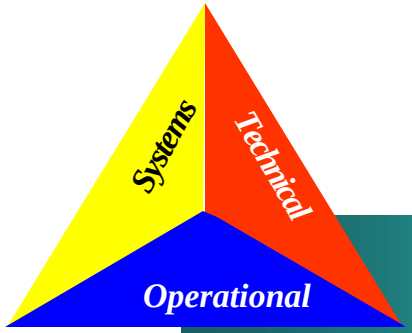
ASD (NII) DoD CIO



DoD Architecture Framework Overview

Dr. Fatma Dandashi

October, 2003

Outline

- Policy and Guidance on Architecture
- History of the Framework
- Framework Definitions and Purpose
- Framework Documents Overview
- Future Evolution of Framework

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Policy and Guidance on Architecture

Federal Policy and Guidance on Architecture – Mandate for Architectures

Information Technology Management Reform Act (ITMRA)/Clinger-Cohen Act. (1996)

Mandates that Chief Information Officers of Executive Agencies are responsible for "developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture for the executive agency ".

OMB Circular A-130

Defines an Enterprise Architecture as "the explicit description and documentation of the current and desired relationships among business and management processes and information technology", describes the required content of an EA, and directs the agencies to create an Enterprise Architecture with required content.

Federal Enterprise Architecture Reference Models

The FEA is being constructed through a collection of interrelated references models that facilitate OMB's cross-agency analysis and identification of duplicative investments, gaps, and opportunities for collaboration.

DoD Policy on Using Architectures

- DoDD 4630.5, Interoperability and Supportability of Information Technology (IT) and National Security Systems, Draft 2003
- DoDI 4630.8, Procedures for Interoperability and Supportability of Information Technology (IT) and National Security Systems, Draft 2003
- DoDD 8000.1, Management of DoD Information Resources and Information Technology, February 27, 2002
- DoDD 8100.01, Global Information Grid Overarching Policy, September 19, 2002
- DoDD 5000.1 The Defense Acquisition System, May 2003
- DoDI 5000.2, Operation of the Defense Acquisition System, May 2003
- CJCSI 3170.01C, Joint Capabilities Integration and Development System, 2003
- CJCSI 6212.01C Interoperability And Supportability Of National Security Systems, And Information Technology Systems, Draft 2003

Recent DoD policy highlights use of architectures for:

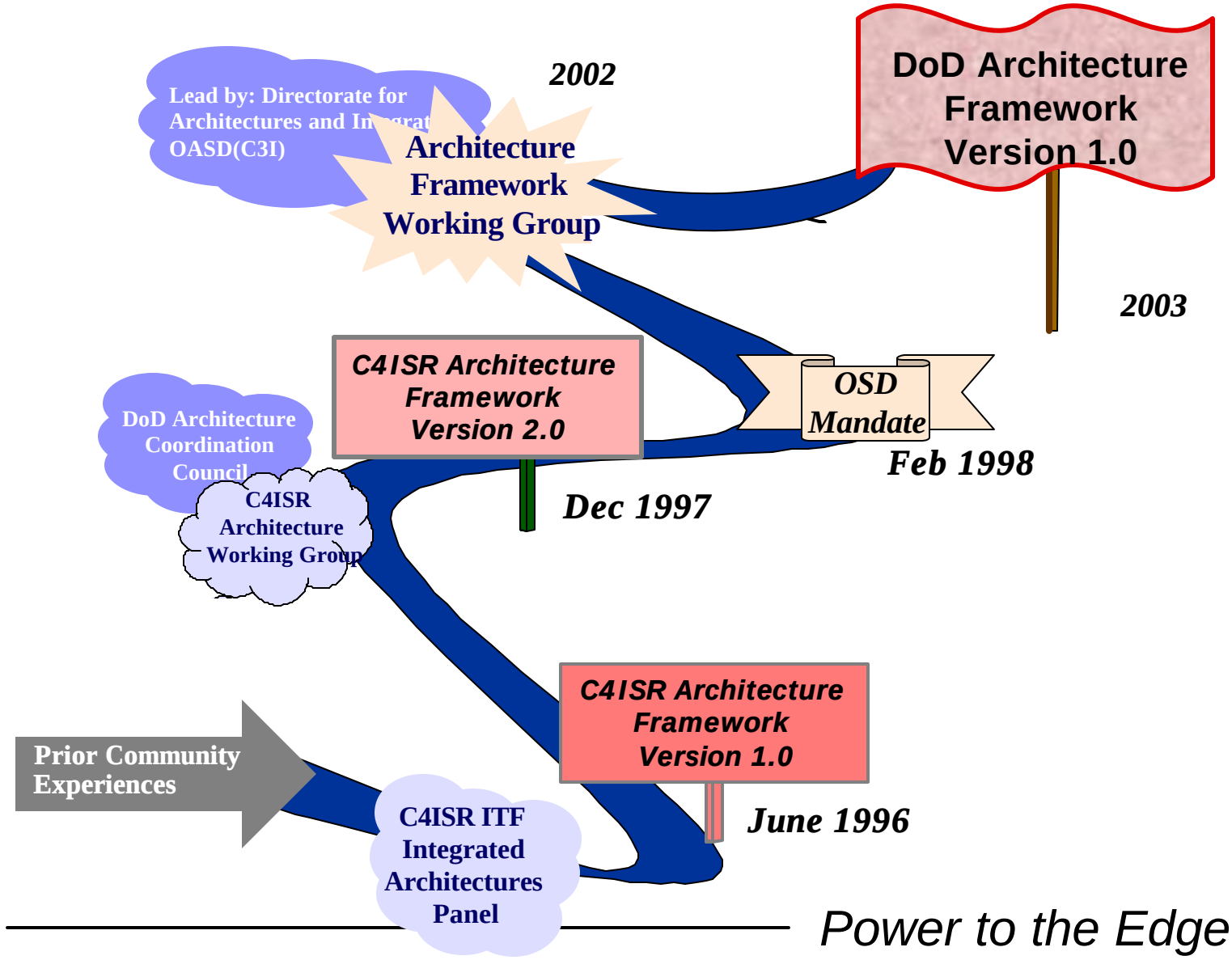
Understanding the DoD as an enterprise

Identification of operational requirements

Rationalization of IT investment decisions

Improvements to interoperability among various systems

History of the Framework



Framework Definitions and Purpose

Architecture Definition

- **Architecture**

  "The structure of components, their relationships, and the principles and guidelines governing their design and evolution over time."
  DoD Integrated Architecture Panel, 1995, based on IEEE STD 610.12

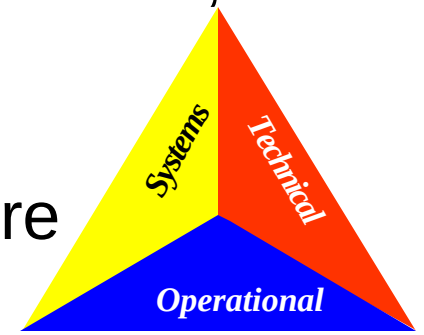
  "An architecture is the fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution."
  IEEE STD 1471-2000

Architecture = **Structure of Components** + **Relationships** + **Principles & Guidelines**

DODAF Purpose

- An **architecture framework** is a **tool…** It should describe a method for designing an information system in terms of a **set of building blocks**, and for showing **how the building blocks fit together**. It should contain a set of tools and **provide a common vocabulary**. It should also include a list of **recommended standards and compliant products** that can be used to implement the building blocks. [TOGAF 8, OpenGroup]

- The Department of Defense (DoD) Architecture Framework (DODAF)
  - Defines a common approach for describing, presenting, and integrating DoD architectures



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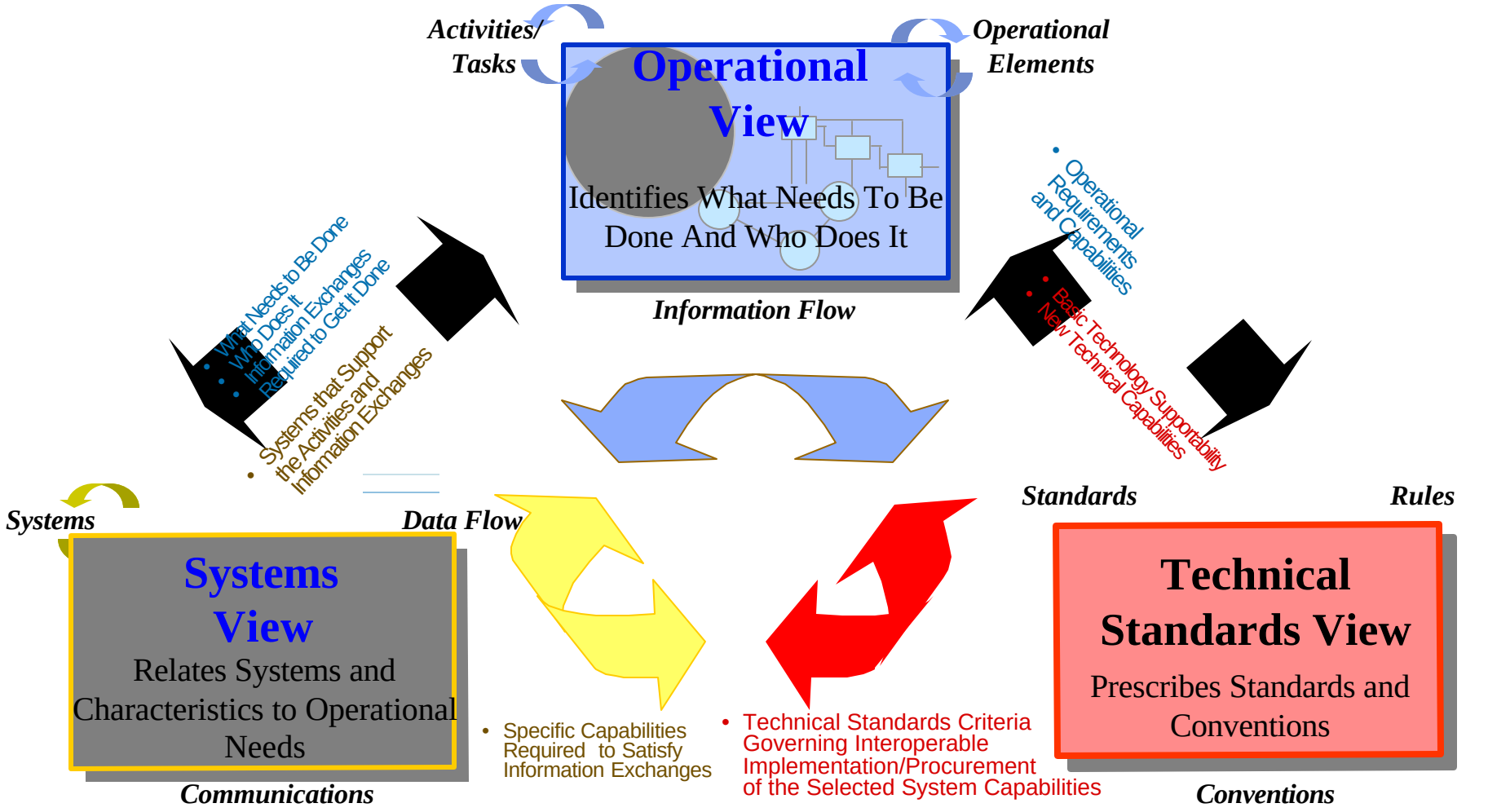
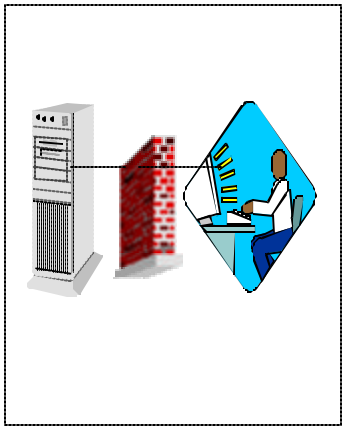
DODAF Basic Principles - An Integrated Architecture with Three Views

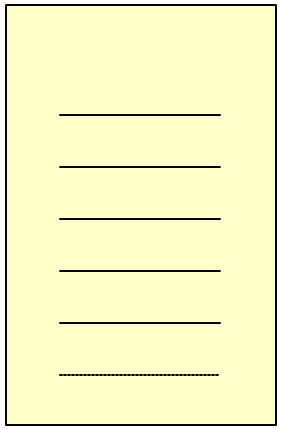


DODAF Products - Graphic, Textual, and Tabular

Graphic



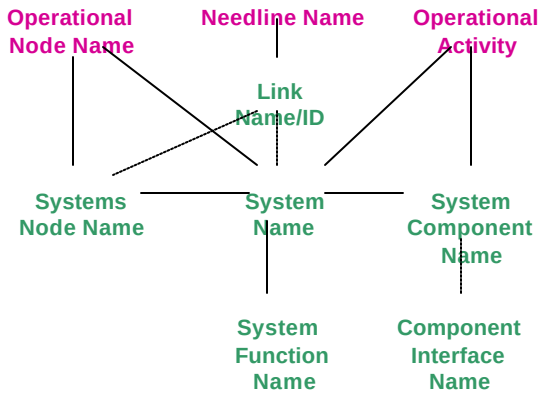
Text



Tabular

	Organizations	Locations	Functions	Applications	Entities	Database/file	Tech Platform
Organizations							
Locations	X						
Functions	X						
Applications	X	X	X				
Entities		X		X			
Database/file					X		
Technology Platforms	X		X	X			

Dictionary Relationships



Use products to:

Capture

Communicate

Analyze

Power to the Edge

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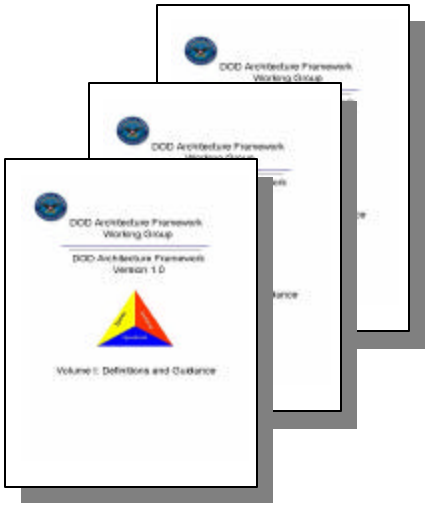
Framework Documents Overview

DoD Architecture Framework

- Volume I: Definitions, Guidelines , and Background
  - Covers value of architectures, measures, use in DoD processes
- Volume II: Product Descriptions
  - Covers Structured Analysis and UML Representations
- Deskbook: Architecture Guidance
  - Provides guidance on development, use, incorporating security into the architecture
- Release Date – Oct 2003
- Web Site:

http://aitc.aitcnet.org/dodfw/



Volume I: Definitions, Background, and Guidelines

- Definitions
  - Architecture, Framework, View, Product
- Background
  - Policies
  - History
- Guidelines
  - Value of architectures
  - Architecture measures
  - **Use of architectures to support DoD processes**
  - The six-step process
- Audience
  - Decision makers
  - Managers

Volume I: Definitions, Background, and Guidelines (cont'd)

- DoD Processes:
- Investment decision making –
  - Examine programmatic considerations such as consolidations, and proposed systems, in context with Joint interoperability needs, leveraging opportunities, and expected impact on mission effectiveness
- Capability and interoperability analysis –
  - Analyze architectures in terms of their support to joint concepts, identify capability needs, and determine the operational and support-related performance attributes of a system(s) that provide the capabilities required by the warfighter

Volume I: Definitions, Background, and Guidelines (cont'd)

- DoD Processes**:**
- **Acquisition program management and system development –**
  - Determine system concepts related to operational concepts and ensure interoperability within a family of systems/system of systems (FoS/SoS)
- **Operational planning –**
  - Examine how various mission participants, systems, and information need to play together; what problems may be encountered; and what quick fixes may be available

ASD (NII) DoD CIO

Key Changes in Volume I

APPLICABLE ARCHITECTURE PRODUCTS

RECOMMENDED USES OF ARCHITECTURE:	All View		Operational View (OV)							Systems View (SV)										Tech Stds View	
	1	2	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10 11	1	2
Planning, Programming, Budgeting Execution Process																					
Capability Based Analysis for IT Investment Decisions	●	●	●	●	●	●	●	●	⊙	●	⊙	●	●	●	●	●	●	●		●	⊙
Modernization Planning and Technology Insertion/Evolution	●	●	⊙	●	⊙	⊙	●	⊙		●	⊙	⊙	⊙	●	⊙	●	●	●		●	●
Portfolio Management	●	●		●			●	⊙		●			⊙	●		⊙	●			⊙	
Joint Capabilities Integration and Development System																					
JCIDS Analysis (FAA, FNA, FSA)	●	●	●	●	⊙	⊙	●	●		●	⊙		⊙	●						⊙	
ICD/CDD/CPD/CRD	●	●	●	●	●		●	●		●	⊙	⊙	●	●	●	⊙	⊙	⊙	●	●	⊙
Analysis of Alternatives (AoA)	●	●	●	●	⊙		●	●		●	⊙	⊙	●	●	⊙	⊙	⊙	⊙		⊙	⊙
Acquisition Process																					
Acquisition Strategy	●	●	●	●	⊙		●	⊙		●	⊙			●						●	
C4I Support Plan	●	●	●	●	●		●	●		●			⊙		●	⊙				●	⊙
System Design and Development	●	●		●	●		●	●	⊙	●	●	●	●	●	●	●	●	⊙	⊙ ⊙	●	⊙
Interoperability and Supportability of NSS and IT Systems	●	●	●	●	●	⊙	●	⊙	⊙	●	⊙	●	●		●	●	⊙	⊙	⊙ ⊙	●	⊙
Integrated Test & Evaluation	●	●		●	●	⊙	●	●	⊙	●	●	●	●	●	●	●			● ⊙	●	
Operations (Assessment, Planning, Execution, …)																					
Operations Planning & Execution	●	●	●	●	●	●	●	●	⊙	●	●	⊙	⊙	●	⊙	⊙				⊙	
CONOPS & TTP	●	●	●	●	●	●	●	●		●	⊙	⊙	⊙	⊙						⊙	
Communications Plans	●	●	●	●		⊙	⊙			●	●						⊙	⊙		●	⊙
Exercise Planning & Execution	●	●	●	●	●	●	●	●		●	●	⊙	⊙	⊙	⊙					⊙	
Organizational Design	●	●	●	●	●	●	●	⊙		⊙	⊙			⊙							
BPR/FPI	●	●	⊙	●	●	●	●	●	⊙												

● = Product is highly applicable

⊙ = Product is often or partially applicable

= Product is specifically addressed in policy

= Product is required for an Integrated Architecture

blank = Product is usually not applicable

- **Matrix provides guidelines on which architecture products are applicable to various uses of architecture**

Volume II: Product Descriptions

- Product Description
  - Definition
  - Purpose
  - Detailed description with templates and/or examples
  - UML representation
  - Data elements definitions
  - CADM support
- Audience:
  - For the manager, product definition and purpose section:
    - Provide a brief overview of architecture products,
    - Describe potential uses of architecture products
    - Allow assessment of products needed to support decisions

Volume II: Product Descriptions

- Audience for Volume II (cont'd)
  - For the architect and engineering team, a detailed description, and architecture data element definitions section:
    - Allow identification of products to be included in the architecture based on architecture's intended use
    - Facilitate determination of architecture data needs
    - Allow identification of sources for the architecture data
    - Allow analysis and comparison of the data gathered
    - Facilitate composition of data into architecture products
  - For the architecture data modelers, tool developers, and engineers, a CADM entities and relationships section:
    - Facilitate implementation of a CADM compliant architecture Modeling tool
    - Facilitate implementation of a CADM compliant architecture data repository

Key Changes in Volume II

- Greater emphasis on architecture data underlying the architecture products
  - Data element tables and element attribute definitions

DoD Architecture Framework (DODAF)

Common approach for developing an architecture description

Common Underlying Meta Model

Common underlying structure for capturing architecture data

Key Changes in Volume II

- Guidance on developing architecture products using UML
- Section on product and data element interrelationships
- Technical View is re-titled the Technical Standards View. The acronym remains TV

Key Changes in Volume II

- New emphasis on capability-based analysis:
  - Operational Activity Model + DOTMLPF Attributes (Operational Activity Sequence and Timing Descriptions OV-6)
  - Expanded SV-5 Matrix relating Operational Activities to System Functions, Operational Activities (in an operational thread) to Capabilities, and Capabilities to Systems

D CIO

Capabilities-Based Methodology*

Concepts

National Military Strategy

Joint Vision

Joint Operations Concepts

Joint Operating Concepts

Functional Concepts

Service Operating Concepts

Functional Concepts

Architectures

Force Application

Battle Space Awareness

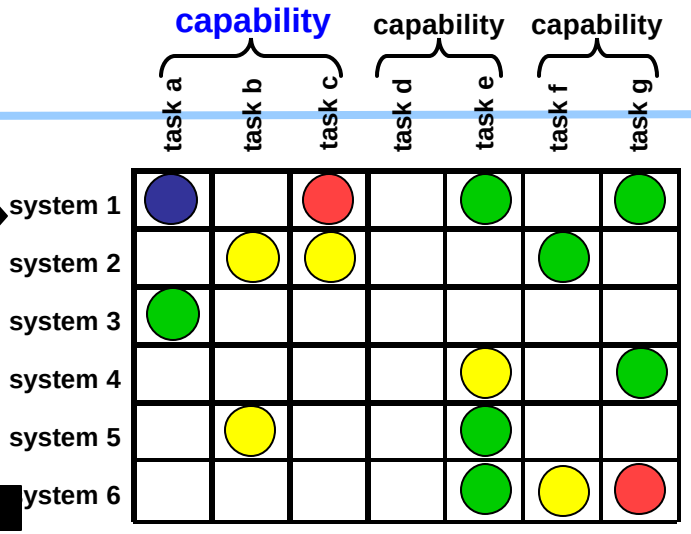
Force Protection

Focused Logistics

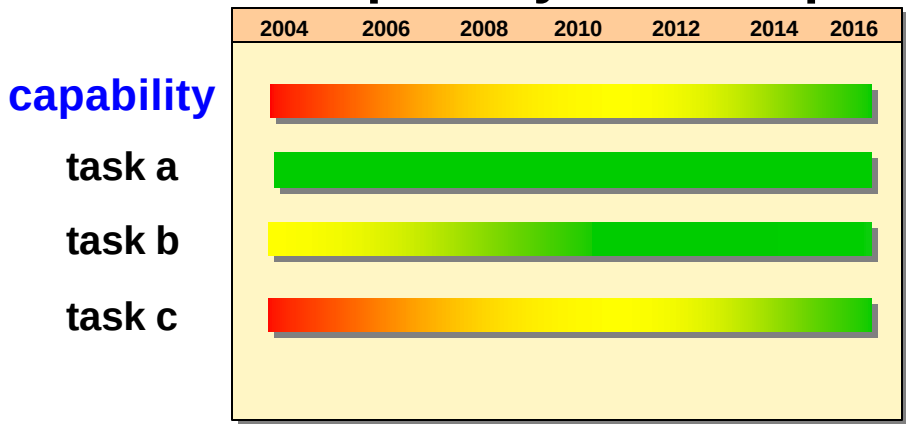
Command & Control

Capabilities

Assessment

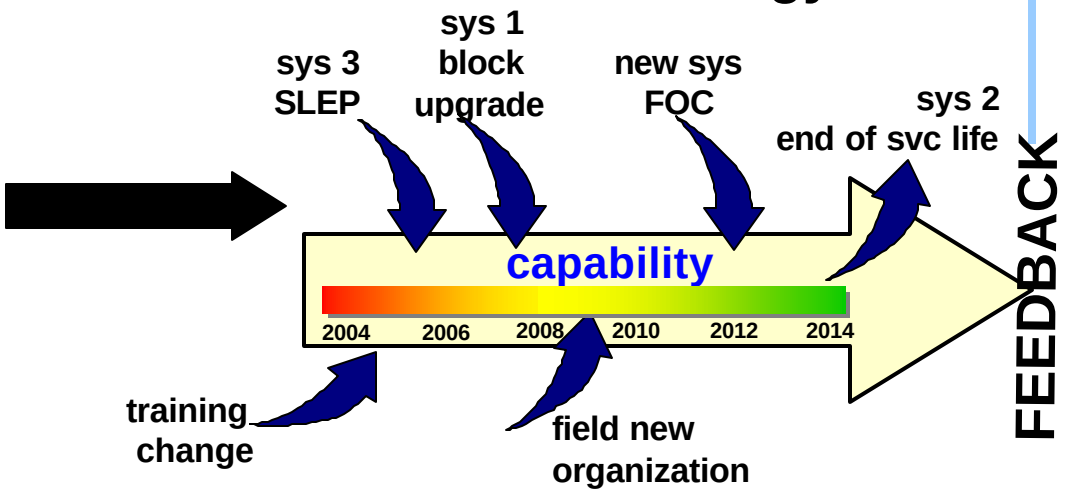


Capability Roadmap



*Source: J8

Resource Strategy



Future Evolution of Framework

Future Evolution Areas

- Common ontology of architecture elements
- Addressing baseline (current) and objective (target) architectures
- Use of architectures to measure mission effectiveness (capabilities and measures of effectiveness)