The Role of Enterprise Architecture Updates in Guiding Decentralized Organizations

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Overview

- Enterprise Architecture and Systems Study Interrelation
- Systems Study Methodology
- Systems Study Data Manipulation
- Summary
- Backup Slides
ENTERPRISE ARCHITECTURE AND SYSTEMS STUDY INTERRELATIONSHIP
Enterprise Architecture (EA)

Previous EA
- DODAF 1.0
- Starting Point for Updated EA

Updated EA
- DODAF 2.0
- Develop with Operational and Functional Focus
- Conduct Reviews with Representative Subset of COI
- Incorporate COI Comments

Updated EA ‘As-Is’ Models in CORE
- Functional Model

Updated EA ‘To-Be’ Models in CORE
- Functional Model
- Notional Physical Model

Updated EA Transition Plan
- Transition from ‘As-Is’ to ‘To-Be’ Architectures
- Organizational and Technical Transition Initiatives
Why Update the EA?

- **Previous EA ‘As-Is’**
  - Documents current state of functionality as of previous EA completion

- **Previous EA ‘To-Be’**
  - Documents desired future state of functionality as of previous EA completion

- **Update EA ‘As-Is’**
  - Documents current state of functionality

- **Updated EA ‘As-Is’**
  - Documents desired future state of functionality
  - Provides planning and policy direction

- **How effective were past policy actions?**
  - Delta describes the difference between the previous planned and updated actual processes
  - Assesses the effectiveness of past decisions and directives

- **What needs to change?**
  - Delta describes the required transitions to achieve the ‘To-Be’ functionality.
  - Influences policy and procurement decisions

- **What is being done differently?**
  - Delta describes the change in the way the community operates from the previous to the updated EA.

- **How has the vision changed?**
  - Delta describes the change in operational vision from the previous to the updated EA.
EA Transition Plan

- Delta describes the required transitions to achieve the 'To-Be' functionality.
- Influences policy and procurement decisions

- Transition from 'As-Is' to 'To-Be' Architectures
- Organizational and Technical Transition Initiatives

Updated EA 'As-Is'

Updated EA 'To-Be'

What needs to change?

How to implement changes?

Updated EA Transition Plan

Organizational Transition Initiatives
Technical Transition Initiatives
Transition Initiative Timeline
The Systems Study Findings will show how existing systems might be leveraged to implement the desired processes and changes as defined in the Updated EA.
SYSTEMS STUDY METHODOLOGY
Systems Study Path Forward

1. Updated EA ‘As-Is’ Functional Models in CORE
   - Review Updated EA ‘As-Is’ Functional Requirements
   - OV-5

2. Updated EA ‘To-Be’ Functional Models in CORE
   - Review Updated EA ‘To-Be’ Functional Requirements
   - Review Updated EA ‘To-Be’ Systems and Services Functional Allocations
   - SV-5a
   - SecV-5
   - OV-5

3. Develop System Evaluation Criteria
   - Develop System Evaluation Criteria
   - Map Evaluation Criteria to Updated EA
   - Map Evaluation Criteria to Transition Initiatives

4. Conduct System Evaluations
   - Establish Data Collection Methods
   - Identify Current Systems
   - Conduct System Evaluations
   - Eval Results

5. Develop EA ‘As-Is’ Physical Architecture
   - Review Current Systems’ Functionality
   - Develop Systems ‘As-Is’ Physical Architecture
   - Phys Arch

6. Develop Systems Study Findings
   - Review System Evaluations Results
   - Develop Systems Study Findings
   - Findings

7. Documentation and Findings

8. Requirements Analysis

9. System Evaluations
Systems Study Path Forward

1. Requirements Analysis
   - Updated EA ‘As-Is’ Functional Models in CORE
     - Operational Resource Flow
       - Review Updated EA ‘As-Is’ Functional Requirements

2. System Evaluations
   - Conduct System Evaluations
     - Current Systems Interconnectivity
     - Current Systems
     - Criteria Evaluation Results
       - Establish Data Collection Methods
       - Identify Current Systems
       - Conduct System Evaluations

3. Documentation and Findings
   - Develop EA ‘As-Is’ Physical Architecture
     - Current Systems Physical Architecture
       - Review Current Systems’ Functionality
       - Develop Systems ‘As-Is’ Physical Architecture
Systems Study Path Forward

- Requirements Analysis
  - Review Updated EA ‘To-Be’ Functional Requirements
  - Review Updated EA ‘To-Be’ Systems and Services Functional Allocations

- Updated EA ‘To-Be’ Functional Models in CORE
  - Service Functional Allocation
  - System Functional Allocation
  - Operational Resource Flow
  - System Functions

- System Evaluations

- Develop System Evaluation Criteria
  - Criteria Descriptions
  - Criteria Measures
  - Criteria System Function Allocation
  - Criteria Transition Initiative Allocation

- Develop System Evaluation Criteria
- Map Evaluation Criteria to Updated EA
- Map Evaluation Criteria to Transition Initiatives
Systems Study Path Forward

1. Develop System Evaluation Criteria
   - Criteria Descriptions
   - Criteria Measures
   - Criteria System Function Allocation
   - Criteria Transition Initiative Allocation
   - Develop System Evaluation Criteria
   - Map Evaluation Criteria to Updated EA
   - Map Evaluation Criteria to Transition Initiatives

2. Conduct System Evaluations
   - Current Systems Interconnectivity
   - Current Systems
   - Criteria Evaluation Results
   - Establish Data Collection Methods
   - Identify Current Systems
   - Conduct System Evaluations

3. Conduct System Evaluations

4. Develop Systems Study Findings
   - Collated Evaluation Results
   - Documented Findings
   - Recommendations
   - Review System Evaluations Results
   - Develop Systems Study Findings

5. Documentation and Findings
Systems Study Path Forward

1. Establish Data Collection Methods
2. Identify Current Systems
3. Conduct System Evaluations
4. Review System Evaluations Results
5. Develop Systems Study Findings
6. Review Current Systems’ Functionality
   - Develop Systems ‘As-Is’ Physical Architecture
7. Develop EA ‘As-Is’ Physical Architecture
   - Current Systems
   - Interconnectivity
   - Criteria Evaluation Results
8. Documented Findings
   - Collated Evaluation Results
   - Recommendations
9. System Evaluations

Documentation and Findings
SYSTEMS STUDY DATA MANIPULATION
Criteria Evaluation Results Data
Determining Systems Potentially Impacting Changes

1a. Determine criteria mapped to TI

1b. Determine criteria mapped to system function

2. Determine criteria occurrences mapped to criteria

3a. Determine non-zero value occurrences

3b. Determine highest value occurrence

Evaluate

Characteristics: 1.1
- Type: Criteria Occurrence
- System A
- System B
- System C

Assets:
- System A
- System B
- System C

Significant Impacting Systems

Most Significant Impacting System

Significant Criteria Occurrences

Most Significant Criteria Occurrence

Determine systems mapped to criteria occurrences
Findings Document Creation

* The following cross matrices are created:
  - Criteria Items to Systems Cross Matrix
  - Criteria Items to Systems Cross Matrix with Criteria Values
  - Functions to Systems Cross Matrix
  - Functions to Systems Cross Matrix with Values
  - Summary Level Criteria Items to Systems Cross Matrix
  - Summary Level Criteria Items to Systems Cross Matrix with Criteria Values
  - Transition Initiatives to Systems Cross Matrix
  - Transition Initiatives to Systems Cross Matrix with Values

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System Interconnectivity Data
Physical Architecture Model Rendering

1. Determine system function mapped to system
   - Asset
     - Type = System
     - System
   - Performs / allocated to
     - Hierarchy Diagram
   - Determine functional correlation

2. Determine applicability of system function IDEF
   - IDEFO-A0
   - IDEFO
   - Action
     - Type = System Function
     - System Function
   - Augmented by
     - IDEFO-A0
     - IDEFO
   - Determine system functions with IDEF Diagrams

3. Determine system function mapped to system
   - IDEFO-A0
   - System User Function
   - Action
     - Type = System Function
     - System User Function
   - Augmented by
     - IDEFO-A0
     - IDEFO
   - Determine applicability of system function IDEF
     - IDEFO
   - Text
     - Functional Correlation
     - Action
       - Type = System Function
       - System Functional Context
     - Augmented by
       - IDEFO-A0
       - IDEFO
     - IDEFO
     - IDEFO
Physical Architecture Document Creation

Develop EA ‘As-Is’
Physical Architecture

- Extract ‘As-Is’ Physical Architecture CORE Scripts
- Related Physical System Functional Contexts’ IDEF0s
- Related Physical System User and External System Functions’ IDEF0-A0s
- System Hierarchy Diagram
- System Function IDEF0-A0
- Decomposable System Function IDEF0
- IDEF
- PPT
- RTF
- DOC

Convert ‘As-Is’ Physical Architecture RTF File

Enter System IO Slides

Systems Interconnectivity Diagrams Briefing

Enter PPT

PPT

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Systems Study Product Creation

* The following cross matrices are created:

- Criteria Items to Systems Cross Matrix
- Criteria Items to Systems Cross Matrix with Criteria Values
- Functions to Systems Cross Matrix
- Functions to Systems Cross Matrix with Values
- Summary Level Criteria Items to Systems Cross Matrix
- Summary Level Criteria Items to Systems Cross Matrix with Criteria Values
- Transition Initiatives to Systems Cross Matrix
- Transition Initiatives to Systems Cross Matrix with Values

Systems Study Products

- Systems Interconnectivity Diagrams Briefing
- 'As-is' Physical Architecture Word File
- Systems Study Data Summary and Correlation Word File
- Systems Study Data Summary Cross Matrix Excel Files
- Systems Study Findings Briefing

Physical Architecture Products

- Physical Architecture Data
- Extract
- Data Processing CORE Scripts
- System Evaluation Data

Findings and Recommendations Products

- Findings and Recommendations Products

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Summary

- Enterprise Architecture (EA) updates answer questions regarding the state and direction of the enterprise.
- Systems Study findings show how existing systems might be leveraged to implement the desired processes and changes as defined in the Updated EA.
- Systems Study data should be stored in the architecture database and mapped to the EA and Transition Initiatives.
BACKUP SLIDES
## Enterprise State and Direction Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Architectural Product / Product Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q1</strong> What is the current process?</td>
<td>Updated EA ‘As-Is’ Functional Architecture</td>
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<tr>
<td><strong>Q2</strong> What is the desired process?</td>
<td>Updated EA ‘To-Be’ Functional Architecture</td>
</tr>
<tr>
<td><strong>Q3</strong> How effective were past policy actions?</td>
<td>Previous EA ‘To-Be’ Functional Architecture / Updated EA ‘As-Is’ Functional Architecture Delta</td>
</tr>
<tr>
<td><strong>Q4</strong> What needs to change?</td>
<td>Updated EA ‘As-Is’ Functional Architecture / Updated EA ‘To-Be’ Functional Architecture Delta</td>
</tr>
<tr>
<td><strong>Q5</strong> What is being done differently?</td>
<td>Previous EA ‘As-Is’ Functional Architecture / Updated EA ‘To-Be’ Functional Architecture Delta</td>
</tr>
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<td><strong>Q6</strong> How has the vision changed?</td>
<td>Previous EA ‘To-Be’ Functional Architecture / Updated EA ‘To-Be’ Functional Architecture Delta</td>
</tr>
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<td><strong>Q7</strong> How to implement changes?</td>
<td>Updated EA Transition Plan</td>
</tr>
<tr>
<td><strong>Q8</strong> What is used to implement current process?</td>
<td>Updated Systems ‘As-Is’ Physical Architecture</td>
</tr>
<tr>
<td><strong>Q9</strong> What can be used to implement changes?</td>
<td>Updated Systems Study Findings</td>
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</tbody>
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Physical Architecture Diagram Summary

- System Function (IDEF0-A0)
  - Shows the inputs and outputs for the system functions. The system is shown as the IDEF mechanism and the data processing requirements are shown as the IDEF controls.

- System User Function (IDEF0-A0)
  - Shows the inputs and outputs from the view of the system user. The system user is shown as the IDEF mechanism.

- System Functional Context (IDEF0)
  - Shows the relationship between the system functions and the system user functions.

- System Functional Context – User IDEF0
  - Shows the relationship between the system functions and the system user functions.

- System Functional Context – Systems IDEF0
  - Shows the relationship between the system functions and other systems' functions.

- System Functional Context – External Systems IDEF0
  - Shows the relationship between the system functions and external systems' functions.

- System Hierarchy Diagram
  - Shows a hierarchical view of the system and subsystems.

EA CORE Model
- 'As-Is' Physical Architecture Word File
- System IO Slide

Visually represents the system relationship with other systems, system decomposition, inputs, outputs, and network requirements.

OPTIONAL

OPTIONAL
2011 System of Systems Engineering Collaborators Information Exchange Webinars

✓ April 12th: **A Game Loop Architecture for the Modeling and Simulation of Mission Threats**, Thomas Tanner, SAIC
✓ May 3rd: **Mission Engineering for Warfighting Integration of Net-Centric Systems**, Eileen Bjorkman and Timothy Menke, USAF
✓ May 10th: **The Role of Enterprise Architecture Updates in Guiding Decentralized Organizations**, John Schatz, SPEC Innovations

• May 24th: **Test and Evaluation Issues for Systems of Systems: Sleepless Nights to Sominex**, Dr. Beth Wilson, Raytheon & Dr. Judith Dahmann, MITRE

• June 14th: **Evaluating the Readiness of Federations-of-Models for Use in Simulation-Based Concept Development of Advanced Warfighting Capabilities**, Bryan Herdlick, JPU/APL

For information, email dasd-se@osd.mil or visit our website: http://www.acq.osd.mil/se/outreach/sosecollab.html