Building net-ready information interoperability performance indicator widgets for DoDAF 2.0 dashboards

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Agenda

Motivation
Goal Driven Measurement – GQIM
Workshop Outcomes
Case Example: Mission-Architecture IPT
Next Steps
Benefit ITAA/GEIA members, government sponsors, builders, developers, and users of …

Products, Processes and Tools related to …

Information Interoperability by …

Filling critical gaps,
Improving performance, and
Reducing costs.
But How Do We Judge?

Measurement!
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Goal-Driven Measurement

When using goal-driven measurement, the primary question is not:

“What metrics should I use?”

rather, it is:

“What do I want to know or learn?”
Measuring Goal Achievement

Goal

Success criteria

Strategy to accomplish goal

Tasks to accomplish goal

Task 1
Task 2
Task 3
Task n

Success indicators

Impact

Progress indicators

For project manager

Roll-up for higher management

Analysis indicators

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**Step 1: Goals**
Components of good goal statements

**Step 2: Clarify Questions**
to refine the goal

**Step 3: Decomposing Goals**
Subgoals by perspective

**Step 4: Operationalize Goals**
Operationalize goal statement

**Step 5: Success Criteria**
Clear articulation of the criteria you will use to decide if the goal has been met.

**Step 6: Success Indicators**
Postulate Success Indicators

**Step 7: Strategies & Activities**

**Step 8: Identify the data elements**

**Step 9: Identify the actions**
needed to implement your measures

**Step 10: Prepare a plan**
Verification and action plans
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Workshop Outcomes: Top Three Goals

- Enable precision information sharing among stakeholders
  - Minimal ambiguity

- Measure the “goodness” for information interoperability standards
  - Then standards in general
  - “Goodness” for information interoperability
  - How effectively are users getting & using information exchanges

- Systems and enterprise’s achieve more effective collaboration and/or achieve greater success by enabling inter-enterprise collaboration
Enable information sharing among stakeholders with minimal ambiguity.

<table>
<thead>
<tr>
<th>Theme (Stakeholder, Info, Std)</th>
<th>Type of Indicator (Success, Progress, Analysis)</th>
<th>Questions</th>
<th>Atomic Indicator</th>
<th>Roll-up Indicator</th>
<th>DoDAF Product &amp; Other Sources</th>
<th>CADM Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder</td>
<td></td>
<td><strong>What are the stakeholders?</strong></td>
<td>Completeness</td>
<td>Completeness</td>
<td>OV-2, OV-3</td>
<td>OperationalNode</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>What information do the stakeholders need?</strong></td>
<td></td>
<td></td>
<td></td>
<td>InformationExchangeRequirement/</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Visiblity</strong></td>
<td>Did the Info Provider publish availability of the Info? Can the Info Consumer discover needed info?</td>
<td>Visibility</td>
<td>SV-4a/b, Enterprise Catalog Service (ECS) &amp; Service Registry, Content Discovery and Delivery (CD&amp;D)</td>
<td>InformationExchange/InformationElement</td>
</tr>
</tbody>
</table>
Quality Evaluation

Notes:

Each category is graded on a scale of 1-5 and weighted to a total of 100%. Data is based on a survey of stakeholders.

Users of the indicator include:
• standard developers and associated marketing
• potential adopters
• actual users
Scalability means across multiple domains
Usability means by multi-functions (non-IT experts)
Interface Maintenance

Cost of Interface Maintenance

Period 1 Period 2 Period 3 Period 4 Period 5 Period 6 Period 7 Period 8 Period 9 Period 10

Dollars

0 20 40 60 80 100 120

Period 1
Adoption

Information Technology Association of America

Standard Adoption

Number

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10

Adopters  Target

0 2000 4000 6000 8000 10000 12000
Semantic Alignment

Latency vs. Session time

WordNet Cyc

# of touches vs. Session time
DoDAF 2.0 “Dashboards”

Defining indicator widgets for dashboards
Workshop Outcomes: Conclusions

Information Technology Association of America

- The SEI GQ(I)M provides a viable methodology to develop information interoperability indicators
- We identified a preliminary set of indicators for measuring the “goodness” of information exchange standards relative to business goals
- We concluded
  - Enterprise architecture frameworks with an explicit focus on services (transactions) provide a means of implementing and improving Information Interoperability
  - Indicators provide a means for establishing a standardized set of reusable dashboard elements (‘indicator widgets’) in these frameworks
Workshop Outcomes: Observations

- The DoDAF 2.0 presentation technology working group has set forth dashboards as a category of presentation views.
- Baseline indicators for information interoperability need to be developed (similar to baseline KPI’s for enterprise architecture frameworks).
- Existing work from assessment, performance, and other model based efforts provide valuable resources for developing information interoperability (as well as other) indicator widgets.
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Quality of Organic and Shared Information is The Primary Focus of Terminology and Lexicon Services

Quality of Organic Information

New Concepts & TTP

Individual Situational Awareness

Tempo

Speed of Maneuver

Self Synchronization

Cognitive Domain

Physical Domain

Information Domain

Collaboration

Shared Situational Awareness

Common Tactical Picture

Robustly Networked Force

Information Sharing

Lexicon Services

Terminology Services: Challenge
Semantic Interoperability Scoping

Terminology Services
Primary Focus

Increasing Search Capability
Terminology Services: Challenge
Information Interoperability

Common Lexicon vs Ad-Hoc Reverse Engineering

Common Terminology Makes Information Interoperability Possible

Reverse Engineering is Expensive, Difficult, and Often Not Feasible
Terminology Services: Related Work
Capability-Based Systems-of-Systems Engineering (SOSE)

NCEE
Naval Collaborative Engineering Environment (NCEE)

NAERG
Naval Architecture Element Reference Guide (NAERG)

Common Access Card (CAC) Enabled Websites

https://ncee.navy.mil/Pages/default.aspx

https://stalwart.spawar.navy.mil/naerg
Architecture Frameworks: Current Work
Mission Architecture Dashboard

- Capability Tracing, Assessment, Validation, and Gap Analysis
- Threat Scenarios
- Inter-Agency Cross-Domain Information-Sharing Supply-Chain

Enterprise Framework - Policies, Rules, Metrics
Processes, Architectures, ...

Mission Architecture Dashboard

Integrated AT&L Life Cycle Management Framework

Operational Mission-Threads
Operational Plans (OPlans)
Mission Operations Systems
Devices

Common Terminology - Managed Vocabulary - Enterprise Lexicon Services (ELS)
Architecture Models: Emerging Standards
DoD Architecture Framework 2.0 Example

Standardized Dashboard Views, Data Elements, Business Rules, etc.

Presentation Techniques
- Graphical Depictions
- Reference Models
- Fusion Products
- Composite Products

Standardized Dashboard Presentation Views

Architecture Information
- Activities
- Data Elements
- Business Rules

Data Elements & Business Rules

Architecture Methods
- Activity Models
- Process Models
- Data Models
- System Function
Architecture Frameworks: Emerging Focus

Enterprise Dashboards and Widgets

DoDAF 2.0

Roles & Responsibilities

Decision Makers

Dashboards

Multiple Dashboards & Decision Makers

Presentation Layer

Business Logic

Data Resources

KPI

Enterprise Lexicon Services

SOA

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KPI – Key Performance Indicator
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Way Ahead

• Further explore leveraging DoDAF 2.0 to help define an open standard for indicator widgets

• Produce an exemplar reference implementation for a set of indicator widgets

• Produce guidance on how to go from existing standards to the indicator widget paradigm
Questions?
Resources Related to Information Interoperability Indicator and Assessment

Information Technology Association of America

- **DOD Net-Centric Checklist, Version 2.1.4, July 30, 2004**
  - Assists program managers in understanding the net-centric attributes that their programs need to implement to move into the net-centric environment as part of a service-oriented architecture in the Global Information Grid.

- **NCIOC Network Centric Analysis Tool (NCAT) & SCOPE model**
  - NCAT is a metric measurement tool developed by the NCOIC for use in evaluating the ability of a system/subsystem/component to operate in a network centric environment. Designed to leverage complementary tools developed by DISA and others, the NCAT is highly flexible, easily adaptable, and can be tailored for specific requirements.

- **DOD's Modular Open Systems Approach (MOSA) Program Assessment and Rating Tool (PART)**
  - An analytical tool to aid DoD Program Managers assess their approach to open systems throughout the acquisition life cycle.

- **Navy Open Architecture Assessment Tool (OAAT)**
  - A Navy tool to assess the openness of a systems or program.

- **DOD's Data and Service Exposure Verification Tracking Sheets**
  - Used to measure net-centricity in support of the DOD's Net-Centric Data Strategy.

**A catalog of reusable indicators can be readily derived**
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