



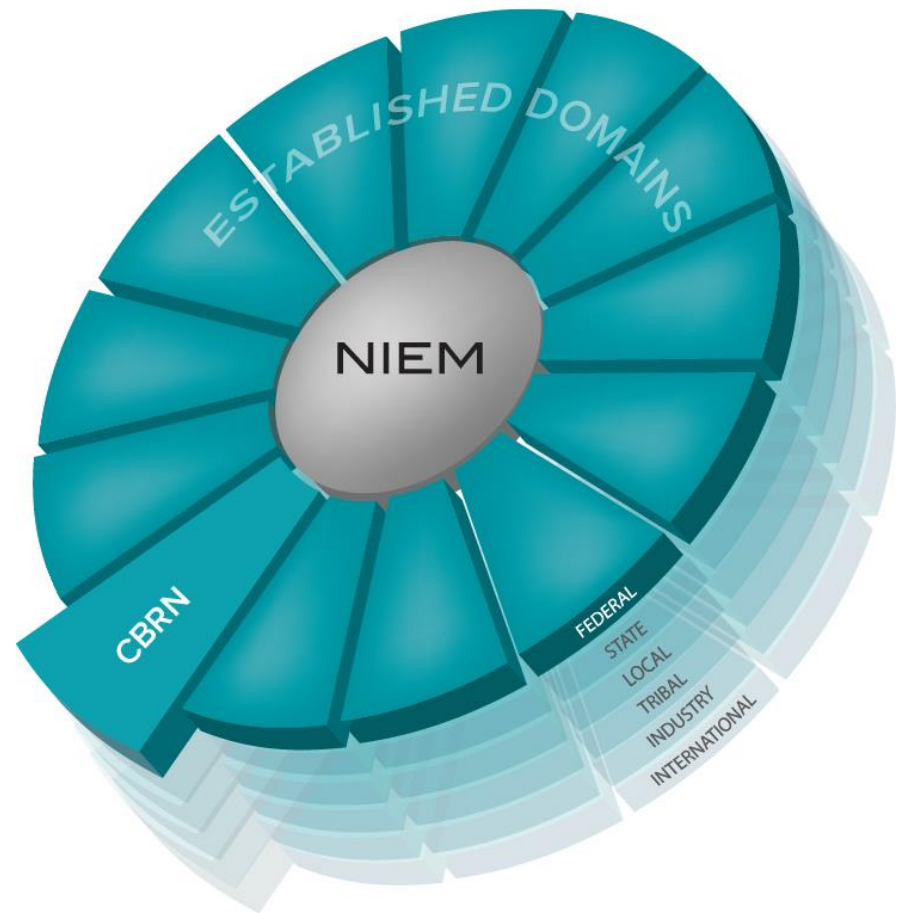
Homeland
Security

U.S. Department of Homeland Security
Domestic Nuclear Detection Office (DNDO)

IEPD Factory Overview

December 2013

Dr. W. R. Wright
DHS/DNDO/CIO Support





- Background
 - IEPD Factory Objectives
 - Model Driven Architecture Approach
 - Integrated Design/Build/Maintain Concept
 - Features



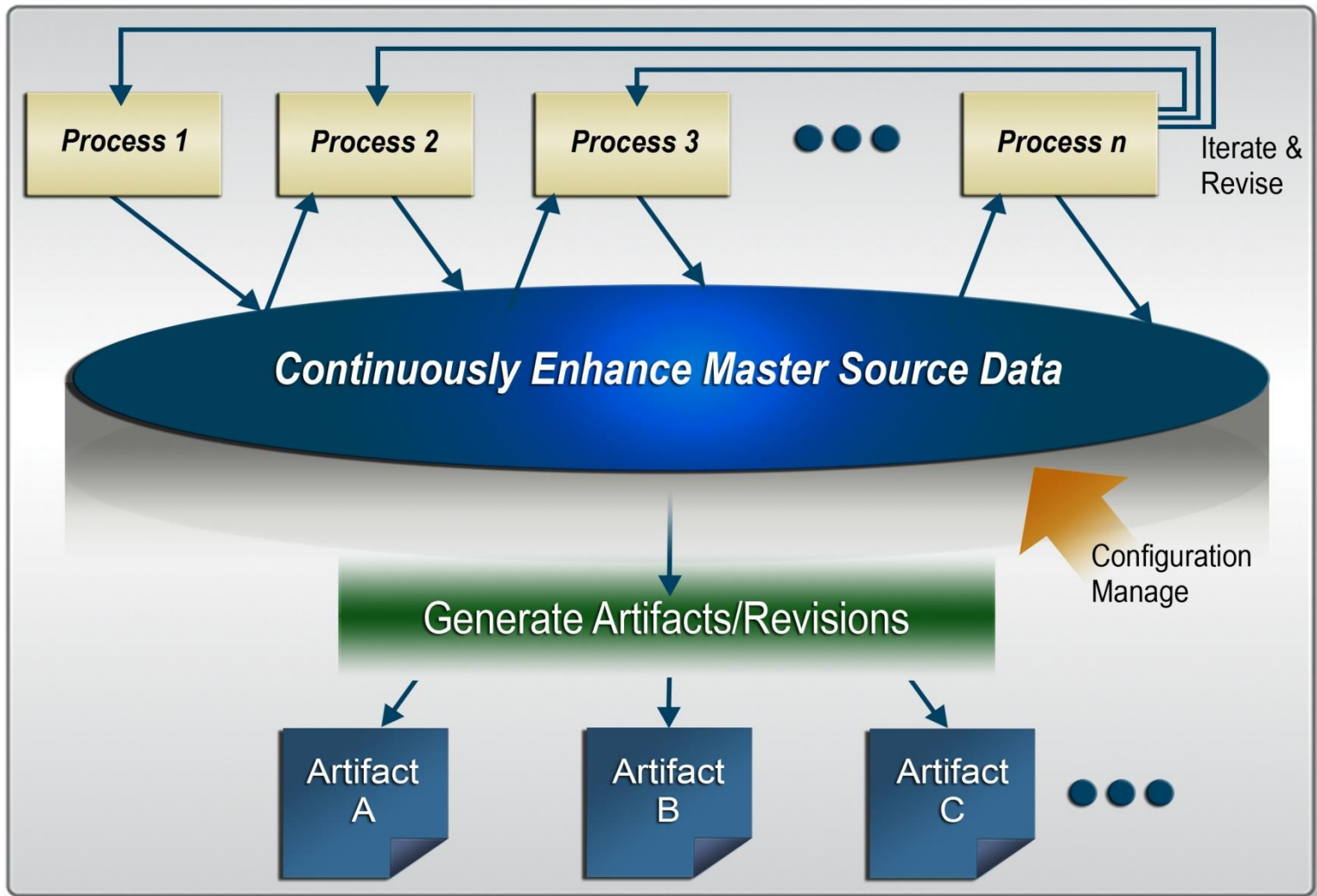
- IEPD Factory created to support DHS NIEM Domain & IEPD development/maintenance
 - Initiated for N.25 IEPD Development Project (interoperability messaging) and NIEM CBRN Domain
 - Started Jan 2008 by DNDO; Tool developed 'just-in-time' as needed during the project
 - Captured NIEM development knowledge learned during the project to enable reuse on next project
 - Focused on process improvement, reduction of labor, time, and breadth of knowledge needed to produce high quality IEPDs
 - Used for development of the ANSI N42.42 standard
 - Enhanced to support Schematron and Codelist management
 - Upgraded to support NIEM 3.0
-



- Eliminate Process Stovepiping
 - Reduce labor effort
 - Eliminate multiple manual entry for each artifact
 - Enable changes to ripple effect thru multiple artifacts
 - Improve artifact quality by eliminating error-prone manual entry/update
 - Accelerate artifact development schedule
 - Reduce cost/schedule/quality risks
- Reduce XML & NIEM level of expertise required – broaden resource pool for IEPD work
- Improve standardization of NIEM conformance
 - Consistent application of rules by incorporating many into the tool

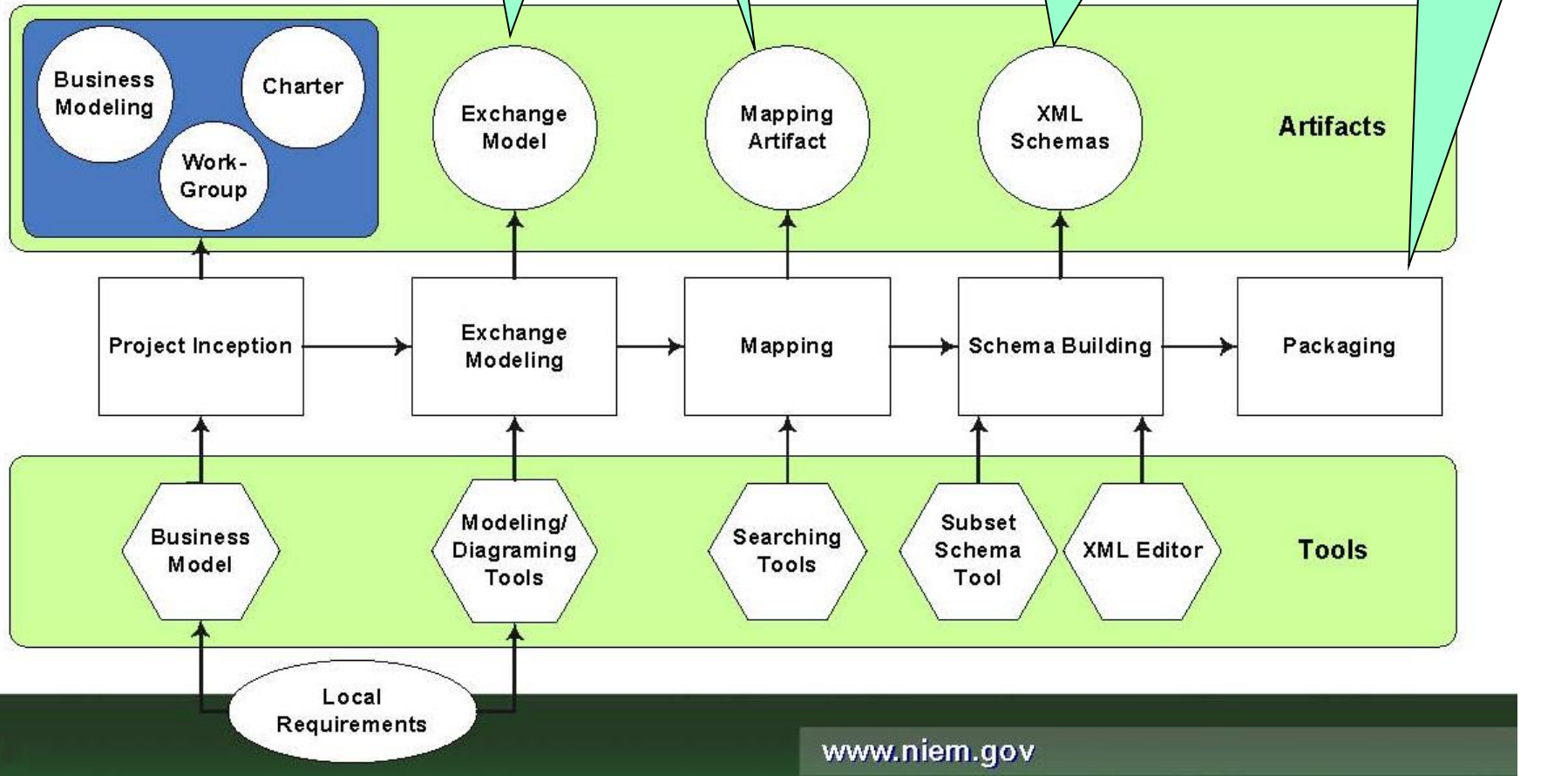


- **Master Source Data Model for an IEPD**
 - Single Source of data
 - Configuration Management (CM) is applied to single source, not artifacts
 - Continuous enhancement to the single source thru each process step; each process step adds value
 - IEPD Artifacts are generated from the single source
 - All processes/tools interact with the single source
 - Facilitates incorporation of additional NIEM standard schemas, leveraging the work of others
 - **Concept is analogous to OMG's MDA**
 - **Well proven in industry**
 - **NIEM rules incorporated into modeling and artifact generation software – "IEPD Factory"**
 - **Combines commercial tool (Trous Architect) with existing NIEM tools where applicable**
-





IEPD Process





IEPD consists of 54 messages

Artifact	Manually Created	IEPD Factory Auto Generated	Total
Component Mapping Spreadsheet	10		10
Visual Model	9		9
Exchange Schema		8	8
Constraint Schema		8	8
Extension Schema		1	1
Extension Constraint Schema		1	1
Code List Schema		1	1
Want List		1	1
Subset Schema		13	13
Catalog		1	1
Metadata		1	1
Schema Outline		8	8
Sample Message		8	8
Master Document (Volumes)	10		10
Total	29	51	80



- IEPD Factory has been built using the Troux Architect (TA) software platform
 - Troux enables building visual object models using object parts
 - Includes a pre-defined set of parts (aka metamodel)
 - Models represent data objects in visual form
 - Models provide handles for using the data in multiple ways
 - TA enables building new sets of parts for new kinds of models
 - IEPD Factory required building a new set of parts; i.e., xml schema components
-



- Troux provides an ideal combination:
 - Built-in capability and extensibility unmatched by any other tool
 - Capability to both develop new metamodels and build new kinds of models using them
- We can adapt the tool to address new requirements without touching the internal software of the tool itself – outstanding flexibility
- Modules built in other tools may also be integrated



- **Supports building & maintaining:**
 - Domain schemas
 - Extension schemas, i.e., common structures for message families
 - Exchange schemas, i.e., message structures
 - Constraint Schemas
 - BIEMs (Business Information Exchange Models)
 - Catalogs & Wantlists
 - Schematron schemas (business rules for messages)
 - **Supports modeling of reference schemas for subset generation**
 - Leveraging standards & work of others, e.g., NIEM, DOJ, International Trade, ANSI, Intelligence, Units of Measure, etc.
 - **Provides codelist management**
 - **Generates XML Schema and NIEM-required documentation artifacts**
-



- Implements a NIEM-conformant subset of W3C XML Schema
 - Reduces complexity
 - Reduces requirement for NIEM expertise
 - Embeds NIEM rules to the extent possible
- Supports NIEM 3.0
- Not limited to NIEM-conformant development
 - IEPD Factory enabled building of ANSI N42.42 schema
- Includes an Online Users Guide