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Oracle WebLogic Suite and Oracle SOA Suite

A Synergistic Offering for Building, Deploying and Managing SOA Applications

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Executive Overview

Many organizations are adopting service-oriented architecture (SOA) to improve business agility and simplify the complexity of their IT environments. SOA represents a fundamental shift in the way enterprise applications are designed, developed and deployed as modular business services that can be easily integrated and reused.

In a SOA environment, software functions are loosely coupled with the operating system and the programming languages underlying the applications. This enables developers to separate functions into distinct units—commonly called services—that can be distributed over a network, easily combined, and reused to create business applications. These services communicate by passing data from one service to another, or by coordinating an activity between two or more services. It all adds up to improved efficiency and productivity for the IT staff and faster business processing.

Customers in every industry have proven that service oriented architecture improves flexibility through the use of discrete software components that can be deployed to solve particular business needs. But how do you create these components quickly and tie them together in a way that ensures reliability, performance, scalability and reuse? SOA poses its own set of challenges to the underlying middleware infrastructure. For example, one of SOA's basic principles is the decoupling of applications and services. As the infrastructure evolves to support new or expanding business requirements, SOA applications typically require more hardware, more infrastructure software, and more intensive administration. How do you automate these provisioning and de-provisioning exercises?

Enterprises need SOA development management and monitoring tools that can support rapid application changes, dynamically allocate resources and maximize the use of the IT infrastructure. This paper will explain how an integrated middleware suite helps

customers create and manage effective SOA environments. It will discuss why purchasing an integrated middleware suite makes sense and what customers gain from implementing these integrated middleware products.

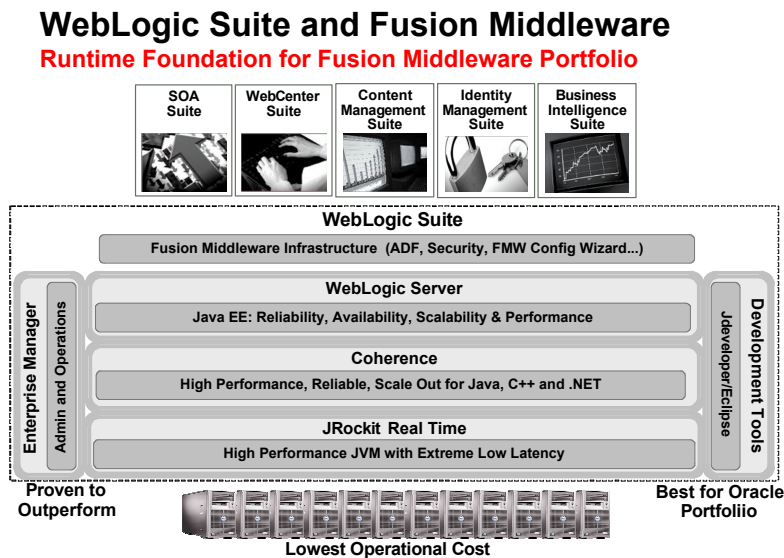
While many components of the Oracle Fusion Middleware family are pertinent to this discussion, the focus of this paper is on Oracle WebLogic Suite 11g and Oracle SOA Suite 11g and their relationship to Oracle's broad product family of applications, development tools and management tools. Oracle WebLogic Suite 11g provides the foundation to integrate and run service-oriented applications. Oracle SOA Suite 11g builds on this foundation by consolidating runtime software assets into a modular backbone. Together, these product suites enable organizations to create and orchestrate business processes that are easy to update, monitor and manage.

A Solid Middleware Foundation: Oracle WebLogic Suite

Modern application servers need key supporting elements in the area of management, runtime predictability, and linear scalability. Oracle WebLogic Server 11g—the fundamental component of Oracle WebLogic Suite—provides a solid foundation to help businesses develop and deploy enterprise applications in an application grid architecture. It includes essential tools for developing applications and managing SOA environments.

It also provides the runtime engine for mission-critical SOA and middleware applications. The suite combines mature products from the Oracle Fusion Middleware family to help companies deploy SOA applications that support extreme transactions, guaranteed SLA compliance, and dynamic management of the application software and infrastructure software, all on low cost commodity hardware. At its core is Oracle WebLogic Server 11g, the world’s highest-performance and most reliable Java EE application server. Oracle WebLogic Suite 11g also includes Oracle Coherence, Oracle JRockit, Oracle JDeveloper and Oracle Enterprise Manager. Together, these products create a SOA infrastructure that simplifies the definition, deployment, and management of multi-node applications.

Oracle WebLogic Suite integrates effortlessly with Oracle Database and other Oracle products. This integration provides the basis for SOA and the application grid infrastructure used by the rest of the Oracle portfolio of products. Having a consistent technology foundation enables customers to build and manage services quickly and effectively.



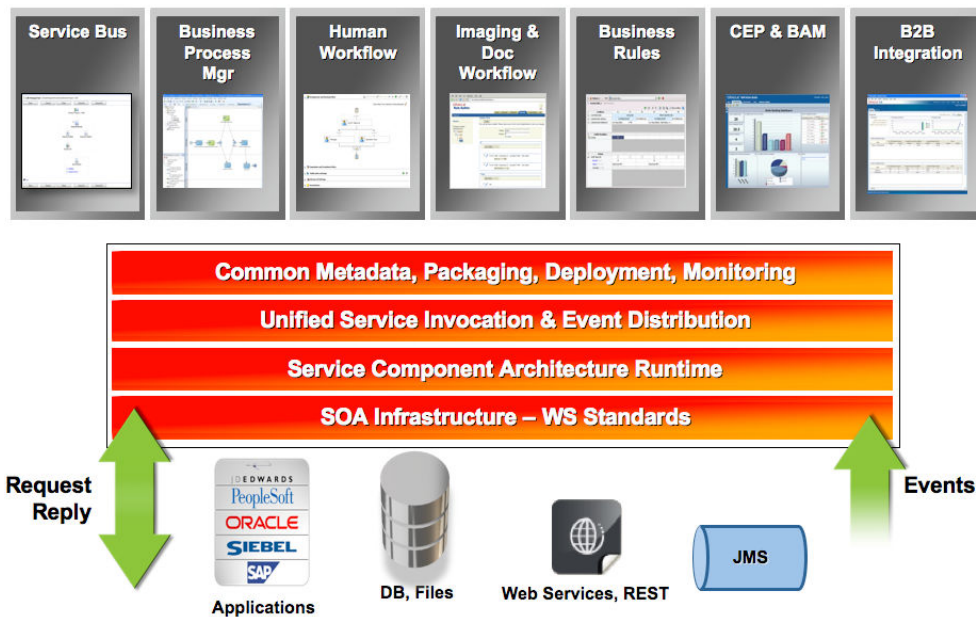
Oracle WebLogic Suite provides a solid foundation for building and deploying applications in an application grid architecture.

An Adaptable Deployment Framework: Oracle SOA Suite

SOA implementations are now common, especially in large IT shops. As organizations depend more heavily on SOA for fundamental business operations, they need cohesive SOA environments that streamline development and simplify maintenance. Oracle SOA Suite 11g helps customers achieve these goals by providing a complete infrastructure for orchestrating, composing and managing services. The suite includes tools for developing service-oriented applications, integrating those applications with existing information systems and orchestrating online business services with human workflow activities. Each component of the suite can be deployed and managed in a similar fashion, with end-to-end security and unified metadata.

Oracle SOA Suite streamlines SOA development while boosting runtime performance and simplifying management tasks. As a standards-based, hot-pluggable infrastructure, it easily interoperates with existing IT investments, which serves to lower implementation costs.

Oracle SOA Suite 11g Unified event and service infrastructure



Oracle SOA Suite 11g provides a complete infrastructure for orchestrating, composing and managing services.

Case in Point: Computer Storage and Data Management Provider

Situation:

- **A global technology company offering a broad portfolio of data retention and data security products.**

Problem:

- **An mish-mash of non-standard point-to-point integration technologies connected this company's information systems**
- **This diverse middleware solution was costly, complex, rigid and expensive to maintain.**

Solution:

- **Oracle SOA Suite running on Oracle WebLogic Suite now enables standards-based integration including JMS and Web Services.**
- **Clustering has enabled performance and scalability.**
- **Consolidating application interfaces on a single Oracle Fusion Middleware platform simplifies development and reduces maintenance**

A Flexible Infrastructure: Application Grid

Application grid is not a product, platform or standard. It is an architecture and set of best-practices for building and deploying composite applications. While key technologies such as application servers and Java virtual machines provide the foundation for application grid, it is how you organize and use these technologies that enable application grid benefits such as greater efficiency, improved performance, better quality of service and quicker response to shifting business needs.

Composite applications often experience unanticipated spikes in demand for back-end resources from the computer servers and data storage devices. In response, application grid automatically adapts and moves resources from areas of least need to areas of most need. An application grid pools, shares and dynamically adjusts IT resources.

With its focus on composite applications and reuse, SOA is increasing the need for application grid. Because SOA applications are comprised of service components that are sourced separately, customers must consider the performance ramifications of sending data from one service to another. An application grid balances the in-memory storage requirements of each service instance among the available servers, creating a distributed, shared memory pool that can be linearly scaled across a heterogeneous grid of machines.

These application grid concepts are now the foundation upon which Oracle Fusion Middleware is built. In-memory data grid technology such as Oracle Coherence turbo-charges the SOA tier by caching the results of service calls and applying shared memory to the SOA architecture. Coherence makes all of the data objects in the grid automatically available to and accessible by all

other applications and services on the grid. This technique improves performance, scalability as well as business continuity. No data is lost in the event of a server failure, since multiple copies of each piece of data are kept in the grid.

Many IT departments are already pooling and sharing resources at the hardware level with help from virtualization software such as Oracle Virtual Machine (VM) software. Application grid applies these same concepts to middleware. Oracle WebLogic Suite automates and simplifies the process by bringing together industry-leading technologies that work together in a cohesive fashion: Oracle WebLogic Server 11g for Java EE, Tuxedo for C/C++/COBOL, Coherence in-memory data grid, JRockit Java runtime solutions, and Enterprise Manager for automated management. These foundational middleware elements bring speed, scalability and manageability to SOA deployments.

What is Application Grid?

An application grid is an infrastructure layer beneath the application layer that pools and dynamically provisions the resources for a given set of applications, dynamically reallocating resources across the applications being served as needs evolve. Instead of dedicated servers and storage for each application, grid computing enables multiple applications to share computing infrastructure, resulting in much greater flexibility, cost, power efficiency, performance, scalability and availability. System administrators can flexibly allocate the runtime infrastructure that supports enterprise applications, such as Java application servers and transaction processing systems.

Automating the SOA Lifecycle: Development to Deployment to Maintenance

SOA facilitates critical IT initiatives geared towards enterprise application integration (EAI), composite application development and legacy modernization. Benefits include rapid composition of enterprise applications, ease of maintenance and improved business visibility. SOA installations are demonstrably more responsive, more cost effective and better able to respond to the needs of the business.

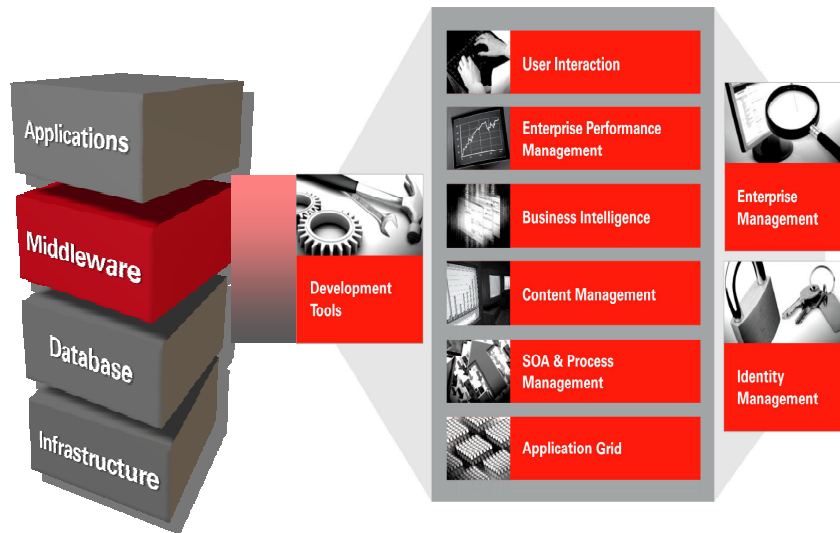
As we've seen, the application grid approach to middleware infrastructure allows a set of applications to meet peak demand and improve overall performance by sharing resources. It also allows for rapid application deployment and automated dynamic adjustments—enabling greater efficiency, competitiveness, and simplification in your IT environment. For example, a component designed to calculate sales tax can be shared by many different applications. If it is deployed on a flexible application grid infrastructure, then administrators can easily devote additional resources to that component to handle spikes in activity.

Having this type of integrated service infrastructure makes it easier to develop cohesive business applications. It also simplifies administrative tasks such as installation, clustering and configuration.

Begin with Applications

Oracle simplifies SOA projects by supplying both applications and enterprise-ready middleware. Applications are key to SOA because they provide the building block services and help structure the business process that customers need.

Oracle Fusion Middleware



Oracle Fusion Middleware provides the building blocks for SOA, with support for Oracle's broad application family.

By starting with enterprise applications, IT departments can build service-oriented architectures while focusing on tangible projects that deliver immediate business benefits. Because Oracle is building its applications on Fusion Middleware, Oracle customers can achieve all of the promised benefits of SOA while only having to maintain a single unified SOA infrastructure and skill-set for building complete, service-oriented business applications.

Comprehensive Development Options

Oracle JDeveloper Integrated Development Environment (IDE) helps customers build SOA components in a standard, reusable fashion. Developers use this Java EE environment to quickly assemble SOA applications and services and deploy them across one or more application servers. JDeveloper also facilitates other types of Fusion Middleware development, including business process management (BPM), portals, business intelligence and more. This sophisticated “soup-to-nuts” development environment spans the entire middleware family, leading to consistency throughout the application stack.

In organizations where Eclipse is the preferred application development environment, developers can leverage the Oracle Enterprise Pack for Eclipse through standard plug-ins that come free with Oracle Fusion Middleware. Oracle Enterprise Pack for Eclipse is a good choice for Java EE developers who prefer using an open source environment to develop, deploy and debug Java SE, Java EE, Spring, ORM and Web Service applications for Oracle WebLogic Server and Oracle Database.

Oracle's broad support for Web Services (WS) standards simplifies the SOA development process by streamlining integration tasks and ensuring interoperability with non-Oracle environments. With thousands of evolving standards in the Web services space, Oracle helps developers devise a standard, repeatable approach to creating and connecting SOA components.

For example, the Oracle Fusion Middleware portability framework simplifies connections at the protocol and policy levels. Oracle WebLogic Suite supports a host of SOA standards including JAX-WS 2.1, the Java API for XML-based Web services along with the latest WS-TX 1.2 OASIS Standards for Web Services Coordination, Web Services Atomic Transactions and Web Services Business Activity. Oracle WebLogic Suite also supports Java SE 6 and major security standards including SAML 2.0, WS-Security 1.1 and WS-SecurityPolicy 1.2.

Three Tier Versus N-Tier

In addition to the n-tier SOA application development profiled in this paper, Oracle supports traditional 3-tier application architectures comprised of presentation, business logic, and data access layers. Constructed with Java EE, these three tiers are commonly developed as follows:

- Presentation with Java server pages (JSP)/servlets
- Business logic with Enterprise Java Beans (EJB)
- Data access logic with Java Persistence API (JPA)

As with SOA applications, these monolithic three-tier applications can be distributed across multiple processors to increase performance and scalability. However, three-tier architectures lack the reusability of service oriented architectures since SOA focuses on encapsulating discrete functionality into services.

Case in Point: SquareTwo Financial

Situation:

- **A leading provider of asset management services specializing in the acquisition, recovery and resale of delinquent accounts**
- **Built rich internet applications for a network of franchise customers that manage the recovery process in the debt purchasing and collections industry**

Challenge:

- **Rapid business growth through pursuit of new markets**
- **Could not predict the cost, time or resources required to complete future projects**
- **Needed an agile SOA-based infrastructure to efficiently handle change and improve efficiency**

Solution:

- **Oracle SOA Suite, Oracle WebLogic Server, Oracle JDeveloper and Oracle Application Development Framework 11g with out-of-the-box integration features**
- **Reduced development time for hundreds of applications and services with automated and human workflow**
- **Maximized liquidation rates, minimized costs, accelerated delivery of IT projects by 30 percent**



"Oracle Fusion Middleware provided a significant development savings through its out-of-the-box integration features and development tools. The rapid development environment has allowed us to lower our overall cost of development while continuing to remain agile as business needs change." **Jennifer Briscoe, chief technology officer and vice president, SquareTwo Financial (formerly Collect America).**

Turnkey Deployment and Monitoring

Availability and performance issues often stem from problems in the underlying technology stack. Proactive monitoring of the IT infrastructure is critical. Oracle WebLogic Suite includes a comprehensive set of tools to simplify management and administration, including faster patching and deployment of updates, better compliance with service level agreements and the ability to quickly uncover the root cause of problems. While a complete discussion of this environment is beyond the scope of this paper, the primary technologies are summarized here.

Oracle WebLogic Server provides a runtime environment for custom applications written in popular programming languages such as Java, C, C++ and Cobol, as well as for applications developed using products in the Oracle Fusion Middleware product family such as Oracle SOA Suite, Oracle WebCenter Suite, Oracle Identity Management, Oracle Content Management,

Oracle Business Intelligence, and grid management tools. This is the best possible foundation for an Oracle portfolio.

Oracle SOA Suite provides a repository for storing, managing and securing SOA components with help from several mature systems management applications in the Oracle Fusion Middleware family. Oracle Enterprise Manager Grid Control provides end-to-end monitoring and management capabilities for the Oracle SOA Suite. Together, they help align business and IT indicators, manage SOA runtime environments and administer SOA components such as business processes, Web services, policies and infrastructure components.

Oracle Enterprise Manager also includes Management Packs for SOA environments such as Oracle BPEL Process Manager and Oracle Service Bus, as well as a Management Pack for Oracle WebLogic Server. Complementing these core management offerings is a Diagnostics Pack and a Configuration Management Pack that supports Oracle and non-Oracle Middleware including JBoss Application Server, WebSphere Application Server, Apache Tomcat and Oracle Tuxedo.

In addition, Oracle Management Pack Plus for SOA provides runtime governance through composite application modeling and monitoring as well as comprehensive service and infrastructure management functionality to reduce the cost of deploying and monitoring SOA initiatives.

Management Packs for WebLogic Suite and SOA

- **Reduce the time and effort required to set up application performance management**
- **Minimize errors associated with manual application performance management processes**
- **Keep up with environmental changes**
- **Lower total cost of ownership**

The Composite Application Modeler and Monitor (CAMM)/Composite Application Performance Management (CAPM) pack helps SOA administrators pinpoint performance issues within complex, multi-tiered applications. These tools enhance visibility by automatically modeling the flow of business transactions for Java and composite applications.

Oracle Fusion Middleware Real Operations Insight enhances visibility across the application infrastructure, helping enterprises ensure continuous availability and performance of applications and services. Real Operations Automation utilizes the metrics provided by Real Operations Insight to optimize resource management.

Scaling with Application Grid

Online retailers commonly provision additional hardware for their applications during the holiday season, as do manufacturers when they face a large production run and software engineers when they want to test large programs. Organizations that run their SOA infrastructure

on Oracle WebLogic Suite can utilize Oracle Coherence and WebLogic Operations Control to automatically provision additional server and storage capacity to accommodate these peak loads. Oracle Coherence, a valuable component of WebLogic Suite, improves performance and scalability of SOA applications. For example, Coherence uses application grid principles to make these applications more fluid and easier to adjust. Administrators can quickly provision and de-provision server instances as the transaction load increases and decreases.

End-to-End Management Tools

Understanding complex service dependencies, monitoring consumer expectations and controlling service ownership costs are the biggest barriers to effectively managing service-oriented architecture (SOA) applications and infrastructure. The high level of abstraction that makes SOA so attractive also masks the relationships among key application components. This lack of visibility makes it difficult for administrators to troubleshoot failures and resolve performance issues. It also makes it difficult to determine the impact of individual updates and changes to particular application components, such as the Web services and application services that make up a modern Java EE application. Monitoring this application layer requires special tools, visibility and expertise.

Oracle WebLogic Server includes scripting tools, an administrative console and a diagnostic framework to manage and monitor the application server environment. These fundamental management capabilities are complimented and extended by Oracle Enterprise Manager, which provides an integrated management framework across Oracle's entire product line, including applications, middleware and databases.

Oracle Enterprise Manager Fusion Middleware Control helps manage the infrastructure layer as well as monitor and configure WebLogic Server applications through a unified console. Operations teams can take advantage of the Oracle Enterprise Manager Diagnostics Pack to stop services, monitor and manage applications across domains and view frequently accessed components. They can also use Oracle Enterprise Manager Management Pack for WebLogic Server to manage performance, track or update configurations and automate operations for multiple Oracle WebLogic Domains. These tools automatically detect the service endpoints for monitoring and provide in-context drill-down to identify performance bottlenecks and diagnose issues within all the applications running in an Oracle WebLogic Server environment.

Oracle's SOA management environment includes Oracle Enterprise Manager Fusion Middleware Control, a web-based environment designed explicitly for managing and monitoring Oracle SOA Suite. This software handles all aspects of SOA management, from attaching security policies to tracking down messages to identifying and repairing exceptions.

At a higher level, by providing visibility into the functional logic of Java EE applications, Oracle Enterprise Manager helps administrators conduct root-cause analysis, from the URLs to the Java

code to the SQL statements, while keeping an eye on the full execution context of the measurement.

Conclusion: An Enterprise Vision for SOA

For years, SOA has been lauded as a sure way for enterprises to lower IT costs through improved reuse of technology assets and to become more responsive to the needs of the business. Today, leading companies are adopting Service Oriented Architecture to simplify their IT environments and expand their business capabilities. SOA installations are in wide production.

SOA proponents often cite studies showing that most IT organizations spend three-quarters of their budgets on maintenance, leaving only one-quarter for new initiatives that drive value to their organizations. SOA, they say, will enable IT to reverse this ratio and spend more time on new initiatives.

Oracle shares the industry's enthusiasm about SOA but takes a more practical and comprehensive approach than other vendors. The business value is clear: a complete SOA offering – from development to deployment to management – that boosts productivity and reduces total cost of ownership.

Are you ready to maximize returns on your Service-Oriented Architecture investments? Find out by taking the Oracle Service-Oriented Architecture Readiness Assessment:

<http://soaready.nvishweb.com/soaready/>.

Would you like to learn more about application grid? View additional information in the Enterprise Solution Cookbook, which highlights ten real-world IT solutions:

http://www.oracle.com/technology/architect/enterprise_solution_cookbook/index.html.



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