



Leveraging DoDAF 2.0 in the DoD Enterprise

Presentation to the Integrated EA Conference

London, UK

1 March 2011

By Mr. David McDaniel

David.McDaniel@SilverBulletInc.com

Enterprise Architecture & Infrastructure Directorate

Office of the DoD Deputy Chief Information Officer

(703) 607-0482 Michael.Wayson@osd.mil



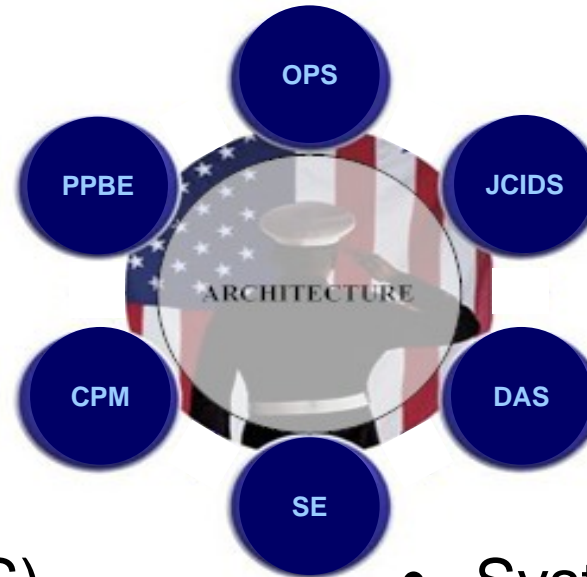
Presentation Outline



- DoD CIO's Role with DoDAF V2.0
- DoDAF V2.0's Role in DoD's Six Core Processes
- Types of Architectures in DoD
- Reference Architectures and DoDAF V2.0
- Two examples
 - Enterprise-wide Access to Network and Collaboration Services (EANCS) Reference Architecture
 - Active Directory Optimization Reference Architecture (ADORA)
- Vision of role of the DoDAF Meta Model (DM2) in empowering architecture roles in core processes



DoDAF is Required to Support DoD's 6 Core Processes



- Operations (OPS)
- Joint Capability Integration Development System (JCIDS)
- Defense Acquisition (DAS)
- Systems Engineering (SE)
- Capability Portfolio Management (CPM)
- Programming Planning and Budget Execution (PPBE)



Short Descriptions



- **Operations (OPS)**

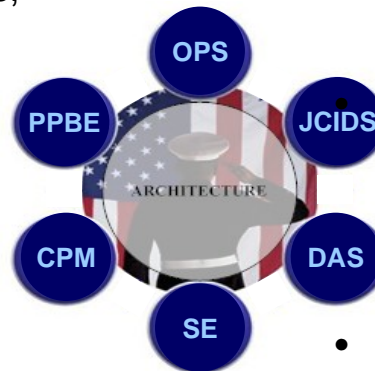
- Combatant Command CONOPS
- Standing communications and operations plans (COMPLAN, O-PLANS)
- These describe networks, systems, organization, activities, equipment allocation, etc.,

- **Joint Capability Integration Development System (JCIDS)**

- Focal point for DoD service chiefs to prioritize needs, shortfalls, and gaps
- Tightly coupled with DAS and PPBE processes

- **Defense Acquisition System (DAS)**

- Approval process for all acquisitions
- Milestones reviews
- Four acquisition categories ~ \$ value
- Architecture data assists go/no-go/contingent decisions



- **Systems Engineering (SE)**

- Technical execution of an acquisitions
- All programs in the acquisition process must have a Systems Engineering Plan
- The developed system engineering documents and specifications should flow from and be consistent with the architecture

- **Capability Portfolio Management (CPM)**

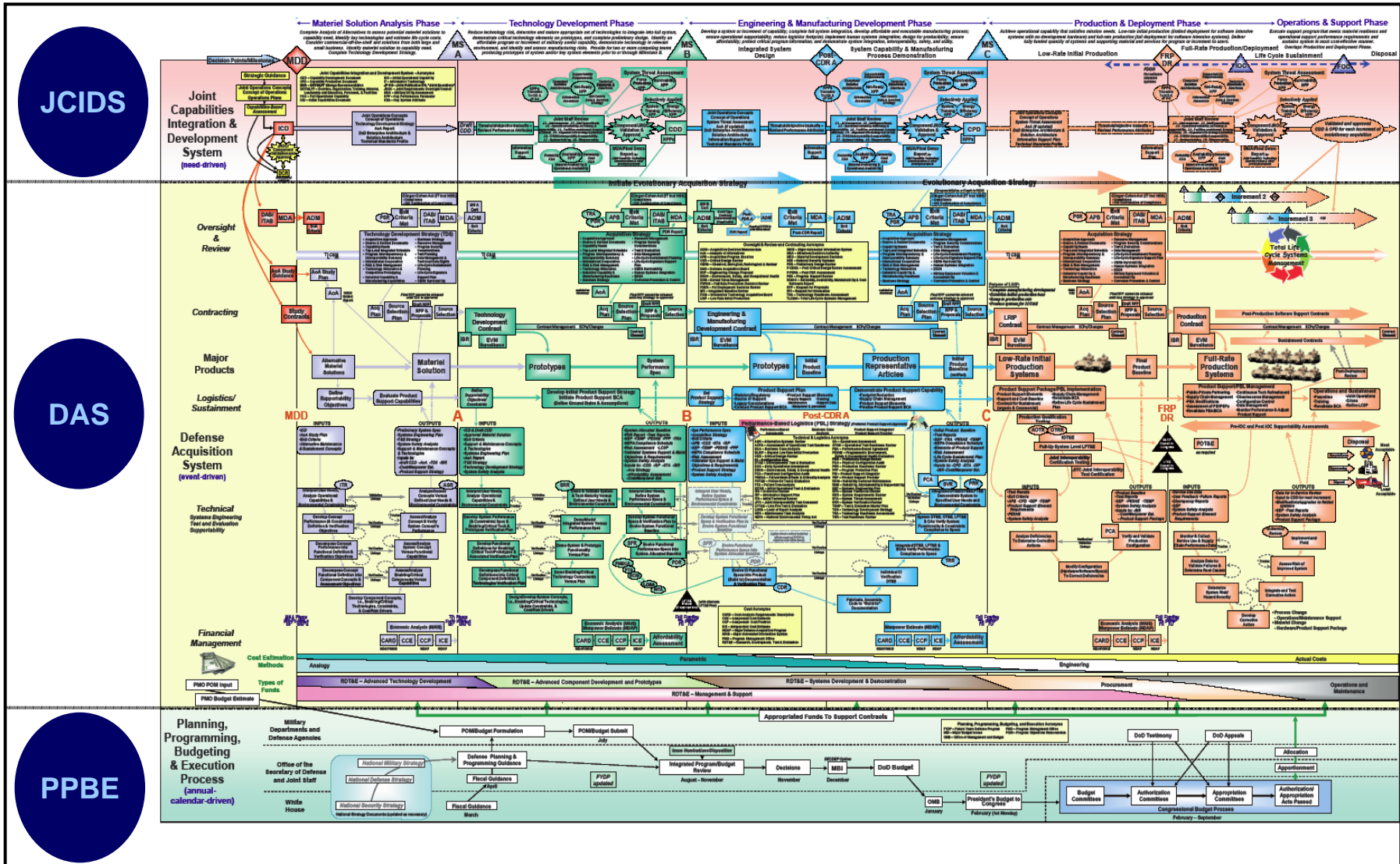
- Process for managing \$'s by required capabilities
- Architecture models link investments to the desired effects, tasks, and conditions of capabilities

- **Programming Planning and Budget Execution (PPBE)**

- Annual 5-year budget proposal to Congress
- Each DoD component develops one and then consolidated by White House to go to Congress
- Architecture models are used to determine interconnected impacts and to justify the \$ request
- Related to Capital Planning and Investment Control (CPIC)



The Processes are Intertwined



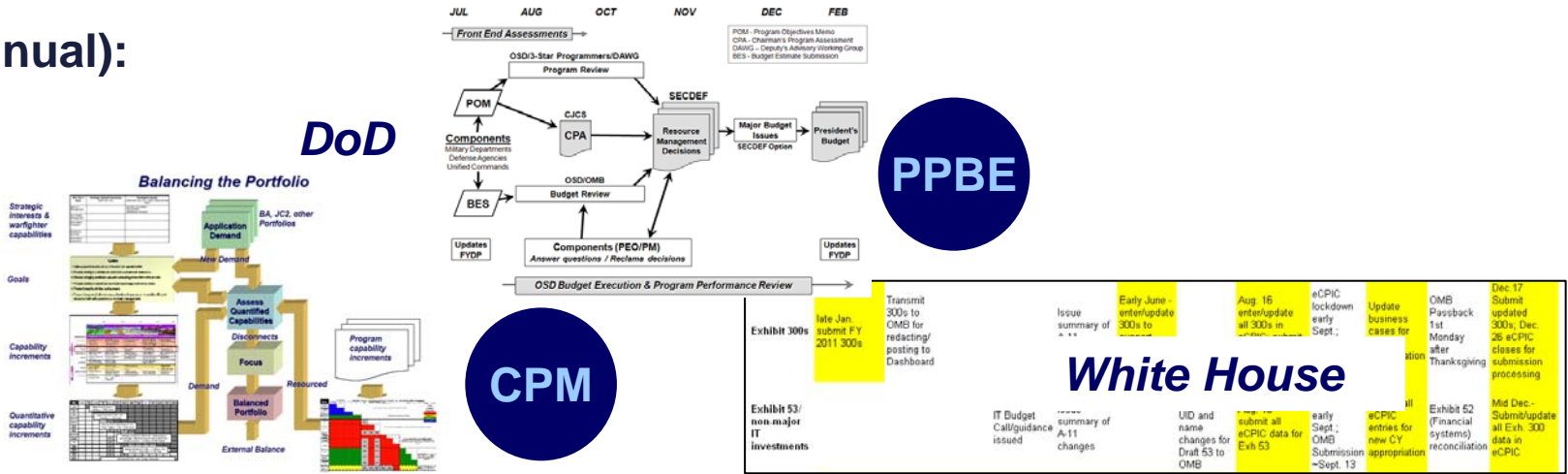


... and asynchronous and multi-organizational



Periodic (annual):

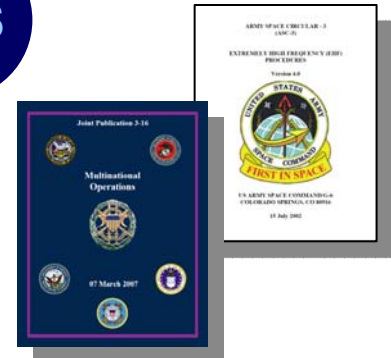
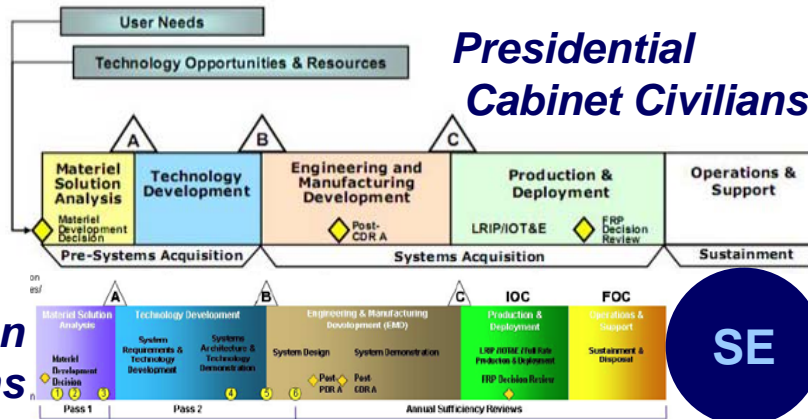
- PPBE
- CPM



Combatant Commands
Doctrine Commands
Training Commands

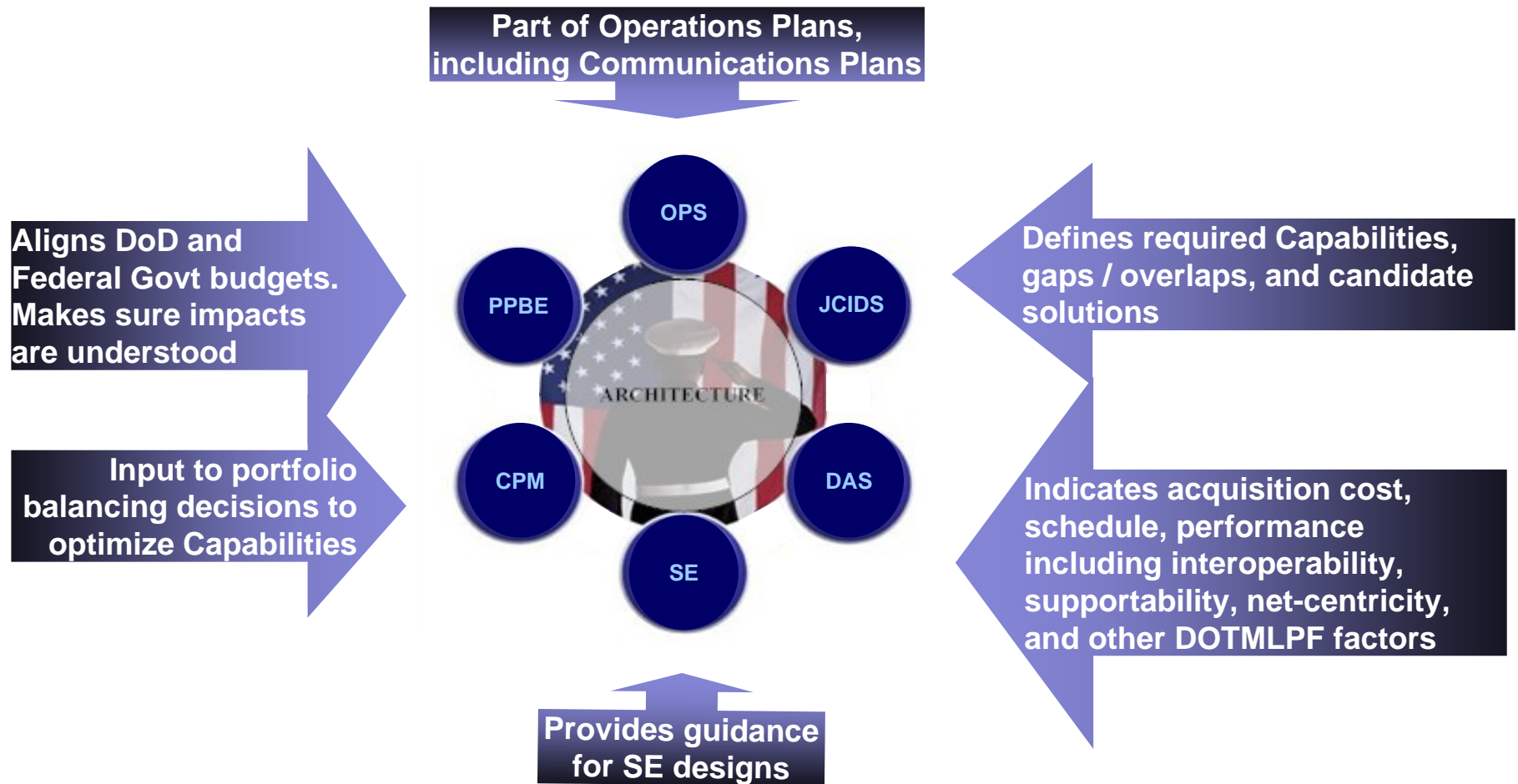
Event Driven:

- JCIDS
- DAS
- SE
- OPS





Architectural Descriptions Support Consistency, Efficiency, and Effectiveness in the Processes

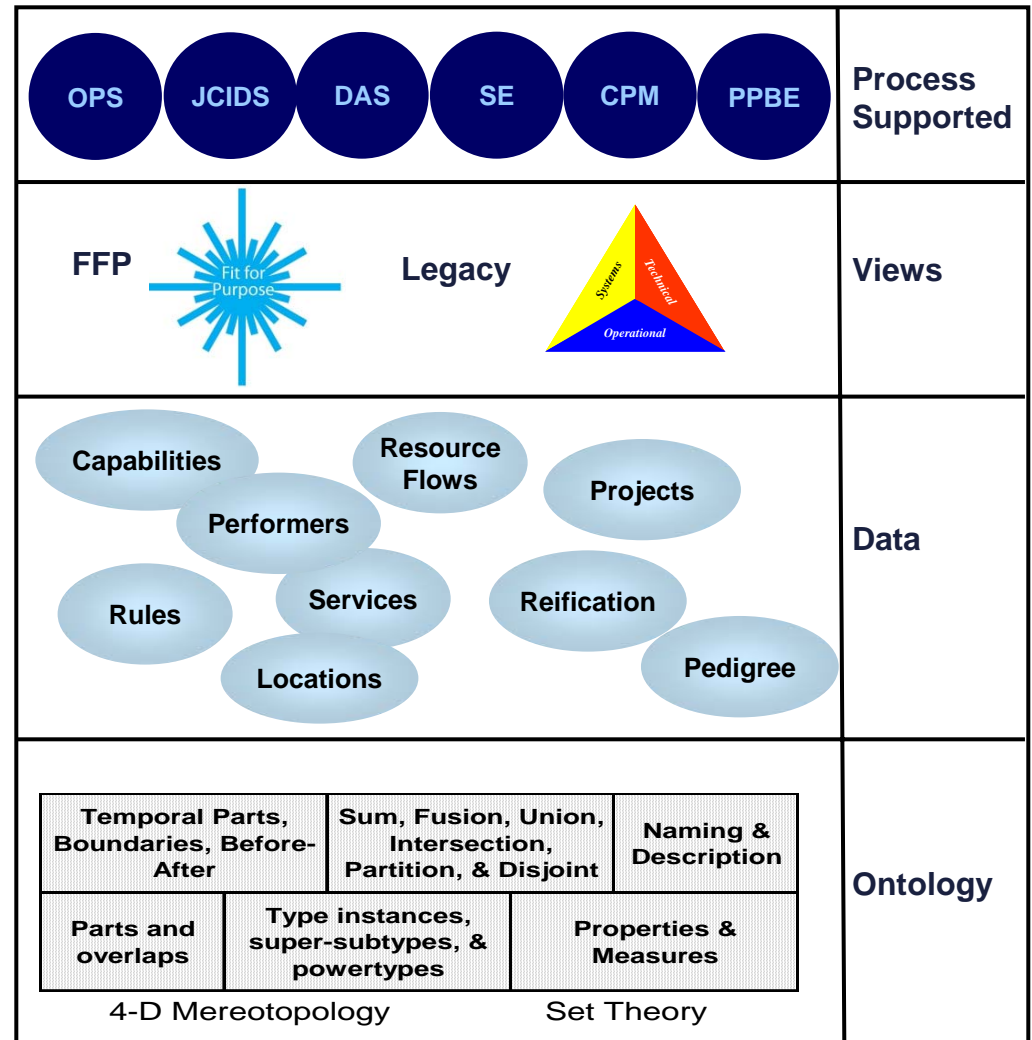




DoDAF 2.0 Provides the Specification and Guidance to Support the Core Processes with Architectures



- Specifies:
 - An underlying *DoDAF Meta Model (DM2)* for describing architectures
 - A set of legacy models (products) that depict some subset of architecture data
- Provides guidance for:
 - Architectural description development
 - “Fit For Purpose” (FFP)* views that optimize Return On Investment (ROI) for the process being supported
 - data conforming to the DM2
 - FFP-based presentation of data

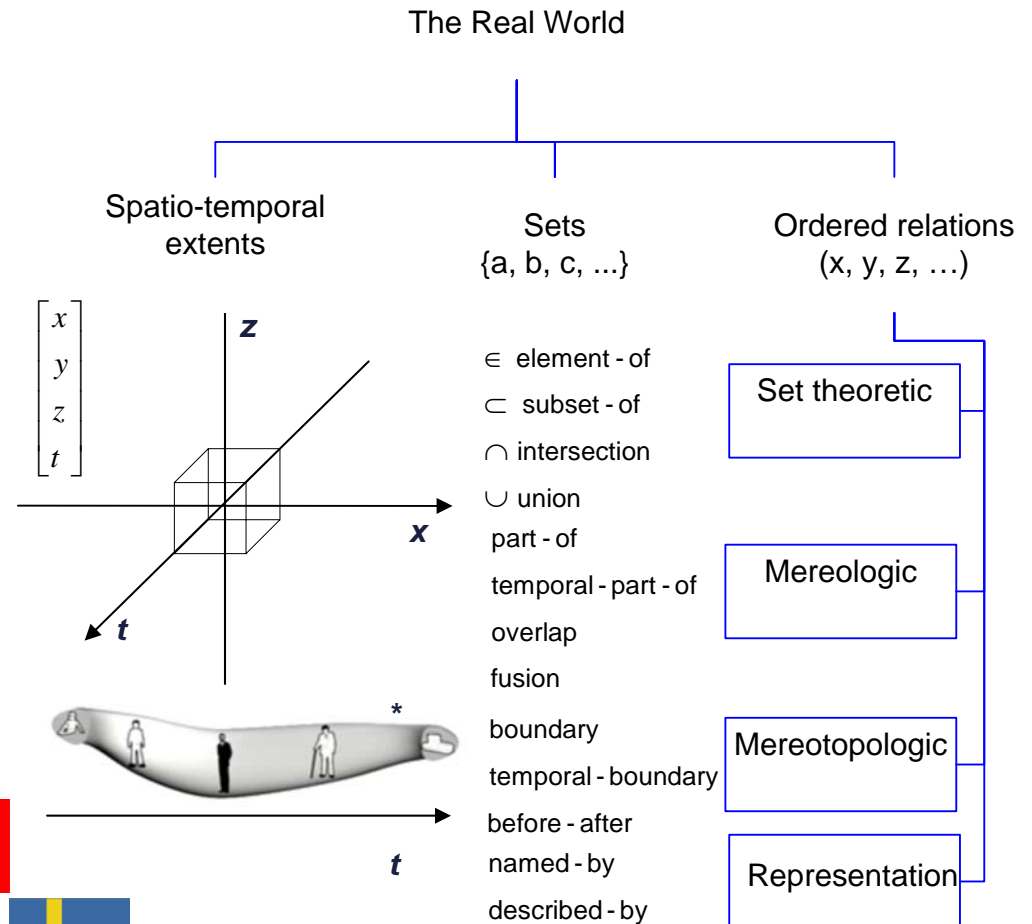
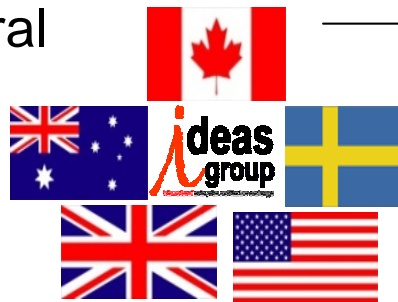




DM2 Mathematical Foundation -- IDEAS

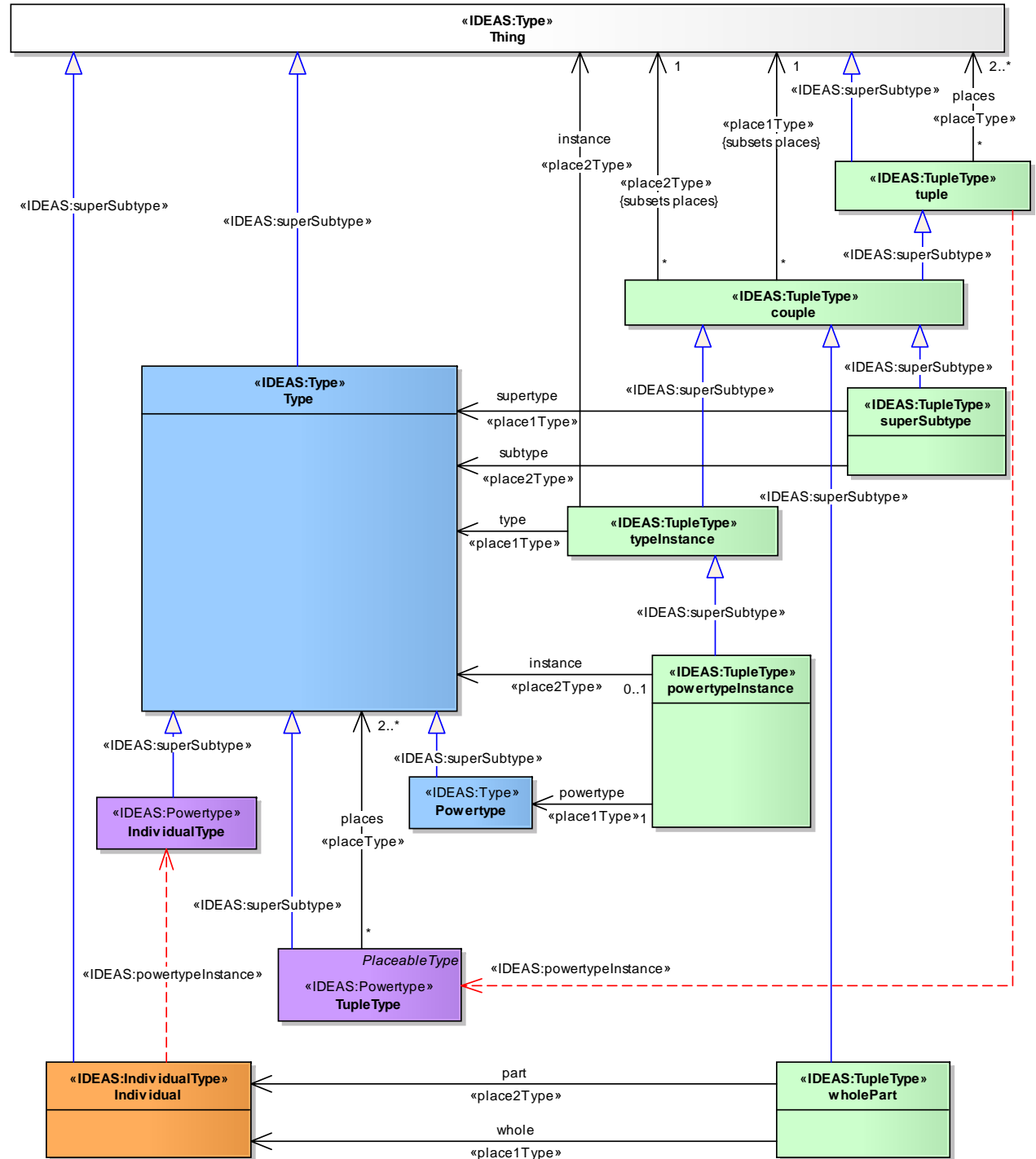


- Four dimensionalist -- xyz_t
- Extensional -- physical existence is the criterion for identity
- Signs and representations are separated from referents
- Mathematics:
 - Type theory ~ Set theory
 - Mereology (wholes and parts)
 - 4D Mereotopology (spatio-temporal relations)



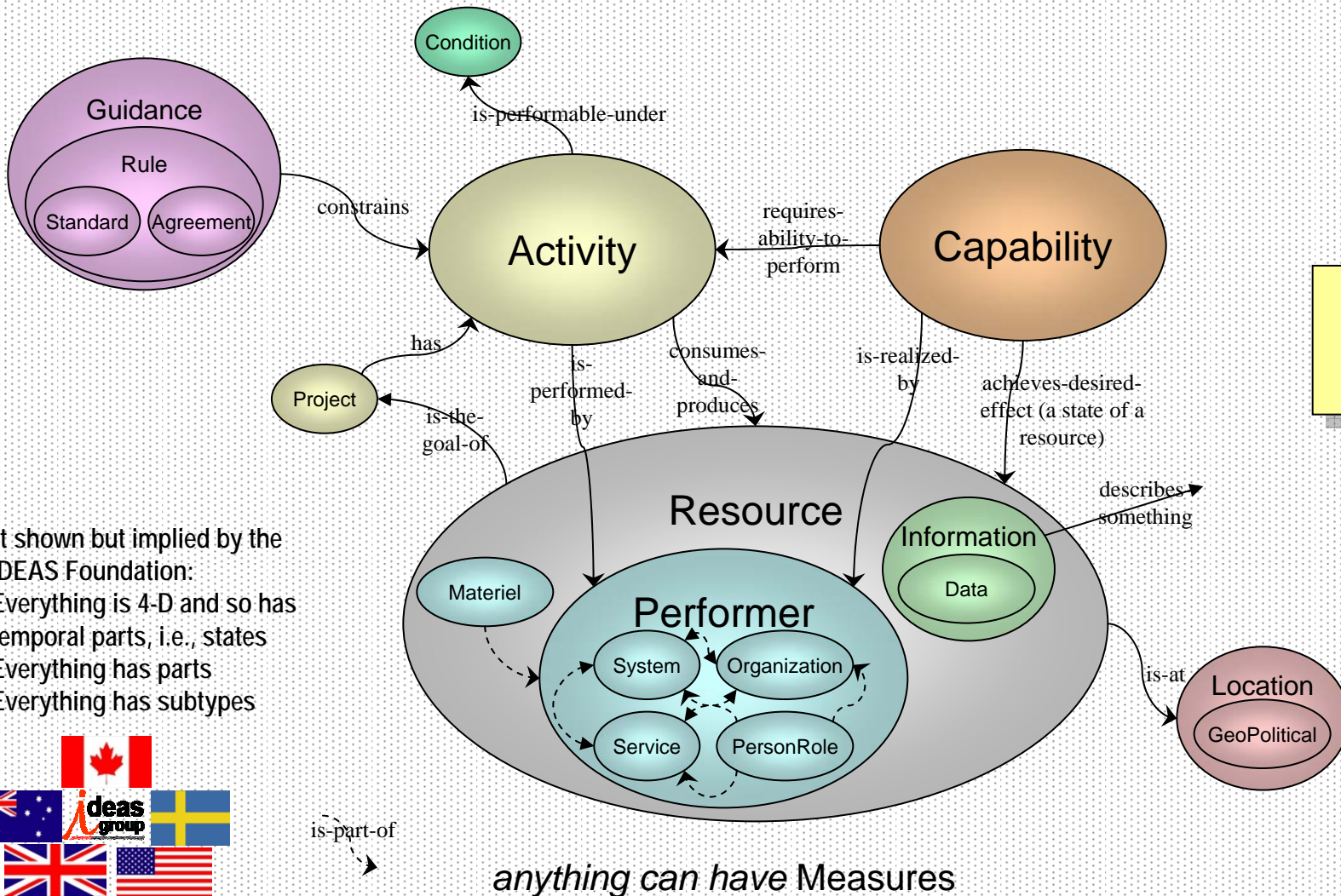
* © Rob Byranton

IDEAS Key Objects





Conceptual Level of DM2 is Simple



Backup slide has term definitions

- Not shown but implied by the IDEAS Foundation:
- Everything is 4-D and so has temporal parts, i.e., states
 - Everything has parts
 - Everything has subtypes





Federation of Architectures in DoD



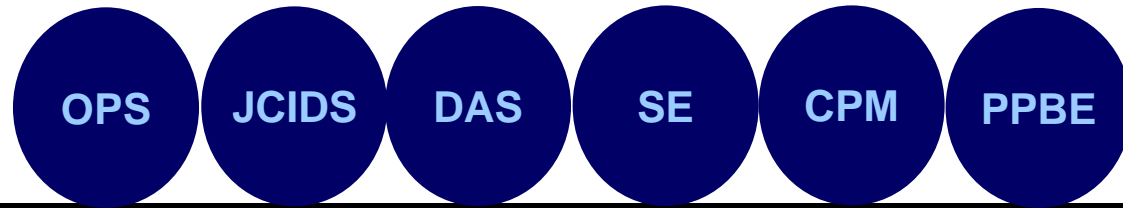
| | | | |
|------------------------------------|---|--------------------------------|---|
| Enterprise Architecture | The explicit description and documentation of the current and desired relationships among business and management processes and information technology. (OMB Circular A-130) | Capability Architecture | A set of descriptions that portrays the context and rules required to achieve a desired effect through a combination of doctrine, organization, training, materiel, leadership and education, personnel, and facilities. (Draft DoDD 8210.bb) |
| DoD Enterprise Architecture | A federation of descriptions that provides context and rules for accomplishing the mission of the Department of Defense. These descriptions are developed and maintained at the DoD, capability area, and Component levels and collectively define the people, | Segment Architecture | Detailed results-oriented (baseline and target) and a transition strategy for a portion or segment of the enterprise. (FEA Practice Guidance, December 2006) |
| Reference Model | An abstract framework for understanding significant relationships among the entities of some environment. (Reference Model for Service Oriented Architecture 1.0, Organization for the Advancement of Structured Information Standards (OASIS)) | Solution Architecture | A set of descriptions that portray the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution. (Draft DoDD 8210.bb) |
| Reference Architecture | An authoritative source of architecture information (within a domain) that guides and constrains the instantiations of solution architectures by providing rules, principles and holistic models and patterns of the abstract architectural elements together w | Component* Architecture | A framework or structure that portrays relationships among all elements of an organizational grouping within the Department of Defense responsible for safeguarding the national security of the United States. (Draft DoDD 8210.bb) |

*e.g., Air Force, Navy & Marine Corps, Army, Defense Logistics Agency, Defense Information Systems Agency, National Geospatial Agency, Business Transformation Agency, National Security Agency, Defense Threat Reduction Agency, Defense Intelligence Agency, Defense Technical Information Center.

Additional information on intended purpose, content, and examples provided in backup slides



Role of Federated Architecture Types in Core Processes



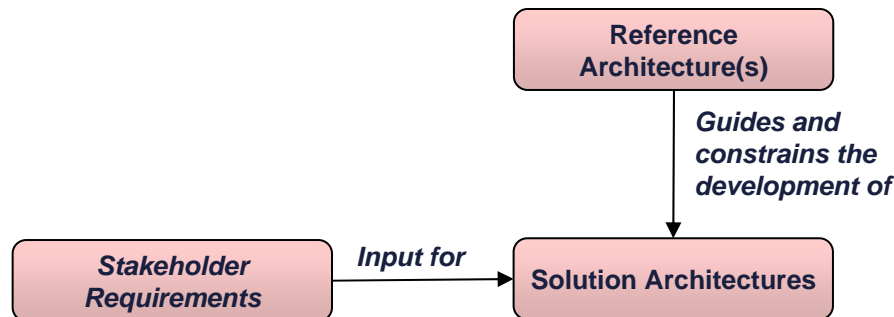
| | OPS | JCIDS | DAS | SE | CPM | PPBE |
|-----------------------------|-----|-------|-----|----|-----|------|
| Enterprise Architecture | | | | | | X |
| DoD Enterprise Architecture | | | | | | X |
| Reference Model | | | | | | X |
| Reference Architecture | | | | X | X | |
| Capability Architecture | X | X | X | | X | |
| Segment Architecture | | | X | X | | |
| Solution Architecture | X | X | X | X | X | X |
| Component Architecture | | | | | | X |



Reference Architectures



- RA's are used in DoD to guide and constrain development of subordinate architectures
 - Define a standard language for a specific subject area
 - Encourage consistency
 - Provide a benchmark for validation



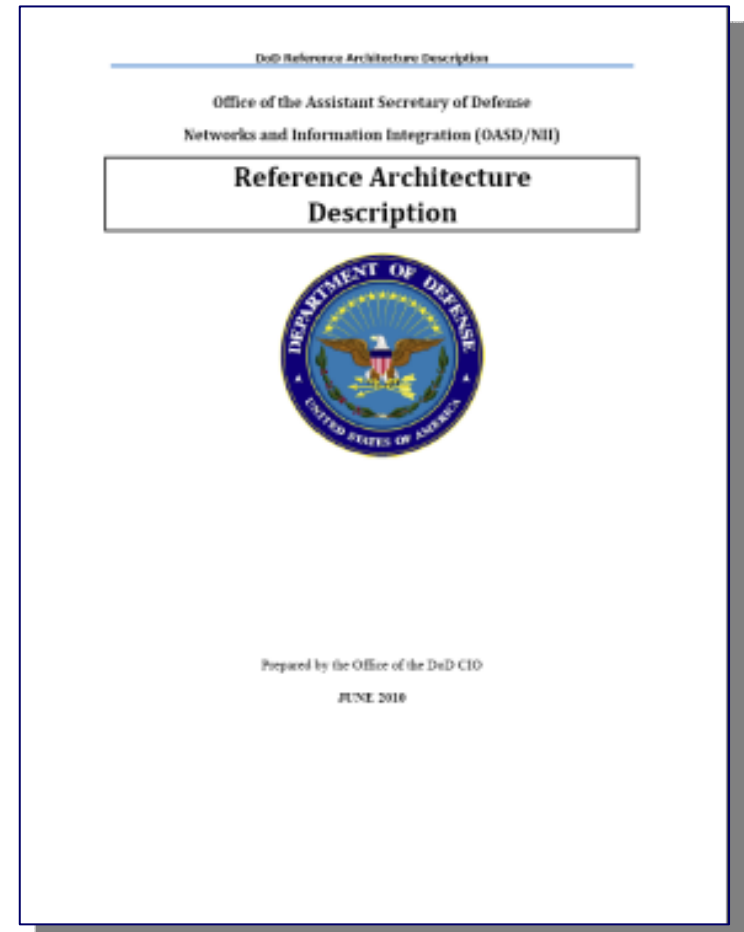
- Reference Architectures provide a way to federate architecture development in an organized manner.



Reference Architectures Have Five Components



1. Strategic Purpose
 - Identifies goals and objectives of the Reference Architecture and describes the specific purpose of and the problem(s) to be addressed by the Reference Architecture.
2. Principles
 - Sufficient high level foundational statements of rules, culture, and values that drive technical positions and patterns.
3. Technical Positions
 - Technical guidance and standards, based on specified principles that need to be followed and implemented as part of the solution.
4. Patterns (Templates)
 - Generalized architecture representations (viewpoints, graphical/textual models, diagrams, etc.) that show relationships between elements and artifacts specified by the technical positions.
5. Vocabulary
 - Acronyms, terms, and definitions that are used in the Reference Architecture and relevant to architectures and solutions that are guided and constrained by the Reference Architecture





DoDAF 2 Data and Views are parts of Reference Architectures

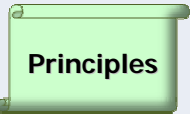


Strategic Purpose

AV-1 Overview & Summary Information

CV-1: Vision – overall strategic concept and high level scope

OV-1 High Level Operational Concept Graphic – what solution architectures are intended to do and how they are supposed to do it



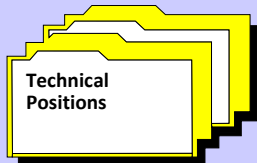
Principles

OV-6a Operational Rules Model

SvcV-10a Services Rules Model

SV-10a Systems Rules Model

OV-4 Organizational Relationships Chart – architectural stakeholders



Technical Positions

StdV-1 Standards Profile

NOTE: Services and Systems in DoDAF 2 include operators – not just machines or software



Patterns

Operational Patterns

OV-2 Operational Resource Flows

OV-5 {a,b} Activity diagrams

Service Patterns

SvcV-1 Service Interfaces

SvcV-2 Service Resource Flows

SvcV-4 Service Functionality

SvcV-10b Service State Transitions

System Patterns

SV-1 System Interfaces

SV-2 System Resource Flows

SV-4 System Functionality

SV-10b System State Transitions

Event-Based Scenario Patterns of Dynamic Behavior

OV-6c Event-Trace Description

SvcV-10c Services Event-Trace Description

SV-10c Systems Event-Trace Description

AV-2 Integrated Dictionary- definitions of terms used throughout solution architectures



Reference Architectures in DoD



- DoD has many RA's for different purposes:
 - **Capabilities Portfolio Management (CPM)** – for alignment, interoperability, and reuse of portfolio elements
 - **Systems Engineering (SE)** -- for alignment, interoperability, and reuse of system, service, System of Systems (SoS), and Family of Systems (FoS) elements
- The subject areas are chosen by the CPM and SE managers based on perceived needs for alignment, interoperability, and / or reuse



Example One: Enterprise-wide Access to Network and Collaboration Services (EANCS) Reference Architecture



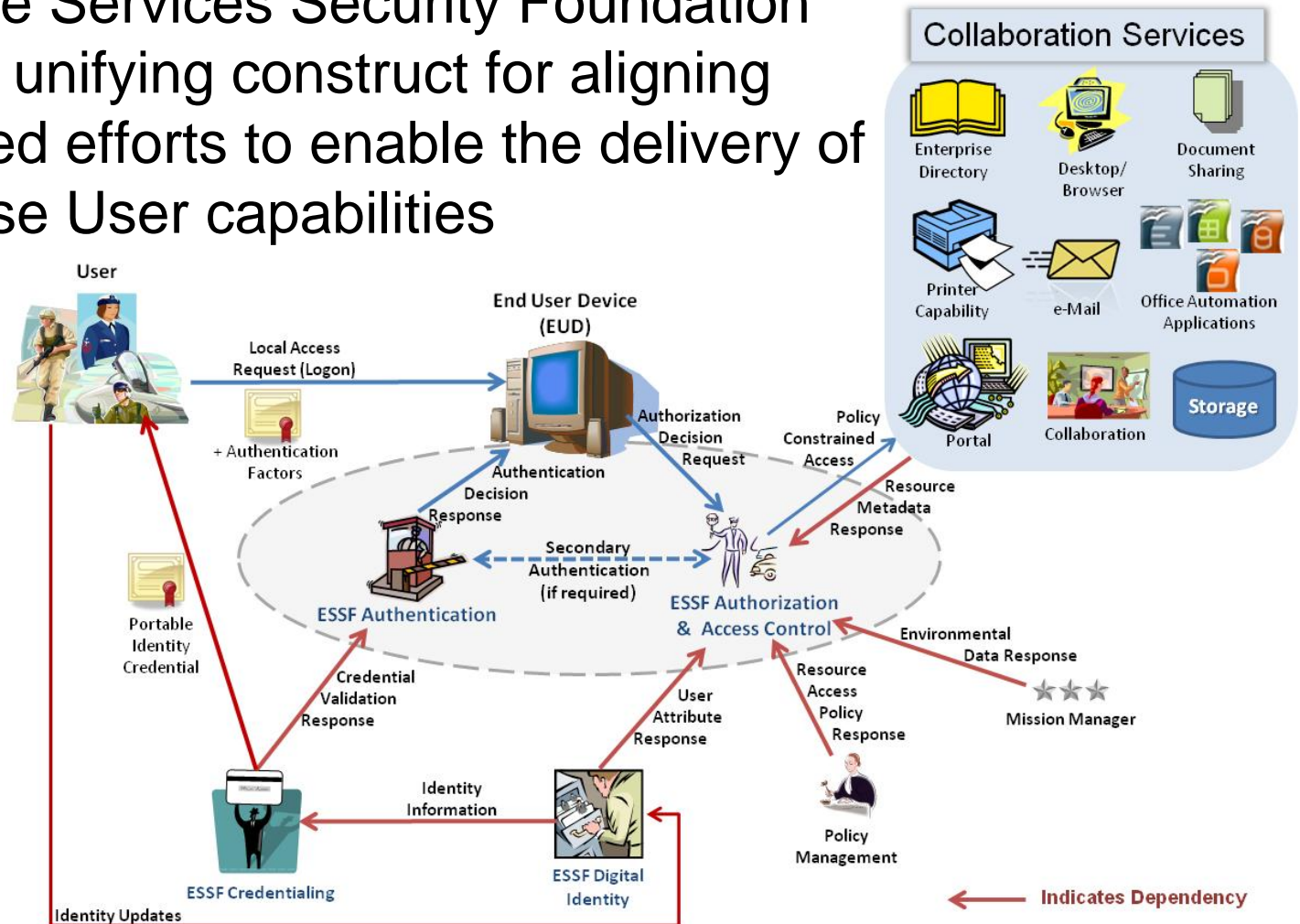
- Go anywhere in DoD, logon, and be productive
- The EANCS architecture supports building the following capabilities
 - Global Access
 - Global Authorization
 - Global Directory Services
- It enables the following three Use Cases
 - Global access to enterprise-level collaboration services
 - Implemented by the Defense IT Infrastructure Library (ITIL) Access Management, Active Directory Optimization, and DoD Visitor initiatives
 - Extend global access to web-based office applications
 - Implemented by the web office automation initiative
 - Incorporate initial attribute-based access control (ABAC)
 - Implemented by the Enterprise Attribute Service and Security initiatives



EANCS OV-1



The Enterprise Services Security Foundation (ESSF) is the unifying construct for aligning security-related efforts to enable the delivery of DoD Enterprise User capabilities

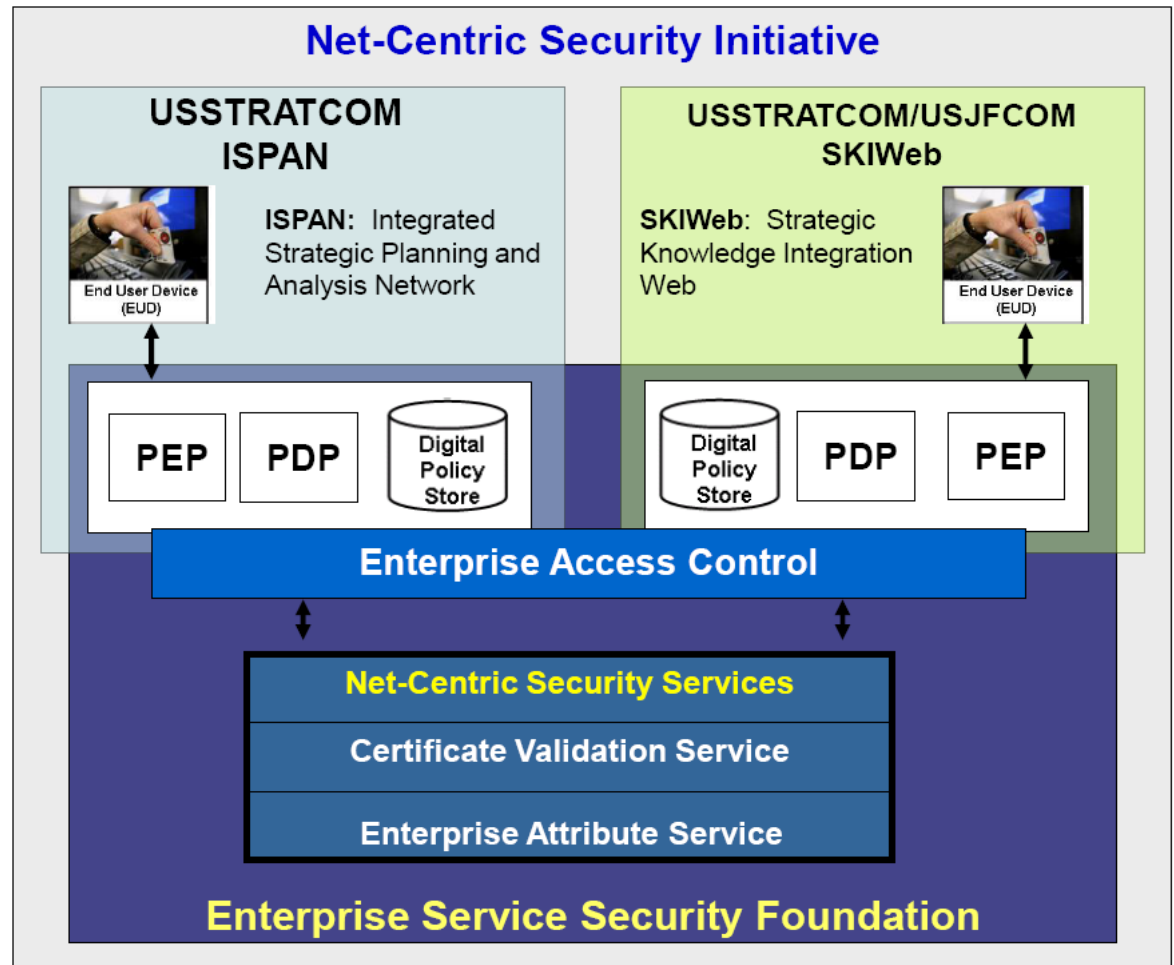




Current Initiatives Being Coordinated



- Need to coordinate over two executive governance boards:
 - DoD-wide executive group overseeing Identity Protection and Management
 - Executive group guiding the development of architectures, policies, and standards for enterprise-wide solutions
- Next candidates:
 - National Senior Leadership Decision Support System (NSLDSS)
 - Global Force Management Data Initiative (GFM-DI)





EANCS DoDAF Views



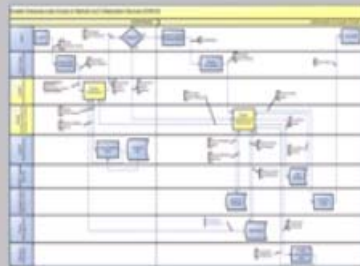
OV-1 (Concept – Consumer & Provider)



OV-5a (Activity Decomposition)

| # | Principle-Rule | DESCRIPTION |
|---|-------------------------------|---|
| 1 | Portable Identity Credentials | All Users must have a portable identity credential for authentication |
| 2 | Authentication-Based Access | User authentication is required to access a designated set of basic capabilities |
| 3 | Common Set of Privileges | All instances of authentication, authorization, and access control shall utilize the same set of designated functions described by the Enterprise Security Foundation (ESF) |
| 4 | Points of Access | Some form of authentication and authorization occurs at every point of access |
| 5 | Key Dependencies | Authentication, authorization, and access control are highly dependent on and must be managed jointly by a key function: identity management, access management, policy management, privilege management, and role management |

OV-6a (Operational Rules Model)



OV-6c (Event-Trace Description)

| View | Category | Version | Description |
|--------|-------------|---------|------------------------------|
| OV-1 | Concept | 1.0 | Service Provider Perspective |
| OV-5a | Activity | 1.0 | Activity Decomposition |
| OV-6a | Operational | 1.0 | Operational Rules Model |
| OV-6c | Event-Trace | 1.0 | Event-Trace Description |
| StdV-1 | Standards | 1.0 | Standards Profile |

StdV-1 (Standards Profile)

Actual views provided in backup slides



Update In-Progress for Additional Services Models



| | | | | |
|--|---|--|--|---|
| <p>Digital Identity</p> <ul style="list-style-type: none"> • Identity Proofing • Vetting • Adjudication • Digital Identity Lifecycle Mgmt. • Linking/Association • Identity Attribute Discovery | <p>Privilege Management</p> <ul style="list-style-type: none"> • Account Management • Bind/Unbind • Provisioning • Privilege Administration ➤ Resource Attribute/ Metadata Mgmt. | <p>Credentialing</p> <ul style="list-style-type: none"> • Sponsorship • Enrollment/ Registration • Issuance • Credential Lifecycle Management • Self-Service | <p>Authentication</p> <ul style="list-style-type: none"> • Credential Validation • Biometric Validation • Session Management • Federation | <p>Authorization & Access</p> <ul style="list-style-type: none"> • <i>Backend Attribute Retrieval</i> • <i>Policy Administration</i> • <i>Policy Enforcement</i> • <i>Policy Decision</i> ➤ Cross Domain Mediation |
| <p>Cryptography</p> <ul style="list-style-type: none"> • Encryption/ Decryption • Digital Signature | <p>Auditing & Reporting</p> <ul style="list-style-type: none"> • Audit Trail • Reports Management | <p>Configuration Mgmt.</p> <ul style="list-style-type: none"> ➤ Configuration Item (CI) Registration ➤ Device Configuration Monitoring | <p>Computer Network Defense</p> <ul style="list-style-type: none"> ➤ Network Monitoring ➤ Attack/Intrusion Detection ➤ Event Analysis ➤ Response Management | <p>COOP/CIP</p> <ul style="list-style-type: none"> ➤ Infrastructure Protection ➤ Data-at-rest & In-processing Protection ➤ Backup, Recovery, and Re-allocation |

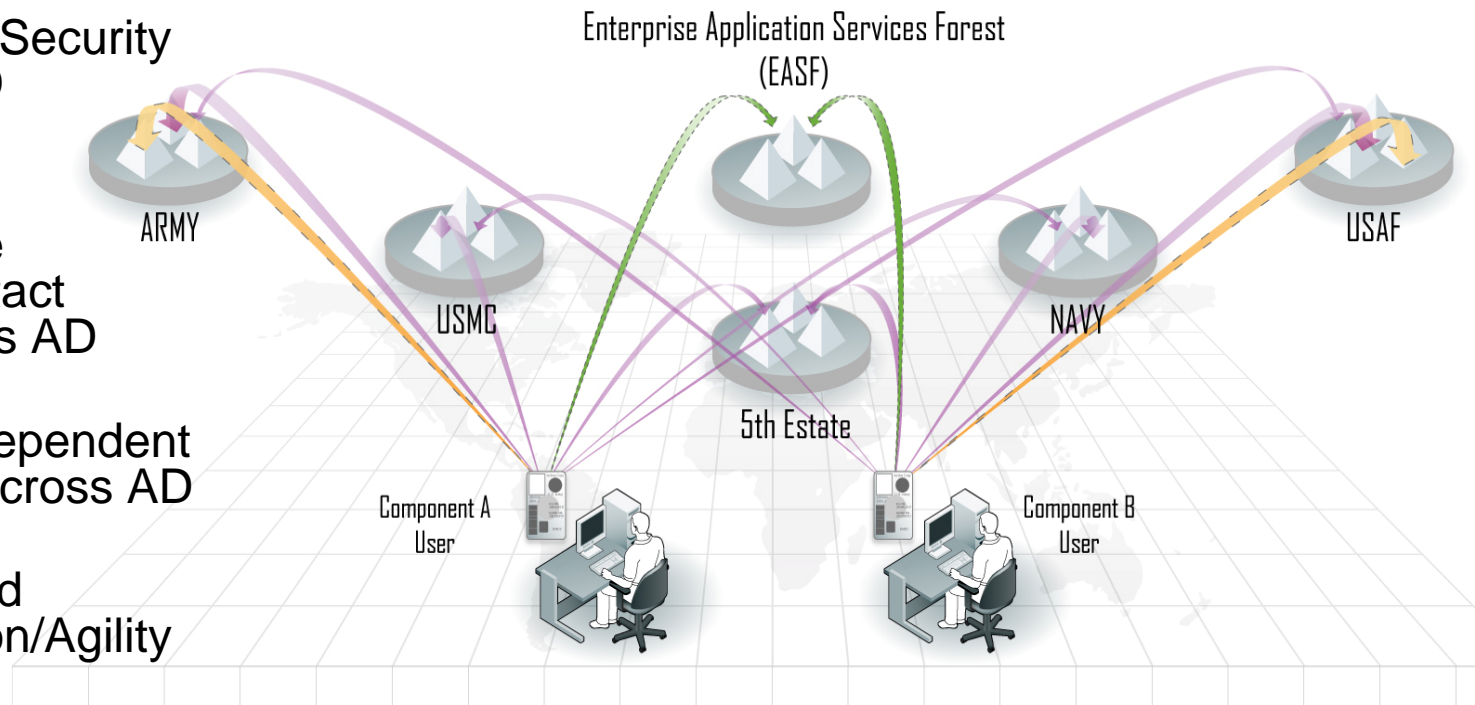


Example 2: Active Directory Optimization Reference Architecture (ADORA)



- Goals:

- Improving the Security of the DoD AD Infrastructure
- Global Logon
- Sharing Active Directory Contact Objects Across AD Forests
- Sharing AD-Dependent Applications Across AD Forests
- Optimize Rapid Reconfiguration/Agility
- Optimize Affordability/Efficiency



Normal home station logon w/ PKI Authentication



Global User Logon w/ PKI Authentication



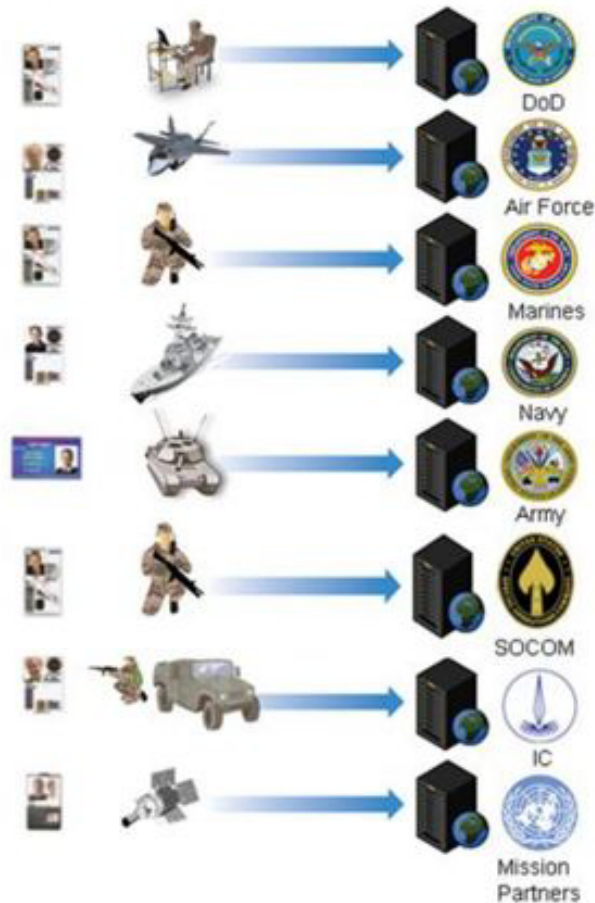
PKI Authentication & STS Access Control



Global Access, Authentication, and Directory Services



CURRENT STATE



Users can only access their information and Service specific directory from within their community network infrastructure

END STATE

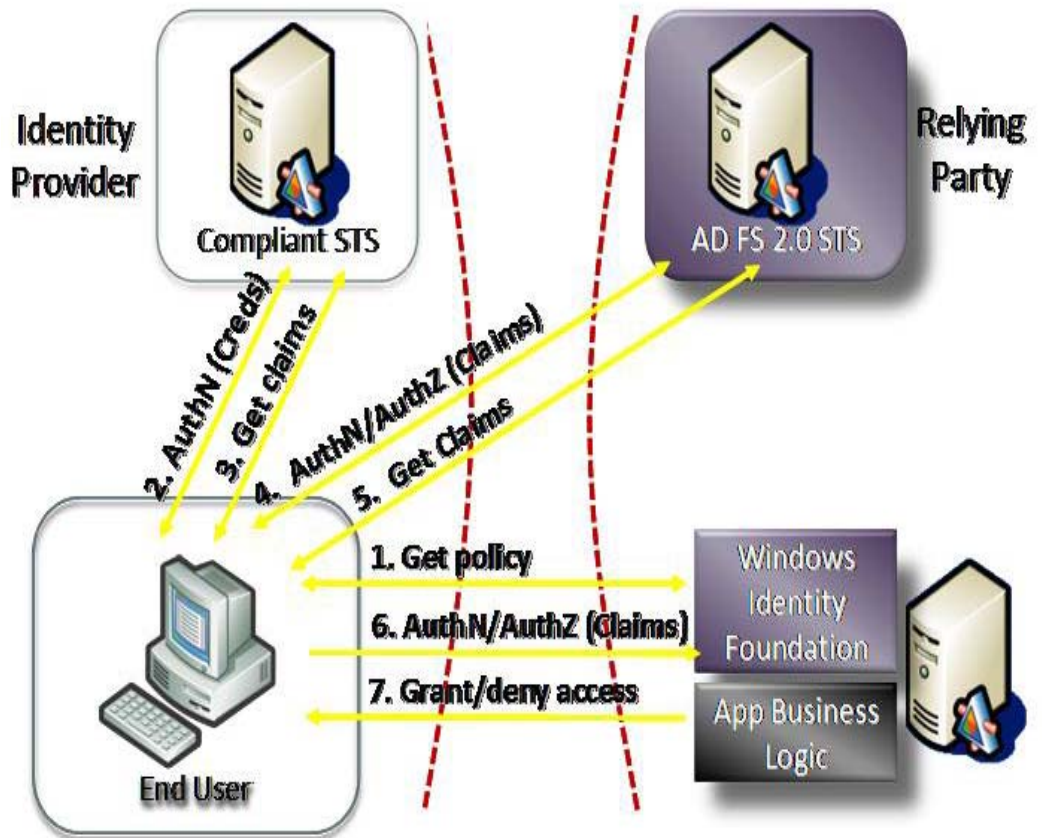


Users can access their information & global DoD directory from anywhere at any time



How?

Enable Activity Directory (AD) dependent application sharing by implementing Secure Token Services (STS) in all forests using Active Directory Federation Services (ADFS)





ADORA

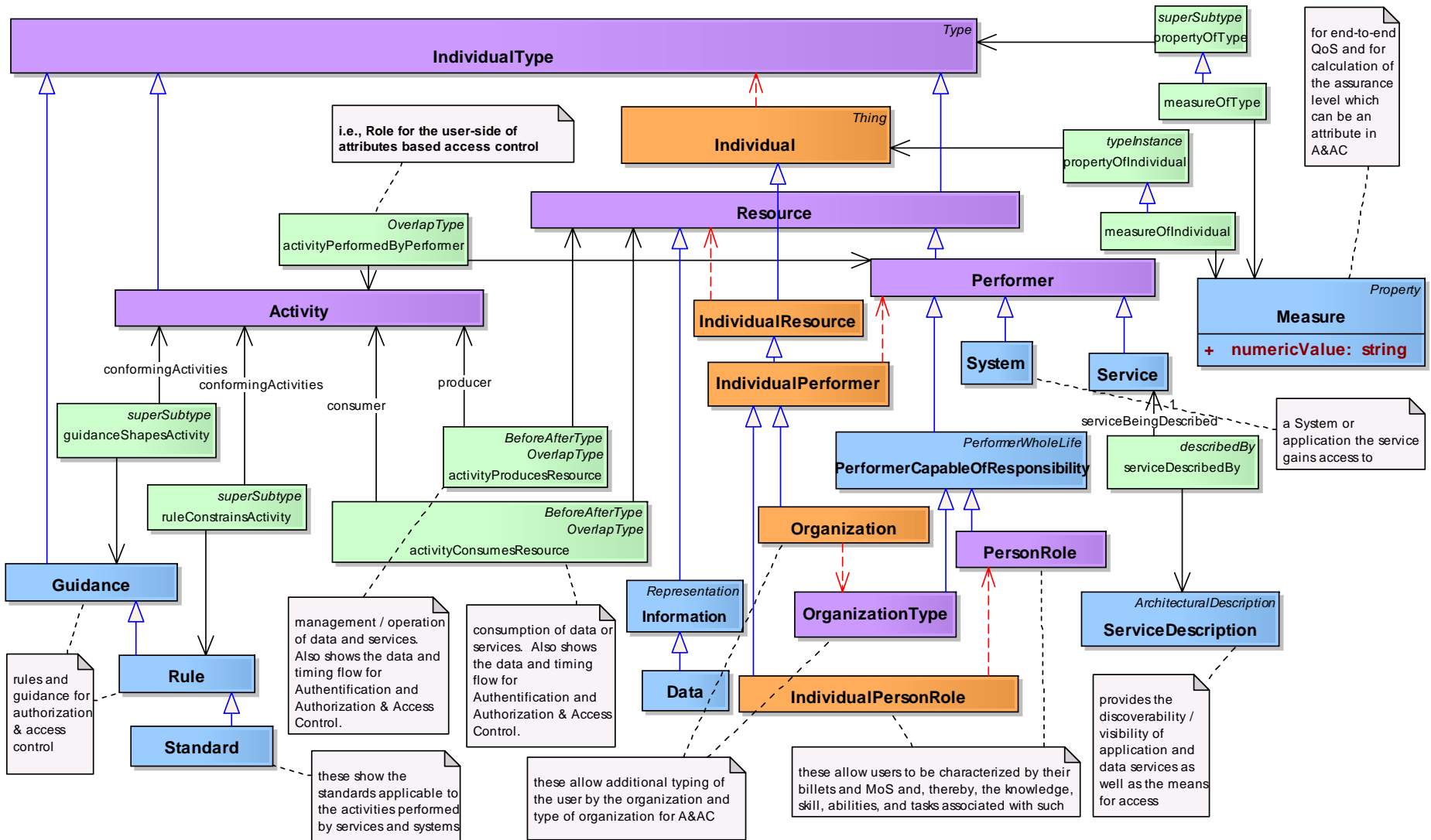
DoDAF Views Developed



| DoDAF View | Value for ADORA |
|--|---|
| AV-1 Overview & Summary Information | standard document component |
| AV-2 Integrated Dictionary | defined AD/ADO terms, e.g., ESSF, Forest, ... |
| OV-1 (multiple) High Level Operational Concept Graphic | standard document component |
| OV-6a Operational Rules Model | security and business access rules |
| OV-6c Global Logon Event Trace Description | showed different AD logon sequences |
| CV-2 Capability Taxonomy | |
| StdV-1 Standards Profile | identified applicable standards and their applicability |



How DM2 Represents EANCS and ADORA RAs

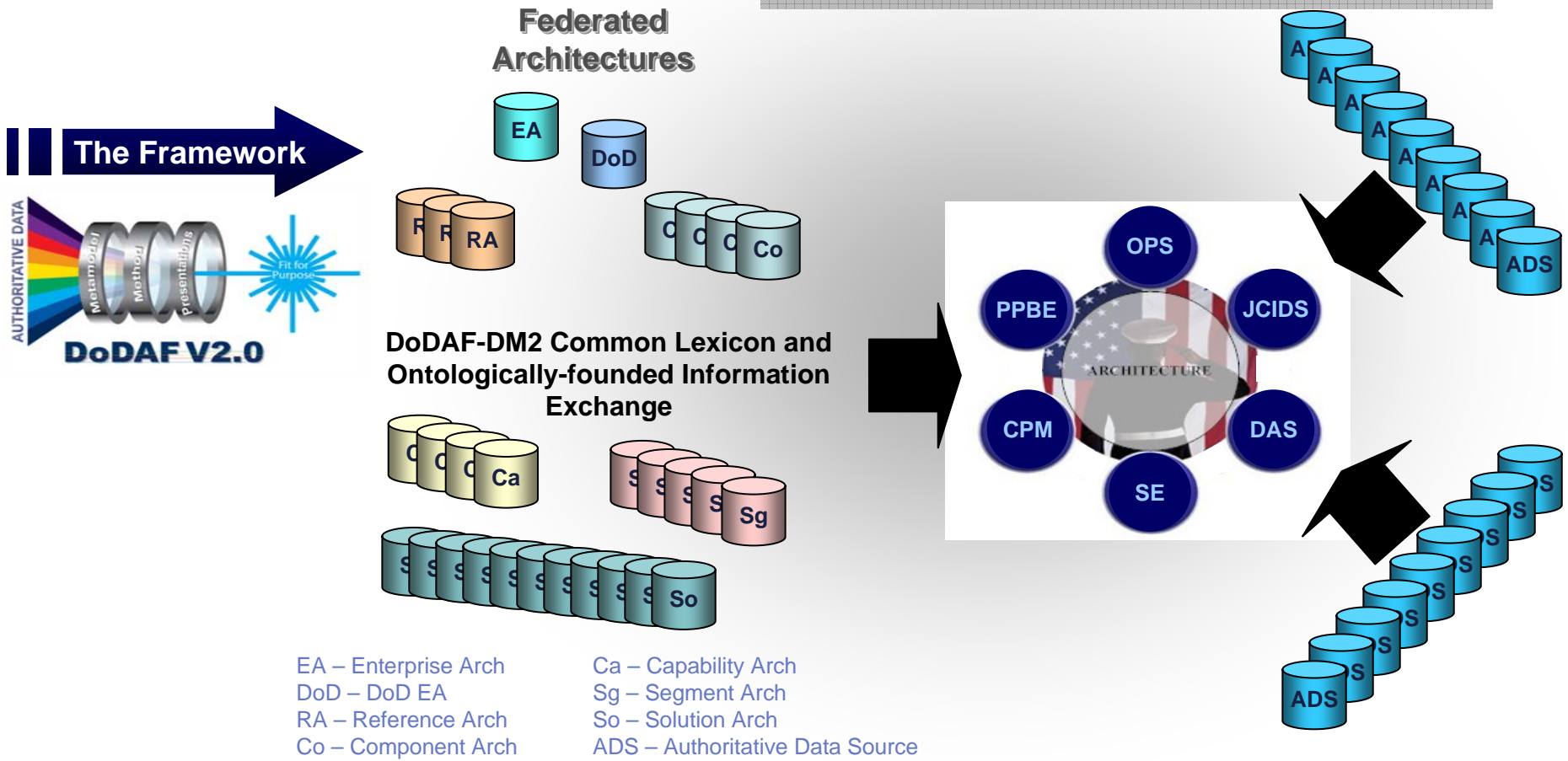




Vision: DoDAF 2 Improves Process Efficiency and Consistency



A fully informed, efficient, and consistent data environment





Summary



- DoDAF 2 is required to support a wide range of complex intertwined processes in DoD and the Federal Government
- A structure for federated architectures has been setup that recognizes the realities of massive scale
- Reference Architectures are part of that structure and they are employing DoDAF 2
- The long range vision is that the internationally developed IDEAS ontology will provide a foundation for a transformed data environment



References



1. DoD CIO; DoDAF Architecture Framework, Version 2.02; <http://cio-nii.defense.gov/sites/dodaf20/>
2. IDEAS Group; IDEAS Foundation, Version 1.0; <http://www.ideasgroup.org>
3. DoD CIO; Reference Architecture Description; June 2010
4. DoD CIO; DoD Information Enterprise Architecture (IEA) v1.2; May 7, 2010
5. Chairman of the Joint Chiefs of Staff; CJCSI 3170.01G, Joint Capabilities Integration and Development System; 9 March 2009
6. Undersecretary of Defense, Acquisition, Technology, and Logistics (USD(AT&L)); DODD 5000.2, Operation of the Defense Acquisition System; December 8, 2008
7. Chairman of the Joint Chiefs of Staff; CJCSI 6212.02E, Interoperability and Supportability of Information Technology and National Security Systems; December 15, 2008
8. Assistant Secretary of Defense, Comptroller (ASD(C)); DODI 7045.14, The Planning, Programming, and Budgeting System (PPBS); November 21, 2003
9. Deputy Secretary of Defense; DTM-04-005, Control of Planning, Programming, Budgeting and Execution (PPBE) Documents and Information; May 27, 2004
10. Under Secretary of Defense, Policy (USD(P)); DODD 7045.20, Capability Portfolio Management; September 25, 2008
11. DoD CIO; Global Information Grid (GIG) 2.0 Operational Reference Architecture (ORA), October 13, 2008
12. Federal Chief Information Officers Council; Federal Identity, Credential, and Access Management (FICAM) Roadmap and Implementation Guidance, Version 1.0; November 10, 2009



Questions?



6th Annual
Department of Defense



Enterprise Architecture
Conference



April 11 - 15, 2011 Hampton, VA

Delivering Warfighting Capability

The banner features a light blue background with a large, faint watermark of the Department of Defense seal. On the left is the official Department of Defense seal. On the right is the United States Joint Forces Command logo, which is a shield-shaped emblem with a map of the United States and the text "UNITED STATES JOINT FORCES COMMAND" and "CJTFM".



Points of Contact



- Michael Wayson
 - Michael.Wayson@osd.mil (703) 607-0482
- Shelton Lee
 - Shelton.Lee@lmco.com (703) 916-7340
- David McDaniel
 - David.McDaniel@SilverBulletInc.com (703) 892-6062 x2



Backups



Federated Architecture Type Purposes and Examples



| Term | Purpose/Intended Use | Sample Content | Example |
|------------------------------------|---|---|---|
| Enterprise Architecture | <p>To describe and document the current and desired relationships between operations and technology of an enterprise and provide a roadmap for transitioning from the current to the desired state.</p> <p>The intended use is to:</p> <ul style="list-style-type: none"> - Identify and document enterprise resources - Align these resources with Strategic goals and objectives to enable effective and efficient operations to accomplish assigned missions - Describe requirements and standards for the desired state in the form of solution portfolios and a vision of the end state | <p>Includes:</p> <ul style="list-style-type: none"> - As-Is Description - Transition Plan - To-Be Description <p>These descriptions may consist of the following elements:</p> <ul style="list-style-type: none"> - Strategic Vision, Mission, and Goals - Concept of Operations - Business Processes - Information Flows and Relationships - Applications - Data Descriptions and Relationships - Technology Infrastructure Descriptions - Technical Reference Model and Standards Profile - Transition Strategy and Roadmap | Business Enterprise Architecture (BEA) |
| DoD Enterprise Architecture | | | |
| Reference Architecture | <p>To serve as an authoritative and unambiguous source of architecture information describing the best practices, principles/rules, patterns/templates, and technical standards for a problem space. It is a model of a way to address a problem and determines how something will be approached, perceived, or understood (i.e., it is prescriptive if chosen).</p> <p>The intended use is to:</p> <ul style="list-style-type: none"> - Standardize solutions through repeated application of RA defined patterns - Guide and constrain solutions through application of RA defined principles, rules, and technical standards | <p>Includes:</p> <ul style="list-style-type: none"> - Principles/Rules - Patterns/ Templates - Technical Positions | Enterprise-wide Authentication for Network Access and Collaboration Services (EANCS) Reference Architecture |
| Reference Model | <p>To provide an abstract, technology agnostic description of the entities and relationships within an environment or problem space.</p> <p>The intended use is to:</p> <ul style="list-style-type: none"> - Establish a common understanding of concepts - Educate users about the entities and relationships of an environment - Improve communications by providing a common language structure for the environment | <p>Includes:</p> <ul style="list-style-type: none"> - Description of environment or problem space - Description of entities - Relationships among the entities - Hierarchical language structure | FEA Business Reference Model |



Federated Architecture Type Purposes and Examples



| Term | Purpose/Intended Use | Sample Content | Example |
|--------------------------------|---|---|--|
| Capability Architecture | <p>Describes and documents the objective requirements for a capability and addresses associated doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). The description should provide a prioritization of requirements, enabling services, performance metrics, and relationships with other capabilities.</p> <p>The intended use is to:</p> <ul style="list-style-type: none"> - Gain a detailed understanding of the capability - Enable effective and efficient management of capability portfolios - Drive solutions to achieve the capability | <p>Includes:</p> <ul style="list-style-type: none"> - Strategic context and scope - Capability Goals, Objectives, and Requirements - Prioritization of requirements - supported /supporting activities - Resource Flows - Enabling Services - Data descriptions and relationships - Dependencies and relationships among related capabilities - Desired effects and associated performance metrics | Joint Deployment and Distribution Architecture |
| Component Architecture | <p>Describe how DoD-level Policy, guidance, and architectures are applied within the Component to guide solutions.</p> <p>The intended use is:</p> <ul style="list-style-type: none"> - To guide and constrain solutions - To describe how Components execute DoD-level requirements - To support investment and capability decision-making | A collection of enterprise, segment, and reference architectures for a given Component. | Air Force C2 Constellation |
| Segment Architecture | <p>Describes and documents the current and desired relationships between operations and technology and provides a roadmap for transitioning from the current to the desired state for DoD segments representing high priority areas agreed to by OMB. Defines requirements and standards for segment investment solutions. The content is derived from relevant enterprise, capability and component architectures.</p> <p>The intended use is to:</p> <ul style="list-style-type: none"> - Identify improvement opportunities in the segment - Translate the DoD vision into a set of investments for achieving priority solutions - Ensure investments enable improvement opportunities and Strategic goals and objectives | <p>Includes:</p> <ul style="list-style-type: none"> - As-Is Description - Transition Plan - To-Be Description <p>These descriptions may contain the following elements:</p> <ul style="list-style-type: none"> - Segment Goals and Objectives - Concept of Operations - Business Processes - Resource Flows and Relationships - Applications - Data Descriptions and Relationships - Technology Infrastructure - Technical Reference Model and Standards Profile - Transition Strategy and Roadmap - Relationships with other segments | Human Resources Management |
| Solution Architecture | <p>Describes and documents a solution for a given problem driven by requirements defined in an Enterprise, Segment, or Capability architecture.</p> <p>The intended use is to describe the fundamental organization of a solution, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.</p> | <p>Includes:</p> <ul style="list-style-type: none"> - Documentation of requirements - Analysis of Alternatives - Solution design - Testing information - Implementation specifics - Etc. | Distributed Common Ground System |



DoDAF 2 Conceptual Data Model Terms



- **Activity:** Work, not specific to a single organization, weapon system or individual that transforms inputs (Resources) into outputs (Resources) or changes their state.
- **Resource:** Data, Information, Performers, Materiel, or Personnel Types that are produced or consumed.
 - **Materiel:** Equipment, apparatus or supplies that are of interest, without distinction as to its application for administrative or combat purposes.
 - **Information:** The state of a something of interest that is materialized -- in any medium or form -- and communicated or received.
 - **Data:** Representation of information in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means. Examples could be whole models, packages, entities, attributes, classes, domain values, enumeration values, records, tables, rows, columns, and fields.
 - **Performer:** Any entity - human, automated, or any aggregation of human and/or automated - that performs an activity and provides a capability.
 - **Organization:** A specific real-world assemblage of people and other resources organized for an on-going purpose.
 - **System:** A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements.
 - **Person Role:** A category of persons defined by the role or roles they share that are relevant to an architecture.
 - **Service:** A mechanism to enable access to a set of one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. The mechanism is a Performer. The capabilities accessed are Resources -- Information, Data, Materiel, Performers, and Geo-political Extents.
- **Capability:** The ability to achieve a Desired Effect under specified (performance) standards and conditions through combinations of ways and means (activities and resources) to perform a set of activities.
- **Condition:** The state of an environment or situation in which a Performer performs.
- **Desired Effect:** A desired state of a Resource.
- **Measure:** The magnitude of some attribute of an individual.
- **Location:** A point or extent in space that may be referred to physically or logically.
- **Guidance:** An authoritative statement intended to lead or steer the execution of actions.
 - **Rule:** A principle or condition that governs behavior; a prescribed guide for conduct or action.
 - **Agreement:** A consent among parties regarding the terms and conditions of activities that said parties participate in.
 - **Standard:** A formal agreement documenting generally accepted specifications or criteria for products, processes, procedures, policies, systems, and/or personnel.
- **Project:** A temporary endeavor undertaken to create Resources or Desired Effects.
- **Geopolitical Extent** A geospatial extent whose boundaries are by declaration or agreement by political parties.



DoD Core Processes -IT Related Processes, Tools and Resources-



| | | Joint Capability Integration Development System (JCIDS) | Defense Acquisition (DAS) | Systems Engineering (SE) | Programming Planning and Budget Execution (PPBE) | Capability Portfolio Management (CPM) | Operations (OPS) |
|---------------------------------------|---|---|---------------------------|--------------------------|--|---------------------------------------|------------------|
| BIRD | BIRD--Budget, Intelligence, and Related Database | | | | X | | |
| CBA | Capabilities-Based Assessment (CBA). Joint Combat Capability Assessment as described in CJCSI 3401.01 E | | | | | X | |
| CBT | | X | | | | | |
| CJA database and Web portal | The CJA database and associated Web portal are maintained by the J-5 Strategy Integration and Analysis Division (SIAD) | | | | | | X |
| cPET | CSDR Planning & Execution Tool (cPET) | | X | | | | |
| CSFL | JCSFL-Joint Common System Function List | X | | X | | X | |
| DACIMS | Defense Automated Cost Information Management System (DACIMS) | | X | | | | |
| DAMIR | DAMIR- Défense Acquisition Management Information Retrieval | | | | X | | |
| DARS and Component Repositoies | DARS-Defense Architecture Registration System | X | | X | | | |
| DITPR / Component Repositories | | | | | | X | |
| DMRS | | | | | | X | |
| DRRS/ESORTS | Chairman's Readiness System. Department of Defense Readiness Reporting System (DRRS)- field usable tools and capabilities. Enhanced Status of Resources and Training System (ESORTS) | | | | | | X |
| EVMS | EVM Central Repository | | X | | | | |
| FEA BRM lexicon/taxonomy | | | | | X | | |
| IPLs | Integrated Priority Lists (IPLs)-used to inform development of Functional Capabilities Board (FCB) planning guidance, inform Capabilities Gap Assessment, and analyze baseline resource priorities for the next IPL submissions, and inform development of the Chairman's Program Recommendation (CPR). | X | | | | | |
| IPLs/GAPS | | | | | | | X |
| JCA/UJTL lexicon/taxonomy | The Comprehensive Joint Assessment (CJA) data is submitted using the Joint Capability Area (JCA) lexicon/taxonomy | X | | X | | X | X |
| JCAMS | The JCA Management System (JCAMS) provides JCA definitions, applications, and uses. | | | | | | X |
| JCPAT | JCPAT-Joint C4I Program Assessment Tool | X | | | | | |



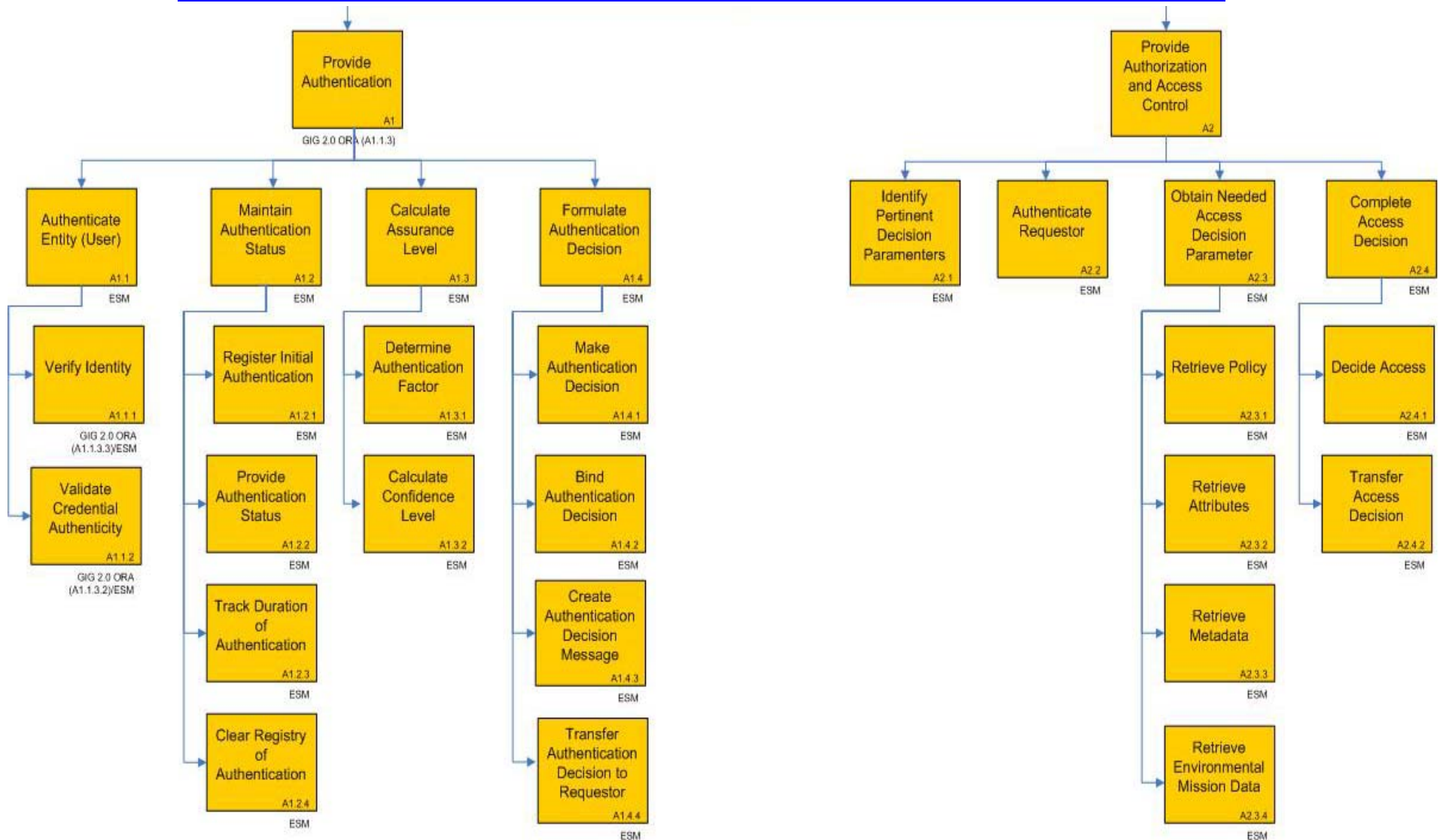
DoD Core Processes -IT Related Processes, Tools and Resources-



| | | Joint Capability Integration Development System (JCIDS) | Defense Acquisition (DAS) | Systems Engineering (SE) | Programming Planning and Budget Execution (PPBE) | Capability Portfolio Management (CPM) | Operations (OPS) |
|---|--|---|---------------------------|--------------------------|--|---------------------------------------|------------------|
| JMTs | | x | | | | | x |
| JMTs/CBTs | JMT/CBT-Joint Mission Thread/Capability Based Testing | | | x | | | |
| JOC/JICs | Joint Operating Concept (JOC) / Joint Integrating Concept (JIC) | x | | | | | |
| JOPES/APEX | Joint Operation Planning and Execution System (JOPES) (CJCSM 3122.01 and 3122.03 series) - A comprehensive process encompassing the full spectrum of processes, procedures, and actions supporting every facet of the planning, decision-making, and execution continuum. Includes sub-processes for mobilization, deployment, employment, sustainment, redeployment, and demobilization. Adaptive Planning and Execution (APEX)-Department level system encompassing policy, process, procedures and supported by communication and information technology being developed by OSD and the joint planning and execution community to plan, monitor and execute Joint Operations. Adaptive planning will replace JOPES in the future. | | | | | | x |
| JPD | Joint Potential Designator (JPD) | x | | | | | |
| JSPS | | | | | | | x |
| KM/DS Tool | The Knowledge Management/Decision Support (KM/DS) Tool-the Joint Staff automated tool for processing, coordination, and repository functions for JCIDS documents | x | | | | | |
| KPPs/KIPs/KSAs/MOEs | Key Performance Parameters (KPP) as defined in Manual for the Operation of the JCIDS | x | | | | | |
| MFP/RIC/PE lexicon/taxonomy | MFP-Major Force Program / RIC-Resource Identification Codes / PE-Program Elements | | | | x | | |
| MIL-STD-161E System Lexicon/Taxonomy | | | x | x | | | |
| Program WBS Dictionary | Program WBS Dictionary | | x | | | | |
| SNaP/SNaP-IT | SNaP-Select and Native Programming Data Input System | | | | x | | |
| TPFDD | Time Phased Force Deployment Data TPFDD | | | | | | x |
| USJFCOM's Web-based VOC/JE | USJFCOM's Web-based Virtual Operations Center (VOC)- combatant commands, and Defense agencies prioritized recommendations for Joint Experimentation (JE) | | | | | | x |
| WBS (MIL-HDBK-881A) | Work Break Down Structure (WBS) as defined in MIL-HDBK-881A | | x | x | x | | |



Activities to be Performed (OV-5a)





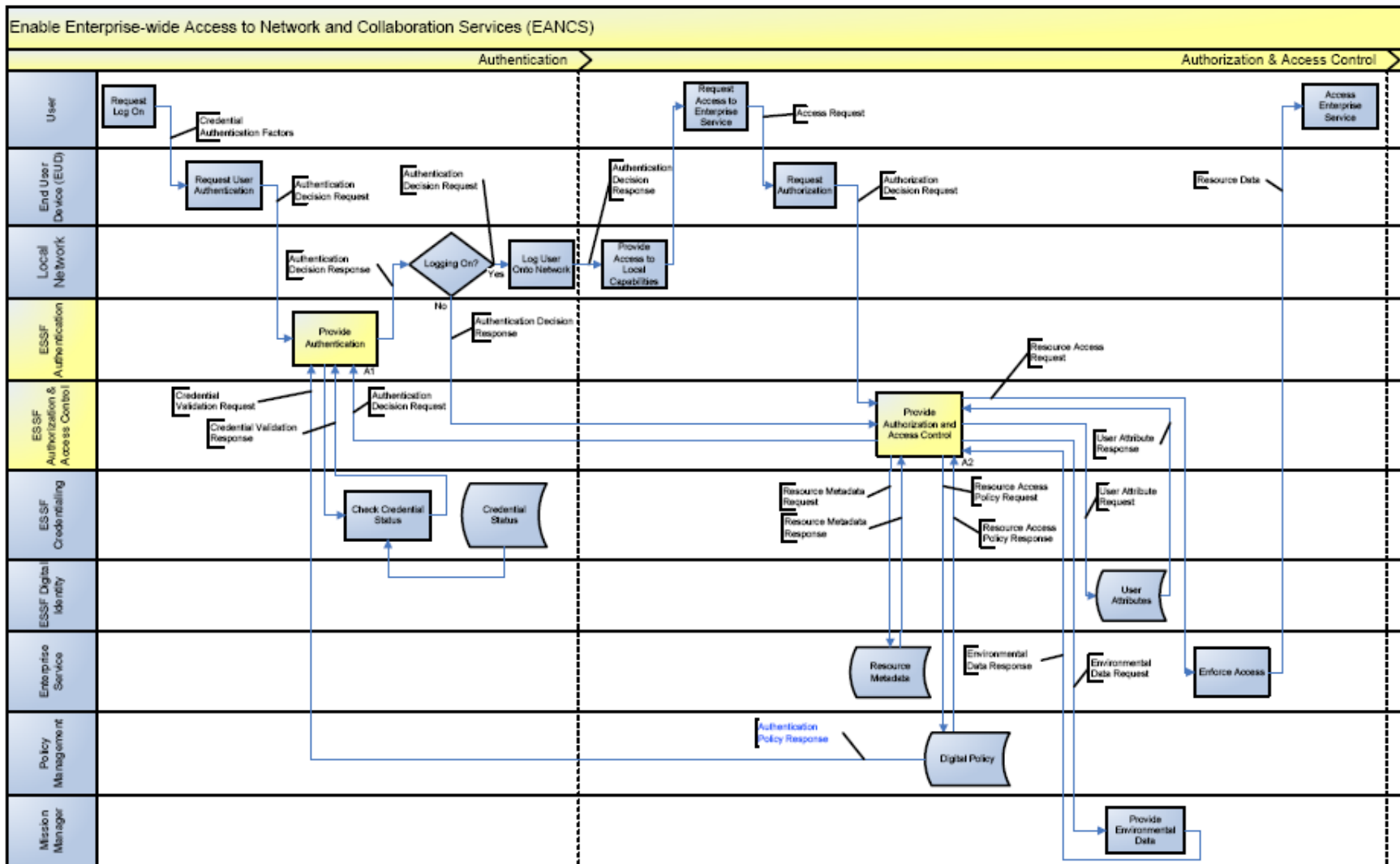
Rules (OV-6a)



| EANCS RA Principles and Rules | | |
|-------------------------------|-------------------------------|--|
| # | Principle/Rule | Description |
| 1 | Portable Identity Credentials | All Users must have a portable identity credential for authentication. |
| 2 | Authentication Based Access | User authentication is required to access a designated set of basic capabilities. |
| 3 | Common Set of Functions | All instances of authentication, authorization, and access control shall utilize the same set of designated functions described by the Enterprise Services Security Foundation (ESSF). |
| 4 | Points of Access | Some form of authentication and authorization occurs at every point of access. |
| 5 | Key Dependencies | Authentication, authorization, and access control are highly dependent on information elements provided by five key functions: identity management, credential management, policy management, privilege management, and attributes management. |

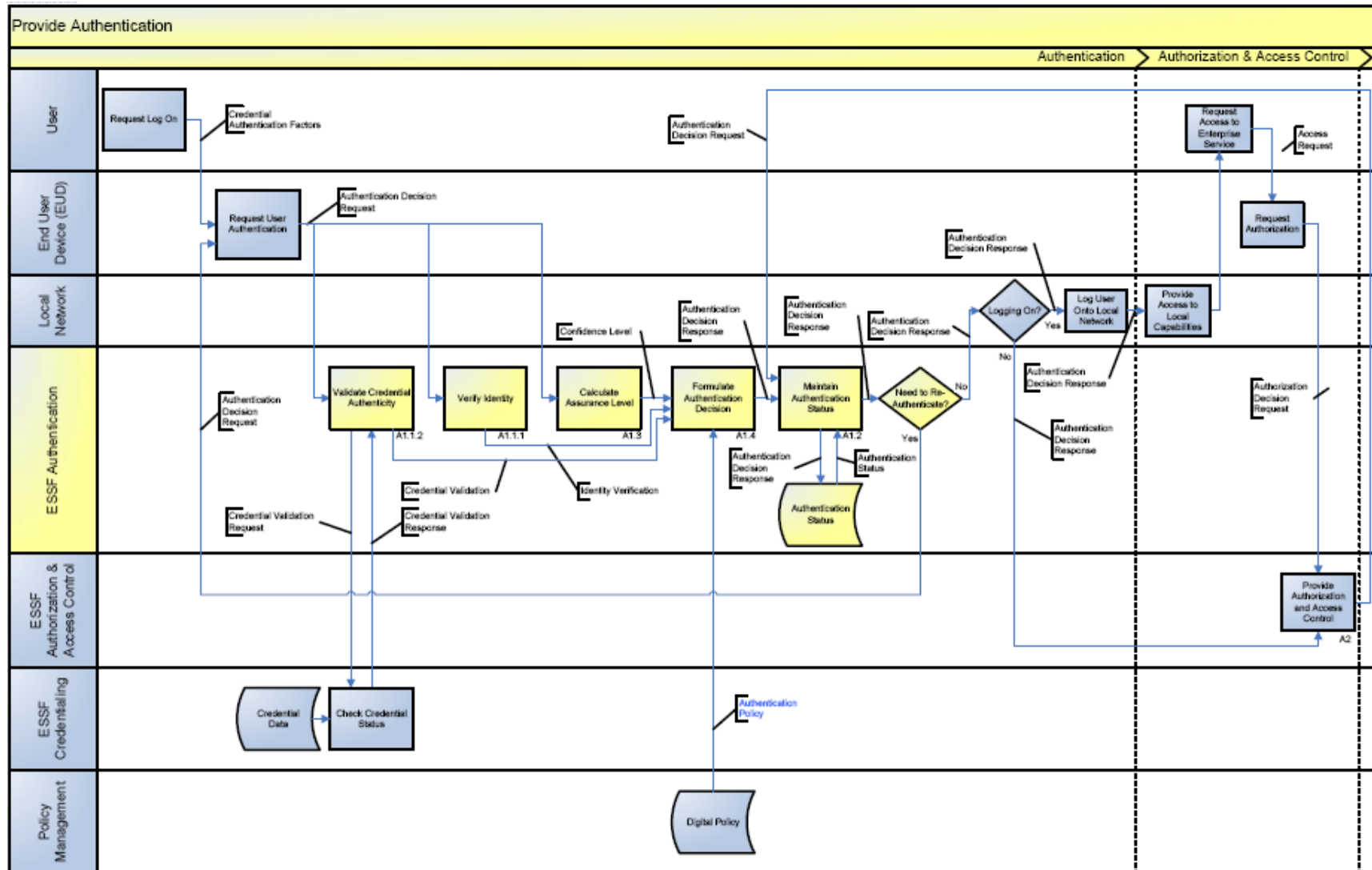


Combined Process Pattern (OV-6c)



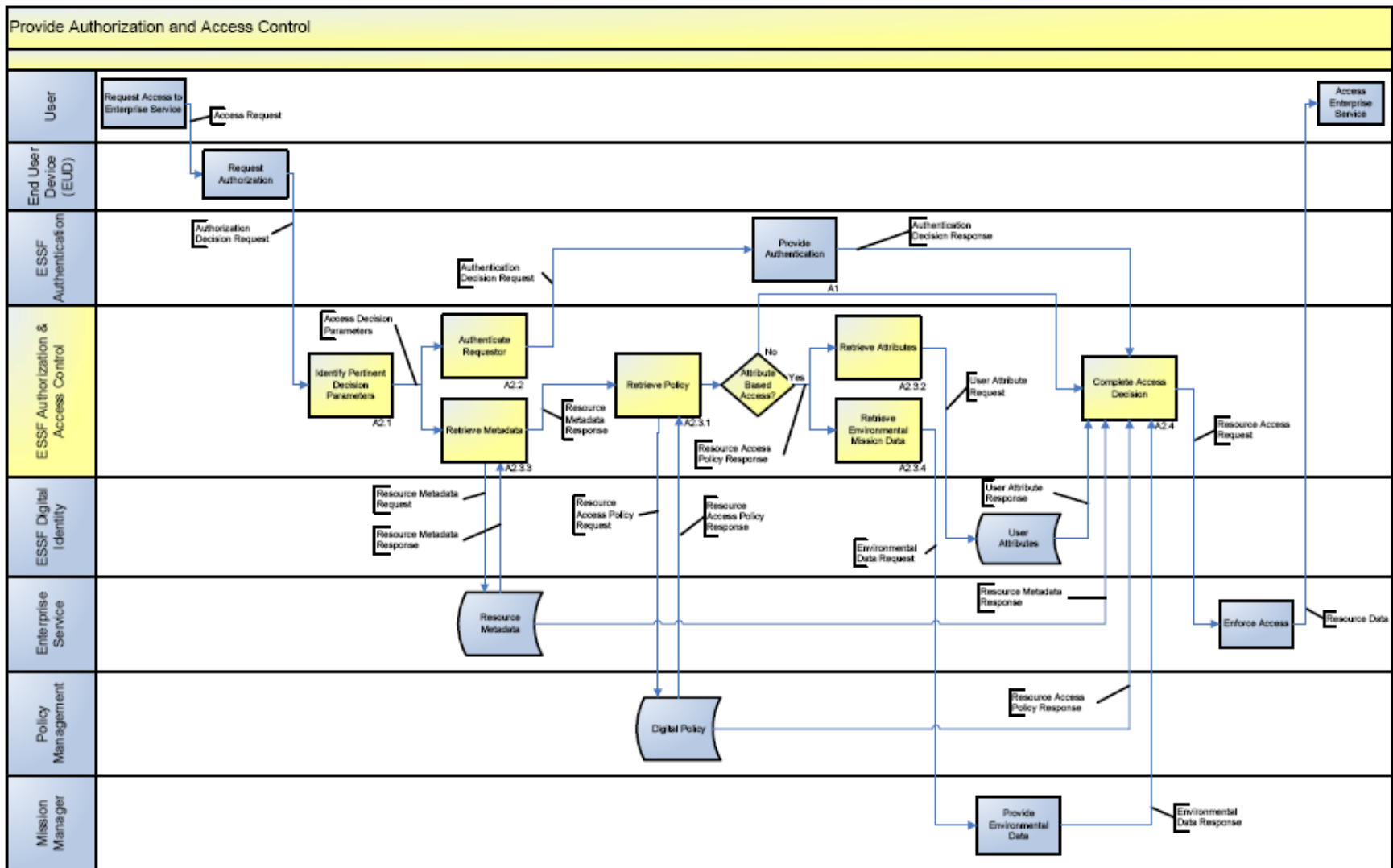


Authentication Process Pattern (OV-6c)



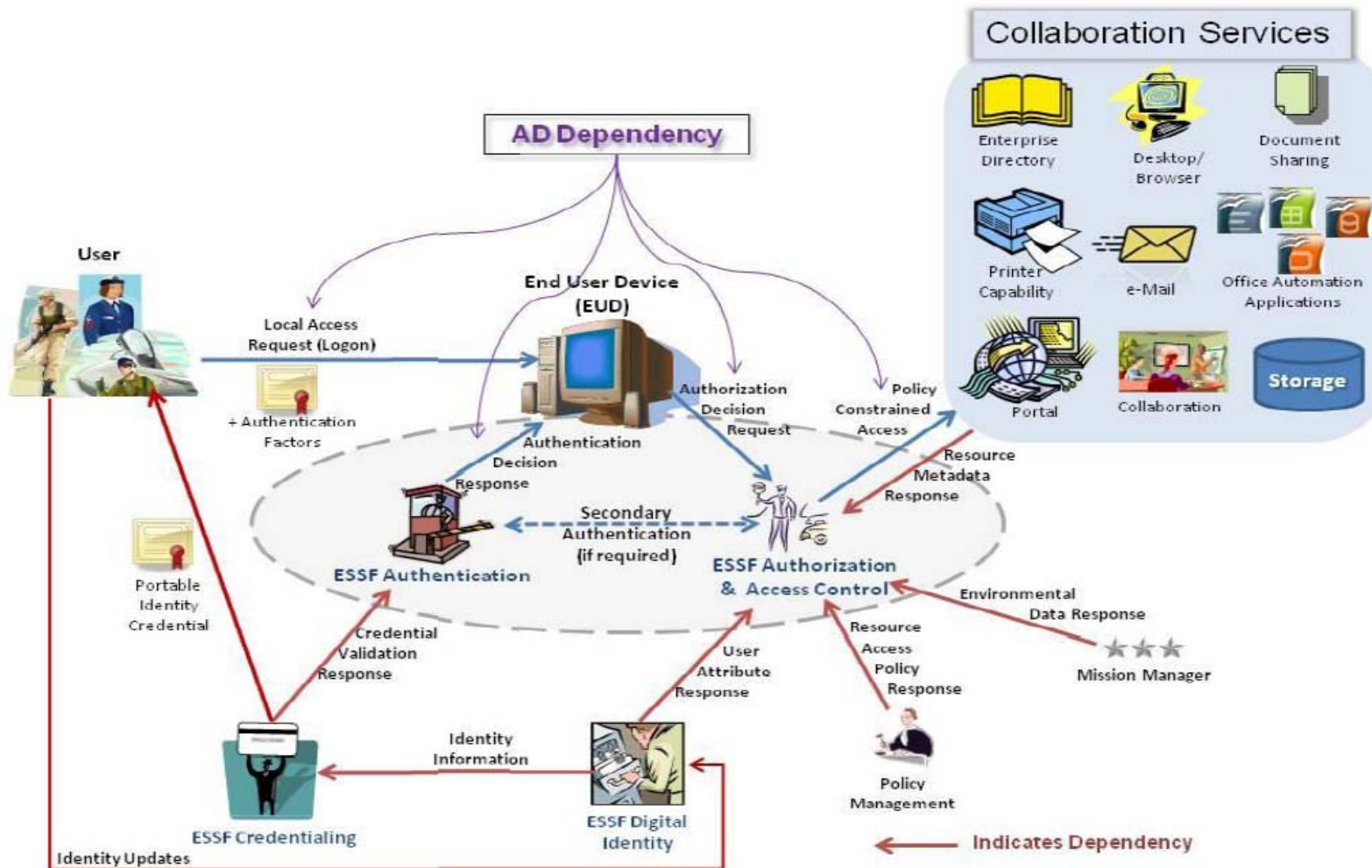


Authorization and Access Control Process Pattern





EANCS Dependencies





StdV

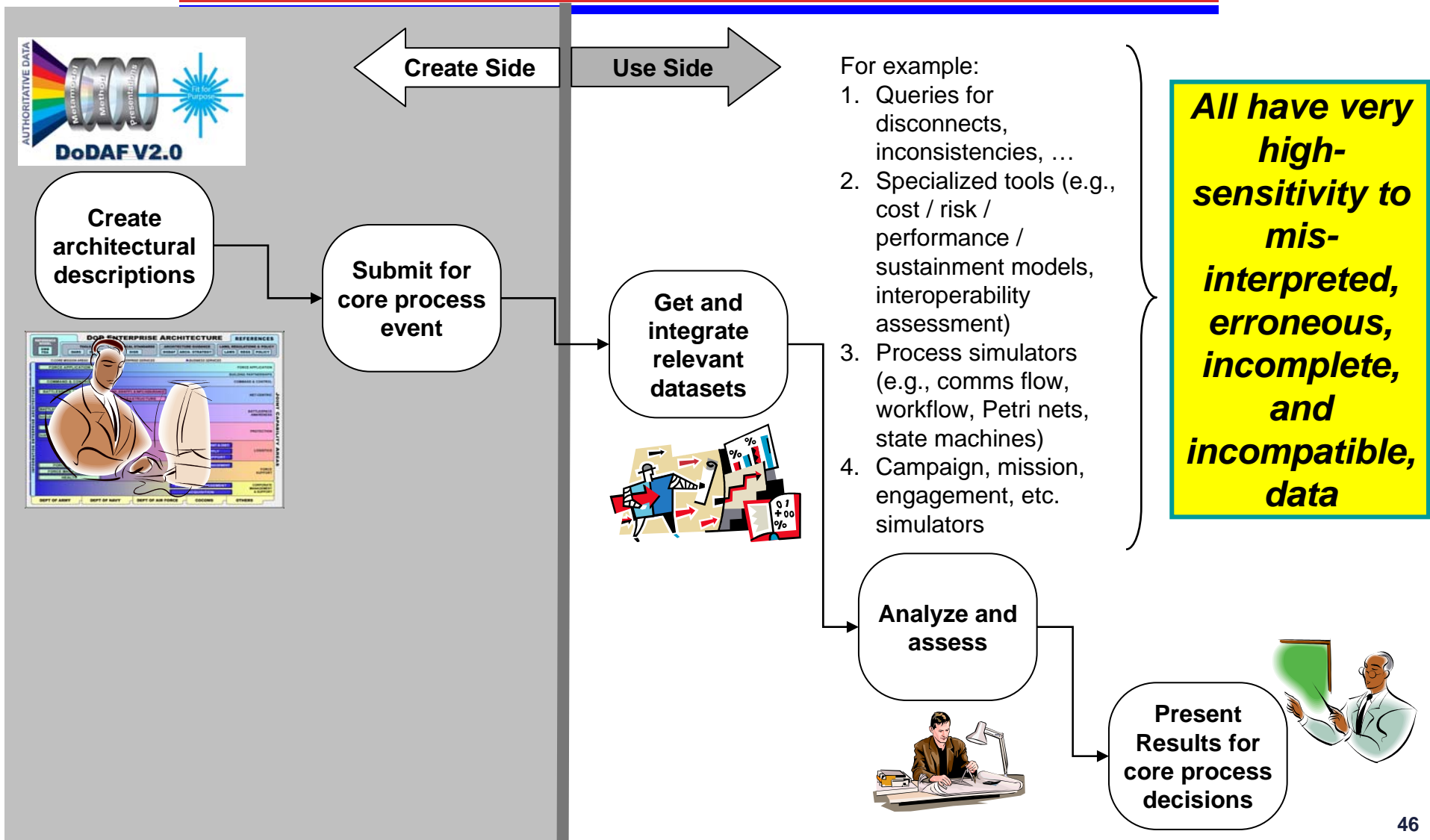


- Note multi-agency external sources

| GROUP | TYPE | NAME | DESCRIPTION |
|-------------------------------|----------|--|--|
| OMB | Policy | M-04-04 | This guidance requires agencies to review new and existing electronic transactions to ensure that authentication processes provide the appropriate level of assurance. It establishes and describes four levels of identity assurance for electronic transactio |
| OMB | Policy | M-05-05 | This memo requires the use of a shared service provider to mitigate the risk of commercial managed services for public key infrastructure (PKI) and electronic signatures. |
| OMB | Policy | M-05-24 | This memorandum provides implementing instructions for HSPD-12 and FIPS-201. |
| OMB | Policy | M-06-18 | This memorandum provides updated direction for the acquisition of products and services for the implementation of Homeland Security Presidential Directive-12 (HSPD-12) "Policy for a Common Identification Standard for Federal Employees and Contractors" and |
| Presidenti al Directive | Policy | HSPD-12 | HSPD-12 calls for a mandatory, government-w ide standard for secure and reliable forms of ID issued by the federal government to its employees and employees of federal contractors for access to federally-controlled facilities and netw orks. |
| NIST | Guidance | SP 800-87 | This document provides the organizational codes for federal agencies to establish the Federal Agency Smart Credential Number (FASC-N) that is required to be included in the FIPS 201 Card Holder Unique Identifier. SP 800-87 is a companion document to FIPS |
| NIST | Guidance | SP 800-103 | This document provides the broadest possible range of identity credentials and supporting documents insofar as they pertain to identity credential issuance. Priority is given to examples of primary and secondary identity credentials issued w ithin the Unit |
| NIST | Standard | FIPS 201-1 | This standard specifies the architecture and technical requirements for a common identification standard for Federal employees and contractors. The overall goal is to achieve appropriate security assurance for multiple applications by efficiently verifyin |
| E- Authentic ation | Guidance | E-Authentication Certificate Credential Assessment Profile | This profile specifies the criteria for certificate-based Credential Services (CSs) that authenticate public key certificates. It is based upon guidance specified in National Institute of Standards and Technology (NIST) Special Publication 800-63, version |
| FPKIA | Guidance | Bridge-Enabling Web Servers | This document discusses technical steps necessary to enable a w eb server to accept PKI based user credentials and validate them through a certificate bridge (e.g., the FBCA). |
| IAB | Guidance | DoD CAC Middleware Requirements Release 3.0 | The Middlew are Requirements defines the standard set of services, interfaces, and configuration options that must be implemented by all middlew are for use on supported Microsoft-Intel (WINTEL) server and desktop operating systems platforms w ithin the DoD. |
| N/A | Standard | Security Assertion Markup Language (SAML) | Security Assertion Markup Language (SAML) 2.0 is an industry standard for w eb SSO and w eb services authentication, attribute exchange, and authorization. SAML-based federation is the basis for Level 1 and Level 2 authentication under the E-Authentication |
| N/A | Standard | Extensible Access Control Markup Language (XACML) | XACML w as chartered "to define a core schema and corresponding namespace for the expression of authorization policies in XML against objects that are themselves identified in XML. |



Vision: Assessment Pattern but ...





Mathematically Structured Data is Necessary for Large-Scale Heterogenous Data Integration and Analysis



Free-text

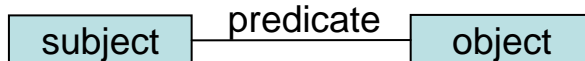
Human-interpretable only

Structured document

Human-interpretable but with a predictable organized arrangement

Database

Databases are semantically weaker than commonly understood, e.g., the fundamental concepts of Entity-Relationship and Class Models:



i.e., structured sentences => language-based

Mathematically structured

- Applicable mathematics:
 - Set or type theory
 - Mereology
 - Mereotopology
 - 4 dimensionalism
 - Predicate calculus
 - Logics: modal, Kripke, ...
- Rules, operators:
 - Commutative, reflexive, transitive, ...
 - Member-of, subset-of, part-of, ...