Oracle Service-Oriented Architecture Suite

Best of Breed SOA Tools and Middleware
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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 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 includes all components and technologies needed for building, managing, and optimizing end-to-end business processes and portfolio of services, integrating virtually any existing data or service source. It delivers unparalleled productivity by leveraging domain specific model driven development. By continuous blending of insight with action, it enables true agility.

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

SOA promises to enable IT address 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.

SOA Drivers

Traditionally, IT’s ability to deliver is hindered by fragmented and complex infrastructures including disjointed legacy systems and packaged applications, a large proportion of which were never designed for information interoperability, integration, and reuse. Consequently, most of the IT budget goes into maintenance of the current infrastructure and only a small percentage is available for supporting new business initiatives. The major portion of budget for new capabilities goes into integrating new functionality into the existing systems. 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, preventing end-to-end business process visibility. 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 as they allow only limited business process adaptability. Moreover, these traditional solutions come at a high cost, relying on proprietary technology and specialized and scarce skills.

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:

"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
• **Greater Interoperability** – SOA, and the industry standards underpinning it, enable existing silo’d applications to interoperate seamlessly and in an easier to maintain manner than any traditional EAI solution.

• **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.

• **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 to be easily captured and implemented.

• **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.

• **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.
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 1 and discussed in the following sections.

Figure 1: The Oracle SOA Suite

The key principles of the Oracle SOA architecture are:

1. Model Assembly instead of Code

The Oracle SOA Suite changes development and integration paradigm from coding to using model driven development. Instead of traditional MDA approaches, Oracle SOA suite features domain specific models. It includes graphical modeling tools for modeling business processes, workflows, business rules, transformations, and routing; these provide the right level of abstractions for the problem domain, and are based on industry standards. These models can then be easily assembled into complete composite applications.
This approach and the tools delivers 10x productivity gains and enables functional developers, developers who are closer to the business applications and not hard core programmers, to take control of the development of SOA applications and integrations.

2. Embedded Analytics

Oracle is the only vendor who provides both market leading SOA and Business Intelligence products, which seamlessly integrate. This marriage of SOA and Business Intelligence enable powerful process analytics enabling business users to measure and optimize their business processes. Oracle’s solution also enables insight driven business processes, where a business process may use BI to make intelligent process choices. Also, when presenting tasks to users, BI reports may be included, enabling them to make their decisions in right context.

3. Governance

Peter Weil, Professor MIT, defines governance as “Specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT.” Effective governance requires specification of business strategies and tying the strategies to IT investments. The Oracle BPA Suite enables business to capture their strategies and objectives, and hierarchically model the business processes to support these. The other requirement for governance is to manage and enforce policies as well as an effectively organized repository. The Web Services Manager enables declarative specification and transparent enforcement of policies. The Service Registry enables cataloguing of services and related metadata organized by taxonomies.

4. Extreme Transaction Processing

Next generation of Oracle Applications will be built using the SOA Suite as the underlying platform, requiring the SOA Suite to meet much higher performance and scalability requirements than any other product. The Oracle SOA Grid architecture provides complete failover and reliability, massive scalability, and extreme transaction processing. Leveraging Oracle coherence, it enables mid-tier caching and load balancing of stateful services. It features many optimizations such as asynchronous database writes, binary DOM, lazy load, etc. to maximize performance.

5. Seamlessly Integrated

The different components of the Oracle SOA Suite, while being best-of-breed stand alone, are also very seamlessly integrated to provide customers a unified experience and lower total-cost-of-ownership. JDeveloper is the single IDE providing consistent development and deployment experience. The Oracle Enterprise Manager provides unified system management and monitoring. End-to-end tracing of transactions across components is supported. Also, the SOA Suite is downloaded and installed as one unified product.
6. Highly Modular and Hot Pluggable

While the Oracle SOA Suite is comprehensive in its breadth of functionality and very seamlessly integrated, it is architected to leverage customer’s existing investments. To start with, Oracle SOA Suite can be layered on top of non Oracle J2EE servers, including IBM’s WebSphere, BEA’s WebLogic, and RedHat’s JBoss. Customers may plug in any component of the stack – e.g. customer’s may choose to use Ilog or FairIssac for business rules instead of the included business rules product.

Oracle Fusion Middleware

For addressing enterprise requirements in entirety a standards-based approach to establishing flexible applications and adaptable business processes, as provided by SOA, is not sufficient. It needs 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. The Oracle SOA Suite is an integral part of the Oracle Fusion Architecture, which provides a blueprint for creating next generation infrastructure that addresses these enterprise requirements.

Figure 2: The Oracle Fusion Middleware
ORACLE BUSINESS PROCESS MANAGEMENT (BPM)

Business value of SOA is realized when it is used to drive agility and business transformation powered by Business Process Management (BPM) concepts including process modeling, execution, monitoring, and optimization. The combination of Oracle SOA Suite and the Oracle BPA Suite provides a unified and comprehensive BPM platform for end-to-end people-centric, document-centric, decision-centric, and system-centric processes.

Key features of Oracle’s BPM solution include:

- **Business Process Modeling and Analysis** – The Oracle BPA Suite enables business users to model and simulate their business processes and metrics as described in section *Business Process Modeling - Oracle BPA Suite*.

- **Business Process Orchestration** – The Oracle BPEL PM supports rich process orchestration semantics based on the BPEL standard as described in section *Composing & Orchestrating Services - BPEL Process Manager*.

- **Human Workflow** – The workflow component of Oracle BPEL PM provides rich support for people centric processes as described in section *Orchestrating Approvals and other People Activities*.


- **Business Activity Monitoring and Complex Event Processing** – The Oracle BAM product enables business users to monitor their business processes in real time from their dashboards and to set up alerts based on complex event patterns as described in section *Insight Driven Action - Business Activity Monitoring*.

![Figure 3: An Oracle BPM Process Portal](image-url)
• **Process Portals** – The Oracle Webcenter product enables rich process portals where end users may find tasks, documents, dashboards, and all other information related to a business process

• **Business Intelligence** – The Oracle BI product including the Real Time Decision component enables optimization of business processes and rich decision-centric processes

• **Collaboration** – The Oracle Webcenter includes Web 2.0 collaboration technologies including discussion forums, Wikis, chat, etc. to enable collaboration-centric information worker processes

• **Document Management and Imaging** – The Oracle BPM solution integrates with the Oracle Enterprise Content Management (ECM) to enable document-centric processes including those involving physical paper

One key facet of BPM is the modeling and development methodology and lifecycle – we discuss these here. The functionality of the execution and operational components are described along with other SOA components later (and as referenced above).

**Business Process Modeling - Oracle BPA Suite**

Based on IDS Scheer’s industry leading Aris product, the Oracle BPA Suite enables business analysts to model their business processes, value chains, organizational models, resources, etc. It supports Enterprise Architecture, and process management and change management initiatives. It aligns SOA with Business Process Management (BPM).

![Business Process Modeling with the Oracle BPA Suite](image)

**Figure 4: Business Process Modeling with the Oracle BPA Suite**

Some of the key features of the Oracle BPA Suite are:
• **Extensive support for modeling standards and frameworks** – In addition to supporting the industry standard BPMN notation, the BPA suite supports many other industry proven notations such as EPC and frameworks such as Zachman.

• **Simulation** – The Oracle BPA suite includes rich simulation support to enable business analysts to test their assumptions and identify bottlenecks prior to implementation.

• **Publisher** – The Oracle BPA suite enables a business analyst to publish a process model and simulation results to a web site so that other stakeholders may review and comment.


**Closed Loop BPM**

For BPM projects to be successful and deliver true value, a closed loop BPM Lifecycle needs to be in place, where there is complete round-tripping from modeling to implementation to monitoring and optimization.

![Closed Loop BPM Lifecycle](image)

**Figure 5: The Oracle BPM lifecycle and stakeholders**

In business process modeling, the business and IT perspectives are quite different and the respective tools work from different set of assumptions to suite the
respective body of users. Traditionally, it has been a challenge to manage the hand-off. Once business handed over their models to IT, IT would make changes in the implementation model, rendering the business model out-of-date and pretty much useless. Some vendors have tried to address this challenge by positioning their tools as one tool for both business and IT; however, this approach disregards the differences between business and IT perspectives, and serves neither users well.

Figure 6: Round-tripping between business and IT

Oracle has devised a unique approach to address this problem by inventing a new concept called “logical design metadata model” that is shared between the modeling tools and execution platform tools. This shared metadata model, called Business Process Blueprint, enables seamless handoff between business and IT with complete round tripping. The Process Blueprint serves as the agreed upon contract between business and IT. Business may continue making changes to the business model; IT can synchronize their model with the business model at any time. Ideally, IT makes the Process Blueprint executable by refinement; that is by adding details consistent with the Blueprint. However, if they need to make changes to the Blueprint they may do so and then submit them back to business for incorporation in the business model.

In addition to round-tripping between modeling and implementation, Oracle is actively working on creating dashboards based on business models as well as to bring execution metrics back to the modeling environment to enable simulation based on true metrics.
ORACLE SOA SUITE COMPONENTS

Insight Driven Action - 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, optimize and identify bottlenecks in your processes, capturing business events from your existing systems. Real time visibility into service levels lead to superior customer experience.

Oracle BAM includes an event aggregation and correlation platform that allows for defining relationships between various events that impact the operations business key performance indicators (KPIs). It also provides the ability to change the business processes and take corrective actions as needed. It utilizes messaging, data integration, advanced data caching, analytics monitoring, alerting, and reporting technology to deliver requested critical information within seconds of an event.

Figure 7: Sample Oracle BAM Dashboard

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 through views, dashboards and business alerts that help improve effectiveness of operations and helps take informed decisions. Active Studio is a 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.

- **Layers Easily on Top of Existing Environments** – Oracle BAM 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.

- **Business Process Ready** – Oracle BPEL Process Manager is pre-instrumented with a sensor framework that enables events to be collected from in-flight business processes to be processed in BAM. This enables pro-active action to be taken in order to handle extreme cases and exceptions in business processes.

BAM also addresses the operationally focused business intelligence (BI) challenges. It enables convergence of the real-time functionality and a BI infrastructure, targeted at the business operations managers who 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.
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 with existing middleware technologies and platforms and provides an unrivaled process portability and vendor flexibility. The graphical capabilities offered are shown in Figure 8.

Key capabilities of Oracle BPEL Process Manager include:

- **Rich Tooling for Integration** – The JDeveloper 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.

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

—David Smith
Gartner

“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

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Figure 8: Graphical Modeler for BPEL Processes

- **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.

Orchestrating Approvals and other People Activities

Most end-to-end business processes include some activities to be performed by people, such as approvals, exception management, or case management. Oracle BPEL PM includes a Workflow component that provides rich human workflow capabilities. This is Oracle’s second generation workflow offering, replacing the earlier workflow product known as Oracle Workflow; therefore, this component is very feature rich leveraging the earlier experience.

Key capabilities of the workflow component include:

- **Pattern based declarative modeling** - Most workflow products require explicit modeling of workflow routing, escalations, and notifications. This quickly leads to spaghetti models that are difficult to understand and maintain. Based on Oracle’s experience developing workflows in its Applications, we realized that most workflow models are based on some common patterns, such as management chain approval. Leveraging this experience, the workflow provides unique declarative modeling (that is specifying the model as a form instead of diagram) leveraging common and custom patterns. The ability to model workflow patterns as explicit and full blown BPEL processes is also available for those who prefer or need to do so.

  ![Declarative workflow modeling](image)

- **Rich Worklist Application** - The workflow component includes an out-of-box worklist application that enables users to find, organize, and perform work and supervisors and process owners to manage work performance and distribution. The source of the application is available to enable unlimited customization; it is also available as portlets to be included in an enterprise portal. The workflow component automatically generates rich JSP forms based on the model metadata, which may then be customized using Oracle JDeveloper IDE.
Figure 10: Worklist application

- **Sophisticated Routing and Assignment** – The Workflow model editor enables declarative specification of common routing patterns including management chain approval, group vote, list of sequential approvers, etc. Work may be assigned to named users and/or roles; dynamic assignment based on process instance data is also supported.

- **Adhoc Routing** – The workflow component supports adding participants at runtime on an adhoc basis enabling flexible processes. Worklist application also enables work to be reassigned on an instance basis (nomination).

- **Escalations and Notifications** – Escalations and notifications are declaratively specified. Variety of notification channels including email, voice, SMS, and fax are supported. Email notifications may be made actionable enabling disconnected users to perform approvals and add comments and attachments using email, without logging into worklist application.

- **Rules Integration** - Users and/or managers may author rules to handle work matching specified conditions. Such rules may automatically act on the work or reassign it. Work load-balancing algorithms are included to redistribute work.

- **Comments, Attachments, Audit Trail** – Participants may add comments or attachments as part of their review or approval. Such comments and attachments become part of the Task data and are available to other participants along with other audit trail information.

- **Directory Integration** – The workflow component looks up users, roles, and organizational hierarchy from external directory. LDAP, Active Directory, OID, and Jazn are supported out-of-box. Any custom directory may be integrated by implementing the documented Identity Service interface.
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 contribute to agility by making it faster and easier to change policies and rules. BPEL and Rules Engines naturally fit together: BPEL enables automated and flexible business processes; Rules Engines enable automated and flexible business policies.

Key capabilities of Oracle Business Rules include:

- **Web based Rule Author** – The Oracle Business Rules features a web-based Rule Author that lets business users declaratively specify their business rules using click-and-select. The Rule Author also allows a business user to tweak the knobs exposed by a rule, such as thresholds. The Rules Author also enables setting up rules, only certain facets of which may be customized, and within specified constraints.

- **Capturing Business Policies Across All Applications** - In the past, Rules engines were primarily used as a technology to solve highly complex problems.

**Figure 11: The Oracle Business Rules Author**

"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
requiring a great degree of inferencing. More recently, the Rules market has evolved such that rules are now being used for the implementation of most high value business decisions and policies. Oracle Business Rules enables business policies to be abstracted out of any application – not just applications that are designed for SOA. It provides Java APIs including JSR-94 APIs.

- **Automation of Business Policies in Business Processes** – Oracle Business Rules is seamlessly integrated with Oracle BPEL Manager, enabling extracting business rules and policies out of Business processes. This makes the business processes more agile as the rules may be changed independent of the business processes.

- **Industry Standard RETE algorithm** – Most modern business rules product are based on the RETE algorithm, an algorithm highly optimized for executing business rules. The Oracle Business Rules is based on Jess, a very popular implementation of the RETE algorithm by Sandia National Laboratories, a premier research institute in the United States.

- **SDK for Custom Authors** – In some applications, an application specific authoring environment is desired to provide the users a seamless and intuitive experience. The Oracle Business Rules includes a SDK to facilitate building of such application specific authoring tools. Figure 12 shows an example where MS Excel is used to author approval rules for discounts.

![Figure 12: Example of a custom author enabled by the Rules SDK](image)

- **Java based Interpreted Rules Language** – Although most users will use the Rule Author or other authoring environment to author rules, the Oracle Business Rules also supports a Java based Rules Language (RL). RL is interpreted and not compiled, providing flexibility to change at run time. The use of RL may be desired when Rules are being primarily used as an IT tool.

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.

![Figure 14: XSL Transformation Editor](image)

• **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.

• **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. 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. Content filtering can also be implemented in messaging systems such as JMS using configurable filter based subscriptions and message selectors.

Data Integration Services – Data Integrator

Oracle Data Integrator is a comprehensive data integration platform that covers all data integration requirements—from high-volume, high-performance batches, to event-driven, trickle-feed integration processes, to SOA-enabled Data Services.

Oracle Data Integrator enables data services and transformation services that can be seamlessly integrated within a SOA infrastructure. It adds support for high-volume, high-performance bulk data processing to an existing service-oriented architecture. In addition, ODI is also used as a standalone data integration platform for high-performance Data Warehousing, Business Intelligence, Master Data Management (MDM), and Legacy Migration (bulk load of data).

ODI’s best-of-breed capabilities are achieved in a 100% Java runtime, allowing for numerous deployment options with SOA Suite components. This architecture uniquely enables enterprise class Data Services for an enterprise SOA. For example, the following Data Services can be supported from an Oracle Data Integrator engine deployed within Oracle SOA Suite:

- **Bulk Data Services** – for large payload data transformation/loading
- **Data Access Services** – for database virtualization & caching
- **Data Quality Services** – for cleansing and matching business data
- **Master Data Services** – for accessing golden records and reference data

Every enterprise class Service Oriented Architecture should have a roadmap for supporting enterprise data management with Data Services. Since Oracle Data Integrator is pre-packaged with highly optimal SOA capabilities, businesses don’t
have to wait for the unification of best-of-breed data integration with best-of-breed SOA infrastructure capabilities – Oracle is already supplying it today.

For more information on Oracle Data Integrator, please visit:

Pervasive Connectivity

Integrating with Applications and Technologies - Adapters
Oracle Adapters provide key connectivity and discovery into enterprise and legacy system data and meta-data. Oracle Adapters abstract away the intricacies of the connected applications and provide easy-to-use and consistent experience, enabling SOA developers to build their SOA applications without being concerned about the end applications.

Oracle Adapters are fully standards-based and are compliant with both the J2EE Connector Architecture (JCA) and the Web Services Architecture. The Oracle Adapter SDK is lightweight and enables any JCA-compliant adapter to be rapidly integrated with the Oracle SOA Suite.

Oracle provides built-in Adapters 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. Other adapters are available from Oracle OEM partners and eco-system.

Figure 16: 300+ adapters are available for Oracle SOA Suite

For more information on Oracle Adapters including datasheets and white papers, please visit:
Integrating with Partners – B2B

Oracle B2B integrates an enterprise’s business processes with its trading partners; it enables the enterprise to define, configure, manage, and monitor the exchange of information, electronically, with its trading partners.

Oracle B2B is a multi-protocol gateway supporting industry standards and protocols extensively.

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Figure 17: Supported B2B Standards and Protocols

Oracle B2B provides easy to use wizard-based UI to define the capabilities of each trading partner as well as the trading partner agreements. Advanced functionality is included for power users to configure EDI, UBL, RosettaNet, UCCnet etc.

Figure 18: Oracle B2B Trading Partner Management

For more information on Oracle B2B, please visit:
Integrating RFID and Physical Sensors – Sensor Edge Server

Oracle Sensor Edge Server (SES) provides the link to the physical world by connecting to RFID readers, sensors and response devices at the “edge” of the infrastructure. The Sensor Edge Server captures, processes, and dispatches data to the center of your IT infrastructure and relays instructions from the rest of the IT infrastructure to response devices such as light stacks, printers and other material handling equipment. Local processing allows shortening of the response time when required. Captured data is normalized to ensure consistency between sensors and to reduce the amount of data that needs to be handled by the network and applications.

The Sensor Edge Server may be used for (i) data collection from RFID readers, printers, temperature, motion, pressure, location, and other response devices; (ii) edge processing, forwarding only relevant data; (iii) data dispatching with guaranteed delivery; (iv) device and sensor management; (v) edge extensions; and (vii) tag encoding/decoding.

Oracle Sensor Edge Mobile; a mobile solution that runs on handheld RFID readers that support Pocket PC 2003 and later platforms.

For more information on Oracle Sensor Edge Server, please visit:
SOA GOVERNANCE

SOA governance is about delivering on business and SOA objectives. It links SOA investments to business goals and initiatives, mitigates the risks associated with SOA, and fits into the context of an organization’s overall IT Governance framework.

Six Steps to Successful SOA Governance

The SOA journey—and thus the SOA governance journey—is an incremental process. A maturity model, such as Oracle’s Five-Level SOA Maturity Model: Level 5 SOA, allows companies to begin and manage the SOA journey. Here we describe a six-step process to help move a company forward in its SOA governance capabilities.

![Figure 20: Six Steps to Successful Governance with SOA](image)

1. Define Goals, Strategies, and Constraints
2. Define Standards, Policies, and Procedures for Financial, Portfolio, Project, Services, and so on
3. Define Metrics for Success
4. Put Governance Mechanisms in Place
5. Analyze and Improve Existing Processes
6. Refine and Go to the Next Level of SOA Maturity

These six steps allow a company to incrementally develop and mature its overall SOA, and thus its business goals.

Step 1: Define Goals, Strategy, and Constraints

The first and most important step is defining the organization’s SOA goals and strategies. These must be aligned with business goals and strategies for the SOA efforts to provide the greatest value. Every policy, process, architecture, and decision should be traceable back to these business goals. Without first understanding and aligning with business goals, it is difficult to justify SOA efforts.

**Best Practice:** Oracle BPA Suite can help you establish SOA goals and strategies that are tightly aligned with the business

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1 Go to [http://www.oracle.com/soa](http://www.oracle.com/soa) and look for the Online SOA Assessment
Step 2: Define Policies and Procedures
The second step is to define standards, policies, and procedures that address the alignment of finance, portfolios, projects, and operations. Most companies begin their SOA journey using a project-based approach and want to see success stories with SOA before expending the time and effort to fully align the various areas. These efforts typically leverage existing tools; governance begins with simple policies, procedures, and standards surrounding the use of these selected tools. As companies move up the maturity model, they create more enterprise-based policies and processes around sharable services. Governance becomes more important and the scope of it widens as SOA becomes more mainstream and reuse increases.

Best Practice: Establish SOA goals, standards, policies, and procedures proportionate to your SOA maturity

Step 3: Define Metrics for Success
The third step is to define the success factors and key performance indicators that will let you know you have achieved your goals and objectives. If you do not define metrics to measure the success of your SOA project, you are unlikely to establish the right governance mechanisms, and are equally unlikely to deliver on your SOA strategy.

Your SOA metrics may include the creation and use of reference architectures, as well as projects that adhere to a scoring model (which includes reference architectures, standards, sharable services, LOB blueprints, and road maps); the number of exceptions and the reasons for each; the number of sharable services created; the number of applications leveraging the shared services; and the cost saved by reusing an existing service. These metrics should be communicated to the business and IT communities to clearly capture the business value of all the SOA activities and successes.

Best Practice: Define clear metrics that are obtainable and can show your progress in maturing your SOA efforts

Step 4: Put Governance Mechanisms in Place
Step four of the SOA governance process involves the enactment of governance mechanisms, including how to obtain and evaluate metrics, how to enforce policies and procedures, and how to reward the architects and developers that create sharable services and the individuals or organizations that use them.

Many governance processes may be automated, such as using tools to make sure that WSDLs for services are WS-I compliant. The more governance processes can be automated the easier it is to scale enterprise-wide SOA efforts. In order to make the procedures effective, executive endorsement is critical. Also the governance mechanisms and associated overhead should be commensurate with the stage of SOA adoption and the size of your company.
**Best Practice**: Put repeatable and well-defined governance processes in place, automating to the extent possible

**Step 5: Analyze and Improve Processes**

One of the things SOA can leverage from the manufacturing space is the notion of kaizen, the Japanese word for “continuous improvement”—that is, focusing on process to remove the major obstacles to production efficiency. As you keep improving your processes, practices, and policies, issues that had slipped through in the past will rise to the top and command attention until they can be fixed, automated, or in some way improved. Remember that feedback from the recipients of the metrics and the participants in the processes (typically the businesses) is vital to improving this process.

**Best Practice**: SOA should leverage kaizen concepts from the manufacturing domain; the closed loop BPM methodology described earlier can help

**Step 6: Refine Your SOA**

Periodically, as your SOA matures, you need to create new policies and procedures that enable you to increase your SOA maturity while delivering on your business goals. One example of continuous improvement is to implement a “Do no harm” governance policy. At Level 1 – SOA governance is primarily a communication and learning process, rather than an enforcement process. At Level 2 of SOA governance, the organization begins to implement more education and some enforcement as policies and metrics are slowly created. At Level 3 of the SOA maturity model, the policies grow more formal, the assessments more complete, and the communication greatly improved.

**Best Practice**: Governance should be commensurate with the level of SOA maturity and the number of services in operation.

**ORACLE SOA SUITE GOVERNANCE COMPONENTS**

In the earlier section we discussed SOA Governance including its importance for ensuring SOA success as well as best practices. Here we discuss the Oracle SOA Suite components enabling SOA Governance.

**Specifying and Enforcing Policies - Web Services Manager**

Oracle Web Services Manager (WSM) enables IT to effectively secure, manage, and monitor services and interactions between these services in an SOA. Oracle WSM 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 WSM centrally defines policies that govern Web services operations such as access policy, logging policy, and content validation, and then
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.

wrap these policies around services, with no modification to existing Web services being required. Also, Oracle WSM collects monitoring statistics at runtime to ensure service levels and security and displays them in a web dashboard in real time, thus providing enterprises better control and visibility over Web services.

Figure 21: Policy specification and enforcement with WSM

Key capabilities for Oracle WSM include:

- **Policy Management** – Oracle WSM’s Policy Manager 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. Oracle WSM has out-of-the-box support for authentication and authorization using HTTP basic authentication, Oracle Access Manager (OAM), CA eTrust SiteMinder, LDAP. Oracle WSM leverages OAM, LDAP and SiteMinder for role-based invocation access. Oracle WSM supports key industry standards such as XML Encryption, XML Signature, WS-Security (including Username, Security Assertion Markup Language (SAML), and X.509 security tokens) for interoperability between different security systems.

- **Enforcement** - Oracle WSM provides two kinds of policy enforcement points: Gateways and Agents. Gateways are typically deployed in the DMZ and can transparently intercept inbound requests to Web services in order to enforce policy steps, adding application security and other operation rules to applications that are already deployed. Agents provide last-mile security by plugging directly into an application or service.

- **Monitoring** - Oracle WSM’s Monitor 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. 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** - Oracle WSM works with multiple Web services platforms and providers including BEA Systems, IBM, JBoss, and Microsoft. For example, users can deploy Web services to WebSphere, WebLogic Server, and JBoss and secure these web services using Oracle WSM. Oracle WSM provides out-of-the-box, native support for multiple transport protocols including HTTP, HTTPS, JMS, and IBM WebSphere MQ. Furthermore, it provides content-based routing and built-in failure handling, including message queuing, failover routing, and configurable message retry capabilities.

**Service Portfolio Management - Service Registry**

Oracle 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 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, to enable Governance, using a comprehensive taxonomy management feature, which allows the import of existing business taxonomies as well as the creation of custom classifications.

![Figure 22: Service Portfolio Management with Service Registry](image)

- **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 facilities 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.


**Managing Metadata – Repository**

The Oracle SOA Suite includes a rich repository for metadata management. Key features include:

- **Unified Repository** – The SOA suite uses a single repository for all design-time and run-time meta-data, including BPEL processes, ESB routing services, run-time audit trails / instance data, policies, etc with a unified schema (installed by IRCA script).

- **Versioning** – Side-by-side versioning is supported, which enables hot-deploy of new process versions while allowing active instances ("in-flight") of earlier versions to complete gracefully. Also, included are version management capabilities such as changing default version, deploy/undeploy versions, retire versions, etc.

- **Clustered Deployment** – The metadata repository enables seamless deployment of versions across clustered servers.

- **Run time changes** – DT @RT ("design-time at run-time") capabilities are provided. For example, ESB routing logic may be modified at run time via a Web-based interface that is built on top of the metadata repository. Similarly, Business Rules may be accessed and modified at run time through either the web-based RuleAuthor or APIs.

- **Integration with Registry** – Metadata stored in the repository can be cataloged in the UDDI v3-compliant Service Registry (described in section Service Portfolio Management - Service Registry), enabling their discovery and re-use, as well as lifecycle management and impact analysis.
• **Relationship Management** – Relationship information, for example which services are called by which BPEL processes, is accessible via APIs. Future releases, such as the 11gR1 release, will provide key new features such as dependency analysis out of the box.

**Integrated Administration Consoles – Enterprise Manager**

Key requirement for Governance is to have end to end visibility and traceability. The Oracle Enterprise Manager provides consistent administration and management experience across Oracle DB, Application Server, SOA Suite, and Applications, leveraging customer’s knowledge and experience across the stack. The administration consoles are integrated and provide end-to-end transaction tracing, across SOA Suite components such as BPEL and ESB.

![Figure 23: End-to-end visibility and tracing with EM SOA Console](image)
THE ORACLE SOA GRID

An SOA grid provides true linear scalability and maximum availability, including 100 percent active-active server failover, no single points of failure, automatic service load distribution, self-healing management and SLA enforcement, and increased throughput (typically a 3x–10x improvement).

Figure 24: The Oracle SOA Grid

Key features of the Oracle SOA Grid include:

- Caching of stateful services – The Oracle SOA Grid provides a JCache-compliant, in-memory, distributed data grid solution for state data. The caching layer offloads the memory storage of a service instance to other machines across the grid, effectively providing a distributed shared memory pool that can be linearly scaled across a heterogeneous grid of machines.

- Continuous availability – Instance data is held in primary and backup nodes. If primary node fails, the SOA grid can automatically detect that condition and immediately route subsequent data access requests to one of the backup nodes, making it the new primary.

- Asynchronous write-behind queues – The SOA Grid can decouple the updating the database from the updating of the grid’s in memory state.

- Load balancing of stateful services – By maintain the state in a shared memory pool, the SOA Grid enables “sticky” stateful services to be load balanced.
STANDARDS

Oracle strongly believes that solutions based on standards drive customer’s total cost of ownership down and promotes successful adoption. Therefore, Oracle works with various standard bodies to drive creation and refinement of standards, especially in the area of SOA. OASIS, OAG, OMG, and W3C are some of the standard bodies where Oracle plays a leadership role.

Figure 25: Oracle plays leadership role in many standard bodies

The Oracle SOA Suite is built on standards based technology and supports many standards natively. Some of the important standards supported are BPEL for Orchestration, BPMN for modeling, XSLT, XQuery and XPath for XML processing, JCA for adapters, JMS for messaging, and WSRP for portals. Also, WS-* standards are extensively supported including WS-Security, WS-Addressing, WS-Policy, WS-Reliable messaging.

Figure 26: Some standards supported by the Oracle SOA Suite

Moreover, Oracle supports the Eclipse community and the Spring framework. For more information, on Oracle's support for standards and strategy please visit http://www.oracle.com/technology/tech/standards/soa-standards.html.
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.

Figure 27: Integration between Workflow Tasks and MS Excel

Oracle SOA Suite fully utilizes Microsoft Window OS as a core platform. In addition to supporting Windows OS as a platform, the SOA Suite leverages its features including:

- Active Directory as the identity store/directory and Windows Logon/Security for Windows Native Authentication
- Microsoft Cluster Services and Network Balancing for scalability and performance
- .NET Web Services

Microsoft Office including Word, Excel, PowerPoint, and Outlook for end user interaction
• Figure 27 shows how Excel may be used as the interface for Workflow Task query and completion and the data binding components available within Excel smart pane for drag-and-drop design.)


**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 as described in the section *Oracle SOA Suite Value Proposition*.

Oracle SOA Suite helps you achieve higher ROI faster; some of the high level benefits that derive from Oracle SOA Suite are described below:

**Realize Greater Organizational Flexibility**

Oracle SOA Suite can help you achieve greater organizational flexibility better than any other solution in the market in following 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.

**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 following 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 shown in Figure 9.
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.

- **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, centralizing systems monitoring and administration, and centralizing identity and access management.
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.

The City of Las Vegas

Over the past one and a half years the City of Las Vegas implemented an enterprise level Oracle SOA architecture solution to better streamline its internal management processes with the goal of improving overall efficiencies and increase citizen access. One of the key projects undertaken was the work order process for the Department of Public Works. This department plans, designs, constructs, operates and maintains city public use facilities, roadway and traffic network, wastewater and storm water management systems as well as being responsible for the regulation of private development. The Water Pollution and Control Facility of Public Works was faced with an ever-increasing backlog of work orders, which was causing a slow down within the department. Public Works looked at the current process for work order creation and process flow and ascertained that in order to better the system and improve efficiencies they needed a way to better communicate with other key applications integrating with the City’s main financial system. This initiative involved tying together the City’s Oracle SPL application for plant asset and operations management with the City’s Oracle e-Business Suite 11i applications (HR, Payroll, Purchasing, Finance, etc.). This solution allowed a seamless integration between water treatment and plant operations and the city’s main back office applications. This initial implementation in the Public Works department played an instrumental role in demonstrating the benefits of SOA and has helped drive additional SOA projects.

The City of Las Vegas has already seen many benefits as a direct result of their SOA Suite implementation. The first phase of their SOA implementation was accomplished, through the help of Innowave Technology, in only one month’s time. Partially due to the Oracle BPEL Process Manager’s ease of use, developers were able to ramp up on the technology quickly thereby decreasing costs and the associated downtime of key personnel. Instead of having users constantly trained on new software they are able to utilize the applications they are already familiar with, which now have greatly increased functionality. This new functionality has also lead to the ability to implement performance based budgeting. The City expects that future projects could result in a significant man-hour cost savings to the city and will only enhance the City’s ability to do business more efficiently and with greater agility.

“Why should we have to train users for all these software applications just to submit a purchase requisition? Users should be able to use the software they are already familiar with. By using the Oracle SOA Suite and BPEL Process Manager we were able to send a requisition from SPL through the approval process in a manner that is transparent to the user...it's as if they were only using SPL.”

- Patricia Dues, Enterprise Program Manager for the City of Las Vegas
Move Inc./CSC

Move Inc. (formerly Homestore) is a publicly traded company on the NASDAQ (MOVE) and is primarily focused on the real estate (Realtor.com) and move related services (Move.com) markets. The company provides over 3.5 million home listings on its main realtor.com site as well as providing listings for the likes of Yahoo.com, Aol.com, and MSN.com.

The competitive landscape in which Move operates requires them to be able to bring new products into the market quickly. This requires a solid infrastructure to integrate their back office systems with any new products. The ultimate goal was for this service-based solution to provide them the ability to do just that, without extensive re-engineering. They were also faced with an inability to create consolidated bills for their customers. Revenues for the company coming from a combination of subscription, cost per click and cost per impressions were being negatively impacted. Gaining this 360-degree view of their customer base was considered to be crucial and would ensure that both the customer’s expectations, and management’s ability to offer new products to customers and increase revenue, were being met. Move has a highly heterogeneous applications and IT environment, with PeopleSoft for HR, Siebel for CRM, and Microsoft application environments already in place. Because of this, Move Inc. wished to have a solution that would allow for complete Oracle and Microsoft interoperability while remaining standards based and open. This issue of disparate customer data was compounded by SOX audit requirements. Current audits were lasting over 6 months. Move faced SOX violations that were not only responsible for negative press, but which ended up landing a few executives in legal trouble. As a direct result, Move Inc. needed to become SOX compliant and do so in a short period of time.

Move Inc. turned to Computer Science Corporation (CSC) and Oracle for a complete solution.

Move’s strategy was based on the following principles:

- Little or no disruption to the business
- Little or no change to the existing fulfillment applications
- Ability to upgrade or change fulfillment applications without any impact on any business process or applications
- Ability to define and fulfill new products within days and not weeks
- Continuously enhance business processes and application functionality (by a phased approach)

In order to achieve the desired results, Move, Inc along with its consulting partner CSC and Software partner Oracle Corporation, decided to implement a number of Oracle Applications and tools:

“We are not just offering an application integration solution, we are helping change how Move Inc. operates on a daily basis. We have been able to help Move streamline operations and improve efficiencies while helping them offer additional products and services to their customers, thereby helping to increase the bottom line. This state of the art solution helped Move leverage their existing investments in .Net technology and provide a solid interoperable middleware solution (across .Net and J2EE platforms) for their long term infrastructure.”

-Ajit Benedict
CSC Technology Director, Western Region
• Oracle Customer Data Hub – Create single source of truth about customer information, use data cleansing and data enrichment tools. Create cross-references across various systems.

• Oracle SOA Suite – Integration Platform

• Oracle Siebel CRM Applications – Corporate CRM application to support Sales and Marketing processes, Order Capture and contract processes and Customer Service Processes

• Oracle PeopleSoft Applications – Support Integration between Oracle Siebel CRM Applications and PeopleSoft Financials applications for Billing and Accounts Receivables.

By Utilizing the Oracle SOA suite and the Customer Data Hub, Move, Inc. has been able to achieve the following benefits:

• Distribute information to all parts of the business easily and rapidly

• Hide differences in platform, software architecture and network protocols

• Assure delivery of information, even when systems and networks go off-line

• Reroute, log and enrich information, under central control, without rewriting applications

• Deploy solutions incrementally, project by project, to better manage expenses

• Support Message, Service and Event Oriented Architecture

• Improve system security, scalability, availability and robustness

• Improved auditability and reduce SOX compliance cost

• This has also allowed Move Inc. to offer new products and value to its customers and prospects resulting in an increase to the companies bottom line.

Move Inc. is currently processing over 3000 orders per month with each order (on average) having over 17 BPEL processes involved in each.
CONCLUSION

The Oracle SOA Suite enables a services and events architecture built on a modular inter-operable infrastructure that leverages existing applications and other IT assets. By shifting development from coding to component assembly it simplifies implementation, increases development productivity and shortens time to deployment. The SOA suite improves enterprise agility by continuous blending of business insight and adaptable business processes. The SOA Suite is comprehensive in its breadth of functionality and lowers customers’ TCO by providing standards based seamlessly integrated and unified architecture, governance, and experience.

The 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. A Business Activity Monitoring (BAM) solution to monitor, analyze, and act on critical business performance indicators in real-time
2. A closed loop BPM solution powered by a BPEL based process engine
3. A Business Rules Engine to enable business policies to be captured and automated
4. A multi-protocol Enterprise Service Bus (ESB) to integrate applications and other data sources
5. A Services Registry for discovering and managing the lifecycle of services
6. A Web services management and security solution for specification and enforcement of policies
7. An Integrated Service Environment (ISE) to develop services

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.