Service-Oriented Architecture (SOA): Bringing Dynamic Agility to the Warfighter

SSTC 2006
Monday May 01, 2006
@ 2:55 PM - 3:40 PM
Track: Track 7
Room: 250 D-F

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BEA Systems, Inc.
<table>
<thead>
<tr>
<th></th>
<th>Agenda Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Service-Oriented Architecture</td>
</tr>
<tr>
<td>2</td>
<td>SOA Concepts: Integration</td>
</tr>
<tr>
<td>3</td>
<td>SOA Concepts: Interoperability</td>
</tr>
<tr>
<td>4</td>
<td>Summary and Additional Information</td>
</tr>
</tbody>
</table>
Service-Oriented Architecture
Definition

“Service-Oriented Architecture is an IT strategy that organizes the discrete functions contained in enterprise applications into interoperable, standards-based services that can be combined and reused quickly to meet mission needs.”
Service-Oriented Architecture
A Paradigm Shift

Distributed-Component Architecture (DCA)
- Functionality-Oriented
- Designed to Last
- Long Development Cycle
- Cost-Centered
- Application Block
- Tightly-Coupled
- Homogeneous Technology
- Known Implementation

Service-Oriented Architecture (SOA)
- Process-Oriented
- Designed to Change
- Iterative Development
- Business-Centered
- Services Orchestration
- Agile and Adaptive
- Heterogeneous Technology
- Abstraction
Service-Oriented Architecture
Addressing the Mission Capabilities Gap

Existing Distributed Component Architectures require months to identify and satisfy delta, assuming linear, fixed requirements...why?

System Requirements generally grow in scope and complexity...why?

The power of SOA is delivering reusable services that can be combined, in different ways, to deliver adaptable, agile capabilities.
Service-Oriented Architecture Benefits

**Key Mission Benefits**
- Agile introduction of new capabilities to support the mission
- Dynamic response to changes in the overall mission
- Alignment of mission needs with IT infrastructure
- Increased operational management capabilities

**Key IT Benefits**
- Reduced Development Time and Cost
- Extensible library of reusable components, applications and data
- Decreased integration cost and complexity
- Elimination of redundant data and systems based on shared services
- Leverage existing rich IT investments

**Key Enterprise Benefits**
- SOA is about more than just the technology!
Service-Oriented Architecture
BEA Domain Model

- SOA-enabled Business Strategies
- Business Process Architecture

- Construction costs
- Business & IT Benefits
- Key Measures

- Organization Design
- Funding
- Skillsets
- Roles & Responsibilities
- Standards
- Operational Processes & Tools
- Change Management

- Reference Architectures
- Manageability/Availability
- Scalability
- Security

- Infrastructure Services
- Information & Access Services
- Shared Business Services
- Presentation Services
- Composite Applications

- Existing Applications
- Key “In-flight” Projects
- Infrastructure Construction Plans
AGENDA

1. Service-Oriented Architecture
2. SOA Concepts: Integration
3. SOA Concepts: Interoperability
4. Conclusions and Next Steps
SOA Concepts
Notional USAF Domain Overview

JOINT (NECC)
- GCCS-J
- GCSS-J
- NKO/AKO
- GCCS-I3
- JOPES

OPS SUPPORT (GCSS-AF)
- DEAMS
- ECSS
- DCAPES
- GATM
- MORE

NCES
- SOA Foundation Services
- Content Delivery

C2 (AOC-WSI)
- GCCS-AF
- BMC2
- TBONE
- TBMCS
- WDAC
- ACE
- MORE

ISR (DCGS)
- SIGINT
- RFINT
- ELINT
- MASINT
- HUMINT
SOA Concepts
NESI Overview

<table>
<thead>
<tr>
<th>NESI Part 1</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>NESI Part 2</td>
<td>ASD NII Checklist Guidance</td>
</tr>
<tr>
<td>NESI Part 3</td>
<td>Migration Guidance</td>
</tr>
<tr>
<td>NESI Part 4</td>
<td>Node Design Guidance</td>
</tr>
<tr>
<td>NESI Part 5</td>
<td>Developers Guidance</td>
</tr>
<tr>
<td>NESI Part 6</td>
<td>Acquisition Guidance</td>
</tr>
</tbody>
</table>

NESI Part 3: Guidance for maintenance / upgrade activities leading to net-centric systems

NESI Part 4: Guidance for developing nodes and their infrastructure to support net-centric applications and services

Source: http://nesipublic.spawar.navy.mil/
SOA Concepts
Application Infrastructure

- **Infrastructure Foundation**
  - J2EE Business Services
  - Infrastructure Services

- **Mission Integration**
  - Component Assembly
  - Composite Applications
  - Process Framework
  - Event-Driven Architecture

- **Dynamic Presentation**
  - Portal Services
  - Web Application Enablement

- **Rapid Development**

**BEA WebLogic Platform**
“Legacy Systems are Sustained”

- **Infrastructure**
  - Standards, R-A-S-P, Shared Infrastructure
  - Legacy Systems Intact

- **Mission Integration**
  - Mission Processes Introduced
  - Adapter-Based Legacy Integration

- **Dynamic Presentation**
  - Standard Web Application Interfaces
  - Reduce proprietary GOTS interfaces

- **Rapid Development**
  - RAD to support Legacy Integration
  - RAD to support process and presentation
SOA Concepts
Net-Centric Upgrade

“Legacy Systems are Transformed”

- **Infrastructure**
  - Standards, R-A-S-P, Shared Infrastructure
  - Legacy Footprint Reduced

- **Mission Integration**
  - Legacy Processes Re-engineered
  - Mission Services Introduced

- **Dynamic Presentation**
  - Dynamic Portals Introduced
  - Standard Web Application Interfaces

- **Rapid Development**
  - RAD to support Portal Development
  - RAD to support process re-engineering

**ISR DOMAIN**

**ISR Capabilities**

**APPLICATION INFRASTRUCTURE** (Node)

- **Web App**
- **Mission Process**
- **ISR Services**

NCSI Migration Level 3
Application Infrastructure Implementation
SOA Concepts
Full Net-Centric Upgrade*

“New Start / In Development”

- **Infrastructure**
  - Standards, R-A-S-P, Shared Infrastructure
  - New Data Stores Introduced

- **Mission Integration**
  - Mission Services Expanded

- **Dynamic Presentation**
  - Dynamic Portals Deployed
  - Standard Web Application Interfaces

- **Rapid Development**
  - RAD to support Portal Development
  - RAD to support process re-engineering

**ISR DOMAIN**

**ISR Capabilities**

**APPLICATION INFRASTRUCTURE** (Node)

**Web App**

**Mission Process**

**ISR Services**

**LEGACY DATA**

NESI Migration Level 4
Application Infrastructure Implementation

bea Think liquid.
SOA Concepts
SOA Lifecycle

What about interoperability?
AGENDA

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SOA Concepts
Enterprise Service Bus (ESB)

BEA AQUALOGIC SERVICE BUS (ESB)

- Service Management
  - Monitoring
  - SLA Alerts
  - Reporting

- Message Brokering
  - Content Based Routing
  - Transformation
  - Error Handling
  - Service Messaging

- Config Framework
  - Service Discovery
  - Change Center
  - Validation
  - Local Registry
  - Metadata Cache

- Security Framework
  - Authentication
  - Authorization
  - Identity
  - WS-Security

- Heterogeneous Messaging
- Service Brokering
- Security & Policy
- Lifecycle Management
- Message Management
- Service Discovery
- Service Orchestration
**SOA Concepts**

**Point-to-Point Interoperability**

**Questions to Consider:**

- Where is the interoperability point defined and managed?
- Where is domain trust managed?
- What are the control boundaries?
- How do proprietary solutions affect interoperability?
- How does respective NESI Compliance affect interoperability?
SOA Concepts
Single ESB Intermediary Interoperability

ISR DOMAIN

ISR Capabilities

Warfighter Capabilities

C2 Capabilities

C2 DOMAIN

Enterprise Service Bus

Application Infrastructure (Node)

Web
App
Mission
Process
ISR
Services

Portals

TBONE
Mission
Process
TBMCS
Services

Questions to Consider:

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SOA Architecture Concepts
SOA Lifecycle
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</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>
Summary and Additional Information

Summary

- SOA Benefits extend from IT through the Enterprise and into the Mission.
  - SOA is about more than just the technology! Get familiar with the SOA Domain Model!

- Application Infrastructure provides the development-driven foundation for integration of Community-of-Interest applications, services and data.
  - NESI provides foundation guidance for the implementation of Net-Centric nodes.

- Service Infrastructure provides the configuration-driven foundation for interoperability between COI Nodes and across USAF domains.
Summary and Additional Information

Additional Information

- **FREE Federal SOA Readiness Assessment**

- **BEA SOA Resource Center**
  - [http://www.bea.com/soa](http://www.bea.com/soa)

- **SOA Domain Model White Paper**
  - [http://www.bea.com/content/news_events/white_papers/BEA_SOA_Domains_WP.pdf](http://www.bea.com/content/news_events/white_papers/BEA_SOA_Domains_WP.pdf)

- **Learn About BEA Services Infrastructure**
  - [http://www.bea.com/content/news_events/white_papers/BEA_AquaLogic_Fam_wp.pdf](http://www.bea.com/content/news_events/white_papers/BEA_AquaLogic_Fam_wp.pdf)

- **Learn About BEA Application Infrastructure**
  - [http://www.bea.com/framework.jsp?CNT=index.htm&FP=/content/products/weblogic](http://www.bea.com/framework.jsp?CNT=index.htm&FP=/content/products/weblogic)

- **Join a Community!**
  - Dev2Dev, Arch2Arch, Exec2Exec, IT2IT

- **NESI Public Website**