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Aligning Transformational Change in Policy and Governance with Net-Centric Operations Technology (I-055)

June 2007

Introduction

What's Different About this Transformation?

What Approach Will Help Ensure Alignment of this Transformation?

How Can We Better Facilitate Alignment?

Implementing transformation towards NCO presents several challenges

- Technical – Being addressed by both DoD and Industry
- Operational/Cultural – Requires equal emphasis

The technology transformation is ahead of the DoD policy and management transformation

- Results in technology sub-optimization and slower transformation

Re-alignment will require new “operating model”

- Address process, architecture, policy, governance, performance monitoring, and cultural issues and practices from an enterprise perspective

Once defined and set in motion, the operating model establishes a framework to better define and manage emerging NCO capability requirements



What's Different About this Transformation?

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Many past transformation initiatives have been undertaken within the existing context of how operations are conducted

- Organizational structure, policy, governance, and performance metrics models remain relatively constant

Net-Centric transformation is different from these previous transformational initiatives

- The Net-Centric Operations and Warfare (NCOW) vision is **enterprise** in its scope and will require an enterprise perspective with regards to architecture, policy, governance, metrics, and cultural change
- The design concepts of Service Oriented Architecture (SOA) are focused on reusable and accessible packets of functionality that are not bounded by traditional systems
- The unfolding of the transformation will be less easy to articulate in traditional forms (e.g., DoDAF)

Consequently, the state of the art in technology is getting too far ahead of the existing operational and governance models

The NCOW vision will require new doctrine and practices (and possibly organizational changes) on how best to optimize the technology for more effective warfighting and combat support

In order to ensure better alignment given the nature of the net-centric vision, several tenets should be applied in governing the transformation

- The Net-Centric Environment should not be too tightly defined from a traditional systems-centric architectural perspective. A revised approach to enterprise architecture will need to be used to better articulate the dynamic nature of net-centricity and the relationship to an operating model
- A supporting operating model needs to be established to harness the people and process dimensions of this transformation. Specific policies, governance structures, and metrics need to be put in place to modify behavior
- The Net-Centric transformation is not a linear process, but rather a “condition” required to progress towards the net-centric vision
- Experimentation will be necessary and will require a laboratory that replicates the conditions of the envisioned net-centric environment



An Approach to Improving Alignment of this Transformation at the Enterprise Level

Service Oriented *Enterprise* Architecture



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In designing the net-centric environment, the entering argument will need to be functionality and supporting services

■ An approach to this design challenge is to leverage both DoDAF and SOA design principles in order to apply a Service Oriented Enterprise Architecture (SOEA)

A SOEA approach does not directly describe the end state, but rather describes the three critical service areas necessary to transform an organization and how they should mature over time to achieve a desired future state

Specifically, the SOEA approach possesses the following characteristics:

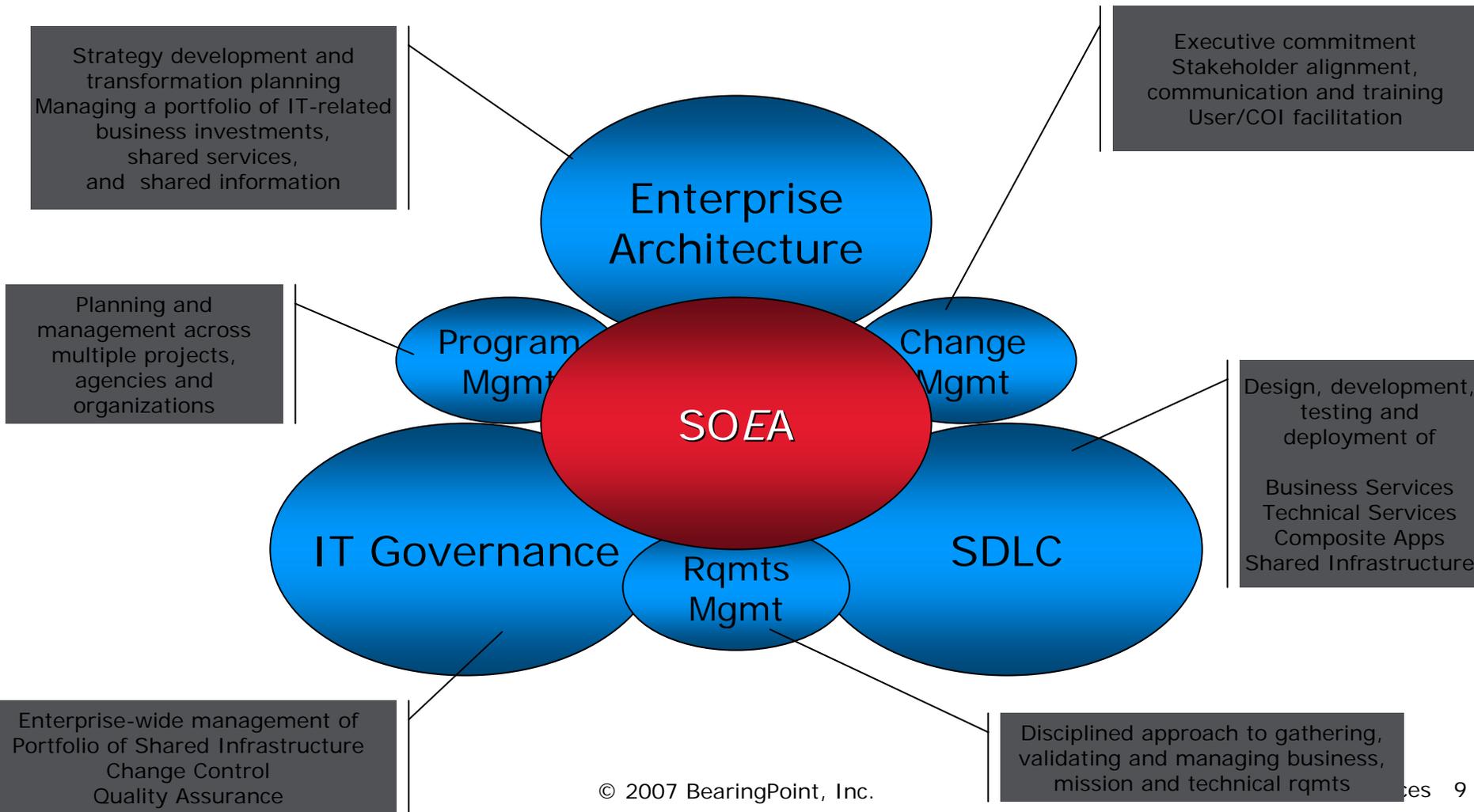
- Recognizes that the architectural process exists in a continuum of maturity
- Facilitates design of the operating model for the net-centric environment (NCE). This means describing procedures and processes in three key areas: 1) Mission execution in the NCE; 2) Managing the NCE; and 3) Evolving the NCE (given the recognition of increasing maturity)
- Provides for process to service mapping
- Establishes clear linkage between the architecture and portfolio management process
- Demonstrates the relationships among the users, the service providers, and the portfolio of services:
 - **Functional Area Services** - Those services necessary to support enterprise activities and processes. They may be enterprise wide or domain specific with a people, Community of Interest (COI) focus
 - **Information/Data Integration Services** - Those services required to make data visible, accessible, understandable, trusted, and interoperable in accordance with the DoD Net-Centric Data Strategy
 - **Network/Communication Enabling Services** - Those services necessary to provide the physical infrastructure for communication and transport within the enterprise. The GIG infrastructure and NCES initiatives are examples

Service Oriented *Enterprise* Architecture

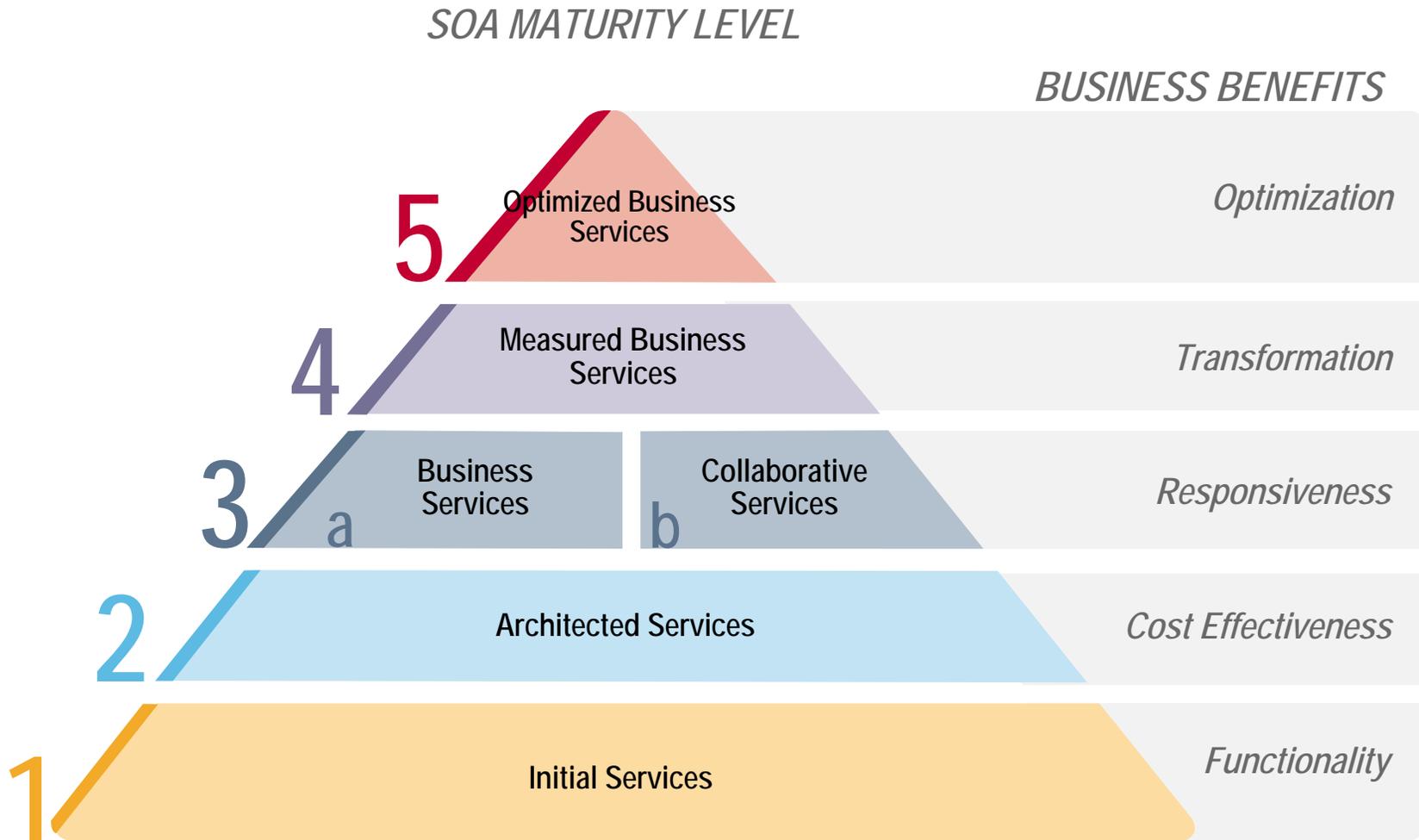


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SOA shares characteristics with many established disciplines and draws upon these disciplines



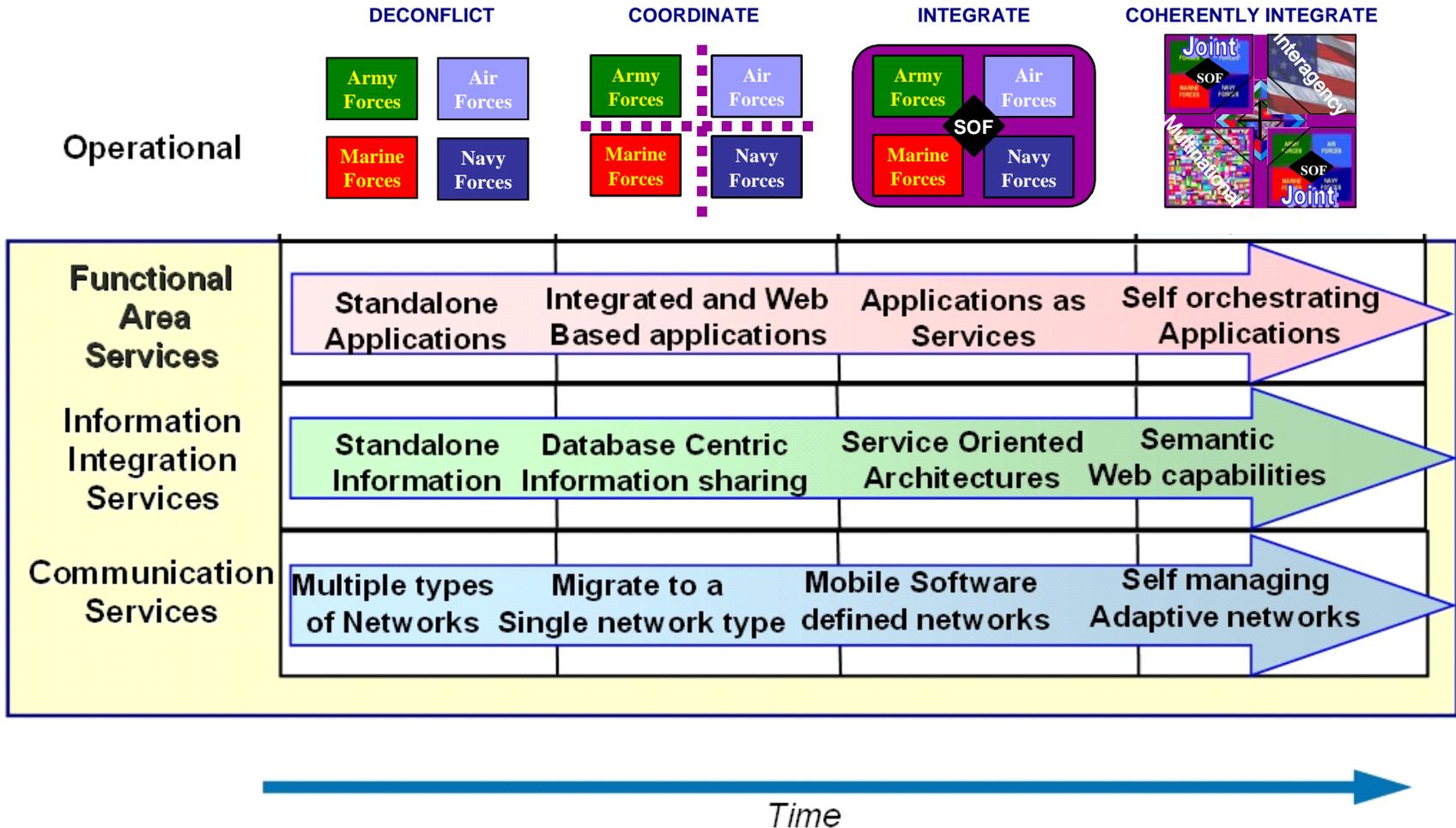
SOA Maturity Model



Reference Architecture



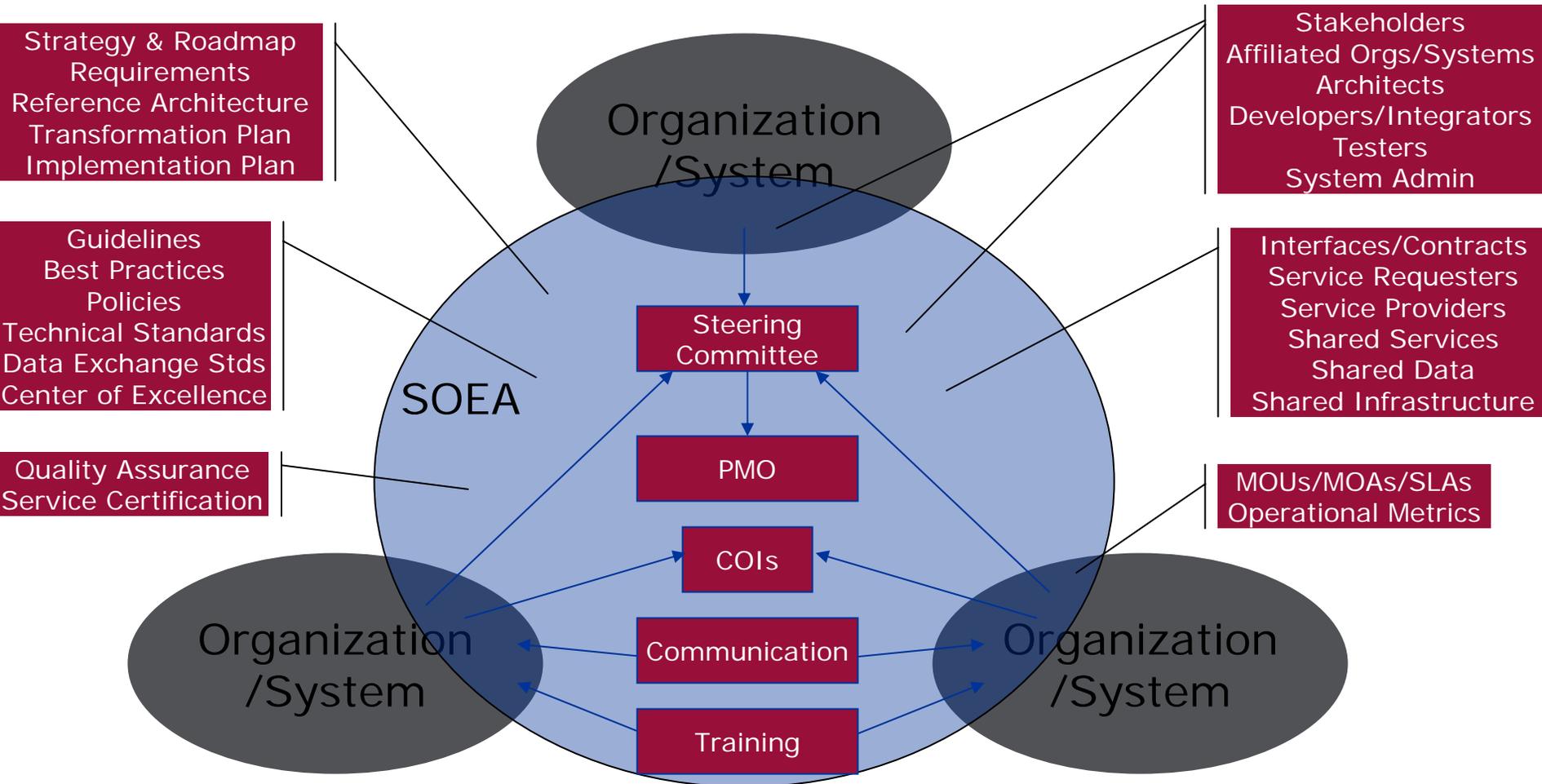
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SOEA Governance - Scope



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***SOEA Governance can encompass all aspects of the SOA.
However, the actual scope of Governance depends on the organization.***



An Approach to Facilitate This Transformation at the Program Level

There are multiple approaches to executing the design of the SOEA and the Operating Model

- However, it can best be facilitated through an iterative and experimental basis leveraging the SOA Maturity Model to guide the direction and pace
- Experimentation will allow practical solutions to operating issues to be identified and resolved and better drive requirements for future C2 systems and capabilities
- Unfortunately, a net-centric environment for experimentation does not fully exist

Consequently, there is a need for a net-centric “test-bed” environment to provide a means to make progress through experimentation

- A prototyping test bed simulates the net-centric operating model and can expand users’ horizons and vocabulary for expressing what they need by showing them a richer lexicon of what is possible when applying new technologies and techniques

A test bed should provide the following benefits to designers who are charged with developing capabilities within the NCE:

- Model the future capabilities to support and improve the development of NCE for specific mission and functional areas in DoD with respect to process, data, and network requirements
- Demonstrate future technologies to drive forward-looking user requirements
- Test vendor solutions based on the emerging/evolving requirements of a net-centric environment, not in the context of vendor-defined parameters

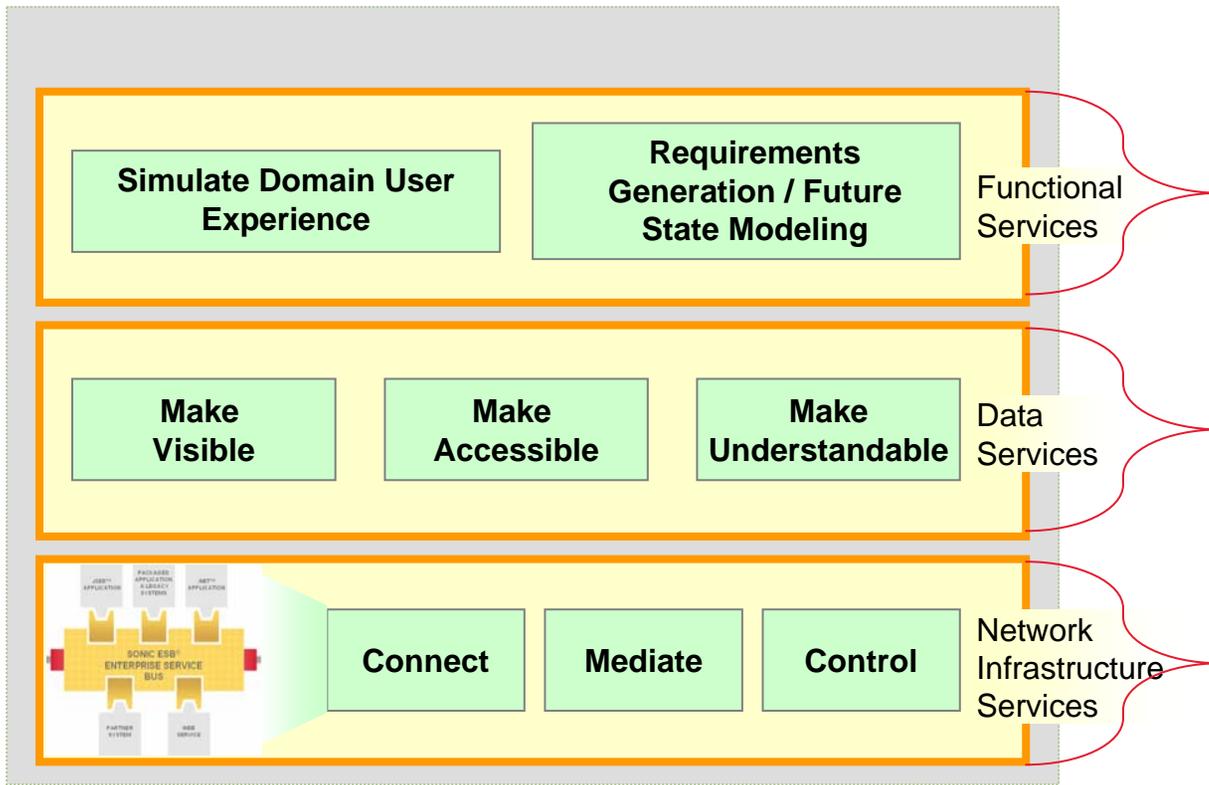
Test Bed Conceptual Environment

Simulate Domain User Experience

Simulate interactions and processes within progressive SOA environment maturity levels.

Requirements Generation / Future State Modeling

Monitor/track user activity/behavior and create architecture artifacts in a repository to determine optimal process/practices and allow further analysis/refinement of functional requirements.



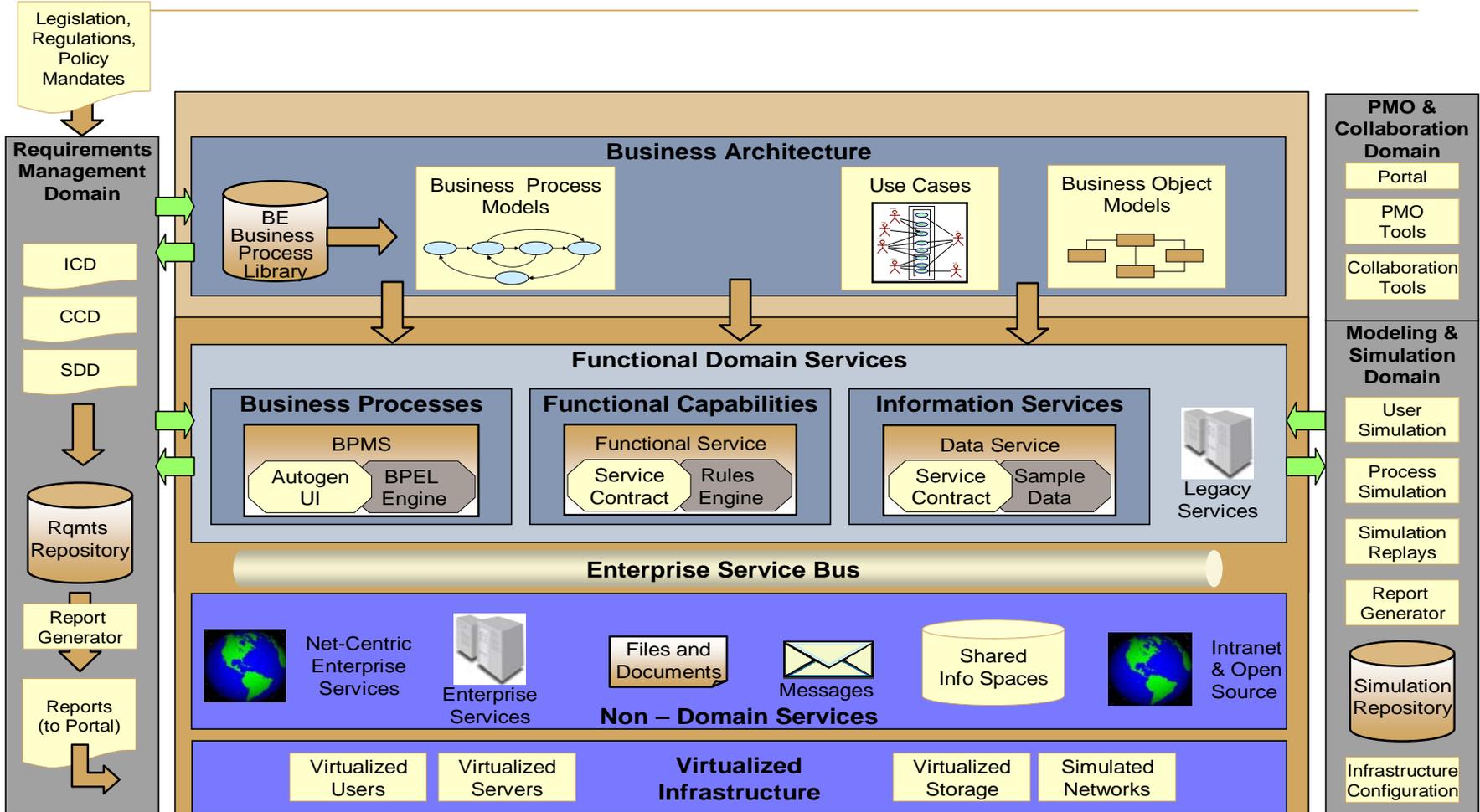
- Simulate interactions and processes within progressive SOA environment maturity levels.
- Track user activity/ behavior
- Create architecture artifacts
- Record in repository to enable further analysis/refinement of functional requirements and determine optimal process/practices

- Simulate consistency with Net-Centric Data Strategy.
- Simulate the GIG ES pervasive security services.
- Simulate mediation / orchestration.

- ESB Foundation Functionality



Test Bed Architecture



Concept of Operations



Imagine a program office that must oversee the development of a notional future warfighter support system (FWSS)

- It must provide certain specified combat support capabilities (e.g., Command and Control) desired to accomplish a mission
- It must be able to leverage services and data from other legacy/planned weapons systems to optimize performance
- It must provide services and data to the GIG to optimize the network

Use of the test bed would allow the program to simulate the NCE

- FWSS users would define requirements by operating in this eventual environment
- Document of their requirements would be in a service-oriented framework as opposed to a system-oriented framework

Once designed, specific capabilities or components of the FWSS can be modeled and tested within the test bed to ensure desired performance achievement

- The resulting changes can be seamlessly documented and managed

Specific services that support the designed FWSS capabilities can be developed, managed and certified

- Development of capabilities could leverage existing services or create new ones
- Certification would be in accordance with current and future DoD NCOW Service Development and Certification Requirements

The resulting composite FWSS application can be stored in the test bed repository for testing, configuration control, enhancement, and ultimate deployment to the GIG

The transformation of combat and combat support systems and processes towards a Net-Centric Environment is an extremely complicated and multi-faceted challenge

- The marketplace does not currently offer service oriented, commoditized solution technologies to facilitate this transition

DoD can better create the conditions for net-centric transformation and ensure alignment between policy and technology by:

- Taking an enterprise SOA perspective and
- Leveraging a SOA Test Bed at the program level

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Questions/Discussion