

# Node Mentoring Workshop “Sharing What We Node”

## CDX Test to Production Flow Steps

New Orleans, Louisiana  
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**ciber**

MISSISSIPPI

Department of Environmental Quality

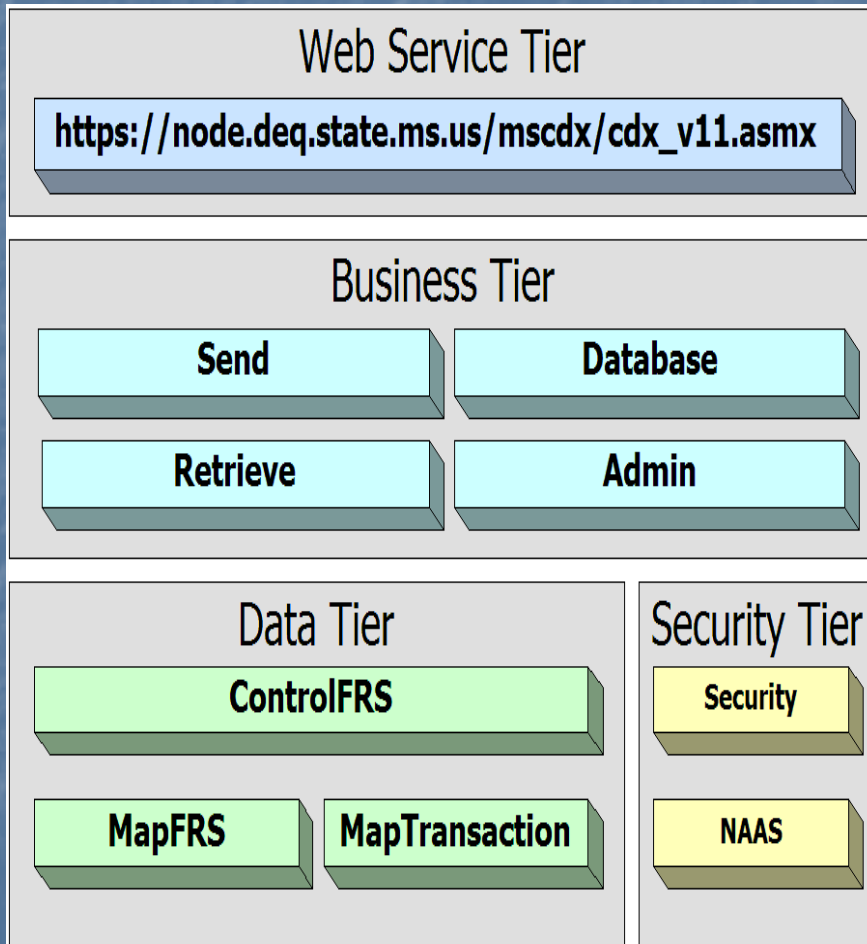


Environmental Information  
**exchange**  
Network

# Introduction

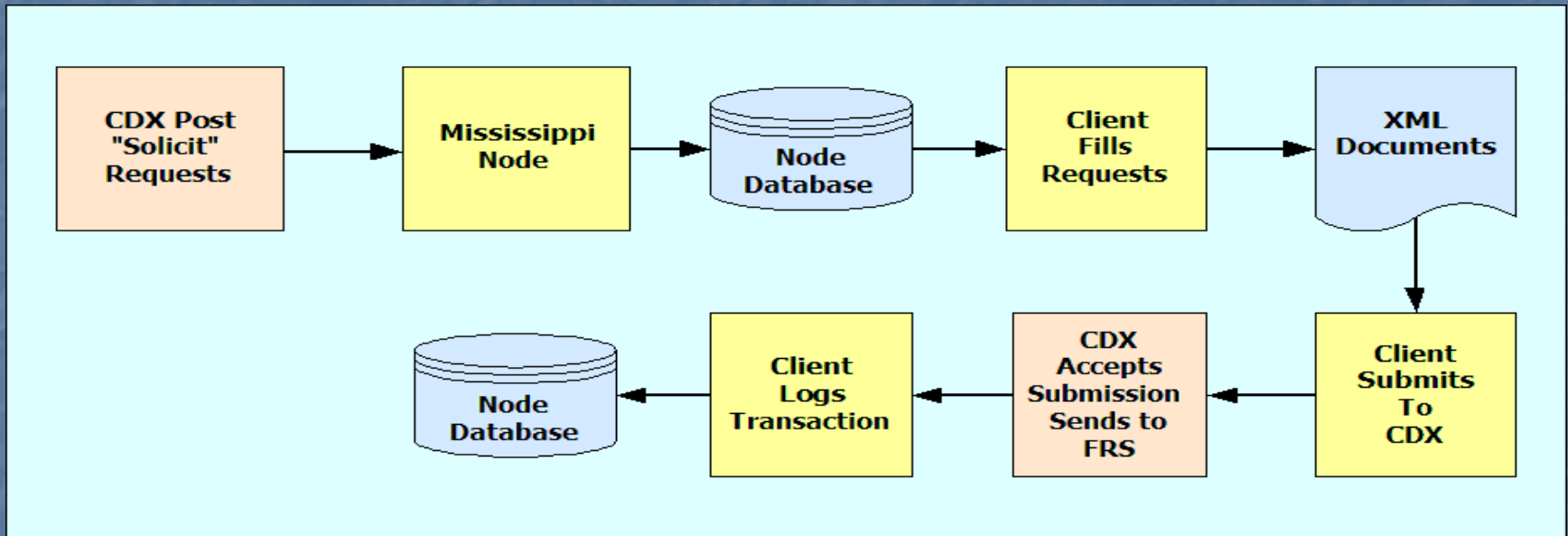
- Melanie Morris, Project Manager, MDEQ
- Brian Shows, Node Administrator, MDEQ
- Harry Boswell, Database Administrator, MDEQ
- Tony Pruitt, Architect / Developer, CIBER
- Max Kuznetsov, Developer, CIBER

# Application Architecture



- Web Service Tier Component Exposes Web Methods to Internet
- Business Tier Components Perform Business Logic
- Data Tier Components Map Relational Database to XML Data Objects
- Security Component Utilizes NAAS to Manage Secure Access

# Asynchronous Data Flow



- Solicit Request Posted to Node by CDX
- Asynchronous Client Executed by System Timer
- Client Fills All Request - Creates XML Documents
- Client Sends All Payloads – DIME Attachments
- Client Logs Transaction to Node Database

# Mapping enSite Data

```
<?xml version="1.0" encoding="utf-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="2.1">
<xsd:include schemaLocation=".IFACID_EnvironmentalInterestDataType_v2.1.xsd" />
<xsd:annotation>
  <xsd:documentation>
    Environmental Interest schema for Data transfer.
    Date format is YYYY-MM-DD.
  </xsd:documentation>
</xsd:annotation>
<xsd:complexType name="EnvironmentalInterestDetails" >
<xsd:sequence>
<xsd:element name="EnvironmentalInterest" type="EnvironmentalInterestDataType" />
<xsd:element name="DataSourceName" type="xsd:string" minOccurs="0">
<xsd:element name="LastReportedDate" type="xsd:date" minOccurs="0">
<xsd:element name="stateFacilitySystemAcronymName" type="xsd:string"/>
<xsd:element name="stateFacilityIdentifier" type="xsd:string"/>
</xsd:sequence>
</xsd:complexType>
</xsd:schema>
```

- Production Database Replicated Nightly
- Data Elements Mapped to Oracle Views
- View Definitions Based on FRS XML Schemas
- MapFRS Class Queries Database using .NET Data Provider for Oracle
- ADO Dataset Object Contains Multiple Record Sets

# FRS Data Classes

```
namespace NodeControlFRS {
    using System.Xml.Serialization;

    [System.Xml.Serialization.XmlRootAttribute(Namespace="us.ms.state.deq.node",
        IsNullable=false)]
    public class EnvironmentalInterestList {

        [System.Xml.Serialization.XmlElementAttribute("EnvironmentalInterestDetails")]
        public EnvironmentalInterestDetails[] EnvironmentalInterestDetails;
    }

    [System.Xml.Serialization.XmlRootAttribute(Namespace="us.ms.state.deq.node",
        IsNullable=false)]
    public class EnvironmentalInterestDetails {

        public EnvironmentalInterestDataType EnvironmentalInterest;
        public string DataSourceName;
        [System.Xml.Serialization.XmlElementAttribute(DataType="date")]
        public System.DateTime LastReportedDate;
        [System.Xml.Serialization.XmlIgnoreAttribute()]
        public bool LastReportedDateSpecified;
        [System.Xml.Serialization.XmlElementAttribute("stateFacilitySystemAcronymName")]
        public string StateFacilitySystemAcronymName;
        [System.Xml.Serialization.XmlElementAttribute("stateFacilityIdentifier")]
        public string StateFacilityIdentifier;
    }
}
```

- .NET XSD Tool  
Creates FRS Data  
Classes Based on FRS  
Schemas
- Data Classes  
Represent the  
Hierarchical Structure  
of the XML Schema
- ControlFRS Class  
Maps ADO Dataset to  
FRS Data Classes

# XML Serialization

```
<?xml version="1.0" encoding="utf-8" ?>
- <EnvironmentalInterestList xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns: xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:SchemaLocation="http://www.epa.gov/enviro/html/frs_demo/presentations/
version2.1/FACID_EnvironmentalInterestList_v2.1.xsd"
xmlns="us.ms.state.deq.node">
- <EnvironmentalInterestDetails>
- <EnvironmentalInterest>
  <InformationSystemAcronymName> ENSITE </InformationSystemAcronymName>
  <InformationSystemIdentifier> MSR102095 </InformationSystemIdentifier>
  <EnvironmentalInterestTypeText> NPDES STORMWATER PERMIT </
EnvironmentalInterestTypeText>
  <FederalStateInterestIndicator> F </FederalStateInterestIndicator>
  <EnvironmentalInterestStartDate> 2002-01-24 </EnvironmentalInterestStartDate>
  <InterestStartDateQualifierText> PERMIT ISSUE DATE </
InterestStartDateQualifierText>
  <EnvironmentalInterestEndDate> 2005-03-27 </EnvironmentalInterestEndDate>
  <InterestEndDateQualifierText> PERMIT EXPIRATION DATE </
InterestEndDateQualifierText>
</EnvironmentalInterest>
  <DataSourceName> MS State Master FILE </DataSourceName>
  <LastReportedDate> 2004-01-31 </LastReportedDate>
  <stateFacilitySystemAcronymName> ENSITE </stateFacilitySystemAcronymName>
  <stateFacilityIdentifier> 9999 </stateFacilityIdentifier>
</EnvironmentalInterestDetails>
</EnvironmentalInterestList>
```

- .NET XML Serialization Component Transforms Data Classes into XML Documents
- Serialization Directives Controls Transformation Rules
- Elements can be Excluded at Runtime Based on Business / Data Rules
- XML Documents can be De-serialized Back into Data Classes

# Component / Unit Testing

- Web Service, Business Tier, and Data Tier Components Developed Independently
- Each Component Project includes a Console Application for Unit Testing
- Test Application Executes Test Cases
- Visual Studio .NET Provides Very Robust Debugger

# Web Service Testing with .NET

- .NET Web Services Optionally Creates a HTML Form for each Web Method
- Option Not Supported for Complex Methods (Arrays, Objects, Etc.)
- Test Web Service Created to Test Complex Methods (Notify, Query, Submit, Etc.)
- Test Web Methods Added for Test Cases such as Database Connection, Authentication, Transaction Log

# CDX Node Test Tools

- CDX Test Web Sites Validates Node Conforms to Exchange Network Protocol
- Must Be Used to Test DIME Attachment Compatibility Between .NET & CDX (JAVA)
- SOAP Filter Alters .NET SOAP Message to be Compatible with CDX
- CDX Test Tool displays SOAP Request and Response Message

# Asynchronous Client Testing

- Multiple Mode Options Allows Specific Testing (Fill Only, Send Only, Unsolicited)
- Test Database Query and Serialization
- Test Quality of FRS Data
- Verifies XML Documents are Well-Formed
- Test DIME Attachment and Soap Filtering
- Test Node Transaction Services

# Final Acceptance

- Facility Site and Environmental Interest Data Must Meet FRS Data Quality Tests
- Recommend Compressing Large Payload Submissions
- ZIP Payloads Document Type = XML
- Administrator Account Setup for Node
- Administrator Creates User Account
- CDX Grants Privileges to User Account
- User Account Must Be Lowercase
- First Production Submission on February 6, 2004

# Contacts

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