The Importance of Standards in IT Architectures

SAP Global Ecosystem and Partner Group
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<thead>
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<th>SAP’s Approach to Technical Standards in Enterprise Service-Oriented Architecture (Enterprise SOA)</th>
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<td>Metadata Infrastructure</td>
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<td>Component Frameworks</td>
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<td>Policy Standards</td>
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Business Drivers for Standards

Invest in differentiating features
- Better support for customers
- Provision of a complete solution
- Extension of business networks
- Time to value
- Business process flexibility

Do not invest in non-differentiating features
- Buy standard software
  - Best practices
  - Compliance
  - Conformance to industry standards
- Lower total cost of ownership (TCO)
  - Increased data accuracy, level of automation, productivity, and performance of the supply chain
  - Open source software (licensing cost and reuse of skills set)

Approach new markets
Standards Are the Foundation of Enterprise SOA

Enterprise SOA requires technical standards to achieve cost-effective and efficient consumption, composition, and maintenance of services and requires business standards to define the precise semantics of services.

**Business standards**
- Driven by user requirements
- Examples: ACORD, CIDX, GS1, and OAGi

**Enterprise requirements**
- Reliability, availability, scalability, performance, and security
- Example: sustained throughput of 100,000 invoices per hour

**Technology standards**
- Driven by interoperability needs (examples: IBM WebSphere and Microsoft .NET)
- Examples: WSDL, SOAP, WS-Security, and WS-ReliableMessaging
### Success = Technical Standards + Business Standards

#### Technology standards

- W3C®
- WS-I®
- OASIS®
- XML.org
- Java Community Process
- UN/CEFACT
- Eclipse

#### Business standards

<table>
<thead>
<tr>
<th>Higher education and research</th>
<th>Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Pharma-ceuticals</td>
</tr>
<tr>
<td>Financial service provider</td>
<td>Oil and gas</td>
</tr>
<tr>
<td>High tech</td>
<td>Insurance</td>
</tr>
<tr>
<td>Telco</td>
<td>Media</td>
</tr>
<tr>
<td>Chemicals</td>
<td>Aerospace and defense</td>
</tr>
<tr>
<td>Automotive</td>
<td>Banking</td>
</tr>
<tr>
<td>Mill products</td>
<td>Retail</td>
</tr>
<tr>
<td>Engineering and construction</td>
<td>Consumer products</td>
</tr>
</tbody>
</table>

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Value of Open Standards

- WS-ReliableMessaging
- WS-Addressing
- WS-Interoperability
- WS-Policy
- Business Process Execution Language (BPEL) and extensions
- Java Enterprise Edition 5
- SDO
- SCA
- EJB 3
- And so on

- Provides interoperability of enterprise SOA–based applications
- Simplifies development of enterprise SOA applications
- Increases platform accessibility for developers
- Lowers TCO by reducing integration costs
Phases in Standardization

- Initial implementation and testing
- Incremental enhancement
- Final and maintenance

**Agreed-upon and common design principles for reaching interoperability**
Driving Standards with Key Corporate Alliances

SAP is leading the industry by contributing its expertise to key corporate alliances whose initiatives drive specifications for enterprise applications based on enterprise SOA

Examples

- Service component architecture (SCA)
- Service data objects (SDO) provide developers with a simpler and more powerful way to construct applications based on enterprise SOA
- BPEL4People provides missing process definition capabilities as one of the key building blocks of an SOA
Driving and Influencing Technology Standards

SAP holds governance roles in important standards organizations
- W3C (Advisory Board)
- OASIS (Board)
- Web Services Interoperability Organization (WS-I) (Chair and Board)
- JCP (Board)
- Enterprise Interoperability Centre (EIC) (Founder)
- RosettaNet (Board)

SAP also leads and coauthors specification development efforts for key technologies within these standards organizations
- W3C: WSDL and WS-Addressing
- OASIS: WS-ReliableExchange
- WS-I: Sample Applications Working Group

SAP participates in many technical committees and working groups
Open standards and open source software are distinct

- Open standards specify implementation requirements
- Open source software is an implementation

Open standards can be implemented well by software whether they involve open source software or commercial software.

Buying decisions should be based on TCO considerations, rather than only on the software licensing model.
Open Source, Commercial Software, and Open Standards

Combine the advantages of a strategic, standards-based commercial platform that is functionally rich, fully integrated, and robust with mature, open source software; such software offers a tactical advantage or reduces TCO.

Standards

Development frameworks: Eclipse, Struts, and Hibernate

Open source languages: PHP, Perl, Ruby, and Python

Operating systems: Linux (Novell, SuSe, and Red Flag)

Browser: Firefox

Database: MaxDB

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SAP’s Approach to Standards in Enterprise SOA

SAP’s standards taxonomy

Focus of this session
Metadata Infrastructure

Metamodeling standards

- Model-driven architecture and the meta-object facility (MOF)
- XML Metadata Interchange (XMI) standard
- Standard metadata application programming interfaces (APIs)

<table>
<thead>
<tr>
<th>Standard</th>
<th>SAP NetWeaver 7.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOF</td>
<td>1.4</td>
</tr>
<tr>
<td>XMI</td>
<td>1.2</td>
</tr>
<tr>
<td>JMI</td>
<td>1.0</td>
</tr>
<tr>
<td>CWM</td>
<td>1.1</td>
</tr>
<tr>
<td>UDDI</td>
<td>2.0, 3.0</td>
</tr>
</tbody>
</table>

JMI is a Java API framework for accessing and manipulating information in a MOF-aware repository.

XMI is the interchange format for MOF metadata definitions.

MOF defines the structure of repositories.
Component Frameworks

Java Enterprise Edition 5 (Java EE 5)
Service component architecture (SCA)
Service data objects (SDO)

Standard  | SAP NetWeaver 7.1
-----------|-----------------
SCA        | 1.0 (preview)
SDO        | 2.1
Java 2EE and Java EE | 5.0
Messaging Standards

Web services
- Envelope standards (SOAP)
- Electronic address standards (WS-Addressing)
- Message delivery standards (WS-Reliable Messaging)

Java Messaging System (JMS)

<table>
<thead>
<tr>
<th>Standard</th>
<th>SAP NetWeaver 7.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMS</td>
<td>1.1</td>
</tr>
<tr>
<td>SOAP</td>
<td>1.1</td>
</tr>
<tr>
<td>MTOM</td>
<td>1.0</td>
</tr>
<tr>
<td>WS-Reliable Messaging</td>
<td>Early implementation of 1.1</td>
</tr>
<tr>
<td>WS-Security</td>
<td>1.0</td>
</tr>
<tr>
<td>WS-I Basic Security Profile</td>
<td>1.0</td>
</tr>
<tr>
<td>WS-I Reliable Secure Profile</td>
<td>Still under development</td>
</tr>
</tbody>
</table>
Profile Standards (1/2)

Web Services Interoperability Organization (WS-I)

- WS-I Sample Application
- WS-I Basic Profile
- WS-I Basic Security Profile
- WS-I Reliable Secure Profile

<table>
<thead>
<tr>
<th>Standard</th>
<th>SAP NetWeaver 7.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-I Basic Profile</td>
<td>1.0 and 1.1</td>
</tr>
<tr>
<td>WS-I Basic Security Profile</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Sample application

Interoperability testing

Sample applications based on other vendors’ platforms

User interface

Web Dynpro container

Authentication and authorization

User management engine

Core business logic

J2EE container

Data dictionary

SAP NetWeaver AS

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Profile Standards (2/2)

WS Profiles

Basic Security Profile Version 1.0
Working Group Draft
2006-03-29

Abstract

Constraints

References

Web services specifications

OASIS

Simple Object Access Protocol
WS2: Note 05 May 2009

Abstract

OASIS Standard Specification, 1 February 2006

Used by

Tests Interoperability of

Sample application architecture specification

WS

Sample applications

Novell

Microsoft

IBM

Oracle

SAP

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Security Standards

- WS-Security
- WS-I Basic Security Profile
- WS-SecureConversation
- WS-Trust
- SSL
- TLS
- SPML
- SAML
Summary

- SAP drives technical and business standards to simplify adoptions of enterprise SOA and improve interoperability.

- SAP runs with open source software, providing increased platform flexibility and, in many cases, dramatically reduced costs.

- Customers are turning to SAP as a trusted advisor to assist them in determining a synergistic IT strategy that leverages open source and industry standards.
Backup
Enterprise Services (ES) Repository and Services Registry*

**Registry**
- Yellow pages of services
- Add deployment information (example: endpoint)
- Manage services
- Ease of consumption: browse, discover, and use services

**Repository**
- Definition of processes and services
- Service metadata for reuse
- Central modeling and design environment

*Preview of current development efforts at SAP*
Updates in Java EE 5

Common annotations for the Java platform

Business logic
- EJB 3.0

Database access
- Java persistence API 1.0

Web services
- JAX-WS 2.0
- JAXB 2.0
- StAX 1.0
- SAAJ 1.3

Web service metadata for the Java platform

User interface
- JSP 2.1
- Servlet 2.5
- JSTL 1.2
- JSF 1.2

Debugging support for other languages
Web Services Support in Java EE 5

General standards for Web services in Java EE 5

- HTTP 1.1
- SOAP 1.1
- SOAP 1.2
- XML 1.0
- WSDL 1.1
- WS-I Basic Profile 1.0

Java standards for Web services in Java EE 5

- StAX 1.0 (Streaming API for XML) - JSR 173
- SAAJ 1.3 - JSR 67 MR3
- JAXB 2.0 (Java architecture for XML binding) - JSR 222
- JAX-RPC 1.1 - JSR 101
- JAX-WS 2.0 (Java API for XML-Based Web Services) - JSR 224
- Web services for Java EE 1.2 - JSR 109 MR2
- Common annotations for the Java platform - JSR 250
- Web services metadata for the Java platform - JSR 181
## Web Service Specifications in Java EE 5

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAX-B 2.0</td>
<td>XML schema $\leftrightarrow$ Java and XML $\leftrightarrow$ Java (de)serialization</td>
</tr>
<tr>
<td>JAX-WS 2.0</td>
<td>WSDL $\leftrightarrow$ Java and provider or consumer runtime and programming model</td>
</tr>
<tr>
<td>Java EE Web services</td>
<td>Description, life cycle, and deployment of Web services in a Java EE environment</td>
</tr>
<tr>
<td>Web services metadata</td>
<td>Definition of common Java annotations for describing Web services. Tight integration with specifications given above</td>
</tr>
<tr>
<td>SAAJ 1.3</td>
<td>SOAP API with attachments for Java 1.3. An object model for a SOAP message</td>
</tr>
<tr>
<td>STAX 1.0</td>
<td>Streaming API for XML parsing: allows active or pull parsing</td>
</tr>
</tbody>
</table>
## Specifications at W3C and Oasis

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WS-Security</td>
<td>Document based authentication, XML decryption and encryption, and XML signature</td>
</tr>
<tr>
<td>WS-Secure Conversation</td>
<td>Establish a secure channel between parties: works well with WS-ReliableMessaging, WS-Addressing, and others</td>
</tr>
<tr>
<td>WS-Addressing</td>
<td>Standardized addressing in SOAP headers for outgoing and incoming messages: actively used by WS-ReliableMessaging</td>
</tr>
<tr>
<td>WS-Reliable Messaging</td>
<td>Reliable transfer of SOAP messages: assures exactly-once and exactly-once-in-order delivery and enables asynchronous communication</td>
</tr>
<tr>
<td>WS-Policy</td>
<td>Standardized language to describe the capabilities and requirements of a consumer or provider; can be integrated with WSDL and other description formats (like SCA)</td>
</tr>
</tbody>
</table>
What is the Web Services Interoperability Organization?

WS-I

An open industry effort chartered to promote Web services interoperability across platforms, applications, and programming languages

A standards integrator to help Web services advance in a structured, coherent manner

Approximately 130 member organizations

- 70% vendors; 30% end-user organizations
**WS-I Goals**

### Achieve Web services interoperability
- Integrate specifications
- Promote consistent implementations
- Provide a visible representation of conformance

### Accelerate Web services deployment
- Offer implementation guidance and best practices
- Deliver tools and sample applications
- Provide a implementer’s forum where developers can collaborate

### Encourage Web services adoption
- Build industry consensus to reduce risks for early adopters
- Provide a forum for end users to communicate requirements
- Raise awareness of customer business requirements

SAP is currently chair of the Sample Applications Working Group and president of the WS-I Board.
SAP Is Committed to More Java Standards

Coming in the next major release of SAP NetWeaver

Service data objects (SDO) and JSR235
- A programming model that unifies object-oriented access across data sources of various types

Portlets and JSR168
- Compliant applications can run in SAP NetWeaver Portal immediately
- Standardized interfaces for preferences, user information, portlet requests and responses, deployment packaging, and security

JSP debugging and JSR45
- Debugging support for other (scripting) languages

Standards in the making (not yet covered by a Java Specification Request [JSR])

Service component architecture (SCA)
- Describes a model for building applications and systems using SOA

BPEL4People
- Describes how the WS-BPEL language needs to be extended to cover user interactions with business processes

Enterprise services community process
- An SAP-initiated, cross-industry community process for enterprise services