Network Knowledge Call #2

December 2, 2003

Environmental Information
eXchange
Network

www.exchangenetwork.net

Agenda

- ➢ Recap of Network Knowledge Call #1 (Resources for Node Builders)
- ➢ Flow Definition
- ➢ Status of Current Flows
- ➢ Flow Deployment: Requirements and Resources Available
- ➢ The Flow Configuration Document (FCD)
- ➢ Using the FCD to Design a Network Flow
- ➢ Case Study: Michigan DMR Flow Experience
- ➢ Question & Answer
- ➢ Participant Input
  - Hurdles to Flow Implementation
  - Additional Guidance Needed

Resources for Node Builders

➢ Demonstrated Node Configurations (DNCs)

➢ Testing Tools

  • https://test.epacdxnode.net/test/

➢ Node Mentoring Group

➢ Network Help Desk

➢ Exchange Network Discussion Board

Version 1.1 DNCs

> **Java-based (Integrated Client and Server DNC)**
> - **Apache Axis 1.1** – DNC can be used with any Java-Based middleware, (e.g., WebLogic, WebSphere, XAware, Oracle 9i)

> **Microsoft .NET DNCs**
> - DNC for server side using Microsoft .NET C#. This requires .NET framework 1.X and WSE 1sp1.
> - DNC for server side using Microsoft .NET VB . This requires .NET Framework 1.X and WSE 1sp1. DNC (executable files) for client side (to generate requests) for Microsoft .NET.
> - Sample client for .NET This is a sample client that uses the included requestor library (CDX_DOTNET_REQUESTOR.DLL). This library is all that is needed to communicate with a Node from any .NET language (e.g., VB, C#, J#). Only requires the .NET Framework 1.X and WSE 1sp1.
> - Also available is a C# client library (.zip file). This allows you to change the requestor library above. If you don't want to change the API, you should download the .NET Sample Client. Requires the .NET Framework 1.X and 1sp1.

> **All Tools available on the Exchange Network Website "Tool Box" Section**

Node Mentoring Group

Purpose

➢ The purpose of this group is to leverage the knowledge gained from previous node building projects and to mentor other states just starting to implement their nodes on the exchange network. The goals are simple:

- Assist new states in implementing their nodes;
- Assist the network steering board in reaching the FY2004 goal of 35 exchange network flows. Network flows cannot occur without a functioning node; And
- Facilitate and organize platform specific technology transfer to reduce cost burden on states using the same or similar technology platforms.

➢ Node Mentoring Group National Meeting
- New Orleans, February 9th-10th, 2004

Node Mentoring Group Contacts

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Test Tools

https://test.epacdxnode.net/test/

- This application provides the ability to test any Node in the Exchange Network, by triggering Network WSDL-compliant requests on that Node.
- If a Node passes a test with this tool, it is very likely, the Node will be interoperable with other Network WSDL-compliant Nodes.
- This tool, which is intended to verify general compliance with the Functional Specification, focuses on interoperability among Nodes. Testers can choose to perform either:
  - interactive tests
  - automatic tests
  - multi-step scenarios.

Node Building Roadmap

- Choose Web Services platform and Web Services toolkit
- Use reference implementation (DNC) or generate from scratch
- Build Web Services and Application Tier
- Integration test against test tool to verify interoperability according to the Network WSDL and to verify compliance with Node Functional Specification
- Implement the Data Services tier
- Integration test with test tool to validate service requests
- Test actual exchanges with destination Node
- Verify Production Status using the *Node, Flow, and Client Definitions and Implementation Statuses* Document (pending NSB approval)

Network Help Desk

The CDX/Network Help Desk is available for data submission technical support.

By Telephone:
Call our toll-free line between the hours of 8:00 am and 6:00 pm (Eastern) at 888-890-1995 (Select Option 2).

Discussion Board

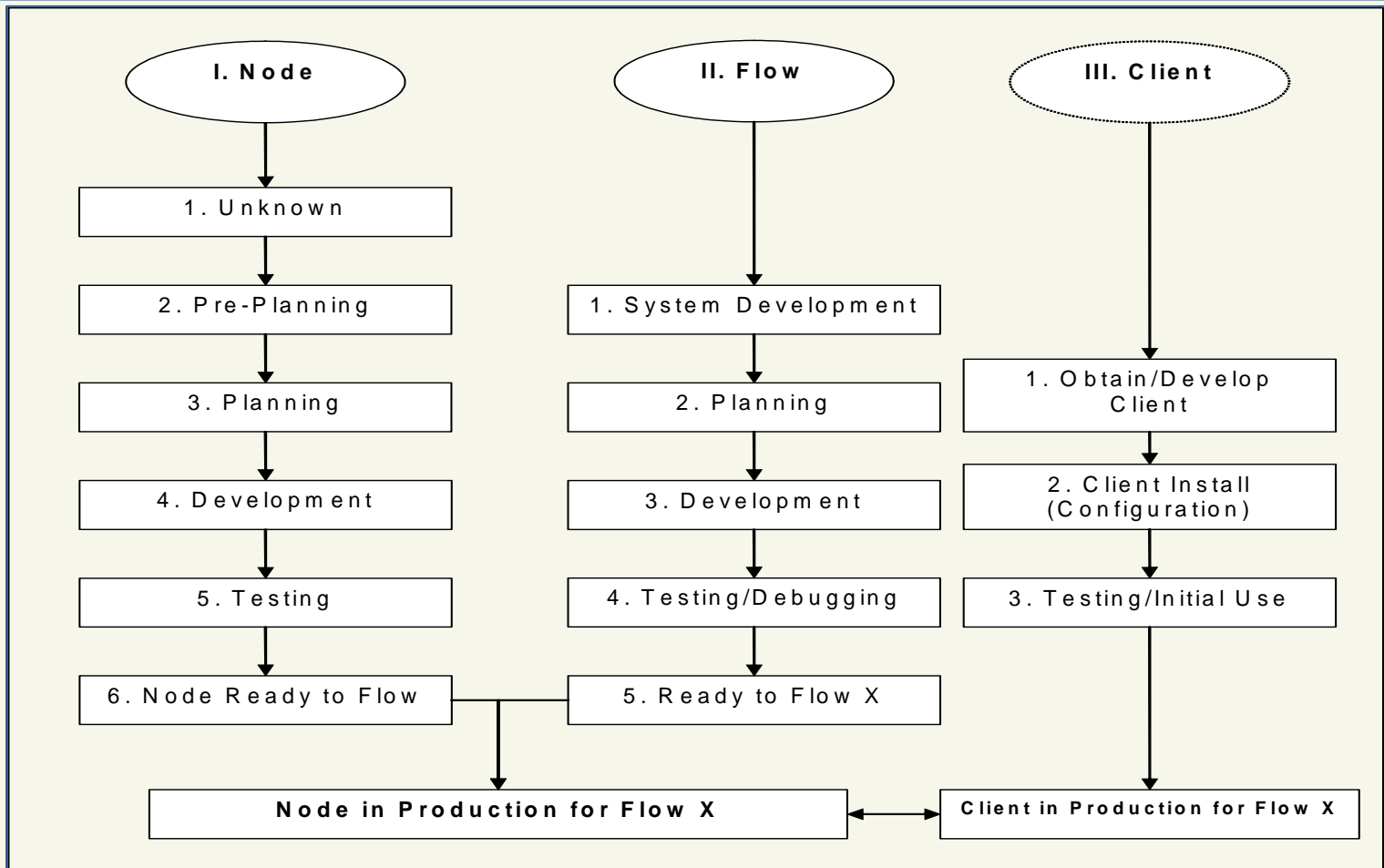The Exchange Network website has been expanded to include a public message/discussion board.

www.exchangenetwork.net

click on message board on left side

Current Discussion Areas

➢ General - Exchange Network

➢ Node Development

➢ Node Configuration

➢ Node Security

➢ XML Schema

➢ Trading Partner Agreements

Flow Deployment

Flow Definition

A Network Flow is a documented grouping of related data, their defined format, and the requests and responses, as defined by the Network Exchange Protocol and Network Node Functional Specification. Network Partners establish these groupings as a convenient way to design and document exchanges so they are consistently implemented by other Partners.

Partners communicate their Flow designs through "Flow Configuration Documents" (FCD).
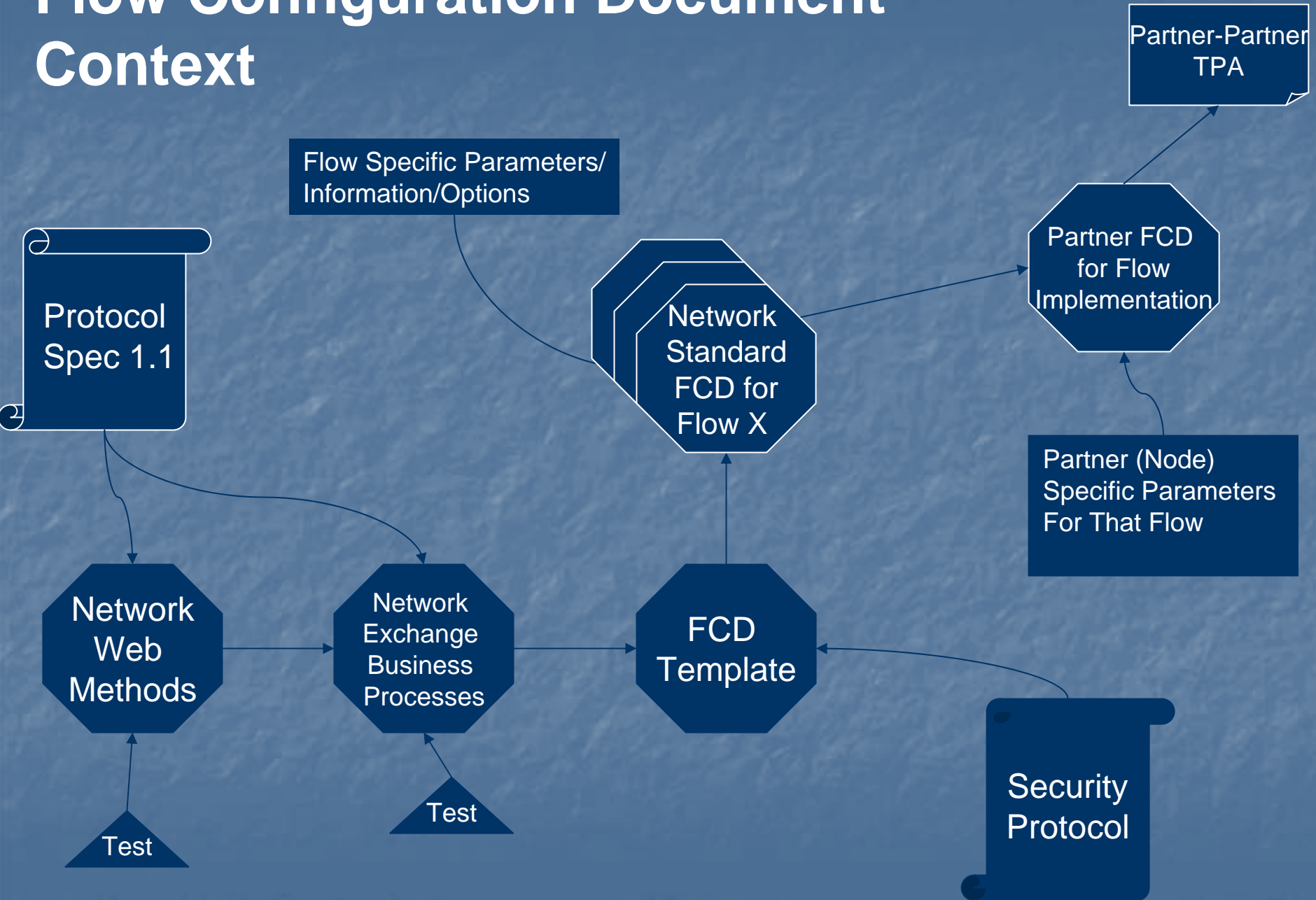
Flow Deployment: Requirements and Resources Available

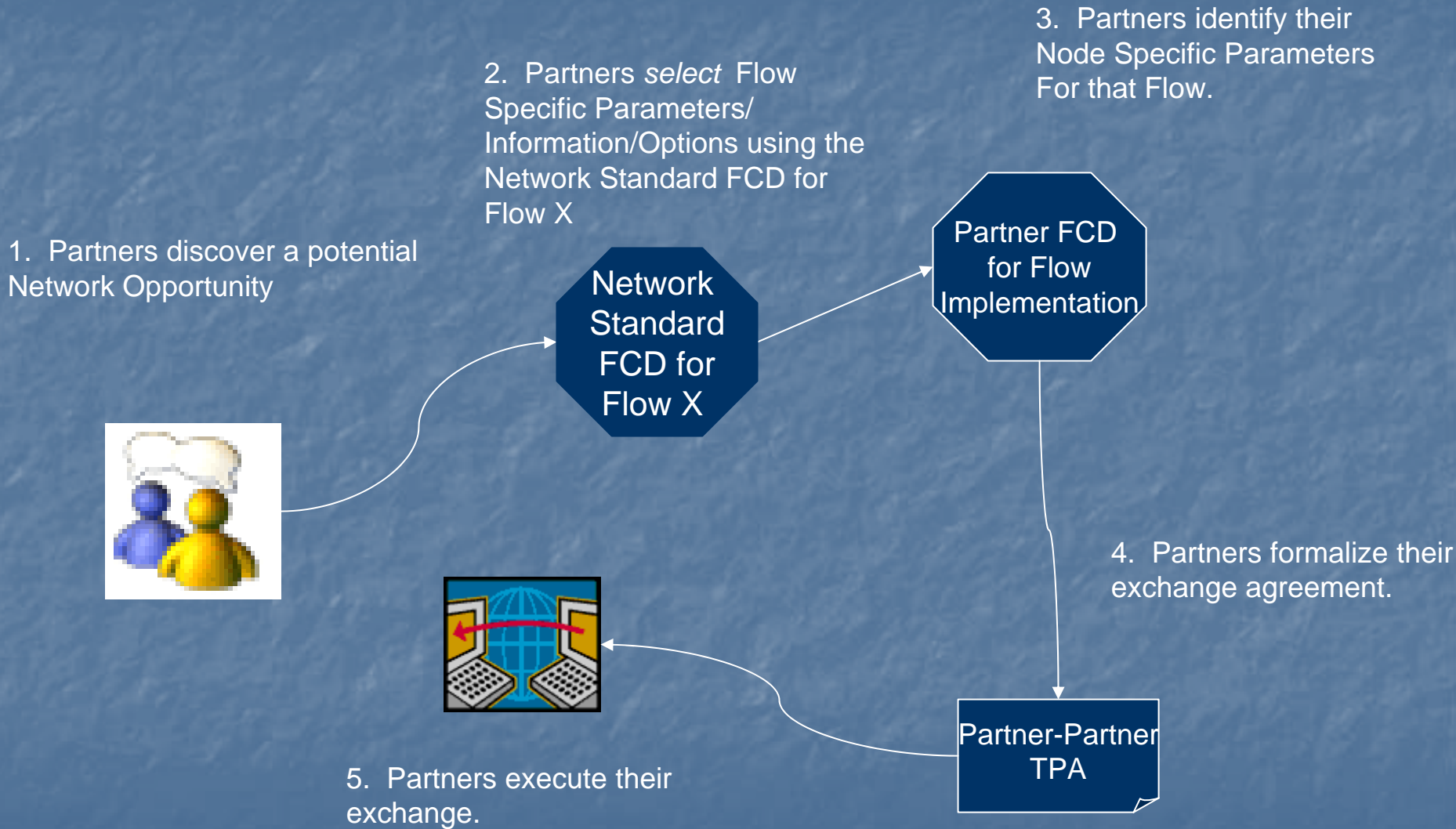| Deployment Stage	Requirements	Resources Available
1. System development Partner is building an information system for the flow.	➢ System development documented	➢ State experiences ➢ Flow pioneers
2. Planning Partner is planning Flow deployment. This includes identifying datasets that will flow over the Network and planning for resources to map Schema to databases.	➢ Flow deployment scheduled (internal)	➢ State experiences
3. Development Partner is in process of linking from Node to source system, mapping to target Schema, and establishing business rules and workflow for the relevant transactions.	➢ Draft Partner FCD for Flow X completed ➢ Backend databases to Schema mapped	➢ Flow Configuration Document Template or Flow Configuration Document for Flow X
4. Testing/Debugging Partners are performing Node-to-Node and end-to-end testing of the flow.	➢ Flow Node-to-Node test suite successful processed ➢ Flow end-to-end test suite (i.e., from source system, through Nodes/client, to destination system, with exchange acknowledgement) successfully processed ➢ Query/Solicit (Data Requests) successfully tested	➢ Flow Start Up Guide (when available) ➢ Revised deployment schedule ➢ Flow Configuration Document (FCD) for Flow X ➢ Test Tool
5. Ready to Flow X The Flow has passed all testing and is ready to exchange data over the Network.	➢ Final Partner FCD for Flow X completed ➢ Final deployment scheduled	➢ N/A

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Status of Current Flows

XML Schema	Status	Type	EPA Can Receive into Systems
Beach (3 flows)	Complete	State/EPA	Yes
FRS	Complete	State/EPA Voluntary	Yes
NEI	Complete	State/EPA Regulatory	Yes
eDMR	Complete	Industry to State	N/A
RCRAInfo - EPA 3 modules	In Progress	State/EPA Regulatory	No
RCRAInfo - Pilot Project All modules	In Progress	State/EPA Regulatory	No
Manifest	In Progress	State to State	N/A
Institutional Controls	In Progress	State/EPA Voluntary	No
SDWIS	Close	State(SDWIS) to EPA regulatory	No
PCS/IDEF	Complete	State/EPA Regulatory	Yes - not simple
AQS	In Progress	State/EPA Regulatory	No
STORET	Not Started	State/EPA Regulatory	No
TRI	Not Started	EPA to State	N/A
Surface Water (piece of STORET)	In Progress	State to State	N/A
Drinking Water	Complete	Industry to State	N/A
Laboratory Drinking Water	Coordinating	Labs to State	N/A
AFS	Not Started	State/EPA Regulatory	No

Flow Configuration Document Context

Partner-Partner TPA

Flow Specific Parameters/ Information/Options

Protocol Spec 1.1

Partner FCD for Flow Implementation

Network Standard FCD for Flow X

Partner (Node) Specific Parameters For That Flow

Network Web Methods

Network Exchange Business Processes

FCD Template

Security Protocol

Test

Test

Vision for Standard Network Flow Implementation

3. Partners identify their Node Specific Parameters For that Flow.

2. Partners *select* Flow Specific Parameters/ Information/Options using the Network Standard FCD for Flow X

1. Partners discover a potential Network Opportunity

Partner FCD for Flow Implementation

Network Standard FCD for Flow X

4. Partners formalize their exchange agreement.

Partner-Partner TPA

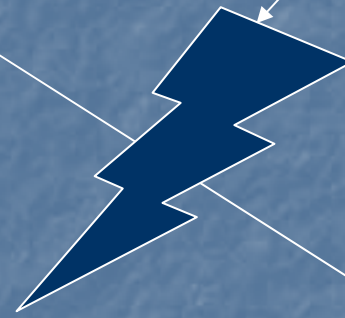5. Partners execute their exchange.

Using the FCD for Network Flow Design

1. Flow group meets to *determine* Flow Specific Parameters/ Information/Options and fills out the FCD Template

2. Flow group discussed how to improve the data Flow by leveraging the Network.

FCD Template

Network Standard FCD for Flow X

Identify other issues
- Message Schema
- Timing
- Query/Solicit Documentation
- Flow Business Process Coordination
- Generic Process/Error Messages

The Flow Configuration Document

The Flow Configuration Document (FCD) Template identifies the universe of information Network Partners should consider when documenting and implementing a *Flow* or a *Common Data Service*. A Flow Configuration Document may include, by reference, information from many other documents (schema, system code lists, or procedures).

Some Definitions: Flows and Common Data Services

Flow - a documented grouping of related data, their defined format, and the requests and responses.

Common Data Services - Network Queries or Solicits that either complement Flows or are used by Network Partners to publish information.

In general, Flows are multi-step processes while common data services are a simple request-response.

Parts of a FCD

1. **Network Exchange**

2. **Node Specific Flow Implementation Sheet Template**

3. **Generic Diagnostics/Feedback for the Entire Exchange**

FCD
1.Network Exchange

1.1.   Common Data Services (One set of information for every data service)

1.1.1.   Data Service Type

1.1.2.   Data Service Parameters, Order, and Format

1.1.3.   Return Method (If Solicit)

1.1.4.   Payload Format (Schema)

1.1.5.   Data Service Timing/Initiation

1.1.6.   Naming Convention

1.1.7.   Security

1.1.8.   Data Service Management and Workflow

1.2. Flow (One set of information for every Flow)

1.2.1.   Flow Network Exchange Business Process Options (an entry for every occurrence for an NEBP supported for this Flow)

1.2.2.   Payload

1.2.3.   Flow Timing/Initiation

1.2.4.   Naming Convention

1.2.5.   Security

1.2.6.   Flow Management and Workflow

FCD
2. Node Specific Flow Implementation Sheet Template

2.1. Node Specific Payload Information

2.2. Exchange Technical Contact

2.3. Exchange Payload Contact

FCD
3. Generic Diagnostics/Feedback for the Entire Exchange

Generic feedback and diagnostics on the flow from the Data Requestor to the Data Provider.

Using the FCD to Design a Network Flow

- ➢ **Flow Planning**
  - • Reference work done by IPT's and Other Partners.
  - • Identify common Data Services/Flows you intend to honor/use.
- ➢ **Flow Development**
  - • Identify common phases and tools that already exist that can be used for Data Services/Flows identified in the planning stage.
    - o e.g. CDX_DOTNET_REQUESTOR.DLL
  - • Identify common products/resources that Flow Pioneers have used to get data ready for Flows
    - o e.g. MI's eDMR-to-IDEF converter stylesheet.
- ➢ **Flow Design: Testing/Debugging**
  - • Use the FCD Data Service/Flow Management sections to define:
    - o Flow Coordination/Business Rules
    - o Flow Status/Fault Conditions
      - o Flow Status Messaging Model
      - o Roles and Responsibilities
    - o Fault Follow-up Actions (e.g., Data Re-submission Process)
    - o Transactional Processing Information

Michigan DMR Data Exchange With EPA

Bill Geake

Michigan Dept of Information Technology

# NEIEN Tools and Products Used to Build Michigan DMR Flow

- E-DMR Challenge Grant products
  - E-DMR XML Schema
  - E-DMR toolkit
  - E-DMR-IDEF converter
- NEIEN Products and Resources
  - Network Helpdesk
  - CSC Staff
  - FCD
  - TPA
  - CSC Node Test Tool
  - DOTNET_REQUESTOR_CLIENT
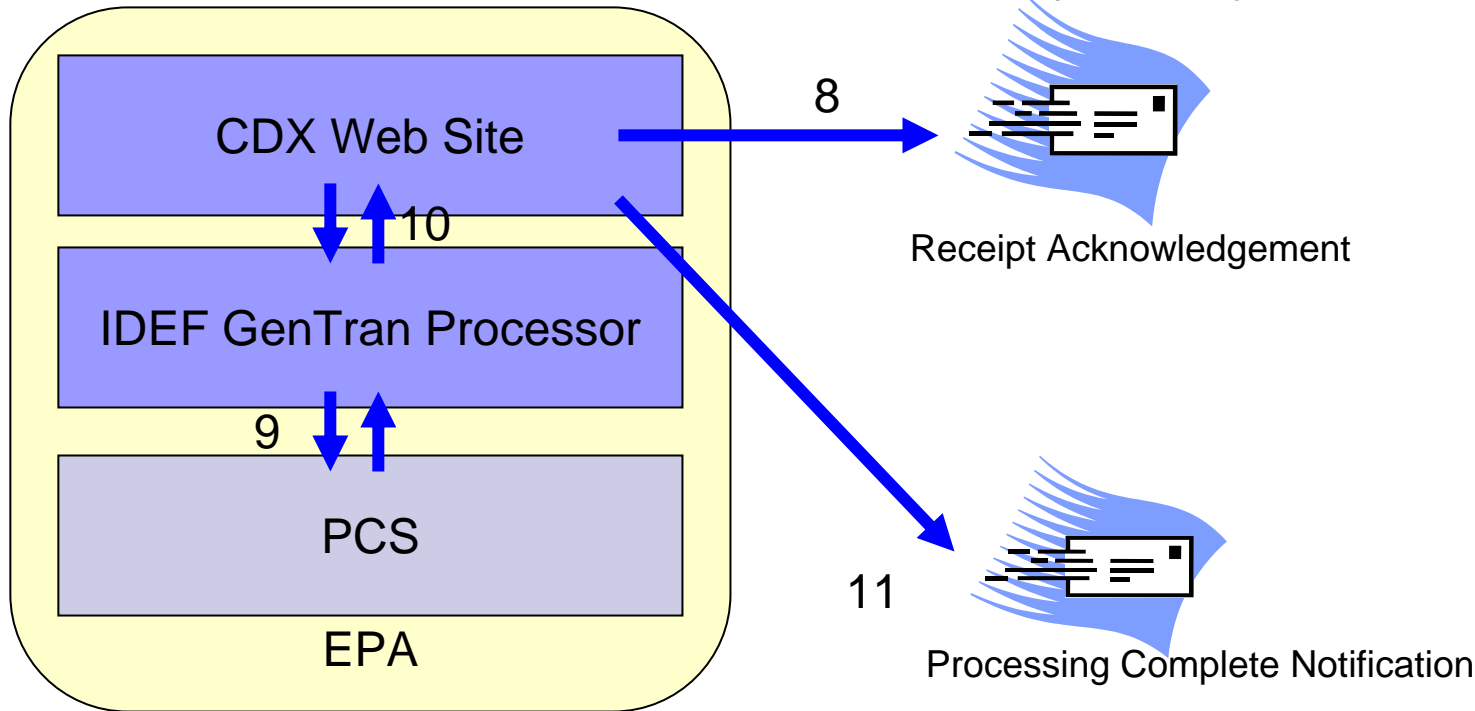- EPA Resources
  - PCS Team

Process Overview
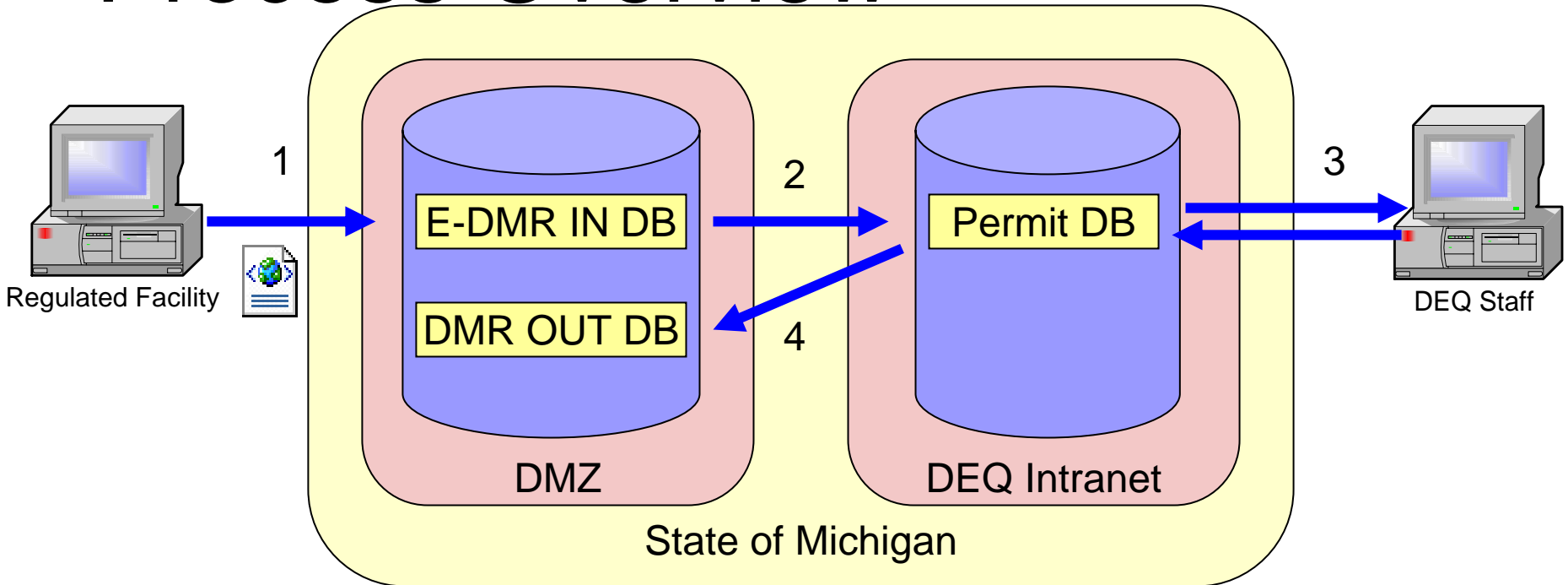
1. Permitted Facilities submit e-DMR to DEQ e-DMR database

2. E-DMRs are copied to internal DEQ Permit Database

3. DEQ staff add data from paper DMRs

4. DMR Data copied to different web-accessible database

Process Overview (cont'd)
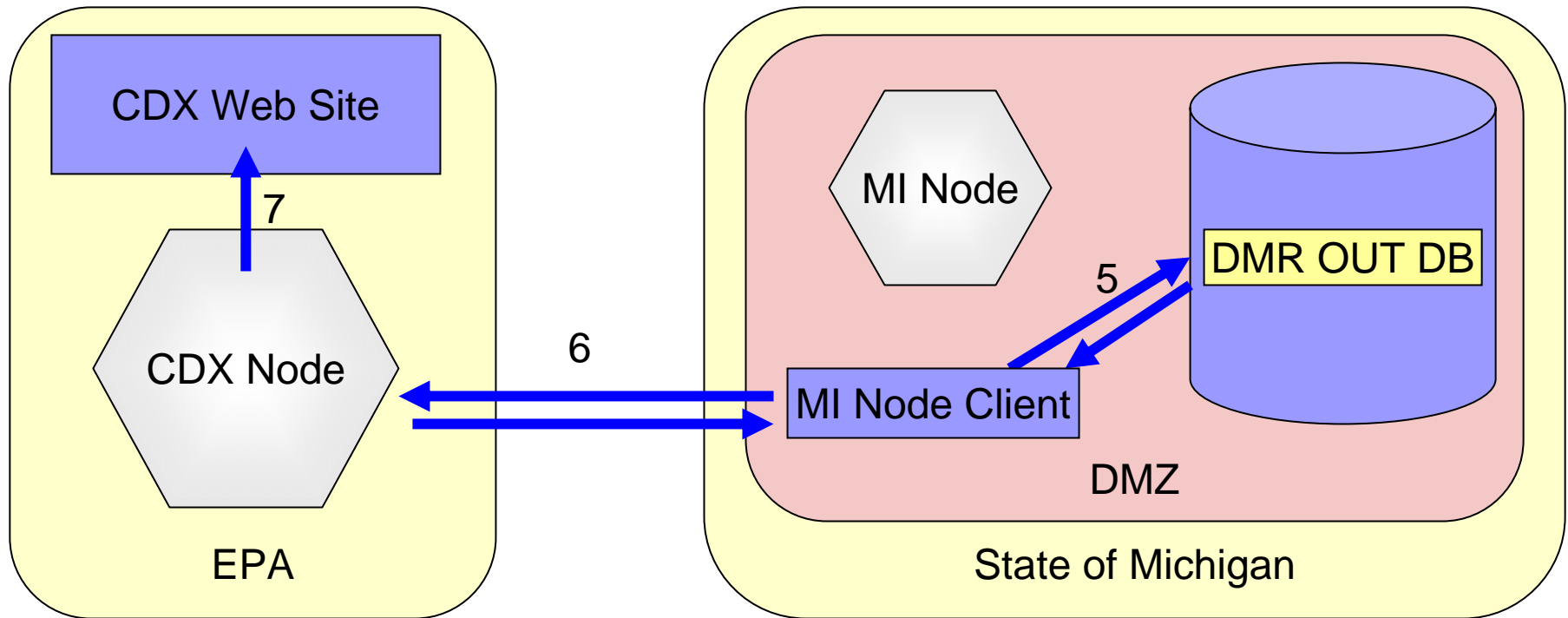
5. Node Client executes Task of retrieving and preparing data for CDX

6. Node Client submits prepared data to CDX Node

7. CDX Node passes submission to CDX IDEF Processing

Process Overview (cont'd)

Receipt Acknowledgement

Processing Complete Notification

EPA box contains: CDX Web Site → (8) ↓↑ 10 → IDEF GenTran Processor → 9 ↓↑ → PCS

8. Legacy CDX sends Receipt Acknowledgement e-mail to account holder

9. Submission is Queued for IDEF Processing and submitted to PCS

10. PCS sends Update Audit Report to CDX InBox of account holder

11. Legacy CDX sends an Report Available e-mail to account holder

Process Overview (cont'd)
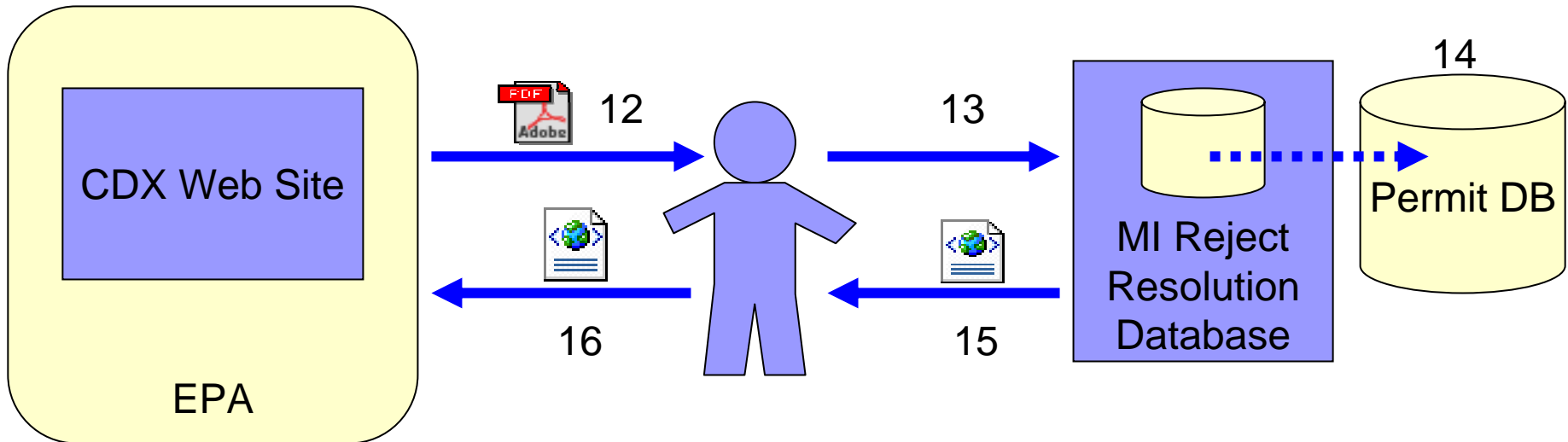
12. User Retrieves Update Audit PDF from CDX Web site

13. User analyzes rejected data, enters resolved data into Reject Resolution Database

14. Certain corrections fix discrepancies in main DEQ Permitting database

15. Reject Resolution Database creates IDEF File

16. User submits resolved DMR data (in IDEF format) to CDX Web Site

Project Tasks

- Prepare Michigan Permit/DMR Database
- Create Utility to Prepare IDEF-compatible submission files from State database
- Test and refine submissions using CDX Test web site
- Prepare and Test State Node
- Create a "Reject Resolution" Utility
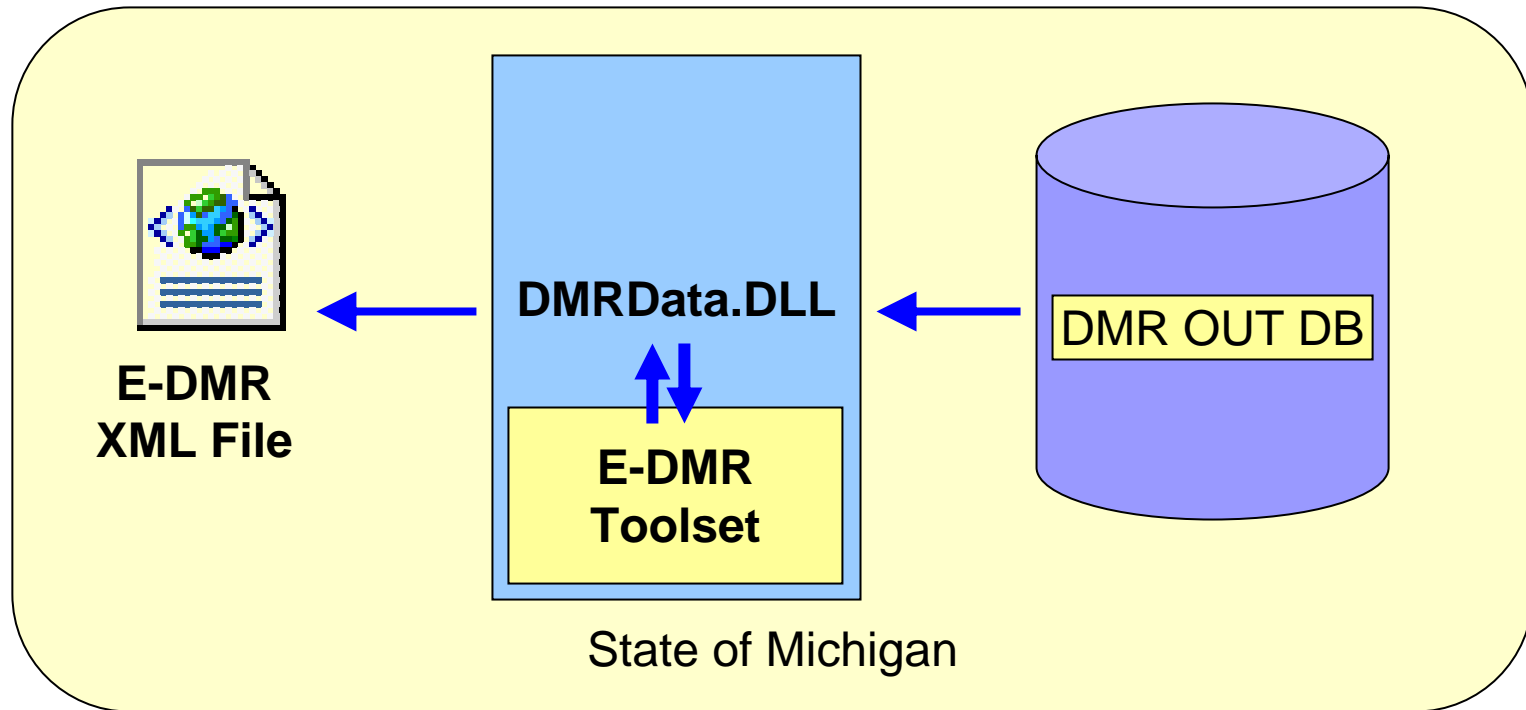- Implementation and FCD for Flow

Prepare State Permit Database

- Permit Limits module in DEQ database
- Add "submission status" flags in DEQ database for DMR data
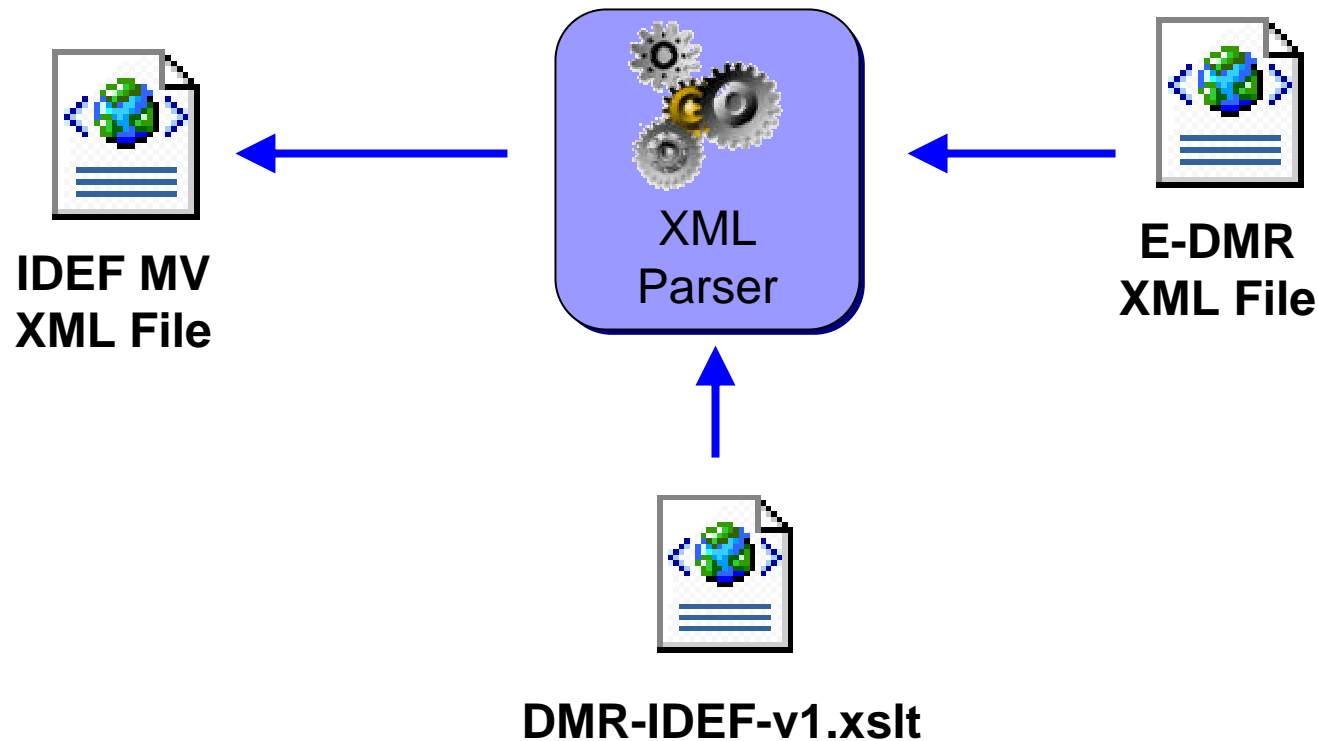
   Each DMR is flagged as either:
   - Unsubmitted (U)
   - Ready to Submit (R)
   - Submitted (S)
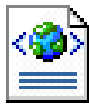
Create e-DMR XML file from State Database (cont'd)

E-DMR XML File

DMRData.DLL

E-DMR Toolset

DMR OUT DB

State of Michigan

Convert e-DMR to IDEF format

IDEF MV XML File

XML Parser

E-DMR XML File

DMR-IDEF-v1.xslt

Convert e-DMR to IDEF format

(Stylesheet Element Mapping)

1 E-DMR <MonitoringData> Block = 1 IDEF MV <Measurement_Violation_Data> Block

E-DMR Schema   **IDEF MV DTD**

Report/ReportIdentification/PermitNumber	<Environmental_Information_System_Identification_Number>
LocationGroupIdentification/StateMonitoringGroupID	<Discharge_Number>
LocationGroupIdentification/IDEFReportDesignator	<Report_Designator>
Report/ReportIdentification/ReportEndDate	<Monitoring_Period_End_Date>
ParameterIdentification/PCSLocationCode	<Monitoring_Location_Type_Code>
ParameterIdentification/ParameterCode	<Parameter_Code>
ParameterIdentification/ReasonNotReportedCode	<No_Data_Indicator_Code>
Report/ReportIdentification/AcceptedDate	<Report_Received_Date>
ParameterIdentification/PermitSampleFrequency	<Frequency_of_Analysis_Code>
ExcursionforSummaryResult/TotalExcursion	<Reported_Number_of_Excursions>
ParameterIdentification/PermitSampleType	<Sample_Type_Code>
SummaryResult/PCAmountIdentifier	<Value_Type>
SummaryResult/MeasurementValue	<Value>
SummaryResult/MeasurementUnit	<Unit_Code>

How IDEF MV XML Maps to Paper DMR

Michigan Department of Environmental Quality Monthly Discharge Monitoring Report (DMR)

PERMITTEE NAME:
MAILING ADDRESS:

PERMIT NUMBER:
MONITORING
POINT:

DISTRICT: Lansing

COUNTY: Ingham

FACILITY:
LOCATION:

Monitoring Period : 2003-05-

NO DISCHARGE FROM SITE: ( )

Parameter			Units				nits	No. Ex.	Frequency of Analysis	Sample Type
Flow PARAM CO Mon. S Stage	ample asurement nt Requirement			MGD						
Total Residu Chlorine PARAM CODE: 50060 Mon. Site C: 011A Stage C: 1	Sample Measurement						mg/l			
	Permit Requirement	*****	*****	*****	*****	*****	0.038 Maximum Daily		Daily	Grab
Total PARO CODE: 01051 Mon. ite No.: 011A te Code: 1	Sample Measurement	*****	*****		*****	*****	ug/l			
	Permit Requirement	*****	*****	*****	*****	*****	(report) Maximum Daily		Monthly	Grab

```
<Measurement_Violation_Data>
<Transaction_Header>
  <Environmental_Information_System_Identification_Number>
  </Environmental_Information_System_Identification_Number>
  <Edit_Type> Edit_Type>
  <Transaction_Type> ransaction_Type>
</Transaction_Header>
<Limit_Requirement_Identifier>
  <Discharge_Nu       scharge_Number>
  <Report_Design     ort_Designator>
</Limit_Requirement_Identifier>
<Measurement_Violation_Detail>
 <Measurement>
  <Monitoring_Period_End_Da     Monitoring_Period_End_Date>
  <Monitoring_Location     Co   onitoring_Location_Type_Code>
  <Parameter_C         r_Code>
  <Frequency_of_A         uency_of_Analysis_Code>
  <Reported_Number_of_Excursi    eported_Number_of_Excursions>
  <Sample_Type_C        ample_Type_Code>
 </Measurement>
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</Limit_Measurement_Value>
</Measurement_Violation_Detail>
</Measurement_Violation_Data>
```
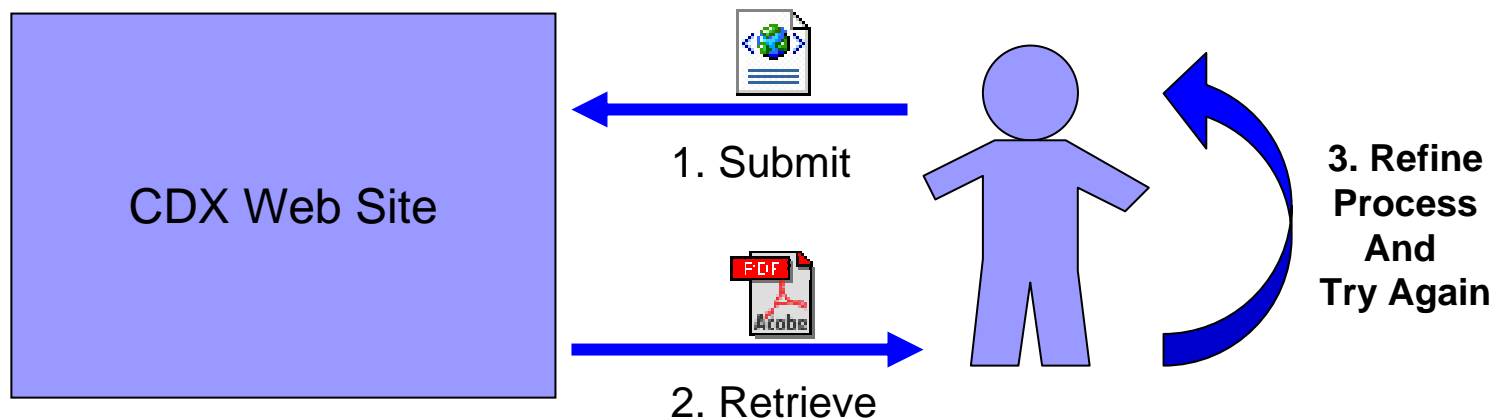
Test and refine IDEF submissions using CDX Test web site

1. Use Node Client operations to generate submission file
2. Manually upload to CDX, wait for processing…
3. Download Update Audit Report and evaluate
4. Refine stylesheet and/or application logic
5. Repeat

CDX Web Site

1. Submit

2. Retrieve

3. Refine Process And Try Again

Prepare and Test State Node and Node Client

- Node
  - Does it respond to all the methods correctly?
  - What Data Services will it support?
  - Needs to be public-facing to use CSC Test Tool 1.1
- Node Client
  - System Architecture considerations
  - Auditing and logging features
  - Performance testing

Implementation and FCD for MI-EPA DMR Data Flow

- Document the details of the flow (what you have seen in this presentation) into one document – the FCD
- Include technical details of flow execution
- Document fail conditions and recovery
- Critical Control points and auditing

Participant Input: Perceived Hurdles to Flow Implementation

What do you perceive as your biggest hurdles/roadblocks in planning/implementing a flow?

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-
-
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-

Participant Input: Additional Guidance

What additional guidance/resources do you think would help you overcome these hurdles and implement a flow?

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-
-

Network Knowledge Call #3 Proposed Call Date/Time

- Tuesday January 13th, 2004
- 2pm EST
- Potential Agenda Topics
  - Security
  - Node Mentoring Face to Face Meeting
  - NFC Final Documentation Presentation
  - Potential Client Topics