Service-Oriented Architecture Foundation

James T. Hennig, Chief Architect SOAF-A
james.hennig@us.army.mil
"If you are not interoperable, you are not on the net, you are not contributing, you are not benefiting, and you are not part of the information age."

~ Art Cebrowski, DoD Director, Force Transformation
Agenda

- Overview
- Capability Portfolio
- Threads
• Service-Oriented Architecture (SOA)
  – “Not a product CIOs can buy and install”
  – “…requires changes in peoples behavior”
    ~ L. Frank Kenney, Gartner

• SOA Foundation
  – Enabling infrastructure
    • Development Environment
    • Execution Environment
    • Management Environment
    • Test Environment
  – Should be the first thing put in place
Physical Architecture

GLOBAL INFORMATION GRID

NCES

Enterprises Capabilities

ARMY

SOAF-A

FCS Network

NAVY

AIR FORCE

NAVY

AIR FORCE

FCS Network

SOAF-A

AMC

HRC

Etc.
Technical Architecture

Presentation Layer
- User interface for services
- Portal and composition environment

Service Registry
- Central location for service specifications
- Design time governance

Schema Repository
- Design time governance
- Enables mediation service

Enterprise Service Bus
- Feature rich processing bus
- Mediation, Messaging, Routing, Orchestration

Enterprise Service Management
- Service level agreements, Run time governance
- Metric collection

Directory
- Attributes, Certificates, Identity

Security
- Attribute Based Access Control
- Policy creation and enforcement

Presentation Layer (MOSS)
- WEBPARTS
- WORKFLOW
- UNIT MNGT

Web Services Life Cycle Management
- XML Data Strategy
- WMA
- BMA
- IMA
- EiMA

Connection Layer
- .NET
- WS
- Web Services
- J2EE
- WS
- Web Services (Legacy Apps)

ESB Components
- Transformation
- JCA

Configuration Layer
- SOAP
- HTTPS
- APIs / ASSESS VENDORS / PUBLISH STANDARDS

ESB Components
- Message Mediation
- Orchestration Choreography

Enterprise Service Management (Governance)
- JEDS
- ABAC
- PIV/CAC

Standard (WS*)
- Service Registry & Discovery
- Directory (EDS)
<table>
<thead>
<tr>
<th>CAPABILITY</th>
<th>ARTIFACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Implementation</td>
<td><img src="office-sharepoint.png" alt="Enterprise Stack" /></td>
</tr>
<tr>
<td>- Enterprise Stack</td>
<td><img src="jericho.png" alt="JERICHO" /></td>
</tr>
<tr>
<td></td>
<td><img src="amberpoint.png" alt="AMBERPOINT" /></td>
</tr>
<tr>
<td></td>
<td><img src="active-directory.png" alt="Active Directory" /></td>
</tr>
<tr>
<td></td>
<td><img src="bea-liquid.png" alt="bea Think (liquid)" /></td>
</tr>
<tr>
<td></td>
<td><img src="systinet.png" alt="systinet" /></td>
</tr>
<tr>
<td>Reference Implementation</td>
<td><img src="boss.png" alt="Open Source/GOTS Stack" /></td>
</tr>
<tr>
<td>- Open Source/GOTS Stack</td>
<td><img src="nagios.png" alt="nagios" /></td>
</tr>
<tr>
<td></td>
<td><img src="fedora.png" alt="fedora" /></td>
</tr>
<tr>
<td></td>
<td><img src="apache.png" alt="APACHE" /></td>
</tr>
<tr>
<td></td>
<td><img src="novell.png" alt="Novell" /></td>
</tr>
<tr>
<td></td>
<td><img src="nsure.png" alt="nsure" /></td>
</tr>
<tr>
<td></td>
<td><img src="udpj.png" alt="UDPJ" /></td>
</tr>
</tbody>
</table>
"Service Oriented Architecture is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains."

~ *OASIS SOA Reference Model*
Agenda

• Overview

• Capability Portfolio

• Threads
Presentation Layer

• Product
  – Microsoft Office SharePoint Server
  – JBoss Portal

• Standards
  – Web Services for Remote Portlets (WSRP)

• Description
  – User facing side of SOA stack
  – Contains user interface to services
  – Composable, Can be connected
  – Can be entry point for user credentials
• Product
  – HP/Systinet, jUDDI, Novell Nsure

• Standards
  – Universal Description Discovery & Integration (UDDI)
    http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=uddi-spec

• Description
  – White pages for services
  – Contains service specifications, businesss, descriptions
  – Defined taxonomy
Service Registry Usage

Using a UDDI Registry

http://www.oasis-open.org/presentations/uddi_v3_webcast_20050222.pdf
• Product
  – HP/Systinet Repository
• Standards
  – ?
• Description
  – Full featured content/document management, search, policy
  – Offered by major registry vendors as an add-on
  – Information store for data definitions in addition to other service artifacts (i.e. compliance reports)
  – Enabler for automated mediation methods
Enterprise Service Bus

• **Product**
  – BEA Aqualogic, Apache ServiceMix, MS BizTalk

• **Standards**
  – BPEL, XSLT, WS-ReliableMessaging, WS-Policy, ...

• **Description**
  – Asynchronous messaging backbone including capabilities for reliable messaging, transformation and content based routing
  – Orchestration and workflow
  – Catch all term coined by Gartner
Oracle/JDeveloper

- Mediation
- Transformation
- Based on schemas

"I have always believed that the real business value of SOA is not so much about IT cost reduction but really about being able to react quickly to change."

~ David A. Chappell, Oracle
• Product
  – AmberPoint, Nagios

• Standards
  – Web Services Distributed Management (WSDM)
    http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wsdm

• Description
  – Metric collection on live SOA
  – Collection Approaches:
    • Agents inside service hosting environment
    • Service themselves report events
    • Managed proxies
• Products
  – MS Active Directory, Fedora Directory Server

• Standards
  – Lightweight Directory Access Protocol (LDAP)

• Description
  – Repository for both users and machines
  – Identities, certificates, and attributes
• Product
  – Jericho, Layer 7

• Standards
  – Security Assertion Markup Language (SAML)

• Description
  – Protocol used in SOAP messages for transmitting identity information
  – Leveraged in Attribute Based Access Control schemes
• Overview
• Component Survey
• Threads
E PLURIBUS UNUM

"Out of Many, One"