

# Comparing Oracle and SAP Support of Standards

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## EXECUTIVE SUMMARY

Enterprises that want to eliminate internal “stovepipes” and create a free flow of information and adaptable business processes, need open IT environments based on open standards. Such open environments have shown to lead to the efficiency, flexibility, and innovation needed to be globally competitive and deliver better services at lower cost. Open IT environments can transform a business, enabling it to better meet the needs of a customer-centric, on-demand world. Open standards are the threads that hold together heterogeneous, interoperable IT environments. Standards that are developed in a fair and open process -open standards - assure the broadest degree of interoperability.

**“Standards are the new field of competition all around the globe”**

**-- Phil Bond, US Undersecretary of Commerce for Technology**

Open IT environments are not built overnight; they evolve. Sustainable open systems require a pragmatic combination of technology and management. Together, they guide the introduction of open standards into the architecture, applications, and partnerships that drive an IT environment’s evolution.

Oracle is a leader in supporting standards bodies and deploys a wide range of industry standards and standards specifications in the Oracle product portfolio, which includes Oracle Fusion Middleware. Standards enable Oracle customers to complement their investments in Oracle software with best-in-class products from Oracle and other vendors without the need to replace and often without the need to reimplement existing software investments.

This paper compares and contrasts open standards and standards specifications support in Oracle Fusion Middleware and SAP NetWeaver, as well as the standards initiatives that Oracle supports, documenting the significant difference in approach between the architectures of these two product families. For example, because of Oracle’s open standards approach, enterprises that use Oracle Fusion Middleware can more quickly and easily move to a service-oriented architecture (SOA) in the heterogeneous IT environment that is common to most companies. Lines of business have the flexibility necessary to change business models and get the right support for the new business models in their enterprise applications.

In contrast, SAP AG offers minimal standards support for its NetWeaver middleware products. Designed primarily to run SAP applications, NetWeaver requires substantial additional investment in other software and custom development to integrate your enterprise.

## **ORACLE LEADS IN THE SUPPORT OF STANDARDS**

IT buyers are often concerned about whether today's software investments will have value in the future. An IT buyer who invests in standards-based technology is investing in technology that can be used further into the future without incurring unnecessary development and support costs.

Oracle is a primary participant in standards organizations that deal with database, middleware, applications, and infrastructure technologies. Since its inception, Oracle has been a leader in adhering to a wide range of standards across its product families. Developing to standards is a core part of Oracle culture and the basis for Oracle's early success. Oracle participates in more than 80 standards-development organizations and consortia. Oracle employees volunteer in leadership positions (as members of boards of directors, chairs, editors, and so on) in several standards organizations, both in the U.S. and internationally, including the World Wide Web Consortium (W3C), OASIS, WS-I, Liberty Alliance, Java Community Process (JCP), INCITS, and ANSI.

Oracle also actively collaborates with partners on standards; for example, it collaborates with Microsoft for .NET as well as Microsoft Office interoperability.

All told, Oracle is a leader and contributor in many new specs for the JCP, OASIS, WS-I, W3C, Liberty Alliance, OMG, and several other standards bodies. Oracle actively supports the introduction and certification of new standards.

### **Standards support portability and investment protection.**

Oracle Fusion Middleware's "Hot-Pluggable" capabilities provide organizations with additional choice and long-term flexibility, and investment protection. Standards help to enable pluggability in a cost effective manner. Customers can bring Oracle software into their IT environments and know that it can be ported quickly and easily to other popular software from vendors such as IBM, BEA, SAP, and Microsoft, as well as open source software.

### **A comparison of standards support: Oracle versus SAP.**

Standards is an area frequently oversimplified or dismissed via superficial assessments. Customers convinced that standards are a critical driver of lower cost and more reliable computing have asked what specific technical standards have been engineered into Oracle and SAP middleware and applications. Unfortunately this information has not been readily available and apparently of little interest to the market research organizations who are all accustomed to proprietary computing environments around enterprise applications.

But we're now at point where the industry has done a great job defining standards in detail with a good process for refining them over time. Comparing products against specific standards is now a straightforward and informative exercise, and

easy to verify. Customers want specifics as they begin the move to a standards-based environment to facilitate service oriented architectures.

In this paper we lay out the precise standards currently supported each company. Equally important, we show how those standards are supported because SAP in several cases supports an older version of a standard - for example with SAML - for security and federated identity management - SAP deploys version 1.1 instead of the latest SAML version 2.0. In other areas such as BPEL, the standard business process language for web services, SAP does not have native support for the standard but only import and export functions requiring a conversion process. Finally in some areas, SAP has added SAP-specific extensions or supports a standard only on certain components not written in ABAP<sup>1</sup>.

### **Software that doesn't support standards cannot fulfill the SOA promise.**

Enterprise application software can be engineered entirely without standards. Large groups of IT engineers can be trained in deploying and supporting software that doesn't incorporate standards. But such software can never fulfill the same promise as software based on open standards. Why? No company's software comes exclusively from a single vendor. To connect heterogeneous enterprise applications without standards-based interoperability, companies have to build custom connectors and therefore incur unnecessary cost and implementation efforts. What if one of the third-party software components changes? A new custom interface will have to be designed, implemented, and supported. Although it is technically feasible, software that doesn't support standards and is not based on interoperable modular design, results in higher cost, reduced flexibility, and increased risk. And with service-oriented architectures, open standards are more important than ever, because services come from diverse vendors.

### **Standards are everywhere in enterprise applications.**

Today's standards don't pertain just to specific functionality or integration. Oracle deploys open standards and standards specifications in all layers of all products. This white paper describes the support of standards in Oracle Fusion Middleware 10.1.3 for which Oracle E-Business Suite, PeopleSoft Enterprise, JD Edwards EnterpriseOne, and Siebel CRM are certified.

Oracle considers a standard to be open when it fits the following description:

- Not controllable by any single person or entity with any vested commercial interests
- Having a transparent evolution and management process open to all interested parties
- Platform-independent, vendor-neutral, and usable for multiple implementations

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<sup>1</sup> See [www.sap.info/public/INT/int/popupimage.php4/ImageFile-211694275f17fa3543](http://www.sap.info/public/INT/int/popupimage.php4/ImageFile-211694275f17fa3543).

- Openly published (including specifications and documentation)
- Available royalty-free or at minimal cost, with restrictions (such as field of use and defensive suspension) offered with reasonable and nondiscriminatory terms
- Approved through due process by rough consensus among participants

This white paper groups standards as follows:

- Business-process-handling and integration (EAI, B2B) standards
- Document standards
- IT-operation-management and service-level-agreement standards
- Programming standards
- Messaging standards
- Security standards
- User interface standards

This information is based on publicly available resources like [www.sap.com](http://www.sap.com), [help.sap.com](http://help.sap.com), [www.sdn.sap.com](http://www.sdn.sap.com), [techieindex.com](http://techieindex.com), [searchsap.techtarget.com](http://searchsap.techtarget.com), [www.sap.info](http://www.sap.info), [sapgenie.com](http://sapgenie.com), [www.duet.com](http://www.duet.com), [www.saptips.com](http://www.saptips.com), [saptraining.fh-wuerzburg.de](http://saptraining.fh-wuerzburg.de), [www.oracle.com](http://www.oracle.com), and [otn.oracle.com](http://otn.oracle.com). This whitepaper has also been reviewed for accuracy by leading analyst firms and has been found accurate at time of publication.

## COMPARING ORACLE FUSION MIDDLEWARE AND SAP NETWEAVER

The following tables document architectural differences in Oracle Fusion Middleware 10.1.3 and SAP NetWeaver 2004s open standards support. They include only standards whose support levels differ.

**Oracle supports ‘hot-pluggable’ capabilities, SAP is mainly for SAP only**

	<b>Oracle Fusion Middleware 10.1.3</b>	<b>SAP NetWeaver 2004s</b>
SOA	Runs on all major Java application servers*	Runs only on SAP Web Application Server
Identity management	Runs on all major Java application servers*	Runs only in SAP environment
Object-relational mapping	Runs on all major Java application servers*	Specific to SAP Web AS
Application frameworks	Eclipse 3.2 and Oracle JDeveloper	Eclipse 2.0, old version that doesn't work with the vast majority of plug-ins available today
Database for applications	Oracle, DB/2, SQL Server, Informix ‡	Oracle, IBM, Microsoft, MaxDB
Development platform	All major Java application servers*	SAP Web AS only

\*Including IBM WebSphere, BEA WebLogic, and JBOSS (open source)

‡ The Oracle eBusiness Suite only runs on the Oracle database. Starting with 10.1.3, Oracle ships the DataDirect JDBC Drivers to be used with the databases mentioned.

### Comparison of business process and SOA standards

	<b>Oracle Fusion Middleware 10.1.3</b>	<b>SAP NetWeaver 2004s</b>
BPEL	1.1	Supported only via import/export from third-party application
JSR 094/Rules	1	Not supported
SOAP	1.1, 1.2	1.1
UDDI	2.0, 3.0	2.0

### Comparison of messaging standards

	<b>Oracle Fusion Middleware 10.1.3</b>	<b>SAP NetWeaver 2004s</b>
Enterprise Web Services	1.1	Not supported
JMS	1.1	1.02
WS-Addr	1.0	Not supported
WS-CF	1.0	Not supported
WS-Events	2.0	Not supported
WS-Reliability	1.0	Not supported

### Comparison of IT operations/SLA standards

	<b>Oracle Fusion Middleware 10.1.3</b>	<b>SAP NetWeaver 2004s</b>
J2EE Deployment	1.1	Not supported
J2EE Management Specification	1.0	Not supported

### Comparison of programming standards

	<b>Oracle Fusion Middleware 10.1.3</b>	<b>SAP NetWeaver 2004s</b>
Common Metadata Annotations for Java Platform (JSR 250)	1.0	Not supported
DOM	Level 1, 2, 3	Level 1
EJB	2.1, 3.0	2.0
EJB3 Java Persistence API	1.0	Not supported
J2CA (JCA or J2EE Connector)	1.5	1.0
Java Enterprise Edition*	1.4, parts of 5	1.3
Java Object Cache	JCache (JSR 107)	Not supported
Java Standard Edition	1.4/5.0	1.4
JAX-RPC	1.1	1.0
RSS/Wiki (ModWiki)	1.0	Not supported
SAAJ	1.2	1.1
Servlet	2.4, 2.5	2.3

Web Services Metadata (JSR 181)	1.0	Not supported
WS Basic Profile	1.1	Not supported
XKMS	2.0	Not supported

\* Oracle Fusion Middleware 10.1.3 is fully J2EE 1.4 compliant. It also includes majority of Java EE 5.0 APIs, such as the Java Persistence API and EJB3. While SAP has announced support for Java EE 5, it is in preview and not supported in SAP NetWeaver 2004S, the current production version, which is still based on J2EE 1.3.

#### Comparison of security standards

	Oracle Fusion Middleware 10.1.3	SAP NetWeaver 2004s
Liberty Alliance	ID-FF 1.1 and 1.2	Not supported
WS-Federation	Yes	Not supported
PKCS	#1, #5, #7, #10, #12	#7, #12
PKIX	IETF RFC 2459	Not supported
SAML	1.0, 1.1, 2.0	1.0
XMLDIGSIG	1.0	Not supported

#### Comparison of user interface standards

	Oracle Fusion Middleware 10.1.3	SAP NetWeaver 2004s
JSF	1.0	Not supported
JSR 168	1.0	Not supported
JSP	2.0	1.2
JESI-JSP Tag Base Library	JSR 128	Not supported

#### Conclusion

For companies to benefit from the latest technologies and upcoming IT innovations, standards are not an option but a prerequisite. Significant returns on IT investment can be achieved with more direct connections with customers, suppliers, and business partners. In addition, companies face the introduction of service-oriented architectures. When companies implement all of this and comply with regulations, a return on investment can be achieved only with software that is based on open standards and that deploys the right versions of standards. Oracle provides the most complete technology stack based on open standards.

For more information, visit [www.oracle.com](http://www.oracle.com).

## **APPENDIX A: STANDARDS SUPPORTED IN ORACLE FUSION MIDDLEWARE**

This appendix explains in detail for each group of standards how Oracle deploys the standards, which versions are used, and what the most recent functionality of those versions has to offer. Not discussed in this section—but also supported by Oracle—are system management standards such as DMTF's CIM/WBEM, industry-specific standards such as RosettaNet, and generic standards such as XBRL.

### **Business-Process-Handling Standards**

The benefits of service-oriented architectures include the ability to change a business process without reimplementation efforts or to connect to a new business partner electronically without having to change the underlying interfaces. Using the right version of these standards matters. For example, UDDI version 2 is not widely deployed at all, whereas UDDI 3 is widely accepted as the most effective standard for registry services. Standards and standard initiatives that Oracle supports include:

#### **BPEL (Business Process Execution Language)**

A standard that includes information such as when to wait for messages, when to send messages, when to compensate for failed transactions, and so on. If BPEL is deployed from a business process modeler such as IDS Scheer or Savvion instead of natively supported within an enterprise application, users will have to export/import the BPEL rules. Any change to a business process will mean a reimport and reimplementation of the rule sets. With native support within the applications, rules can be changed on the fly and end users typically don't require IT help to change rules.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

#### **JSR 094/Rules (Java Rules Engine)**

Defines generic API support for parsing rule sets that are represented by use of XML. Other rule engine operations supported are adding objects to an engine, firing rules, getting resultant objects from the engine, using multiple instances of rule engines, sharing rule sets between different instances of a rule engine, and resetting and reusing an instance of a rule engine.

Current version Oracle Fusion Middleware 10.1.3 supports: V1

### **UDDI** (Universal Description, Discovery, and Integration)

A platform-independent, XML-based registry for businesses worldwide to use to list themselves on the Internet. UDDI creates a standard interoperable platform that enables companies and applications to dynamically find and use Web services over the Internet. It is a cross-industry effort driven by major platform and software providers as well as marketplace operators and e-business leaders in the OASIS standards consortium.

Current version Oracle Fusion Middleware 10.1.3 supports: 3

## **Document Standards**

Teams collaborating around the world need to be able to create, edit, and deploy documents. Standards such as WebDAV help such teams work on documents without being forced to deploy the same applications or the same portal globally. Standards and standard initiatives that Oracle supports include:

### **ICE** (Information & Content Exchange)

An XML vocabulary that provides an exchange protocol for content on the Web. ICE defines the roles and responsibilities of syndicators (data providers) and subscribers (data consumers). While ICE was initially developed to support commercial publishing applications on the Web, it is expected to prove useful in automating content exchange and reuse in both traditional publishing environments and in business-to-business relationships.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **ONIX**

ONIX International is the international standard for representing and communicating book industry product information in electronic form, incorporating the core content, which has been specified in national initiatives such as BIC Basic and AAP's ONIX Version 1. Onix supersedes EPICS.

Current version Oracle Fusion Middleware 10.1.3 supports: 2.1

### **WebDAV** (Web-Based Distributed Authoring and Versioning)

Provides functionality for creating, removing, and querying information about Web pages, for linking pages of any media type to related pages, for copying and moving Web pages, for receiving a listing of pages at a particular hierarchy level, for keeping more than one person from working on a document at the same time, and for storing important revisions of a document for later retrieval. Version management supports collaboration, by enabling two or more authors to work on the same document in parallel tracks.

Current version Oracle Fusion Middleware 10.1.3 supports: mod\_dav 1.0.3

### **XPath** (XML Path Language)

A terse (non-XML) syntax for addressing portions of an XML document. XPath is used to navigate through elements and attributes in an XML document. It includes more than 100 built-in functions, including functions for string values, numeric values, date and time comparison, node and QName manipulation, sequence manipulation, Boolean values, and more.

Current version Oracle Fusion Middleware 10.1.3 supports: 2

## **IT-Operation-Management and Service-Level-Agreement Standards**

The J2EE platform manages the infrastructure and supports the Web services. To enable development of componentized, secure, and interoperable business applications, IT operations management needs to be based on standards to monitor services across hardware platforms and networks. Standards and standard initiatives that Oracle supports include:

### **J2EE Deployment API** (Java Platform Enterprise Edition Deployment Application Programming Interface)

JSR 88 in the Java Community Process, it defines standard APIs to enable deployment of components and applications based on the J2EE platform as well as the development of platform-independent deployment tools.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

### **J2EE Management Specification**

The goal of the reference implementation (RI)—JSR 77—is to provide a tool for managing any application based on J2EE technology on any J2EE server that has implemented the J2EE management interfaces. Without this, companies have to manage and maintain applications separately on each server.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **JMX** (Java Management Extensions)

Java technology that supplies tools for managing and monitoring applications, system objects, devices such as printers, and service-oriented networks.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.2

### **WS Reconciliation Roadmap** (Web Services Reconciliation Roadmap)

Not a standard but a reconciliation attempt to align WS-Management and Web Services Distributed Management, including WS-Transfer, WS-ResourceFramework, WS-Notification, and WS-Eventing.

## **Messaging Standards**

Open messaging standards allow for messaging to move from a traditional point-to-point connection between two systems, such as Electronic Data Interchange (EDI), to n-to-n connections, inside the firewall as well as across the Internet. Deploying open standards such as SOAP in the most up-to-date version makes it unnecessary to write custom code to connect to legacy systems. Standards and standard initiatives that Oracle supports include:

### **AS2 (Application Statement 2)**

An encryption protocol for exchanging messages. AS2 is a standard by which vendor applications communicate EDI or other business-to-business data (such as XML) over the Internet by using HTTP, a standard used by the World Wide Web. AS2 provides security for the transport payload through digital signatures and data encryption and ensures reliable, nonrepudiable delivery through the use of receipts.

Current version Oracle Fusion Middleware 10.1.3 supports: 1

### **Enterprise Web Services (JSR 109)**

This specification defines the programming model and architecture for implementing web services in Java. The specification will build on the work of JSRs 67, 93 and 101. The specification will also build on the JSRs for J2EE technologies, including J2EE itself, Servlets and JSPs.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

### **IIOP/ORB (Internet Inter-Orb Protocol/Object Request Broker)**

An abstract protocol by which object request brokers (ORBs) communicate. An ORB is a piece of middleware software that allows programmers to make program calls from one computer to another via a network.

Current versions Oracle Fusion Middleware 10.1.3 supports: CORBA/IIOP 3.0.3, GIOP 1.2

### **Java Object Cache**

Specifies the API and semantics for temporary in-memory caching of Java objects, including object creation, shared access, spooling, invalidation, and consistency across JVMs.

Current version Oracle Fusion Middleware 10.1.3 supports: JCache (JSR 107)

### **JMS** (Java Message Service)

A Java message-oriented middleware (MOM) API for sending messages between two or more clients. For distributed applications running on Java application servers to make full use of messaging systems, Java-language clients and Java middle-tier services must have a common way to “talk to” enterprise messaging products. JMS provides that capability. In essence, it is an abstraction layer that lets Java programmers create elements without having to know the low-level particulars of any vendor’s solution. Version 1.1 supports the most recent versions of Sonic JMS. Without it, companies would have to build custom connectors.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

### **JTA** (Java Transaction API)

Java EE APIs allow distributed transactions across multiple interface resources. JTA provides for demarcation of transaction boundaries.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0.1b

### **MTOM** (Message Transmission Optimization Mechanism)

SOAP Message Transmission Optimization Mechanism is a protocol for optimizing the transmission and/or wire format of a SOAP message by selectively re-encoding portions of the message, while still presenting an XML Infoset to the SOAP application.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **ONS** (Object Naming Service)

Mechanism that leverages Domain Name System (DNS) to discover information about a product and related services from the Electronic Product Code (EPC). It is a component of the EPCglobal Network used with RFID (Radio Frequency Identification).

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **SOAP** (Simple Object Access Protocol)

Not a standard but a protocol for exchanging XML-based messages over a computer network, normally by use of HTTP. Version 1.2 of SOAP includes enhancements designed to simplify Web services development with SOAP toolkits. SOAP 1.2 introduces a “processing model” that allows developers to establish rules on how SOAP messages are handled. It also has several XML-oriented enhancements that will make it easier to manipulate data formatted as XML.

documents. With SOAP 1.1, proprietary header fields are necessary and a custom bridge would need to be built.

Current versions Oracle Fusion Middleware 10.1.3 supports: 1.1 and 1.2

#### **WSDL** (Web Services Description Language)

Not a standard but a specification, it describes the public interface to the Web service. WSDL is an XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information. The operations and messages are described abstractly and then bound to a concrete network protocol and message format to define an endpoint.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

#### **WSIF** (Web Services Invocation Framework)

Not a standard, but an adapter that describes the public interface to the Web service. Version 1.4 adds—among other new features—interaction with abstract representations of Web services through their WSDL descriptions instead of working directly with the SOAP APIs. This also allows updated implementations of a binding to be plugged into WSIF at runtime and allows the calling service to defer choosing a binding until runtime. To be replaced by the Services Fabric in Fusion Middleware version 11.

Current version Oracle Fusion Middleware 10.1.3 supports: parts of 1.4

#### **WS-Addr** (Web Services Addressing)

Provides transport-neutral mechanisms to reference Web services and to facilitate end-to-end addressing of endpoints in messages. This specification enables messaging systems to support message transmission through networks that include processing nodes such as endpoint managers, firewalls, and gateways in a transport-neutral manner.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

#### **WS-CF** (Web Services Coordination Framework)

Defines a software agent to handle context management. Web services in a composite application register with a coordinator to ensure messages and results are correctly communicated and allow, e.g. the success or failure of an individual service to be tied to the success or failure of the larger unit of work comprising multiple Web services.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **WS-Events** (Web Services Events, also known as Web Services Eventing)

Defines a protocol for one Web service (called a "subscriber") to register interest (called a "subscription") with another Web service (called an "event source") in receiving messages about events (called "notifications" or "event messages").

Oracle Fusion Middleware R11 will support 2.0 in future point release

### **WS-I** (Web Services Interoperability)

To promote Web services interoperability across platforms, applications, and programming languages, profiles are created as named groups of Web services specifications at specific version levels, along with conventions about how they work together. WS-I develops a core collection of profiles that support interoperability for general-purpose Web services functionality. Its goal is to be a standards integrator to help Web services advance in a structured, coherent manner. WS-I has organized the standards that will affect the interoperability of Web services into a “stack” based on functionalities.

Current versions Oracle Fusion Middleware 10.1.3 supports: BP 1.0 and 1.1

### **WS-Metadata Exchange**

Defines SOAP request-response message types retrieves WS-Policy, WSDL and XML Schema information associated with an endpoint receiving a Web service message, or a given target name space.

Oracle Fusion Middleware R11 will support this standard

### **WS-Reliability** (Web Services Reliability)

A SOAP-based OASIS specification that fulfills reliable messaging requirements critical to some applications of Web services.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **WS-TX** (Web Services Transaction)

A set of protocols to coordinate the outcomes of distributed application actions. It includes a specification providing protocols for services that create a coordination context, which uniquely identifies an activity, and register participants in the activity.

Oracle Fusion Middleware R11 will support it in a point release

### **XML Namespaces**

Forms a context for identifiers. An identifier defined in a namespace (a set of names accessible at a given point in a program) is associated with that namespace and can be defined in multiple namespaces. The meaning of an identifier in one namespace is completely separate from the meaning it has in any other namespace.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **XML Schema**

Can be used to express a set of rules to which an XML document must conform in order to be “valid.”

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **XML Signature**

Used to sign data, typically XML documents, but anything that is accessible via a URL can be signed.

Current versions Oracle Fusion Middleware 10.1.3 supports: Core Syntax and Processing, Canonical XML 1.0, Exclusive XML C14N 1.0

## **Programming Standards**

J2EE is the most common programming standard used in the IT industry today. But only if the right version of J2EE is deployed can users connect application servers such as those from Oracle, IBM, and BEA. Without the right version of standards such as J2CA, users cannot deploy the right adapters, effectively creating a version lock-in situation. Standards and standard initiatives that Oracle supports include:

### **ADA**

A third-generation computer programming language positioned to address much the same tasks as C or C++, but with the type safety of a language such as Java. A programming language is type-safe when it does not permit programmers to treat a value as a type to which it does not belong.

Current version Oracle Fusion Middleware 10.1.3 supports: Sec 88

### **Common Metadata Annotations for Java Platform (JSR 250)**

This JSR will develop annotations for common semantic concepts in the J2SE and J2EE platforms that apply across a variety of individual technologies. Part of Java EE 5.0 and OFM, it has complete support of feature but is not compliant with the spec (has not passed CTS).

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **DOM (Document Object Model)**

A form of representing structured documents as an object-oriented model. DOM is the official W3C standard for representing structured documents in a platform- and language-neutral manner. Level 3 facilitates renaming of nodes. It also allows two documents to be in memory or be merged, or a part of one document to be included in another. Without Level 3 support, such procedures would have to be custom-coded.

Current versions Oracle Fusion Middleware 10.1.3 supports: Level 1, 2, 3

### **EJB (Enterprise JavaBeans)**

A server-side component that encapsulates the business logic of an application. Version 3 provides automatic rollback.

Current versions Oracle Fusion Middleware 10.1.3 supports: 2.1 and 3.0

### **EJB3 Java Persistence API**

The EJB3 Java Persistence API supports basic object-oriented concepts like inheritance and polymorphism with EJB3 entities. TopLink Essentials (a community edition) is the Reference Implementation JPA 1.0 of Java EE 5.0 and is fully compliant with the spec.

Current versions Oracle Fusion Middleware 10.1.3 supports: 1.0

### **J2CA (a.k.a. JCA) (J2EE Connector Architecture)**

With the J2EE 1.4 and J2EE Web service specifications, Web services have been defined as part of J2EE. Version 1.5 of J2CA supports the latest iWay adapters. With previous versions of J2CA, users are locked in to using older versions of iWay adapters, which typically results in the need to build custom connectors.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.5

### **J2EE (Java 2 Platform, Enterprise Edition)**

A programming platform—part of the Java platform—for developing and running distributed multitier architecture Java applications, based largely on modular software components running on an application server. Version 1.4 allows companies to deploy and consolidate application servers from multiple vendors, including Oracle Fusion Middleware, IBM WebSphere, BEA WebLogic, and JBoss.

Current version Oracle Fusion Middleware 10.1.3 supports: Oracle Fusion Middleware 10.1.3 is fully J2EE 1.4 compliant. In addition, Oracle Fusion Middleware offers early access to various parts of the Java Enterprise Edition 5.0 version, such as the Java Persistence API of EJB3.

### **J2SE (Java 2 Platform, Standard Edition)**

A collection of Java programming language APIs. Version 5.0 adds support for server-class Solaris/SPARC machines running the server VM, as well as support for the DOM level-3 family of APIs. In 5.0 the XDND protocol is also supported and the Motif DnD protocol has been reimplemented to not depend on the Motif library.

Current versions Oracle Fusion Middleware 10.1.3 supports: 1.4 to 5.0

### **JAF (Java Agent Framework)**

Allows an agent's behavioral logic to perform without the knowledge that it was operating under simulated conditions. For example, a problem-solving component in a simulated agent would be the same as in a real agent of the same type. The

framework also needed to be flexible and extensible and yet maintain separation between mutually dependent functional areas to the extent that one could be replaced without modification of the other.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **JAX-RPC** (Java API for XML-Based RPC)

Allows invoking from a Java application a Java-based Web service with a known description. The JAX-RPC version 1.1 specification is required for using SOAP Messages with Attachments (SwA) to support MIME-encoded parameters or return types in a SOAP message.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

### **JAX-WS** (Java API for XML Web Services)

Used to build Web applications and Web services, incorporating the newer XML-based Web Services functionality. Provides the foundation for the Web Services Interoperability Technology to present enterprise features that interoperate with Microsoft Windows Communication Foundation.

Oracle Fusion Middleware will support it in R11

### **JAXB** (Java Architecture for XML Binding)

Allows Java developers to edit and create XML by using familiar Java objects.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **JAXP** (Java API for XML Processing)

Provides the ability to validate and parse XML documents. Version 1.2 adds support for the W3C XML Schema and includes an XSLT framework based on TrAX (Transformation API for XML), plus some updates to the parsing API to support DOM level 2 and SAX version 2.0, as well as an improved scheme for locating pluggable implementations.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.2

### **JAXR** (Java API for XML Registries)

Defines a standard API that enables Java platform applications to access and programmatically interact with various kinds of metadata registries.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **JDBC** (Java Database Connectivity)

An API for the Java programming language that defines how a client may access a database.

Current version Oracle Fusion Middleware 10.1.3 supports: 3.0

### **JNDI** (Java Naming and Directory Interface)

An application programming interface (API) for accessing different kinds of naming and directory services. JNDI is not specific to a particular naming or directory service. It can be used to access many different kinds of systems, including file systems; distributed object systems such as CORBA, Java RMI, and EJB; and directory services such as LDAP, Novell NetWare, and NIS+.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.2

### **MOF** (Managed Object Format)

Standard language used to define elements of the Common Information Model (CIM). The MOF language specifies a syntax for defining CIM classes and instances. MOF provides developers and administrators with a simple and fast technique for modifying the CIM Repository.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **RMI/IIOP** (Remote Method Invocation over Internet Inter-Orb Protocol)

A container or direct replacement for structures, unions, sequences, arrays, and strings. Remote Method Invocation (RMI) is one Java implementation of the remote procedure call paradigm, in which distributed applications communicate by invoking procedure calls and interpreting the return values. Oracle Containers for J2EE (OC4J) supports RMI over both the Oracle Remote Method Invocation (ORMI) protocol and the IIOP protocol. By default, OC4J uses RMI/ORMI. It provides additional features such as invoking of RMI/ORMI over HTTP.

Current version Oracle Fusion Middleware 10.1.3 supports: RMI/ORMI

### **RSS/Wiki** (Rich Site Summary / Wiki) a.k.a. ModWiki or RSS WikiModule

An extension module for RSS to describe metadata particular to wiki applications. As such it's an XML application conforming to the W3C's RDF Specification and the RSS specification of the RSS-DEV Working Group.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **SAAJ** (SOAP with Attachments API for Java)

Provides a standard way to send XML documents over the Internet from the Java platform. In version 1.2, a security intermediary authenticates users and verifies message integrity, effectively alleviating or complementing processing done by the ultimate receiver, resulting in higher security levels.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.2

### **SAX 1.0/2.0 + Extension** (Serial Access Parser API for XML)

Provides a mechanism for reading data from an XML document.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0/2.0+ Extension.

### **Servlet**

Allows a software developer to add dynamic content to a Web server by using the Java platform. The generated content is commonly HTML but may be other data such as XML. Version 2.4 added—among other improvements—support for third-party applications. In version 2.4, security is enhanced with support for the Transport Layer Security (TLS) 1.0 security protocol and the exporting capabilities of public and private key pairs and trusted roots. Version 2.5 is part of Java EE 5.0 and OFM has partial implementation and is not compliant with spec

Current version Oracle Fusion Middleware 10.1.3 supports: 2.4, 2.5

### **UBL NDR** (Universal Business Language Naming and Design Rules)

Provides guidelines for the construction of XML components for the UBL vocabulary, conveying a normative set of XML schema design rules and naming conventions for the creation of business based XML schema for business documents being exchanged between two parties using XML constructs defined in accordance with the ebXML Core Components Technical Specification.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **WS Basic Profile** (Web Services Basic Profile)

Specification from the Web Services Interoperability industry consortium, provides interoperability guidance for core Web Services specifications such as SOAP, WSDL, and UDDI. The profile uses Web Services Description Language (WSDL) to enable the description of services as sets of endpoints operating on messages.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

### **Web Services for Remote Portlets (WSRP)**

Standard for content aggregators, such as Web portals, to access and display content sources (i.e. portlets) that are hosted on a remote server. WSRP is a technology agnostic protocol designed for accessing remote Portlets in a standard manner. The WSRP specification defines a web-service interface for interacting with interactive presentation-oriented web services.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **Web Services Metadata - JSR 181 (Java Specification Requests)**

Defines a simplified programming model that facilitates and accelerates the development of enterprise Web services. Without Web Services Metadata, a declarative tool is required to support a metadata programming environment.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **XKMS (XML Key Management Specification)**

Leverages the Web Services framework to make it easier for developers to secure inter-application communication using public key infrastructure (PKI). XML Key Management Specification is a protocol developed by W3C, which describes the distribution and registration of public keys. Services can access an XKMS compliant server in order to receive updated key information for encryption and authentication.

Current version Oracle Fusion Middleware 10.1.3 supports: 2.0

### **XML (Extensible Markup Language)**

A markup language for creating special-purpose markup languages, capable of describing many different kinds of data.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **XQuery (Query Language)**

Provides the means to extract and manipulate data from XML documents or any data source that can be viewed as XML, such as relational databases or office documents.

Current version Oracle Fusion Middleware 10.1.3 supports: 1

**XSLT** (Extensible Stylesheet Language Transformations)

An XML-based language for the transformation of XML documents. The original document is not changed; rather, a new document is created, based on the content of an existing one.

Current version Oracle Fusion Middleware 10.1.3 supports: 2

## **Security Standards**

With more connections outside the firewall to suppliers, customers, and business partners using the Internet, security is a top priority for all IT decision makers. But without federated security management based on SAML and Liberty, maintaining user repositories, for example, remains error-prone and leaves companies vulnerable. Standards and standard initiatives that Oracle supports include:

### **ADSI** (Active Directory Service Interface)

A library of routines that provide an interface to various directories, such as the Windows NT user account database and the Windows 2000 Active Directory. ADSI can be used in VBScript, Visual Basic, Visual Basic for Applications, and other environments. Besides NT and Active Directory, ADSI also supports Novell bindery, Novell NDS, Internet Information Server (IIS), and other LDAP compliant directories.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **HTTP(S)** (Hypertext Transfer Protocol)

A set of rules for exchanging files, with an additional encryption/authentication layer between HTTP and TCP.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.1

### **JAAS** (Java Authentication and Authorization Service)

An API that enables Java applications to access authentication and access control services without being tied to those services.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **Kerberos**

A computer network authentication protocol that allows for communication over an insecure network to prove identity in a secure manner. Version 5.0 allows for tracing across hardware platforms, including mainframes. Without it, only a custom-built process can track and trace transactions across hardware platforms.

Current version Oracle Fusion Middleware 10.1.3 supports: 5.0

**LDAP** (Lightweight Directory Access Protocol)

A networking protocol for querying and modifying directory services running over TCP/IP.

Current versions Oracle Fusion Middleware 10.1.3 supports: 2.0 and 3.0

**Liberty Alliance**

Consortium representing organizations worldwide, created in 2001 to address the technical, business, and policy challenges of identity and identity-based Web services.

Current versions Oracle Fusion Middleware 10.1.3 supports: ID-FF 1.1 and 1.2

**PKCS** (Public Key Cryptography Standards)

A set of de facto standards in wide use in the industry today. It includes encryption (PKCS #1), password-based encryption (PKCS #5), cryptographic messages (PKCS # 7), private-key information (PKCS #8), attribute types (PKCS #9), certification requests (PKCS #10), and personal information exchange (PKCS #12).

Current versions Oracle Fusion Middleware 10.1.3 supports: #1, #5, #7, #10, #12

**PKIX** (Public-Key Infrastructure X.509)

A public key certificate (or identity certificate) is a certificate that uses a digital signature to bind together a public key with an identity—information such as the name of a person or an organization, the address, and so forth.

Current version Oracle Fusion Middleware 10.1.3 supports: IETF RFC 2459

**SASL** (Simple Authentication and Security Layer)

A framework for authentication and data security in Internet protocols.

Current version Oracle Fusion Middleware 10.1.3 supports: 2.1.17

**SSL** (Secure Sockets Layer)

Cryptographic protocols that provide secure communications on the Internet.

Current version Oracle Fusion Middleware 10.1.3 supports: 3.0

### **SAML** (Security Assertion Markup Language)

An XML-based standard for authentication and authorization designed to provide single sign-on so that people can be authenticated once and then be able to access multiple Web services. Without SAML, companies cannot do federated security management: If a person leaves the company, all user directories need to be updated manually. SAML 2.0 allows identities to be reused at third-party sites.

Current versions Oracle Fusion Middleware 10.1.3 supports: 1.0, 1.1, and 2.0

### **TLS** (Transport Layer Security)

A protocol for securing and authenticating communications across a public network by using data encryption that can be negotiated during the startup phase of many internet protocols, such as SMTP, LDAP, IMAP, and POP3. TLS is designed as a successor to SSL and uses the same cryptographic methods but supports more cryptographic algorithms.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **XMLDIGSIG** (XML Digital Signature)

XML Signatures provide integrity, message authentication, and/or signer authentication services for data of any type, whether located within the XML that includes the signature or elsewhere.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

### **Web Services Security**

A communications protocol providing a means of applying security to Web services.

Current versions Oracle Fusion Middleware 10.1.3 supports: SAML Token Profile 1.0, SOAP Message Security 1.0, Username Token Profile 1.0, X.509 Certificate Token Profile 1.0, Kerberos Token Profile 1.0 (committee draft), SOAP Messages with Attachments (SwA) Profile 1.0 (committee draft).

### **WS-Federation** (Web Services Federation)

Defines mechanisms to allow different security realms to federate by allowing and brokering trust of identities, attributes, and authentication between participating Web services.

Current version Oracle Fusion Middleware 10.1.3 supports: 1

### **X.509**

A standard for public key infrastructure (PKI). Specifies, among other things, standard formats for public key certificates and a certification path validation algorithm.

Current version Oracle Fusion Middleware 10.1.3 supports: 3.0

### **XACML** (eXtensible Access Control Markup Language)

Describes both a policy language and an access-control decision-request/response language (both written in XML). XACML is closely related to SAML and is an extension to it. XACML defines how policy information for access control must be defined and transported. Policy makers can use it to define what Web services can do with access privileges to documents. XACML thereby becomes a single repository for the entire organization.

Current version Oracle Fusion Middleware 10.1.3 supports: 2

### **XML Encryption** (Extended Markup Language Encryption)

A specification that defines how to encrypt the contents of an XML element.

Current version Oracle Fusion Middleware 10.1.3 supports: Core Syntax and Processing, Decryption Transform for XML Signature.

## **User Interface Standards**

Many companies deploy portals to provide access to disparate applications. But without the right standards, such as JSR 168, users cannot use a single portal of their choice to give access to all disparate applications. This results in the need to deploy multiple portals or the inability to share data via remote portlets among suppliers, customers, business partners, and employees. Standards and standard initiatives that Oracle supports include:

### **JESI-JSP Tag Base Library** (Java Edge Side Include)

JESI tags simplify the declaration of cacheable dynamic fragments, content invalidation, and personalization.

Current version Oracle Fusion Middleware 10.1.3 supports: JSR 128

### **JSF** (JavaServer Faces)

A Java-based Web application framework that simplifies the development of user interfaces for Java EE applications. Without JSF, a proprietary tool is required, which necessitates additional skills and causes incompatibilities with other standards-based tools and environments.

Current version Oracle Fusion Middleware 10.1.3 supports: JSR 252

### **JSP** (Java Server Pages)

Allows software developers to dynamically generate HTML, XML, or other types of documents in response to a Web client request. JSP 2.0 adds—among other new features—several new configuration options to the deployment descriptor, to allow for global configuration instead of per-page configuration. More-flexible rules and new standard action elements make writing JSP pages as XML documents much easier with version 2.0.

Current version Oracle Fusion Middleware 10.1.3 supports: 2.0

### **JSR 168** (Java Specification Requests)

An API specification for the Java Enterprise Platform to enable interoperability between Java portlets and Web portals. JSR 168 ensures that a portal can display portlets from other portal vendors. Without it, companies would be forced to build and deploy all portlets from one and the same vendor. This is specifically a barrier in environments in which customers, suppliers, and business partners need access to data via these portlets.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

**SPML** (Service Provisioning Markup Language)

An XML-based framework, being developed by OASIS, for exchanging user, resource and service provisioning information between cooperating organizations.

Current version Oracle Fusion Middleware 10.1.3 supports: 2.0

**WSRP** (Web Service Remote Portlet)

A standard that enables Web portals to access and display portlets that are hosted on a remote server. The WSRP specification defines a Web service interface for interacting with interactive presentation-oriented Web services. When the WSRP standard is not deployed, a third-party data feed cannot be deployed.

Current version Oracle Fusion Middleware 10.1.3 supports: 1

**XHTML** (Extensible Hypertext Markup Language)

A family of current and future document types and modules that reproduce, subset, and extend HTML 4. XHTML family document types are XML based, and ultimately are designed to work in conjunction with XML-based user agents.

Current version Oracle Fusion Middleware 10.1.3 supports: 1.0

## **APPENDIX B - Oracle JSR Participation**

As an executive member of the Java Community Process, Oracle participates in more than 80 Java Specification Requests (JSRs) and Oracle people serve as spec leads for several important JSRs.

### **JSRs in which Oracle contributes a Spec Lead:**

JSR Specification

JSR 74 Public Key Cryptography Standards 1.0

JSR 138 Performance Metric Instrumentation

JSR 198 A Standard Extension API for Integrated Development Environments

JSR 220 Enterprise JavaBeans 3.0

JSR 223 Scripting for the Java Platform

JSR 225 XQuery API for Java (XQJ)

JSR 227 A Standard Data Binding & Data Access Facility for J2EE

JSR 247 Data Mining 2.0

JSR 276 Design-Time Metadata for JavaServer Faces Components

### **Other JSRs in which Oracle participates:**

JSR 4 ECperf Benchmark

JSR 5 XML Parsing

JSR 10 Preferences API

JSR 12 Java Data Objects

JSR 15 Image I/O Framework

JSR 16 Java Connector Architecture (JCA)

JSR 19 Enterprise JavaBeans 2.0

JSR 21 JAIN Java Call Control

JSR 26 UML/EJB Mapping

JSR 30 J2ME Connected, Limited Device Configuration

JSR 31 XML Data Binding

JSR 37 Mobile Information Device Profile for the J2ME Platform

JSR 40 The Java Metadata Interface (JMI)

JSR 43 JTAPI 1.4

JSR 45 Java APIs for WSDL

JSR 51 New I/O APIs for the Java Platform

JSR 53 Java Servlet 2.3 and JavaServer Pages 1.2

JSR 56 Java Network Launching Protocol and API

JSR 67 Java APIs for XML Messaging 1.0

JSR 69 Java OLAP Interface (JOLAP)

JSR 72 Java GSS API

JSR 73 Data Mining API

JSR 76 RMI Security for J2SET

JSR 88 Java EE Application Deployment

JSR 94 Java Rule Engine API

JSR 101 Java APIs for XML-based RPC

JSR 107 JCACHE - Java Temporary Caching API

JSR 109 Implementing Enterprise Web Services

JSR 110 J2EE APIs for Continuous Availability

JSR 112 J2EE Connector Architecture 1.5

JSR 114 JDBC Rowset Implementations

JSR 115 Java Authorization Contract for Containers

JSR 117 J2EE APIs for Continuous Availability

JSR 121 Application Isolation API

JSR 126 Distributed Page Assembly

JSR 127 JavaServer Faces

JSR 128 JESI - JSP Tag Library for Edge Side Includes (ESI)

JSR 131 ECPeef 1.1

JSR 133 Java Memory Model and Thread Specification Revision

JSR 139 Connected Limited Device Configuration 1.1

JSR 147 Workspace Versioning and Configuration Management

JSR 151 Java 2 Platform, Enterprise Edition 1.4 (J2EE 1.4)

JSR 152 JavaServer Pages 2.0

JSR 153 Enterprise JavaBeans 2.1

JSR 155 Web Services Security Assertions

JSR 156 Java API for XML Transactions

JSR 159 Java Process Component API (JPC)

JSR 160 Java Management Extensions (JMX) Remote API 1.0

JSR 163 Java Platform Profiling Architecture

JSR 168 Portlet Specification

JSR 169 JDBC Optional Package for CDC/Foundation Profile

JSR 170 Content Repository for Java Technology API

JSR 172 J2ME Web Services

JSR 173 Streaming API for XML

JSR 174 Monitoring and Management Specification for the Java Virtual Machine

JSR 175 A Metadata Facility for the Java Programming Language

JSR 176 J2SE 5.0 (Tiger) Release Contents

JSR 188 CC/PP Processing

JSR 196 Java Authentication Service Provider Interface for Containers

JSR 199 Java Compiler API

JSR 201 Extending the Java Programming Language with Enumerations, Autoboxing, Enhanced for loops and Static Import

JSR 204 Unicode Supplementary Character Support

JSR 206 Java API for XML Processing (JAXP) 1.3

JSR 207 Process Definition for Java

JSR 208 Java Business Integration (JBI)

JSR 212 Server API for Mobile Services: Messaging - SAMS: Messaging

JSR 215 Java Community Process version 2.6

JSR 221 JDBC 4.0 API

JSR 222 Java Architecture for XML Binding (JAXB) 2.0

JSR 223 Scripting for the Java Platform

JSR 224 Java API for XML-Based Web Services (JAX-WS) 2.0

JSR 233 J2EE Mobile Device Management and Monitoring

JSR 244 Java Platform, Enterprise Edition 5 (Java EE 5)

JSR 245 JavaServer Pages 2.1

JSR 250 Common Annotations for the Java Platform

JSR 252 JavaServer Faces 1.2

JSR 261 Java API for XML Web Services Addressing (JAX-WSA)

JSR 262 Web Services Connector for Java Management Extensions (JMX) Agents

JSR 265 API for Utilizing Web Services Policy

JSR 269 Pluggable Annotation Processing API

JSR 270 Java SE 6 ("Mustang") Release Contents

JSR 273 Design-Time API for JavaBeans (JBDT)

JSR 277 Java Module System

JSR 283 Content Repository for Java Technology API Version 2.0



*Comparing Oracle and SAP Support of Standards*

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