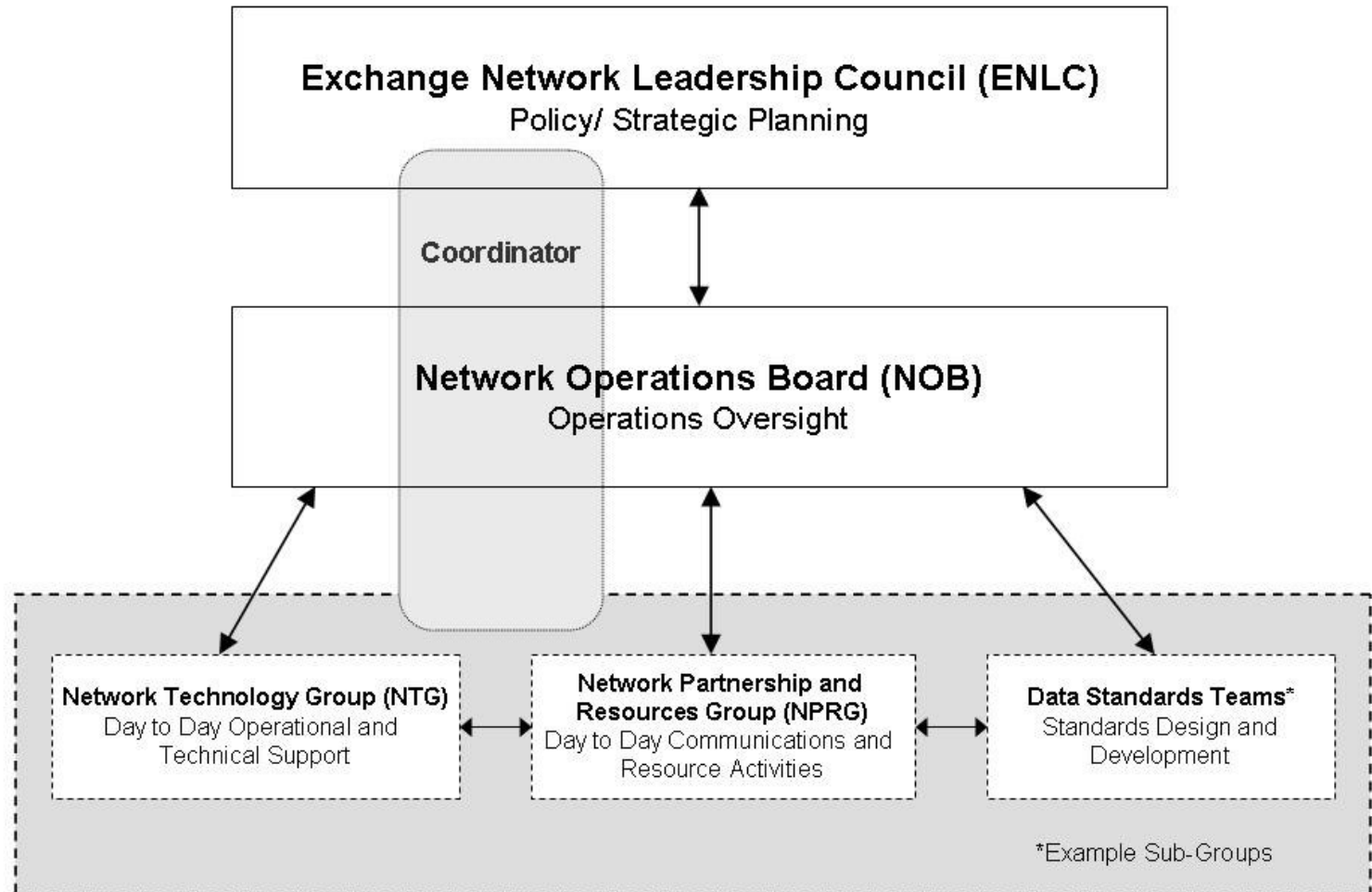
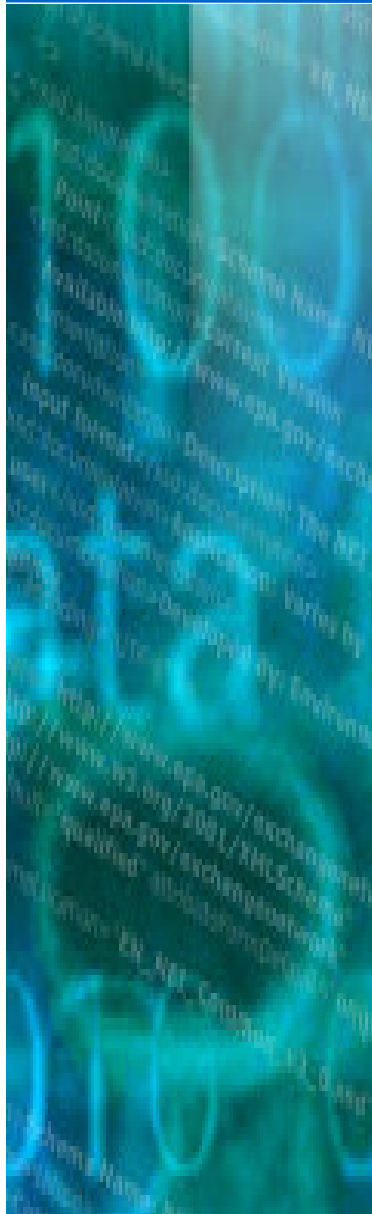


Network Technology Group Open Call

Updates for Schema Designers

May 18, 2006

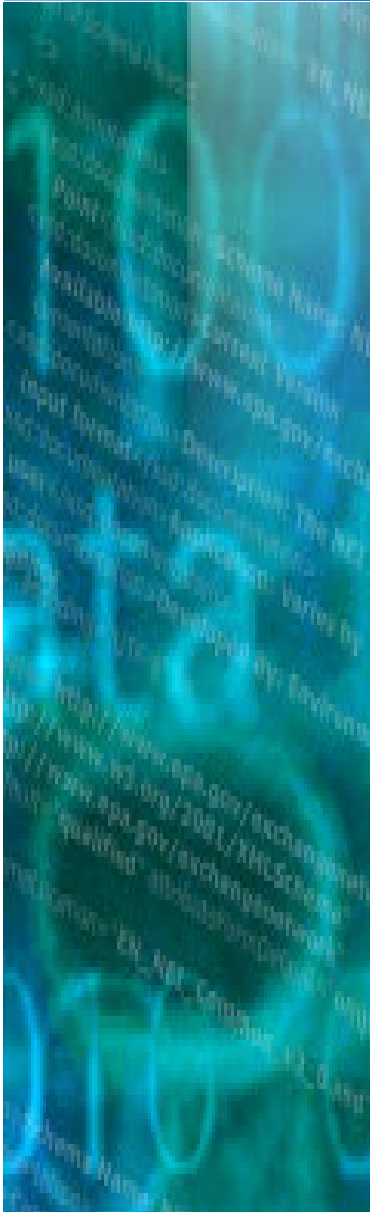
Exchange Network Governance



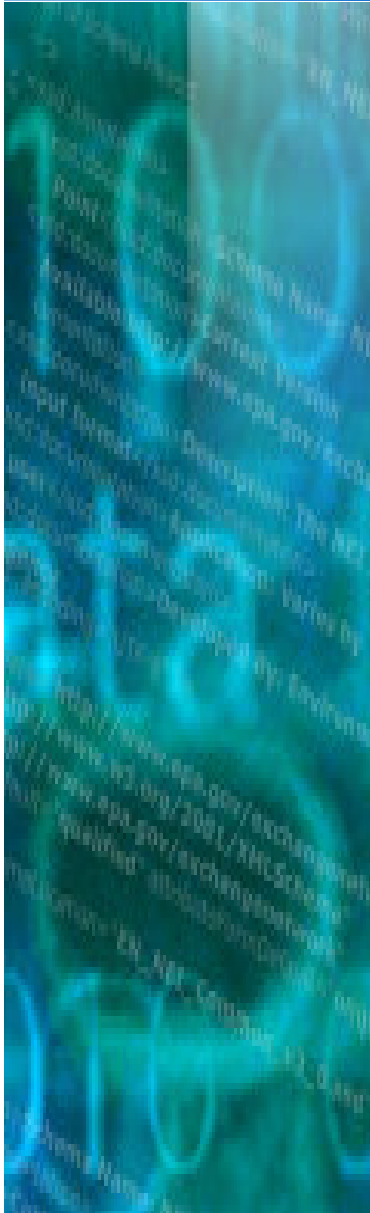
NTG Responsibilities

“We Are Building One Network”

- To support the open standards and interoperability at the heart of the Exchange Network the NTG:
 - Oversees technical operation of the Network
 - Example: Network Security and NAAS
 - Provides technical resources
 - Documentation and guidance for developers
 - Shepherds Flow & Schema development
 - Schema conformance review and guidance
 - Evaluates new network technologies
 - Provides technical vision for EN infrastructure

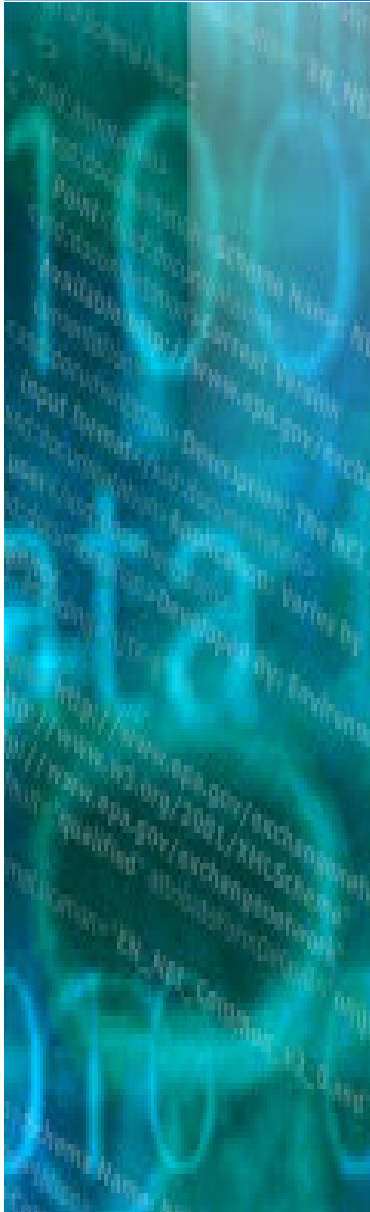


Updates for Schema Designers



- **Introduction**
 - Scott Totten and Connie Dwyer
NTG Co-Chairs
- **Design Rules & Conventions 1.1**
 - Tom Aten
NTG Member
Wisconsin Department Of Natural Resources
 - Bill Rensmith
Windsor Solutions
- **Shared Schema Components 2.0**
 - Matt Markoff
Ross & Associates Environmental Consulting
- **Questions?**

NTG Activities on Schema Design



- **Recent activities**

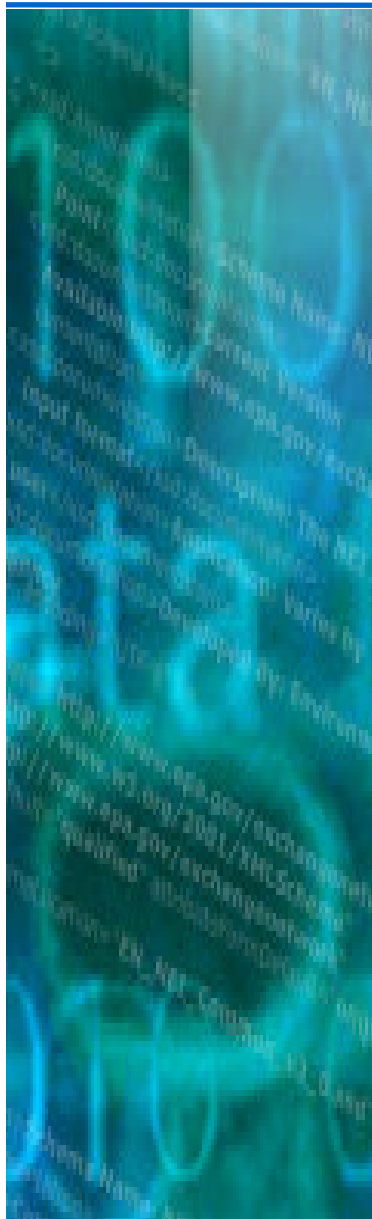
- Design Rules and Conventions (DRC)
- Shared Schema Components (SSC) 2.0
- Update to XML namespace guidance
- Repository update / restructure
- Flow Development Checklist

- **Ongoing Activities**

- Change Management
- Schema Conformance Report Review

- **Future Activities**

- Technical re-review of DRC
- Develop Schematron guidance
- Schema development overview



XML Design Rules & Conventions

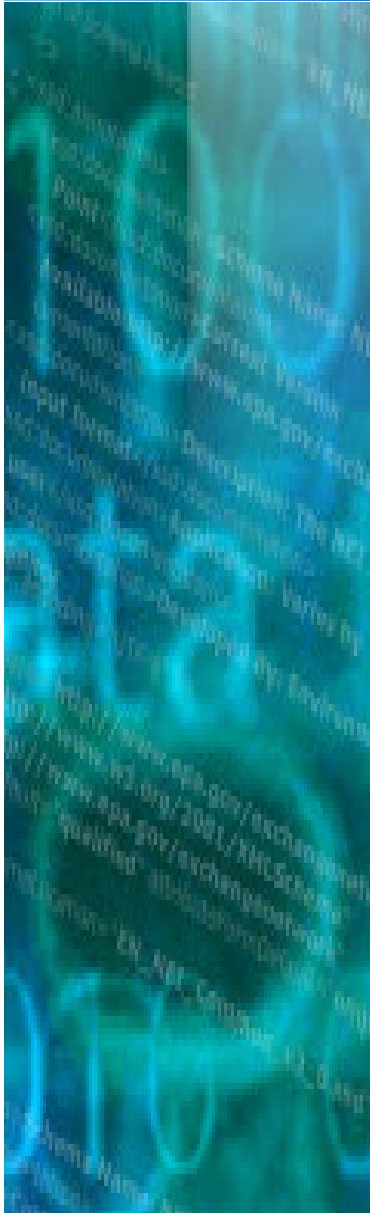
Tom Aten – Wisconsin DNR

Thomas.Aten@dnr.state.wi.us

Bill Rensmith – Windsor Solutions

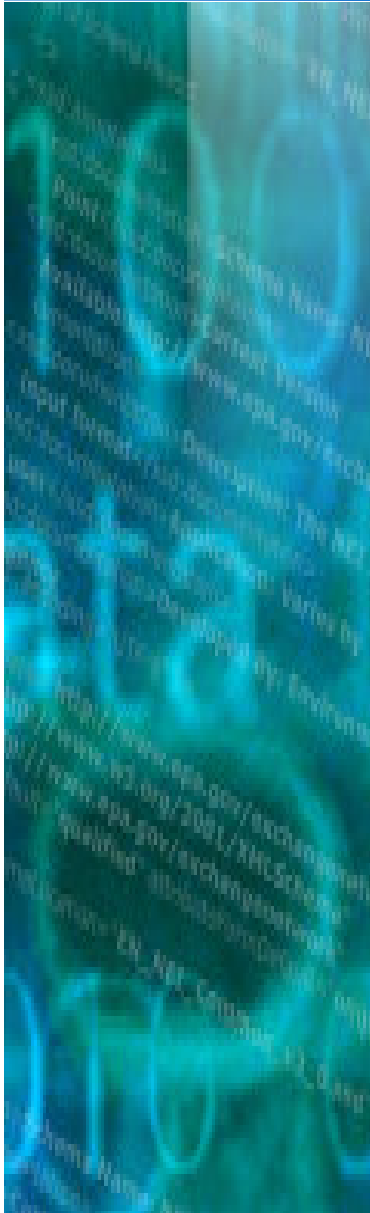
Bill_Rensmith@WindsorSolutions.com

Design Rules & Conventions



- **Background:** In September 2003, the Technical Resources Group published version 1.0 of the Design Rules and Conventions. Why?
 - Network Principles: ...agreed upon...common data exchange standards and protocols...facilitate exchanging data...standardized data exchanged formats...established best practices...private sector.

Design Rules & Conventions



- **General XML Design**
- **File Naming Rules and Guidelines**
- **XML Tag Naming Conventions**
- **Datatypes**
- **Elements and Attributes**
- **Namespaces**
- **Schema Configuration and Documentation**
- **Information Association and Uniqueness**
- **Advanced W3C Schema Concepts**

XML Schema Design Rules and Conventions (DRC v1.1) Update

**XML Design
Rules and Conventions v1.0**
Released Sept 2003



**XML Design
Rules and Conventions v1.1**
Released April 2006

http://www.exchangenetwork.net/dev_schema/

DRC v1.1 Summary

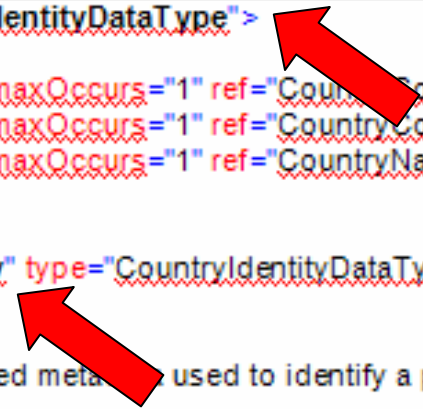
- Definition of EN Schema Types
- File Naming (Section 3.2)
- **Tag Naming (Section 3.3)**
- **Namespaces (Section 3.4)**
- **Schema Versioning (Section 3.6)**
- General Updates (Section 3.1)
- **Shared Schema Components (Section 3.5)**
- EN Header (Section 3.7)

(today's call covers topics in bold face)

Tag Naming Rules and Guidelines

- **[GD3-8]** Within a namespace, all element, attribute, and datatype tag names **MUST** be unique.
- **[GD3-A]** All datatype names **MUST** end with either “Type” or “DataType”.

```
<xsd:complexType name="CountryIdentityDataType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="1" ref="CountryCode"/>
    <xsd:element minOccurs="0" maxOccurs="1" ref="CountryCodeListIdentifier"/>
    <xsd:element minOccurs="0" maxOccurs="1" ref="CountryName"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="CountryIdentity" type="CountryIdentityDataType">
  <xsd:annotation>
    <xsd:documentation>
      A designator and associated metadata used to identify a primary geopolitical unit of the world.
    </xsd:documentation>
  </xsd:annotation>
</xsd:element>
```



Namespaces in EN Schema

- **[SD4-A]** The schema namespace name **MUST** be URL-formatted as:

[http://www.exchangenetwork.net/schema/{category}\[/sub-category\]/Version](http://www.exchangenetwork.net/schema/{category}[/sub-category]/Version)

For example:

<http://www.exchangenetwork.net/schema/AQS/3>

<http://www.exchangenetwork.net/schema/RCRA/Handler/1>

Namespaces...

- **[SD4-B]** ...**MUST** contain a category term which clearly and uniquely defines the type of data being exchanged.
- **[SD4-C]** ...**MAY** contain a subcategory term...
- **[SD4-D]** ...**MUST** contain a major version number ...
- **[SD4-E]** ...**MUST NOT** contain a minor version number ...

Target Namespaces in Schema

- **[SD4-F]** The schema's targetNamespace MUST match the namespace name of one of the declared namespace qualifiers, but not the w3c qualifier.


```
<xsd:schema xmlns:TRI="http://www.exchangenetwork.net/schema/TRI/2"  
            targetNamespace="http://www.exchangenetwork.net/schema/TRI/2"  
            xmlns:xsd="http://www.w3.org/2001/XMLSchema">  
  <!-- information removed for example purposes -->  
</xsd:schema>
```

- This ensures that included schema (such as SSC 2.0 schemas) assume the namespace of the target schema
- Side note: prefixes other than 'xsd' for W3C schema constructs may now be used (i.e. 'xs', 'x' or none)

schemaLocation attribute in XML Instance Documents

- **[SD4-H]** If a schemaLocation is specified in an XML instance document, the location MUST match the namespace URL address.

```
<?xml version="1.0" encoding="UTF-8"?>
<FacilityContact xmlns="http://www.exchangenetwork.net/schema/NPDES/1"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.exchangenetwork.net/schema/NPDES/1
  http://www.exchangenetwork.net/schema/NPDES/1">
  <FirstName>Joe</FirstName>
  <LastName>Smith</LastName>
  <!-- information removed for example purposes -->
</FacilityContact>
```

A red arrow points from the left side of the code block to the `xsi:schemaLocation` attribute in the XML snippet.

- Important implications for how the Exchange Network repository will be structured and how schemas are versioned.
- Too often, instance documents contain local paths in the schemaLocation attribute (i.e. "C:\myschema...") which can cause problems for recipient.

Components of Schema Versioning

1. Namespace Names

- **[SD4-D]** Namespace **MUST** contain major version number only. This ensures that only major revisions get a new namespace.


2. Schema File Names

- **[SD5-22]** Schema files **MUST** contain both major and minor version number. This enables multiple minor versions to coexist in the same directory.

3. Schema Version Attribute

- **[SD5-21]** The built-in version attribute **MUST** be used (major and minor version)

```
<?xml version="1.0" encoding="UTF-8"?>  
<xsd:schema xmlns:NPDES="http://www.exchangenetwork.net/schema/NPDES"  
xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="1.1">  
  <!--information removed for example purposes-->  
</xsd:schema>
```

A red arrow points to the "version="1.1" attribute in the XML schema declaration.

Components of Schema Versioning

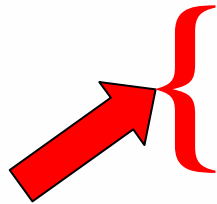
4. Developer Defined *schemaVersion* Attribute

- **[SD5-26]** Data-centric schemas MUST define a required attribute named "schemaVersion" in the root element of all message schema.

Schema

```

<xsd:element name="TRI">
  <xsd:complexType>
    <xsd:complexContent>
      <xsd:extension base="TRI:TRIDataType">
        <xsd:attribute name="schemaVersion" use="required">
          <xsd:simpleType>
            <xsd:restriction base="xsd:decimal">
              <xsd:pattern value="2\.\d*" />
            </xsd:restriction>
          </xsd:simpleType>
        </xsd:attribute>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:element>
  
```



Doc.

```

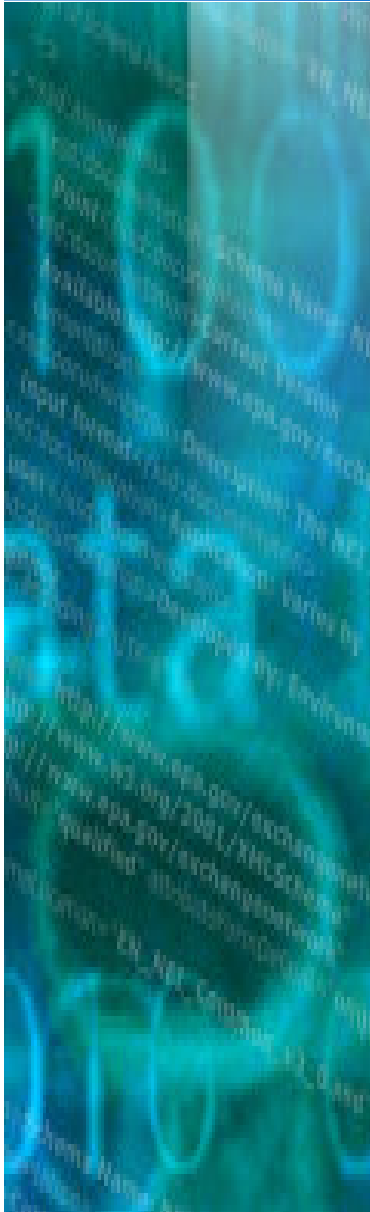
<TRI xmlns="http://www.exchangenetwork.net/schema/TRI/2" xmlns:xsi="ht
schemaVersion="2.1">
  <!-- information removed for example purposes -->
</TRI>
  
```



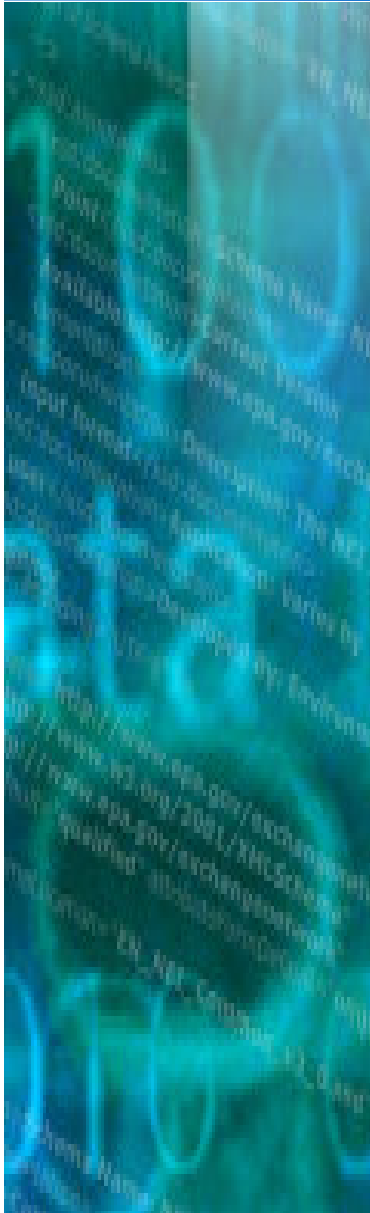
Components of Schema Versioning

IF A SCHEMA CHANGES, THE VERSION MUST ALSO CHANGE

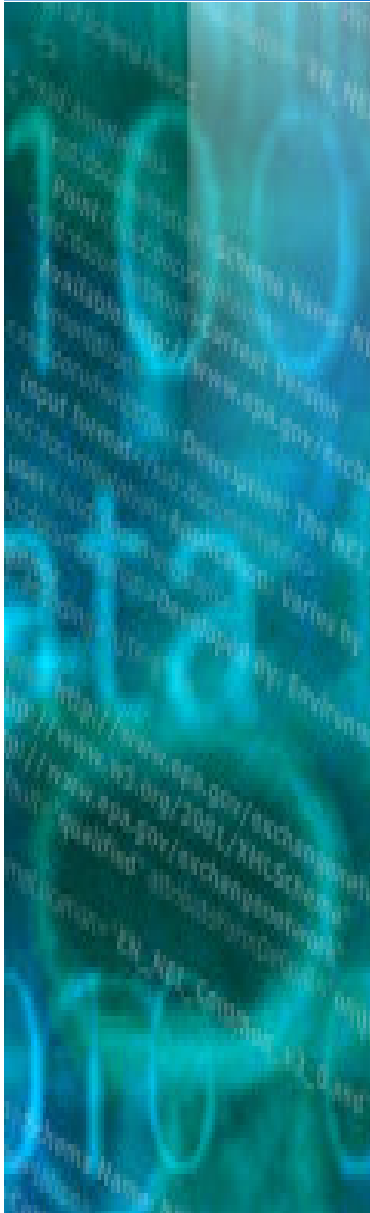
- **[SD5-L]** When any schema construct is altered in a given namespace, all schema in the namespace **MUST** undergo a version increment.
- **[SD5-K]** The schema file name, XSD version attribute, header documentation, and namespace **MUST** all contain matching version information.
- It is good practice to also follow these rules when making changes to draft versions for internal IPT use.



Major vs. Minor Version Changes



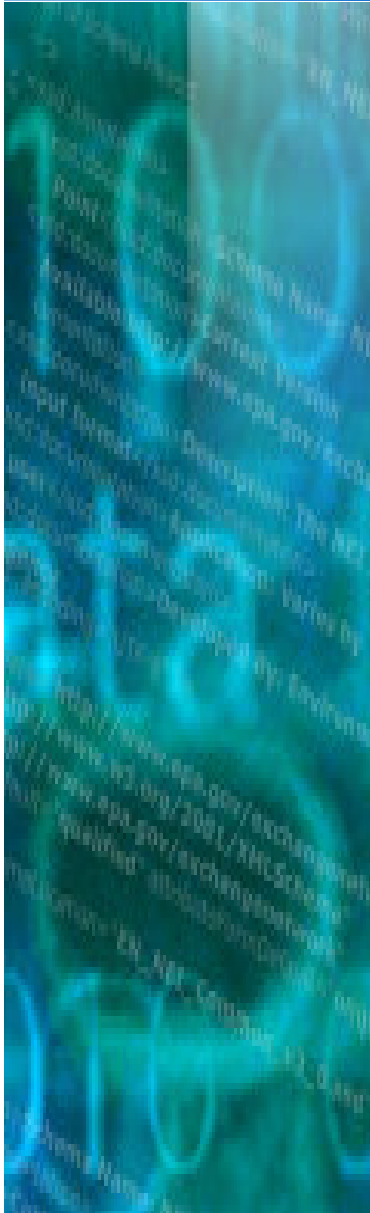
- It is a Minor Version Change if:
 - Only new, optional elements are added
 - Existing required elements may be made optional
 - Restrictions may be loosened, such as eliminating a facet restriction or pattern from an existing element
 - the namespace remains unchanged from previous minor versions
- All other changes are Major version changes
 - i.e. any construct is removed or renamed, or if restrictions are added to existing constructs



Shared Schema Components 2.0

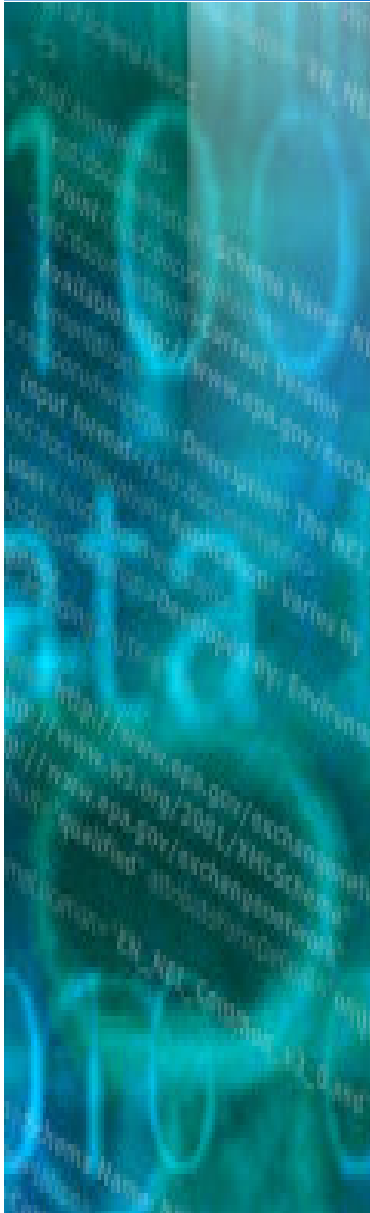
Matt Markoff – Ross & Associates
matt.markoff@ross-assoc.com

Shared Schema Components 2.0



- Shared Schema Components (SSCs) *must* be used in Schema where applicable
 - NOB Decision Memorandum 2005-02
<http://www.exchangenetwork.net/operations/nob/decisions.htm>
 - Design Rules and Conventions v1.1
http://www.exchangenetwork.net/dev_schema/
- SSC 2.0 upgrade makes reuse easier
 - SSCs can be *included* in target namespace rather than *imported* from separate namespace

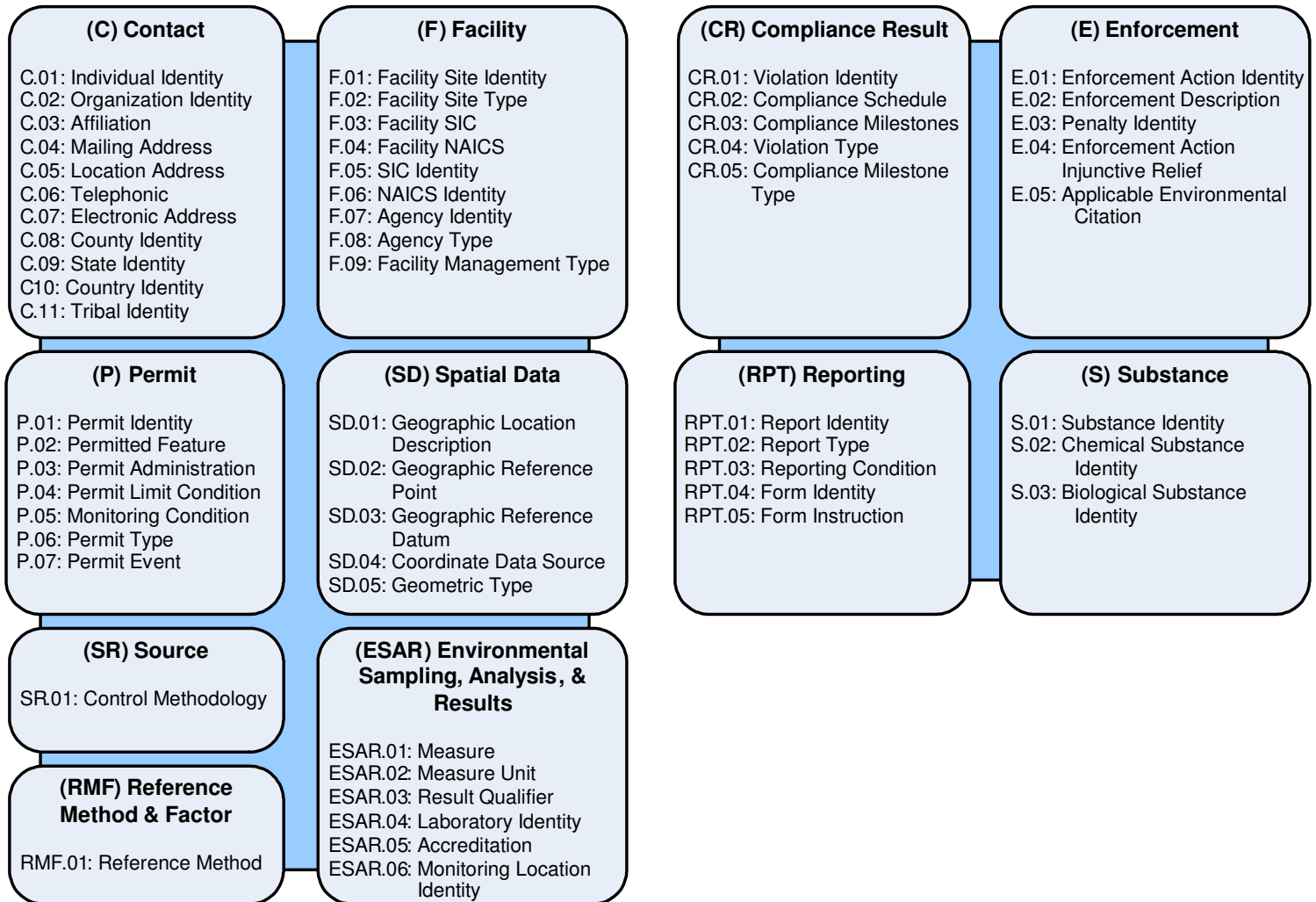
Benefits of Using SSCs



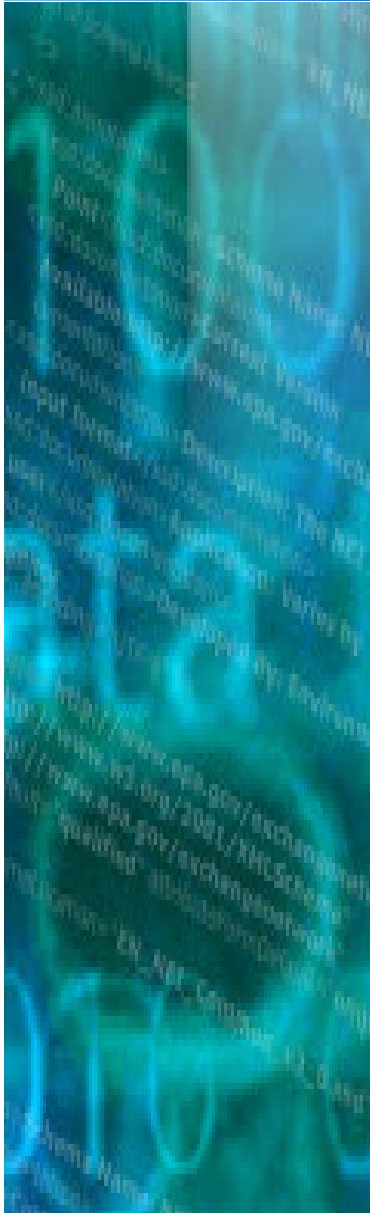
- More efficient schema/flow development
- Stability
- Data Quality
- Extensibility
- Reusability
- Promotion of Common Tools

Current SSCs

Shared Schema Components

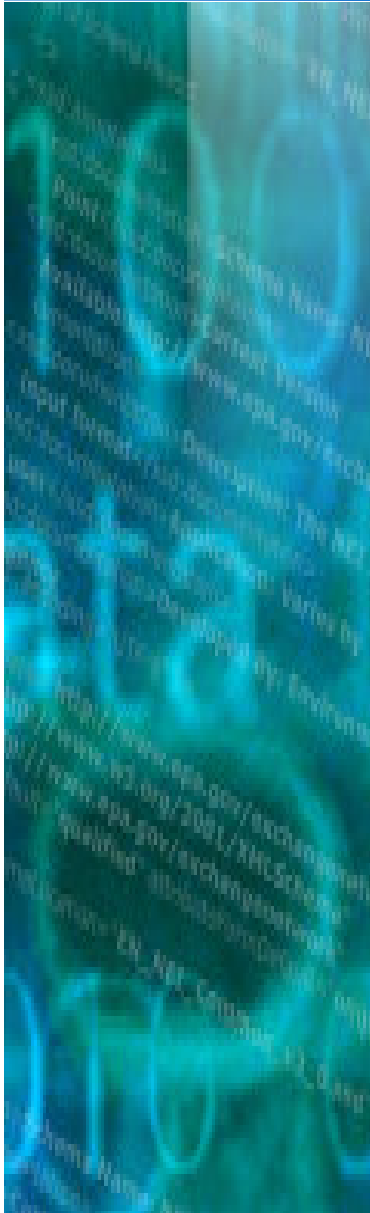


SSC 2.0 Upgrade Changes



- Removed `TargetNamespace` declaration from SSCs to comply with Namespace guidelines
- New location in EN Repository
<http://www.exchangenetwork.net/schema/SC/>
- SSC Usage Guide and Technical Guide have been updated to reflect 2.0 changes

Examples demonstrating SSC use



- Incorporate an SSC
- Make an SSC element required
- Remove an element from an SSC
- Add an element to an SSC

Incorporate an SSC

Just example flow name and qualifier, could be TRI, etc.

```

<?xml version="1.0" encoding="utf-8"?>
<xsd:schema xmlns:scx="http://www.exchangenetwork.net/schema/SCexample/1"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.exchangenetwork.net/schema/SCexample/1" elementFormDefault="qualified"
  attributeFormDefault="unqualified" version="1.0">

  <xsd:include schemaLocation="http://www.exchangenetwork.net/schema/SC/SC_IndividualIdentity_v2.0.xsd"/>
  <xsd:include schemaLocation="http://www.exchangenetwork.net/schema/SC/SC_ElectronicAddress_v2.0.xsd"/>

  <xsd:complexType name="NameAndEmailDataType">
    <xsd:sequence>
      <xsd:element ref="scx:IndividualIdentity"/>
      <xsd:element ref="scx:ElectronicAddress"/>
    </xsd:sequence>
  </xsd:complexType>

  <xsd:element name="NameAndEmail" type="scx:NameAndEmailDataType">
    <xsd:annotation>
      <xsd:documentation>Schema used to transfer individual contact information</xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  
```

Make an SSC element required

```
<?xml version="1.0" encoding="utf-8"?>
<xsd:schema xmlns:scx="http://www.exchangenetwork.net/schema/SCexample/1"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.exchangenetwork.net/schema/SCexample/1" elementFormDefault="qualified"
  attributeFormDefault="unqualified" version="1.0">

  <xsd:include schemaLocation="http://www.exchangenetwork.net/schema/SC/SC_IndividualIdentity_v2.0.xsd"/>

  <xsd:complexType name="ExampleRestrictedMailingAddressDataType">
    <xsd:complexContent>
      <xsd:restriction base="scx:MailingAddressDataType">
        <xsd:sequence>
          <xsd:element ref="scx:MailingAddressText" minOccurs="1" maxOccurs="1" />
          <xsd:element ref="scx:SupplementalAddressText" minOccurs="0"/>
          <xsd:element ref="scx:MailingAddressCityName" minOccurs="0"/>
          <xsd:element ref="scx:StateIdentity" minOccurs="0"/>
          <xsd:element ref="scx:AddressPostalCode" minOccurs="0"/>
          <xsd:element ref="scx:CountryIdentity" minOccurs="0"/>
        </xsd:sequence>
      </xsd:restriction>
    </xsd:complexContent>
  </xsd:complexType>
```

Remove an element from an SSC

```
<?xml version="1.0" encoding="utf-8"?>
<xsd:schema xmlns:scx="http://www.exchangenetwork.net/schema/SCexample/1"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.exchangenetwork.net/schema/SCexample/1" elementFormDefault="qualified"
  attributeFormDefault="unqualified" version="1.0">

  <xsd:include schemaLocation="http://www.exchangenetwork.net/schema/SC/SC_IndividualIdentity_v2.0.xsd"/>

  <xsd:complexType name="ExampleRestrictedMailingAddressDataType">
    <xsd:complexContent>
      <xsd:restriction base="scx:MailingAddressDataType">
        <xsd:sequence>
          <xsd:element ref="scx:MailingAddressText" minOccurs="0"/>
          <!-- <xsd:element ref="scx:SupplementalAddressText" minOccurs="0"/> -->
          <xsd:element ref="scx:MailingAddressCityName" minOccurs="0"/>
          <xsd:element ref="scx:StateIdentity" minOccurs="0"/>
          <xsd:element ref="scx:AddressPostalCode" minOccurs="0"/>
          <xsd:element ref="scx:CountryIdentity" minOccurs="0"/>
        </xsd:sequence>
      </xsd:restriction>
    </xsd:complexContent>
  </xsd:complexType>
```

Add an element to an SSC

```
<?xml version="1.0" encoding="utf-8"?>
<xsd:schema xmlns:scx="http://www.exchangenetwork.net/schema/SCexample/1"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.exchangenetwork.net/schema/SCexample/1" elementFormDefault="qualified"
  attributeFormDefault="unqualified" version="1.0">

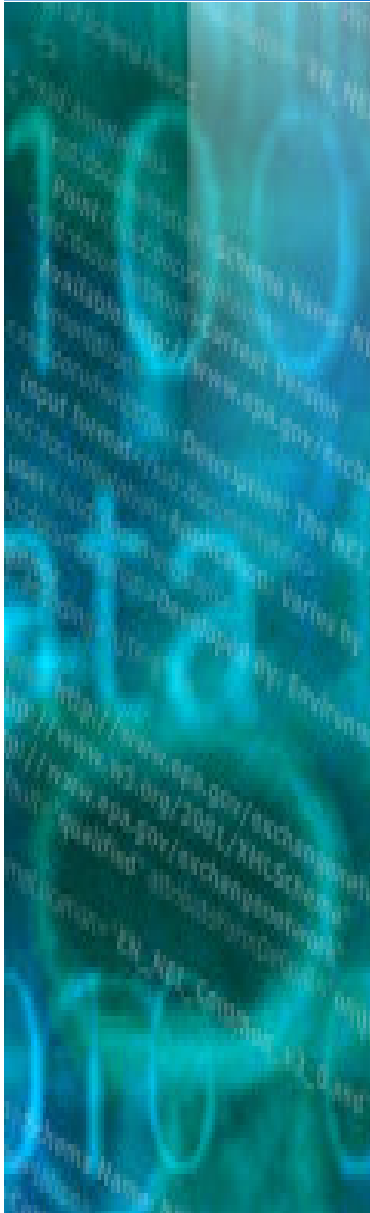
  <xsd:include schemaLocation="http://www.exchangenetwork.net/schema/SC/SC_IndividualIdentity_v2.0.xsd"/>
  <xsd:include schemaLocation="SCexample_SimpleContent_v1.0.xsd"/>

  <xsd:complexType name="ExampleExtendedMailingAddressDataType">
    <xsd:complexContent>
      <xsd:extension base="scx:MailingAddressDataType">
        <xsd:sequence>
          <xsd:element ref="scx:PlanetIdentity" minOccurs="0"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
```

Environmental Information

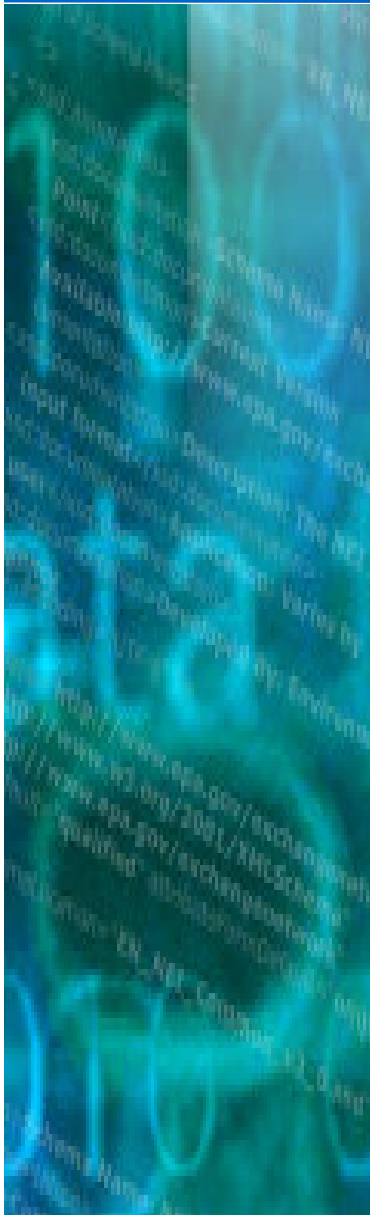


Questions?



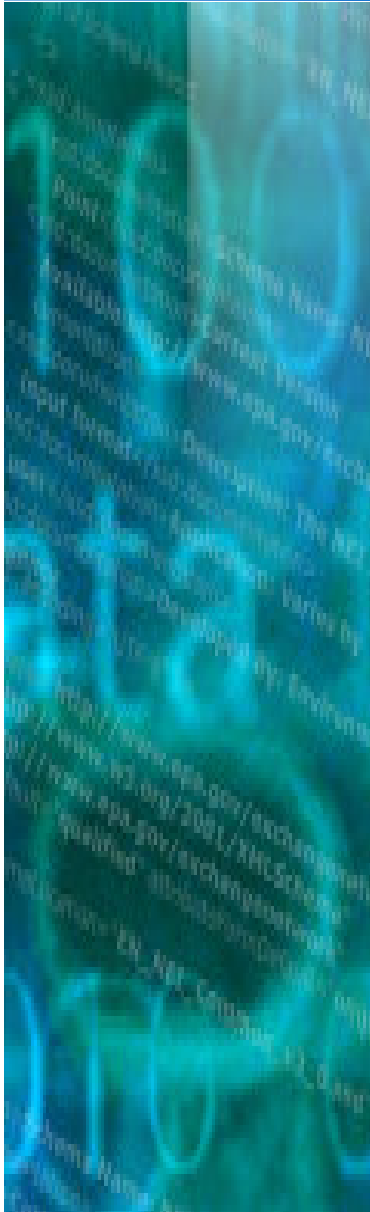
Early Engagement & Next Open Call

- The Network Operations Board (NOB) may offer IPTs targeted developer assistance with EN standards early in flow development process
 - If interested, contact the NOB Co-Chairs for more info
 - Mitch West - west.mitch@deq.state.or.us
 - Andrew Battin - battin.andrew@epa.gov
- **Next NTG Open Call**
 - Will be announced by Network Alert
 - Topic: Flow Development Process
 - Hear about experiences and lessons learned from other flow developers
 - More information will be provided about early engagement from NOB

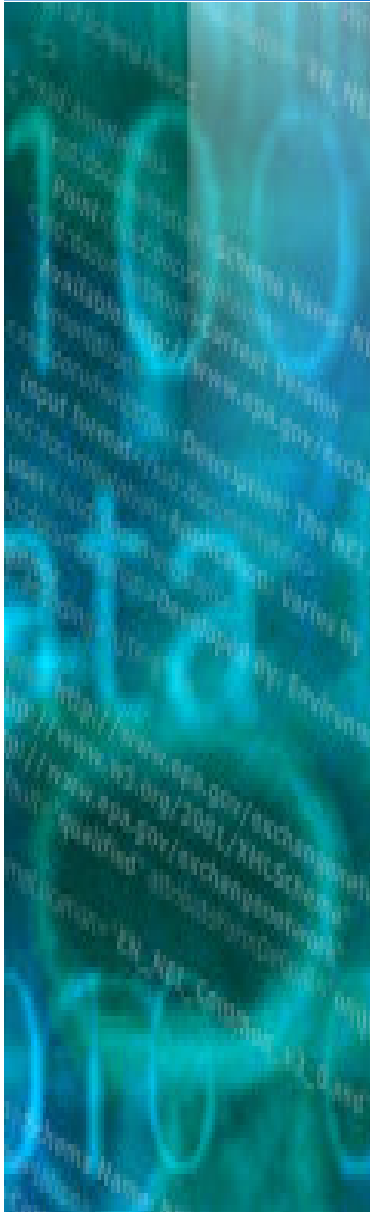


Feedback for the NTG

- **Comments or Questions?**
 - For specific Questions, contact presenters
 - For NTG Questions, contact co-chairs
- **Feedback on NTG activities is invited**
 - The group's work plan and a copy of this presentation will be posted on exchangenetwork.net website



Resources



- **Node Help Desk**
 - **Hours** 8:00am - 6:00pm (EST).
 - **Phone:** 1-(888)-890-1995
 - **Email:**
nodehelpdesk@csc.com
- **Tom Aten**
 - Thomas.Aten@dnr.state.wi.us
- **Scott Totten**
 - scott.totten@dnr.mo.gov
- **Bill Rensmith**
 - bill_rensmith@windsorsolutions.com
- **Connie Dwyer**
 - dwyer.connie@epa.gov
- **Matt Markoff**
 - matt.markoff@ross-assoc.com

EN Operations page website

<http://www.exchangenetwork.net/operations/>

Develop XML Schema

http://www.exchangenetwork.net/dev_schema/