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1. Introduction

The Department of Defense (DoD) Federated Enterprise Architecture (EA) represents the
"next generation" Global Information Grid (GIG) Architecture.

The current GIG Architecture, along with the Net-Centric Operations and Warfare
Reference Model (NCOW RM) is an overarching architecture description of the GIG.¹
However, the DoD is too large and complex to be described within a single integrated
architecture. Additionally, Enterprise architectures have an inherent problem. To fully describe
an enterprise, architects must either abstract the content into simple constructs that don’t lend
themselves to supporting a broad range of decisions, or they must compile massive amounts of
data that make comprehension difficult at best. One of the primary objectives of enterprise
architectures is to describe the enterprise so that decision makers can make informed decisions
based on or within a common context. It will result in the development of a cohesive EA
supporting the alignment and integration of architecture efforts in support of DoD business and
warfighter strategic goals. Therefore, architects must constantly balance complexity with utility.
The DoD GIG Architecture is no different.

What is required is a rethinking of the GIG architecture concept to effectively leverage
current architecture efforts and maintain comprehension while, at the same time, providing DoD
decision makers with the information they need. Federating existing architectures of DoD
elements that describe the various echelons (or tiers) is one way to achieve this goal. Federation
techniques allow disparate architectures (based on a variety of established frameworks) to be
meaningfully related and permit acceleration of new architecture efforts across the DoD
community to support DoD decision makers who require more detailed content that is not
reasonable for the department level.

To date, there have been advancements in both the architecture and stakeholder
communities that use architecture information. Architecture products, however, are presently not
as sufficiently discoverable and accessible as needed to support decision making. Today’s
architectures are built for specific purposes and viewpoints; they do not normally refer to or
relate to each other as they should to gain maximum value from the architecture investment.

As a remedy, the Department has chosen architecture federation² as a new GIG architecture
paradigm. The next generation GIG architecture will be constructed by federating the separate
architecture artifacts throughout the DoD and employ a set of EA Services for registering,

¹ The current DoD overarching architecture description consists of three Components: GIG Architecture ver 1.0,
GIG Architecture ver 2.0, and the NCOW RM ver 1.1. The GIG Architecture consists of architecture products
describing the DoD Enterprise from the perspective of five different scenarios. Version 1.0 described the “as-is”
enterprise circa 2000; ver 2.0 describes the “to-be” enterprise circa 2015. While the NCOW RM is not an
architecture itself it does establish the strategies and target technical standards for migration to a net-centric
operating environment as the Department moves from the “as-is” to the “to-be” and therefore serves as a part of
the Enterprise Architecture as defined by OMB for Clinger-Cohen compliance.

² The concept of federation or “federalism” infers both a division of authority, accountability and interdependence
between the Department level and the Commands, Services, and Agencies. See page 8 for full explanations of
Federated EA and Federation Concepts.
discovering, and utilizing architecture data to support key DoD decision processes by implementing concepts from the DoD Net-Centric Strategies.

1.1. Intended Audience

The primary audience for the DoD Federated Enterprise Architecture Strategy Document includes two distinct classes — first, those responsible for implementation of the Federated EA, and second, producers and consumers of architecture information, e.g., decision makers, program managers, analysts, operators, architects, and engineers within DoD and external partners in the extended enterprise.

1.2. Background

The Director, Office of the Assistant Secretary of Defense for Networks and Information Integration, Architecture & Interoperability (OASD[NII/A&I]) has worked with the Services Chief Architects to define the federated approach. The federated approach will guide the building of the next generation GIG Architecture. This approach recognizes the need for autonomy but requires linkages and alignment of architectures from the Program level up to the Federal Enterprise level. OASD(NII) will introduce requirements in phases to achieve enterprise-wide GIG descriptions that move the Department toward a shared Net-Centric Vision and Transition Plan. These requirements are being identified and met through systems engineering processes that leverage architecture descriptions as blueprints. The use of shared architecture descriptions in Test & Evaluation processes within the federated approach will provide the ability to verify that capabilities are being fielded in accordance with (IAW) the GIG Architecture.

There are challenges related to institutionalizing architecture into DoD core processes.

Challenge 1: There is no comprehensive architectural description of the DoD Enterprise and its relationship between and among the entities that make up the enterprise that can be used to support department-level decision making.

Challenge 2: Architectures are currently developed independently by many organizations across DoD conforming to multiple frameworks. They are maintained in independent repositories, and we assume this mode of operation will continue. This situation, however, raises several concerns for architects and architecture end-users, specifically that there is no:

- Capability to globally search, vertically or horizontally, for architectures and/or artifacts that may be relevant for analysis, reference, or reuse
- Consistent set of standards for architecture configuration management that would enable users to determine the development status, quality, and authority of data in various architectures and/or artifacts
- Standard methodology for specifying linkages between architectures developed using different tools and maintained in independent repositories required to provide enterprise-wide context and understanding

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2 See Appendix B for a definition of “artifact.” Examples include: graphical models, structured models, tabular data, and structured or unstructured narratives. Individual artifacts may be aggregated.
Architecture alignment through linking will require standardization of vocabularies and taxonomies. The lack of these standards will impede the level to which an individual architecture artifact may be federated. This work is currently being addressed with such efforts as Consolidated Operational Activities List (COAL), and Consolidated Systems Function List (CSFL) and Joint Command, Control, and Consultation Information Exchange Data Model (JC3IEDM).

Based on these challenges, DoD needs to provide an enterprise wide architecture environment that will:

1. Improve the users’ ability to share information on architecture content.
2. Enable rapid access to actionable information to support strategic decisions; and
3. Increase agility to address unforeseen requirements supporting warfighting needs.

In the March 2005 National Defense Strategy, the DoD restated its commitment to making operations net-centric. The foundation for net-centric operations is to give users the ability to access the information and applications where and when needed. The key enabler of this ability is the DoD GIG. To move the GIG from Net-Centric concept to Net-Centric reality, the OASD(NII)/DoD Chief Information Officer (CIO) has established the following goals:

- Make information available on a network that people depend on and trust.
- Populate the network with new, dynamic sources of information to defeat the enemy.

The DoD Net-Centric Data Strategy, May 2003, addressed the challenges of finding and using information on the GIG. The Data Strategy defined a vision in which information is easily made visible, accessible, and understandable. The draft GIG Enterprise Services Strategy espouses a dual path approach to achieving these goals. It advocates that DoD Components—Combatant Commands, Services, and Agencies (C/S/As)—continue to provide and consume services and embrace service-oriented architecture (SOA) principles (see Appendix B). In parallel, the GIG Enterprise Services Strategy drives the enterprise to identify and adopt the necessary services, standards, policies, and processes to federate C/S/As services and SOAs for the benefit of the Department and its partners.

This DoD EA Federation Strategy and associated EA Services apply the net-centric concept, Data Strategy, and GIG Enterprise Services Strategy to the DoD Enterprise architecture. A net-centric approach to Federated EA ensures that the Department has an accessible Enterprise Architecture with content derived from multiple sources. The intent of this Strategy is to enable cross-departmental discovery and use of architecture artifacts to support the Department’s decision makers in evolving and maintaining the enterprise information technology (IT) infrastructure in accordance with law and policy while maintaining autonomy for the owners of the architecture artifacts.
1.3. Related Guidance

Architecture requirements are solidly grounded in Law; the Clinger-Cohen Act assigned CIOs the responsibility for “developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture.” Additional details are provided in the Office of Management and Budget Circular A-130 and are expanded upon in guidance from the DoD and the Joint Staff (JS) regarding the development and use of architectures and their relationship to net-centric operations. Full details are provided in Appendix D of this Strategy.

2. Purpose

The purpose of this Strategy is to present an agreed upon method and strategy to achieve a DoD Federated EA that would support decision makers in the DoD at the department level as well as the DOD Components and Programs.

After months of study, OASD, with participation from the JS and DoD Components, has determined that the best way to address the challenges presented above is to federate disparate architectures into a DoD-wide Federated EA. The DoD Federated EA would be constructed using a set of federation standards and Core Enterprise EA Services (registration, discovery, and translation services).

3. Vision

The Federated EA vision is to provide DoD decision makers and their staffs’ access to a broader and deeper architecture data set that is available, accessible, understandable, trustworthy, and able to be tailored for decision support at the department and DoD Component levels.

4. Goals

The challenges identified in the Background paragraph serve as the drivers for this Strategy. Their resolution can be found in the following goals necessary to achieve EA Federation:

1) An environment to support the decision makers and their staffs with access to a set of common architecture artifacts enabling common understanding of the DoD Enterprise that can be used to support DoD decision making at the enterprise and DoD Component levels
2) A means to identify internal and external interfaces to the DoD Enterprise
3) Improved EA information sharing of architectural content, ensuring that users, including unintended users, can find and use the right information
4) Increased agility that leverages existing architecture and/or artifacts to swiftly adjust or expand their capabilities through architecture reuse and integration to meet their changing mission and business needs

5. Objectives

The following five objectives provide the focus for achieving the Goals identified above. Achievement of all is critical for success.
A. **Provide a structure** for federating architectures to achieve the DoD EA and to establish a means for autonomous development of DoD Component’s EA to support tiered accountability. Related Goals: 1, 2, 3

B. **Provide guidance** for federating architectures to achieve the DoD Federated EA and to establish a means to allow each DoD Component to build its Architecture within the guidance given by the Enterprise to support tiered accountability. Related Goals: 1, 2, 4

C. **Align DoD Component EA within a common framework of semantic understanding**. This common framework is based on the use of taxonomies from the C/S/As and aligned with the Department level taxonomies to ensure that the DoD Components can achieve standardization and semantic understanding with DoD Component’s EAs. Related Goal: 1

D. **Leverage Core Enterprise EA Services to provide Architecture Registration and Discovery Services** that are available, accessible, and usable by consumers within the enterprise to share architecture information both vertically and horizontally throughout and achieve information visibility in a coherent manner. Related Goals: 1, 3, 4

E. **Provide a foundation to support emerging capabilities through Federated EA services** as a way of making the underlying business, mission, or transaction function in a system or application available to a broad set of consumers. These services can be easily reused and repurposed to provide building blocks for new capabilities. An example of these services would be to provide specific analytic capabilities leveraging EA holdings to support logistics, blue force tracking, and mission planning. Related Goal: 3, 4

6. **Benefits**

There are many benefits to be realized from implementing a Federated EA. The implementation of the Federated EA is intended to provide useful analytical information to various stakeholders within the DoD. Multiple benefits accrue as the DoD GIG is federated and progressively populated with widely sharable information and capabilities, which significantly boost operational efficiency and effectiveness. This section will identify many of the reasons and benefits and give a simple description or example of how they are used. These benefits are dependent on the degree and nature of the content provided by program and DoD Component architectures.

6.1. **Benefits to DoD Decision Makers**

**Enables Rapid Access to Information for Strategic Decisions:**
Access to actionable, relevant, decision quality, architecture information will accelerate the leaders’ ability to make better decisions that impact the enterprise (e.g., human resource capabilities; condition, status, and location of assets; and how funds are invested for the warfighting mission). The ability of the Federated EA to support these types of decisions is content dependent.
Improves Information Sharing of Architecture Content:
Populating the GIG with federated architecture products and leveraging Core Enterprise Services to provide EA discovery and search services ensures that architecture information can be accessed throughout the enterprise. Any user who has access to the GIG will be able to find and use information from any Web-enabled device.

Understanding of Interactions and Interdependencies:
One of the primary uses of federation is to allow an Enterprise to understand the interactions and interdependencies among its component parts. DoD needs to understand the interactions among its major elements, the DoD Components, with the means to govern and manage the Department “cross-functionally” to realize a cost-effective, Net-Centric GIG. The Department recognizes that the exchanges among the domains are vital to modernizing the enterprise. By understanding the minimum set of exchanges required, the enterprise can reduce or eliminate unnecessary processes and the resources required to support those unnecessary processes.

Supports Portfolio Management of Technology Options:
The Federated EA depicts the supporting technology and implementation as defined by the program and DoD Component’s architectures, for each activity within the enterprise. By evaluating the set of technologies across the Federated EA, the analyst or portfolio manager can gain an understanding of multiple uses of the same technology and multiple technologies applied to support the same type of activities.

Supports the Joint Warfighting Capability of the DoD:
Joint military requirements are driving the need for greater commonality and integration of mission operations across the Department. The Department’s infrastructure must enable rapid response to the warfighting community and be compatible with the global, networked military it supports.

Reduced Cost of Defense Operations:
Streamlining operations using Operational Architecture View data will enable decision makers to deal with growing pressures on resources and ensure every Defense dollar is optimally applied for long-term mission effectiveness.

6.2. Benefits to DoD Architects

Promotes Distributed Configuration Management:
Once the enterprise has federated its architecture, configuration management is reduced to two efforts: maintenance of the federation and configuration of enterprise artifacts. As part of the centralized control and decentralized execution of developing the enterprise architecture, the enterprise can very tightly manage the high-level taxonomies, the relationships with the DoD Component’s activities, and the enterprise list of instances for each.

Provides Clear “stopping” rules for Enterprise Architecture Development:
When developing enterprise architectures, the greatest mistake comes from overstepping the scope of the department level description. No architect should ever develop details that are
clearly in the purview of a lower-level tier. For example, the department level does not have the
authority or expertise to develop the details as well as the DoD Components. Once the
relationship is established between high-level taxonomies and a DoD Component’s architecture
artifact, the department level should then cease its examination of details and point to the DoD
Components. The DoD Component maintains the responsibility and authority to detail the
artifact and define how the enterprise achieves the goal.

**Increases Agility:**
This benefit is the natural result of the use of Web-based services for registration and
discovery, which are modular, reusable, interoperable building blocks. Users can search the
Federated EA Registry and find existing architecture content, significantly reducing the time and
cost for new architecture development, fielding of a new capability, and gaining improved
interoperability “out of the box.” By using these building blocks, warfighters can swiftly adjust
their architectures to meet changing business and mission needs.

6.3. **Benefits to Architectural Governance Bodies**

**Sets Enterprise Boundaries:**
A Federated EA with activity-based alignment shows each DoD Component’s activities
and how they relate to achieving the enterprise’s goals. The relationships among the activities
identify the activities that are “owned” or performed uniquely and those that are shared by one or
more of the DoD Components. Once all the activities of the Enterprise are related to the
activities of the DoD Components, then the collection of all activities owned by a single DoD
Component sets boundaries throughout the Enterprise. Boundaries are vertical and horizontal
start and stop points for accountability in the roles and responsibilities for Federated EA’s.

**Promotes Autonomy or Self-Governance:**
A federated architecture supports a governance structure that defines the responsibility and
authority among Components to achieve and support enterprise-wide goals. Once a DoD
Component accepts its defined boundary, as depicted within the federated architecture, it enjoys
autonomous control of the development and analysis of its architecture. The DoD Components
determine the breadth and depth of detail relating to their individual architecture, and produce
and archive the artifacts, as required, to meet or support the goals of the enterprise.

7. **Guiding Principles**
In an effort to gain the most re-use out of existing architecture artifacts, and to minimize
the need for additional architecture development, the development of the DoD EA Federation is
guided by the principles below. The Federated EA will:

- Respect the diverse requirements of individual DoD Component while focusing
  on the associations that cut across organizational boundaries IAW statutory
  roles and responsibilities for the DoD Components.

- Focus on federating existing disparate architecture artifacts regardless of
  structure and format – not re-building architectures.

- Maximize the reuse of existing architectures at all tiers.
• Evolve from a product-centric approach (focused on DoDAF and other work products produced by architecture developers) towards a data-centric architecture approach focusing on common semantics.

• Support DoD’s net-centricity objectives (e.g., make information and services visible, accessible, and understandable) and vision.

8. Scope

This Strategy encompasses DoD architectures at all levels of detail and classification. It defines or references interfaces to architectures outside the Department under the Federal Enterprise Architecture Framework (FEAF) and the Federal Enterprise Architecture Reference Models. The GIG, a Federated EA, will not be isolated to IT but will have relevance for Doctrine, Organization, Training, Material, Leadership and education, Personnel, and Facilities (DOTMLPF), as the use and utility of architecture expand in those areas.

This Strategy is applicable to all DoD Mission Areas and addresses the relationships among all levels of enterprise details from the program/initiative level up to the Department level. This Strategy will:

• Define architecture federation and integration concepts.

• Define architecture alignment (linking and mapping) processes.

• Define EA Services for registering and discovery of architecture holdings and associated metadata.

This Strategy will accommodate the range of architecture formats, methodologies, toolsets, and levels of abstraction, and will be applicable to multiple decision processes.

As part of this Strategy, Policy, Governance, and Implementation Planning documents will need to be defined and developed to support the vision and goals of this strategy.

9. Federated EA Defined

We use the term Federated Architecture to represent the concept that architecture artifacts are related in a meaningful way. Federated Architectures conform to common or shared architecture standards across autonomous Program, DoD Component, Mission Area enabling developing/owning entities to maintain diversity and uniqueness, while providing opportunity for implementing interoperability. 4

4 Federal Enterprise Architecture (FEA) Reference Models (RM) - The FEA is a tool used to align the DoD enterprise Architecture with the rest of the Federal Government’s Components. There are five Reference Models within the FEA: Performance Reference Model (PRM); Business Reference Model (BRM); System Reference Model (SRM); Technical Reference Model (TRM); and Data Reference Model (DRM).

PRM – Identifies the performance measures of the enterprise
BRM – Identifies the key activities of the enterprise
SRM – Identifies the primary systems used within the enterprise
TRM – Identifies the approved and emerging standards used within the enterprise
DRM – Identifies the data and information used within the enterprise

Adapted from New York State Office for Technology – see definitions
A Federated Enterprise Architecture shows how a DoD Component aligns activities, services, systems, and infrastructure with federation standard taxonomies, providing context. Initially, EA federation will be based on semantic alignment of each Program, DoD Component, Mission Area, architecture’s top-level activity with the Enterprise’s top-level taxonomy of activities called the “High-level Taxonomy.” An example of “High-level Taxonomy” is the implementation of the BEA activity model which serves as the Business Mission Area’s (BMA)’s “High-level Taxonomy” for DoD Component alignment. Semantic Alignment will be based on the context\(^6\) of the architectures and the individual activities being related – for DoDAF architectures this is normally identified in the (OV-5). Semantic alignment of other architectural elements will be pursued, as needed, to support key decision processes and as other federation high-level taxonomies are developed.

Federated Architecture shows the allocation of responsibility across the Enterprise. In contrast, Integrated Architecture shows the interaction of multiple activities to achieve a mission or goal across the Enterprise.

Federation is a way to organize an enterprise’s body of knowledge (architecture) about its activities (processes), people, and things within a defined context and current/future environment. Federation provides the architect-analyst additional means to examine aspects of the DOTMLPF concepts across organizational boundaries.

### 10. EA Federation Concepts

#### 10.1. The EA Federation

This section identifies key concepts that define the Federated Enterprise Architecture elements. These concepts are important to understanding Federation and how it is most useful in supporting decision making and Tiered Accountability. These concepts enable Department-wide producers and consumers to achieve the Goals and Objectives of a Federated EA.

#### 10.2. Tiered Accountability

Tiered accountability is distribution of authority and responsibility of an element of the enterprise architecture to an organization. Through the policy of Tiered Accountability (TA), DoD addresses the responsibility for producing these EA architecture artifacts. Under TA, DoD is currently defining and building enterprise-wide capabilities that include data standards, business rules, enabling systems, and an associated layer of interfaces for Enterprise, Mission Area, DoD Components, and Programs. Each tier of the enterprise – Department, Mission Area, DoD Components, and Program – has specific goals, as well as responsibilities to the tiers above or below them.

Each tier has full authority and responsibility to develop their portion of the EA. Unfortunately, data between tiers are often unavailable via an accurate, timely, and reliable

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\(^6\) See definition on page 10.
method. In order to navigate through these tiers in a coherent way, and achieve information visibility, accessibility, and responsiveness, an organizing structure is needed.

10.3. High-level Taxonomies

In the context of the Federated EA, a high-level taxonomy is a structure or model that spans the enterprise. At the highest level of the enterprise, the DoD Activity High-level Taxonomy \(^7\) sets the context for the alignment of the Mission Areas’ activities and associated reference models. At the DoD Component level, it is used to categorize and organize the DoD Component’s architectures to depict boundaries and provide context for federation. For the Federated EA, the Activity High-level Taxonomy will be the first High-level taxonomy produced.

10.4. Architecture Categorization

DoD EA DoD Component’s architectures need to be categorized to facilitate alignment (mapping and linking), cataloging, navigating and searching disparate architecture in a DoD registry of holdings, and providing a framework for aligning architectures. This Strategy identifies four major levels of echelon and taxonomies to be used for categorization Figure 1:

- Department (OSD, JCS, etc)
- DoD Mission Area (Warfighting, Business, DIMA, and EIE Mission Areas)
- DoD Component (Army, JFCOM, DLA, etc)
- Program (NECC, FCS, etc)

Figure 1 Architecture Levels for Tiered Accountability

Where possible, this should include identifying a common reference language\(^8\) or model applicable to the mission areas that can be used by all participating architectures. These

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\(^7\) The Business Reference Model (BRM) is the high-level Federated EA Activity Taxonomy.

\(^8\) As an example, for the BEA Materiel Visibility BEP, the (SFIS) provides a common reference for all DoD Logistics architectures.

**NOTE:** This also complies with the guidance in DoD 4140.1-R, Paragraph C1.4.1.1, to use the SCOR processes of "Plan, Source, Maintain/Make, Deliver, and Return as a framework for developing, improving, and conducting
top level taxonomies should be complemented by other architecture categorization schemes
including Joint Capability Areas (JCAs), Joint Mission Areas (JMAs), Missions, Universal Joint
Task List (UJTL), DoDAF product type, functional area, acquisition program, transformation
architecture, and others, as appropriate. A full description of a proposed categorization scheme
is in Appendix E.

10.5. Context

Context defines the environment of the enterprise architecture. Five basic questions
make up the Context and help to fully define the external environment of the enterprise.

1) What is the purpose of the architecture effort and what are the questions to
be addressed by this architecture effort?
2) What is the boundary of the enterprise? What is considered inside the
enterprise versus external?
3) What is the scope of the architecture effort, what are the echelons or
organizational levels involved, and what level of detail will be required in
the descriptions?
4) What is the viewpoint of the architecture? From who’s perspective do we
examine the enterprise and write the descriptions (external customer,
supplier, or casual observer; internal role player; or process owner)?
5) What echelons are represented by the architecture?

The Context should be defined before the architecture effort is begun and articulated
within the AV-1. The context is part of the architecture’s metadata, which can be used for
discovery, semantic alignment, and contextual comparison with other architecture efforts.

10.6. Boundaries for Tiers

Each enterprise tier – Department, Mission Area, DoD Component, and Program – has
specific goals, as well as responsibilities to the tiers above or below them that are used to
determine the level of detail (or abstraction) necessary for their architecture.

10.7. Semantic Alignment

A key goal of net-centricity is to enable semantic understanding of data so that
interoperability can be achieved between any applications that have the ability to access and
interpret the structural and semantic rules associated with data.

The Federated EA will be based on the semantic alignment of tier level architecture
elements with elements of federation high-level taxonomies. Semantic alignment refers to the
relationship specified between the meanings of taxonomy elements. The semantic relationships
specified between activities will typically include “is equivalent to,” “is part of,” or “is similar
to.” These relationships provide the alignment between the elements of DoD Component’s

material management activities to satisfy customer requirements developed collaboratively with the support
providers.”
C/S/As architectures and the high-level reference taxonomies that specify the interface points in
the federation for tiered accountability of the Federated EA content.

Through Tiered Accountability, Stakeholders and the DoD Components will retain the
authority to manage their own internal Architecture holdings, consistent with federation
standards or methodologies. However, the federated EA governance body at the appropriate tier
will have responsibility for capturing semantic consistency out of the separate DoD Components
and communities of interest/practice, defining the semantic (meaning) and syntactical (structure)
standards that will provide for consistent usage and meaning. Where possible, external and
industry standards will be considered for incorporation. Specifics on how semantic alignment
can be achieved will be included in the Federated EA Implementation Plan.

11. EA Services — Making the EA Visible, Accessible, and Understandable

In order to make the EA visible, accessible, and understandable, EA Services will be
implemented using Web Services, in which specific content and/or functionality is provided by
one user for others, many of whom may be unanticipated by the provider (see Figure 1). The
return on investment in the Federated EA will result from DoD providers continually populating
the Federated EA with architecture data and products that satisfy a variety of anticipated and
unanticipated consumer needs. This will require the following development of standards and
services:

- A set of standard metadata will be maintained for all architectures in
  confederating repositories and Web service specifications (Web service
definition language [WSDL]) for discovery and registration.
- A registration service will enable cataloging and linking of architectures in
  federated repositories.
- A discovery service will enable users to execute a federated search for
  architecture holdings meeting specified search parameters.

The following paragraphs elaborate on those concepts.

11.1. Metadata

To implement a Federated EA search service, metadata elements must be defined to
capture attributes of artifacts required to support search parameters based on user needs. The
DoD Discovery Metadata Specification (DDMS) V1.3 provides a baseline specification for
architecture discovery metadata. The architecture conceptual model (currently the CADM)
provides additional AV-1 discovery metadata specifications. Several new metadata elements,
defined as “DDMS Plus” metadata, enable configuration management, architecture registration,
and cataloging.

Data may be stored in any format using relational, object oriented, or hybrid
technologies based on any kind of data model. These principles do, however, require that

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9 Visible, Accessible, and Understandable are key Net-Centric concepts from the NCOW RM v1.1 as integrated
from the Net-Centric Strategies.
agreements be reached within the DoD EA Community of Interest (COI) or Community of Practice (COP) on the structure and semantics of data elements used for data asset discovery, linking, exchange, and integration. Metadata elements needed to support the EA user services described herein are defined and proposed for DoD EA COI/COP acceptance as the standard for net-centric federated EA services.

11.2. Registration

Federation repositories will capture all architecture metadata for architectures developed in local environments. Federation repository owners will be responsible for implementing mechanisms to collect metadata specifics on the implementation of Registration, including specific metadata requirements, which will be contained in the Federated EA Services Implementation Plan.

11.3. Discovery

The Federated EA will include a federated metadata discovery capability. The intent is to provide a user-friendly service that enables discovery of architecture metadata available from federated repositories. Federated repositories are achieved when sources of similar content can be searched via enterprise services. It will also enable the user to follow links to the source architectures in the federated repositories. Specifics on the implementation of this tool will be contained in the Federated EA Services Implementation Guidance Document.

The following sections address the two primary modes of discovery, registry browsing and searching.

Registry Browsing:

Users may browse a catalog of holdings for Federated EA repositories to find artifacts of interest. Cataloging of repository holdings should enable users to search for artifacts by navigating categorization taxonomies similar to browsing item categorizations in online shopping Web sites. Multiple categorizations may apply to any single architecture. Catalog navigation trees should use standardized category names from “approved” enterprise taxonomies, when available, and may be extended by domain extensions where needed. Navigation trees should provide links to detailed metadata on architecture holdings to enable users to determine potential interest value and include links to the products in source repositories to enable user access to selected products.

Searching:

An architecture search capability must enable a user to specify a set of criteria for architecture artifacts of interest. A single search interface using that set of search criteria needs to be able to reach all architecture data repositories and present a consolidated response to the user. The consolidated response, at a minimum, should:

- Provide sufficient metadata on holdings, so that users can ascertain their relevance.
- Provide links to the results, taking the user to the source repository consistent with the user’s role-based access privileges.
• Include all available architecture metadata, including metadata not specified as
search parameters.

Figure 2 illustrates the concept for the proposed Core Enterprise EA Services/DARS
implementation for the DoD Federated EA Services. It illustrates metadata registration and
discovery of architecture content within the federated repositories required to make the enterprise
architecture data visible, accessible, and understandable for the DoD community.

12. Governance

Since the Federated EA is not a unitary architecture, it will require a governance structure
to provide direction and oversight within the framework of TA and the existing DoD and DoD
Component governance structures. The DoD CIO, or the CIO’s delegate, will serve as the
ultimate chairperson for management of the Federated EA. However, due to the complex
relationships between the architecture producers/developers at various levels, the governance
roles within the Federated EA will vary according to roles within Tiered Accountability.

1) At the Enterprise or OASD/JS-level, governance will address DoD-wide
   Authority, Direction, Guidance, Monitoring, and Affirmation/Remediation.

2) At the Mission Area-level, governance will address Implementation,
   Monitoring, and Affirmation/Remediation in response to DoD-wide guidance as
   well as Mission Area unique Authority, Direction, and Guidance.

3) Similarly, the DoD Component-level, governance will address Implementation,
   Monitoring, and Affirmation/Remediation in response to DoD-wide guidance
The details for governance will be provided in a separate document, the planned DoD Federated EA Governance Document. It will address areas such as:

- Charter Development/Approval
- Roles and Responsibilities
- Organizational Framework
- Resource Requirements and Responsibilities
- Policies
- Incentives
- Data Management
- Standards
- Services
- Quality
- Compliance
- Maturity Models
- Synchronization
- Repositories
- Security/Access
- Accreditation
- External Relationships

A tentative outline for Governance is provided in Appendix F.

**12.1. EA Federation Roles and Responsibilities**

This Federation Strategy is in accordance with DoD 8320.2-G, *DoD Guidance for Implementing Net-Centric Data Sharing* by enforcing Tiered Accountability, whereby each tier, or level, of the federation is responsible for managing its own architectures and data while also making those architectures and data visible, accessible, and understandable to other members of the federation. The Federation Strategy seeks to operationalize Tiered Accountability.

Each Tier has both internal and external roles and responsibilities that it must perform to make the Federated EA function as intended. These are presented in Table 1, where external roles and responsibilities are denoted with a star (*) and internal roles and responsibilities are denoted with a square (■).

<table>
<thead>
<tr>
<th>Department</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star (★)</td>
<td></td>
</tr>
<tr>
<td>Impose constraints on federated Mission Areas, DoD Components, and Programs in order to achieve cross-federation.</td>
<td></td>
</tr>
<tr>
<td>Add or remove information from the DoD Federated EA as appropriate via the various feedback loops outlined in the Implementation Plan.</td>
<td></td>
</tr>
<tr>
<td>Develop top-level taxonomies and categorization schemes in order to ensure that Mission Areas, DoD Components and...</td>
<td></td>
</tr>
<tr>
<td>Square (■)</td>
<td></td>
</tr>
<tr>
<td>Establish a governance structure for the DoD EA Federation.</td>
<td></td>
</tr>
<tr>
<td>Develop and maintain the environment in which the Federated EA is developed and maintained.</td>
<td></td>
</tr>
<tr>
<td>Create, publish, and administer the high-level Discovery and Registration Services.</td>
<td></td>
</tr>
<tr>
<td>Store, publish, and maintain federation mapping “links” to enable traceability through each tier and across the Department Level.</td>
<td></td>
</tr>
<tr>
<td>Create and manage the DoD EA RMs.</td>
<td></td>
</tr>
</tbody>
</table>
Program architectures can align in a meaningful way.

Mission Area

★ Impose constraints on the DoD Components and Programs in order to achieve Mission Area (MA) goals and support interoperability between mission areas.
★ Develop and maintain MA enterprise architectures and mapping results.
★ Provide configuration management (CM) to DoD Components’ taxonomies by MA.
★ Provide content to taxonomies and categorization schemes utilized for the DoD Federated EA.
★ Report changes in content for DoD EA Federation, as necessary.

DoD Components and Enterprise Programs

★ Impose constraints on DoD Components’ Programs in order to achieve the DoD Components’ goals and support cross-DoD interoperability.
★ Manage its enterprise architecture to support its mission and vision.
★ Propose modifications to the DoD EA to increase/improve alignment between tiers.
★ Develop and maintain the DoD Components’ enterprise architectures.
★ Provide CM to domain taxonomies.
★ Make the DoD Components’ architecture and mapping results visible, accessible, and understandable.
★ Adhere to the standards for data sharing established by the Enterprise and MAs.
★ Ensure that the DoD Components’ Program architectures and mapping results are visible, accessible, and understandable.
★ Support metadata development.
★ Implement the discovery services within the DoD Components’ environments.
★ Map to the taxonomies and categorization schemes provided by the DoD Components as appropriate.
★ Make the Programs’ architecture and mapping results visible, accessible, and understandable.
★ Adhere to the standards for data sharing established by the Enterprise, MAs, and DoD Components.
★ Develop and maintain the Programs’ architecture and mapping results.
★ Extend high-level taxonomies.
★ Use the taxonomies and categorization schemes provided by the MA levels to map its architectures to the DoD EA.
★ Ensure that the DoD Components’ Program architectures and mapping results are visible, accessible, and understandable.
★ Support metadata development.

DoD Component Program’s

★ Maintain Program architecture element names and definitions.
★ Propose modifications to the DoD EA to increase/improve alignment between tiers.
★ Propose modifications to the DoD EA to increase/improve alignment between tiers.
★ Develop and maintain the Programs’ architecture and mapping results.
★ Develop and maintain the Programs’ architecture and mapping results.
★ Extend high-level taxonomies.
★ Extend high-level taxonomies.

Additional roles and responsibilities will be identified, as required, within the Governance Document. Detailed roles and responsibilities specific to each level will be outlined in the DoD EA Federation Implementation Plan.

12.2. Information Assurance

This Strategy will embrace information assurance concepts and principles and other DoD guidance, as appropriate. This is to ensure the integrity of the information across the Federated EA that’s required to support the goals of visibility, accessibility, understandability, and trustability (through metadata tagging of artifacts).
13. Implementing the Federated EA

As an integral part of this Strategy, a detailed Implementation Plan will be provided as a separate document.

13.1. Pilot Efforts

There are two primary areas of interest for Proof-of-Concept (PoC) Pilot efforts. One is to build and analyze a Federated EA using the DoD High-level Activity Taxonomy, a Mission Area Taxonomy, and DoD Components’ architecture. The other is to build and demonstrate EA Services with an initial focusing on Registration and Discovery Services.

Enterprise Federation – Federated EA Pilot

The first pilot will build and analyze a Federated EA using the DoD High-level Activity Taxonomy, Mission Area Taxonomy, and DoD Components’ architecture. OASD(NII) and the EA Summit are currently evaluating candidates for this pilot.

EA Services — The DARS Pilot for Registration and Discovery

For the second pilot – registration and discovery capabilities – EA Registration and Discovery Services will be implemented initially as Core Enterprise EA Services in DARS and a selected set of federated repositories. These capabilities will then be federated to other DoD Components’ repositories, resulting in a more robust department-level capability. Using this federated capability, a search request on one repository, e.g., DARS, will result in a returned set of records matching the search criteria and will contain as much of the architecture metadata as is available from each of the federated repositories having holdings that match the search criteria. URLs in the reply metadata set will provide links to the source architectures in the federated repositories.

An architecture search capability should enable a user to specify a set of criteria for architecture artifacts of interest. Users should be able to specify specific search criteria in a search GUI using methods such as pick lists for the allowable values for each of the criteria. That set of search criteria needs to be propagated to all architecture data repositories. The user then needs to receive a single consolidated response that:

- Provides consistent metadata from all sources
- Provides sufficient metadata to enable the user to ascertain their relevance
- Provides links to the sources

Once a user determines which architecture artifacts are of interest, a link associated with each result will take the user to the source repository. Depending on the security policy of the source repository, the link may either provide direct access to the selected artifact in the native repository format or visualization environment, or, in future versions; it may direct the user to a role subscription service on the native repository for requesting access to the product. User credentials may also be passed by the search service to the source repository for authentication to enable automated access based on access roles/privileges associated with the user in the source repository.
14. Critical Success Factors

A review of the business and warfighting mission drivers/needs (with respect to their information needs), at an enterprise, i.e., joint level, reveals the high degree of cooperation and participation needed for federating the disparate architectures across the entire DoD, including alignment of external organizations and agencies in support of strategic, joint decision making.

Following is a list of broad categories of candidate Critical Success Factors (CSF) related to the institutionalizing of a DoD Federated Architecture environment. The broad CSF categories are:

- Required commitment by OSD, JS, and DoD DoD Components for participation in the FJAWG,
- Adoption and implementation by OSD, JS, and DoD DoD Components for architecture governance, registration, high-level taxonomies, federation levels, roles and responsibilities, federation methodologies, etc.
- Selection and successful implementation of a PoC Pilot in order to validate EA Federation concepts, governance, methods, tools, high-level taxonomies, etc.
- Linking Business and Warfighting mission drivers/needs.
- Commitment of resources at OSD, JS, and DoD DoD Components to support federation development and implementation.
- Adoption of DARS as the Federated EA Registry.

Appendix G contains a detailed list of CSFs within each category.

15. The Way Ahead

To begin implementation of this Strategy:

- OSD Leadership, working with the DoD Components and other stakeholders, will articulate details required for implementation.
- Registry and repository owners will work with the registry pilot lead on federating discovery services.
- FJAWG as the EA Summit arm will complete the development of the high-level activity taxonomies.
- The community will define how linkages are managed between the Tiers in the Federation.
- DARS will implement the linkages between the Tiers in accordance with the community requirements as a community extension to Core Enterprise EA Services for EA.
- Mission Area Leads will define their high-level taxonomies for inclusion in the DoD EA Reference Models.
## APPENDIX A: ACRONYM LIST

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACAT</td>
<td>Acquisition Category</td>
</tr>
<tr>
<td>ACCB</td>
<td>Architecture Configuration Control Board</td>
</tr>
<tr>
<td>BEA</td>
<td>Business Enterprise Architecture</td>
</tr>
<tr>
<td>BMA</td>
<td>Business Mission Area</td>
</tr>
<tr>
<td>BRM</td>
<td>Business Reference Model</td>
</tr>
<tr>
<td>BTA</td>
<td>Business Transformation Area</td>
</tr>
<tr>
<td>C/S/A</td>
<td>Command/Service/Agency</td>
</tr>
<tr>
<td>CADM</td>
<td>Core Architecture Data Model</td>
</tr>
<tr>
<td>CCB</td>
<td>Configuration Control Board</td>
</tr>
<tr>
<td>CIO</td>
<td>Chief Information Officer</td>
</tr>
<tr>
<td>CJC</td>
<td>Chairman of the Joint Chiefs of Staff</td>
</tr>
<tr>
<td>CJSI</td>
<td>CJCS Instruction</td>
</tr>
<tr>
<td>CM</td>
<td>Configuration Management</td>
</tr>
<tr>
<td>COAL</td>
<td>Consolidated Operational Activities List</td>
</tr>
<tr>
<td>COI</td>
<td>Community of Interest</td>
</tr>
<tr>
<td>COP</td>
<td>Community of Practice</td>
</tr>
<tr>
<td>COTS</td>
<td>Commercial Off The Shelf</td>
</tr>
<tr>
<td>C/S/As</td>
<td>Combatant Commands, Services, and Agencies</td>
</tr>
<tr>
<td>CSF</td>
<td>Critical Success Factors</td>
</tr>
<tr>
<td>CSFL</td>
<td>Consolidated Systems Function List</td>
</tr>
<tr>
<td>DARS</td>
<td>DoD Architecture Registry System</td>
</tr>
<tr>
<td>DDMS</td>
<td>DoD Discovery Metadata Specification</td>
</tr>
<tr>
<td>DIA</td>
<td>Defense Intelligence Agency</td>
</tr>
<tr>
<td>DoD</td>
<td>Department of Defense</td>
</tr>
<tr>
<td>DODD</td>
<td>DoD Directive</td>
</tr>
<tr>
<td>DODI</td>
<td>DoD Instruction</td>
</tr>
<tr>
<td>DOTMLPF</td>
<td>Doctrine, Organization, Training, Material, Leadership and education, Personnel, and Facilities</td>
</tr>
<tr>
<td>DRM</td>
<td>Data Reference Model</td>
</tr>
<tr>
<td>EA</td>
<td>Enterprise Architecture</td>
</tr>
<tr>
<td>EIE</td>
<td>Enterprise Information Environment</td>
</tr>
<tr>
<td>FCB</td>
<td>Functional Control Board</td>
</tr>
<tr>
<td>FEAF</td>
<td>Federal Enterprise Architecture Framework</td>
</tr>
<tr>
<td>FJAWG</td>
<td>Federated Joint Architecture Working Group</td>
</tr>
<tr>
<td>GIG</td>
<td>Global Information Grid</td>
</tr>
<tr>
<td>GOTS</td>
<td>Government Off The Shelf</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>JCA</td>
<td>Joint Capability Area</td>
</tr>
<tr>
<td>JC3IEDM</td>
<td>Joint Consultation Command and Control Information Exchange Data Model</td>
</tr>
<tr>
<td>JCS</td>
<td>Joint Chiefs of Staff</td>
</tr>
<tr>
<td>JMA</td>
<td>Joint Mission Area</td>
</tr>
<tr>
<td>JS</td>
<td>Joint Staff</td>
</tr>
</tbody>
</table>
MA  Mission Area
NCOW  Net Centric Operations and Warfare
OASD  Office of the Assistant Secretary of Defense
PoC  Proof of Concept
PRM  Performance Reference Model
RM  Reference Model
SFIS  Service Oriented Architecture
SRM  System Reference Model
TA  Tiered Accountability
TRM  Technical Reference Model
UJTL  Universal Joint Task List
WSDL  Web Service Definition Language
APPENDIX B: DEFINITIONS

Architecture:
Architecture is the structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time. [CIO Council, A Practical Guide to Federal Enterprise Architecture, February 2001]

Architecture Integration:
Architecture Integration is the process of consolidating the content of disparate architectures to support analyses of a broader scope than that possible with any single disparate architecture. Architecture integration includes the mapping or standardization of terms and definitions across disparate architectures and the integration results in a set of data and products that support Joint operations and development efforts. [DoD Federated Joint Architecture Working Group (FJAWG) recommendation, Dec 2005]

Artifact:
An abstract representation of some aspect of an existing or to-be-built system, component, or view. Examples of individual artifacts are a graphical model, structured model, tabular data, and structured or unstructured narrative. Individual artifacts may be aggregated. [US Department of Agriculture Office of the CIO, http://www.ocio.usda.gov/e_arch/glossary.html]

High-level (Adj.):
For purposes of this Strategy, the phrase “high-level” is used as an adjective representing the highest-level structure within an enterprise, mission area, or DoD Components providing context and guidance for all lower levels. It is used primarily as a modifier to another term “taxonomy” to represent highest-level structure within an echelon shown above.

Core Enterprise EA Services:
Core Enterprise Services are IT services that provide the foundation for DoD service and data providers by delivering and managing the underlying capabilities from which communities build and receive the services they need to meet their business and information processing needs. For EA, the initial IT services that support the registration and discovery of architectural artifacts, architectures, or products will be developed. Additional anticipated services include translation services that ensure artifacts, architectures, or products are understandable between DARS and other architectural repositories.

Discovery:
The act of locating a machine-processable description of a Web service-related resource that may have been previously unknown and that meets certain functional criteria. It involves matching a set of functional and other criteria with a set of resource descriptions. The goal is to find an appropriate Web service-related resource. [Web Services Glossary, W3C Working Group Note 11 February 2004]

Discovery Service:
A discovery service is a service that enables agents to retrieve Web services-related resource description. [Web Services Glossary, W3C Working Group Note 11 February 2004]
Enterprise:

Enterprise is an organization (or cross-organizational entity) supporting a defined business scope and mission. An enterprise includes interdependent resources (people, organizations, and technology) that must coordinate their functions and share information in support of a common mission (or set of related missions). [CIO Council, A Practical Guide to Federal Enterprise Architecture, February 2001]

Federated Architecture:

Federated architectures define common or shared architecture standards across autonomous program areas, enabling state government entities to maintain diversity and uniqueness, while providing interoperability. [New York State Office for Technology: http://www.oft.state.ny.us/arcPolicy/policy/glossary.htm]

An Architecture Federation is a framework for enterprise architecture development, maintenance and use that links, locates, and aggregates disparate architectures and architecture information. A federated architecture approach recognizes the uniqueness and specific purpose of disparate architectures, and allows for their autonomy and local governance, while enabling the enterprise to benefit from their content. [DoD FJAWG recommendation, Dec 2005]

Federated Architectures: Separate, Distinct, Individual Architectures:

Separate architectures were built under different contexts but may be aligned within an overarching scope and boundary, viewed from a common point of view, for a common purpose, and a specified set of questions to be addressed by the resulting federated architecture. [DoD FJAWG recommendation, Dec 2005]

Services:

A mechanism to enable access to 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. [From the GIG Enterprise Services Strategy, Oct 2006]

Service-Oriented Architecture and SOA Principles:

SOA is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains. It represents a collection of services on a network that communicate with one another. It is any architecture that can be decomposed, on a logical level, into three categories of components: a service, a provider of the service, and a consumer of the service. SOA addresses three roles and three operations. The three roles are the service producer (provider), the service consumer (requester), and the service registry. The objects acted upon are the service and the service description, and the operations performed on these objects are publish, find, and bind. Within industry and DoD the concept and service principles are evolving as we gain experience with SOA. Some general service-oriented principals are: discoverable, accessible, and dynamically bound; enable interoperability; are loosely coupled; have a network addressable interface; are location transparent; and are not bound to specific systems. [NCOW RM v1.2 (draft)]
Service Registry or Registry Service:
Is a platform neutral, network based directory that stores information about services and is searchable based on the descriptive metadata defined in the service specification. [DoDAF Version 1.5 Vol 2 Oct 2006]
APPENDIX C: REFERENCE DOCUMENTS


“Joint Concept of Operations for Global Information Grid NETOPS version 2.0”, USSTRATCOM, 10 Aug 2005

APPENDIX D: RELATED GUIDANCE

Architecture requirements are solidly grounded in Law; the Clinger-Cohen Act assigned Chief Information Officers the responsibility for “developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture.” Additional details are provided in Office of Management and Budget Circular A-130. The Circular establishes an Enterprise Architecture (replacing the term “information technology architecture”) as consisting of the following elements: business processes, information flows, data descriptions, applications, technology infrastructure, and standards. The Circular also establishes the requirement for the EA to be incorporated in the Executive Agency’s Capital Planning and Investment Control Process.

DoD prescribes the DoDAF version 1.0 (DoDAF) as the basis for DoD developing architecture descriptions. DoDAF-based architecture descriptions are required in many of the Department’s major processes; these descriptions are also required to be consistent with the GIG Architecture and NCOW RM. The following policies require the development of architecture descriptions:

- CJCSI 3170.01E, Joint Capabilities Integration and Development System
- CJCSI 6212.01D, Interoperability and Supportability of Information Technology and National Security Systems
- DoDD 5000.1, The Defense Acquisition System
- DoDI 5000.2, Operation of the Defense Acquisition System
- DoDD 4630.5, Interoperability and Supportability of Information Technology and National Security Systems
- DoDI 4630.8, Procedures for Interoperability and Supportability of Information Technology and National Security Systems
- DoDD 8000.1, Management of DoD Information Resources and Information Technology
- DoDD 8115.1, Information Technology Portfolio Management
- DoD CIO Memorandum, DoD Net-Centric Data Strategies:
  - Net-Centric Data
  - Shared Services
  - Information Assurance

These policies are enforced through processes that include assessments of compliance with applicable architectures. DoDI 5000.2, for example, includes requirements for Clinger-Cohen Compliance. One of the compliance criteria requires that acquisitions are “consistent with the Global Information Grid policies and architecture, to include relevant standards.” The DoD CIO as well as the DoD Component CIO’s assess lower Acquisition Category (ACAT) programs.

The development of a DoD Federated EA will be conducted in accordance with both DoD and Federal policy on the development and use of Enterprise Architectures. The approach to federation described herein shall closely follow DoD policy and directives on net-centric data management. The following net-centric references are applicable:

- DoD CIO Memorandum, DoD Net-Centric Data Strategies
Key net-centric principles that must be adhered to are that data assets must be made visible, accessible, understandable, and trusted (when referring to IA), and they must be enabled to support interoperability. These principles do not assume or prescribe any requirements for physical data storage. Data may be stored in any format using relational, object oriented, or hybrid technologies based on any kind of data model. These principles do, however, require that agreements be reached within the DoD EA Community of Interest (COI) or Community of Practice (COP) on the structure and semantics of data elements used for data asset discovery, linking, exchange, and integration. Metadata elements needed to support the EA user services described herein are defined and proposed for DoD EA COI/COP acceptance as the standard for net-centric federated EA services.
APPENDIX E: ARCHITECTURE CATEGORIZATION, STRUCTURE (TAXONOMY)

The top level of the DoD Federated EA taxonomy will initially consist of the four DoD Business Reference Model (BRM) Mission Areas (MAs) [see Figure E-1] and be coordinated by a federated DoD EA control board.

Figure E-1: Federated DoD EA Taxonomy

Table E-1 identifies MA Taxonomy Configuration Management (CM) Authorities that will have autonomy for defining and managing a core set of taxonomy elements for each MA. Mission area taxonomies should be derived from MA activity decomposition and synchronized with the DoD BRM.

<table>
<thead>
<tr>
<th>BRM Mission Area</th>
<th>Taxonomy Content CM Authority</th>
<th>Decomposition Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warfighting</td>
<td>JS</td>
<td>FCBs/JCAs</td>
</tr>
<tr>
<td>Business</td>
<td>BTA</td>
<td>BEA (TBD)</td>
</tr>
<tr>
<td>Intelligence</td>
<td>DIA</td>
<td>DoD BRM for Intel</td>
</tr>
<tr>
<td>Enterprise Information Environment</td>
<td>DoD CIO</td>
<td>DoD BRM for EIE</td>
</tr>
</tbody>
</table>

The number of High-level taxonomy tiers defined and managed, as a core set will depend on the degree to which the MA Taxonomy CM Authority wishes to exercise CM control over the taxonomy structure. Decomposition levels below the MA core structure will be defined by DoD Components, as authorized by the MA Taxonomy CM Authority. Each EA DoD Components’
The Federated Joint Architecture Working Group (FJAWG) has already developed several assessments and recommendations in regard to taxonomy, which are provided here for reference, pending establishment of the formal structure for their implementation:

1. Mission Area Taxonomy CM Authorities must accept responsibility for defining and managing MA core upper tier taxonomy nodes. Therefore, the EA summit should adopt and promulgate the recommended EA High-level Taxonomy strategy.

2. DoD Components will have autonomy in developing domain taxonomies. However, domain architecture mappings and extensions to the MA core must be regulated to minimize categorization redundancies. Therefore:
   a. MA authorities should provide guidance on developing and mapping domain extensions to the MA core, to include approval and mapping of “authoritative” extensions.
   b. The FJAWG should recommend guidance to MA authorities on regulating DoD Component domain extensions and mappings to the MA core.

3. MA core taxonomies need to be coordinated to maximize uniqueness of top-level nodes and minimize potential categorization redundancies; and business analysis needs may drive requirements for additional taxonomies to be incorporated into the MA high-level taxonomy in the future. Therefore, a Federated EA high-level taxonomy configuration control function and governance should be established above the individual MAs for regulating the high-level taxonomy structure and coordinating/de-conflicting the MA-taxonomy top-level nodes. Governance authority should be assigned to the DoD Architecture Configuration Control Board (ACCB). Execution responsibility should be assigned to the FJAWG as the technical advisor to the ACCB.

Changes in the MA core taxonomies will impact alignments in the registry and should be managed. Therefore, MA Authorities should develop and implement a core taxonomy CM process subject to ACCB approval.
APPENDIX F: DOD FEDERATED EA GOVERNANCE DOCUMENT

Draft Governance Outline

Scope
Governance Framework
OASD/JS Level

• Authority
  o Charter Development/Approval
  o Organizational Framework
    ▪ Governance Bodies
    ▪ Voting Members
    ▪ Stakeholder Participation
  o Roles and Responsibilities
  o Resource Requirements and Responsibilities

• Guidance
  o Policies
  o Synchronization
  o Security/Access
    ▪ Accreditation of content
    ▪ Accreditation of members
    ▪ Access control and privileges
  o External Relationships

• Direction
  o Standards
    ▪ Tools
    ▪ Metadata
  o Quality
  o Maturity Models
  o Repositories
  o Registries
  o Data Management
  o Services
  o Configuration Management

• Monitoring
  o Metrics
  o Compliance

• Affirmation/Remediation

Mission Area and DoD Component Levels
  • Implementation Responsibilities
  • Monitoring Responsibilities
  • Affirmation/Remediation Responsibilities
APPENDIX G: A DETAILED LIST OF CRITICAL SUCCESS FACTORS (CSF) BY CSF CATEGORY

1008 • Commitment by DoD DoD Components to:
1009 o Actively participate in FJAWG effort
1010 o Maintain DoD Components -level architecture metadata
1011 o Be willing to participate in and support EA Federation PoC Pilot efforts
1012 o Organizations external to DoD that need to assist or provide access to information for
1013 identifying external architecture interface needs

1015 • Adoption and implementation by DoD DoD Components of the following:
1016 o Federated EA registration and discovery services
1017 o Architecture federation rules
1018 o Federated EA metadata standards
1019 o Recommended Federation structure
1020 o EA Federation roles and responsibilities
1021 o Proposed high-level taxonomies
1022 o Standard methodologies for aligning and linking architectures
1023 o Architecture categorization schemes
1024 o Architecture federation governance

1026 • Proof-of-Concept Pilot is needed to validate the following:
1027 o Applicability & effectiveness of proposed high-level taxonomies
1028 o Architecture configuration management
1029 o Architecture discovery capabilities and performance requirements are satisfied
1030 o Architecture governance at all levels ensures integrity, visibility, accessibility,
1031 availability, understandability, and usability of architecture data by business/mission
1032 users
1033 o Architecture metadata at DoD Components level satisfies business/Mission Area
1034 information discovery needs
1035 o Architecture navigation and discovery provides correct architecture content
1036 o Architecture registration and discovery capabilities and performance requirements are
1037 satisfied
1038 o Capability to discover (and acquire) architecture content via navigation, search, and
1039 browsing services
1040 o Capability to provide and search on user-defined search criteria
1041 o Categorization schemes are effective in serving business and MA information
1042 discovery needs
1043 o Correctness of rules for federating architectures across the DoD
1044 o Discovery capabilities meet unanticipated user needs
1045 o Effectiveness and efficiency of architecture navigation schemes
1046 o Effectiveness and efficiency of registration service
1047 o Guidance for federation structure
1048 o Key interface points for linking architectures are the correct ones
1049 o Linkage to architectures external to the DoD EA Federation
Linkages are established, on different platforms, with independent repositories within the federation.
Viability and effectiveness of implemented EA Federation roles and responsibilities framework.
Viability of accommodating various formats and toolsets.

- **Linking Business and Warfighting mission drivers/needs:**
  - Alignment of operational activities
  - Identifying a “common scenario” applicable to the business or warfighting missions
  - Supporting IT enablers for the operational activities

- **Resources at DoD Components and EA Federation levels must be available to:**
  - Participate in and support the PoC Pilot efforts
  - Aid in identifying all architecture formats and toolsets in use
  - Identify interface needs
  - Assist in identifying architecture interface points
  - Develop and governance structure at DoD Enterprise and DoD Component levels
  - Develop and update architecture metadata at DoD Component level
  - Develop and update links to architecture content at the DoD Component level
  - Map Mission Areas to each other
  - Assist in DoD Component repository federation effort

- **Adoption of DARS as the Federated EA Registry for Architecture - DARS must be:**
  - Accessible and available across entire DoD
  - Intuitive, user-friendly, fast, responsive, and timely for architecture registration and discovery

- **EA Federation Tools performance requirements involve the following:**
  - Automated mapping and linking of architecture content
  - Applications that must have timely response times
  - Must be user-friendly, intuitive, fast online response
  - Interfaces that must be developed to accommodate all architecture formats and toolsets for architecture registration and discovery

- **Knowledge and/or skills in:**
  - Architectures external to the DoD that need to be interfaced with the Federated EA
  - DoD technology infrastructure
  - Existing disparate architectures across the DoD
  - Technologies and tools to provide linking to architecture content
  - Web technology
  - Metadata standards that need to be implemented
  - Architecture formats, methodologies, and toolsets
  - Prospective current and future types of unanticipated users of Federated EA
  - Types of architecture artifacts needed by unanticipated users
APPENDIX H: ACTIVITY-BASED EA FEDERATION ALIGNMENT

Activity-Relationship-Activity:

Federating the architecture in an enterprise requires a high-level taxonomy (under development) of the enterprise and an activity model for each DoD Component of interest in the enterprise. The activities within the high-level taxonomy and DoD Components’ activity models will be related in one of the following four ways as illustrated in Figure H-1 below.

- Equivalent to
- Similar to
- Part of
- No relationship

Figure H-1. Federation Relationships Among Activities

A DoD Components’ activity is considered “equivalent to” a high-level activity if the descriptions and artifacts of both are identical.

A DoD Components’ activity is considered “similar to” a high-level activity if the descriptions are the same but the primitives differ in some specification between the enterprise design and the DoD Components implementation, the activity is done differently by two or more DoD Components, or two or more DoD Components accomplish the same activity with different primitive specifications.

A DoD Components’ activity is considered “part of” a high-level activity if the description of the DoD Components’ activity achieves part of the high-level activity’s goal, and another

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DoD Components’ activity that also has a “part of” relationship with the same high-level activity completes the goal.

If a DoD Components’ activity has no relationship with any of the high-level activities, then no relationship is shown.

Relationships between the high-level and DoD Components’ activities can occur at any level of decomposition.