

Oracle Service-Oriented Architecture Suite

*Best of Breed SOA Tools and Middleware
July 2006*

EXECUTIVE OVERVIEW

Changing markets, increasing competitive pressures and evolving customer needs are placing greater pressure on IT to deliver greater flexibility and speed. Today every organization is faced with the need to predict change in a global business environment, to rapidly respond to competitors, and to best exploit organizational assets for growth. In response to these challenges, leading companies are adopting Service-Oriented Architecture (SOA) as a means of delivering on these requirements by overcoming the complexity of their application and IT environments. SOA represents a fundamental shift in the way new applications are designed, developed, and integrated with legacy business applications, and facilitates the development of enterprise applications as modular business services that can be easily integrated and reused.

Oracle Fusion Architecture builds on SOA and provides a blueprint for creating next generation infrastructures that enables sustainable competitive advantage through the continuous blending of business insight powered by high quality information, and adaptable business processes realized through SOA. Oracle SOA Suite enables Oracle Fusion Architecture with a comprehensive, unified suite of standards-based SOA components that provides a comprehensive technology foundation.

Oracle SOA Suite is a standards-based best of breed suite that enables you to build Service-Oriented Application and deploy them to your choice of middleware platform. It consists of (i) a Integrated Service Environment (ISE) to develop services; (ii) a multi-protocol Enterprise Service Bus (ESB) to integrate applications; (iii) a services registry for discovering and managing the lifecycle of services; (iv) a BPEL-based orchestration engine to tie services into business processes; (v) a business rules engine to enable business policies to be captured and automated; (vi) a Web services management and security solution to enforce authentication and authorization policies on services and to monitor services and processes for compliance to SLAs; (vii) a Business Activity Monitoring (BAM) solution to gain real-time visibility into business entities and their interactions, and enables services to be optimized, and, (viii) an Enterprise Portal for employees, customers and partners to access content, access relevance performance metrics, collaborate and take actions via interaction with business processes.

Oracle SOA Suite can help you achieve greater organizational flexibility better than any other solution in the market. It can reduce your costs and middleware complexity better than any other solution. Finally, it can help you to achieve the best total value of opportunity.

INTRODUCTION

Today, every organization is faced with the need to predict changes in the global business environment, to rapidly respond to competitors, and to best exploit organizational assets to prepare for growth. Your enterprise application infrastructure can either help you meet these business imperatives or it can impede your ability to change. To help you, your infrastructure must:

- *Improve Your Ability to Predict and Respond to Change* - By improving your organization's visibility to business events; by enabling you to develop and roll out new business services quickly; by modernizing your legacy systems and applications; and by helping you to optimize business processes in response to market dynamics.
- *Enhance Organizational Productivity* - By facilitating better decisions with accurate business intelligence; by helping employees to find the information they need and to share it collaboratively with others; and by providing employees and customers with the information they need when and where they need it.
- *Simplify Your Information Technology Environment* - By being provisioned, deployed, monitored, and managed as a single cohesive infrastructure.
- *Leverage Existing Investments* - By being modular, open, and extensible to allow you to adopt it in a heterogeneous environment without needing to remove or replace your existing systems, and in an incremental fashion.

Oracle SOA Suite can improve your organization's ability to predict and respond to market dynamics, it can enhance your organization's productivity, and it can radically simplify your information technology environment, while enabling you to exploit your existing investments.

This paper outlines the capabilities of Oracle SOA Suite.

SOA PROMISE

IT's charter of delivering on dynamic business requirements such as improving the customer value proposition, competing on process efficiency and delivering end to end processes, complying with new regulations, supporting M&A, realizing better insight and auditing, and delivering on shorter change cycles is hindered by fragmented IT landscape and IT silos.

SOA Drivers

Increasingly fragmented and complex infrastructures are limiting IT's ability to deliver on business needs. Many organizations have inherited disjointed legacy systems and packaged applications, a large proportion of which were never designed for information interoperability, integration, and reuse. The result of this is that most of the IT budget goes into maintenance of the current IT infrastructure and only a small amount is available for new functionalities to drive new business

opportunities. The major portion of budget for new capabilities goes into the cost of integrating new functionality into the existing systems that offers poor support for interoperability. In fact, according to Gartner's *IT Spending and Demand Survey* the end result of the status quo is that organizations effectively spend less than 10% of their IT budgets on "real" new capabilities and only 12% on integration – leaving more than 80% of the IT budget focused on maintenance.

Traditionally, business information systems have been developed with a functional orientation often resulting in silos of services and information. The fundamental problem here is that end-to-end business processes, which must span silos, are not adaptable to change as business needs evolve – they are fragmented and embedded deep within systems. Enterprise application integration (EAI) and other traditional middleware solutions partially address this by enabling systems to communicate with each other, but they don't fully solve the problem. Their ability to create cross-application business processes is inadequate, and they allow only limited business process adaptability. Moreover, these traditional solutions come at a high cost. The majority of EAI and traditional middleware solutions use proprietary technology, which makes you dependent on specialized skills and limits you to that single vendor's products. In addition, the systems become tightly coupled, so if an interface change occurs in one system, all other systems need to be adjusted. So not only does the technology make it difficult to make changes; it can become cost-prohibitive to do so.

Key SOA Benefits

SOA helps address the fragmented IT landscape and addresses the difficulties associated with silos of IT infrastructure and applications. It enables greater flexibility through:

1. *Greater Interoperability* – SOA, and the industry standards underpinning it, enable existing silo'd applications to interoperate seamlessly and in a more easy to maintain manner than any traditional EAI solution.
2. *Increased Reuse* – Once legacy systems and applications are service-enabled, these services can be reused, which results in reduced ongoing development costs and results in reduced time to market. Further, business processes built as an orchestration of services can also be exposed as services - further increasing reuse.

“Oracle’s SOA Suite provides us with a comprehensive set of Process, Integration and Portal tools to build a highly dynamic system to fulfill our requirements for flexibility and short-term business results. It was key to us that Oracle’s SOA Suite integrates well into our present heterogeneous IT environment including the existing CRM system, SAP R/3 financials in the backend, Novell Single-Sign-On and Directory technologies and various other systems.

- Wolfgang Schlott, Process Management, Lufthansa Flight Training

3. *More Agile Business Processes* – SOA reduces the gap between the business process model and implementation. This enables changes to business processes already implemented as orchestrations of services to be easily captured and implemented.
4. *Improved Visibility* – SOA can give improved business visibility by enabling business capabilities exposed as services, and the status of in-flight business processes automated with BPM technology, to be rapidly integrated into service-enabled enterprise portals aiding business decision-making.
5. *Reduced Maintenance Costs* – SOA development encourages duplicated overlapping business capabilities (services) that span multiple applications and systems to be consolidated into a small number of shared services. This enables elimination of redundant services and reduces the cost of maintaining systems by providing a single point of change for application logic. Further, SOA gives IT the means to gradually phase out legacy systems and applications whilst minimizing disruption to the applications that are built on, or are integrated with, them using SOA principles. This frees up funds for new projects.

Lastly, SOA also enables compliance and governance by realizing better and more standardized operational procedures, provides the basis for a comprehensive security solution, and enables better visibility into business operations and exception conditions.

No wonder leading companies are tackling the complexity of their application and IT environments with SOA.

Integrated Service Environments (ISEs) enable developers to expose application functionality as services. Enterprise Service Bus technology makes service connections less brittle when changes need to be made, for example by supporting a logical naming construct, and by decoupling applications from protocols and data formats. Business Process Management (BPM) solutions such as those based on Business Process Execution Language (BPEL) enable services to be orchestrated into business processes. Processes built using a BPM solution can be reused, changed easily in response to business requirements, and enable real-time process visibility. Business Activity Monitoring Solutions realize monitoring of KPIs and SLAs and enable business entities to take pro-active actions. These key technologies when used together form the basis for continuous improvement – or the *Fusion Effect*. This is shown visually in

Figure 1.

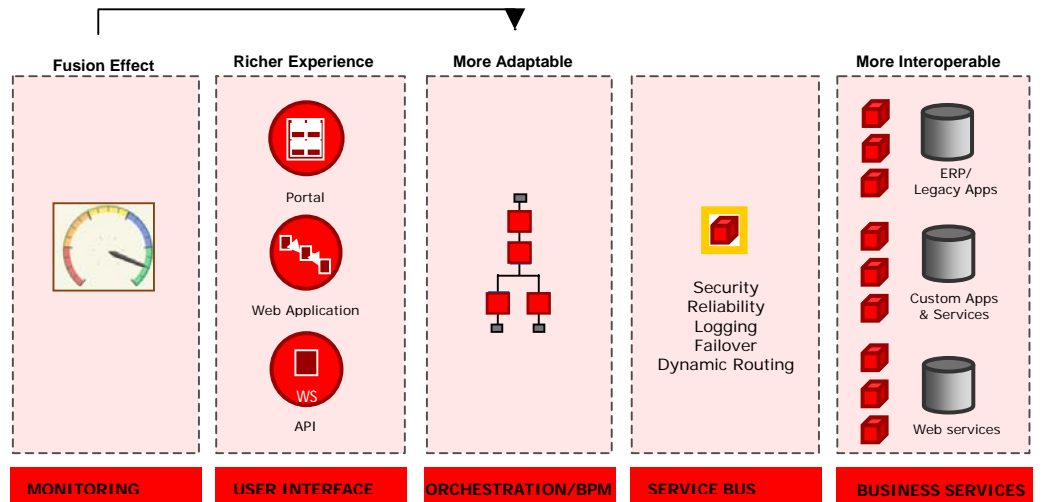


Figure 1: SOA and the Fusion Effect

Using SOA to Address Enterprise Requirements

SOA identifies the standards-based approach to establishing flexible applications and adaptable business processes, but does not alone fully describe how to address important customer concerns such as how to leverage information to gain actionable insight; how to create collaborative workplaces linking people, processes, and systems; how to achieve better security through unified services and identity management; how to deliver mainframe “QoS” to services at run time; and, to do so on low cost commodity hardware.

Uniquely ranked as Leader
in the following Gartner Magic Quadrants

- Application Platform Suites
- Development Tools
- Application Server
- Web Services Platform
- Enterprise Portal
- Business Integration
- Identity Management
- Web Services Management
- ETL Data Integration

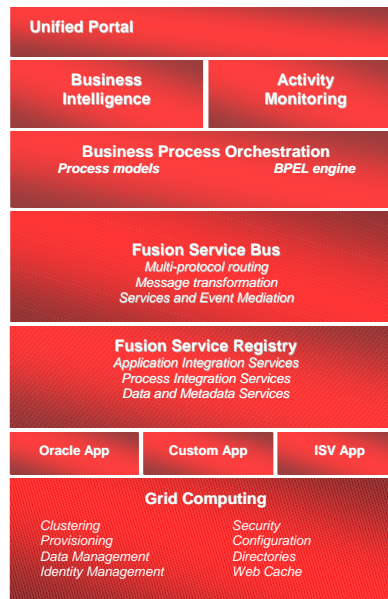


Figure 2: Oracle Fusion Architecture

Oracle Fusion Architecture fully embraces SOA and provides a blueprint for creating next generation infrastructure that addresses these enterprise requirements (shown in Figure 2).

The key principles of this architecture are:

- Service and event enabled applications for maximum flexibility and reuse
- Model-driven applications and business processes for highest productivity and customizability
- Actionable intelligence to make decisions and optimize business operations in real time
- Grid ready to deliver mainframe 'QoS' on low cost hardware
- Standards-based, portable and pluggable in a heterogeneous applications and technology environment to enable seamless adoption.

Oracle Fusion Middleware enables Oracle Fusion Architecture with a comprehensive, unified suite of standards-based middleware components that provides a comprehensive technology foundation – an Application Platform Suite (APS). Oracle SOA Suite is a comprehensive package of key best of breed components in Oracle Fusion Middleware that is focused on enabling organizations to build and deploy applications built to SOA. It seamlessly integrates into existing heterogeneous IT environments including 3rd party application server products. As such, it provides the quickest return on investment and lowest risk solutions to organizations looking to succeed with SOA.

"Oracle leads all other vendors. This is due to strong scores in the current offering category of connection where the vendor provides superior support for a wide range of connectivity protocols, including both core and extended Web service specifications and standards. The vendor also scored well in the areas of mediation and change and control."

- Mike Gilpin, Ken Vollmer, John Rymer,
Forrester Wave – Enterprise Service Bus,
Q4 2005

ORACLE SOA SUITE VALUE PROPOSITION

Oracle SOA Suite provides a comprehensive suite of key best of breed SOA technologies that plugs into heterogeneous IT infrastructures and enables enterprises to incrementally adopt SOA. The components of the suite benefit from common capabilities including a single deployment and management model and tooling, end-to-end security and unified metadata management. Oracle SOA Suite is unique in that it provides a set of integrated capabilities – messaging, service discovery, orchestration / BPM, activity monitoring, Web services management and security, business rules, services directory and development tool, service-enabled portal, yet, at the same time, provides support for existing middleware technologies – such as third party J2EE application servers, development tools, and message queues and ESBs. Hence, enterprise IT departments can adopt the whole suite, which benefits from an integrated set of capabilities, or, adopt pieces a la carte. The components of Oracle SOA Suite are shown in Figure 3 and discussed in the following sections.

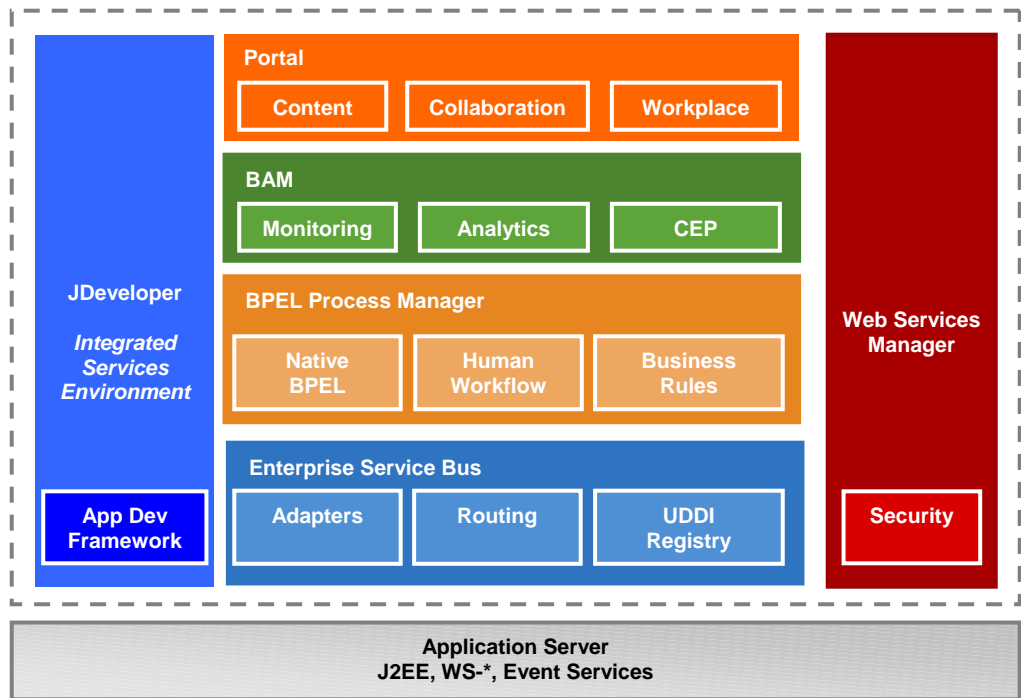


Figure 3: Oracle SOA Suite

Creating Services – JDeveloper, ADF, Toplink

Oracle JDeveloper, Oracle Application Development Framework (Oracle ADF), and Oracle TopLink are development components of Oracle SOA Suite that together form a comprehensive integrated services environment (ISE) to develop, compose, and orchestrate services into business processes that can be deployed, registered, and consumed from several types of user interfaces, including desktop clients, browsers, and mobile and telnet devices.

Oracle JDeveloper is an ISE that enables developers to model, create, discover, assemble, orchestrate, test, deploy, and maintain composite applications based on services. JDeveloper supports SOA principles and XML Web services standards, as well as traditional Java, J2EE, and PL/SQL component and modular code mechanisms. Oracle ADF is a model-driven SOA framework that automates and manages business and data services and provides a standard data-and service-binding layer based on JSR 227 that can be used with process flows, page flows, and service invocations. Oracle ADF also implements SOA design practices, and makes user interfaces as loosely coupled as services themselves. Oracle TopLink is a data services framework that allows access to relational and XML data. It provides visual mapping tools for facilitating object to relational and object to XML mapping. Oracle TopLink and Oracle ADF frameworks simplify creation of business and data services that can be invoked from rich Web interfaces of service-oriented applications.

“Having chosen ADF framework and adopted that in our development cycle; it has given us a lot of different benefits that we really didn’t expect. One of which is that has accelerated the actual coding of projects and allowed us to now concentrate on the upfront business challenge that faces the organization.”

- Les Morton, Project Team Leader
Associated Wholesales Inc.

Oracle JDeveloper, Oracle ADF and Oracle TopLink together help organizations adopt SOA and deliver applications and services productively. Applications developed can be changed more easily. This helps to protect investments in heterogeneous environments.

The use of JSF and BPEL development is shown in the screenshot in Figure 4.

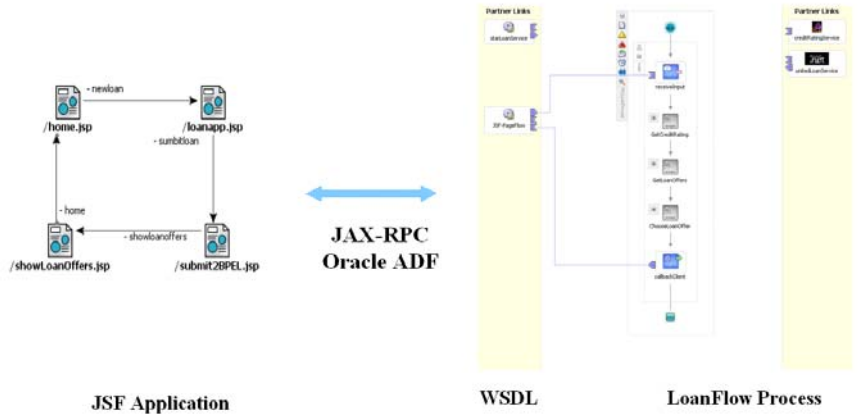


Figure 4: JSF-Based Web Application and BPEL Process Flow in JDeveloper

Oracle JDeveloper, Oracle ADF, and Oracle TopLink together provide a comprehensive integrated services environment and framework that allows developers to build model-driven applications and business processes which can then be deployed and registered as applications, services, or business processes into Oracle SOA Suite components.

Key capabilities include:

- *Creating Business Services* – Support for WSIF bindings that allows the publishing of Java, EJB, Java Message Service (JMS), and enterprise applications connected via Java Connector Architecture (JCA) adapters as services that can be invoked natively. Support for REST (Representational State Transfer) based service. JDeveloper also features support for developing J2EE 1.4–compliant Web services, with the ability to create JAX-RPC clients and services, and WS-Security, WS-Reliability, and WS-Management. Support for developing bottom-up services via meta data tags and contract-driven development using the WSDL editor is also included.
- *Creating Business and User Interface Logic* – JDeveloper includes Support for EJB 3.0 that simplifies backend business logic and persistence mapping aspect. New JDeveloper wizards generate EJB 3.0 components, and property editors support the incremental development of business methods and mapping annotations. Support for JSF for building Web applications enables rich user interfaces. JDeveloper provides several tools such as visual UI component

editing via JSF WYSIWYG editors, drag-and-drop capabilities for JSF components onto pages, and visual diagrammer for rapid development of JSF navigation.

- *Binding User Interfaces to Services* - JDeveloper includes support for JSR 227 that facilitates binding user interfaces to data sources and services. Support for drag-and-drop attributes, collections and operations from the data control palette that is exposing backend business systems, and for services and business process is also included. Also featured is support for data-binding Oracle ADF Faces components to backend business services and business process.

Discovering Services - Service Registry

Oracle SOA Suite Service Registry provides a configurable, scalable and secure repository for Web services that can be provisioned, discovered and governed by Oracle SOA Suite. The product complements the SOA functionality provided by other suite components, supplying the enterprise with a mechanism for advertising and managing available service offerings. The Registry is one of the first product offerings to fully support the OASIS Universal Description, Discovery and Integration (UDDI) v3 standard.

Capabilities of Oracle SOA Suite Service Registry include:

- *Service provisioning* – The Service Registry enables providers of Web services to publish services and related artifacts, thereby making offerings available to service consumers. Services can be categorized or classified using a comprehensive taxonomy management feature, which allows the import of existing business taxonomies as well as the creation of custom classifications.
- *Service Discovery* – The Registry essentially serves as a “directory” of services, providing references to service descriptions and endpoints available on Oracle SOA Suite instances. The Registry facilitates SOA adoption by enabling users to search for services that meet specific criteria as well as browse offerings available from providers, without having to understand the underlying UDDI data structures. Controlled access to services ensures accountability and responsibility, while enabling users to limit the visibility of sensitive services.
- *SOA Governance and Lifecycle Management* – The Registry serves a single point of control for SOA governance, ensuring quality and consistency of service offerings across the enterprise. A quality control workflow feature is incorporated through which services are first published to a “staging” registry, then moved to a “production” registry accessible to consumers after corporate-mandated checks have been performed. A subscription mechanism enables consumers to be notified when changes are made to a service, promoting reuse of services and preventing reinvention of existing functionality.

- *Fusion Integration* – Work on integrating the Registry with components of the Oracle SOA Suite - Oracle BPEL Process Manager, Oracle JDeveloper, Oracle Web services Manager and the broader Fusion Middleware platform is on-going, with the ultimate goal of making it easier to discover, orchestrate, secure, and manage an SOA. In addition, the Oracle SOA Suite Service Registry provides comprehensive Web-based user interfaces for publishing and discovering services, as well as for managing the installation.

Integrating Services - Enterprise Service Bus

Oracle SOA Suite features an Enterprise Service Bus (ESB). As the “glue” for the enterprise application infrastructure, your integration platform provides the basis for gathering information that drives the organization from all types of data sources. Oracle ESB is the realization of the SOA and Event Driven Architectures (EDA) whereby distributed applications are integrated in a loosely coupled paradigm. At their core ESBs implement messaging to enable services to be integrated in a message-based paradigm – both synchronous and asynchronous styles. They also incorporate routing so that messages can be routed to the appropriate services based on rules governing both the message content and any external factors. Thirdly, ESBs also embody message transformation. Since ESBs enable routing and transformation logic to be changed at runtime, they enable more maintainable applications to be built, since service connections are less brittle when an ESB is used.

Key capabilities for Oracle ESB include:

- *Reliable Multi-Transport Bus* - Oracle ESB provides a flexible real-time enterprise backbone capable of supporting industry standard protocols such as SOAP, HTTP(s), or JMS. A special in-memory optimization is automatically used for service calls within the same virtual machine. It provides fast, scalable, guaranteed once and only once message delivery using both point-to-point and publish/subscribe patterns. Oracle ESB can use Oracle's own JMS or Oracle Advanced Queuing (AQ) as a message transport; it is also certified with other messaging providers such as IBM MQ, Sonic MQ and Tibco.
- *Complex Business Data Transformations* - Businesses require flexibility in combining data models from disparate systems. Oracle ESB utilizes standards based data mapper functionality within JDeveloper to create transformation templates in the XSLT language for reuse across the enterprise. The auto-mapping feature increases user productivity by remembering and reusing common mappings from previous transformations.
- *Comprehensive Management and Deployment Infrastructure* - At design time, Oracle ESB allows you to create virtual service names into lookup repositories, such as UDDI, that are later bound to real or physical application URLs defined during deployment. Oracle ESB Diagrammer and Topology Viewer allow you to build and visualize relationships between services and graph

dependency charts or impact analysis for proposed changes to your systems. The viewer includes an ESB wide search facility to locate components such as Adapters, messages and active process instances based on unlimited input criteria. Centralized management of distributed applications is a key component of Oracle ESB.

- *Pervasive Enterprise System Connectivity* - Adapters provide key connectivity and discovery into enterprise and legacy system meta-data to enable mapping of objects to real-time events in your ESB. Oracle provides built-in Adapter wizards for Database, Oracle AQ, JMS, Email, FTP and Files, as well as enterprise applications such as the Oracle E-Business Suite, PeopleSoft, JD Edwards, SAP and legacy systems such as CICS, IMS and even TPF. All adapters conform to the J2EE Connector Architecture (JCA) open standard adopted by all major integration vendors.
- *Flexible Content Based Routing* - The ability to filter and route data based on message content is critical to optimal management of your ESB. Oracle ESB enables routing in design time deployment descriptor definitions that can be modified at runtime for adjusting application efficiency. This minimizes the overhead of redeployment. For example, as system demand increases and you add servers to your cluster, you can dynamically route traffic based on content such as currency, region, product name or any other contextual data. Oracle ESB supports a variety of rules capabilities for filtering including Oracle BAM, Oracle Business Rules and external providers. Content filtering can also be implemented in messaging systems such as JMS using configurable filter based subscriptions and message selectors.

Composing & Orchestrating Services - BPEL Process Manager and Workflow

Oracle BPEL Process Manager enables business processes to be modeled, automated, and monitored. Unlike code-generation techniques for automating business processes, BPEL Process Manager includes a native BPEL (Business Process Execution Language) engine that executes the processes. This approach not only enables reuse, but also enables visibility into in-flight business processes at the individual and aggregate levels (the latter being provided by Oracle BAM), and lays the foundation for close-loop business process management, process improvement and compliance. Oracle BPEL Process Manager provides a comprehensive, standards-based and easy to use solution for creating, deploying and managing cross-application business processes with both automated and human workflow steps. It provides high-performance, reliable execution of service-oriented business processes defined with the BPEL standard. Its native support for standards such as BPEL, XML, XSLT, XPATH, JMS, JCA and Web services makes it an ideal solution for creating integrated business processes that are truly portable across platforms. It also provides audit trails for both completed and in-flight processes, and process history that enables process improvement. Finally, the Oracle BPEL Process Manager is a 100% native BPEL engine that coexists happily

“BPEL will emerge as the leading industry standard for Web services flow composition (0.8 probability).”

—David Smith
Gartner

with existing middleware technologies and platforms and provides an unrivaled process portability and vendor flexibility. The graphical capabilities offered are shown in Figure 5.

Key capabilities of Oracle BPEL Process Manager include:

- *Rich Tooling for Integration* – The Eclipse-based Oracle BPEL Designer is unique in that it uses BPEL as its native format. This means that processes built with the Designer are 100-percent portable. Oracle BPEL Process Designer also comes as a plug-in to the Oracle JDeveloper environment, providing a unified design time environment to develop user interfaces and orchestration services. Built-in integration services enable developers to easily leverage advanced workflow, connectivity, and transformation capabilities from standard BPEL processes. These capabilities include support for XSLT and XQuery transformation as well as bindings to hundreds of legacy systems through JCA adapters and native protocols using WSIF. The extensible WSDL binding framework enables connectivity to protocols and message formats other than SOAP. Bindings are available for JMS, email, JCA, HTTP GET, POST, and many other protocols enabling simple connectivity to hundreds of back-end systems. This approach gives unparalleled performance, yet ease of development. User-friendly wizards to set up simple and complex human workflow steps, configure adapters, and define complex transformation maps are provided as standard services. Human workflow services such as task management, notification management, and identity management are provided as built-in BPEL services to enable the integration of people and manual tasks into BPEL flows.

“BPEL is the future of the integration space in my view... Why? Because the value is so much higher when you provide not only a way to integrate applications, but also a way to create services from them and put them into business processes.”

— John Rymer, Vice President
Forrester Research

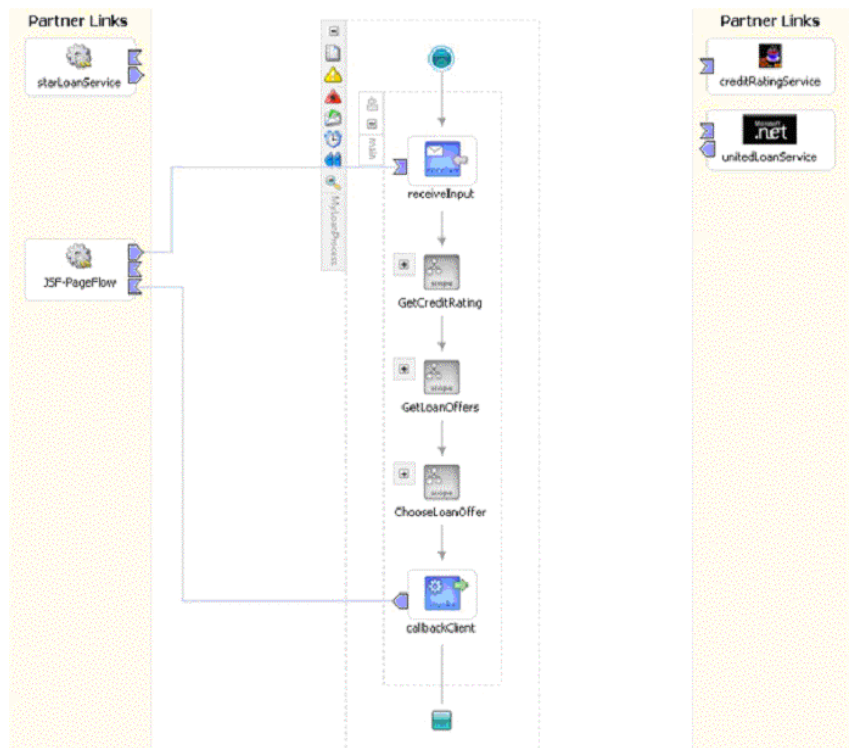


Figure 5: Graphical Development of Business Processes in BPEL

- *Comprehensive Monitoring and Management* - Oracle BPEL Process Manager Console provides a user-friendly Web-based interface for management, administration, and debugging of processes deployed to the BPEL server. Audit trails and process history/reporting information are automatically maintained and available through the BPEL Process Manager Console and via a Java API. The workflow task lists and historical process analysis reports are also integrated into the same console.
- *Un-paralleled Scalability and Availability* - The core BPEL engine provides the most mature, scalable, and robust implementation of a BPEL server available today. The Oracle BPEL Process Manager executes standard BPEL processes and provides a “dehydration” capability so that the state of long-running flows is automatically maintained in a database, enabling clustering for both fail-over and scalability. The BPEL Server leverages Oracle Containers for J2EE as an underlying J2EE application server, but also supports most major commercial application servers such as BEA WebLogic and JBoss.

“Oracle BPEL allows CapGemini to define a business process that exactly matches what the business needs at any point in time

-- Rick Hymer. VP CapGemini

Automating Business Policies - Business Rules

“We have chosen Oracle’s SOA Suite including Oracle BPEL Process Manager with SAP Adapter, Business Activity Monitoring and Portal to implement a composite application for Lufthansa Flight Training realizing process automation for a new business segment called “Competence Training” including a sales channel for external business partners.

- Wolfgang Schlott, Process Management, Lufthansa Flight Training

Agility is one of the biggest promises of SOA and BPM: the ability to make rapid changes to processes in step with the changes that occur inside of your business. Such changes are not always changes to the process. Often they are changes to the rules that drive the process. A typical business process often includes a number of decision points. These decision points generally have an effect on the process flow; for example, someone's credit rating may determine whether he/she is approved for a low-cost loan. These decisions are evaluated based on certain conditions and facts, which may be internal or external to the business process, and predefined company policies or rules. Business Rules Engines allow architects to easily define, automate, manage, and update the decision logic that directs enterprise applications from a single location without needing to write code or change the business processes calling them. Rules Engines are naturally of interest to enterprise architects building out SOAs, since they contribute to agility by enabling reduced time to automate, easier change, and easier maintenance for business policies and rules. BPM technology and Rules Engines naturally fit together: BPM enables automated and flexible business processes; Rules Engines enable automated and flexible business policies.

Key capabilities of Oracle Business Rules:

- *Capturing Business Policies Across All Applications* - In the past, Rules engines were primarily used as a technology to solve highly complex problems requiring a great degree of inferencing. More recently, the Rules market has evolved such that rules are now being used for the implementation of business policies. Oracle Business Rules enables business policies to be abstracted out of any application – not just applications that are designed to SOA. It is based on the Jess Rules Engine, but conforms to JSR-94 and enables facts to be defined in Java.
- *Automation of Business Policies in Business Processes* – Business processes typically involve decision steps. Oracle Business Rules enables decisions and business policies to be abstracted out of the business process, providing a single location for policy management and change. Oracle Business Rules enables facts external to the business process to be asserted in the evaluation of business rules, unlike monolithic BPM Suites. The rules are separated from the process logic and can be changed independently without impacting them. This makes business processes less brittle - rule changes can be deployed without modifying or rebuilding rule-enabled processes and applications. In order to ease development, increase developer productivity and enable more agile applications, developers can use Oracle JDeveloper to build *both* the business processes in Oracle BPEL Process Manager and related business policies using Oracle Business Rules.
- *Shared Metadata Across Rules, Processes, Portal and Activity Monitoring* – Rules have relevance to document flows, business processes, and activity monitoring. Oracle BPEL Process Manager, Oracle BAM and Oracle Portal applications

can leverage rules in Oracle Business Rules, including rules metadata. This eliminates the need to synchronize rules across multiple rules engines and allows a common set of rules to be used for integration, BAM, portal and other applications. For example, a business rule that works out the interest rate on a loan application that has been implemented as a process in BPEL, can take into account the amount of loans approved this month to similar customers – this data coming from the activity monitoring solution.

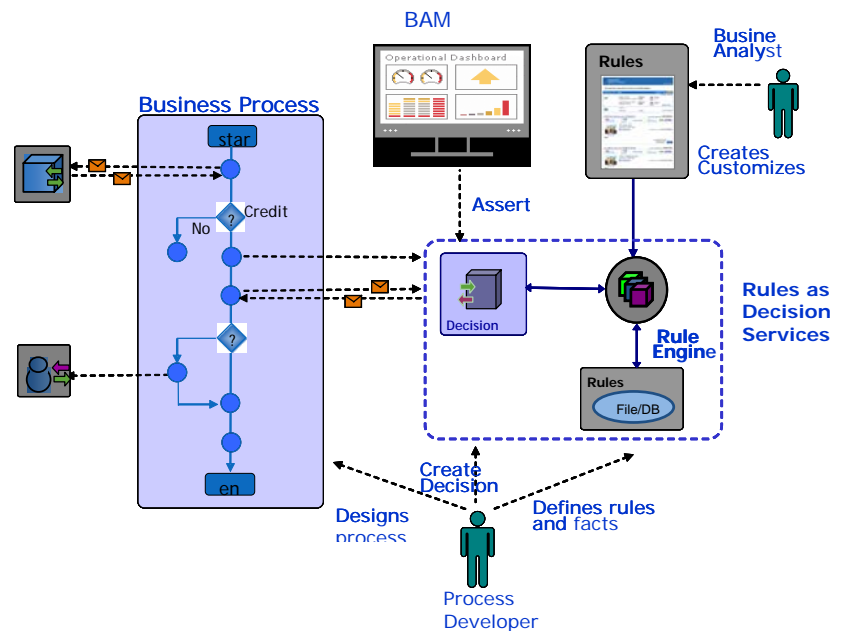


Figure 6: Business Rules as a Decision Service for Business Processes

Securing & Managing Services - Web Services Manager

Oracle Web Services Manager (OWSM) enables IT to effectively monitor, manage and secure services and interactions between these services in an SOA. It provides tools for building security and operations policies that can be layered over new or existing applications and Web services; runtime facilities for intercepting calls to and from an application or service and then executing these policies; dashboards for monitoring these policies as they execute, to ensure service levels and potential problems; and, alerting to enable corrective actions to be taken in a timely fashion. Oracle Web Services Manager can centrally define policies that govern Web services operations such as access policy, logging policy, and content validation, and then wrap these policies around services, with no modification to existing Web services being required. Also, Oracle Web Services Manager collects monitoring statistics to ensure service levels and security, and displays them in a web dashboard. As a result, Oracle Web Services Manager brings enterprises better control and visibility over Web services.

Key capabilities for Oracle Web Services Manager include:

The Oracle Web Services Manager (OWSM) allows companies to define policies that govern Web services operations such as access, authorization, logging, and load balancing, and then wrap these policies around Web services.

- *Policy Management* – The Policy Manager in OWSM is a graphical tool for building new security and operations policies, storing policies and managing distribution and updates to runtime agents and gateways. Policy Manager supports both client-side and service-side policy enforcement, and allows administrators to configure operational rules and propagate them to the appropriate enforcement components across an application deployment of any scale and complexity. OWSM has out-of-the-box support for authentication and authorization using: HTTP basic authentication, COREid, Netegrity, LDAP, X.509 Certificates; leverages Oracle COREid, LDAP and Netegrity for role-based invocation access; and, supports Security Assertion Markup Language (SAML) for interoperability between different security systems.
- *Enforcement* - To ensure maximum deployment flexibility, OWSM provides two kinds of enforcement components: Policy Gateways and Policy Agents. Policy Gateways are deployed in front of a group of applications or services. Policy Gateways can intercept inbound requests to these applications in order to enforce policy steps, adding application security and other operation rules to applications that are already deployed. Policy Agents provide an additional, fine-grained level of security by plugging directly into an application or service. OWSM enforces true end-to-end message-level security, supports WS-Security for authentication and message-level security including encryption and signing, and supports full and partial encryption and decryption step.
- *Monitoring* - Monitoring Dashboard collects data from gateways and agents as they execute policies and displays results in a graphical format. This allows administrators to set quality of service levels for each application. The Dashboard displays alerts when the application exceeds established targets. It also provides IT operations staff with real-time visibility into the health, performance, security and utilization of crucial Web services, including end-to-end monitoring of business processes. By harnessing the real-time data collection capabilities of the enforcement components, Monitoring Dashboard enables administrators to analyze discrepancies between expected and actual performance and to monitor compliance with IT operational best practices in real-time, such as audits on security violations on a per-Web service, per-operation and per client basis. The result is best-practice security and operations across all applications and services across an enterprise and its partners, regardless of the how these applications and services were developed.
- *Comprehensive Support for Protocols & 3rd party Platforms* - OWSM works with multiple Web services platforms and providers including BEA Systems, IBM, Microsoft, Netegrity, TIBCO and VeriSign. For example, sites using TIBCO BusinessWorks can install OWSM agents to act as SOAP interceptors that enforce Web service policies. OWSM provides out-of-the-box, native support

for multiple transports, including HTTP, HTTPS, JMS, and IBM WebSphere MQ and multiple messaging models, including synchronous and asynchronous messaging. Furthermore, it provides content-based routing and built-in failure handling, including message queuing, fail-over routing, and configurable message retry capabilities.

Optimizing Services - Business Activity Monitoring

Oracle Business Activity Monitoring (BAM) provides real-time access to critical business performance indicators, along with the supporting information to improve the speed and effectiveness of business operation and enable pro-active alerts. It enables you to monitor and optimize processes identifying bottlenecks in your business processes by integrating BAM with your existing systems to track processes and capture business events; and, enables you to deliver a superior customer experience through better management and real-time visibility of your service levels. In short, it enables services to be optimized.

"BAM defines the concept of providing real-time access to critical business performance indicators to improve the speed and effectiveness of business operations"

—Bill Gassman, Analyst
Gartner Group

Oracle BAM provides users with an event aggregation and correlation platform that allows for building a state model defining relationships between various events that impact the operations business key performance indicators (KPIs). It also provides users the ability to change the business processes and take corrective action if the business environment changes. The architecture utilizes messaging, data integration, advanced data caching, analytics monitoring, alerting, and reporting technology to deliver requested critical information within seconds of an event or change in status.

Key capabilities of Oracle BAM include:

- *Personalized Real-time Streaming Dashboard* – Oracle BAM is a complete solution for building real-time operational dashboards, monitoring and alerting applications over the Web. It features visually rich business intelligence and activity dashboards to help identify bottlenecks in your business processes and data sources. Data is streamed to the dashboards in real-time using Oracle's patented *Active Data* technology that provides unparalleled scalability by only sending incremental data updates to the dashboards. It can accept tens of thousands of updates per second into a memory-based persistent cache that is at the center of the architecture. Oracle BAM delivers complex event processing, and business intelligence married with advanced real-time reporting across historical, real-time data and events.
- *Provides Rich Visualization and Ease of Use* – Oracle Business BAM provides the ability for delivering actionable information on critical business parameters to business users thru views, dashboards and business alerts that help improve effectiveness of operations and helps take informed decisions. Active Studio is the thin and rich web application for business users to build reports with alerts and to share them with other users. It runs in a Web browser and requires no install. Available reports include one or many views, which can monitor one of many different data objects (in the Active Data Cache).

Oracle BAM now has a library of 38-different view types that could be used to represent data in a graphical format on the screen. View types include various lists, charts, columnar reports, crosstabs, arrows and KPIs, spreadsheets, Funnel Chart, 3D Charts (Bar, Line, Area, Combo, Pie, Stacked Bar), SPC Charts, Market arrow, Matrix Cross-tab, Summary Cross-tab, Action List (radio buttons), Collapsed List and Action-form, and more.

A national chain of retail stores uses operationally focused BI applications to monitor the relationship between point-of-sale data and inventory. When an under stock warning occurs, users research the history of the product and suppliers, and react within hours to schedule inventory shifts. Oracle BAM and Oracle Business Intelligence

- *Layers Easily on Top of Existing Environments* – Oracle BAM provides rapid ROI for organizations implementing SOA. The solution enables developers to easily create event sources and enables events to be collected from a host of databases, packaged applications and external systems. It easily integrates into existing IT environments through a range of standards-based mechanisms such as Web services, messaging (JMS, Oracle AQ, IBM MQ, SonicMQ, Tibco), databases, XML data sources, flat files, and packaged applications through standard-based JCA-based adapters. Oracle BAM delivers alerts to portals, mobile devices and, through Web services, to other enterprise applications. Furthermore, Oracle BPEL Process Manager is pre-instrumented with a sensor framework that enables events to be collected from in-flight business processes. This enables pro-active action to be taken in order to handle extreme cases and exceptions in business processes.

Figure 7 below shows the rich visualization in Oracle BAM.



Figure 7: Oracle BAM Dashboard Combining Real-Time Information, Historical Information, Alerts & Actions

BAM has also emerged as a critical component of solutions that address the operationally focused business intelligence (BI) challenges. This is a convergence of the real-time functionality of BAM and a BI infrastructure, targeted at the business operations staff. Unlike traditional BI users, such as business planners and

executives who monitor more-slowly moving indicators and trends, users of operationally focused BI applications cannot afford to make decisions based on "stale" data. Instead of understanding the past, they must understand the present. With Oracle BAM based operational dashboards, business managers can easily define and modify their own dashboard pages to monitor key business activities with real-time operational insight across multiple business applications. From a standard Web browser, they can access and monitor sales, marketing and service performance with rich data visualizations, drill-down on performance metrics for transactional details and leverage seamless, real-time integration into business applications to turn analysis into action.

STANDARDS SUPPORTED

Some of the standards supported in the Oracle SOA Suite are depicted visually in Figure 8.

- *Business Logic* – Business logic may be developed using Oracle JDeveloper, which features the development of J2EE 1.4-compliant Web services; includes the industry's most comprehensive EJB 3.0 implementation that simplifies backend business logic and persistence mapping aspect; and enables the creation of JAX-RPC clients and services. It also includes development time support for WS-Security, WS-Reliability, and WS-Management. Developing bottom-up services via meta-data tags and contract-driven development using the WSDL editor is also supported. Eclipse may also be used to develop business logic that is deployed to Oracle SOA Suite.
- *User Interfaces* - Rich user interfaces can be developed using a declarative JavaServer Faces (JSF) and Struts-based development environment with an extensive library of graphical user interface components. Oracle's Application Development Framework, Oracle ADF, provides a 100% industry standards-based SOA development framework built on the Model-View-Controller design pattern to dramatically improve developer productivity. Oracle ADF is based on the JSR 227 industry standard.
- *Connectivity and Messaging* - Support for Web Services Invocation Framework (WSIF) bindings allow the publishing of Java, EJB, Java Message Service (JMS), and Java Connector Architecture (JCA) adapters, as services that can be invoked natively. This provides improved performance. Support for REST (Representational State Transfer) based service is also included.
- *Integration* - Once services have been developed, they can be wired together with Oracle ESB – either in Oracle JDeveloper Integrated Service Environment (ISE) or in Eclipse. This tooling enables the modeling JCA adapters, XSLT transformations, and routing rules with XPATH based filter expressions. It also includes editors for building XSD schemas, Java

programs, EJBs, JSP pages, WSDL files and a host of other J2EE related service components. Oracle ESB features extensive support for opens standards and 3rd party interoperability that enables you to leverage your existing infrastructure and increase overall productivity. Supported standards include JMS, SOAP, WS-Addressing, WS-Security, JCA, WSIF, JBI, BPEL, JDBC, HTTP, FTP, and RMI.

- *Adapters* – A comprehensive set adapters is provided with Oracle SOA Suite, including: *application adapters* - Oracle, SAP, Peoplesoft, JD Edwards, Siebel; *database adapters* - Oracle 8i and above, MS SQL Server, IBM DB2 UDB, Sybase, Informix, JDBC/ODBC; *adapters for connectivity with messaging systems* - Oracle AQ, MQ Series, TIBCO, JMS; *technology adapters* - SOAP, HTTP[S], SMTP, FTP[S], Flat File; *legacy adapters* - CICS, IMS/DB, IMS/TM, VSAM, 3270; and, *adapters for partner connectivity* – RosettaNet, AS1, AS2, EDI on VAN, UCCNet.
- *Orchestration, BPM, Workflow and BAM* - Oracle BPEL Process Manager enables services to be wired together into end-to-end business flows. It features native support for BPEL 1.1 (full) and 2.0 (partial), HTTP 1.0 and 1.1, SOAP 1.1, SOAP with Attachments, XPath, XQuery, WS-Addressing 1.0, WSDL 1.1, WS-I Basic Profile 1.0, WS-Policy, WS-Security 1.0 and UDDI v3. Services and business processes can be analyzed and optimized in real-time with Oracle BAM, which supports heterogeneous event sources via a number of standard protocols, including JMS, Web Services, and HTTP.
- *Securing and Monitoring Services* - Oracle Web Services Manager, which is used to monitor and secure services and business processes, features out-of-the-box support for authentication and authorization using: HTTP basic authentication, COREid, Netegrity, LDAP, X.509 Certificates; leverages Oracle COREid, LDAP and Netegrity for role-based invocation access; and, supports Security Assertion Markup Language (SAML) for interoperability between different security systems. Other standards supported include WS-Security, XML Encryption and XML Digital Signatures.

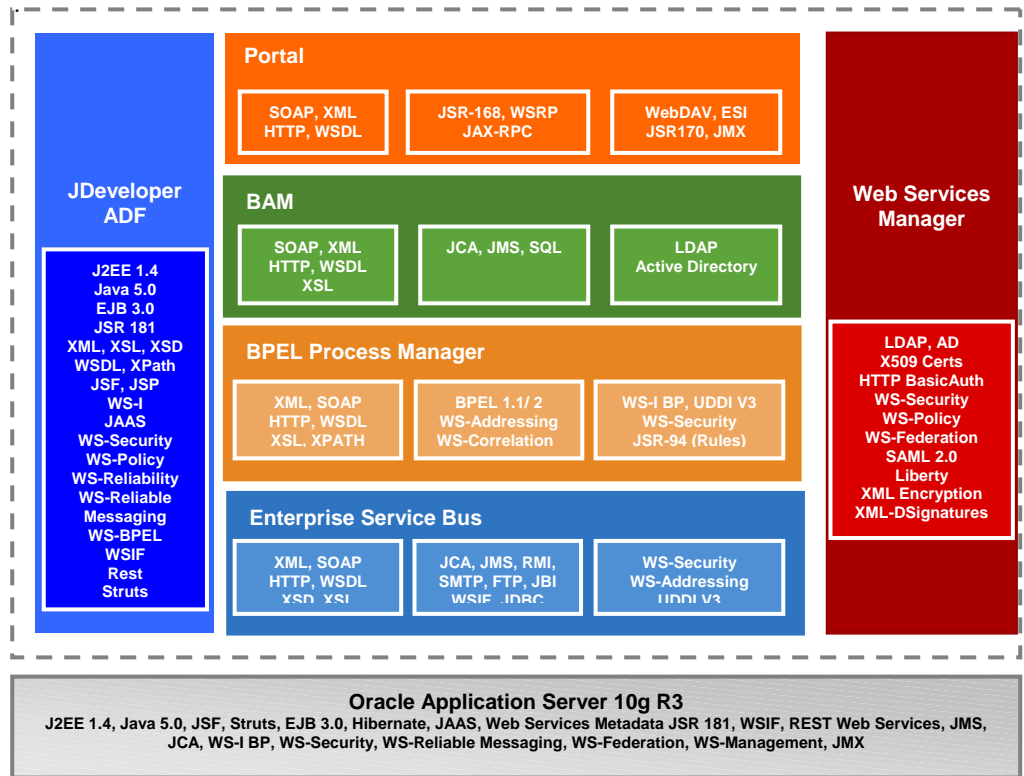


Figure 8: Standards Support in Oracle SOA Suite

The SOA Suite deploys to leading application servers as well as Oracle Application Server 10g R3, which includes several new features to support very high performance, scalability and high availability in a grid computing architecture. Dynamic workload management; enhanced clustering; automated back up and recovery; automated disaster recovery; and a new JMX-based management console are some of the new features designed to make it one of the industry's only grid-ready middleware solutions.

Oracle Application Server 10g R3 is certified with open source software including Spring, Apache Struts, Apache Axis, Apache MyFaces, Hibernate, Tapestry, JUnit, CVS, SubVersion, Ant, Eclipse and Log4J. Oracle Application Server 10g Release 3 features support for a host of standards required to build next-generation SOAs, including WS-Reliable Messaging, WS-Security, WS-Federation, Web Services Metadata, Web Services Invocation Framework (WSIF) and REST Web Services.

MICROSOFT INTEROPERABILITY

Oracle SOA Suite has been designed and built with a particular focus on enabling customers to leverage their existing investment in Microsoft technologies. For organizations that have existing investments in heterogeneous packaged applications, legacy systems, modern J2EE systems, and .Net and other Microsoft based technologies; Oracle SOA Suite offers the most compelling technologies and solution to support both Microsoft and Non-Microsoft systems.

Windows Platform

There is a strong focus within Oracle Fusion Middleware and Oracle SOA Suite to fully utilize Microsoft Windows OS as a core platform to ensure superior performance and maximum leverage of included platform capabilities for customers who use this platform.

- *Strong Support for Windows OS as a core platform* - Oracle Fusion Middleware and Oracle SOA Suite is available on Microsoft Windows NT, 2000, XP and 2003, and will support Microsoft Vista when it becomes available. There is also a dedicated Windows platform team within Oracle's Server Technology organization that works closely with Microsoft to ensure early support of Microsoft Windows versions as they are released and to work collectively to resolve any issues.
- *Utilization of Active Directory* - Oracle SOA Suite can utilize Microsoft Active Directory as the underlying identity store/directory. The Suite also supports Windows Logon/Security, which provides simpler Windows Native Authentication, and allows users to leverage their Windows logon information. Oracle Web Services Manager can be used with Active Directory as the identity store for controlling access to services and business processes, including .Net, J2EE, Legacy, and other services. Oracle BPEL Process Manager's built-in identity service is tested specifically with Microsoft Active Directory. This means that user identities in Microsoft Active Directory can be used for human worklist task assignment (provided through Oracle BPEL Process Manager) as well as security, role based access control, or other interactions with directory services. Furthermore, Oracle Federation Services integrates with Active Directory Federation Services. Using Oracle SOA Suite, Identity can also be federated from Microsoft environments and to Microsoft Environments, enabling seamless single sign-on and identity sharing across business partners.
- *Leveraging Microsoft Cluster Services and Network Balancing for scalability and performance* – Oracle SOA Suite can natively take advantage of Microsoft Cluster Services and Network Balancer to address high availability and scalability requirements. This includes support for: automatic installation, configuration, provisioning and patch management of cluster nodes; automatic failover of nodes; and, death detection and restart of middle-tier and infrastructure processes.

.Net / Windows Server Systems

Oracle SOA Suite enables you to leverage your existing investments in the Microsoft Server Systems including Microsoft directory infrastructure, integrations in Biztalk, .Net services, IIS, etc. Specific integrations include:

- *Support for .Net Web Services* – Oracle SOA Suite provides strong support both for .Net Web Services as well as other technologies and products in Microsoft's .NET family, which Microsoft often describes as Windows Server Systems. These include BizTalk, SQL Server, SharePoint, Internet Information Server (IIS), Internet Security and Acceleration Server (ISA), Commerce Server, and Active Directory. Oracle SOA Suite also provides legacy support for C++ Web Services to enable J2EE and Web Services Interoperability.
- *Ensuring Interoperability* – Oracle SOA Suite components provide support for standards across the WS-* range, such as WS-I Basic Profile, which are included in .Net 1.1 (.Net 2.0 as it is released), and Web Service Enhancements (WSE) 2.0 (WSE 3.0 as it is released). Further, there is a strong focus at Oracle on ensuring that Web Services/Protocols standards that are jointly supported by Oracle and Microsoft do actually deliver interoperability. This is accomplished both through involvement with the standards setting organizations, but also through direct testing either in a testing lab setting or at events organized for these purposes, such as Microsoft PlugFests events.
- *Leveraging .Net, J2EE, PL/SQL Web Services* – Services in an SOA can be easily used, and reused, by different applications and business processes, even if different technologies were used to implement those services. For example, a J2EE application could use, or consume, a Web Service that was implemented in .Net, and conversely a .Net application could leverage a Web Service that was implemented in PL/SQL. In order to find Web Services that can be reused in this fashion, UDDI registries provide a catalog of available Web Services. Oracle SOA Suite enables use of: Microsoft UDDI Browser or Oracle's UDDI Registry for discovering services; consumption of .Net Web services by SOA Suite components, including using Oracle ADF Model layer to bind to .Net Web services to View; and, publishing J2EE, PL/SQL Web services to Visual Studio .Net and Office. Further, Microsoft UDDI Browser is supported so that Web Services can be easily discovered and reused from both JDeveloper at design time, and Oracle ESB and Oracle BPEL Process Manager at runtime. Lastly, Oracle Web Services Manager that has a native .Net agent can manage .Net Web Services, both for security/policies as well as SLA purposes.
- *Process Integration, Workflow and Microsoft Biztalk* – In the Microsoft world, Services and applications may be exposed via .Net Web Services, processes might be orchestrated with Microsoft BizTalk, people might be linked through workflow processes involving Microsoft WinForms or Microsoft

Office InfoPath documents, and transactions might be integrated through using Microsoft MSMQ for a messaging infrastructure. All of this range of Microsoft capabilities is supported in Oracle SOA Suite so that integrated processes can be developed that mix and match these Microsoft-enabled elements of a process or workflow with elements that are not supported by Microsoft. Specific capabilities provided in Oracle SOA Suite include enabling integration of Microsoft .Net Web Services, integrations in Biztalk, J2EE Web Services and enterprise applications exposed as services using Oracle ESB and Oracle BPEL Process Manager. Microsoft WinForms, Office documents/ Infopath, XML documents can all be used to integrate people into workflow processes in Oracle BPEL Process Manager. Furthermore, Oracle BPEL Process Manager provides extensive Microsoft support: .Net clients can be used to access Oracle BPEL processes; Oracle BPEL Process Manager can orchestrate interactions between .NET based web services – sync and async (via WS-Addressing); Oracle BPEL Process Manager can be integrated with MS Sharepoint via Web services. Microsoft SQL Server can be used as application or dehydration store for both Oracle BPEL Process Manager and Oracle BAM – the latter can also use Microsoft SQL Server as event store. Lastly, Active Directory can be used as the user repository for BPM users in Oracle BPEL Process Manager. Additional integration points are provided through messaging and support in Oracle SOA Suite for MSMQ through a JMS bridge.

- *Portals* – Oracle SOA Suite can be used to enable content to be included with a Microsoft SharePoint portal. Specifically: J2EE applications and Oracle Portal can similarly expose Web services and portlets that Microsoft SharePoint can include. Services built and deployed on the Oracle SOA Suite can be consumed into Sharepoint portals, and, business processes automated with Oracle BPEL Process Manager can be kicked-off from Sharepoint or C# applications. Oracle Portal and Microsoft SharePoint support industry standards such as WSRP for enabling portlets to be used across portals. Oracle Portal and Content Management content can be accessed from Microsoft desktops through WebDAV. Lastly, Oracle Identity Management can be integrated with Active Directory to ensure shared users have access to content in Microsoft SharePoint.

MICROSOFT OFFICE

Oracle Fusion Middleware is used by many organizations to develop enterprise applications that automate transaction processing; streamline business processes; and access and deliver information within their organizations. Many organizations increasingly want to use their traditional desktop productivity applications – specifically Microsoft Office – within the context of their Enterprise Applications. There is an extensive range of capabilities provided in Oracle SOA Suite to enable the use of Microsoft Office – Word, Excel, PowerPoint, Outlook – along with enterprise applications, Web Services, and custom applications.

- *XML Reference Schemas* - Simplifies publishing and consuming Office formatted documents: With Office 2003, each of the Microsoft Office Applications supports XML Reference Schemas. This makes it easier to create or consume Office formatted documents (Word, Excel, InfoPath, etc).
- *Web Services* - Office 2003 provides support Web services to enable Office Smart Documents, which allow intelligent information transfer (such as links to external applications). Therefore, Office documents can act as a client to applications in a richer way. Documents can retrieve the latest information directly from an application when they are opened. Alternatively, information entered into a document could be posted, via a Web service, back into an external application.
- *Office Smart Documents* - Office Research Task Pane, which is provided in all Office Applications, can access Web services exposed/enabled via Oracle SOA Suite. This provides an easy mechanism to allow Office documents to act as simple clients for applications that expose Web Services. Smart Tags provide a mechanism for easy and quick in-context access to information.

Oracle SOA Suite enables key scenarios involving Microsoft Office that require interoperability between Microsoft Office and enterprise applications:

- *Self Service Information Entry Driving Business Processes and Workflows* – Oracle SOA Suite enables Office documents to be incorporated into business processes and workflows. In addition, workflow routing and approvals in Oracle BPEL Process Manager can be integrated with appropriate identities and roles, potentially stored in Microsoft Active Directory.
- *Live Data Entry and Forms* – Office documents can incorporate, and interact with Web services created or exposed with Oracle JDeveloper and Application Development Framework and deployed to Oracle SOA Suite. With Oracle Identity Management and Oracle Web Services Manager, you can also embed appropriate security and access control into Office documents so that data is not inappropriately shared, or transmitted without appropriate security.
- *Business Process and Business Activity Monitoring Alerts to Outlook* – Alerts from Oracle BPEL Process Manager and Oracle BAM can be delivered with document-centric Information to Outlook Inbox.
- *Delivering Business Information to Office* – Web Services deployed to Oracle SOA suite, including those built using Oracle ADF, can query and extract information from enterprise applications that can be accessed via Office documents, to enable live charts. Access to services from Office applications can also be secured using Oracle Web Services Manager.

Oracle SOA Suite supports: a range of application servers including IBM WebSphere and JBoss; leading business rules engines such as Ilog Jrules and Corticon; any LDAP V3 compliant directory such as Active Directory, iPlanet and Novell; leading messaging services such as IBM MQ, SonicMQ, Tibco, in addition to Oracle AQ.

- *In Context Web Information Access and Enterprise Portal Launch through Smart Tags* – Smart tags are programmed to make Web service calls based on matches on words or patterns. Services deployed on Oracle SOA Suite can be plugged into the Smart Tags framework. These include services developed with Oracle JDeveloper, and potentially Oracle BPEL Process Manager. The Research Task Pane capability in all Office 2003 Documents/Outlook can be easily subscribed to Web services exposed by Oracle SOA Suite.
- *Using an Office Document to initiate the process* – A Smart Document can be used leveraging an embedded Web service that initiates an Oracle BPEL Process Manager process when the user clicks submit. In this case, the information entered by the user is packaged into the Web service call, and passed to Oracle BPEL Process Manager. Alternatively, a “dumb” document could be used and submitted through email to Oracle BPEL Process Manager. In that case, the document would be parsed for the necessary information; the document itself could also be carried along as an attachment.

Oracle SOA Suite effectively works with Microsoft products which when combined with The Suite’s extensive support for a wide range of applications, industry standards, and other vendor products enables the delivery of applications and solutions that accommodate the wide heterogeneity typically found in most enterprises.

WHY ORACLE?

Oracle SOA Suite is the only comprehensive and integrated SOA suite in the industry. While other vendors claim to have similar platforms, Oracle SOA Suite provides several unique differentiators over other products.

Realize Greater Organizational Flexibility

Oracle SOA Suite can help you achieve greater organizational flexibility better than any other solution in the market in four important ways:

- *Service-Oriented Applications* – Oracle SOA Suite enables rapid development of service-oriented applications that can be deployed and managed on a robust SOA platform. It also allows you to wrap existing applications and legacy systems as services without rewriting them.
- *Business Process Optimization* – Oracle SOA Suite provides you with visibility to business events across your enterprise and allows you to optimize your business processes to respond to events.
- *Unified Workplace* – Oracle SOA Suite improves employee productivity with an enterprise portal that provides unified access to organizational information, to services and to business processes, and to business intelligence, allowing employees to find information rapidly and to collaborate effortlessly with one other.

Eliminate Middleware Complexity

Oracle SOA Suite can reduce your costs and middleware complexity better than any solution available from any other vendor. It is the industry's only SOA Suite technically engineered to be a single product. Oracle SOA Suite differs from other market solutions in four key areas:

- *Single Development Framework* – Oracle SOA Suite is the only SOA suite that provides a single integrated design time environment to develop enterprise applications, to compose Web services, to create enterprise portals, and to orchestrate business processes. You learn one tool to target the entire platform.
- *Single Deployment Architecture* – Oracle SOA Suite is the only SOA suite that provides a common architecture for scalability, availability, workload distribution, resource management, security, and metadata management. You spend less time integrating your middleware infrastructure.
- *Single Management Architecture* – Oracle SOA Suite is the only SOA suite that has a common identity management and systems management architecture. You monitor and manage users and systems centrally, lowering cost and improving security.
- *Single Metadata Management System* – Oracle SOA Suite is the only SOA suite that leverages a common metadata management system across all components, speeding up application development and leading to more maintainable applications.
- *Easy to Adopt* – All of the SOA Suite components are built upon and support industry standards, to ensure that they can be incrementally adopted and easily integrated into an organization's existing information technology infrastructure. Oracle SOA Suite integrates seamlessly into your existing IT environment. This “hot-pluggable” architecture is show in Figure 9.

Oracle BAM will provide business value by helping us to monitor and measure all of our business processes as a foundation for permanent optimization and improvement.”

- Wolfgang Schlott, Process Management, Lufthansa Flight Training

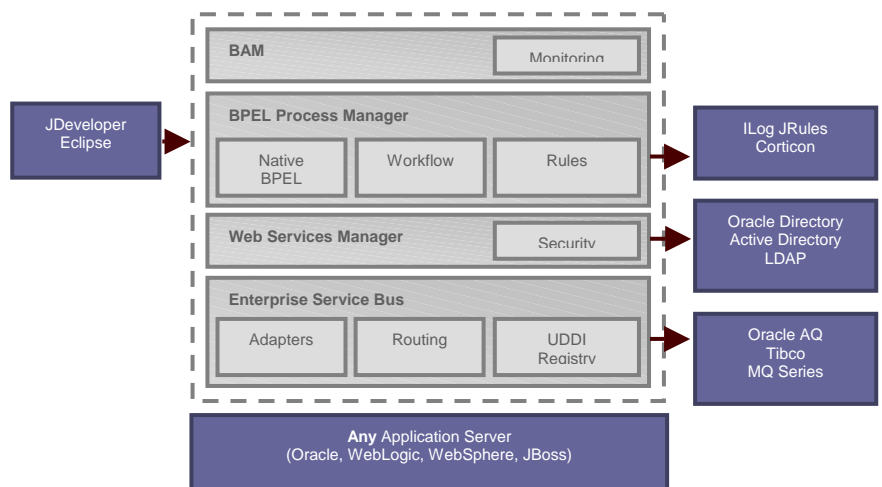


Figure 9: Oracle SOA Suite, Hot-Pluggable Architecture

Achieve Best Total Value of Opportunity

Oracle SOA Suite can help you achieve the best total value of opportunity by means of:

- *Develop and Deploy Applications Faster* – As the market’s only integrated SOA Suite, Oracle SOA Suite greatly reduces the overall cost of architecting, developing, deploying, and managing applications. Applications are built faster, they can be put into production sooner, and their associated benefits can be realized sooner. You save money, and you can reassign software engineers and funds to other projects.
- *Reduce Application Deployment Costs* – SOA Suite is the only SOA Suite designed to leverage grid computing to lower costs by deploying enterprise applications on modular, low-cost hardware and storage.
- *Reduce Maintenance and Management Costs* – Oracle SOA Suite lowers management costs by automating software provisioning across groups of systems and by centralizing systems monitoring and administration. It lowers security administration costs by centralizing identity and access management.

Oracle SOA Suite can help you achieve the best total value of opportunity by reducing your development costs, by reducing your deployment costs, and by reducing ongoing maintenance costs, thus providing you with the fastest return on your investment.



“Oracle is our strategic SOA Platform going forward. We have successfully implemented an SOA-based Lease Automation project at ING Lease Belgium leveraging Oracle BPEL Process Manager. The Web Services Manager, BAM, Rules Engine and ESB are a natural progression of a comprehensive, open and best-of-breed SOA Suite. As a matter of fact, we are planning to implement Oracle BAM on top of BPEL in one of our upcoming projects.”

- Geoffroy DeLamalle, Accelior,
Architect of ING Lease Belgium SOA
Project

CUSTOMER PROOFPOINTS

Oracle Fusion Middleware boasts some 28,500+ customers, many of whom are using the comprehensive and hot-pluggable architecture to build Service Oriented Applications.

ING Lease Belgium is a pioneer in the leasing sector and is a fully owned subsidiary of ING Group, one of the world’s largest financial services companies. ING is continuously looking to expand its footprint by offering existing products to new audiences, such as enabling end customers to take out car leases, and innovations such as real-estate leasing. ING Lease deployed Oracle SOA Suite components and achieved 2-3 fold time reductions in process steps such as “customer identification”.

ING

ING Lease has been growing both in terms of increasing numbers of customers serviced and through acquisitions. As a result, it has inherited a fragmented IT infrastructure with 3 different backend systems – AS 400 (I-series) billing apps, client server, etc. Evolving business needs are hitting known bottlenecks in existing business processes, for example, caused by fragmented customer data spread across multiple systems. ING Lease needed to optimize business processes.

They turned to SOA and BPM and an Agile SOA Methodology developed by their SI Partner, Accelior. Business processes would be decoupled from back-end systems and existing back-end systems would be exposed as services around quoting, contracting, billing and auditing. These were orchestrated using Oracle BPEL Process Manager into end-to-end business processes. ING Lease are deploying Oracle Business Activity Monitoring to monitor the aggregate performance of automated business processes and KPIs to identify bottlenecks, and areas for improvement. The combined solution provides a single unified Leasing Automation and Optimization platform (for core leasing process – “quote to contract”). Accelior’s SOA Methodology delivered the system in 6 months with Oracle SOA Suite.

Webster Bank

The banking industry depends on some of the world's most stalwart information systems to make payments, transfer funds, and manage liquidity. These workhorse systems do the job with precision and reliability on a massive scale. Customers and merchants demand more-flexible options beyond batch processing from their financial services providers. Because most of the payment systems were built 30 or 40 years ago, they lack the flexibility and responsiveness that customers expect in today's world of Web-aware software applications. Webster Bank implemented a

payment processing system using Oracle SOA Suite. The result is a more accurate payment system that not only makes it easier for their customers to do business with the Bank, but also provides rapid ROI through reduced errors.

Webster adopted SOA and used Oracle's BPEL Process Manager to create the new payment system based on Web services that bring together back-end processes for routing payments and reconciling accounts, many of which are provided by other companies and service providers. Using the BPEL platform makes the iterative development process more accurate for developing a new application - as the project was progressing; their IT group is able to demonstrate the workflows to business stakeholders within the actual modeling environment. Webster Bank values the way that Oracle BPEL Process Manager improves the way that developers and business analysts work together. BAM provides a window into business processes, so managers can easily survey what is transpiring. Oracle BAM provides views of critical business events, by providing real-time visibility into key performance indicators and metrics, so managers can quickly detect and correct inefficiencies.

The feedback on the new payment system has been so positive that Webster can foresee extending the capabilities to customers and partners. Because developers created the system using SOA, they can expose certain parts of the application over the Internet to other companies that are interested in using some portion of the technology, further extending the reach of those applications.



"With its SOA Suite, Oracle provides everything we need for developing, monitoring, and managing our SOA solution, so we don't need to worry about integrating and supporting a bunch of disparate technologies. For us, this was a huge benefit. Our information technology team at Webster Financial used the BPEL modeling tool within Oracle JDeveloper to create a payment processing application."

- Greg Jacobi, vice president of e-commerce at Webster Bank

Lufthansa

Lufthansa Flight Training (LFT) is a wholly owned subsidiary of Lufthansa AG, and is one of the world's largest providers of aviation-training services, such as pilot training, to over 40 airlines. LFT needed a sales force management system. Although they did consider a Sales and Distribution module from their ERP vendor, employees in sales, operations and planning preferred to use existing packages or extension of them. Users liked their existing applications and feared a complicated CRM module upgrade that would require a lot of training. An evolutionary approach seemed like the best way to proceed. The decision against purchasing additional modules from their ERP vendor was made – the focus was on building a composite application leveraging their existing ERP and other packaged applications. They deployed Oracle SOA Suite - Oracle BPEL Process Manager to build the sales and distribution (composite) application, Oracle BAM to help monitor and optimize business processes, Oracle Portal for a simple to use interface, and Oracle Identity Management to enforce authentication and authorization policies. LFT also used Oracle's SAP Adapter to integrate with their existing ERP implementation, and integrated with Novell's eDirectory.

The result of this project convinced LFT that building composite applications to SOA was the better alternative to ERP modules that would require extensive customization. The solution that was deployed with Oracle SOA Suite enables



Process, Integration and Portal tools to build a highly dynamic system to fulfill our requirements for flexibility and short-term business results. It was key to us that Oracle's SOA Suite integrates well into our present heterogeneous IT environment including the existing CRM system, SAP R/3 financials in the backend, Novell Single-Sign-On and Directory technologies and various other systems.

- Wolfgang Schlott, Process Management, Lufthansa Flight Training

more flexible agile solutions that LFT can develop step by step and later modify and optimize if necessary, offering an evolutionary approach that delivers required capabilities while meeting milestones.

CONCLUSION

Oracle SOA Suite is a standards-based best of breed suite that enables you to build Service-Oriented Application and deploy them to your choice of middleware platform. It consists of:

1. An Integrated Service Environment (ISE) to develop services
2. A multi-protocol Enterprise Service Bus (ESB) to integrate applications
3. A Services Registry for discovering and managing the lifecycle of services
4. A BPEL-based orchestration engine to tie services into business processes
5. A Business Rules Engine to enable business policies to be captured and automated
6. Web services management and security solution to enforce authentication and authorization policies on services and to monitor and manage services and processes for compliance to SLAs
7. A Business Activity Monitoring (BAM) solution to gain real-time visibility into business entities and their interactions, and to optimize services and business processes
8. An Enterprise Portal for employees, customers and partners to access content, access relevance performance metrics, collaborate and take actions via interaction with business processes.

Due to the "hot-pluggable" architecture of the SOA Suite and the components, you can seamlessly integrate the capabilities into your existing IT environment. Since the best of breed components of the Oracle SOA Suite may be adopted incrementally, they can be used to solve identified business problems, and expanded to enterprise deployments. As Greg Jacobi, vice president of e-commerce at Webster Bank says, "The systems we have created leveraging Oracle's SOA Suite enable a flexible business model that gives us lots of options for the future." Give your business options for the future - adopt Oracle SOA Suite *today*.



Oracle Service Oriented Architecture Suite
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