Selecting DoDAF 2.0 Views and Models for Use in DoD Projects, Their Integration & Analysis

Ann Reedy and Beryl Bellman
4.12.12
Federated Enterprise Architecture Certification Institute
reedy@feacinstitute.org
bellman@feacinstitute.org

A Zachman Corporation
Selecting DoDAF 2.0 Views and Models for Use in DoD Projects, Their Integration & Analysis

Presented at the 2012 DoD Enterprise Architecture, MIAMI, FL, APRIL 30 - MAY 3, 2012

Security Classification:
- Report: Unclassified
- Abstract: Unclassified
- This Page: Unclassified
Agenda

• A short introduction to the FEAC DoDAF Certification Program
• Overview of DoDAF 2.0
  – Changes from 1.5
• Six Step Process for Planning
• Examples
  – Example questions and corresponding views
  – Example planning example
The FEAC DoDAF Program

- FEAC was founded in 2001 and has certified over 1600 architects
- FEAC offers DoDAF education and training that leads to FEAC Certification, which is given by California State University East Bay and can earn graduate
- The program consists of five courses, four of which can be taken for graduate academic credit from the Department of Engineering at CSUEB
- FEAC has a relationship with National University (www.nu.edu) who accepts these units into their MS in Engineering Management program with a specialty in Enterprise Architecture. The remainder of that degree courses is offered online.
- Students learn how to plan, develop, model, implement and do EA analysis for an actual DoDAF project throughout the program and delivered as a practicum
- FEAC also offers short workshops and DoDAF boot camps, as well as TOGAF 9 certification courses
The DoDAF Courses

• The five basic FEAC courses are designated by the following course numbers; depending on whether you are taking the program for CEU or graduate academic units:
  – EXSP 8680/ENGR 7806 Framework Basics
  – EXSP 8681/ENGR 7807 Planning for Architecture Development and Use
  – EXSP 8682/ENGR 7808 Framework Views and Models
  – EXSP 8683/ENGR 7809 Advanced DoD Architecture Modeling and Analysis
  – EXSP 8684 DoDAF Practicum/Thesis

• We also provide an Elective TOGAF Course for those wanting TOGAF 8.1.1 Certification, which qualifies those who want to TOGAF 9 to take the Bridging Examination
Organizations that have sent students to FEAC for Certification

**Government**

Army Def Med Log SS
Army AIMD TRADOC
Air Force HQ OSSG
Air Force AIMD TRADOC
Air Force USJFCOM
Air Force US PACOM
Air Force US STRATCOM
Bureau of Engraving & Printing
City of Glendale, CA
City of Virginia Beach
DOD OSD BMSI
Department of Commerce - NTIA
Department of Commerce PTO
Department of Education SFA
Department of Education HQ
Department of State
DOICIO
DOIOSM
DODSA
DHS - ASBTF-OIRM
FDB
Federal Railroad Administration
FERC
Forest Service
GAO
GSA
IRS
Joint Forces Command
Lawrence Livermore National Labs
National Park Service
Navy ONR
Navy NAVSISA
NASA HQ
NASA Centers
NOAA
Office of the Comptroller of the Currency
OMB
OPM
Security and Exchange Commission
Smithsonian
Treasury - US Mint
USDA HQ
USDA RMA
US Postal Service
US Coast Guard
US Commerce Department
US Patent and Trademark
US PACOM/J2T2
US Senate
University Of Leuven (Belgium)
Veterans Administration
VA Veterans Benefits Administration
White House-EOP

**Industry**

Aerospace Corporation
AMIT
AMS
Analytics and Mechanics Assoc
Anteon
Apteon
Arinc
BAE Systems
BEA
Boeing
Booz Allen Hamilton
Burk Consortium
CACI
Conquest-Boeing
CSC
Dell
DiamondCluster
International
DigitalNet
Egan McAllister
East Bank Technologies
ERP
General Dynamics
GrupoActivity (Spain)
Headstrong
Hewlett Packard
IBM
Independent Consultants
Information Dynamics
Johns Hopkins University-APL
Knowledge Code
L-3 Communications
Lockheed Martin Co
Mitre
Northrup Grumman
NTT Data Agilnet (Japan)
Oracle
PacTel
Phase One Inc
Raytheon
RG2
RGS Assoc
Rose International
RSIS
SAIC
Samsung (Korea)
Schafer
Sci Group
ScotCro
SKCC (Korea)
SRA
Stanley Associates Inc
Summaria Sys Inc
Titan
VAAP Technologies
Goals

• Understanding how to identify required data and select DoDAF described models based on stakeholder questions
DoD Architecture Framework 2.0

• What it is:
  – Guidance on the types of data and relationships needed to document a DoD architecture in a standard way (new in 2.0)
  – Guidance on format and content for a standard set of DoDAF Described Models for describing architectures
  – High level meta-process for using the DoDAF

• What it isn’t:
  – A specific architecture
  – A tool
  – A detailed architecture development process
DoDAF V2.0 Vision

Structured Knowledge Base – Common Model

Views for Other Stakeholders

Views for the Architect
Levels of Architecture

Enterprise Level Architectures

Segment Level Architectures

Solution Level Architectures

System Context
SoS Architectures
FoS Architectures

DoD Enterprise

Capability Based
DoDAF V2.0 Viewpoints

Data models split out into separate Viewpoint in V2.0

Services views split out into separate viewpoint in V2.0

New in V2.0
Views Are Models
Not Pictures

• Models have a standard semantic interpretation
  – Rules for correctness and consistency
• Most DoDAF described models/views have a graphic template
• The graphic is backed up with dictionary entries (based on data entities and relationships from DM2):
  – Data elements provide definitions and descriptions of items in the graphic

plus
  – Additional supporting information and relationships to other architecture elements
• The data elements integrate the set of views
  – Views share data
DoD AF As Guidance

• Views have options discussed in Volume II
  – Choices of things like:
    • Techniques/notations
    • Level of detail

• All views may be tailored
  – Graphic conventions
  – Techniques to manage complexity
  – Edits of dictionary entries: changes to data elements
Unified Profile DoDAF and MoDAF: UPDM

• OMG Standard: provides a UML 2 and optional SysML profile for expressing DoDAF and MoDAF model elements

• Provides identification of data included in DoDAF described models
  – Used to be included within DoDAF volumes
  – Now included in separate document
  – Enhances and refines DM2 in DoDAF

• Provides way of writing DoDAF described models in UML
  – UML is a notation, not a methodology
UPDM Goals

• Enhance the quality, productivity, and effectiveness associated with enterprise and systems of systems architecture modeling
• Promote architecture model reuse and maintainability
• Improve tool interoperability and communication between stakeholders
• Reduce training impacts due to different tool implementations and semantics
Architecture Planning
Six Step Process (V2.0) - The Planning Perspective

Scoping Architecture Work

1. Determine the intended use of the architecture

Planning the Architecture Project

2. Determine scope of the architecture
3. Determine data required to support architecture development
4. Collect, organize, correlate, and store architecture data
5. Conduct analyses in support of architecture objectives
6. Document results IAW with Decision-Maker needs

What Needs to be Done

How the Work Will Be Done
What Does the Six Step Process Do for Planning?

The Six Step Process is important to the identification of required data and selection of views together with their options and tailoring.

- Performance of Steps 1-4 yields information for your AV-1:
  - Purpose and stakeholders
  - Scope
  - Views with options and tailoring

- Planning for Steps 4-6 yields constraints on view options and tailoring based on development and analysis processes.
Step 1: Determine Intended Use
The Problem Statement

- What questions need to be answered?
- Are there specific strategic objectives to be satisfied?
- Are there specific trade offs to be considered?
- What critical issues need to be addressed?
- How is the EA used to support key decision-making processes?
- What types of analysis need to be supported?
Why Is Purpose Important?

• Architecture is a tool to support decision making
  – If you don’t know what you are going to use it for, there is a good chance it won’t be useful
  – You need to identify and understand the different purposes of different stakeholders

• Architectures can be expensive to build
  – Doesn’t make sense to build one if you don’t plan to use it!
Why Is Purpose Important?

PURPOSE

DRIVES

VIEWS
DETAIL
COMPLETION
Step 2: Determine Scope

• Operational bounds
  – What’s the enterprise, what level of architecture
  – What mission(s), functions, and organizations
  – What geographical context
• Constraints on technology to be considered
• Timeframes
  – As-Is, To-Be, phasing and evolution
• Specific project schedule and resource constraints
Step 3: Determine Data Required to Support Architecture Development - Think About Architecture Primitives (DoDAF Conceptual and Logical Data Model (DM2) Entities)

- Performers
- Activities
- Information elements
- Events/triggers
- Capabilities
- Goals
- Systems
- Services
- Rules
- Standards
- Locations
- Measures
- Projects
Step 4: Collect, Organize, Correlate, and Store Architecture Data

- Emphasis in planning is how data will be organized
- That is, what DoD AF views will eventually be used, including options and tailoring
- This tells us what the meta-data should be and identifies repository requirements
- This tells us what needs to be collected and how it should be correlated
Overview and Summary Information (AV-1)

- Identification
  - Name
  - Architect
  - Organizations Involved
  - When Developed
- Purpose
  - Analysis Needs
  - Decision Support Needs
- Scope
  - Views and Products Used
  - Time Frames Addressed
- Context
  - Mission
  - Geographical
  - Rules, Criteria, and Conventions Followed
- Findings: Results, Recommendations
- Tools and File Formats

Integrated Dictionary (AV-2)

At a minimum, the integrated Dictionary is a glossary with definitions of terms used in the given architecture description. Each labeled graphical item in the graphical representations should have a corresponding entry in the Integrated Dictionary.
Example Questions Mapped to Views:
Enterprise-Level Architecture
   Capability Management
   Portfolio Management
# Example Capability Management Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do the capabilities relate to enterprise strategy and goals?</td>
<td>Vision, Goals, Desired Effects, Capabilities, Relationship between capabilities and goals</td>
<td>Vision (CV-1)</td>
</tr>
<tr>
<td>Are there dependencies among the capabilities?</td>
<td>Capabilities, Relationships among capabilities, including dependencies</td>
<td>Capability Dependencies (CV-4)</td>
</tr>
<tr>
<td>How will capability performance be measured?</td>
<td>Capabilities, Performance Measures, Relationships of capabilities to performance measures</td>
<td>Capability Taxonomy (CV-2)</td>
</tr>
</tbody>
</table>
Example Capability Management Questions (continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>When will the capabilities be available and what projects will provide them?</td>
<td>Capabilities, Projects, Timeframes, Relationships among the above</td>
<td>Capability Phasing (CV-3)</td>
</tr>
<tr>
<td>What organizations will use the capabilities?</td>
<td>Capabilities, Organizations, Relationships among capabilities and organizations</td>
<td>Capability to Organizational Development Mapping (CV-5), Organizational Relationships Chart (OV-4)</td>
</tr>
</tbody>
</table>
Example Portfolio Management Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>What organizations are in change of which projects?</td>
<td>Organizations, Projects, Relationships between organizations and projects</td>
<td>Project Portfolio Relationships (PV-1) Organizational Relationships Chart (OV-4)</td>
</tr>
<tr>
<td>What are the timelines for the projects and are there dependencies among them?</td>
<td>Projects, Timelines: start and end dates, Dependencies among projects</td>
<td>Project Timelines (PV-2)</td>
</tr>
<tr>
<td>Which projects are delivering capability configurations that realize which capabilities?</td>
<td>Projects, Capabilities, Relationships between projects and capabilities</td>
<td>Project To Capability Mapping (PV-3)</td>
</tr>
</tbody>
</table>
Recommendation: Basic Views for Enterprise-Level Architectures

- Vision (CV-1)
- Capability Phasing (CV-3)
- Capability Dependencies (CV-4)
- Capability to Organizational Development Mapping (CV-5)
- Project Portfolio Relationships (PV-1)
- Project Timelines (PV-2)
- Project to Capability Mapping (PV-3)
- Organizational Relationship Chart (OV-4)

Plus AV-1 and AV-2, as always
Integration of Enterprise Level Architecture Basic Views

- **Vision (CV-1)**: Value Added: How Capabilities Support Strategic Goals & Objectives
- **Capability Dependencies (CV-4)**: High Level Capabilities Are the Same
  - Value Added: Capability Dependencies and Specializations
  - Capabilities Match
- **Capability Phasing (CV-3)**: Capability Configuration Changes Over Time
  - Capabilities and Configurations Are the Same
  - Delivery Dates Match
- **Capability to Organizational Development Mapping (CV-5)**: Value Added: Maps Organizations to Capabilities and Configurations They Use with Delivery Dates
- **Project to Capability Mapping (PV-3)**: Value Added: Links Capabilities to Projects That Deliver Configurations to Implement the Capabilities
- **Project Timelines (PV-2)**: Value Added: Project Delivery Timelines & Cross Project Dependencies
  - Projects Match
- **Project Portfolio (PV-1)**: Value Added: Links Projects to Organizations That Manage Them
  - Organizations Map
- **Organizational Relationships Chart (OV-4)**: Value Added: Organizational Relationships
  - Organizations Map
Example Questions Mapped to Views:
Solution-Level Architecture
Setting Context for a System, SOS, or FOS
**Example Solution-Architecture Questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the key elements of the Operational Concept for this architecture?</td>
<td>Abstractions of: Key mission process/activities Key performers Key resource exchanges</td>
<td>High-level Operational Concept Description (OV-1)</td>
</tr>
<tr>
<td>How are mission operations performed (now or in the future)?</td>
<td>Mission process/activities Resources exchanged/inputs &amp; outputs Performers</td>
<td>Activity Model (OV-5) Operational Resource Flow Description (OV-2) Operational Resource Flow Matrix (OV-3)</td>
</tr>
</tbody>
</table>
Basic Operational Views Capture the Critical Mission Relationships and Resource Exchanges

High-Level Operational Concept Description

Operational activities performed and their input/output relationships

Performers, Activities for each performers and resource needlines

Resources exchanged between performers and the relevant attributes of the exchanges
## Example Basic Solution Architecture Questions (continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>What systems/services and what are their interfaces (internal and external)?</td>
<td>Systems/services&lt;br&gt;System/service interfaces&lt;br&gt;Standards</td>
<td>System Interface Description (SV-1)&lt;br&gt;or Services Context Description (SvcV-1)&lt;br&gt;Standards Profile (StdV-1)</td>
</tr>
<tr>
<td>How do the systems/services support operations?</td>
<td>Relationship of systems/services to performers&lt;br&gt;Relationship of systems/services interfaces to needlines&lt;br&gt;Relationship of systems/services to activities</td>
<td>OV-2&lt;br&gt;SV-1/SvcV-1&lt;br&gt;Operational Activity to Systems Function Traceability Matrix (SV-5) or Operational Activity to Services Traceability Matrix (SvcV-5)</td>
</tr>
</tbody>
</table>
Relationships Between OV-2 and SV-1 (SvcV-1)
Put IT in Context with Mission Operations
Standards Profile Identifies Implementation Criteria That Govern the Given Architecture

**Application Software**

<table>
<thead>
<tr>
<th>SERVICE AREA</th>
<th>SERVICE</th>
<th>STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Applications</td>
<td>Web Applications</td>
<td>Internet Explorer Version 4.X or better</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Netscape Version 3.X or better</td>
</tr>
</tbody>
</table>

**Application Platform**

<table>
<thead>
<tr>
<th>SERVICE AREA</th>
<th>SERVICE</th>
<th>STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Interchange</td>
<td>Document Interchange</td>
<td>XML 1.0, W3C Recommendation, 10 February 1998, Rec-xml-19980210 (Extensible Markup Language)</td>
</tr>
<tr>
<td>Communications</td>
<td>World Wide Web Services</td>
<td>IETF RFC-2068 Hypertext Transfer Protocol – HTTP/1.1, June 1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IETF Standard 10/RFC-2047 IETF RFC-2048 IETF RFC-2049 Multipurpose Internet Mail Extensions (MIME), November 1996</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IETF RFCs 2045-2049 Internet Mail Extensions (MIME) Transport Services, November 1996</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IETF RFC 2046 Multipurpose Internet Mail Extensions (MIME) Services, November 1996</td>
</tr>
<tr>
<td>Distributed Computing</td>
<td>Object Services</td>
<td>Common Object Request Broker (CORBA) Version 2.3 Object Management Group (OMG) document formal/08-12-01, June 1999 (Proposed)</td>
</tr>
<tr>
<td>Security</td>
<td>Authentication</td>
<td>HIPAA/NPI 112伤病者编号, 15 May 1985</td>
</tr>
</tbody>
</table>
Recommendation: Basic Views for Solution-Level Architecture

• High Level Operational Concept Description (OV-1)
• Operational Resource Flow Description (OV-2)
• Operational Resource Flow Matrix (OV-3)
• Operational Activity Model (OV-5a, b)
• Systems Interface Description (SV-1) or Services Context Description (SvcV-1)
• Standards Profile (StdV-1)
• Capability to Operational Activity Mapping (CV-6)*

Plus AV-1 and AV-2, as always

*New with DoDAF V2.0; assumes a Segment-Level or Enterprise-Level architecture related to the Solution-Level architecture.
These Basic Views Link to Each Other

HIGH-LEVEL OPERATIONAL CONCEPT DESCRIPTION (OV-1)

VALUE ADDED: SUMMARY LEVEL REPRESENTATION OF ORGANIZATIONS/ROLES, MISSION, AND CONTEXT FOR THE ARCHITECTURE

OPERATIONAL ACTIVITY MODEL (OV-5)

VALUE ADDED: BUSINESS/MISSION PROCESS & RELATIONSHIPS AMONG ACTIVITIES AND RESOURCE EXCHANGES

OPERATIONAL RESOURCE FLOW MATRIX (OV-3)

VALUE ADDED: INDIVIDUAL RESOURCE EXCHANGES ASSOCIATED WITH EACH NEEDLINE & PERFORMANCE REQUIREMENTS

OPERATIONAL RESOURCE FLOW DESCRIPTION (OV-2)

VALUE ADDED: STATEMENT OF OPERATIONAL PERFORMERS, ACTIVITIES, AND CRITICAL RESOURCE EXCHANGE NEEDS

STANDARDS PROFILE (StdV-1)

VALUE ADDED: COMPLETE LIST OF RELEVANT STANDARDS WITH OPTIONS & PARAMETERS

SYSTEMS INTERFACE DESCRIPTION (SV-1)

VALUE ADDED: STATEMENT OF LOCATIONS, SYSTEMS & INTERFACES

STANDARDS APPLY AT SYSTEM TO SYSTEM INTERFACES

OPERATIONAL CONCEPT
ROLES & MISSIONS SET SCOPE FOR ACTIVITY MODEL

• ACTIVITIES MAP TO OV-2 PERFORMERS
• IOS MAP TO NEEDLINES
• PERFORMERS OF ACTIVITIES, IF SHOWN ON OV-5, MAP TO OV-2 PERFORMERS

INPUT/OUTPUT LABELS MAP TO OPERATIONAL RESOURCE EXCHANGES (NOT ALWAYS ONE-TO-ONE)

RESOURCE EXCHANGES ASSOCIATED WITH EACH NEEDLINE ARE DETAILED IN OV-3

• PERFORMERS ARE ASSOCIATED WITH SYSTEMS AND LOCATIONS
• EACH OPERATIONAL NEEDLINE MAPS TO ONE OR MORE SYSTEM INTERFACES

Scenario or Mission Language (For Multi-National Operations)

Identifier/Name of Information Exchange

<table>
<thead>
<tr>
<th>Name</th>
<th>Information Source</th>
<th>Information Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g., 1-a</td>
<td>1-ne.g., 2-a</td>
<td>2-n</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Segment-Level Architecture

Capability Focus
Recommendation: Basic Views for Segment-Level Architecture

- Combination of Enterprise and Solution Level core views
- If the Segment is used to manage the investments and portfolio for the capabilities included in the segment, then the Enterprise Level core views apply
- If the Segment is used to coordinate a set of Solution Level architectures, then the Solution Level core views apply to set the business context and document:
  - Relationship of major systems to high-level business process
  - Interfaces among business processes and among systems necessary to ensure interoperability
Additional Example
Questions Mapped to Views
## Example Dynamic Behavior (Timing & Sequencing) Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
</table>
| What scenarios explain the concept of operation or key performance or security issues? | Events  
Messages  
Performers/systems/services  
Relationship among the above | Event/Trace Descriptions:  
Operational (OV-6c)  
Systems (SV-10c)  
Services (SvcV-10c) |
| What are the states/statuses that key elements of the architecture have and how do they change? | States for a given element of the architecture  
Transitions  
Events  
Relationships among the above | State Transition Descriptions:  
Operational (OV-6b)  
Systems (SV-10b)  
Services (SvcV-10b) |
| What are the rules that constrain operations, systems and/or services?    | Rules  
Relationships of rules to other elements of the architecture | Rules Models:  
Operational (OV-6a)  
Systems (SV-10a)  
Services (SvcV-10a) |
# Example Domain Data Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the shared mission/business concepts and their relationships?</td>
<td>Entities, Attributes, Relationships among the above</td>
<td>Conceptual Data Model (DIV-1)</td>
</tr>
<tr>
<td>What is the logical structure of the key structured shared data in the architecture?</td>
<td>Entities, Attributes, Relationships among the above</td>
<td>Logical Data Model (DIV-2)</td>
</tr>
<tr>
<td>What is the physical structure of the key structured shared data in the architecture?</td>
<td>Entities, Attributes, and Relationship among the above or File Structures or Message Structures or ?</td>
<td>Physical Data Model (DIV-3)</td>
</tr>
</tbody>
</table>
### Example Transition Planning Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>When will new systems/services be available?</td>
<td>Systems/Services Timeframes</td>
<td>Systems Evolution Description (SV-8)/Services Evolution Description (SvcV-8)</td>
</tr>
<tr>
<td>What IT performance improvements should be expected at key transition milestones?</td>
<td>Systems/Services Performance measures Relationships among the above</td>
<td>Systems Measures Matrix (SV-7)/Services Measures Matrix (SvcV-7)</td>
</tr>
<tr>
<td>What are the trends in systems/services and standards and associated personnel skills that may impact IT during the transition period?</td>
<td>Systems/Services Areas, Categories, and Standards Timeframes Forecasts</td>
<td>Systems Technology and Skills Forecast (SV-9)/Services Technology and Skills Forecast (SvcV-9) Standards Forecast (StdV-2)</td>
</tr>
</tbody>
</table>
## Example Matrix/Mapping Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which systems/services interface with which other systems/services?</td>
<td>Systems/services&lt;br&gt;Systems/services interfaces</td>
<td>Systems(^2) Matrix (SV-3)&lt;br&gt;Systems-Services Matrix (SvcV-3a)&lt;br&gt;Services(^2) Matrix (SvcV-3b)</td>
</tr>
<tr>
<td>How do services relate to capabilities?</td>
<td>Services&lt;br&gt;Capabilities&lt;br&gt;Relationships among the above</td>
<td>Capability to Services Mapping (CV-7)</td>
</tr>
<tr>
<td>What are the key attributes (such as throughput) of the system/services resources flows?</td>
<td>System/Service Interfaces&lt;br&gt;System/Services Resource Flows&lt;br&gt;Attributes of Resource Flows</td>
<td>Systems Resource Flow Matrix (SV-6)/Services Resource Flow Matrix (SvcV-6)</td>
</tr>
</tbody>
</table>
Mapping Summary

Mappings help check for architecture consistency.
### Other Example Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>What organizations are included in the architecture and how do they relate to the performers or other elements of the architecture?</td>
<td>Organizations Reporting/management relationships Relationships of organizations to other elements of the architecture</td>
<td>Organizational Relationships Chart (OV-4)</td>
</tr>
<tr>
<td>What are the key communications IT that support the systems/services interfaces?</td>
<td>Systems/services Communications systems, technologies &amp; protocols Relationships among the above</td>
<td>Systems Resource Flow Description (SV-2)/ Services Resource Flow Description (SvcV-2)</td>
</tr>
<tr>
<td>What are the systems functions/services and the data flow among them?</td>
<td>Systems functions/services Data flows among the systems functions/producer-consumer flows among the services</td>
<td>System Functionality Description (SV-4)/ Services Functionality Description (SvcV-4)</td>
</tr>
</tbody>
</table>
Planning Example: Solution Level Architecture

Case Study: Hypothetical Richard M. Nixon (RMN) civil aviation air field that wants to grow over the next 15 years into a viable option to LAX

– Extract of Case Study from book
Purpose

• Define upgraded passenger identification business processes for RMN Airport
• Provide guidance for the acquisition of the set of applications and common database to support these upgraded business processes
Stakeholders and Issues (1)

Port Authority, RMN Management, and DHS
• Will the new business processes and applications meet government regulations and requirements? That is, what types of passenger identification data are required?
• Who needs what data and who should provide the data?
• How do the new processes improve confidence in passenger identification? (Measures include speed, availability, and consistency of data)
Stakeholders and Issues (2)

RMN Management and DHS

- How many personnel will be needed for the new business processes?
- Will the personnel need additional skills?
- When will any additional personnel be needed?
- Will new facilities be required? If so, when will they become available for use?
Stakeholders and Issues (3)

RMN Management

• When will the upgraded processes and their supporting applications be ready for use?
• What performance, in terms of passengers per hour, should be expected from the new processes?
Stakeholders and Issues (4)

RMN Management and RMN Employees

• What are the upgraded business processes?
• How do the new applications support the business processes?
• How do the new applications, services, and databases integrate with other RNM IT?
• What infrastructure will be required?
• What standards will the new applications, systems/services, and databases use?
Stakeholders and Issues (5)

DHS, Passenger Airlines, and FAA

• What are the upgraded business processes?
• How do we use the new business processes and applications to get the data we need?
Scope

• Solution Level architecture for the Passenger Management Segment of the RMN Airport enterprise
• Mission/function/organizational bounds: Passenger identification business services for RMN
• Geographic bounds: RMN Airport grounds and associated business offices
• Timeframe: To-Be (Present + 10 Years timeframe that includes international travel
• Technology Constraints: Overall compatibility with RMN enterprise IT standards and Federal (DHS/FAA) data standards; using COTS components and infrastructure
• Expected Analysis: Business Case Analysis; Acquisition Requirements Analysis
## Partial Mapping of Questions to Required Data Types and Views (1)

<table>
<thead>
<tr>
<th>Question</th>
<th>Stakeholders</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>What types of passenger identification data are required?</td>
<td>Port Authority, RMN Mgmt, DHS</td>
<td>Data model</td>
<td>Logical Data Model (DIV-2) modeling information exchanges/activity I/Os</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Information Exchanges</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operational Resource Exchange Matrix (OV-3) with basic columns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I/Os from activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Activity Model (OV-5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Government regulations and standards</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Standards Profile (StdV-1) tailored to include regulations</td>
</tr>
</tbody>
</table>
## Partial Mapping of Questions to Required Data Types and Views (2)

<table>
<thead>
<tr>
<th>Question</th>
<th>Stakeholders</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who needs what data and who should provide the data?</td>
<td>Port Authority, RMN Mgmt, DHS</td>
<td>Performers</td>
<td>Operational Resource Flow Description (OV-2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationships of performers to activities</td>
<td>Operational Resource Flow Matrix (OV-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information Exchanges</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I/Os from activities</td>
<td>Activity Model (OV-5)</td>
</tr>
<tr>
<td>How do the new processes improve confidence in passenger identification?</td>
<td>Port Authority; RMN Mgmt; DHS</td>
<td>Business processes</td>
<td>Activity Model (OV-5) tailored to include performance measures and goals</td>
</tr>
<tr>
<td>(Measures include speed, availability, and consistency of data)</td>
<td></td>
<td></td>
<td>Operational Resource Flow Matrix (OV-3) with additional columns</td>
</tr>
</tbody>
</table>
## Partial Mapping of Questions to Required Data Types and Views (3)

<table>
<thead>
<tr>
<th>Question</th>
<th>Stakeholders</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>When will the upgraded processes and their supporting applications be ready for use?</td>
<td>RMN Mgmt</td>
<td>Timeline for application and process availability</td>
<td>Systems/Services Evolution Description (SV-8/SvcV-8) tailored to include process definition &amp; training completion dates</td>
</tr>
<tr>
<td>What performance, in terms of passengers per hour, should be expected from the new processes?</td>
<td>RMN Mgmt</td>
<td>Business processes</td>
<td>Activity Model (OV-5) tailored to include performance measures and goals</td>
</tr>
<tr>
<td></td>
<td>Information Exchanges</td>
<td></td>
<td>Operational Resource Flow Matrix (0V-3) with Periodicity column (average and worst case numbers)</td>
</tr>
</tbody>
</table>
## Partial Mapping of Questions to Required Data Types and Views (4)

<table>
<thead>
<tr>
<th>Question</th>
<th>Stakeholders</th>
<th>Required Data Types</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many personnel will be needed for the new business processes?</td>
<td>RMN Mgmt; DHS</td>
<td>Performers</td>
<td>Operational Resource Flow Description (OV-2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Organizations &amp; Number of personnel who are performers per organization</td>
<td>Organizational Relationships Chart (OV-4) tailored to include number of personnel per performer group</td>
</tr>
</tbody>
</table>
Summary of Selected Views
From Partial Mapping

- OV-2: performers are roles
- OV-3: with Needline ID, Information Exchange ID, Description, Media, Triggering Event, Producing Performer and Activity, Receiving Performer and Activity columns, Periodicity (average & worst case), plus other columns
- OV-4: with map to performers and including number of personnel per performer/role
- OV-5: including performance measures/goals for top level processes
- DIV-2: Modeling information exchanges and activity inputs/outputs
- SV-8: including process definition and training completion dates
- StdV-1: including regulations; use FAA TRM
Summary: Traceability to Purpose Ensures Useful Architectures

Architecture Users/Decision Makers

Have

Questions/Issues

That Require

Data

Support

Fit-for-Purpose Views

Provides Data to Generate

Architecture Repository/Structured Knowledge Base

Feed Consistent, Complete Data

Developed Through

Architects’ Views