Department of Defense

Information Enterprise Architecture (DoD IEA)

Version 2.0

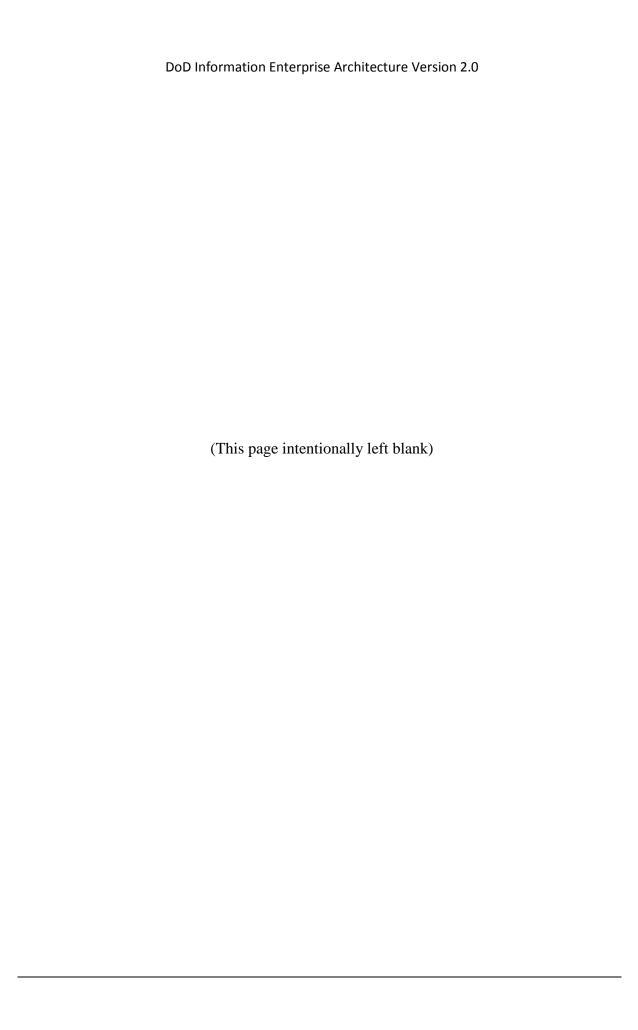## Volume I – Management Overview of the DoD IEA

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Office of the Chief Information Officer

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EXECUTIVE SUMMARY

In the face of numerous, varied, and complex Information sharing challenges facing the Department, the DoD CIO has set a vision to deliver an Information Enterprise (IE) that enables DoD and partners to securely access information and services they need at the time, place and on approved devices of their choosing. To achieve this vision the DoD CIO is leading a new unifying initiative called the Joint Information Environment (JIE) focused on five major focus areas which are driven by and aligned to Joint requirements. The DoD IEA v2.0 is the authoritative capstone architecture that describes priority areas, principles and rules, and activities that guide the evolution of the DoD IE to realize the JIE vision.

The five major focus areas of the JIE will be delivered incrementally with increasing optimization of information, network, hardware, applications and governance. The JIE is focused on delivery of IT infrastructure that compliments warfighting and mission capabilities. Four of the initial focus areas that deliver capabilities are Data Center Consolidation, Network Normalization, Identity and Access Management (IdAM), Enterprise Services, all within a single Security Architecture. Each of these focus areas will have a reference architecture that leverages the content from the DoD IEA v2.0.

The value of the DoD IEA is that it provides a clear, concise description of what the DoD IE must be and how its elements should work together to accomplish such a transformation and deliver effective and efficient information and service sharing. Information is viewed as a strategic asset throughout the Department and includes everything along the continuum from data to knowledge. The DoD IEA enables proper planning for shaping the DoD IT landscape, managing the acquisition of required resources, and effectively operating the resulting IT environment. The DoD IEA describes a future vision for the JIE based on merging mission operational needs with the concepts previously embedded in separate net-centric strategies. It is subdivided into a manageable set of required capabilities which are discrete actions the DoD IE must either perform or provide. Each of these capabilities is described in terms of activities, services, and rules necessary to ensure the capability is achieved. The DoD IEA outlines how capabilities are delivered by providing descriptions of services the DoD IE must have to operate at optimum effectiveness. These services represent a collection of required information across the spectrum of Doctrine, Organization, Training, Material, Leadership and education, Personnel, Facilities, and Policy (DOTMLPF-P).

The capability descriptions allow the development of a transition plan to evolve from the current DoD IE to the future vision of JIE. A common view and understanding of the DoD IE enables stakeholders to determine their path for IT transformation and develop and direct a unified approach to achieve that transformation across the Department by providing the basis for acquisition decisions, portfolio assembly and implementation, and planning, programming, and budget execution.

Major stakeholders of the DoD IEA are: architects, investment decision-makers, and program managers. Architects use the DoD IEA's content and structured view of what the DoD IE must be and how it must operate to develop Reference Architectures (RAs). These RAs provide the necessary level of technical direction and standards to direct development of standardized, interoperable or consistent solutions across the Department. They are incorporated into the DoD IEA as extensions of the requirements. Architects also use the content of the DOD IEA and approved RAs to develop Mission Area, Component, and solution architectures able to drive JIE-conformant solutions. Investment decision-makers use the descriptions of required DoD IE capabilities as a baseline to determine where existing and projected capabilities will not achieve the DoD IE vision. They then determine how to spend available funds to fill identified gaps. Program managers use the DoD IE capability descriptions to design programs and then measure their progress towards achieving desired capabilities as described in their Information Support Plans (ISP). They also use the rules associated with capability descriptions to guide and test program abilities.

The DoD IEA is the authoritative source for DoD CIO-designated architecture governance bodies to determine compliance with the IE vision in achieving mission effectiveness, cyber security, and efficiency goals. Strategic planners and policy writers must incorporate DoD IEA content during development of their documents. Compliance guidance is provided in various sections of the DoD IEA as described below.

For ease of use, DoD IEA v2.0 has been divided into the following:

- Volume I – a managerial and key decision-maker overview of the DoD IEA v2.0
- Volume II – an architect compendium on the DoD IEA v2.0 architectural description and, appendices on use of (Appendix D) and compliance with the DoD IEA v2.0 (Appendix E) and compliance with the DoD Enterprise Architecture (DOD EA) (Appendix G)
- DoD IEA Information Reference Resource (I2R2) Tool – search and understand the relationships of policy, guidance and other authoritative documents with DOD IEA v2.0 capabilities/services

In today's information environment the DoD IEA rules apply within the persistently-connected Internet Protocol (IP) boundaries of the Global Information Grid (GIG). Outside of these boundaries, the principles still should be considered, but the rules of the DoD IEA must yield to the state of technology, and the needs and imperatives of the Department's missions.

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Introduction for the DoD IEA v2.0

1 Overview of the DoD IEA v2.0

The DoD Information Enterprise Architecture (DoD IEA) is the authoritative capstone architecture that sets the operational context and vision of the Information Enterprise (IE). It addresses the concepts, strategies, goals and objectives related to the IE and provides a common, enterprise foundation to guide and inform IT planning, investment, acquisition and operational decisions in achieving the IE vision. It describes the IE capabilities that enable DoD operations by establishing the activities, rules and services involved in providing the IE capabilities. In order to oversee the DoD transition to the IE vision, the DoD IEA v2.0 has provided enhanced compliance criteria. The DoD IEA enables alignment of DoD architectures with the IE vision, drives enterprise solutions, promotes consistency throughout the DoD IE and complements the IT Enterprise Strategy and Roadmap (ITESR).

The DoD IEA v2.0 is a continuation of the effort within the DoD CIO to describe the evolving IE concepts and strategic positions. Previous versions of the DoD IEA were priority area based descriptions of the IE. The initial version (v1.0) identified five priority areas to focus near-term decision making and established a baseline framework of principles and rules to guide investments in these areas. Later updates (v1.1 and v1.2) described how to apply the principles, rules, and associated activities; criteria for DoD IEA compliance; and provided DoD Enterprise Architecture (EA) compliance requirements. The DoD IEA v2.0 describes the vision for the future IE and the initial set of capabilities it must provide to enable DoD Mission Area and Component operations. The DoD IEA v2.0 focuses primarily on warfighter operational requirements that include a smaller set of operational requirements that are common across all Mission Areas and Components. It was also developed using information from existing sources with differing purposes, scopes, and perspectives. The continued evolution of the DoD IEA will enhance the capabilities to address unique mission area and component requirements; refine and better focus the activities, rules, functions, and services used to achieve the IE capabilities; and increase the level of detail and analysis to further support IT investment decision making and solution development for the IE.

To accommodate operational needs, the DoD IEA v2.0 has evolved to a capability based description of the DoD IEA. It incorporates content from the Global Information Grid (GIG) 2.0 Operational Reference Architecture (ORA); clarifies the IE vision; introduces required IE capabilities described through activities, rules, services, and standards; and continues to institutionalize this content. The capabilities described in the DoD IEA v2.0 align closely with the Net-Centric Joint Capability Area (JCA). Incorporation of the GIG 2.0 ORA results in more comprehensive activity decompositions and an operational context that describes the operational concepts, characteristics, and requirements that drive the future IE. The GIG 2.0 ORA also addresses the day-to-day operations of the Department that are relevant to business and intelligence operations.

Enterprise-wide Reference Architectures (RAs) play a key role in extending the DoD IEA and providing more detailed information to guide and constrain solutions and implementations for a

specific focus area. These RAs, along with general DoD IEA information, provide the basis for compliance with the DoD IEA. A content navigation support tool, referred to as the IEA Information Reference Resource (I2R2) is also being developed to accompany the DoD IEA v2.0. The I2R2 consolidates and organizes compliance and guidance information by document type, capability type, and other categories to help understand compliance and analysis.

Future increments of the DoD IEA will continue to enhance and refine content, as necessary, to describe changing enterprise strategies and priorities; update relationships, application, and use; and clarify compliance criteria.

1.1 Purpose

The purpose of the DoD IEA v2.0 is to provide a strategic level architecture to stakeholders. The DoD IEA will be extended with detail by developing reference architectures. The content of the IEA and the RAs will be provided in formats supporting different stakeholder needs, done through a set of tools that will promote the use of the IEA and RA content for decision-making. These tools focus on the navigation, integration, and use of architectural data and analysis. They include architecture development tools such as System Architect; data navigation, integration, and use tools such as the I2R2 and Enterprise Elements. The DoD IEA impacts IT efficiencies by:

- Establishing the authoritative vision for the DoD IE
- Providing the technical enterprise direction necessary to implement the DoD IE vision
- Providing context and guidance to critical Department-wide efforts such as the IT Enterprise Strategy and Roadmap (ITESR) and the IT Effectiveness effort
- Providing prescriptive architectural content for DoD compliance processes and tools
- Providing direction to IT stakeholders in formats supporting their needs through a set of tools that promote IE content-based decision-making

1.2 Goals

The DoD IEA v2.0 provides a means to ensure that all applicable DoD programs, regardless of Component or portfolio, align with the DoD IE vision and enable agile, collaborative net-centric information sharing. The goals of the DoD IEA v2.0 are to:

- Provide the basis for an IE that better enables Warfighting, Business, and Defense Intelligence domain operations

- Provide a traceable line-of-sight from strategic guidance to solution architectures

- Provide direction for proper planning for transforming the DoD IT landscape

- Enable more informed acquisition of resources

- Effectively operate the resulting IT environment

In achieving these goals, it is necessary to describe and institutionalize the capabilities and services required to meet warfighting operational requirements. To do this, the DoD IEA must provide information and descriptions, useable in analysis, that answer stakeholder questions.

1.3 Scope

The DoD IEA v2.0 expands, enhances, and evolves the description of the future IE and supports DoD IT investment decisions based upon tiered accountability and federation considerations. The Department's approach to net-centric transformation in this environment is guided by the concepts of Tiered Accountability and Federation. Tiered Accountability aligns responsibility for decision making and execution across the Department. Federation ensures decision makers and implementers understand and align programs and capabilities horizontally and vertically across all these levels. A federated approach allows each element (in accordance with its Title authority) to leverage the decisions and services of other elements. Each element governs the areas, for which it is responsible, and should acknowledge and maintain consistency with guidance from higher level reference architectures. To improve understanding, Department architectures depict department-wide rules and constraints while Component architectures depict mission-specific services and capabilities and Solution architectures depict solutions that conform to higher rules and constraints. The following areas are described in the DoD IEA v2.0:

- Operational context for the IE
- A traceable line-of-sight from strategic guidance to solution architectures.
- IE vision and the capabilities needed to achieve the vision
- Activities, rules, services, and standards for providing the IE capabilities
- Refined compliance criteria for the DoD IEA

These descriptions are provided through a robust set of architecture views including All Views (AV), Capability Views (CV), Operational Views (OV), Service Views (SvcV), and Standards Views (StdV). The DoD IEA informs and constrains enterprise-wide decisions that influence the requirements for systems and solutions with a focus on the following three primary sets of customers:

    a. Architects: Includes architects across capability portfolios, Federal Agencies and DoD Components. They use the DoD IEA in the development of architectures to align touch points and boundaries, as well as to identify interoperability gaps and the requirements for federation. DoD architectures, including the DoD IEA, are collectively known as the federated DoD Enterprise Architecture (DoD EA). This means that DoD Architectures are autonomous, but they apply common services, processes, and standards to ensure interoperability. The components of the DoD EA include strategic guidance such as policy; the DoD Architecture Framework (DoDAF); the OMB FEA reference models; tools such as repositories and registries; and the set of federated Command/Service/Agency (C/S/A) enterprise, reference, and solution architectures.

b. Investment Decision Makers: Includes Investment Review Boards (IRBs), Capability Portfolio Managers (CPMs), CIOs, and others managing IT investments. In addition to providing investment criteria, architecture information can help identify key business processes to enable with a solution, and help determine whether to deliver capability via enterprise-wide services or with Component-specific services. This will enable investment decision makers to comply with the tenets of DoDD 8000.01, such as:

- Measure IT investments against the desired IE end state vision
- Analyze, select, control, and evaluate IT investments based on DoD IEA v2.0 requirements
- Assess and manage IT investment risks via DoD IEA v2.0 analysis
- Review IT investments for conformance with DoD IEA v2.0, its associated reference architectures, and the IT standards and related policy requirements included in them.
- Use DoD IEA capabilities and services and their associated principles, rules and standards to ensure interoperability and information assurance requirements will be met through investment portfolio strategies and decisions

c. Program Managers: Includes DoD and Component Program Executive Officers (PEOs), Program Managers (PMs), and their functional requirements managers. The DoD IEA v2.0 translates and clarifies warfighting operational requirements and strategic guidance into a coherent, easy to understand, and actionable set of capability descriptions to serve as the basis for acquisition and budget planning, implementation development, and program development and execution. PMs use the description of the IE vision and the resulting capabilities, services, activities and pertinent principles and rules to ensure compliance with the DoD IEA v2.0. They use the line of sight provided by both the architecture views and the documents in the I2R2 to make decisions for fielding capabilities and developing reference architectures that provide greater detail. These stakeholders ensure compliance by assessing their programs to determine whether:

- IT solutions are based on IE capabilities and services and adhere to the principles, rules, policies and standards associated with those capabilities and services
- IT solutions solve a specific part of an overall mission problem and deliver a measurable benefit and use the IE capabilities and services and their associated principles, rules, policies and standards in determining benefits.
- Pilots and prototypes for large, high-risk IT solutions use the DoD IEA v2.0 requirements to ensure desired objectives and prototypes are achieved in accordance with the IE end state vision

The parts of the DoD IEA v2.0 that are most applicable to program managers and acquisition planners are Sections 3 through 7 and Appendices B, D, and E of Volume II and the I2R2 web based tool.

Enterprise-wide RAs are a key component of the DoD IEA because they provide more detailed content on capabilities, as well as rules, patterns, and technical positions for specific IE focus areas. DoD IEA v2.0 also provides an information navigation support tool referred to as the I2R2. The vision, principles, and rules in the DoD IEA support the DoD's war fighting, business, and intelligence missions. Evolution of the capabilities based on this architecture must recognize and navigate obstacles at the tactical edge, such as constraints in bandwidth, information latency, and emissions control. Certain rules are not fully achievable in an Emission Control environment as network Public Key Infrastructure (PKI) authentication requires two-way communication. Similarly, in many Battlespace systems milliseconds matter; however, many state-of-the-art Internet Protocol (IP) and SOA-based technologies operate in seconds, not milliseconds. Architectures don't trump the laws of physics, the state of technology, or operational needs of commanders in the field.

 In today's information environment the DoD IEA rules clearly apply within persistently-connected IP boundaries of the GIG. Outside these boundaries, the principles still should be considered, but the rules of the DoD IEA must yield to the state of technology, and the needs and imperatives of the Department's missions.

The DoD IEA provides context to help everyone from policy makers to system developers understand implications of principles and business rules. Applied pragmatically, the DoD IEA will drive common solutions and promote consistency and integration across DoD's key programs, applications, and services.

Figure Intro1.3-1, DoD IEA Concept Map, illustrates the scope of the DoD IEA. Using the DoD IEA as a central organizing document for aligning the parts of the IE is critical. The definitions provided below Figure 1.3-1 allow navigation through the concepts in the DoD IEA Concept Map to increase the understanding of each component in relation to other components.
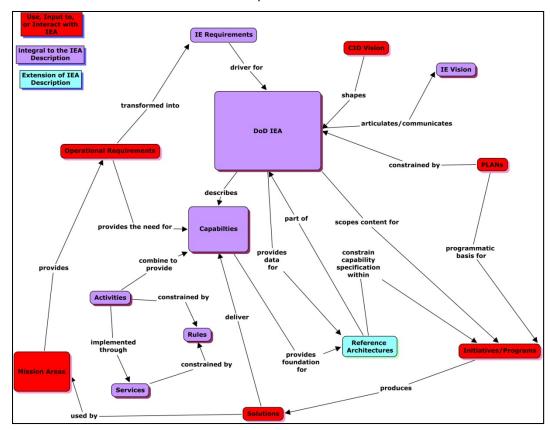
Figure Intro1.3-1 - DoD IEA Concept Map

- The *Mission Areas* (Warfighting, Business, Intelligence, and Enterprise Information Environment) provide warfighting *Operational Requirements*. The fulfillment of successful operations is measured against those requirements.

- The warfighting *Operational Requirements* are transformed into **IE Requirements** that the Enterprise Information Environment *Mission Area* must provide in order to facilitate meeting warfighting *Operational Requirements.* The warfighting *Operational Requirements* are also the justification for the need for *Capabilities* from the IE.

- The consolidated set of *IE Requirements* becomes the driver for defining the IE and is the foundation of the *DoD IEA.*

- In addition, the vision for the future IE (the *CIO Vision*) shapes the content of the IE and the resultant documentation of that vision in the *DoD IEA*. The result is that the *DoD IEA* captures that vision and the evolution of the IE is managed through the *DoD IEA.*

- There are several ways of organizing the *IE Requirements*. Based on the desire to aggregate *IE Requirements* by separation of concerns and acquisition utility (i.e., alignment with the JCIDS Capabilities-Based Assessment [CBA] approach to acquisition), the organizing principle was to use *Capabilities* to define packages of *IE Requirements.* See Note[1] for further discussion on the meaning of *Capabilities* in the context of the IE.

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[1] The current formal definition of a "capability" is: the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks [Chairman of

- *Capabilities* are described through *Activities* that are performed. The alignment of independent operational *Activities* to IE *Capabilities* provides users of the DoD IEA with an understanding of the *Activities* that need to be performed to enable that capability and the fact that some *Activities* are needed by multiple *Capabilities*.
- The *Activities* are the basis for defining the scope of what *Services* need be implemented to meet the *IE Requirements*. As noted previously, *Activities* are developed independently of *Capabilities* to optimize their use and reuse by one or more *Capabilities*.
- The alignment of *Services* to each IE capability provides users of the DoD IEA with a better understanding of the resources and associated processes needed to achieve each capability. This alignment is accomplished through associating *Services* with *Activities* that are required of, and implemented through, those *Services*.
- The alignment of principles and *Rules* to IE *Capabilities* provides users of the *DoD IEA* with a better understanding of constraints that have been imposed on achieving each capability. The alignment is accomplished through associating *Rules* with *Activities* and, subsequently, to *Services*.
- An important activity for the CIO is to specify, based on common enterprise-wide services and improved interoperability, Enterprise-wide *Reference Architectures*. CIO prescription or DoD Component *Solution* Provider needs for greater detail or guidance is the basis for the development of needed Enterprise-wide *Reference Architectures* that provide greater architectural detail for specific areas of the DoD IEA. Many times, *Reference Architectures* are organized around a capability or combination of *Capabilities* that are needed in the IE. Once the *Reference Architecture* is developed and approved it is considered a part of the *DoD IEA* and provides more detailed architectural content for application and compliance in relevant architectures.
- Under the direction of the DoD CIO, Strategic *Plans* for implementation of *Capabilities* are developed for evolution of the IE.
- Strategic *Plans* are the basis for *Initiatives/Programs*. In order to influence or prescribe how the *IE Requirements* are implemented in *Solutions* (i.e., constrain the capability specification)*, Reference Architectures* may be directed as part of an *Initiative/Program.*
- The *Initiative/Program,* authorized by approved *Plans,* provides the programmatic direction for the development/production of *Solutions.*
- The *Solutions* are developed to meet mission needs in accordance with the IE guidance where applicable.

2 DoD IEA Document Organization

The DoD IEA is organized into two separate volumes. Volume I is a management overview of the DoD IEA that focuses on general content, the value of the content, and intended uses for the content. Volume I is useful for all readers, but specifically targets those readers that should use the DoD IEA in the execution of their duties. Volume II is a description of the DOD IEA

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the Joint Chiefs of Staff Instruction/Manual (CJCSI/M) 3010 series]. In the context of the IEA, we define *IE Capability* **as the ability to achieve an objective (goal) in support of a military operation (mission) using the Information Enterprise (IE)**. As such, the "objective" is represented as a description of a set of aggregated requirements around a stakeholder concern.

providing more detailed information about the architecture views and results of architecture analysis. Its target audience is architects and other readers that require greater detail about the DOD IEA to perform their duties. Volume II also contains a set of appendices providing additional information that is relevant to all users, including information for applying and complying with the DoD IEA.

Volume I – Management Overview of the DoD IEA

1 Introduction

Volume I ensures readers gain an understanding of the DoD IEA and the various ways it can be used. The information in Volume I is useful to all readers, but specifically targets those readers that are involved in processes that can use the DoD IEA in the execution of their duties.

2 Volume I Organization

Volume I is organized to present the DoD IEA content in a logical progression to describe key uses of the content. It includes sections that provide:

- Summary of the Content in the DoD IEA v2.0
- Intended Uses of the DoD IEA
- Tools for Using the DoD IEA

3 Summary of Content in the DoD IEA v2.0

The key content in the DoD IEA v2.0 describes the future Information Enterprise (IE). This description includes a vision for the IE; required capabilities and the activities, rules, and services needed to provide them; and information for applying and complying with the DoD IEA. Through these artifacts, it describes the basic components of the IE and how those components are expected to operate and provides quantitative answers to questions about:

- The most cost effective set of resources to acquire for implementing information sharing.
- The abilities of existing systems and services to meet IE requirements in determining how well current capabilities meet requirements
- How to definitively measure the performance of investment strategies, as well as determine the quantitative risk associated with such strategies
- How to assess proposed initiatives and programs to determine how well they can be expected to address gaps in meeting current requirements without the cost of developing and deploying projected solutions. Such analysis provides a more cost effective way to decide which investments should be made and which programs and initiatives should be pursued to achieve an IE that is able to meet operator and CIO requirements

3.1 Vision of the Future IE

The DoD CIO is tasked with improving the combat power of the Department through information sharing—as well as its security and efficiency—by ensuring that the Department treats information as a strategic asset and that innovative information capabilities are available throughout all areas of DoD supporting warfighting, business, and intelligence missions. The DoD CIO Vision and Mission are:

- **Vision** - Deliver agile and secure information capabilities to enhance combat power and decision making.

- **Mission -** Information is one of our Nation's greatest sources of power. Our first and greatest goal is to deliver that power to enable the achievement of mission success in all operations of the Department − warfighting, business, and intelligence.[2]

The DoD IE, as shown in **Figure 3.1-1**, is the DoD information resources, assets, and processes[3] required to achieve the vision and perform the mission of the DoD CIO. A robust and seamless IE provides decision makers and action officers with the information they need to make decisions and complete actions. The DoD IE enables net-centric warfighting, business, and intelligence operations as a unified DoD information enterprise. It provides a rich information sharing environment in which data and services are visible, accessible, understandable, and trusted across the enterprise. It also enables an available and protected network infrastructure that enables responsive, information-centric operations, using dynamic and interoperable communications and computing capabilities.
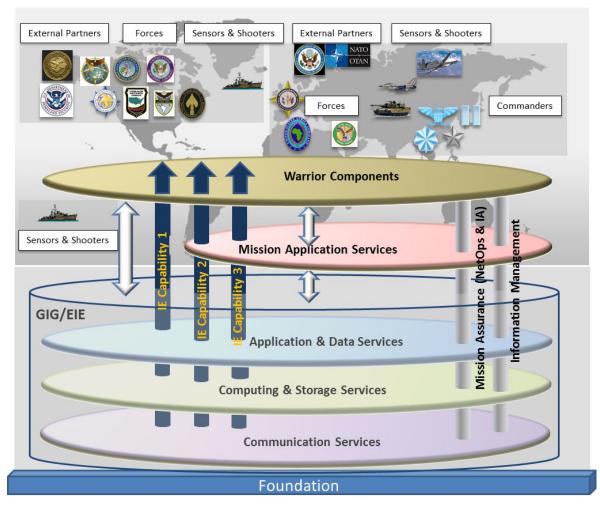

Figure 3.1-1 - Illustration of the DoD IEA

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[2] Department of Defense (DoD) Chief Information Officer (CIO) Campaign Plan, baseline, Version 0, October 5, 2011, Pg. 5.
[3] DoDD 8000.01, Management of the DoD Information Enterprise, February 10, 2009, Pg. 10.

The operational requirements described as operational goals and associated outcomes in Volume II, play an important role in shaping the vision for the IE. The IE must enable and support these operational requirements while also meeting DoD CIO management and oversight requirements. The IE will enable, support, and meet these requirements by:

- Providing end user capabilities to connect to IE networks and access and share assured information and information assets in support of achieving operational goals and outcomes
- Using enabling capabilities within the IE to properly operate, defend, and govern the IE in its provisioning of end user capabilities.

Together, the end user capabilities and enabling capabilities comprise the IE capabilities. **Figure 3.1-2** depicts the vision for the IE with respect to operational requirements, end user capabilities, and enabling capabilities.
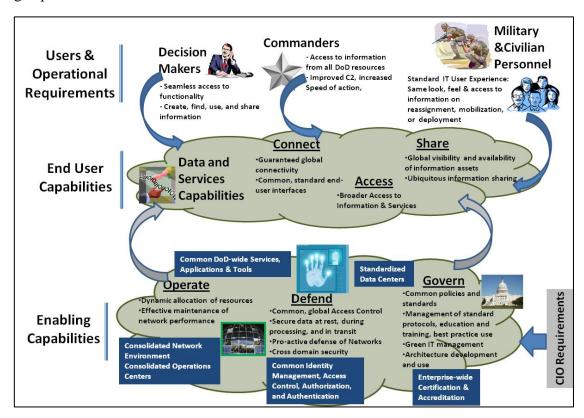

Figure 3.1-2 – IE Capability Vision

The operational requirements are the basis for determining the end user capabilities provided by the IE. These operational requirements are represented by four goals:

- Provide a unified IE optimized for the joint warfighter and supporting business and defense intelligence elements to facilitate force integration
- Deliver the information advantage necessary to facilitate freedom of action
- Enable secure access to required information anytime and anywhere, expediting decision cycles
- Ensure agility and versatility of the IE to enable operational reach and synergy of the force

Based on these goals, the IE needs to provide a set of capabilities that enable end users to connect to, access, and share information and information assets in performing DoD missions and operations.

More detailed information about the vision for the IE can be found in Section 4 of Volume II.

3.2 IE Capabilities

The DoD IEA v2.0 sub-divides the IE into a set of discrete IE capabilities, defining what the IE must do or provide to the operator in order to effectively enable warfighter, business, defense intelligence, and EIE operations. The DoD IEA describes the IE as a discrete set of IE capabilities to facilitate understanding, developing, managing, and operating the IE. Based on the vision, these capabilities are organized under the following capability areas:

End User Capabilities
- **Connect** is the set of computing and communications infrastructure capabilities enabling any user or service to reach any other user or identify and use any other service.
- **Access** is the set of capabilities enabling the granting or denying of available information assets to both human and machine users.
- **Share** is the set of capabilities enabling information and information assets to be used within and across mission areas.

Enabling Capabilities
- **Operate** is the set of capabilities providing real-time situational awareness, protection, and operational management of the IE.
- **Defend** is the set of capabilities ensuring data and services are secured and trusted across DoD.
- **Govern** is the set of capabilities involved in overseeing the development of and managing the IE.
  - **Processes and Models** is the set of capabilities providing procedures and tools to be used for analysis enabling effective overall management of IE development, deployment, and use.
  - **Standards and Policies** is the set of capabilities providing patterns and strategic direction to be followed to ensure interoperability across DoD.
  - **Monitoring and Compliance** is the set of capabilities enabling effective oversight of development, deployment, and use of the IE.

Describing the DoD IEA as distinct capabilities provides advantages to planners, investment managers, and program executives/managers. An "as is" view of the existing IE can be compared to the overall picture of the target IE represented by the DoD IEA to determine where gaps exist in providing required capabilities. These gaps can be examined in relationship to the full set of required capabilities to prioritize the gaps for use in determining where to focus scarce resources. Capability gaps can be examined in terms of which activities are not being performed, which services are missing or inadequate, and/or which rules are not being followed, with appropriate, focused DOTMLPF-P approaches identified to address specific deficiencies.

The total set of IE capabilities is meant to represent everything that must be done or provided in the IE to meet operator needs. Complete IE capability descriptions should also include a set of measures for use in determining when the capability has been achieved; such measures are not currently included in this version of the DoD IEA, but are planned for a future release.

 More detailed descriptions of the IE capabilities can be found in Section 5 of Volume II.

3.3 Operational Activities, Services, and Rules

IE capabilities are described in the DoD IEA in terms of the activities that need to be performed to enable the capability, the services that would ideally be implemented to perform those activities, and the rules that govern how the services should operate and how the activities should be performed to achieve the desired results.

3.3.1 Operational Activities in the DoD IEA v2.0

The DoD IEA v2.0 activities and their definitions are based on separate, but related, activity hierarchies taken from the GIG 2.0 ORA v1.5 and DoD IEA v1.2. Activities contained in these two existing documents were aligned, normalized, and then combined to form the DoD IEA v2.0 activity hierarchy. A mapping of GIG 2.0 ORA and DoD IEA v1.2 activities with DoD IEA v2.0 activities to assist users in transitioning to the DoD IEA v2.0 can be found in Appendix F of Volume II. The activities are decomposed using the following main activities:

- **Manage and Oversee the IE** – This activity governs the development and implementation of the IE. It establishes and uses those structures and processes required to provide effective, high-level management and oversight of the components of the IE and its operations. The activity develops and enforces the required vision, strategy, and guidance to direct the IE so it meets requirements and applicable law, regulation, and policy (LRP), while at the same time delivering the capabilities necessary to fully enable net-centric warfighting, business, and defense intelligence operations for successful mission accomplishment.
- **Protect and Secure the IE** – This activity develops and implements processes and mechanisms required to guard critical data, capabilities, the IT infrastructure, and data exchanges within the IE, while providing authentication and non-repudiation of information and transactions to enable assurance and trust. It provides the ability to control user access to data and services, determine vulnerabilities, and prevent the exploitation of these vulnerabilities by both external and internal threats. The activity enables the monitoring of IE operations, recognition and assessment of security-related incidents, and selection and execution of appropriate responses.
- **Provide IE Infrastructure** – This activity supplies the enterprise-level communications and computing capabilities required to enable net-centric operations and the Enterprise-wide services required by all users. It provides basic IT elements/components which are foundational to the DoD IE and which enable it to fully support assured information sharing across the Enterprise and with mission partners.
- **Control and Operate the IE** – This activity implements capabilities required to provide integrated NetOps in order to enable information access by any user across network and security domains. It includes processes and mechanisms for Enterprise Management, Content Management (which includes Records Management), and Network Defense. The activity

enables NetOps to monitor the status and health and direct the actions of DoD IE resources in support of successful accomplishment of joint warfighting, business, and defense intelligence missions.

- **Use the IE** – This activity enables an authorized user to access the IE and use its functionality to easily discover information, services, and applications, regardless of location, and to assess and critique information, services, and applications based on specific needs in order to improve IE capabilities and service. In support of operations, the activity also enables the user to collaborate and share information (which includes data and knowledge) with others.

Activities that need to be performed in the delivery of a capability have been mapped to that capability. Several activities may map to more than one capability. More detailed information about the activity decomposition can be found in Section 3 of Volume II.

3.3.2 Services in the DoD IEA v2.0

The services described in the DoD IEA v2.0 were identified by analyzing and rationalizing a wide spectrum of DoD service models, such as Defense ITIL, GIG Enterprise Services, Enterprise-wide Access to Network and Collaboration Services (EANCS), Marine Corps Enterprise Services, and the DISA Enterprise Service Platform. The DoD IEA describes the context of services in the IE and the functional organization of services with a Services Context Description (SvcV-1) and a Services Functionality Description (SvcV-4). These services represent how DoD will deliver IE capabilities to operate most effectively. More detailed information about services can be found in Section 7 of Volume II.

3.3.3 Rules in the DoD IEA v2.0

The rules described in the DoD IEA v2.0 include the legacy principles/rules from previous versions of the DoD IEA and operational rules derived from analysis of the GIG 2.0 ORA core characteristics. These rules govern how the services are to operate and the activities are to be performed to deliver the IE capabilities. They are associated with the IE capabilities based on the mapping of the services and activities they govern to the capabilities. The list of rules can be found in Appendix B of Volume II.

3.3.4 Application of and Compliance with the DoD IEA v2.0

Architectures are expected to comply with the DoD IEA. Appendix D-Applying the DoD IEA and Appendix E-Compliance with the DoD IEA are provided to assist with compliance. A compliance use case is also provided in the Uses of the DoD IEA section in Appendix I of Volume II. Certain organizations, such as the US Special Operations Command, with unique legal, operational, and organizational considerations may not be impacted by the DoD IEA.

4 Stakeholders Use of the DoD IEA

This section discusses a sampling of intended uses of the DoD IEA; some sample use cases to illustrate key uses of the DoD IEA can be found in Appendix I in Volume II. The value of the DoD IEA is the information it provides in support of activities carried out to enable the functions of various stakeholders. These stakeholders can be categorized as follows:

- Architects – Chief Enterprise Architects down to Solution Architects developing architectures that need to be compliant with the DoD IEA
- Investment Decision Makers – to include Portfolio Managers (PfMs) and Investment Review Boards (IRBs)
- Program Managers – to include DoD and Component Program Executive Officers (PEOs), Program Managers (PMs), and corresponding functional requirements managers

The broad applicability of the information contained in the DoD IEA, reveals it as a central and critical organizational document for aligning the IE. The following subsection paragraphs provide summary-level information on the utility of the DoD IEA and intended use by a sampling of these stakeholders. Use Cases depicting uses of the DoD IEA in the context of the processes used by these stakeholders are in Appendix I of Volume II. Volume II, Appendix D, has more details on how to use the DoD IEA in conjunction with these three categories of stakeholders.

It should be noted that reference to use of capabilities by stakeholders, further described below, may cover any or all of the attributes or associated properties of the capabilities as part of the analysis that would be applied by a stakeholder. That is, capabilities are described through a description of the applicable Activities, Principles, and Rules and derived Service descriptions. Depending on the nature of the stakeholder's need, one or more of these attributes associated with capabilities may be evaluated or used in conjunction with further analysis associated with the DoD IEA content.

4.1   DoD IEA Support to Architecture Development

All architectures in the DoD that interact with or use the IE are required to align with the DoD IEA. This alignment varies with the type of architecture being developed (i.e., EA, RAs, and Solution Architectures). All architectures will base their description of interaction/use of the IE on the DoD IEA vision and pertinent capabilities. Where applicable, capability descriptions (to include the description of pertinent activities, rules, and services) will be reused in the architecture under development. Approved RAs incorporated into the DoD IEA may provide additional architectural detail for reuse in the form of patterns, technical positions, and rules to be included in solution architectures. Rules should be used to constrain actions and processes in all architectures, but are especially applicable in solution architectures. Application of the DoD IEA to Mission Area EA, Component Area EA, and RA are further explained in the Use Cases in Appendix I, Volume II. The details on which elements of the DoD IEA apply to each type of architecture can be found in Appendix D, Volume II.

4.2   DoD IEA Support to IT Investment and Planning Management

Support in this area includes, but is not limited to, supporting CIO stakeholders involved in the following tasks:

- DoD IEA support to Investment Planning
- DoD IEA support to DoD CIO Campaign Plan Development
- DoD IEA support to DoD CIO Initiative/Program Planning and Oversight
- DoD IEA support to DoD CIO Policy Formation (Policy Informs the DoD IEA; the DoD IEA Can Inform Policy)

4.2.1   DoD IEA Support to Investment Planning

The DoD IEA should be used to assist in determining which IT investments the Department should make to evolve the IE. The IE capabilities (CV-2 in Volume II) from the DoD IEA represent what is required to achieve the desired end-state of the IE.   By comparing existing and required IE capabilities, gaps can be identified as investment targets. Investment managers can now prioritize these gaps and plan for investment options. Capabilities are realized through the definition of Services (i.e., DOTMPLF delivery) as described in CV-7 in Volume II. Service descriptions in the DoD IEA should be considered by the investment manager when determining investment options.

The requirements for the DoD IEA capabilities (and by derivation the Services to be implemented) provide the input to cost/benefit analysis (where the benefits are essentially derived from the description of the Service requirements). The cost of the upgrades will be evaluated and matched against planned budgets. Cost/benefit analysis will further refine the candidate list of information technology investments that will reduce the list to be selected for acquisition within budget constraints.

4.2.2   DoD IEA Support to IE Strategic Planning

The DoD IEA contains the scope of work that needs to be planned and executed by the DoD CIO. The IE vision and description of capabilities define the future IE and how the IE evolves, and determine the nature of work required to realize the IE. As such, the IE vision (CV-1 in Volume II) and IE capabilities (CV-2 in Volume II) become the basis for IE strategic planning that enables realization of the vision. Ultimately, the DoD CIO needs to determine what actions need to be taken to deliver the prioritized capabilities from the DoD IEA. These actions are organized into a set of goals and objectives and tasks to be performed.   The strategic plan organizes the goals, objectives, and tasks for execution.

4.2.3   DoD IEA Support to IE Initiative/Program Planning and Oversight

Use of the DoD IEA provides consistent, coherent, and configuration managed information for use by DoD CIO management from a top-down perspective. The intent is to initiate and oversee the development of initiatives, projects, and programs to assist in achieving identified IE capabilities. Initiative/program planning and implementation is aligned under a single approach, which makes the DoD IEA central to strategic planning. Evaluation of Capabilities (and eventually Services) for inclusion as part of the initiatives can be evaluated in the context of the DoD IEA. The first level of review is against compliance with a base lined DoD IEA.   Any new Capabilities discovered through initiatives must be analyzed for redundancy, overlap, or inclusion in the DoD IEA baseline. This requires careful tradeoffs of effectiveness and efficiency within tight budget constraints. The incremental roll-out of the delivered capabilities implied in the initiatives must be planned and coordinated through governing the DoD IEA baseline.

Initiatives/Programs are managed according to different organizing principles. The DoD Acquisition community most commonly acquires systems and services by aggregations of requirements managed as Capabilities. The DoD IE can be infused in the Capabilities-Based Acquisition (CBA) approach used by the acquisition community. IE Capabilities provide an authoritative basis for evaluating how to aggregate portfolios managed for the benefit of the enterprise. The Portfolios can be arranged around themes (e.g., Initiatives and/or Programs). By the same token, one or more Capabilities can

be assigned to one or more Programs or Initiatives.   The relationship of Capabilities to mission priorities and to IE priorities set by the DoD CIO must be carefully balanced in order to meet stakeholder needs and evolve the IE. The DOD IEA can provide authoritative information about capabilities to those tasked with overseeing Initiatives and/or Programs by helping them make tradeoff decisions in support of final IE acquisition decisions.

4.2.4   DoD IEA Support to IE Policy Formation

The DoD IEA is based on existing DoD CIO policy, but can also be used to help develop new policy and guidance. Enterprise-wide RAs provide detailed rules, patterns, and technical positions in specific areas that may be prescriptive in nature. This information should be analyzed to determine its applicability while updating policy. Newly developed operational rules (Appendix B in Volume II) in the DoD IEA should be used in the same way. With this in mind, policy developers should review the DoD IEA to extract content for placement into policy to help drive the enterprise in a more prescriptive fashion and accelerate progress toward achieving the vision for the IE.

4.3   DoD IEA Support to IT Program Management

Programs must ensure that their solutions can effectively interact with, use, and contribute to the IE. The DoD IEA contains the operational and technical baseline for governing the IE through focused selection of requirements extracted from the DoD IEA. Governance and testing will evaluate this ability during the development of a solution. Sources for this evaluation are Appendices D, E, and G in Volume II of the DoD IEA. Appendix D describes how to apply the content in the DoD IEA based on role. Appendix E describes the criteria for complying with the DoD IEA and provides a compliance checklist to assist in understanding compliance. Appendix G describes DoD EA compliance requirements.

5. Tools for Using the DoD IEA

Since DoD IEA v2.0 has been developed as a data-based architecture, it addresses one of the longstanding challenges to the use and reuse of architectural information and supports the search for an analysis of its content to help answer questions posed by stakeholders. It should also be recognized that other documentation and information (e.g., policies, directives, etc.) outside the DoD IEA v2.0 content will also be influential in answering the questions of decision makers in carrying out their responsibilities (e.g., match needs to budget targets, trade capabilities against meeting capability gaps, prioritizing incremental development over time, etc.). As the DoD IEA is institutionalized within the Department's processes, tools will naturally evolve to leverage the information in the DoD IEA in this way and support the comparison of other architectures against the DoD IEA.

In fact, several tools are under development, and/or planned to assist decision makers and their staffs in leveraging the DoD IEA and related information for both seeking architecture guidance and documenting compliance. These tools will use the guidance presented in Appendices D, E, and G of Volume II. In addition, the I2R2 currently under development will assist in pointing to authoritative

sources for architecture or architecture-related information to be used by an architect to extract relevant information for assisting the decision maker.