INFORMATION EXCHANGE POLICY VOCABULARY (IEPV)

INFORMATION EXCHANGE FRAMEWORK (IEF)
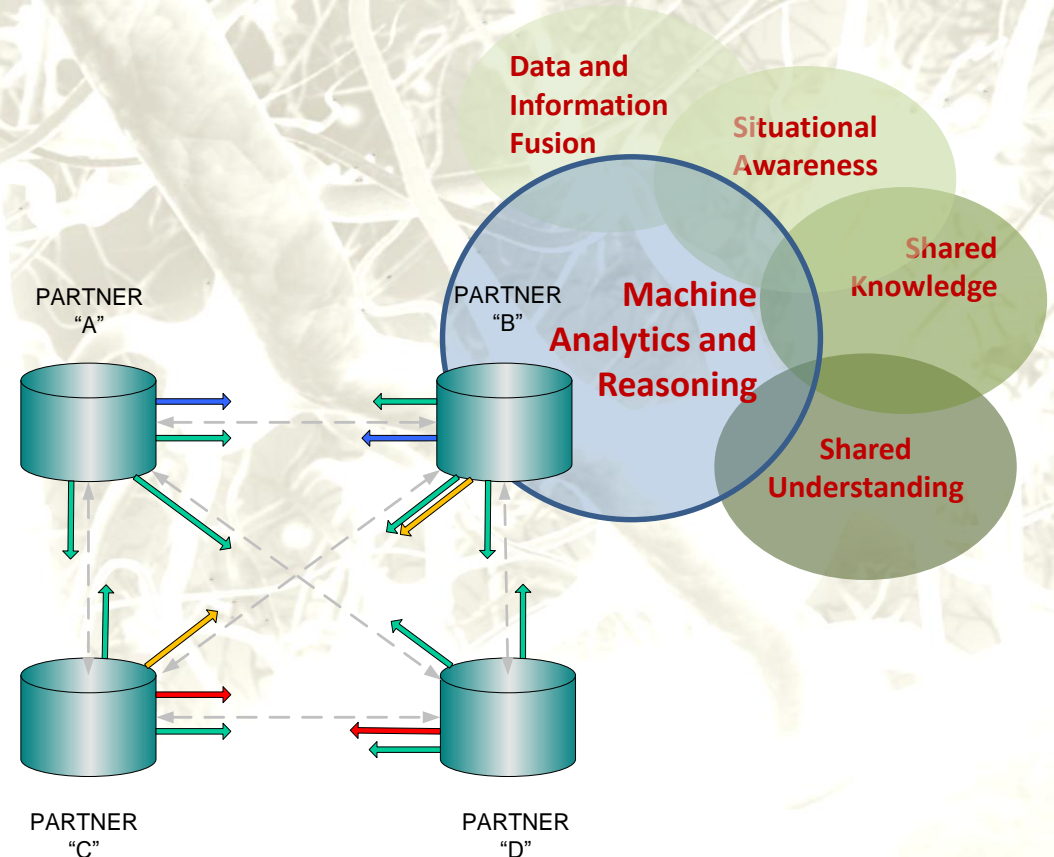
March 2013

Presented by: Mike Abramson
President, Advanced Systems Management Group (ASMG) Ltd.
Co-chair OMG C4I Domain Task Force
Chair Information Exchange Framework (IEF)

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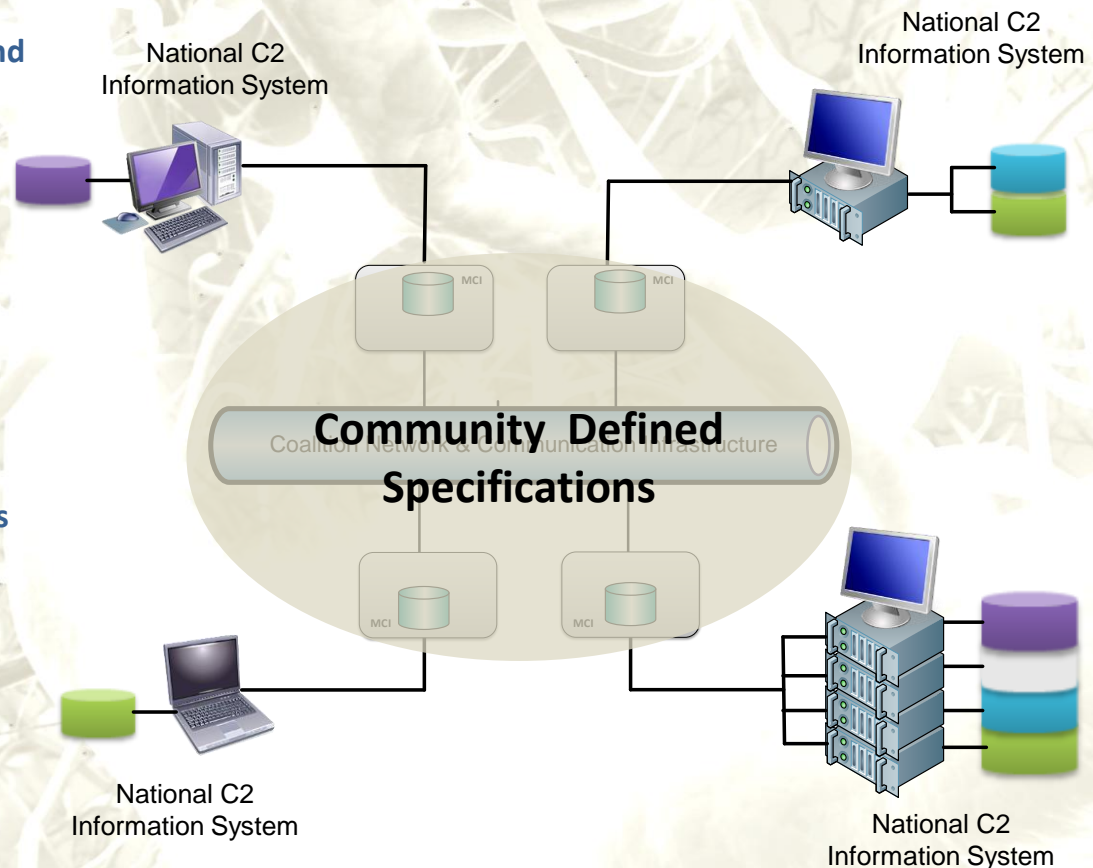MANAGEMENT GROUP

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- **Asymmetric Sharing:** The ability to share content with different communities, agencies or individuals conforming to legislative, regulatory, policy, contractual of service level requirements – while leveraging standard protocols, interfaces and infrastructure.

- **Adaptive Sharing:** The ability to selectively share information content based on operational or business context: roles, relationship, risks, threats, trust, …

- **Safeguard**: The ability to appropriately protect the content, storage and exchange if information and data elements.

- **Automation:** The ability deliver machine computable ISS decision and enforcements points.

- **Auditable**: The ability to trace the sharing of information implementations to Legislative, regulatory, policy, … mandates.

- **"ilities":** The ability to deliver and deploy computable ISS decision and enforcements points that provide adaptability, flexibility, agility, supportability, …

PARTNER "A"

PARTNER "B"

PARTNER "C"

PARTNER "D"

Data and Information Fusion

Situational Awareness

Shared Knowledge

Machine Analytics and Reasoning

Shared Understanding

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Example of Data Model Approach
Multilateral Interoperability Programme (MIP)

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- A programme the spans 1992 to presents.

- Subsumed ATCCIS in 2000/01.

- Multilateral Interoperability Programme consists of 29 Nations comprising permanent and associate member national plus 1 NATO, full history found at: (https://mipsite.lsec.dnd.ca/Pages/Default.aspx)

- The Joint Consultation, Command & Control Information Exchange Data Model (JC3IEDM), STANAG 5525; and recently updated as the MIP Information Model (MIM)

- MIP Common Interface; based on a common MIP defined Specification

- Also support by the OMG Shared Operational Picture Exchange Services (SOPES) Information Exchange Data Model (IEDM) Specification: Transactional Model got the JC3IEDM V3.1c. Specification found at: (http://www.omg.org/spec/SOPES/)

National C2 Information System

National C2 Information System

Community Defined Specifications

Coalition Network & Communication Infrastructure

MCI MCI MCI MCI

National C2 Information System

National C2 Information System

https://mipsite.lsec.dnd.ca/Public%20Document%20Library/Forms/AllItems.aspx
?RootFolder=%2FPublic%20Document%20Library%2F04-
Baseline_3.1&FolderCTID=0x012000CDEC559A618DF74781A1E0AE00DB1626&
View={1DE80D78-9CC7-43F2-BDA0-08741E0F35E7}

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Accomplishment: Common Data Model and Exchange Mechanism for shared C2 Situational Awareness (SA) across a military coalition (1992 – Current) – 29 nations and 1 NATO HQ
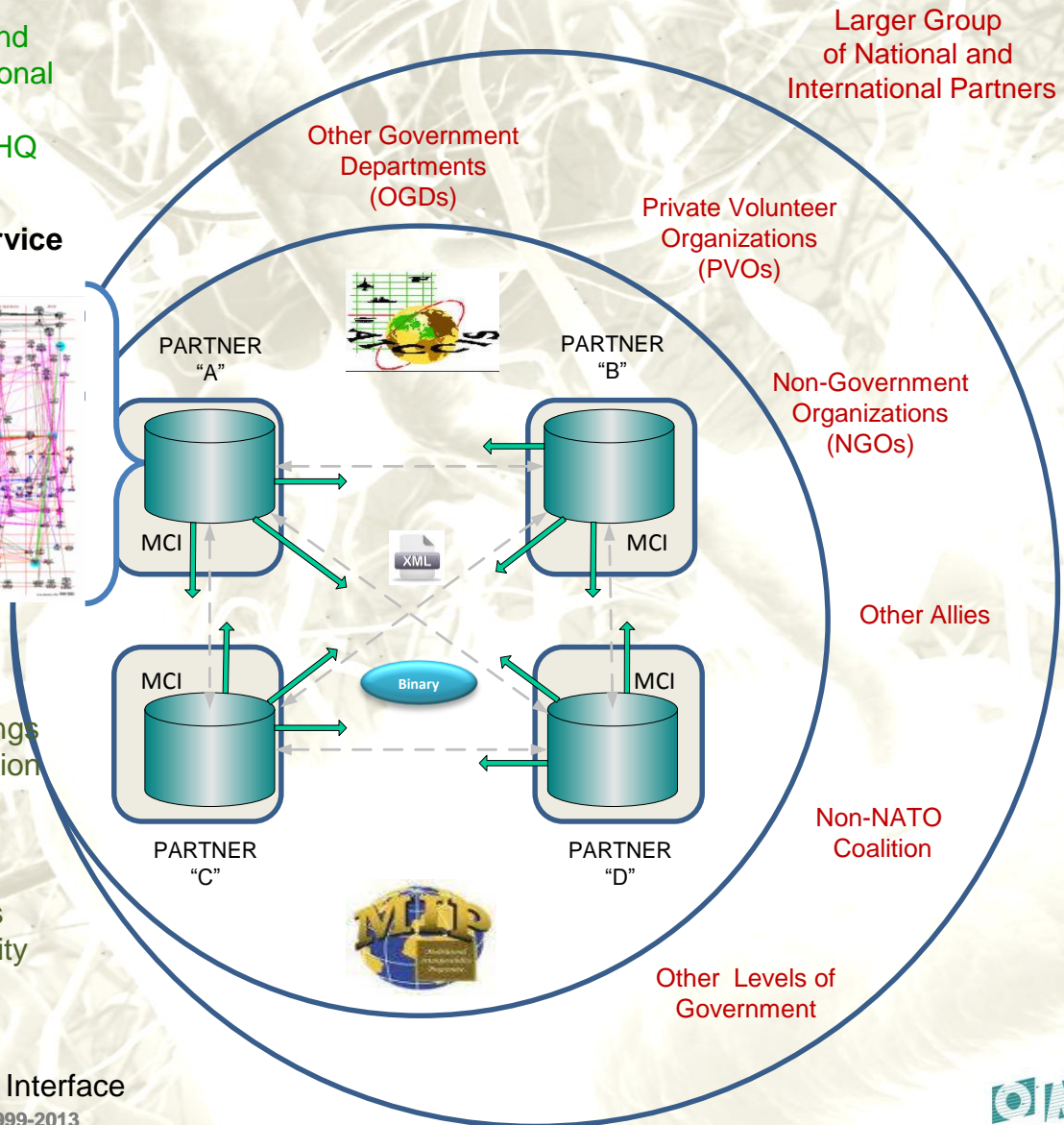
Complex Information and Service Domains
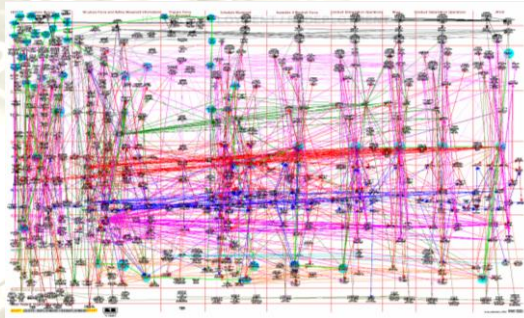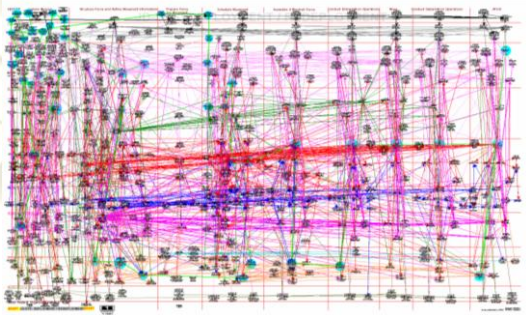
Reach back to National Domain

Shortfall:
(1) Stage complex national information holdings into the coalition, while enforcing information security policy and SOPs
(2) Establish the ability to support multiple communities of interest with different information needs & Messaging Protocols
(3) Dynamic (context Sensitive) Interoperability
(4) Alignment to C2 Applications and Military Messaging

MCI – MIP Common Interface

Larger Group of National and International Partners

Other Government Departments (OGDs)

Private Volunteer Organizations (PVOs)

Non-Government Organizations (NGOs)

PARTNER "A"

PARTNER "B"

MCI

MCI

XML

Binary

MCI

MCI

PARTNER "C"

PARTNER "D"

Other Allies
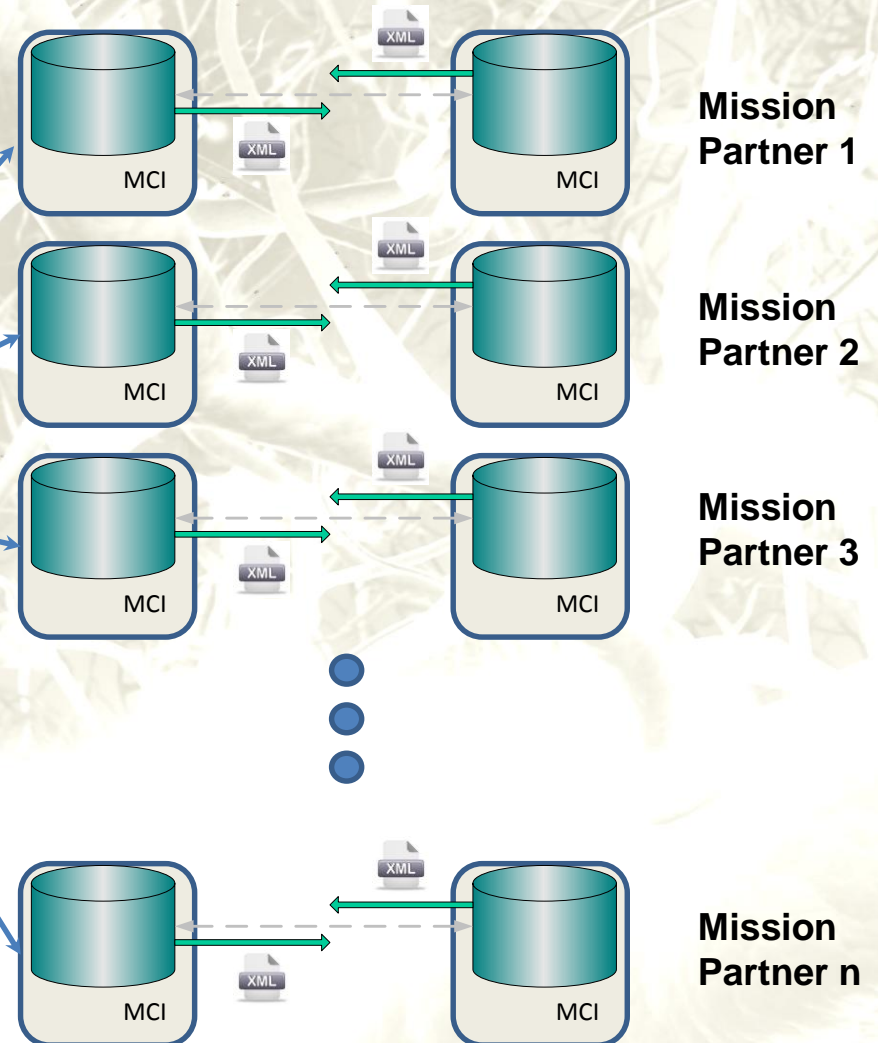
Non-NATO Coalition

Other Levels of Government

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MIP: Dealing with varying levels of Trust

Complex Information and Service Domains

Reach back to National Domain
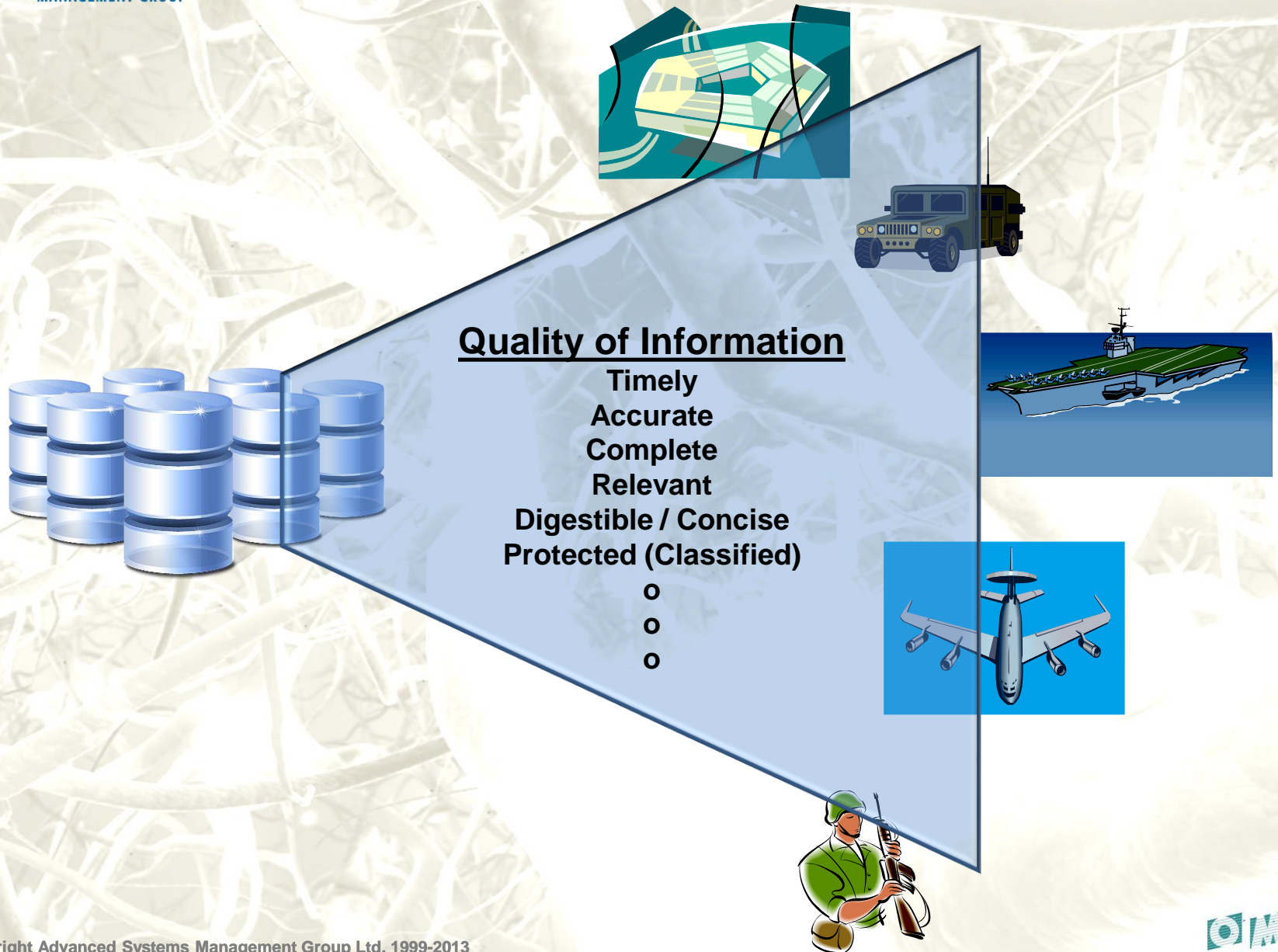
Mission Partner 1

Mission Partner 2

Mission Partner 3

Mission Partner n

MCI – MIP Common Interface

Addressing the variations in information needs

Quality of Information
Timely
Accurate
Complete
Relevant
Digestible / Concise
Protected (Classified)
o
o
o

Quality of Information
Timely
Accurate
Complete
Relevant
Digestible / Concise
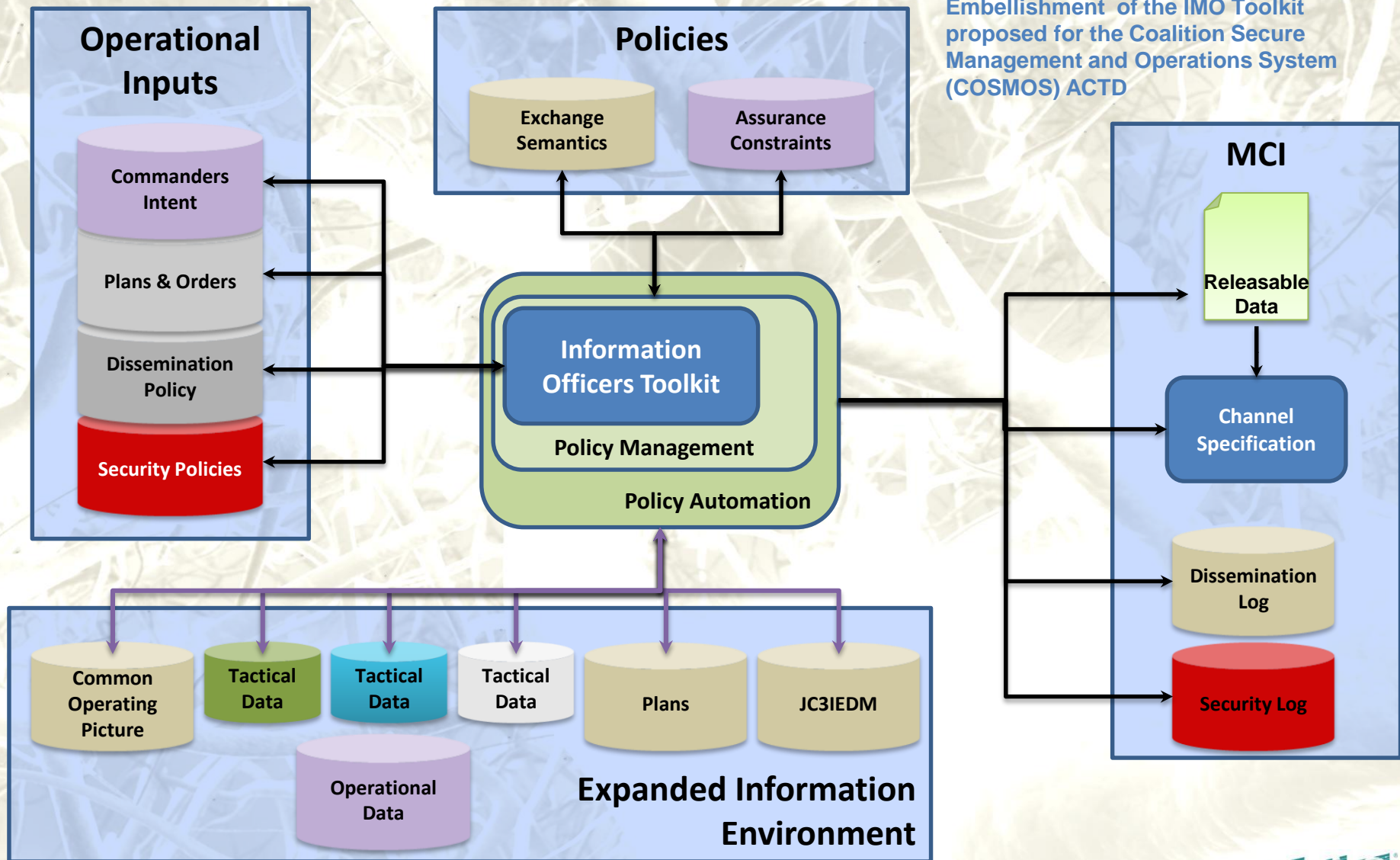**Protected (Private)**
o
o
o

Seeking a Context Sensitive MCI
Information Management Officer (IMO)

Embellishment of the IMO Toolkit proposed for the Coalition Secure Management and Operations System (COSMOS) ACTD

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Operational Inputs

- Commanders Intent
- Plans & Orders
- Dissemination Policy
- Security Policies

Policies

- Exchange Semantics
- Assurance Constraints

Information Officers Toolkit

Policy Management

Policy Automation

MCI

- Releasable Data
- Channel Specification
- Dissemination Log
- Security Log

Expanded Information Environment

- Common Operating Picture
- Tactical Data
- Tactical Data
- Tactical Data
- Plans
- JC3IEDM
- Operational Data

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Example of Shared Messaging Model
National Information Exchange Model (NIEM)

Not Addressed   **Addressed**   **Not Addressed**

Information Systems

INTERFACE

COMMONLY FORMATTED DATA

INTERFACE

Information Systems
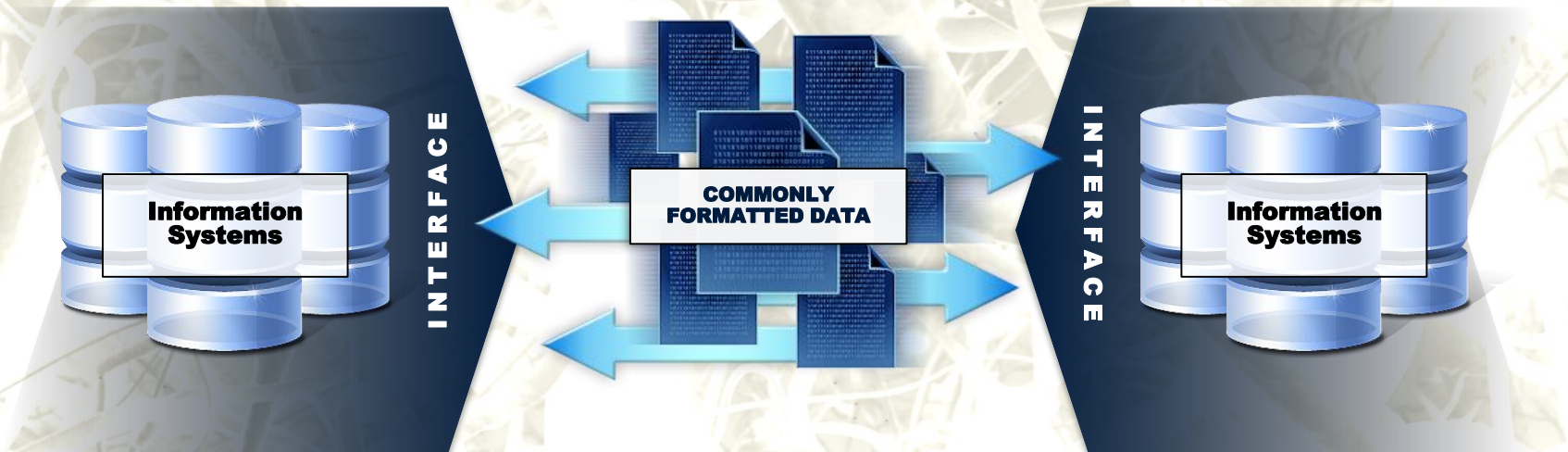
NIEM, as with other Shared Messaging Strategies, intentionally separates itself from the processing and storage requirements. They serve as a translation layers (providing a common understanding) between and across disparate systems.

- **NIEM CORE**
- **Biometrics**
- **CBRN**
- **Cyber**
- **CYFS**
- **Emergency Management**
- **GRM**
- **Health**
- **Human Services**
- **Immigration**
- **Infrastructure Protection**
- **Intelligence**
- **International Trade**
- **Justice**
- **Maritime**
- **Screening**
- **DOD – War-Fighter**
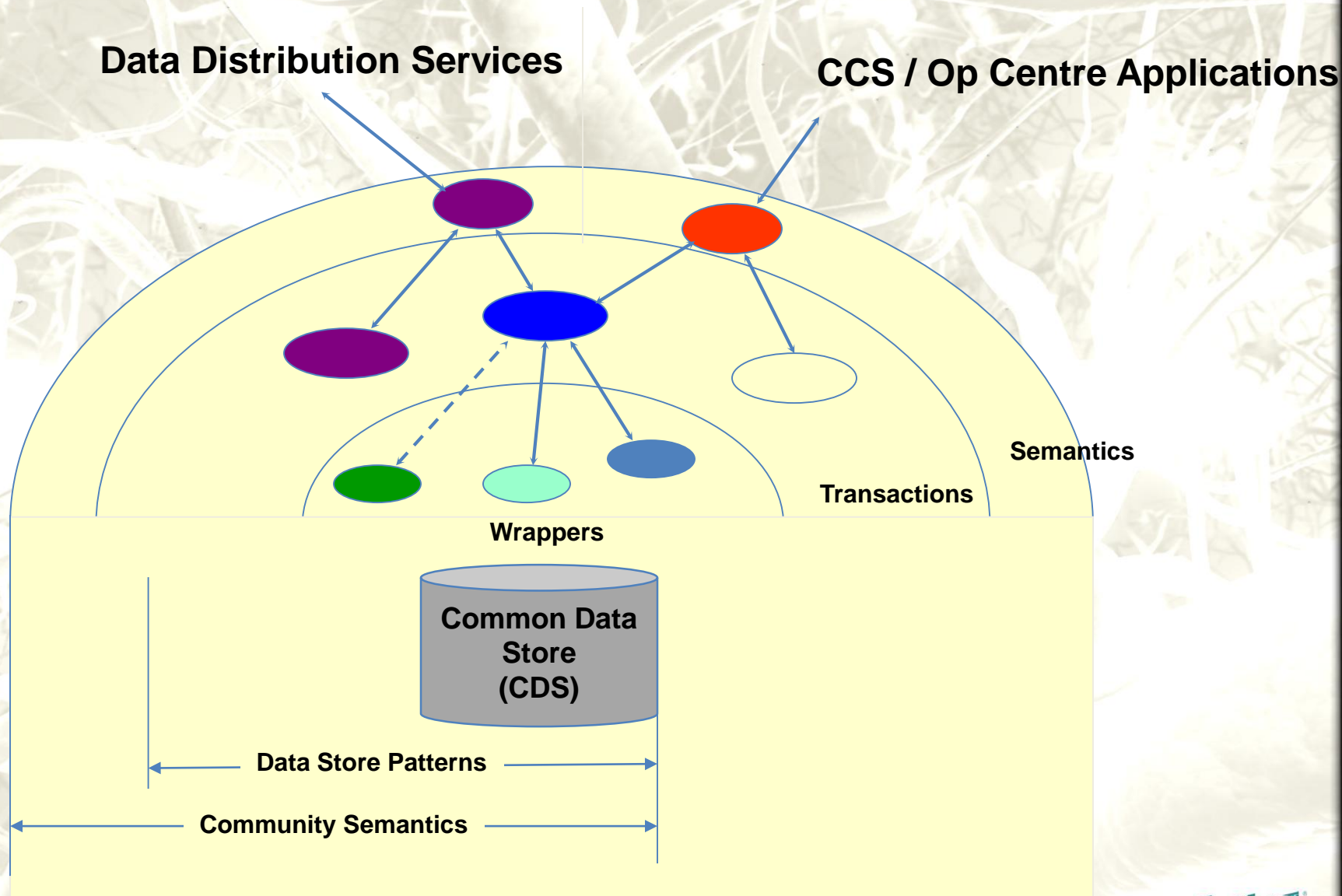- **More to Come**

- **These domains Cross Environments:**
  - *Federal*
  - *State*
  - *Local*
  - *Tribal*
  - *Industry and*
  - *International (Canada, Mexico)*

- **The are many opportunities for agencies to participate in multiple domains**
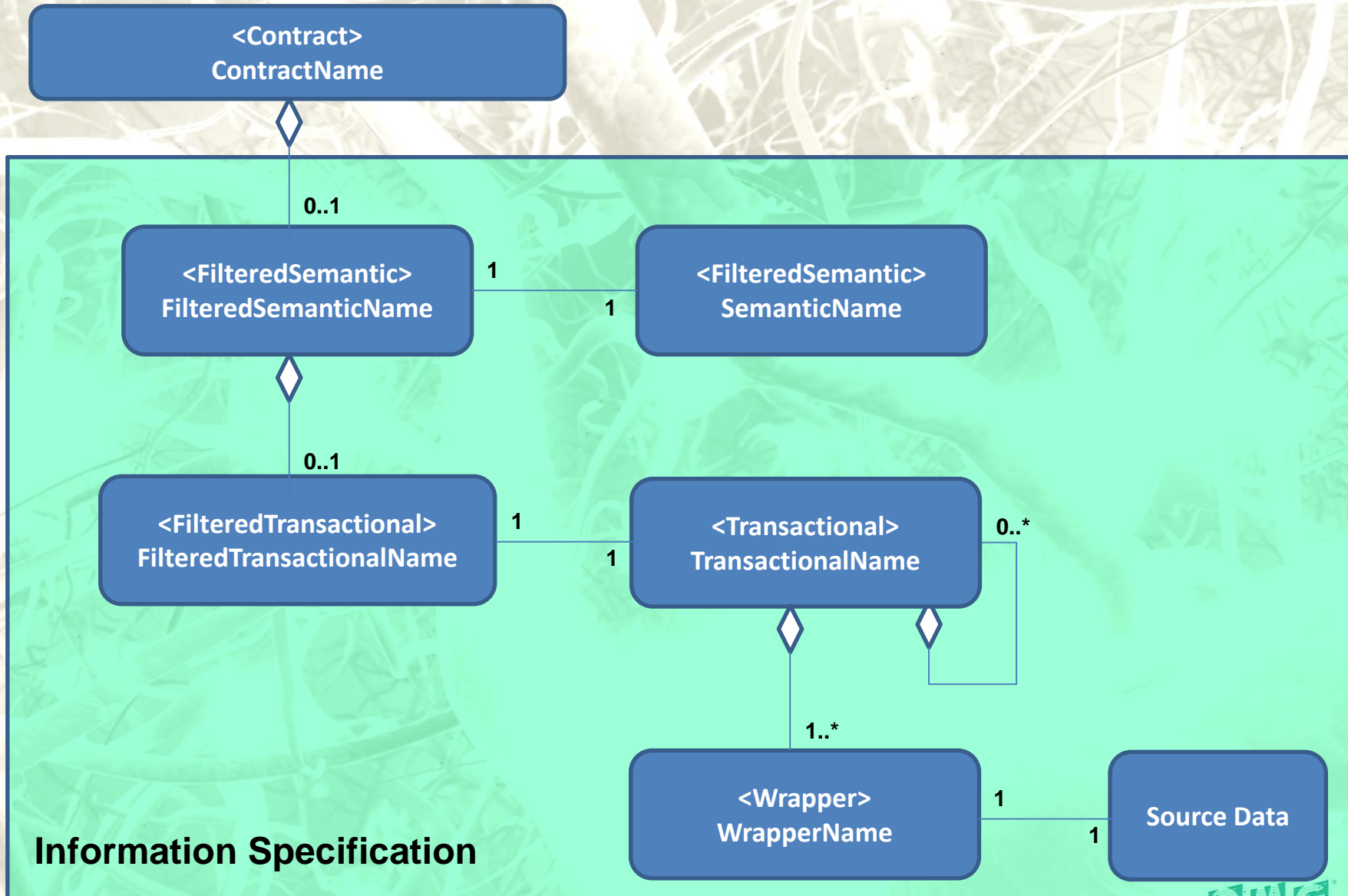
OMG
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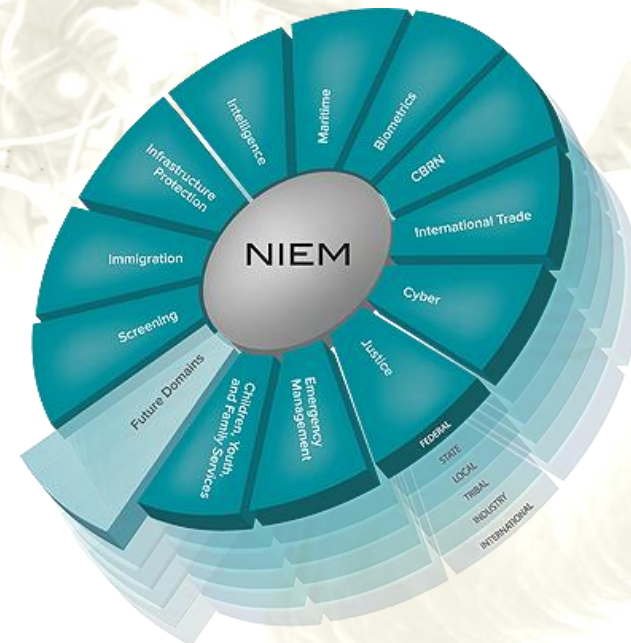
- **IE Packaging Policy Vocabulary (IEPPV) that enables:**
  - *The development of architecture and modeling tools that enable the translation policy into machine executable rules/instructions and deliver flexible, agile and dynamic semantic Interoperability*
  - *The development of Model Driven Architecture (MDA) transformations that convert the information sharing and safeguarding requirements into executable machine instructions*
    - *Data Aggregation (i.e., Semantic and Transactional Data Patterns), Processing and Marshaling Instructions*
    - *Data Transformation Instructions*
    - *Static and Dynamic Filtering Instructions*

- **IE Policy-based Packaging Services (IEPPS) that enables:**
  - *The development of decision and enforcement points that digest IEPPV defined policies to configure the run-time environment in a manner that dynamically adapts operational context*
  - *The responsible sharing and safeguarding of semantically complete and relevant information*

- **IE Policy Authorization Services (IEPAS)**
  - *Policy-based Request Services*
  - *Policy-based Authorization Services*

A Federal Employee may share a data segment of privacy data **with a federal employee or contractor for 90 days if the transfer is audited and the data is encrypted when outside of the primary system from which the data came.**

Policy/Rule Life-cycle
(Policy-based Packaging)

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Source Requirement

Legislation/International Agreement
Government Policy
Regulation
Agency Policy
Operating Procedures
Service Level Agreements

Change Recommendations

Architecture

Post Mission Analysis

2

1

AF Domain Model

Architecture Driven Transformation

Executable Policy

Testing, Validation and Certification

Architecture Framework (AF)
DODAF/UPDM/IEPPV/NIEM-UML

Policy Management

Governance

1 **2**

Policy Enforcement Point

Policy Decision/Enforcement Point

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Data Distribution Services

CCS / Op Centre Applications

Semantics

Transactions

Wrappers

Common Data Store (CDS)
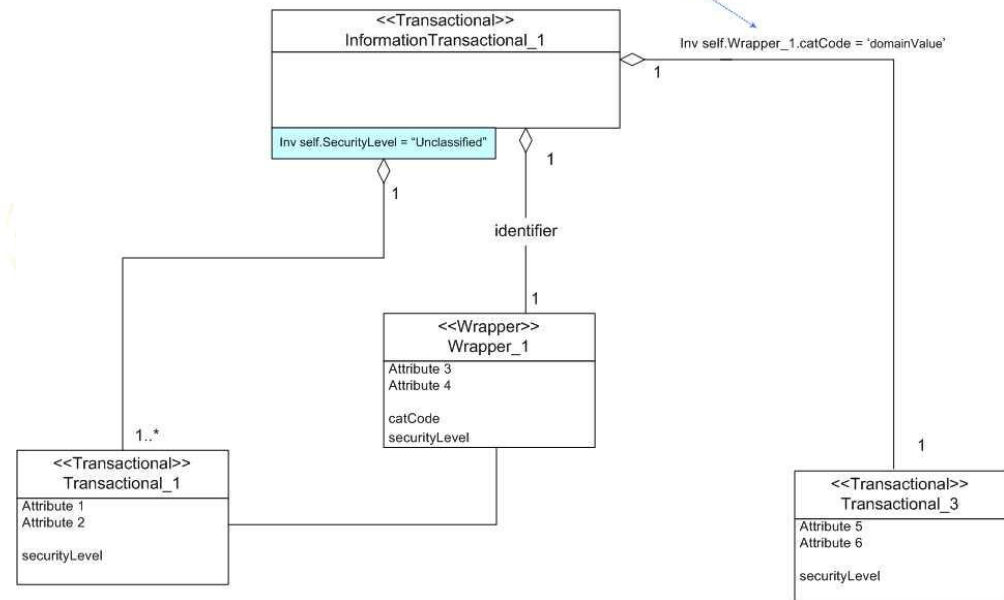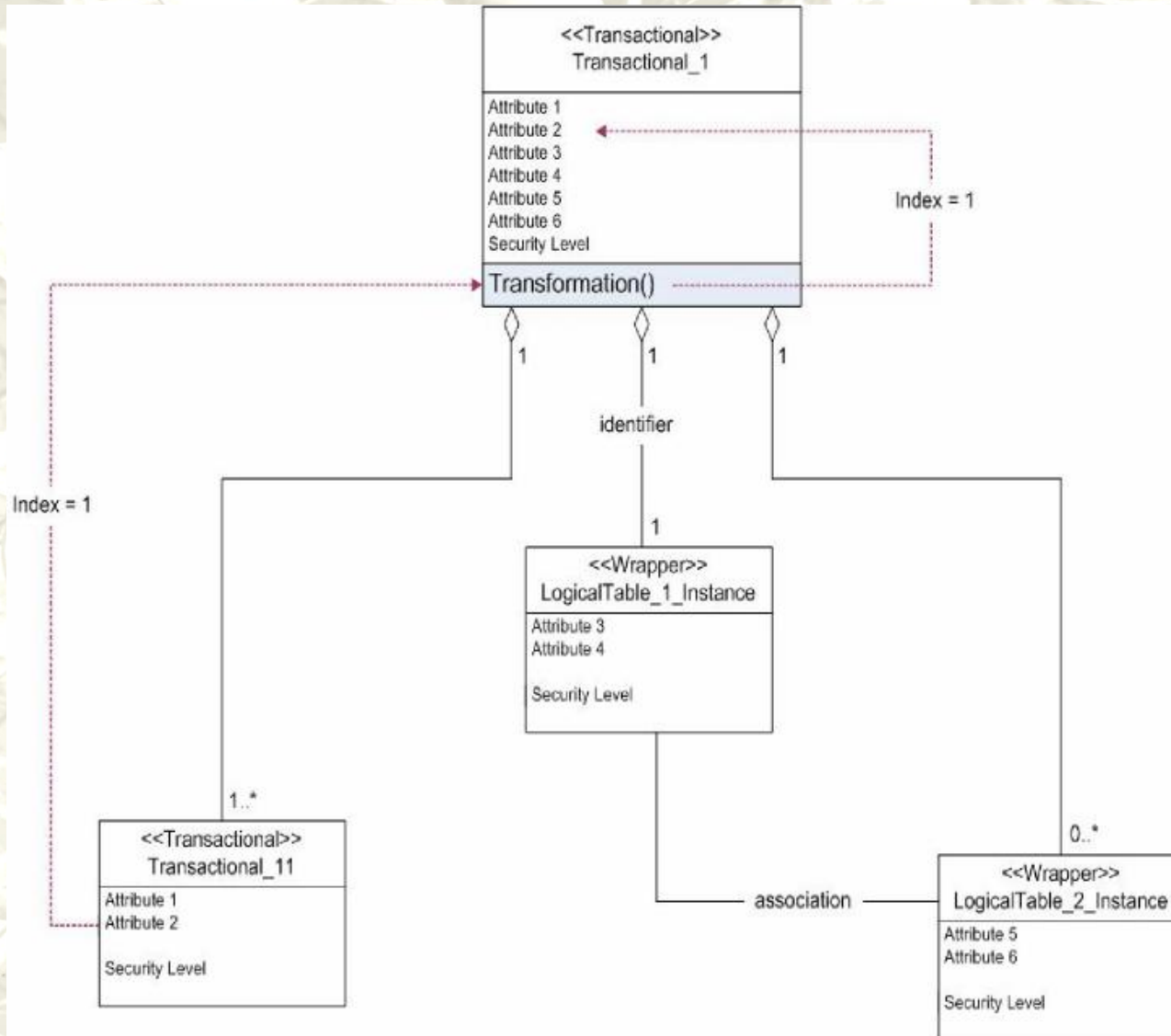
Data Store Patterns

Community Semantics

This qualifier establishes acts as a filter during the aggregation data under this pattern. I restricts the aggregation to datasets containing the specific domain value ('properValue')
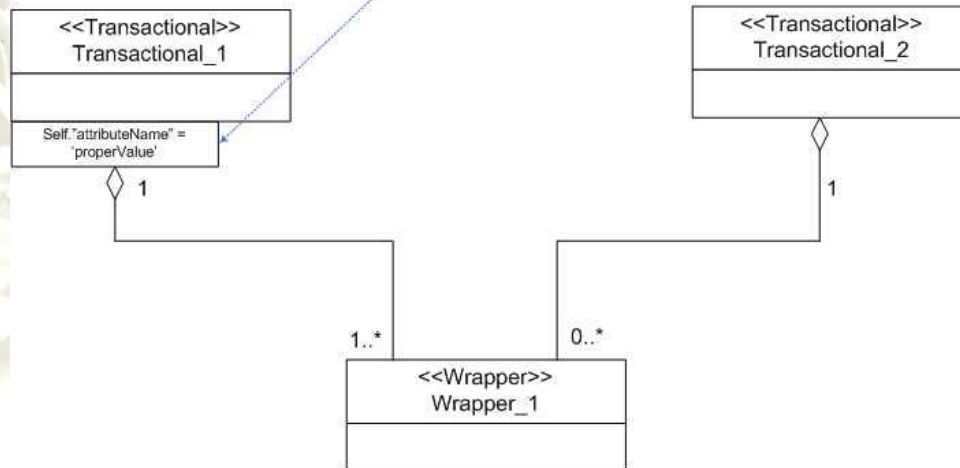
The construction sequence only aggregates the subtended elements if the condition is met

<<Transactional>>
Transactional_1

Self."attributeName" = 'properValue'

1

<<Transactional>>
Transactional_2

1

1..*

0..*

<<Wrapper>>
Wrapper_1

<<Transactional>>
InformationTransactional_1

Inv self.Wrapper_1.catCode = 'domainValue'

1

Inv self.SecurityLevel = "Unclassified"

1

1

identifier

1

1

<<Wrapper>>
Wrapper_1

Attribute 3
Attribute 4

catCode
securityLevel

1..*

1

<<Transactional>>
Transactional_1

Attribute 1
Attribute 2

securityLevel

<<Transactional>>
Transactional_3

Attribute 5
Attribute 6

securityLevel

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**Information Exchange Framework
Roadmap
March 2013**

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