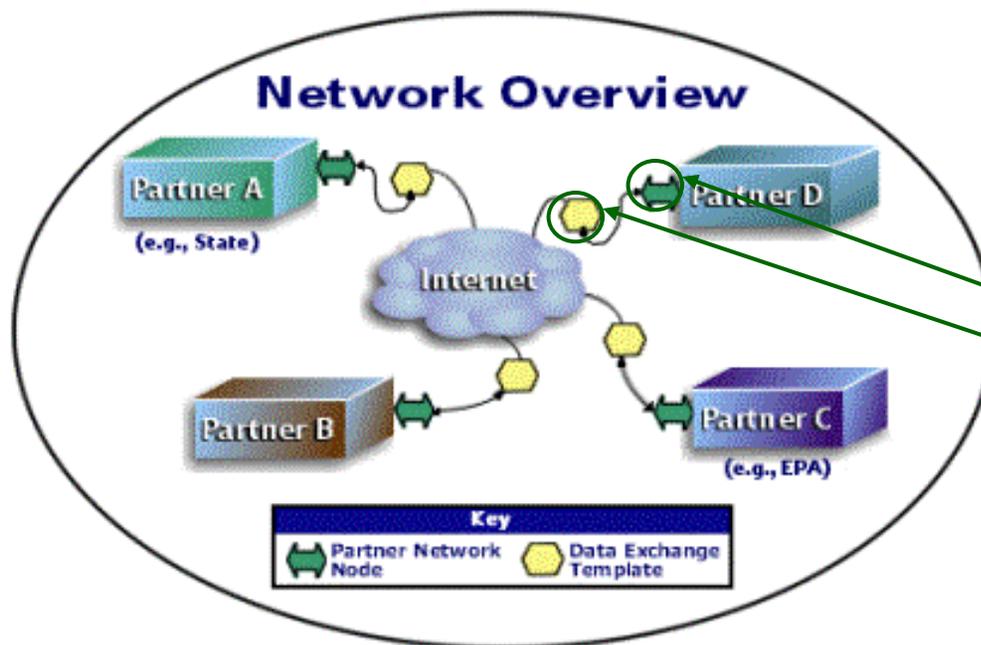
- What is the Exchange Network?
- Network Nodes and Web Services
- What is CDX?
- Services you use with NEI
- Setting Up and Using Services
- Questions

# Topics

- **What is the Exchange Network?**
- Network Nodes and Web Services
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# What is the Exchange Network?

*An Internet and standards-based method for exchanging environmental information between partners*

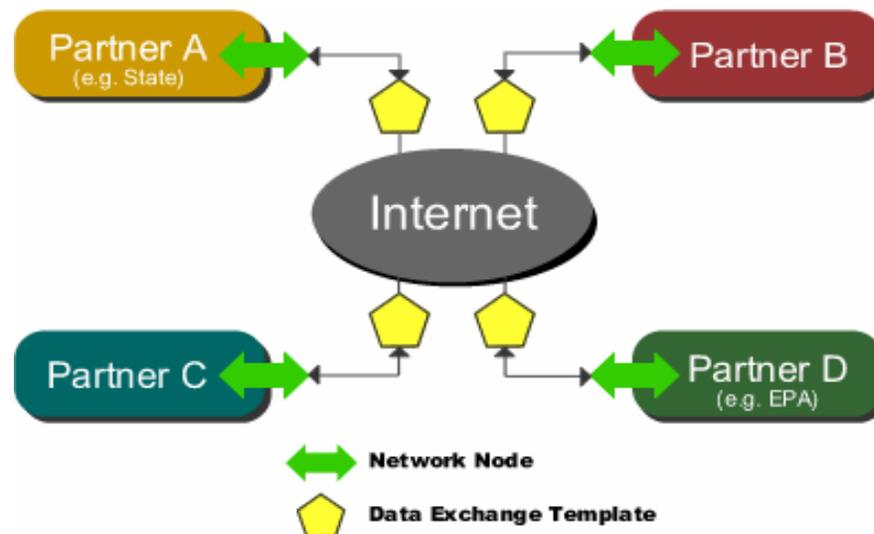


## Key Components

- Data Standards and Standard Protocols
- Nodes
- XML Schema/Registry
- Trading Partner Agreements
- Grant Program

# Purpose of Network

- Supports automated exchange of data
- Enables timely and accurate exchange
- Reduces reporting burden
- Improves data quality



# Types of Data Exchanges on the Network

## State-to-EPA

- Facility Data to FRS
- Water Quality Data to WQX
- Drinking Water Data to SDWIS
- Haz Waste Data to RCRAInfo
- Air Emissions Data to NEI
- Air Quality Data to AQS

## EPA-to-State

- TRI Data Submissions
- Substance and Chemical Data
- Facility Data from FRS
- Air Quality Data

## State-to-State

- Water Quality Data
- Hazardous Waste Transporters
- Air Quality Data
- Homeland Security Data

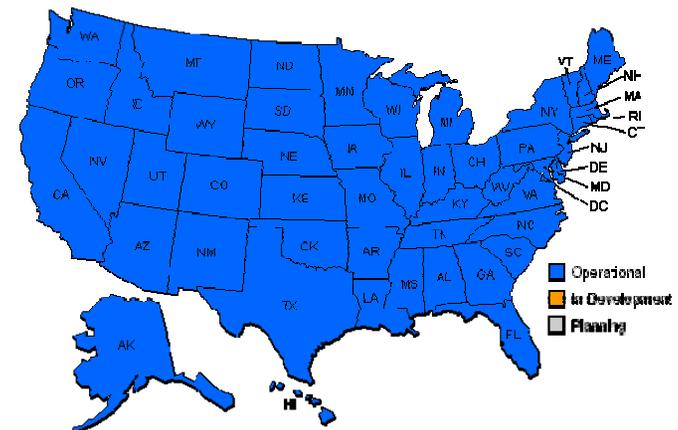
## Intrastate and Local Agencies

- Environmental Data to Health Departments
- Drinking Water Labs to States
- Homeland Security/Law Enforcement Data
- County Water Data

# Status of State Nodes October 2007

	Operational		Development		Planning	
	Nodes	Clients	Nodes	Clients	Nodes	Clients
States	50	0	3	0	1	0
Tribes	1	6	5	0	16	0
Territories	0	0	2	0	0	0
Other Partners	0	1	0	0	0	0
<b>Total</b>	<b>51</b>	<b>7</b>	<b>10</b>	<b>0</b>	<b>17</b>	<b>0</b>

**Many States/Tribes have Nodes  
You can exchange Emissions  
Data through these Nodes!**



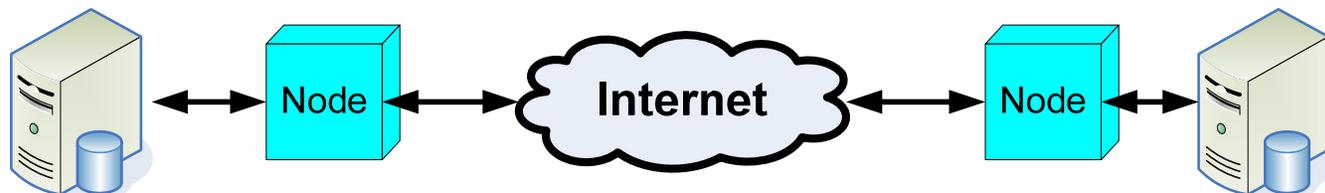
# Topics

- What is the Exchange Network?
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# What is a Network Node?

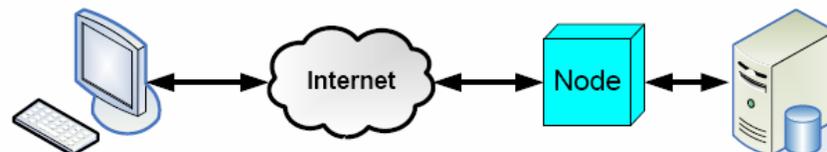
*“A simple environmental information **Web service** that initiates requests for information, processes authorized queries, and sends/receives the requested information in a standard format.”*

- Is a Server accessible on the Web
- Complies with the protocols to ensure secure exchanges
- Sends and receives standards-based messages
- Returns requested information as XML
- Each partner has only one Node

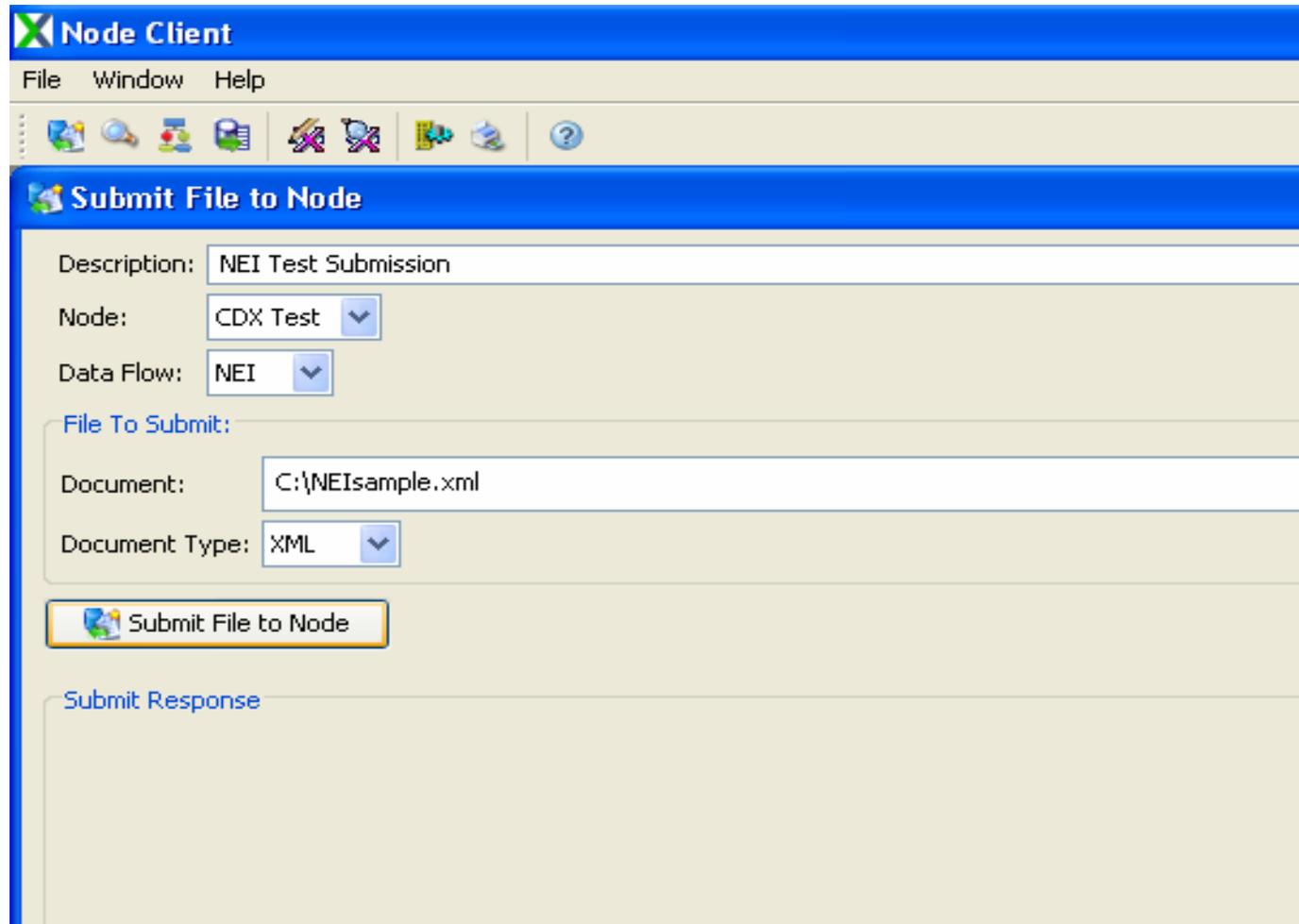


# Node Client Applications

- Simplify access to services on full Network Nodes
  - Cannot listen (and respond) to requests from other nodes
- Human-to-Machine interaction
- Easy to install and use
- Available in .NET and JAVA versions
- Node Client Software Developer Kit (**SDK**) - simplifies integrating Node client functions (web service calls) with just a few lines of script
- Local Agencies who are not eligible for grants can use free node client



# Node Client EPA JAVA/Velocity



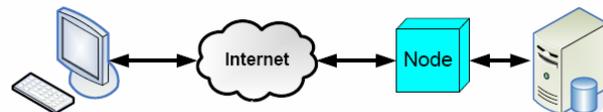
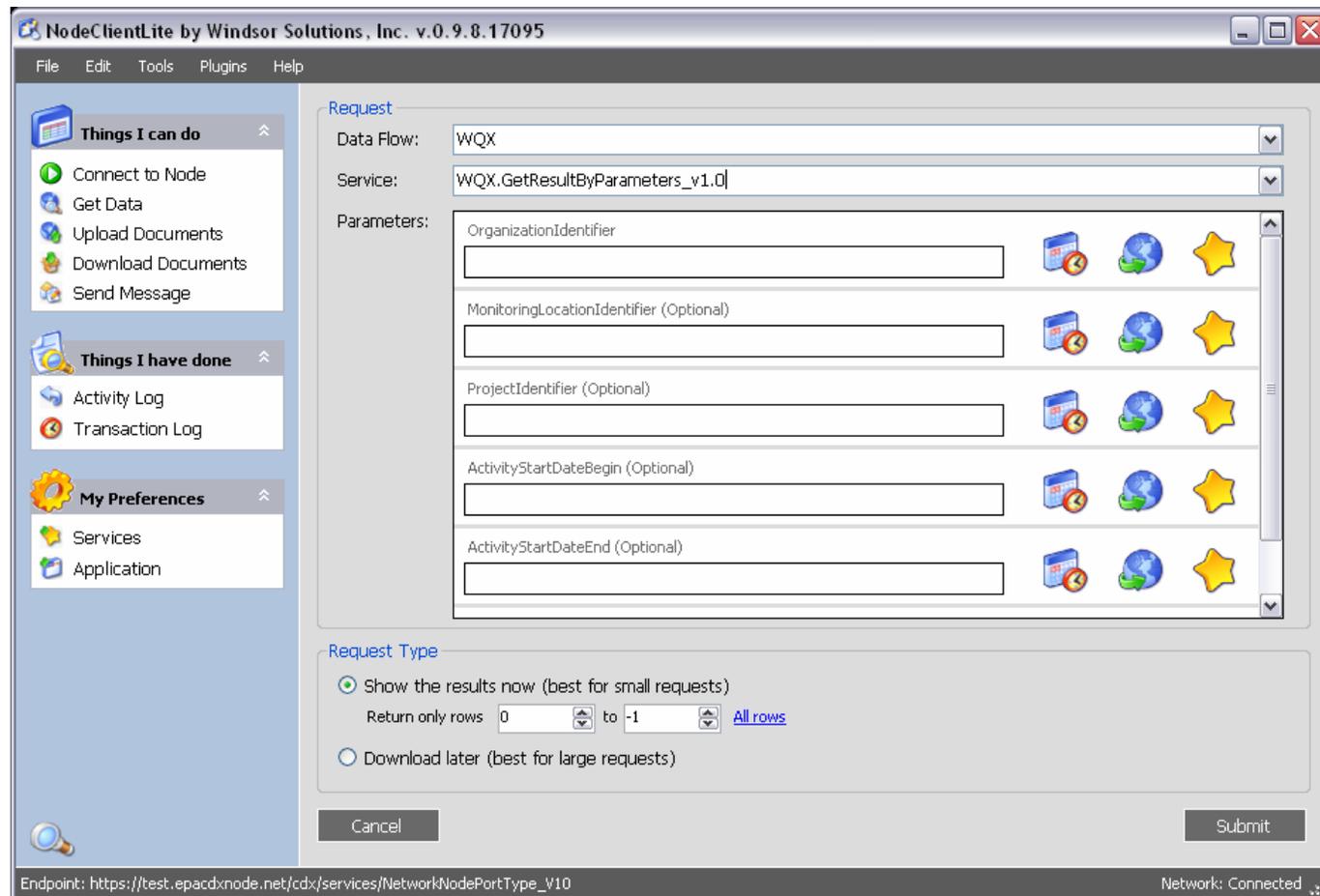
The screenshot shows the 'Node Client' application window. The title bar reads 'Node Client' and the menu bar includes 'File', 'Window', and 'Help'. Below the menu bar is a toolbar with various icons. The main content area is titled 'Submit File to Node' and contains the following fields:

- Description:
- Node: - Data Flow: - File To Submit:
  - Document:
  - Document Type:

At the bottom of the form is a button labeled 'Submit File to Node' and a section titled 'Submit Response' which is currently empty.



# Node Client Lite (Windsor -.NET)



# Network Desktop (EPA -.NET)

File Tools Security Options Help

Home Query Wizard Submit Wizard QA Wizard History

Exchange Network Submit Wizard

This page allows you to select a data flow and a document to be submitted. The transaction ID parameter is optional, it is used only if the file is associated with a previous submission.

### Choose File to Submit

1 2 3 4

**Submit**

Choose an Endpoint:

Transaction ID:

Exchange:

Document:  ...

Document Type:  XML  ZIP  Other



# Heartland Emergency Response Client (HERE)

The screenshot displays the HERE Client Help application interface. The main window is titled "HERE Client Help" and contains a navigation menu on the left with items: About HERE Client, Application Setup, Dashboard, Search, and Site Detail. The central area is titled "Dashboard" and includes a description: "The Dashboard provides summary-level information about the HERE Client as well as access to the task scheduler."

The dashboard is divided into several sections:

- Application Status:** Shows Network Status (Connected), Site Record Count (94169), and Last Updated On (3/18 11:01 AM). A button "Click to map all sites" is present.
- Data Status by Source:** A table listing data sources and their counts:

Livestock	5,943
Public Water Supply	01
Remediation	2,076
Solid Waste	855
Tanks	15,303
Wastewater	2,397
MO	3/18 11:01 AM
Chemical Storage	7,018
Livestock	631
Public Water Supply	15,697
NE	3/18 11:01 AM
Air	3,517
Chemical Storage	5,357
- Saved Searches:** A dropdown menu showing "Sample Facility" with "Load" and "New" buttons.
- Data Snapshots:** A bar chart titled "Top 10 record counts by environmental Interest". The x-axis categories are: Chemica, Public W, Livestoc, Tanks, Air, Wastew, Remedia, Solid W, and Hazardo. The y-axis ranges from 0 to 40,000.
- Tasks:** A task titled "Data Download" with a description "Default data download task." and run times: Last Run: 2007-08-07 09:29, Next Run: 2007-08-07 09:29. A "New" button is at the bottom right.

The bottom status bar shows "Current NAAS Identity: client@windsorsolutions.com" and "Connected: Yes". The Windows taskbar at the bottom includes the Start button, several open applications (RE: HERE scr..., Lotus Domino D..., Presentations, WinZip - Help.Zip, HERE Client Help), and the system tray with the time 1:09 AM.

# Web Service

- Definition: Information sources/application components whose functionality and interfaces are exposed to consumers using ***standard messaging protocols*** including:
  - Extensible Markup Language (XML) for the payload or file,
  - Simple Object Access Protocol (SOAP) as a wrapper for the payload,
  - Web Services Description Language (WSDL) for network exchange functions and services, and
  - Secure Hypertext Transfer Protocol (HTTP) for secure communication via the internet

***Basically: A machine readable Email message***

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# What is CDX?

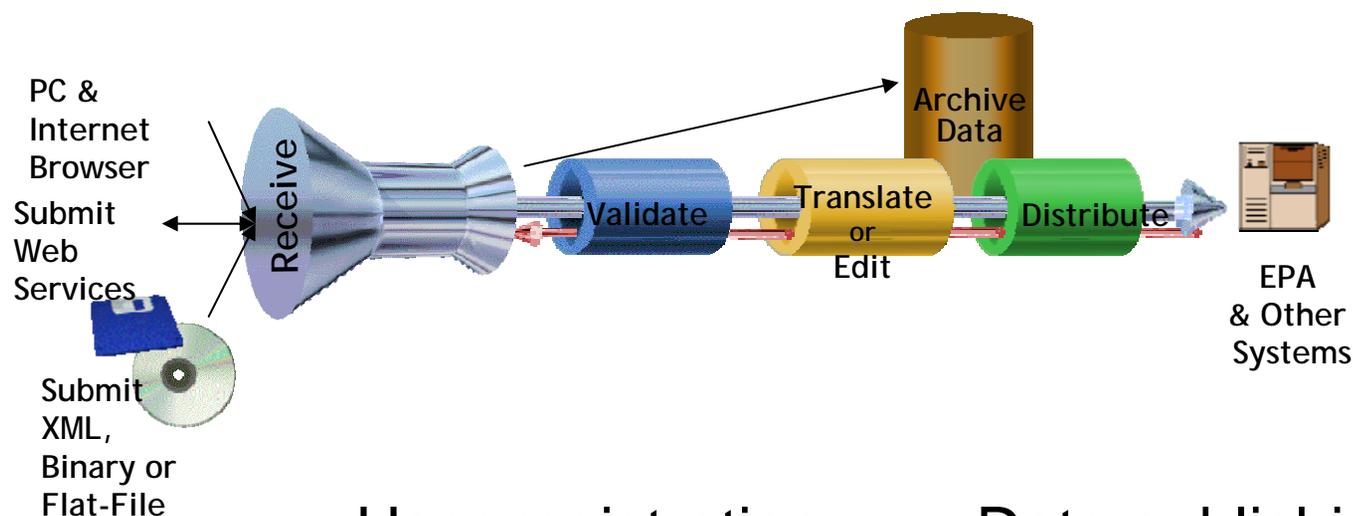
- The **Central Data Exchange (CDX)** is the central point through which environmental data enters the Agency
- EPA's Node on the **Environmental Information Exchange Network** (Inflows and Outflows of Data to Partners)

# CDX Exchange Mechanisms

***CDX Node*** – EPA's Web services infrastructure on the Exchange Network

- Supports machine-to-machine data exchanges
- Standardized Web service protocols and XML schemas used

# What Functions Does CDX Provide?



- User registration
- Authentication
- Enhanced Security
- Translation
- Data validation
- Data publishing
- Archiving
- Distribution
- Messaging services
- Customer support



# *User* Benefits of CDX

- Responds to Industry/state/program desires for a common point of exchange with EPA
- Provides common registration process for industry
- Provides standard interface and formats for users
- Integrates receipt, security, translation, archiving and distribution functions
- Maintains centralized customer support

# Topics

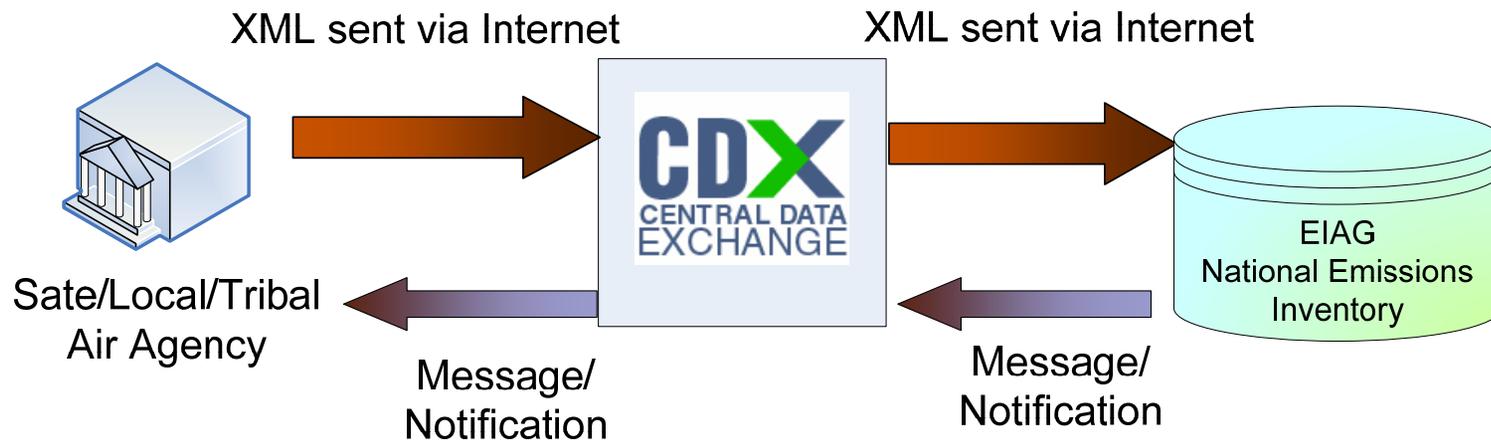
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# CDX/Exchange Network Services You Use with NEI

## Centralized, Shareable Web Service Components

1. Registration (Network)
2. Authentication and Authorization (NAAS)
3. Secure Document Exchanges
4. Data Reporting
5. Messaging (status, error)
6. Quality Assurance (validation)
7. Web Service Management (Monitor Services)
8. Internal Services: Archiving, Logging, Routing, Distributing, etc.

# CDX/Exchange Network Services You Use with NEI

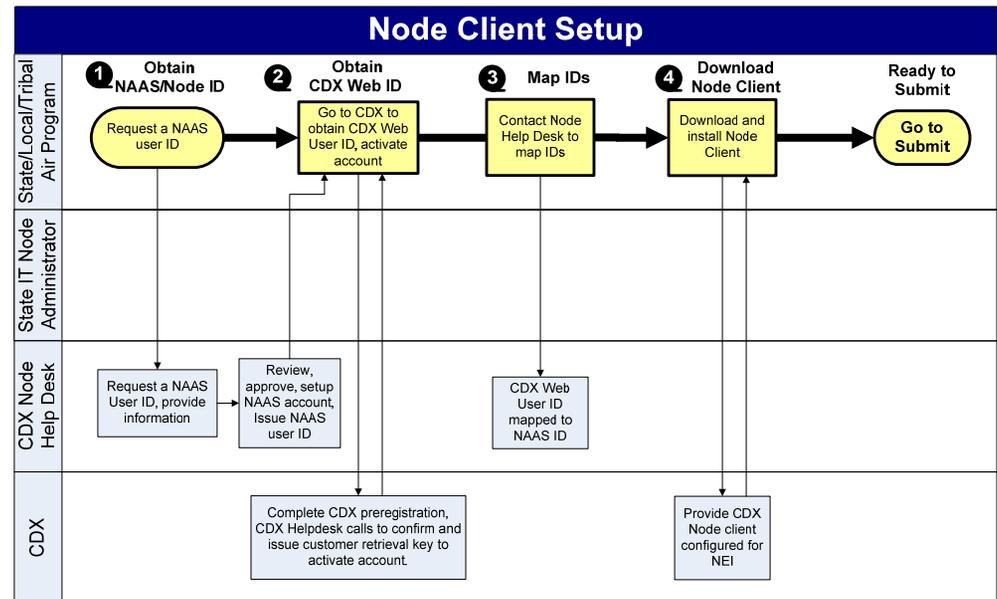
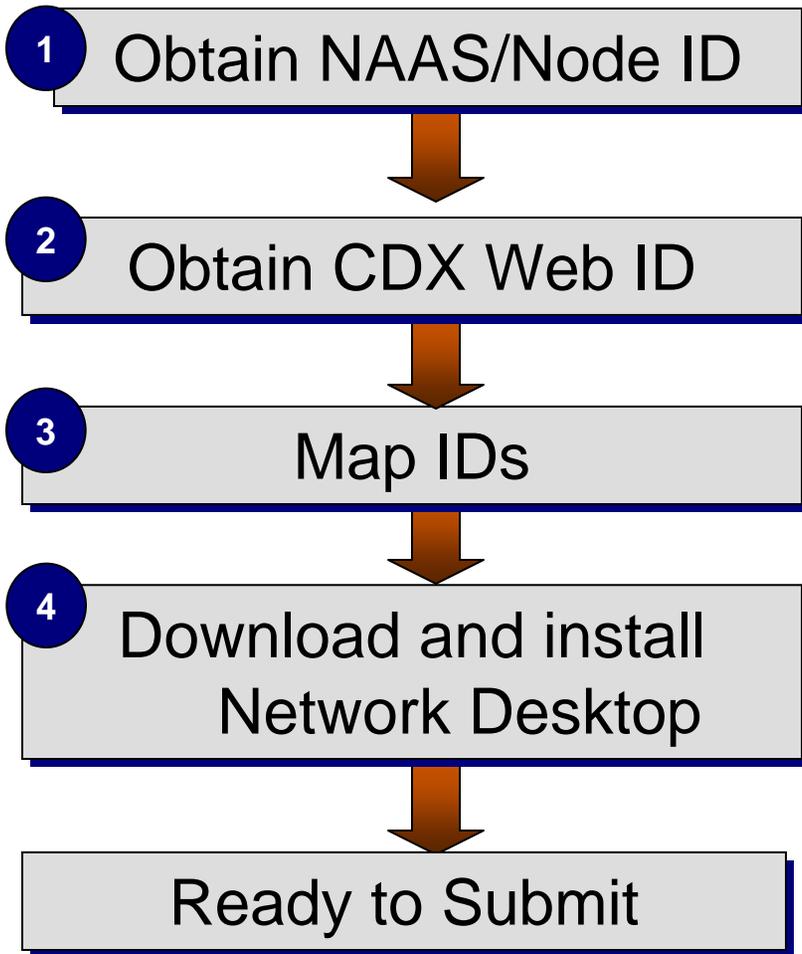


- *Registration*
- *New Account Setup*
- *Authentication/ Authorization*
- *Secure reporting*
- *Data Reporting*
- *Validation*
- *Messaging*
- *Monitoring*
- *Internal Services*

# Topics

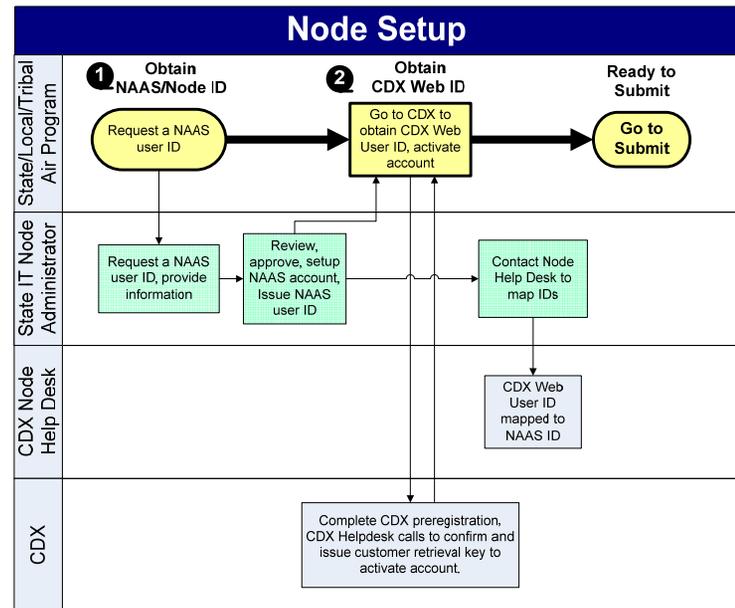
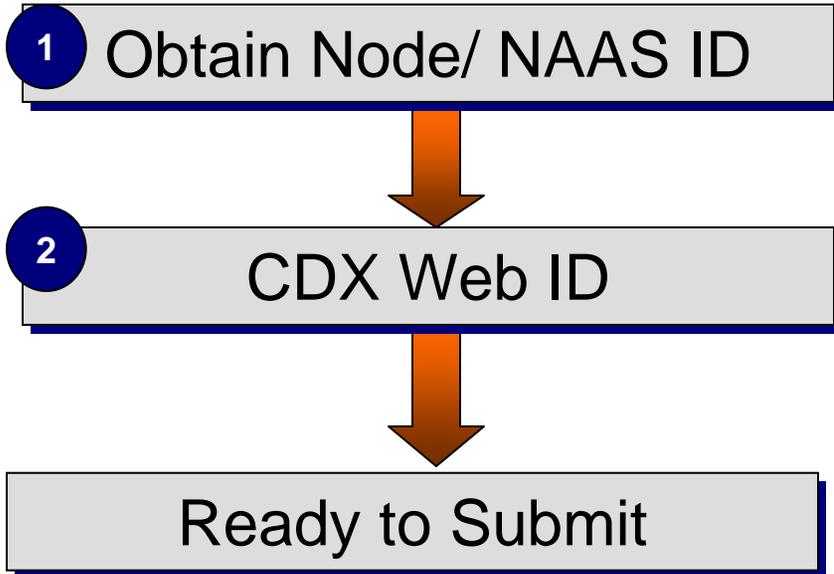
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# Network Desktop Setup

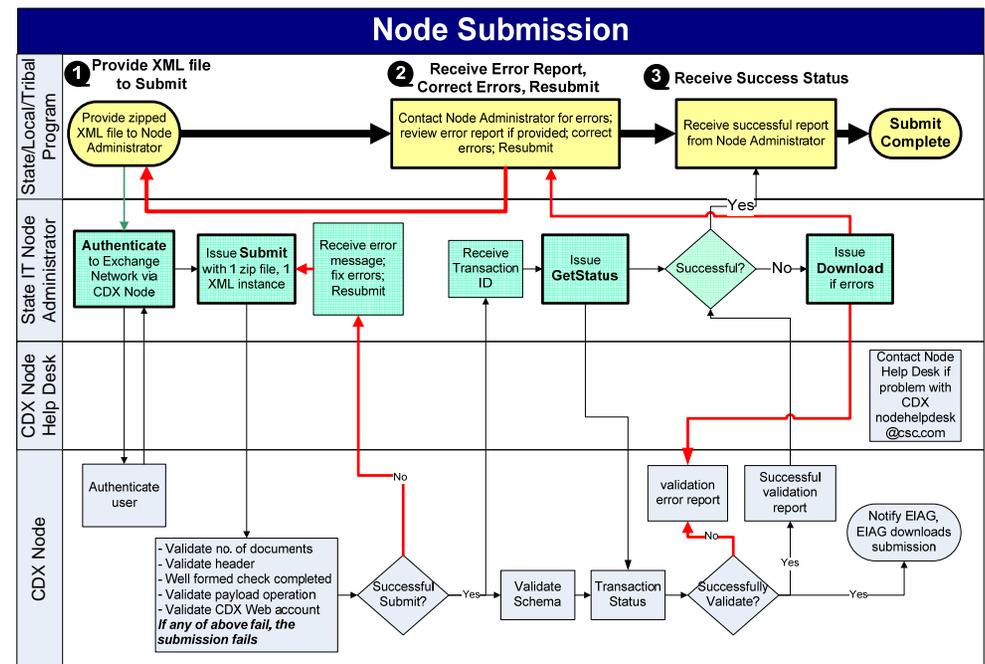
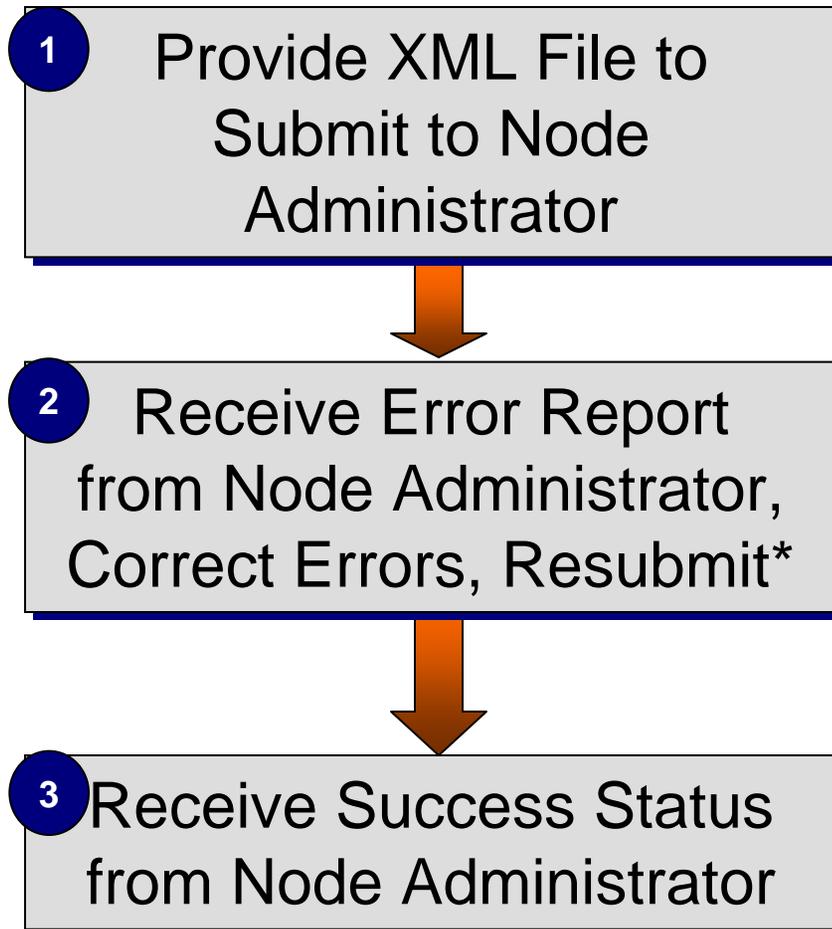




# Network Node Setup



# Network Node Submission



***Talk to Your Node Administrator!***

\*Node 2.0 can send e-mail status to user

# Summary

- Exchange Network and CDX have services being used by 50 states and 12 tribes
- You can submit NEI data through the CDX Node on the Exchange Network
  - Using a *Full Network Node*
  - Using a *Network Desktop/ Node Client*
- Local Agencies who are not eligible for grants can use free node client
- If you are using a full node, establish how Program and IT staff communicate correcting submission errors.
- Use a node client for this type of annual submission

# Resources

- EPA Exchange Network  
<http://www.epa.gov/exchangenetwork>
- Exchange Network  
<http://www.exchangenetwork.net>  
<http://www.exchangenetwork.net/node/>
- CDX  
<http://www.epa.gov/cdx/>
- Node Help Desk
  - [nodehelpdesk@csc.com](mailto:nodehelpdesk@csc.com)
  - 1-(888)-890-1995 Option 2
- CDX Node Client (velocity)  
[https://test.epacdxnode.net/cdx\\_client/](https://test.epacdxnode.net/cdx_client/)
- Network Desktop  
<http://clientcentral.epacdxnode.net/msi/setup.msi>
- NGN Download Info  
<http://test.epacdxnode.net/ngn>



**Questions?**

# Resources

- UDDI Website

<https://uddi.epacdxnode.net/uddi/bsc/web>

- UDDI Web Services Endpoints

- Search (Staging):

<https://uddi.epacdxnode.net:443/uddi/inquiry>

- Publishing (Staging):

<https://uddi.epacdxnode.net:443/uddi/publishing>

- Search (PRODUCTION):

<https://uddi.epa.gov:443/uddi/inquiry>

# Search for Service Details

EPA UDDI and Business Services Registry - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://uddi.epacdxnode.net/uddi/web>

Google Search 142 blocked Check AutoLink AutoFill Options

The UDDI returns detailed results for the service.

Date created, etc.,...

**View service 'OPPTS validation service'**

**Details**

Service key: **uddi:0831cdc0-223e-11db-8550-c26592a18533**

name	language
OPPTS validation service	

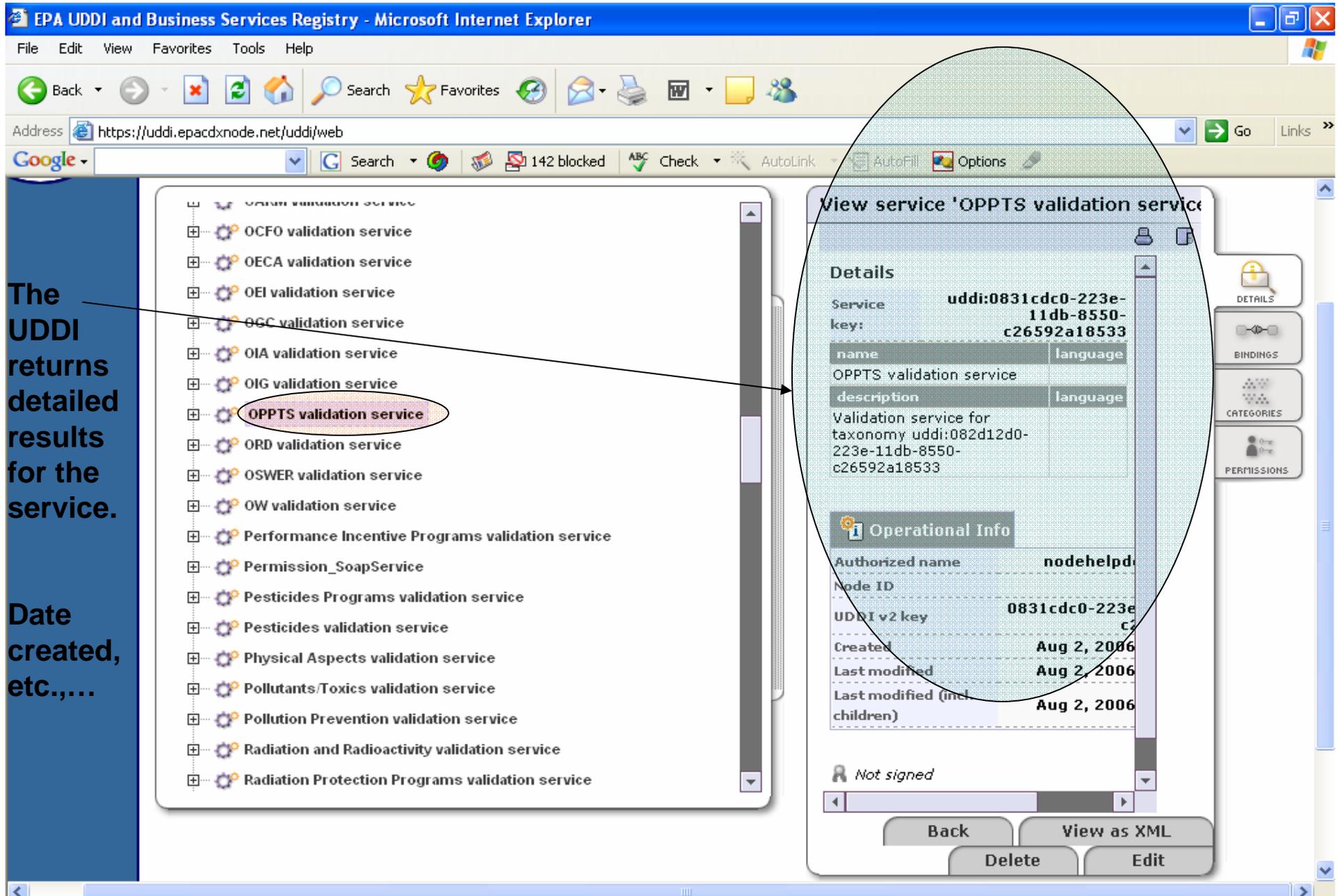
description	language
Validation service for taxonomy uddi:082d12d0-223e-11db-8550-c26592a18533	

**Operational Info**

Authorized name	nodehelpd
Node ID	
UDDI v2 key	0831cdc0-223e-11db-8550-c26592a18533
Created	Aug 2, 2006
Last modified	Aug 2, 2006
Last modified (incl children)	Aug 2, 2006

Not signed

Back View as XML Delete Edit



The screenshot shows a web browser window with the EPA UDDI and Business Services Registry. On the left, a list of validation services is displayed, with 'OPPTS validation service' circled in red. An arrow points from this service to a detailed view on the right. The detailed view shows the service key, name, description, and operational information. A blue box on the left contains text explaining that the UDDI returns detailed results for the service, including the date created, etc. The detailed view also includes buttons for 'Back', 'View as XML', 'Delete', and 'Edit'.

# UDDI - Web service access

- Get all network node addresses from the UDDI
- dim serviceList
- serviceList = Array()
- create a node client object
- set myClient = CreateObject ("NodeClient")
- myClient.SetProperty "XMLParser", "1"
- Call Service
- serviceList =  
myClient.GetNodeAddresses("https://uddi.epacdxnode  
.net:443/uddi/inquiry", "uuid:9a70cac0-8081-11d9-  
bd6b-a4522580bd6b")

# Web Service Response

```
https://216.226.179.156/node.webservices/nodeservices.asmx
https://www.dec.state.ak.us/ias/Xnode
https://azdeq.gov/jboss-net/services/ADEQNetworkNode_V11
https://dpxn01.adeg.state.ar.us/service.asmx
https://node.calepa.ca.gov/node/service.asmx
https://test.epacdxnode.net/cdx/services/NetworkNodePortType_V10
https://cdxnode.epa.gov/cdx/services/NeworkNodePortType_V10
https://enode.dphe.state.co.us/node/service.asmx
https://denode1.dnrec.state.de.us/denetworkNode10/Node.asmx
https://cdxnode.epa.gov/cdx/services/NetworkNodePortType_V10
https://node.deq.idaho.gov/axis/services/NetworkNodePortType
https://157.91.43.10/node/services/NetworkNodePortType_V10
https://idnrtb5.dnr.state.ia.us/xanode/services/CDXService
https://165.201.142.7/Node/Service.asmx
https://198.182.163.87:4445/node/services/NetworkNodePortType_V10
https://mde-node.mde.state.md.us/xanode/services/CDXService
https://massdx.dep.state.ma.us/service.asmx
https://secure1.state.mi.us/node.webservices/nodeservices.asmx
https://neient.pca.state.mn.us/xanode/services/CDXService
https://www.dnr.mo.gov/xanode/services/CDXService
https://161.7.9.182:4458/node/services/NetworkNodePortType_V10
http://164.119.180.7:8090/axis/services/CDXService
https://eidea.state.nm.us/NMNode/services/NetworkNode
https://www1.dec.state.ny.us/nodeservice/services/Node
https://149.168.30.155/ncnode/services/NetworkNodePortType_V10
http://ndcdxnode.doh.nd.gov/Service.asmx
https://node.deq.state.ok.us/node/Service.asmx
https://node.deq.state.or.us/node/node.asmx
https://205.172.107.147/xanode/services/CDXService
https://eqcweb01.dhec.sc.gov/axis/services/NetworkNodePortType_V10
https://anrnode.anr.state.vt.us/xanode/services/CDXService
https://205.174.192.33/xanode/services/CDXService
https://test-fortress.wa.gov/ecy/node/node.asmx
https://apps.dnr.state.wi.us/neien/services/NetworkNodePortType
```

# Used to Populate Applications

Home Query Wizard Submit Wizard QA Wizard History

Exchange Network Query Wizard

Select one flow for which you want to query data. If a flow has a information web page that is provided and you can click on the link to discover more about the flow.

If you click 'Refresh Metadata, then the Client will download any updates to the list of available flows, node or services from the national Network Discovery server.

Select one or more Nodes that which to query by left clicking on each one. Only Nodes that support the selected exchange are listed here.

If a Partner has published a web site to provide details about they way they have implemented a flow, then this can be accessed by right clicking on a Node and linking to that web page.

Advanced: If all of the Nodes selected accept Production NAAS credentials then check the 'Use single Production NAAS Token' checkbox. If however, any one or more Nodes requires other forms of credentials (e.g., a Test NAAS account) then you need to uncheck the option, and potentially specify different credentials for each Node by right clicking on that Node. To add additional sets of credentials, you will need to access the Advanced Option > Primitives > Authentication page and enter additional credentials there. These can then be assigned to each Node selected by right clicking on the Node and selecting the credentials to use.

### Choose Data Flow and Choose Nodes to Query

**Select data flow:** Refresh Metadata

- ENDSRequestRefresh
- ENDSDataServiceRefresh
- AQDE
- PNWDCRefresh
- NEI
- SubmitTRI
- PNW
- ENDSExampleRefresh
- ENDSStyleSheetRefresh
- SRS
- ENDSSchemaRefresh
- WasteX
- PNWHostAppend
- ORAQX
- ENDSParameterRefresh
- ENDS
- FRS

**Select node:** Select All

- https://azdeq.gov/boss-net/services/ADEQNetworkNode\_V11
- https://dpxn01.adeq.state.ar.us/service.asmx
- https://node.calepa.ca.gov/node/service.asmx
- https://test.epacdxnode.net/cdx/services/NetworkNodePortType\_V10
- https://cdxnode.epa.gov/cdx/services/NeworkNodePortType\_V10
- https://enode.dphe.state.co.us/node/service.asmx
- https://denode1.dnrec.state.de.us/denetworkNode10/Node.asmx
- https://cdxnode.epa.gov/cdx/services/NetworkNodePortType\_V10
- https://node.deq.idaho.gov/axis/services/NetworkNodePortType
- https://157.91.43.10/node/services/NetworkNodePortType\_V10
- https://idnrhb5.dnr.state.ia.us/xanode/services/CDXService
- https://165.201.142.7/Node/Service.asmx

**Additional data exchange information...**

No Exchange Link Provided

