The Joint Architecture Working Group (JAWG)

Enterprise Architecture in the Intelligence Community:
The Joint Architecture Working Group (JAWG)

Randy Marks; Chair, Joint Architecture Working Group
NSA/TE Deputy Chief System Engineer for Enterprise Architecture
Afghanistan Stability / COIN Dynamics
• Info Sharing/Integration is a grassroots effort – not an enterprise principle
  – Phone call, email, word of mouth
  – Warfighters are unaware of solutions

• Current implementation hampers Information Integration
  – Point-to-point interfaces
  – Inability to find information
  – Service provider
  – Private libraries

• Standards need to be enterprise focused
Enterprise Architecture to the rescue!
Federal

- Clinger-Cohen (Public Law 104-106) – 1996
- E-Government Act – 2002

DOD

- DoDD 8000.1: Global Information Grid Overarching Policy
- DoDI 5000.2: Operations of the Defense Acquisition System

Guidance

Federal Enterprise Architecture

Global Information Grid
The Architecture Trifecta

• The “AS IS” Architecture
• The “To Be” Architecture
• The Architecture Transition Plan - Roadmap
Multiple ways to produce an architecture...
DOD Architecture Framework

Integrated Architecture

An architecture where architecture data elements are uniquely identified and consistently used across all products and views within the architecture.
Enterprise Architecture (circa 2006)

1. Enterprise Architecture

* Acknowledgement to Dr. Scott Bernard, Introduction to Enterprise Architecture
The Joint Architecture Reference Model: 10 Layer Model

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<thead>
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Model Comparisons

Operational Drivers
- Abstract Models and Architectures used to build the lower layers
- People using IT that is provided below

Operations-specific Services
- Software performing specific activities

Undercarriage Services
- “Enterprise”-wide software and hardware services utilizing shared networks and facilities
- For unique mission capabilities, these layers may be dedicated to specific operations

- 1. Facilities Infrastructure (Power, Space, & HVAC)
- 2. Physical Connectivity Infrastructure (OSI Layer 1)
- 3. Networks (OSI Layers 2 & 3)
- 4. Computing and Storage Platforms (HW & OS)
- 5. Enabling Services for Applications and Content
- 6. Software Frameworks and Content Structure
- 7. Applications and Content
- 8. Enterprise Activities and Exchanges
- 9. Capability Areas (and Threads)
- 10. Operational Objectives & Policies

Other Enablers
Example of the way we did EA

Enter the Joint Architecture Working Group

JAWG
The JAWG's Objective

...to define the IC Federated Enterprise Architecture and provide tools to support IC Element and IC Enterprise investment (acquisition) decisions across the IC
**JAWG Timeline**

### Membership

**2008**
- Sep’08: NRO NSA NGA ODNI DIA OUSD(I) CIA FBI DHS USN (N2) DoD CIO JCS

**2009**
- May ‘08: NRO Ground transformation
- Aug ‘08: JSEF forms
- Dec ’08: 1st Community Review (IGCR)
- Sep ’08: IC Architecture-focused forum established (JAWG)
- May ‘09: 2nd Community Review (JAR); JAWG subsumed into IC CIO under ICI2P
- Oct ’09: Community Status Review (JASR); JSEF became the Architecture Standards & Engineering Committee (ASEC)

**2010**
- Mar ‘10: 3rd Community Review (AER)
- Jul ‘10: IC Core TEM 1
- Apr ‘11: DoD EA Conference

**2011**
- Sep ‘10: IC Core TEM 2
- Nov ‘10: Community Status Review (JICSR)
- May ‘11: 4th Community Review
The Joint Architecture Reference Model

The Tools

To be effective, we need to use the JARM in a standard way toward a shared goal...
The Joint Architecture Reference Model: 10 Layer Model

Supports

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Operational Drivers
• Abstract Models and Architectures used to build the lower layers
• People using IT that is provided below

Top Down

Bottoms Up
# The Joint Architecture Reference Model: 10 Layer Model

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## 9. Capability Areas and Threads: (IC CAPABILITIES: The ability to...)

<table>
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<tr>
<th>Capability Area and Thread</th>
<th>Function</th>
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<tr>
<td>collect and process foreign intelligence</td>
<td></td>
</tr>
<tr>
<td>analyze and make foreign intelligence available</td>
<td></td>
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<tr>
<td>defend against and counter foreign intelligence activities</td>
<td></td>
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<tr>
<td>support time critical operational needs</td>
<td></td>
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<tr>
<td>manage and protect information and resources</td>
<td></td>
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<tr>
<td>select, develop, deploy, and retain human capital</td>
<td></td>
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<tr>
<td>efficiently and effectively manage business operations</td>
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## 6. Software Frameworks and Content Structure

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<tr>
<th>Content Structure</th>
<th>Security Management</th>
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<td>Software Frameworks and Content Structure</td>
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## 5. Enabling Services for Applications and Content

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## 4. Computing and Storage Platforms (HW & OS)

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<th>Hardware &amp; Operating Systems</th>
<th>Security Management</th>
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## 3. Networks (OSI Layers 2 & 3)

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<th>Network Protocols</th>
<th>Security Management</th>
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## 2. Physical Connectivity Infrastructure (OSI Layer 1)

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## 1. Facilities Infrastructure (Power, Space, & HVAC)

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<th>Infrastructure</th>
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The Joint Architecture Reference Model: 10 Layer Model

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- Software performing specific activities

**Undercarriage Services**
- “Enterprise”-wide software and hardware services utilizing shared networks and facilities
- For unique mission capabilities, these layers may be dedicated to specific operations

Diagram:
- 10. Operational Objectives & Policies
- 9. Capability Areas (and Threads)
- 8. Enterprise Activities and Exchanges
- 7. Applications and Content
Enterprise Competency Model (ECM)

• The ECM is a standard characterization of mission and business functions and activities
  – It’s a way to represent what our agencies do
  – It’s related to the FEA Business Reference Model

• Functions identified within the ECM represent Layer 8 “Enterprise Activities and Exchanges”

• The ECM introduces three concepts
  – Enterprise Competencies
  – Enterprise Components
  – Accountability Levels

The ECM provides a more in-depth representation of IC mission and business functions than the current IC BRM
A Closer Look at the ECM

6. Data Acceptance & Ingest

- Strategy / Planning
  - 6-S-1. Data Acceptance & Ingest Planning & Analysis (New)

- Management
  - 6-M-1. Data Acceptance & Ingest Management (New)

- Execution
  - 6-E-1. Data Request Operations (New)
  - 6-E-2. Data Acceptance (New)
  - 6-E-3. Data Routing Operations (New)
  - 6-E-4. Records Management and Retention (404-141)
  - 6-E-5. Information Management Operations (New)
  - 6-E-6. Information Sharing (New)
Enterprise Services List (ESL)

- The ESL provides a mission/business-driven, functional framework classifying enterprise services.
- ESL terminology is consistent with the FEA Service Reference Model:
  - Service Domains
  - Service Types
  - Service Components

The ESL provides a more comprehensive list of enabling services for the IC.
The Joint Architecture Reference Model: 10 Layer Model

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#### Technical Services Taxonomy

**Applications and Content**
- Planning and Analytical Support Services
- Data Acquisition Services
- Source Data Processing Services
- Investigation Services

**Software Frameworks and Content Structure**
- Framework Services
- Business Process Services
- Information Management Services
- Enterprise Infrastructure Management Services

**Enabling Services for Applications and Content**
- Common Services
- Service Delivery Services
- IT Infrastructure Services
- Service Delivery Services

**Compute and Storage Platforms**
- Compute and Storage Services
- Platform Services
- Storage Services

**Networks**
- Enterprise Network Services
- Internet Security Services

**Physical Connectivity Infrastructure**
- Fiber and Cable Infrastructure Services
- Fiber and Cable Information Security Services

**Facilities Infrastructure**
- Physical Facilities Services
- Physical Security Services

#### Mission Management Services
- Mission Management Services
- Collection Requirements Management Services
- External User Situational Awareness Services
- Mission Planning
- Orbit Planning Services
- Resource Management
- Mission Scheduling Services
- Mission Workload Management
- Mission Assessment Services
- Source and Production Strategy Services
So why do we care?
Start With A Common Language

(U) Sprechen Sie Deutsch?

Parlez-vous français?

אחת מדבר עברית?

Вы говорите по-русски?

Parli Italiano?

¿Habla usted español?

(U) We all speak different “languages;”
The IC Enterprise Architecture bridges these ‘gaps’;
The Joint Architecture Reference Model (JARM) is the common lexicon
That’s the Enterprise…
let’s narrow our focus a bit more…
A Federated Environment Enabling Information Integration

“Any data, any time, any place, usable by any authorized consumer; preventable only by law or policy, not technology.”
The IC Core Defined

• The IC Core is a focused set of joint & community services, specifications and standards, processes, and policies for enabling the Business of Intelligence for the federated Intelligence Community Enterprise.

• IC Core elements must:
  - be foundational
  - enable the Business of Intelligence, and
  - foster interoperability and integration
# IC Core Baseline Increment 1

## Service Offerings

### Identity & Access Management (IdAM)
- Access Control
- Digital Policy Management
- Intrusion Prevention
- Cryptography
- Digital Resource Identification
- Audit Trail Capture & Analysis
- Forensics
- Identification and Authentication
- Digital Signature Management
- Computers / Automation Management

### Collaboration
- Email
- Organizational Messaging
- Voice Communication
- Audio Conferencing
- Workgroup / Groupware
- Video Conferencing
- Computer / Telephony Integration
- Real-Time Chat
- Threaded Discussion
- Shared Calendaring
- Instant Messaging
- Personalization
- Community Management

### Content Discovery & Retrieval (CDR)
- Information Retrieval
- Subscriptions
- Alerts & Notifications
- Data Exchange
- Metadata Management
- Knowledge Distribution and Delivery
- Knowledge Categorization
- Precision / Recall Ranking
- Document Library
- Task Management
- Text Messaging
- Multimedia

### Infrastructure Enablers
- Network Management
- Communications
- Enterprise Infrastructure Assessment
- Virus Protection
- Intrusion Detection
- Incident Response
- Cross Domain Data Transfer
- Document Categorization
- Indexing
- Document Classification
- Security Classification
- Service Monitoring
- Service Discovery
- Service Publication
- Content Acquisition
- Directory Services
- Workforce / Directory Locator
- Information Mapping / Taxonomy
- Mission Assessment
- Personnel Administration

---

**Legend**

- Service Offering
- IC Core Enterprise Service Component
- Enterprise Service Component

- Requires synchronization with ESL
So we’ve got another framework, another taxonomy… What do we do with it?
Need to make acquisition decisions based on functions (capabilities) rather than individual programs.

So how do we use the JAWG products to better inform acquisition decisions?
Enterprise Architecture to Investment Portfolio Alignment

10 Layer Architecture Model

Information Portfolio (IP) Structure

- Agency Strategy
- Agency "Concise Look Forward"
- Investment Portfolio Strategy
- Agency Program Guidance

Team Effort with SME support
Overlaps, Possible Duplication, or areas of Common Concern

Then – look for hotspots or concentrations of activity

Budget Center Bxxx

Effort 1
Material
Labor
Mgmt, Sys Engr, HW Main, SW Dev ...
Travel, Transportation & Supplies
Infrastructure
Facilities

Effort 2
Material
Labor
Mgmt, Sys Engr, HW Main, SW Dev ...
Travel, Transportation & Supplies
Infrastructure
Facilities

Budget Center Byyy

Effort 1
Material
Labor
Mgmt, Sys Engr, HW Main, SW Dev ...
Travel, Transportation & Supplies
Infrastructure
Facilities

Effort 2
Material
Labor
Mgmt, Sys Engr, HW Main, SW Dev ...
Travel, Transportation & Supplies
Infrastructure
Facilities

Capability GAP!
Mission Critical Capability but no evidence of financial support
Within an Agency

Model For Partner Interoperability of Mission/Business Operations

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Undercarriage Services
- “Enterprise”-wide software and hardware services utilizing shared networks and facilities
- For unique mission

What do I have on the floor?
What do I have in Development?
What areas am I doing research in?

Programs A, B & C
So why not do it on a grander scale?
IC CIO Requirement for FY12 Program Build
Exhibit 53 & 300 Mapping to the JARM

• Exhibit 300 Data
  – Required: Mapping to the ECM
  – Required: Mapping to the ESL

• Exhibit 53 Data
  – Optional: Mapping to the ECM
  – Optional: Mapping to the ESL

• Required pre-2010
  – Reporting data for the FYDP, not just a single FY
  – Percentage of the Budget allocated to the BRM
  – Percentage of the Budget allocated to the SRM
JARM Enterprise Competency Model (ECM)
JARM Enterprise Services List (ESL)
(U) Do the circled boxes indicate potential critical business service gaps? We do not know. Data set is incomplete.

(U) ESL Component 8.3.5 Multi-Lingual Support defines the set of capabilities that allow access to data and information in multiple languages.
Most Common JARM ESL Mappings in Ex 300s for FY12

At least five (out of six) of the reporting agencies mapped to each of the following service components for FY12 within the JARM ESL:

- Product Management
- Customer/Account Management
- Alerts and Notifications
- Process Tracking
- Requirements Management
- Program/Project Management
- Governance/Policy Management
- Quality Management
- Business Rule Management
- Risk Management
- Procurement
- Invoice Requisition Track/Approve
- Library Storage
- Document Creation/Validation
- Information Retrieval
- Information Mapping/Taxonomy
- Information Sharing
- Knowledge Capture
- Document Classification
- Ad-Hoc
- Standardized/Canned
- Data Exchange
- Data Warehouse
- Data Recovery
- Data Access
- Cross Domain Data Transfer
- Software Development
- Identification and Authentication
- Access Control
- Query
- Systems Engineering

Mapping of all Ex 300 reporting programs across the community highlights areas where the IC might collaborate today in our respective development efforts

The “heat map” shows all service component mappings across all six agencies [for illustration only]

(Source: Exhibit 300s)
(U) The circled boxes indicate Enterprise Service components in which 1 or fewer of the 6 reporting agencies are investing. (Exhibit 300s, FY12)

8.29.2 Precision / Recall Ranking – Defines the set of capabilities that support selection and retrieval of records ranked to optimize precision against recall.
Less than 5% of the budget accounted for in the Exhibit 300’s yet we still find overlaps in capability.

Think about what we might find if everything was aligned to a common framework
Some Final Thoughts regarding IT Efficiencies and Enterprise Architecture

Where will the cost savings come from?
People attending the conference ~600

Annual Loaded Cost to Government ($300K/per year) $180,000,000/year

($300K per contractor, $250K per govie, say, 2/3 of audience is contractor, 1/3 govie) $120,000,000

+ $ 50,000,000

------------------

$170,000,000/year

Associated Activity: Architecture

50% to 75% of an Agency’s budget goes to manpower!
Improved (acquisition) decision-making realizing mission Capabilities more quickly

Mission needs

Derive

Strategy

Realize

Budget Alignment

Input into Investment Decisions

Inform

Recommend

Initiatives

human capital

Services (tech/non-tech)

JARM

JARM products provide the foundation for communication, analysis, visibility, and decision-making
The Bottom Line on the JAWG

- We work together **collaboratively**
- Each IC Element has unique skills and abilities, that when combined with other IC Elements’ respective skills and abilities **supports the overarching Mission of the Intelligence Community**
- **IT** is all about providing **agility for the Mission**; a force multiplier!
- Our JARM tools can **scale** and are usable at multiple levels of an organization/enterprise/community, for many different perspectives.
- It is all about providing “...**any data, any time, any place, usable by any authorized consumer; preventable only by law or policy, not technology.**”
For More Information:

► JAWG on Intelink:
  – (NIPR) www.intelink.gov/wiki/Joint_Architecture_Working_Group

► More Questions:
  – jawgleadershipsupport@ugov.gov
  – randy.c.marks@ugov.gov
The greater danger for most of us lies not in setting our aim high and falling short; but in setting our aim too low, And achieving our mark.”

…Michelangelo