Success with Enterprise Architecture – Philip S. Homan
Success with Enterprise Architecture

• Overview
  – Enterprise Architecture
  – DoD Architecture Framework (DoDAF)
  – The Navy ERP Program

• Building a Successful EA for Navy ERP
  – The State of the Navy ERP EA in July 2010
  – Navy ERP EA Development
  – The State of the Navy ERP EA today
  – How we got here
  – How the EA is being used

• Lessons Learned – here and in the past
• Practicing IT Architecture for 25 years
• Internal IBM on Order Management, Contract Management, Billing, Inventory Management System
• Became Chief Business Architect for IBM Product Support Services – Worldwide
• Chief Contractor Architect for DoD Business Enterprise Architecture for 18 months – delivered 3.0 and 3.1
• Provided architecture support to the USAF, FEMA, USN
Why Enterprise Architecture?

• EA is the answer to several different needs
  – Perform Enterprise strategic planning
  – Integrate / share data between independent systems
  – Understand the Enterprise’s Application Portfolio
  – Control seemingly redundant investments in IT
  – Replace legacy systems with more efficient applications using newer technology

• Office of Management and Budget requires an approved Enterprise Architecture to obtain funding
“Enterprise Architecture is a well-defined practice for conducting enterprise analysis, design, planning, and implementation, using a holistic approach at all times, for the successful development and execution of strategy.

Enterprise Architecture applies architecture principles and practices to guide organizations through the business, information, process, and technology changes necessary to execute their strategies.

These practices utilize the various aspects of an enterprise to identify, motivate, and achieve these changes.”

- “A Common Perspective on Enterprise Architecture”, feapo.org
What is an Enterprise Architecture?

- It Depends on the Needs of the Program / Initiative (i.e., Fit for Purpose)
- It Defines what’s in and what’s out (i.e., the scope of the “Enterprise”)
- It can describe how People and Technology accomplish the objectives of the Program
- It can describe how “what’s in” interacts with “what’s in”
- It can describe how “what’s in” interacts with “what’s out”
What is the DoD Architecture Framework?

- Collection of models (53 in DoDAF 2.0) used to describe the various aspects of a system and how that system interacts with other systems

- Multiple Viewpoints
  - Overview of the Architecture (All View)
  - Operational
  - System / Services
  - Data and Information
  - Technical Standards
  - Capability Requirements (2.0)
  - Project (2.0)
What is the DoD Architecture Framework?

- Provides a palate of well-defined models that, when used together, provide the different perspectives (viewpoints) on the program required by the client.
- Required by the US Department of Defense
- Well understood by a large number of IT Architects
- Well defined yet flexible
- Supported by tools (e.g., System Architect, ARIS)
- Other Architecture Frameworks – e.g., TOGAF, MODAF, Zachman EA Framework – provide similar benefits
• Department of the Navy (DON) financial system of record
  – Key to producing auditable financial statements by 2017
  – Savings through business process standardization and legacy system retirement
• Financial system used by 6 major Navy commands
  – Common processes
  – Single installation used by all
• Over 64,000 users around the world.
• Approximately 50 percent of the Navy’s budget is currently executed within Navy ERP
Navy ERP Program Functionality

• Financial Management
  – Budgeting
  – Accounts Receivable / Accounts Payable
  – Period Closing
  – General Ledger

• Program / Project Management

• Acquisition Management
  – Procurement
  – Asset Management
• Supply Chain Management
  – Logistics Planning and Allowancing
  – Order Fulfillment and Outfitting
  – Inventory Management

• Workforce Management
  – Personnel Time Management
  – Personnel Training and Development
  – Personnel Appraisal
Navy ERP Program Processes

• Acquire to Dispose
• Check-in to Check-out
• Plan to Perform
• Plan to Pay
  – Procurement
  – Logistics Planning
  – Order Fulfillment
  – Inventory Management
• Budget to Authorize
• Post to Report
The Navy ERP EA in November 2010

Current Enterprise Architecture assessment

- Originally represented Navy ERP as the “to-be” architecture. Now that Navy ERP is the “as-is” architecture for some commands but not for others the EA has not evolved to represent current status and transition.
- Transition plan outdated and not specific
- Improvements needed in all areas:
  - Complete
    - Does not provide a holistic representation that includes the business process, organizational, location, application, data, and technology perspectives
  - Accurate - Not all processes have been validated
  - Verifiable – No regular publishing schedule or formal feedback channel
  - Accessible – lacks web publishing and navigation capabilities
  - Not responsive to changing needs
  - Realistic – Gaps between architecture and actual solution exist
  - Managed – Encyclopedias not managed; no release schedule or plan
  - Monitored – tools and metrics not in place
  - Governed – Updated as afterthought, no formal review of changes
The Navy ERP EA in November 2010

Authorizing Authority EA Findings (summarized)

- Diagrams do not follow standards
- No traceability between complementary products
- Traceability to solution uses non-standard customized objects
- Traceability matrix inconsistent and incorrect in many cases
- EA description (AV-1) dated and with modeling-tool specific references
- Operational Activity names often too low-level and not representative of basic capabilities
- Inconsistent level of detail and terminology
- Models created for version 1.0 (financial) are different than those created for versions 1.1 (supply solution) and neither are BPMN compliant
• The Team

  - Government Chief Architect was Open Group Certified IT Architect with vast private sector development experience and 10 years EA experience as a contractor. Four months exposure to DoDAF.
  
  - Team (2 contractors, 1 government) was highly motivated and knowledgeable of the system functionality but untrained in DoDAF and most standard modeling methodologies.
  
  - I was filling an open position as a peer architect, reporting to the Chief Architect. I worked for a different contractor than the other two contractors.
Navy ERP EA Development

• First steps
  – Orientation
  – Gain trust of the team
  – Understand objectives of the Chief Architect, including program short-term needs related to EA
  – Understand EA Scope
  – Perform an assessment of all existing EA products
Navy ERP EA Development

• Put together a plan
  – Determine EA products needed to address program needs
  – Determine traceability requirements across EA products
  – Prepare proposal for EA development
  – Evaluate and update plan, as needed, based on prior EA assessment
  – Gain SPAWAR agreement on the products to be produced and the plan to produce them
    • Presented plan face-to-face in December 15, 2010 meeting
    • Lively discussion about some products and traceability
    • Gained agreement with minor issues resolved over the next few months
• Basics of the Plan
  – Use IBM Telelogic System Architect, with DoDAF plug-in
  – Use out-of-the-box DoDAF products as much as possible
  – Tailor the DoDAF Architecture Development Process for the detailed plan.
  – Develop and maintain an EA Design Guide to document all standards and guidelines established along the way.
  – Ensure traceability across products is defined and understood so that this is built in from the start.

• Before we began
  – Established initial standards for each product.
  – Ensured the team member understood and agreed with the purpose, scope, and content of each product.
Navy ERP EA Development

DoDAF Architecture Development Process

1. Determine the Intended use of the Architecture
   - Stakeholder Requirements
     - Purpose
     - Critical Issues
     - Target Objectives
     - Key Tradeoffs
     - Decision Points
     - Probable Analysis Methods

2. Determine Scope of the Architecture
   - Geographical, Operational, and Functional Bounds
   - Technological Bounds
   - Time Frame(s)
   - Architecture Resource and Schedule Constraints

3. Determine Data Required to Support Architecture Development
   - Required Architectural Characteristics:
     - Architectural Data Entities
     - Levels of Detail
     - Units of Measure
     - Associated Metadata

4. Collect, Organize, Correlate, and Store Architecture Data
   - Automated Repositories
   - Activity Models
   - Data Models
   - Dynamic Models
   - Organizational Models
   - Metadata Registration

5. Conduct Analysis in Support of Architecture Objectives
   - Shortfall Analyses
   - Capacity Analyses
   - Interoperability Assessments
   - Business Process Analysis
   - Test Architecture Completeness, Accuracy, and Sufficiency

6. Document Results in accordance with Architecture Framework
   - Architecture Products and Views (Operational, Systems, and Technical)
   - Reusable Architecture Data
   - Analysis Reports
DoDAF Build Sequence
Navy ERP EA Development

• Development
  – Determined a good source for the definition of scope.
    • SAP Level 4 Business Processes (basically System Functions)
  – Defined Business Scope with Operational Activities via the Operational Activity Node Tree
    • Matrix mapping Operational Activities to System Functions is in DoDAF
    • This established the foundation for all other products.
  – Focused on Business Process Models to define details of how the system was used and what it was used for.
  – Leveraged the program-managed Interface Control Agreements and System Data Exchanges to define interactions with other systems.
The Navy ERP EA today

• Version 3 of the EA is complete
• Architecture statistics
  – 224 Business Process Diagrams
  – 2486 Process Steps
  – 166 Operational Activities (116 leaf-level)
  – 150 System Functions
• Architecture attributes
  – Consistent naming across all products
  – Traceability between related objects within products
  – Consistent “look and feel” of all products
  – Embraced by Functional experts
Independent Audit Assessment

Solution documentation –
Enterprise architecture

Findings

- The Navy ERP Architecture 3.0 document is a comprehensive and complete guide for understanding the scope and depth of the program.
- The Operational Event-Trace Description (OV-6c) is valuable because it decomposes each high-level scenario into a traceable series of actions and sequence of events.
- The Navy ERP Architecture – Business Process Diagrams – 3.0 document complements the event-trace descriptions and shows graphical business process flow diagrams, decomposes them into detailed process steps, and shows how they interrelate with other processes and master scenarios.

**IMPACT:** These documents enable personnel within the Navy ERP program to familiarize themselves with the complex business processes and understand how the SAP software integrates with these processes.

- New personnel assigned to the program will be able to ramp up their process knowledge quickly by providing the context needed at high and more detailed levels.

Recommendations

- Ensure that all personnel assigned to any functional capacity within the Navy ERP program become familiar with the valuable content in these documents.
How we got here

- Knowledgeable and committed Chief Architect and EA Team
- EA that was scoped to the needs of the program
- Reasonable and valuable oversight provided by SPAWAR
- Establishment of and adherence to standards
- Use of industry standard, well documented, methodologies
- Scheduled releases – with confidence that additional work will occur following each release
How we got here

• Funding – DoD audit readiness requirement and Navy FMO requirement for business standardization provided resources for extensive access to end users and Functional experts
How the EA is being used

• **Program Documentation**
  - Published in the Information Support Plan (ISP) as the description of the program
  - Official program documentation for data calls
  - Used for orientation of new personnel to the program
  - Used for orientation of SAP auditors

• **Compliance / Audit Readiness**
  - Documents alignment with BEA, SFIS, and DON EA
  - Used by Joint Interoperability Test Command (JITC) for interface testing and certification
  - Documents GL Postings being produced and Financial Control Points being enforced by Navy ERP in support of Audit Readiness
How the EA is being used

• **Navy Portfolio Management**
  – Used to identify any overlap in functionality of Navy ERP and other Navy systems

• **Change Management**
  – Used to assess and document changes needed in Navy ERP to support changes being made to other systems
  – Used to document to-be processes for major functional enhancements
  – Maintained in sync with changes applied to the system

• **Testing**
  – Used by Regression Test to evaluate the scope of their tests during audit of coverage and effectiveness
Lessons Learned

• Don’t do more architecture than is needed
• Try not to build less architecture than is needed, either
• Make sure the client knows what is being built, why it’s being built, and agrees that it’s needed
• Make sure the team knows what is being built, why it’s being built, how to build it, and understands that the client thinks it’s needed
• Don’t mix Strategy, Management, and Execution on a single architecture
Lessons Learned

- Don’t limit your palate of models to those already defined
  - Be creative
  - Define standards for every model being developed
- Make your architecture visible so that the entire program can benefit from it
Building a Successful Enterprise Architecture takes:

- Agreed-to Scope
- Understanding of Client Needs and Critical Dates
- Vision of the Target Architecture
- Quality Personnel with Knowledgeable Leadership
- Committed Client (Knowledgeable helps)
- Access to key information and key personnel
- Agreed-to and Documented Standards with the authority to enforce them.
- Delivery Dates with Reasonable Expectations
• Philip Homan
  – philip.homan@ECS-Federal.com
Relationships between Interface-Related Architecture Objects

Information Exchanges, ICOMs, Needlines, Message Flows, System Data Exchanges, and System Interfaces

- Normally, IEs are named the same as ICOMs on the OV-5a A-0 Context Diagram. The specific rule is:
  - **IE Name** =
    - ICOM Name, when IE – ICOM on the A-0 is 1-1
    - SDE Name, when IE – ICOM on the A-0 is 1-M and IE – System Data Exchange is 1-1
    - Other meaningful name, when both relationships are 1-M
  - **Message Flow Name** = ICOM Name

- Symbol Legend:
  - **PK** Primary Key
  - **FK** Foreign Key
  - **Bold** indicates “required”
System Interface Description

System Entities Owned by non-Navy Components
- DONCADS - WFM
- NES - WFM
- OPINS - WFM
- TFMMS - WFM

System Entities Owned by the Navy
- APVM-EUD - FM
- FM - DCD
- FM - DDRS
- DTS - FM
- FM - DTS
- FM - FRB
- FRB - FM
- FM - myInvoice
- PBIS - FM
- PPVM-EUD - FM
- FM - PPVM-EUD
- CDF-NG - SCM
- WAWF - FM
- FM - WAWF
- CPEN - SCM
- SCM - CPEN
- G02APU - SCM
- SCM - G02APU
- SCM - IPAC
- SCM - SABRS
- SCM - STARS-FL
- STARS-HCM - SCM
- OTS - SCM
- SCM - OTS
- eRMS - SCM
- SCM - eRMS
- SAM - SCM
- SCM - ICAPS
- ITIMP - SCM
- MISIL - SCM
- SCM - MISIL
- NALCOMIS-OIMA - SCM
- PARTS - SCM
- Readiness Suite - SCM
- SCM - Readiness Suite
- REMAD - SCM
- SCM - REMAD
- FPDW - SCM
- SCM - FPDW
- SLDP - SCM
- SCM - SLDP
- SPS - SCM
- SCM - SPS
- TRIDENT LDS - SCM
- SCM - TRIDENT LDS
- UICP - SCM
- DCAS - FM
- DCPS - FM
- WFM - DCPS
- WebCMET - FM
- DAAS - SCM
- SCM - DAAS
- FLIS - SCM
- SCM - FLIS
- SCM - CAV-ORM
- SCM - CDMD-OA
- SCM - ITIMP
- SCM - NALCOMIS-OIMA
- NDMS - SCM
- ADS - FM
- FM - ADS
- ICAPS - SCM
- WAWF - SCM
- SCM - WAWF
- SCM - DCAS
- DCPS - WFM
- FM - PBIS
- FM - VISTA
- FM - DIFS
- DIFS - FM
- MFCS - SCM
- SCM - SAS Server
- SCM - NAVSUP BO
- NAVSEA BO - SCM
- SSP BO - FM
- NAVAIR BO - SCM
- SCM - Inform21
- SCM - CDW
- MFCS - SCM
- SCM - EMS
- EMS - SCM
- FM - BAM
- FM - SCRT