OMG’s Model Driven Architecture® Standards for Information Sharing

ISS Policy
Information Exchange Policy Vocabulary (IEPV)

As illustrated: the IE Packaging Policy Vocabulary (IEPPV) is the first in a series of IEPV specifications that will be needed to address the growing number of IEF Service Specifications.
ISS Objectives

- **Semantic Interoperability**: the ability of information systems to exchange information in a manner; enabling automatic processing, classification and analysis of the content to infer the implicit meaning; and then provide relevant elements to decision makers in a timely, accurate and digestible manner. To achieve semantic interoperability, both sides of the exchange must infer common meaning and intent based on agreed domain, semantic or ontological models.
  - **Information Sharing**: refers to the combination of policies, governance, procedures, and technologies that allow different organizations to share relevant/important data with each other.
  - **Information Safeguarding**: refers the combination of policy, governance, procedures and technologies that assure that the information (content) is not released to those not authorized or credentialed to receive it.
- **Policy-Driven**: the ability to translate policy into machine enforceable instructions in a manner that is traceable and auditable. (resulting in Policy Automation)
- **Policy Management**: the ability to configured and tailor run-time policies to accommodate changes in operational context.
- **Overcome current operational, architecture and design challenges**: the ability to evelop or align specifications that enable tool vendors to deliver the tools required to deliver and sustain Flexible, Agile and Adaptive information Sharing and Safeguarding Solutions.
- **Policy Automation**: the ability of information systems, intelligent agents and appliances to enforce policy without the requirement of human interaction.
Semantic Interoperability Goals

- **Asymmetric Sharing**: The ability to share content with different communities, agencies or individuals conforming to legislative, regulatory, policy, contractual or 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 to 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, ...
Addressing Operational Challenges

- Data rich and Information poor: enable the selective sharing of information based on established policies and semantics and enhance the quality of information (timely, accurate, relevant, digestible, …) available to the decision makers.

- Expanding legislative, regulatory and policy required to responsibility share relevant information: enable the translation regulations and policies into machine enforceable rules.

- Balancing information sharing and information protection: enable selective release of information content based on sensitivity, level of trust or recipient and operational context.

- Adapting to increasing complexity of the information domain: enable timely and cost effective development, testing and certification of ISS capability.

- Balancing information and data overload: deliver integrated/fused information tailored to the policies and semantics of the decision maker.

- Adapting to highly dynamic and fluid operational environments: enable management (activate, deactivate, modify, append) policies and semantics at runtime.

- Perception the IM and SA system do not provide quality Information: provide direct traceability and auditability of decision makers requirements for accurate, relevant, timely, digestible, usable, complete, trustworthy, secure/protected – enabling analytics and reasoning.
Addressing Architecture and Design Challenges

• Specifications for the development of tools that will enable the translation of ISS Policies into machine enforceable rules, instructions and constraints.

• Specifications for the development of Policy Decision and Enforcement Points/Services (e.g., IEPPS)

• Practices that enable users with the ability and capacity to keep pace with:
  – New Legislation, Policy, and Operating Procedures
  – Evolving threats and risks
  – Asymmetric operations
  – New Techniques and Technologies
  – Real-world operational context and coalitions

• Practices that enables users to retain institutional knowledge and memory

• Practices that increase capacity while reducing IM/IS/IT life-cycle costs
Where is the challenge?

Data in Use
- Addressed by Extract, Transform Load; or Application Code

Data in Transit
- Rigid and Brittle
- Costly to Maintain and Adapt
- Not Responsive to Changes in Operations

Data at Rest
- Typically Pier-to-Pier
- Task/Organization Specific
- Stove-piped

Organizations have lost, the institutional knowledge and memory needed to manage and maintain Business Rules related to information usage and exchange.
Where are the Challenges

IEPPV Profile

- Business Rules
  - Aggregation
  - Tagging
  - Filtering/Redaction
  - Transformation
    - Vocabulary
    - Domains
    - Structure

Information Exchange

Identity Access Credential Policy

Cyber Policy

Syntax and Structure

NIEM Profile

- Business Rules
  - Parsing
  - Marshaling
  - Integration/Fusion
  - Transformation
    - Vocabulary
    - Domains
    - Structure

Increasing Sensitivity
How it is typically Handled

User Application

Data Interface

Custom Application
ETL
Mediation
Middleware
Other

Custom or Tool Specific
Code or Script

Information Exchange Packaging Policy Vocabulary (IEPPV)

Exchange Semantics

Minimal alignment with other architectural elements.
Policy/Rule Life-cycle
(Policy-based Packaging)

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

Architecture
- Architecture Framework (AF)
  - DODAF/UPDM/IEPPV/NIEM-UML
- Architecture Driven Transformation
- Executable Policy

Testing, Validation and Certification

Policy Management

Post Mission Analysis

Change Recommendations

Policy Enforcement Point

Policy Decision/Enforcement Point
Contact

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