

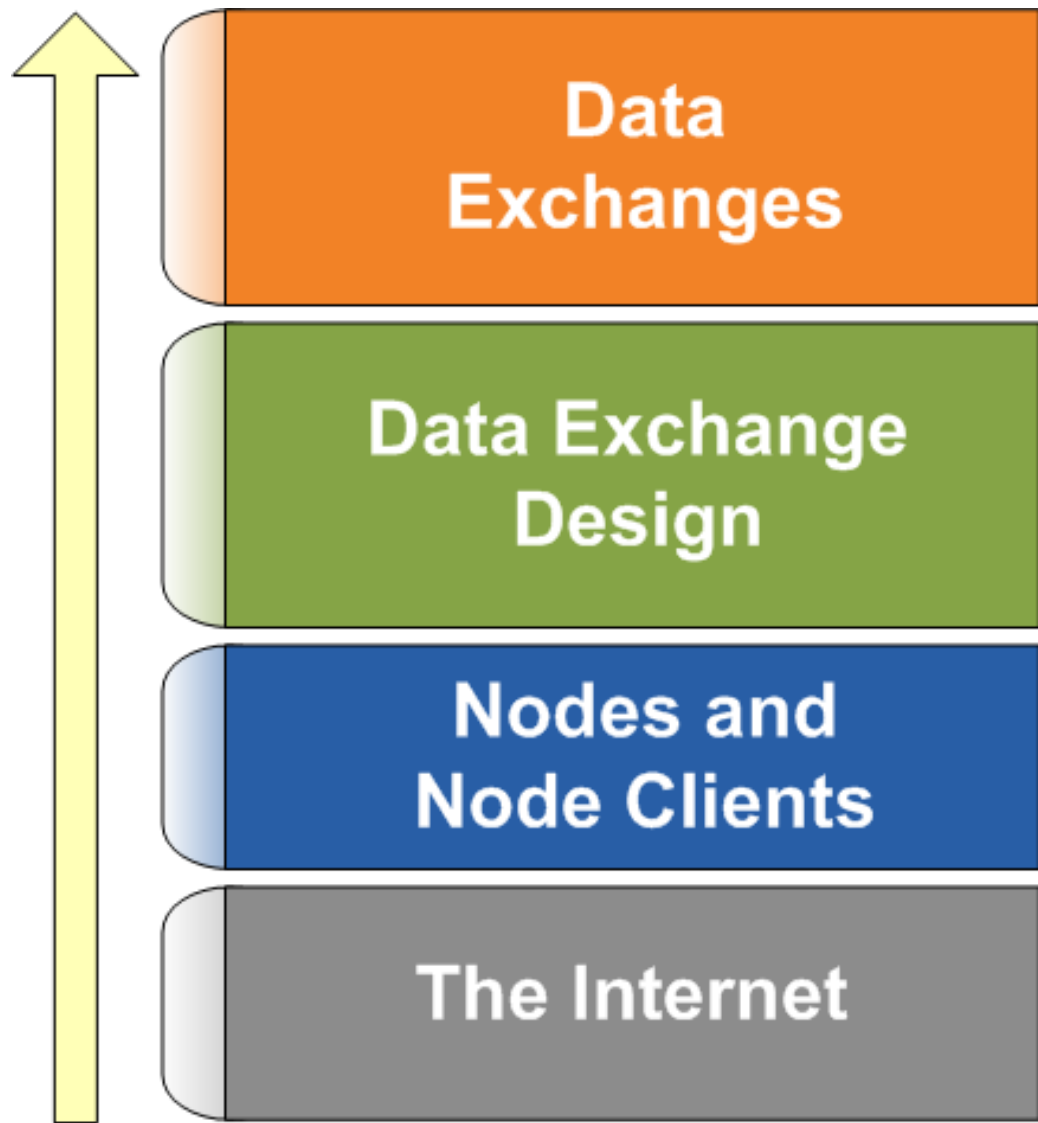
# Exchange Network Building Blocks

The Pieces and Parts  
That Make the Network Work

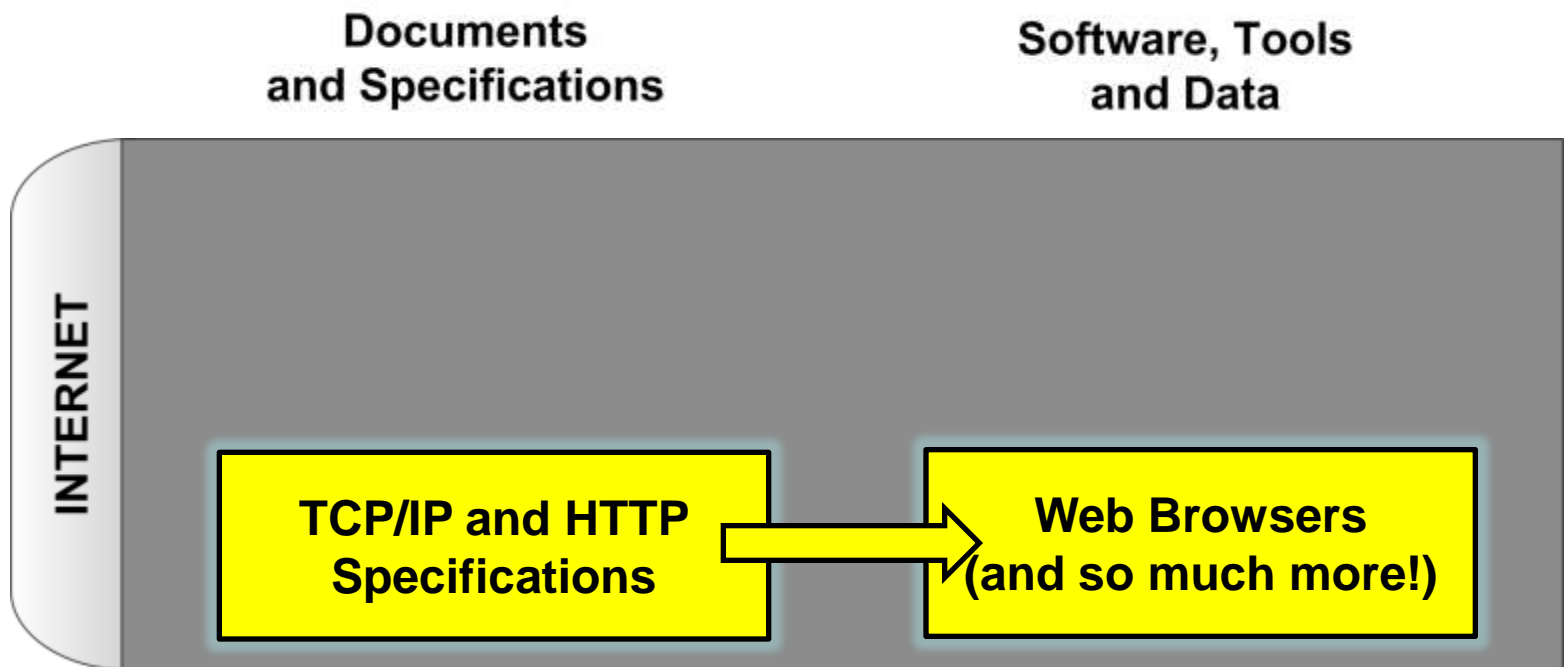
Bill Rensmith, Windsor Solutions, Inc.  
Exchange Network National Conference  
4/26/2011



# exchange **The Big Picture** Network



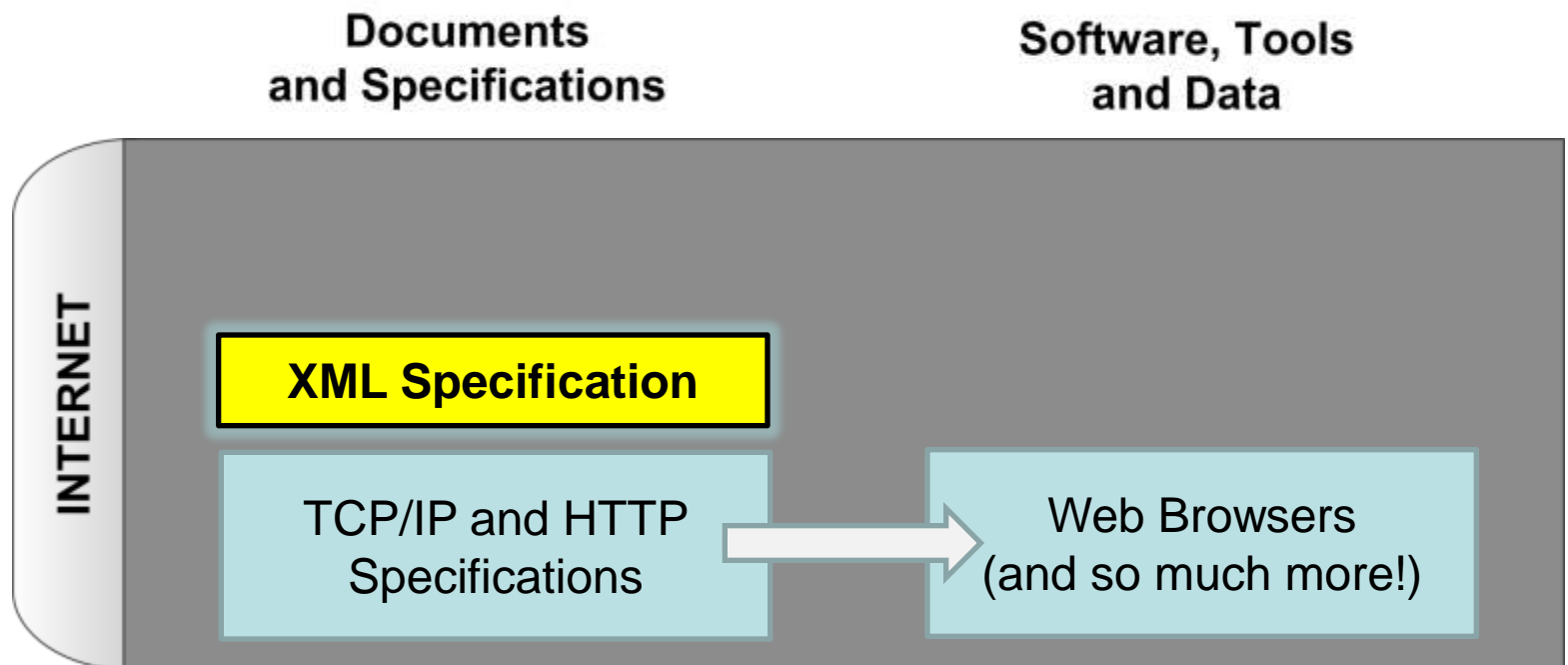
- Without the Internet, there wouldn't be an Exchange Network
- All EN transactions travel over the internet using standard web protocols



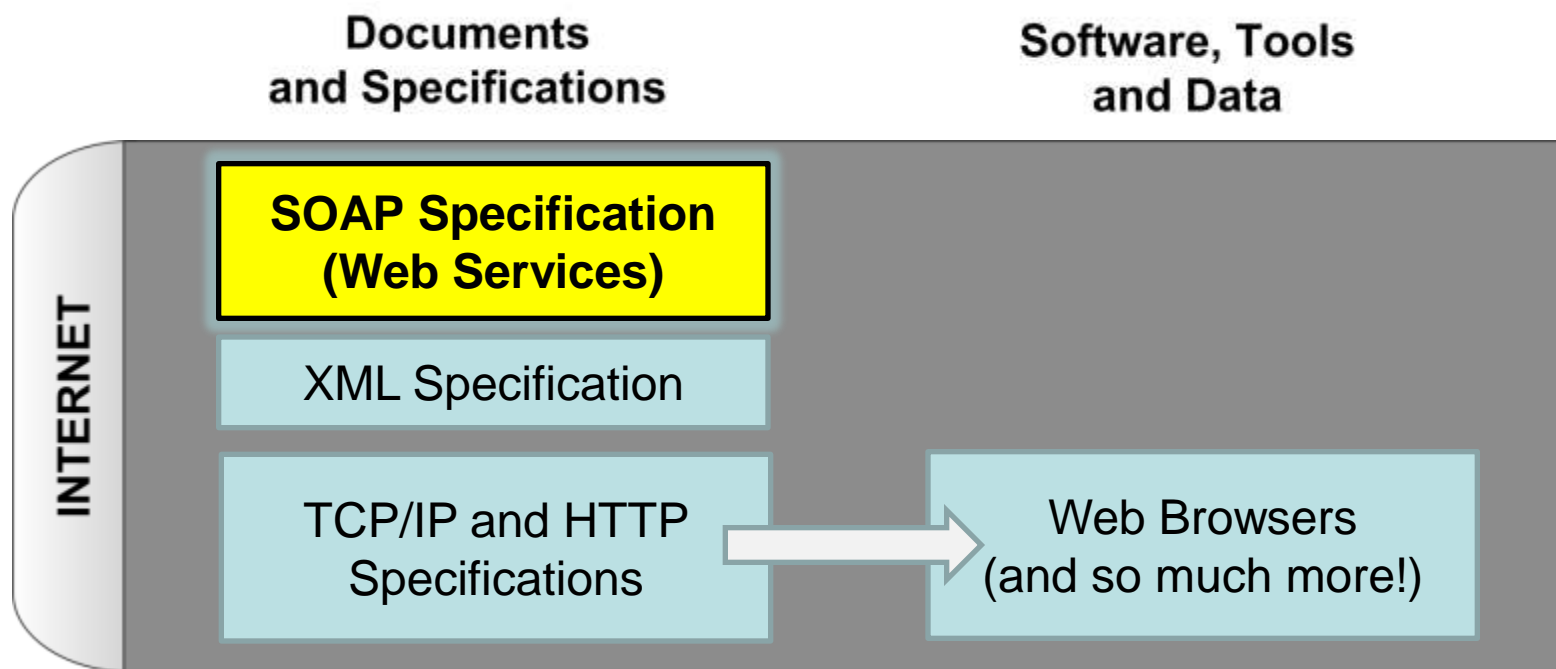
- XML is a text file format, both human and machine readable.

```
<PermitNumber>ABC123</PermitNumber>
```

- Big improvement over flat files

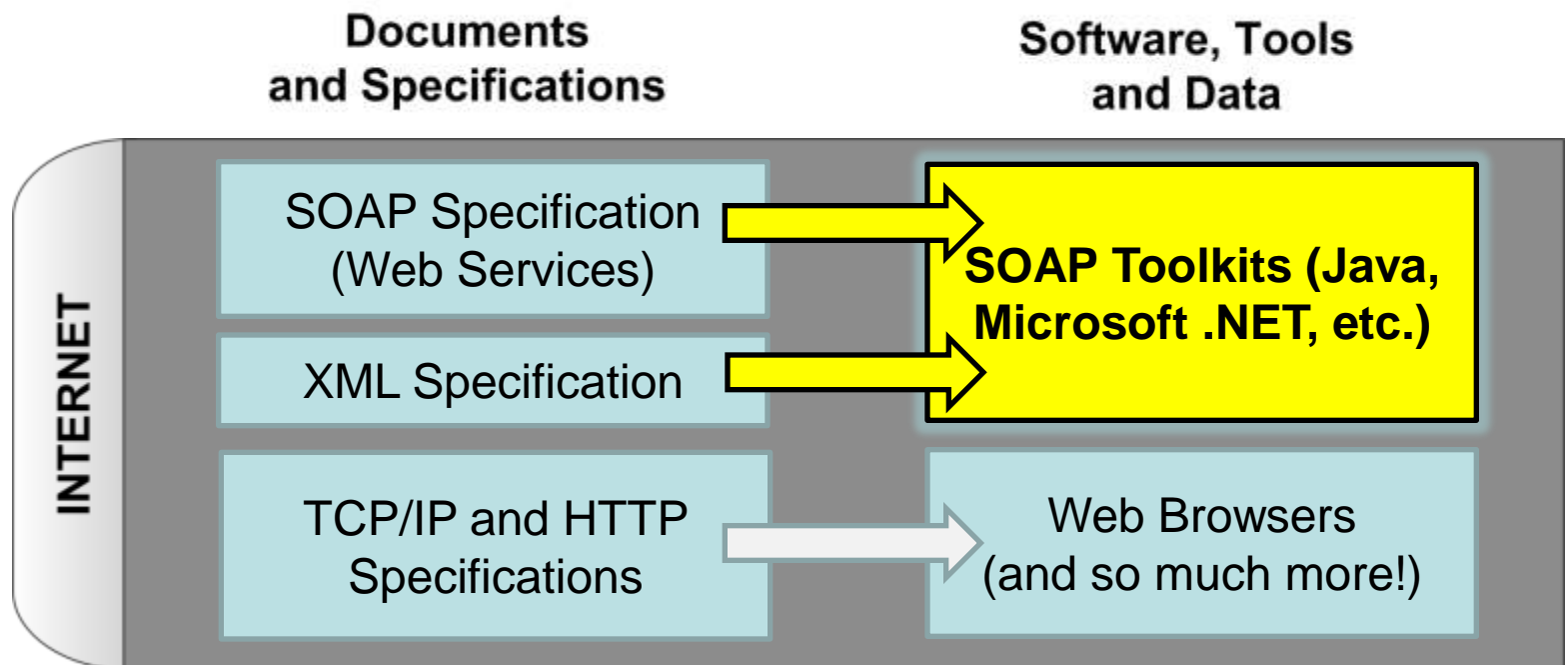


- SOAP is a mechanism for computer-to-computer communication across the internet
- The language of SOAP is XML
- “Web Services” *usually* use SOAP



# The Internet – SOAP Toolkits

- Vendors (Microsoft, Java, etc.) have created toolkits to simplify the creation of web service software
- Not all implementations play nice together!



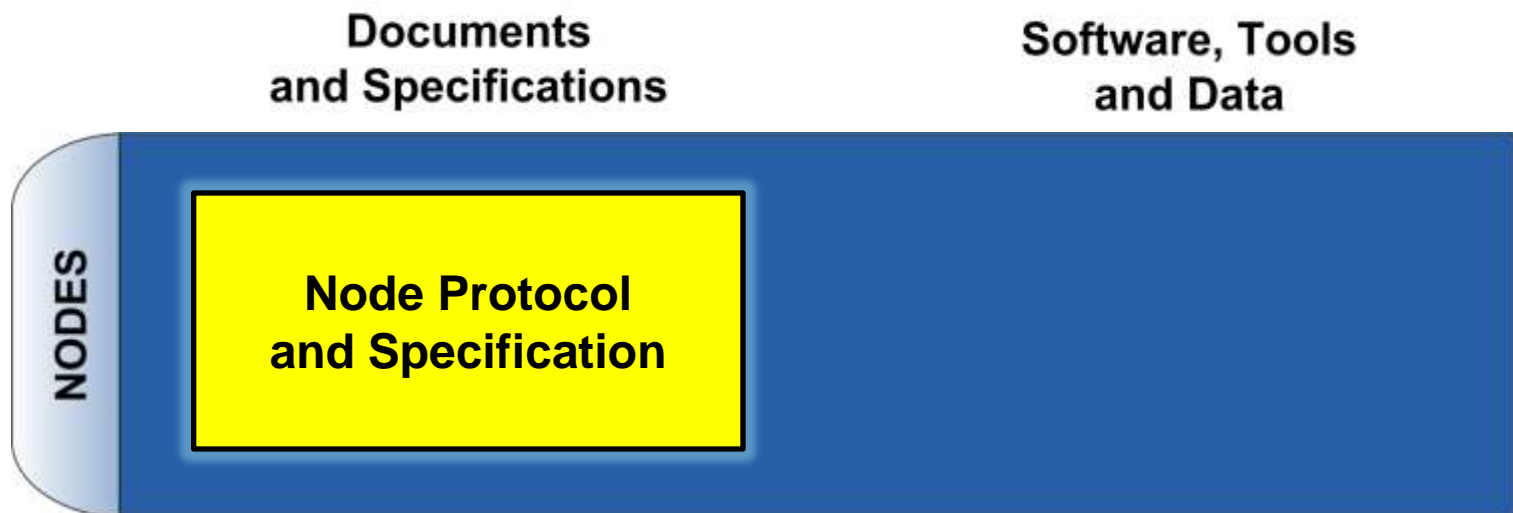
With these protocols and technologies in place,  
the foundation has been laid for the  
Exchange Network...



# exchange Nodes – Specifications

Network

- The Node Protocol and Specification are blueprints for building a Exchange Network Node or Node Client
- Describes very basic operations:
  - Submit, Query, GetStatus, Download...

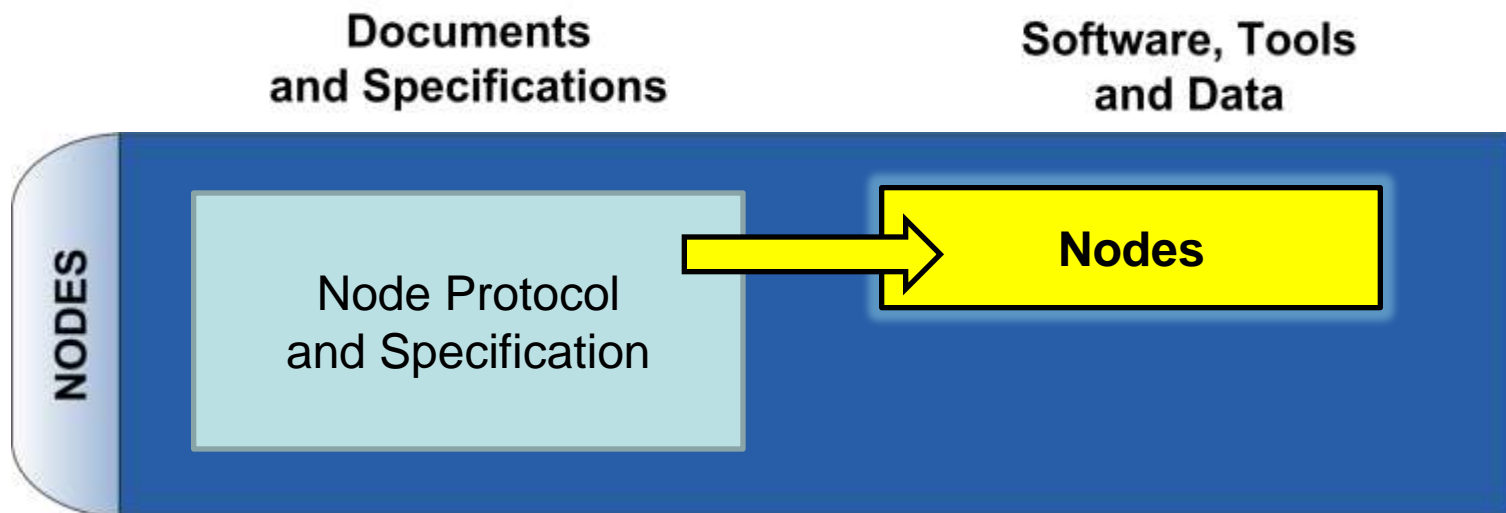




# exchange Nodes – Node Software

Network

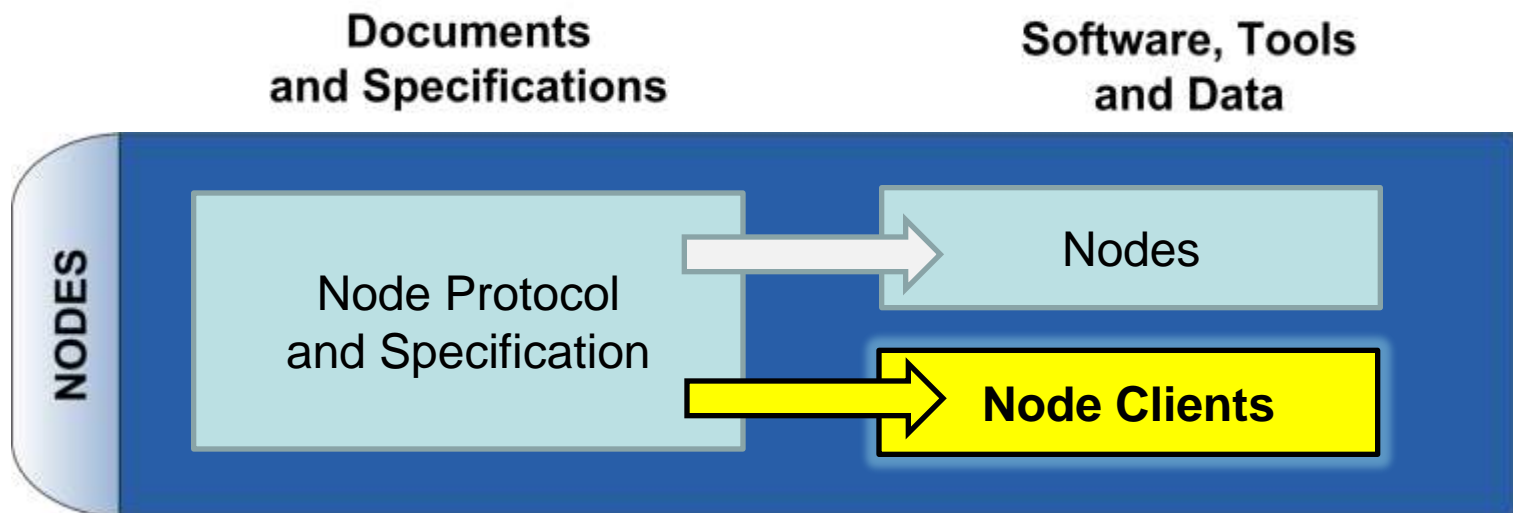
- Nodes are the software that send, receive and process data that flows across the Network
- Several free implementations available
  - See the Exchange Network web site



# exchange Nodes – Node Client Software

Network

- Node client software can be used to initiate transactions (such as submit or query data)
- Node clients can't listen for external requests
- Free web-based and desktop software available



Now we have the apparatus  
for exchanging data...

...but then what data do we send?

...and how does anyone know what to do with it?

# Data Exchange Design – Design Rules

- Design guidelines ensure consistency in flow design

Documents  
and Specifications

Software, Tools  
and Data

EXCHANGE DESIGN

**Exchange Design Rules  
and Specifications  
(EDRCs)**

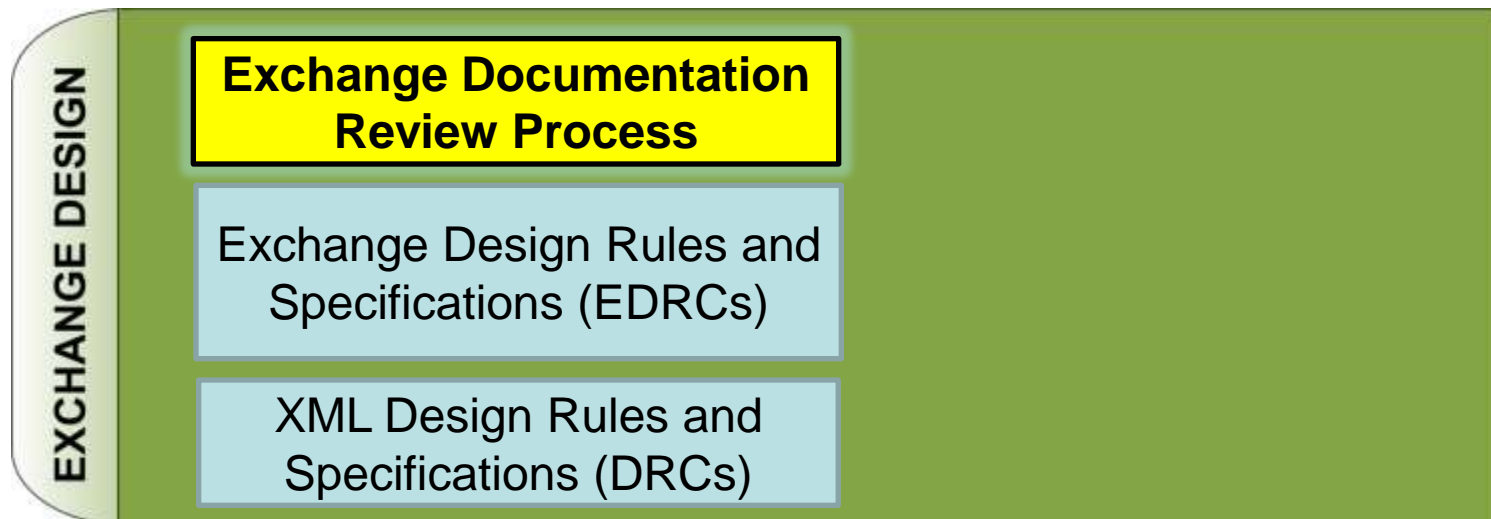
**XML Design Rules and  
Specifications (DRCs)**

# Data Exchange Design – Review Process

- New exchanges must go through a review process
- Ensures packages are complete and consistent with design guidelines

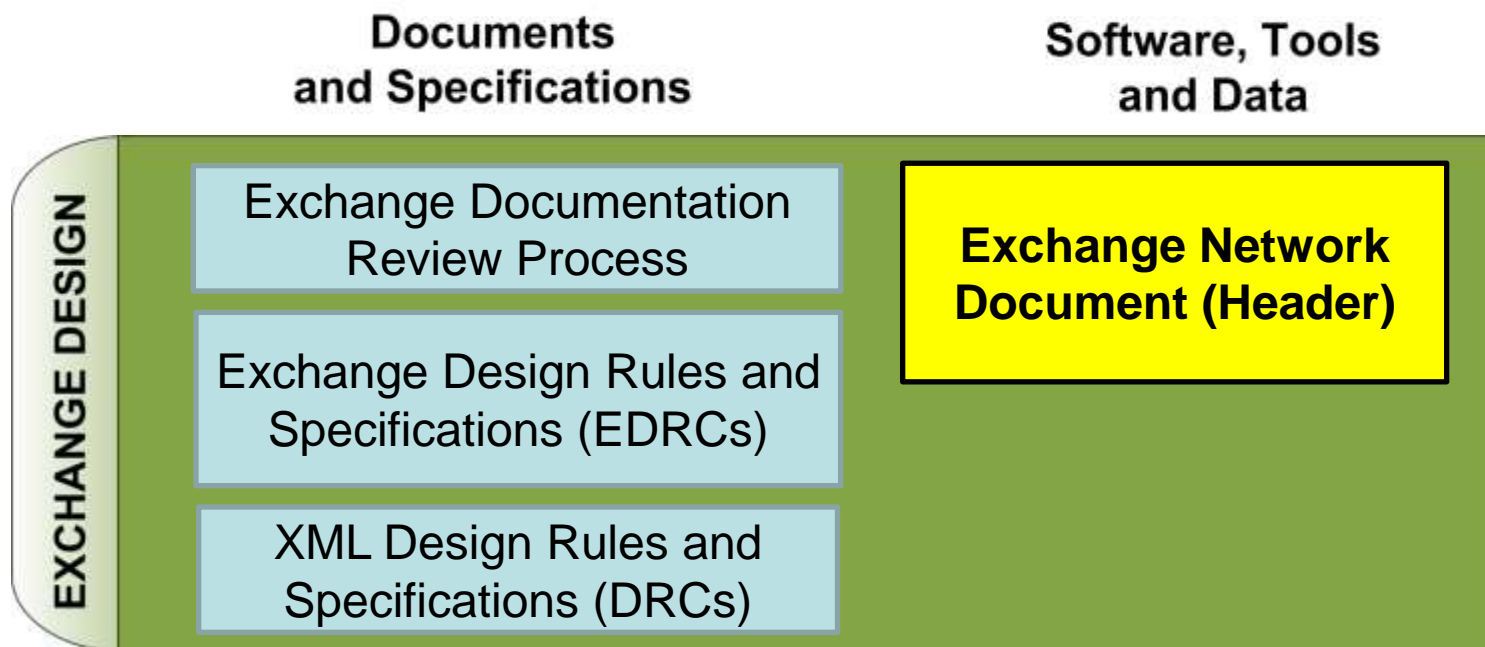
Documents  
and Specifications

Software, Tools  
and Data



# Data Exchange Design – Header

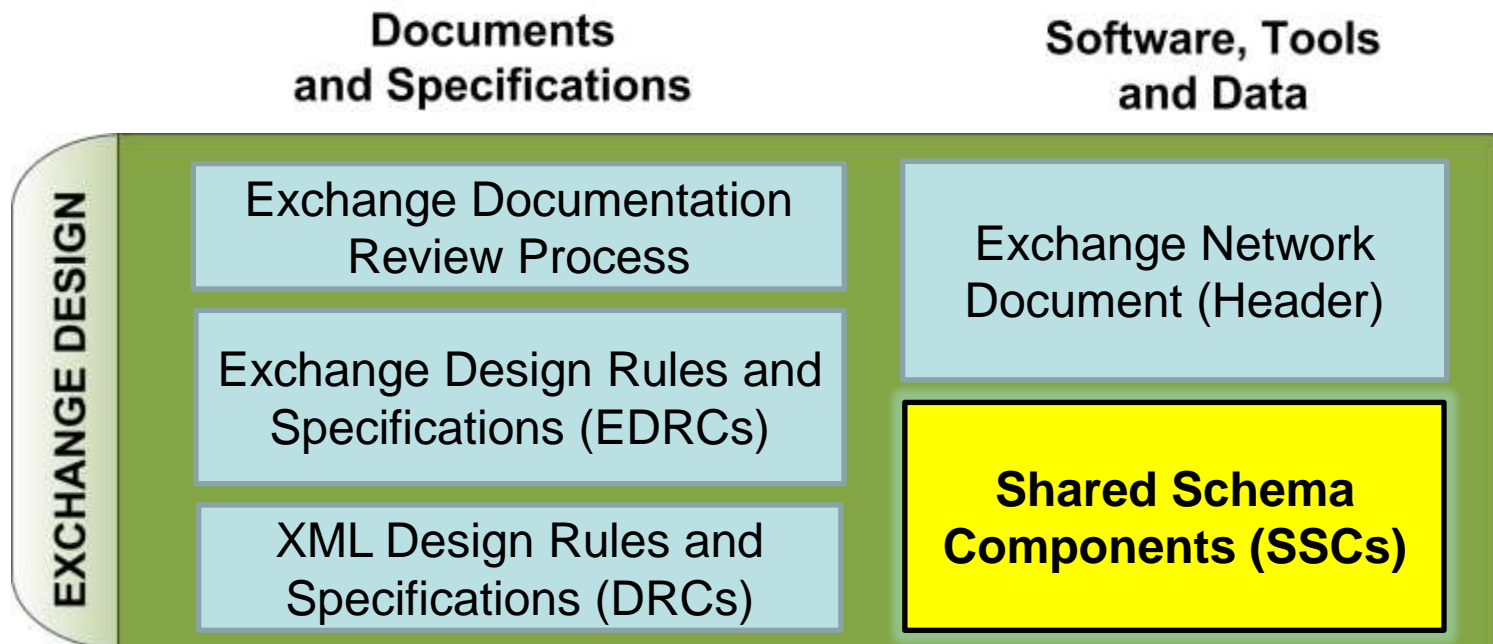
- Header is a generic “wrapper” for XML submission files
- Describes the XML submission (who, what...)
- The Header is required for submissions





# Data Exchange Design – Shared Schema Components (SSCs)

- SSCs are generic XML building blocks that describe environmental data such as permits, facilities, samples...
- Useful when building new exchanges



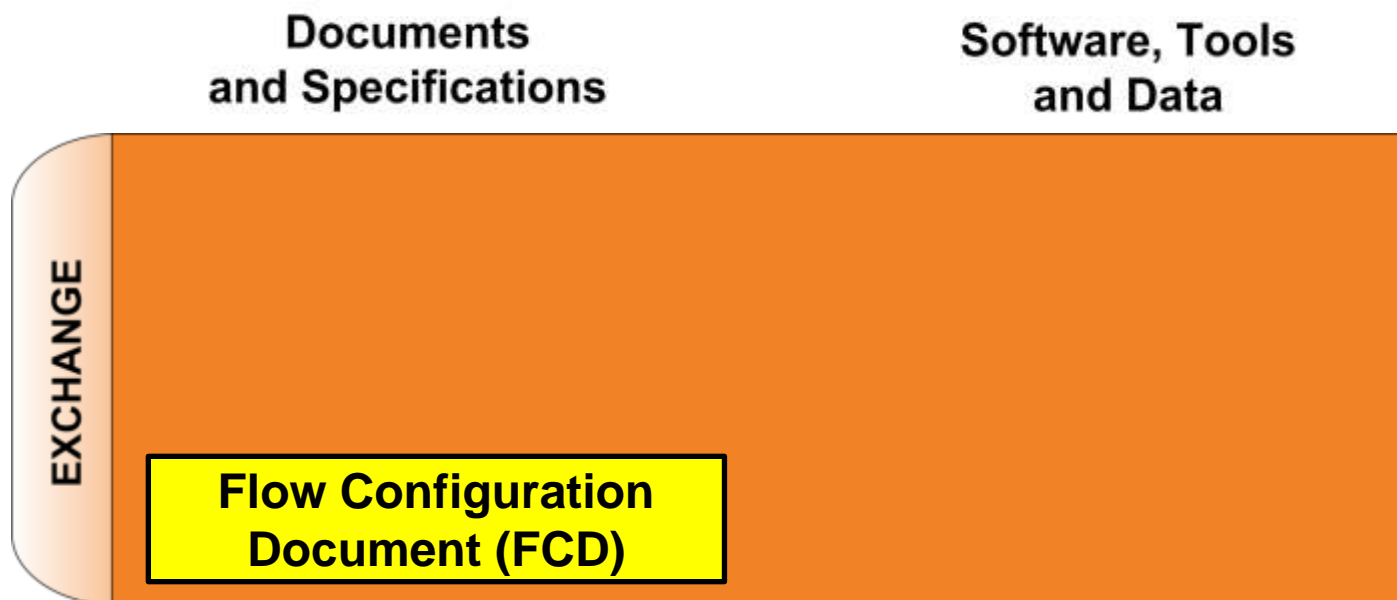


## Data Exchanges or “Flows”

- Are specific to a type of environmental data
  - Air, Water, Waste, Pollution Prevention...
- Often target a specific partner or data system
  - EPA databases are the most common target
- Can be designed for general sharing of data
  - Exposes queries for ad hoc consumption by any number of interested external partners

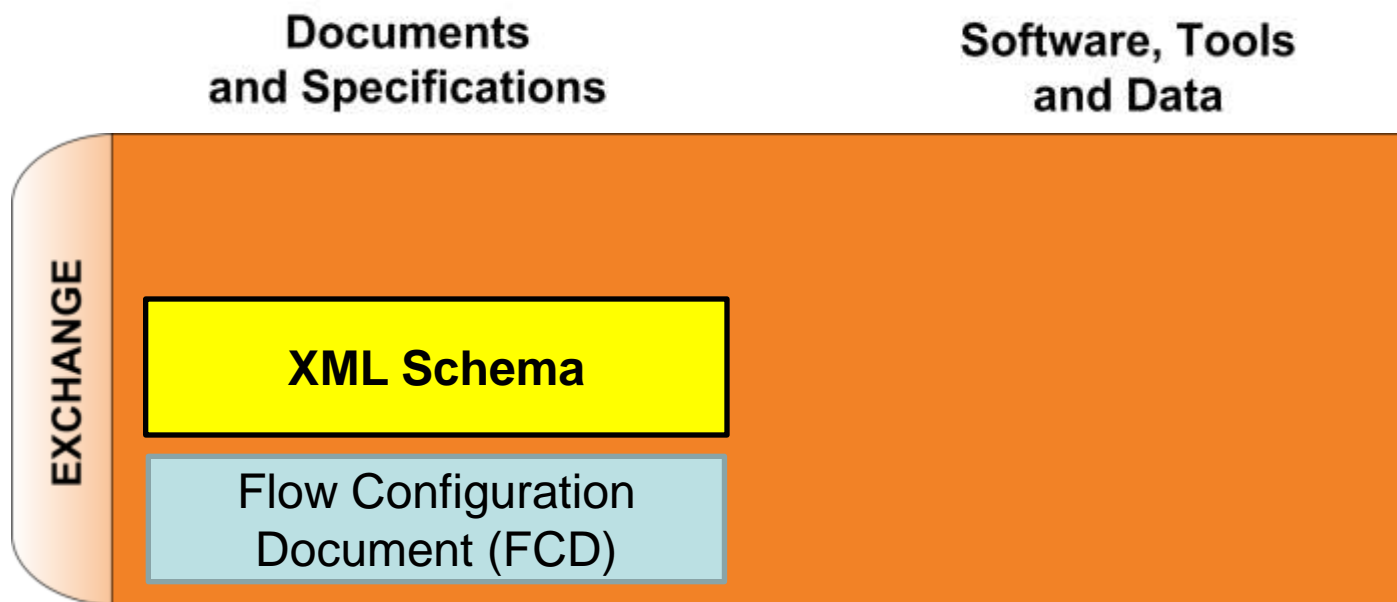
## Flow Configuration Document

- Describes *How* to exchange data
- Describes processing steps (if applies)
- Describes flow services (exposed queries)



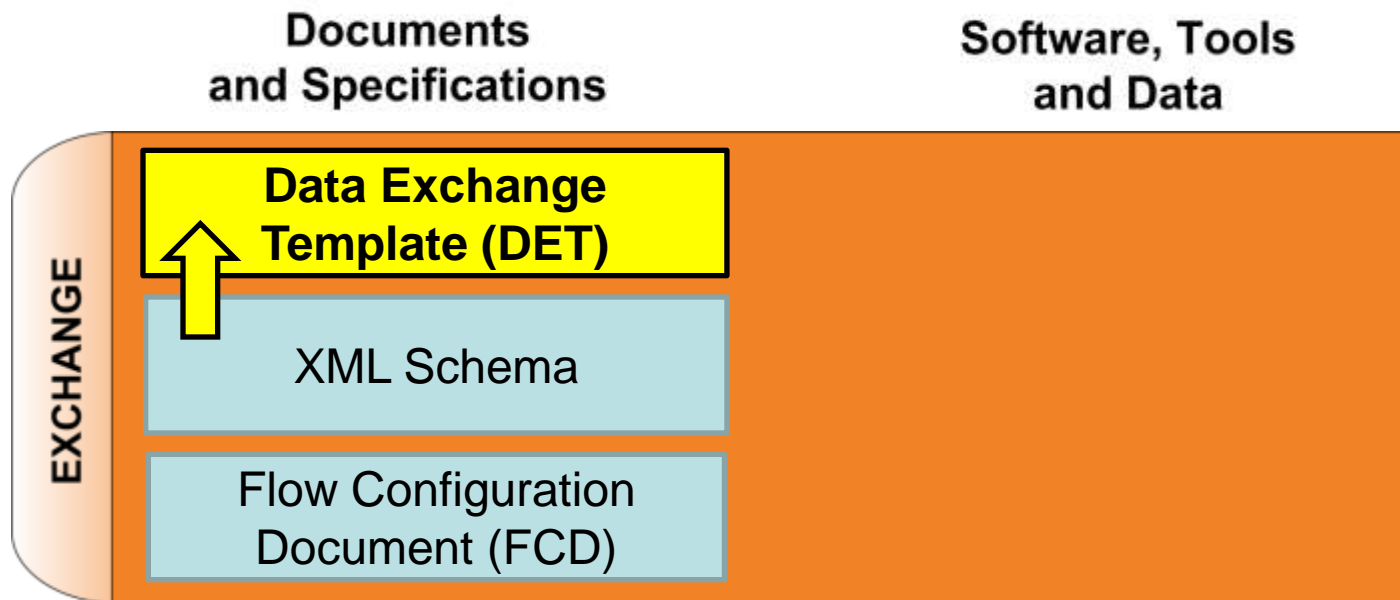
## XML Schema

- Describes the structure of a given data set
- Defines the payload format for a given submission or query result set



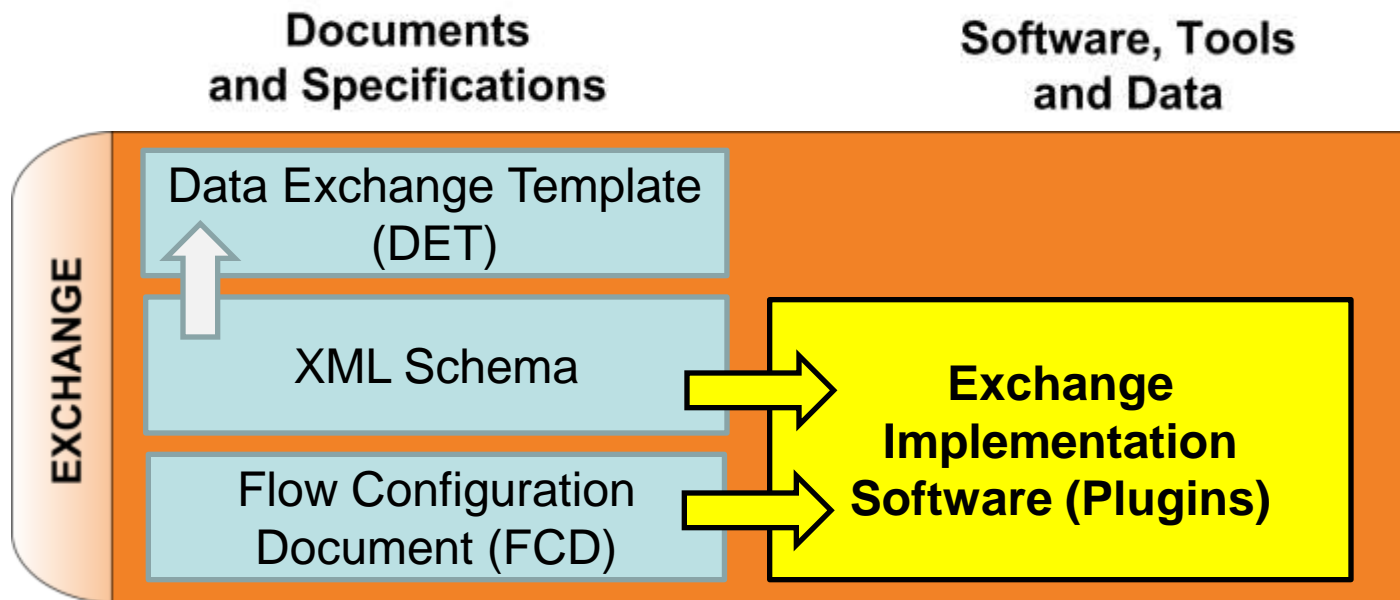
## Data Exchange Template (DET)

- A data dictionary for an XML Schema
- Usually in spreadsheet form
- Describes each element, type, length, description, business rules, etc.



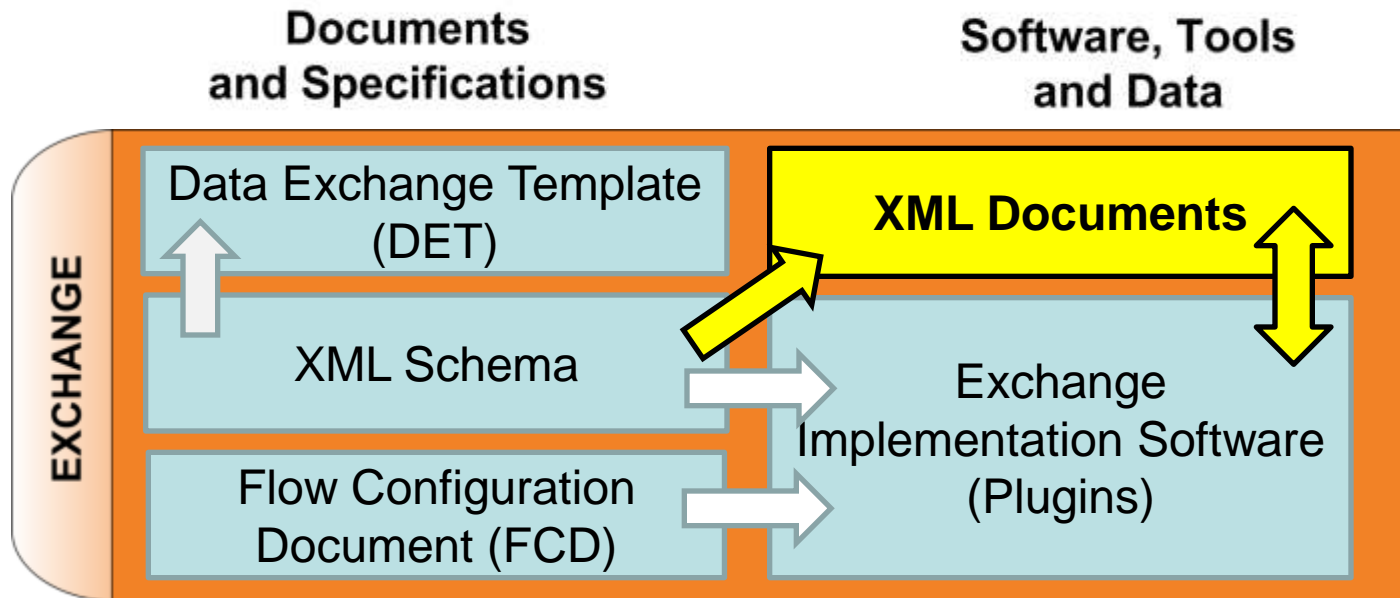
# Data Exchanges – Implementation Software

- A developer builds the data exchange software using the information provided in the FCD and XML Schema
- Pre-built exchange software exists for available nodes



# Data Exchanges – XML Documents

- XML Documents “conform” to an XML schema
- Either submitted to a node or returned from a node
- Both sender and receiver must understand





# The Telephone Analogy...

- **Internet** – the infrastructure (poles and wires)
- **Nodes and Clients** - Telephones
- **Exchange Design** – Language and grammar
- **Data Exchanges** – Conversations





# The Big Picture Revisited

