

**Oracle Application Server 10<sup>g</sup>**  
**NEW FEATURES OVERVIEW**

*A Technical White Paper*  
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# Oracle Application Server 10g – New Features Overview

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**Oracle has designed the next generation of its Application Platform Suite, Oracle Application Server 10g, to meet the critical requirements that organizations have for Information Technology infrastructure that offers “Greater Responsiveness at Lower Cost.**

## EXECUTIVE OVERVIEW

Over the past few years, the speed and unpredictability of business cycles have pushed the Information Technology infrastructure within many organizations to its limits. Rapid changes in market and competitive dynamics have forced organizations to become more responsive to change. However, their information systems and business applications are frequently monolithic and inflexible. Further, critical business processes within organizations span many different systems, are not optimized, and difficult to modify. They, therefore, impede the organization’s ability to adapt to change. Organizations are also faced with continued and accelerating pressure to lower Information Technology budgets. However, their technology infrastructure is often fragmented and very expensive to maintain and evolve due to the use of expensive components, excess capacity, and costly labor-intensive administration. To meet their critical business needs, therefore, organizations need an Enterprise Application Infrastructure that addresses the needs for “Greater Flexibility or Responsiveness at Lower Cost”. Oracle designed the next generation of its Application Platform Suite – Oracle Application Server 10g – to provide these two benefits – greater I/T flexibility at radically lower cost.

## INTRODUCTION

Enterprise Applications have traditionally been developed in isolation as monolithic blocks of code. Existing Applications become legacy systems as soon as they are developed. They are inflexible and very expensive to adapt or maintain. Increasingly organizations also find that their corporate Business Processes span multiple Applications and systems. Existing Enterprise Applications and Legacy Systems are virtually impossible to integrate into Business Processes that in turn cannot be quickly and efficiently adapted to competitive events. Finally, as Enterprise Applications continue to proliferate within organizations, employees, suppliers, and customers find it very difficult to find all the information and applications they need to do their jobs quickly and easily. They are faced with fragmented corporate information; the inability to access the applications they need anywhere and at anytime; the need to re-enter the same information in multiple places; and the inability to collaborate productively with their colleagues or partners.

A Responsive Software Infrastructure for Enterprise Applications must, therefore, provide the ability to (i) Develop Enterprise Applications at Lower Cost; (ii) Enable

Oracle Application Server 10g provides a Responsive Software Infrastructure for Enterprise Applications. It provides the ability to:

- Develop Service-Oriented Applications (SOA) at Lower Cost
- Integrate Systems into Streamlined Business Processes that can be Quickly Optimized in Response to Events
- Make Employees more Productive by providing them an Enterprise Portal to access information and do work (Workplace)

Streamlined Business Processes that can be Quickly Optimized in Response to Events; and (iii) Make Employees more Productive by providing them an efficient Workplace to access information and do work. Oracle Application Server 10g is designed to address these three challenges:

- *Service Oriented Development of Applications (SOA)* – It provides a productive and open Application Development Framework; a comprehensive J2EE standards-based SOA runtime, and facilities to service-enable existing applications and legacy systems without rewriting any of the applications.
- *Event-driven Business Process Optimization* - It provides facilities to synchronize data between systems; to integrate systems within the Enterprise (EAI) and with partners (B2B); to automate business processes (BPM); and to monitor and optimize business processes in response to events.
- *Unified Workplace with Pervasive, Multi-channel Access* – It provides pervasive access from anywhere, any time, and from any device to an Enterprise Portal that provides unified access to Information, Services, Business Processes, and Business Intelligence; and a productive and collaborative Workplace for employees.

Additionally, organizations are faced with the escalating costs to deploy and manage Enterprise Applications due to four important cost drivers: First, Enterprise Applications have traditionally needed specialized hardware that is very expensive in order to offer good Quality of Service. Second, organizations have typically needed to deploy Enterprise Applications on dedicated servers and storage in order to ensure that they have sufficient computing capacity to handle peak workloads. This has driven huge amounts of excess (and expensive) computing capacity. Third, Enterprise Applications and Software Systems are very expensive to provision and manage due to their complexity; the specialized tools, procedures, and skills required; and the large amounts of manual human intervention needed to manage large numbers of systems. Finally, the costs of security administration is growing rapidly driven by the large numbers of users accessing Enterprise Applications today; the number of Applications they access; the number of locations where security is administered; and the growing number and severity of security attacks.

A lower cost software infrastructure must, therefore, lower the costs of servers and storage, systems management, and user/security management. Grid Computing is a new software architecture designed to Pool Low Cost Modular Storage and Servers to create a “virtual computing resource” across which work can be transparently distributed. It allows computing capacity to be used very efficiently, at low cost, to deliver very high performance and high availability. The resources in a grid can include storage, servers, databases, and also Application Servers and Enterprise Applications. Oracle Application Server 10g is designed to leverage Grid Computing to lower costs associated with deploying and Managing Enterprise Applications:

Oracle Application Server 10g is designed to leverage Grid Computing to lower costs associated with deploying and Managing Enterprise Applications. It provides:

- Enterprise Performance, Scalability, and High Availability using lower cost hardware and storage
  - Lower management costs and better business continuity by automating Software Provisioning; Centralizing Monitoring and Administration of sets of systems
  - Lower Security Administration Costs by centralizing identity and access management
- *Enterprise Quality of Service on Commodity Computing Grids* – It provides enterprise-levels of Performance, Scalability, and High Availability using commodity hardware and storage. It saves costs by lowering computing capacity requirements and enabling modular, inexpensive capacity growth.
  - *Lower Cost Systems Management* – It lowers management costs and provides better business continuity by automating Software Provisioning; centralizing Monitoring; and enabling Policy-based Administration of sets of systems.
  - *Lower Cost Security Management* – It provides a secure platform for Enterprise Applications and lowers the cost of user management by centralizing identity and access management.

## 1. LEVERAGING TECHNOLOGY INNOVATIONS

Oracle Application Server leverages the recent technology innovations that help reduce the cost and complexity associated with IT infrastructure and address contributing factors that increases the IT budget as identified above.

### Application Development - Technology Evolution:

*Service Oriented Application (SOA) Development Framework* provides the flexible development framework to build or convert existing applications that can be easily deployed on a grid environment. This helps reduce the cost associated with application development.

*Optimized Business Processes* using standards based communication between applications ensures seamless and efficient business operations within the enterprise as well as with trading partners. This results in more efficient business transactions and thus, improves enterprise wide productivity.

*Access through Multi Channel Portals* deliver personalized and timely information to the right user when it is most relevant.

### Application Development Issues – Technology Evolution:

*Grid computing* is a new software architecture designed to address the following IT challenges:

*Effective use of capacity* provides the ability to use large amounts of resources, polled together. This architecture enables workload distribution over virtual computing resources such as storage units, servers, databases, application servers, and applications. The architecture also ensures these resources are highly available.

*Dynamic allocation of resource* provides the ability to add additional resource based on certain criteria, on demand.

*Resource management capability* provides the ability to manage large amounts of resources as simple logical units, thus reducing the administrative overhead.

Oracle Application Server 10g is an integrated Application Platform Suite designed to enable organizations to have a lower cost, more responsive software infrastructure for their Enterprise Applications.

## 2. ORACLE APPLICATION SERVER 10g – KEY HIGHLIGHTS

Leveraging these technology innovations, Oracle Application Server 10g offers a complete solution (Figure 1) to address the needs of application development and deployment in the Grid Computing environment.

**SOA Development Solutions** - Oracle Application Server 10g is a comprehensive and integrated platform that provides an easy to use and flexible SOA based development framework, toolset and infrastructure to develop new applications, based on open standards as well as run existing applications on a grid. It also provides a modular Application Development Framework to help build flexible service oriented applications for grid using Oracle JDeveloper 10g and Oracle Developer Suite 10g.

**Event Driven Business Process Optimization** - Oracle Application Server Integration provides a complete solution to optimize data integration, business process orchestration, heterogeneous system connectivity and data consistency.

**Pervasive Access through Multi Channel Portal** - Oracle Application Server Portal and Oracle Application Server Wireless enable pervasive access to relevant information and applications through any device from anywhere.

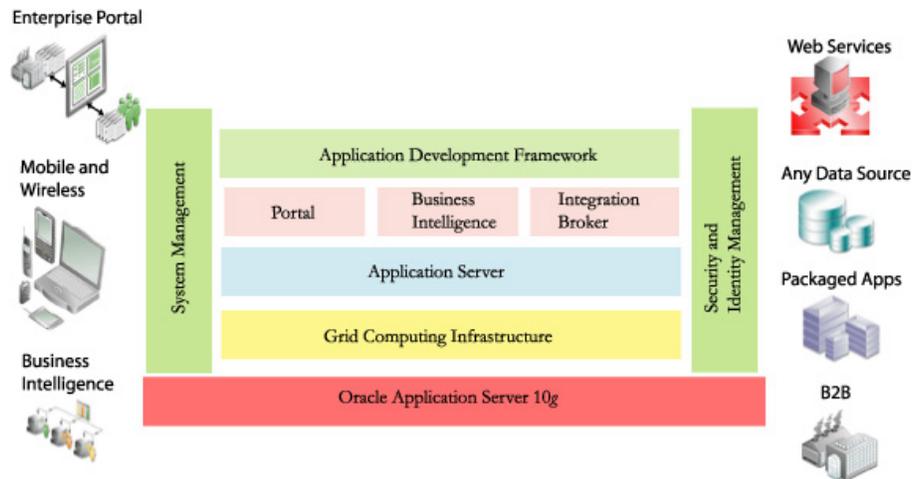


Figure 1: Oracle Application Server 10g Platform

### Ensure Quality of Service (QOS) when deployed on commodity hardware –

Oracle Application Server 10g deploys on commodity hardware but ensures application and system performance is good without wasting any additional hardware by using efficient workload management and on demand computing. In addition, Oracle Application Server 10g is highly available and provides excellent QOS on commodity hardware.

**Provision and manage users centrally** – Oracle Application Server 10g uses Oracle Identity Management infrastructure to efficiently provision and manage all users from a central location. This infrastructure can also communicate with any existing non Oracle Identity Management solutions.

**Make Systems self managing** – Oracle Enterprise Manager - Grid Control 10g and Oracle Application Server 10g enable automated software provisioning, system management and application management. This ensures that the system can self manage to a great extent, thus reducing the cost and human errors associated with system management.

### 3. APPLICATION DEVELOPMENT

Oracle Application Server 10g addresses the following challenges faced by organizations with respect to enterprise application development.:

- *Costs to Develop and Adapt New Enterprise Applications* – Driven by the inability to build Enterprise Applications as modular services that can be quickly composed into “Composite or Fusion Applications”; adapted to change; or extended.
- *Costs to Integrate Applications into Business Processes* – Driven by the costs associated with developing new corporate business processes, integrating Enterprise Applications with these Processes; maintaining the Business Processes as Enterprise Applications evolve; and optimizing Business Processes in response to competitive and market dynamics.
- *Complexity in Providing Coherent Access to Users* – Driven by the complexity that users face in accessing many different applications through many different user interfaces, with different security credentials, and in many different locations.

Oracle Application Server 10g provides a Responsive Software Architecture that is designed to address these challenges. It supports a new model for Enterprise Application Development and Integration - *SOA*. With *SOA*, a shift has begun from building monolithic applications that are difficult to adapt and integrate to building “composite” applications, which are applications that assemble individual business components or services. These business components, also known as *Web Services*, have standards-based interfaces so that they can be re-used across applications. Any new or existing application can be published as a *Web Service*. By exposing existing Applications as *Business Services*, organizations can compose new “*Composite Applications*” from existing applications more quickly. Organizations can also more quickly and efficiently define, deploy, and optimize *Business Processes* (that orchestrate *Business Services* or span multiple Applications). They can provide users with more cohesive and personalized access to Enterprise Applications and information by consuming *Business Services* in *Enterprise Portals* that can provide consolidated access to information and applications. Employees can be made more productive by providing them with a single place – the

Oracle Application Server 10g is a comprehensive and Responsive Software Platform for Enterprise Applications by providing:

- **The Industry’s Most Comprehensive and Fastest J2EE and Web Services Platform**
- **Rich Enterprise Integration and Business Process Optimization Services**
- **The Market’s Leading Enterprise Portal and Multi-channel Delivery Services**
- **Integrated business intelligence services including query, analysis and reporting capabilities**

Enterprise Portal – where they can find the information they need and where they can do work (“a Corporate Workplace”).

These facilities are designed to enable Oracle Application Server 10g to provide three important benefits:

- *Enable Service Oriented Development of Applications* - that provide easy, flexible and standards based application development environment for new applications as well as service enables the existing applications to run in grid environment without any rewrite of the application.
- *Enable event-driven Business Process Optimization* - to provide the ability to model and capture business events, to drive business processes through events, to monitor, improve and optimize business processes.
- *Enable Coherent, Pervasive, Multi-channel Access to Information and Services* - Pervasive access by from anywhere, any time, any service from any device through an enterprise portal that can provide personalized views to different services, thus simplifying the access to any information and processes.

Specifically, Oracle Application Server 10g provides the following new features for Application Development.

*Reduce application development costs by:*

- Enabling rapid application development and interoperability using standards based development (such as J2EE and Web Services).
- Improving productivity by using platform neutral technology to develop new applications (such as MVC based ADF).
- Reusing legacy applications by wrapping them using SOA.



*Optimize business processes by:*

- Using a single integrated platform to integrate systems, data sources or packaged applications using Oracle Application Server Integration Platform into event driven business process.
- Connecting to and exchanging data between systems seamlessly.
- Coordinating and optimizing business processes to improve efficiency.
- Collaborating with trading partners using standard protocols.

*Provide pervasive access of information and applications to users:*

- Provide relevant, up to date, personalized and composite view of applications and content.
- Deliver content and provide access to applications using Oracle Application Server Portal and Wireless.
- Provide comprehensive real time and historical business intelligence.

### 3.1 Application Development - Enhancements

As discussed before, Oracle Application Server 10g supports a new model for Enterprise Application Development and Integration - SOA. With SOA, you shift from building monolithic applications that are difficult to adapt and integrate to building “composite” applications, which are applications that assemble individual business components or services. These business services, can have well defined interfaces so that they can be re-used across applications. Any new or existing application can be published as a service. By exposing existing applications as business services, organizations can compose new applications from existing applications more quickly. When exposed using standard interfaces like WSDL, these services are called web services that facilitate interoperability across platforms.

#### 3.1.1 Oracle Application Server Containers for J2EE (OC4J)

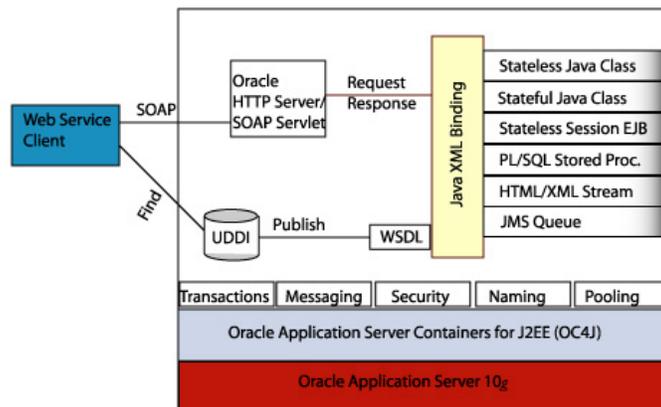
Oracle Application Server Containers for J2EE 10g (9.0.4) has a number of new features to support Service-Oriented Applications. These include:

**Java Server Pages Enhancements** – (i) *JSP Standard Tag Library (JSTL)* - Support for JSTL, per JSR-152, is packaged to work out of the box (ii) *Multimedia JSP Tag Library*: The multimedia JSP tag library simplifies the creation of JSP web applications that support the upload and retrieval of multimedia data stored using the Oracle 10g media object types. The tags also simplify access to data in HTML file upload forms.

**JMS Enhancements** - JMS support has been enhanced to add a lightweight JMS provider, in addition to the Oracle JMS delivered with earlier releases. The new lightweight JMS is now fully JMS 1.0 compatible and has been enhanced to support durable messaging through a file based persistence mechanism and provides improved stability and performance.

**Web Services Enhancements** - Oracle Application Server 10g (9.0.4) provides a comprehensive platform (Figure 2) to develop and deploy Enterprise Web Services.

Figure 2: Oracle Application Server 10g– J2EE and Web Services Platform



New functionality introduced in this release includes:

New Features for J2EE and Web Services Development include:

- **Enhancements to JSP, JMS, JCA, JNDI, TopLink, EJB Containers Persistence Manager and other J2EE Services**
- **Enhancements include support for new type of web services, new datatype support, SOAP, WSDL and UDDI enhancements**
- **Broader and better .NET interoperability**
- **Productivity features through Wizard driven approach in Oracle JDeveloper 10g**
- **Introduction of an open, MVC architecture-based J2EE App. Development Framework: ADF**

- *New Types of Web Services* - (i) Stateless Java Classes as Document Web Services; (ii) Stateful Java Classes as Document Web Services; (iii) JMS endpoints as Document Web Services; (iv) Message Driven Beans as Web Services; (v) Reports, Discoverer, Portal applications as Web Services.
- *New Datatypes for Web Services* – Support PL/SQL CLOB, BLOB and XML data type.
- *SOAP Enhancements* – (i) SOAP headers and header API for accessing and creating SOAP headers; (ii) SOAP fault support for ill formed SOAP requests.
- *WSDL Enhancements* - WSDL analyzer tool to test simple Web Services without needing to write client applications.
- *UDDI v2 Enhancements* - Publisher assertion via the business relationship Model; Inquiry/publishing enhancements including support for wildcards; Business name/identifier collections; User authentication/authorization; Entity validation with external services (e.g. integrate with Dun and Bradstreet validation services); Support for UDDI v2.0 replication API; and support for an installable UDDI schema into a non-Oracle database such as IBM DB2 and Microsoft SQL Server.
- *.NET Interoperability* - Untyped and typed SOAP support for .NET interoperability

### 3.1.2 Oracle JDeveloper 10g

Oracle JDeveloper 10g is a J2EE™ development environment with end-to-end support for modeling, developing, debugging, and deploying e-business applications and Web services based on SOA. Oracle JDeveloper 10g allows developers to build J2EE applications and Web services either from scratch or by using a J2EE framework. To maximize developer productivity and freedom to choose implementation at the various layers of the architecture, JDeveloper provides a comprehensive set of integrated tools to support the complete development lifecycle. JDeveloper simplifies J2EE development by providing wizards, editors, visual design tools, drag and drop data binding to user interfaces, and deployment tools to create high-quality, standard J2EE components. JDeveloper also provides a public Extension SDK to extend and customize the development environment and to seamlessly integrate with external products.

Oracle's solution to the ever-increasing complexity of the J2EE platform is the Oracle Application Development Framework (ADF). Based on the Model-View-Controller (MVC) architecture, Oracle ADF lets application developers focus on the business domain rather than on the underlying technologies. In addition to ADF new features, JDeveloper 10g introduces new features focusing on J2EE & Web Services and IDE.

**ADF Features:** Ease of development features include application navigation, technology scoping and MVC architecture support.

**J2EE and Web Services Features:** End to end modeling of business components, import EJB wizard, integration with OracleAS TopLink CMP Beans, client generation for EJBs, one click Java class web service creation, drag and drop WSDL from UDDI browser.

**IDE Features:** The new IDE includes improved windows management, ability to define customized audit and metric profiles, new UML profiles, model extensibility framework for third party integration, XML schema editor.

Table 1 below summarizes the key application development new features introduced in Oracle Application Server 10g.

<p><b>SOA – OC4J (JSP, EJB, JMS)</b></p> <ul style="list-style-type: none"> <li>• Built in JSP Standard Tag Library (JSTL)</li> <li>• JSP Tag Library Descriptor Caching</li> <li>• Multimedia JSP Tag Libraries (Audio, Video and Image)</li> <li>• Stateful EJB Activation and Passivation</li> <li>• Extended EJB-QL Support (Date, Time, Timestamp, SORT)</li> <li>• Volatile JMS Support</li> <li>• JMS with file persistence</li> </ul> <p><b>SOA - OC4J (EJB)</b></p> <ul style="list-style-type: none"> <li>• CMR: 1 to many optimizations</li> <li>• CMR: 1 to many foreign key support versus association table</li> <li>• Persistence Manager optimizations</li> <li>• CMP: Lazy loading turned off by default</li> <li>• RMI over IIOP (SSL Support)</li> <li>• RMI over IIOP managed by OPMN</li> <li>• Data Source and JCA Enhancements</li> </ul>	<p><b>SOA – Web Services</b></p> <ul style="list-style-type: none"> <li>• SOAP header support for routing, logging and transactions</li> <li>• Better PL/SQL Web Service support</li> <li>• Support for OracleAS Portal as Web Service</li> <li>• Web Services runtime debugging improvements</li> <li>• New Datatype support (CLOB, BLOB)</li> <li>• New dynamic WSDL tester for arbitrary WSDLs</li> <li>• JMS as Web Service support</li> <li>• Untyped/typed SOAP support for .NET interoperability</li> </ul> <p><b>SOA – JDeveloper 9.0.4</b></p> <ul style="list-style-type: none"> <li>• Significant performance improvements in startup, project loading, code editor and help system startup</li> <li>• BC4J generation from Designer</li> <li>• BC4J design time enhancements</li> <li>• BC4J Usability enhancements</li> <li>• Integrated with TopLink editor</li> <li>• OracleAS component plugins</li> </ul>	<p><b>SOA – JDeveloper 10g</b></p> <ul style="list-style-type: none"> <li>• New Application Navigator</li> <li>• Drag/drop application binding</li> <li>• Visual page flow modeler</li> <li>• New visual editors including html</li> <li>• UML Modeling</li> <li>• J2EE/Web Service enhancements</li> </ul> <p><b>OracleAS Mapviewer</b></p> <ul style="list-style-type: none"> <li>• Build/visualize custom maps using XML APIs, JSP and JSP tags</li> <li>• Business geography and spatial analysis support</li> <li>• Seamless integration with location based services, business applications and wireless platforms</li> </ul> <p><b>OracleAS TopLink</b></p> <ul style="list-style-type: none"> <li>• Workbench enhancements</li> <li>• Additional architecture and message format support</li> </ul>
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**Table 1: Oracle Application Server 10g – Application Development new features**

New Features for Enterprise Integration and business process optimization include:

- Data Integration Services
- **B2B Integration Services**
- **Trading Partner Management**
- **Business Process Management (BPM)**
- **Business Activity Monitoring (BAM)**
- Vertical Solutions: RosettaNet, EDI, e-Business Suite
- J2CA-based Adapters to Connect to Mainframes, Legacy Systems, Packaged Applications, and other Systems

### 3.2 Integrating Applications and Systems - Enhancements

Oracle Application Server 10g (Figure 3) allows organizations to improve their business operations in three main ways:

- *Synthesize Information and Reconcile Data Between Multiple Systems* – Oracle Application Server 10g enables organizations to synthesize information and reconcile data from multiple systems with each other. These services provided by OracleAS Integration include facilities to extract data from multiple systems and Packaged Applications through adapters and synchronize data between them using high speed messaging coupled with Data Translation and Transformation.
- *Integrate Systems into Enterprise Business Processes* – Oracle Application Server 10g enables organizations to define and deploy Business Processes that span Enterprise Applications and Legacy Systems. These services provided by OracleAS Integration include facilities to – (i) Model and deploy Enterprise Business Processes (including human Workflow where necessary); (ii) Integrate Business Processes with Packaged Applications through adapters; (iii) To translate (convert syntax), transform (convert semantics), and validate information in multiple formats (including XML and legacy formats such as EDI); (iv) To create and manage Trading Partners through standard Trading Partner Agreements; and (v) To coordinate B2B Business Processes with them using a variety of industry-specific vocabularies including HL7, RosettaNet, UCCNet, and EDI.
- *Optimize Business Processes through Business Activity Monitoring* – To optimize Business Processes, Oracle Application Server 10g provides integrated Business Process and Business Activity Monitoring facilities that enable analysts to monitor Business Processes and Business Events and optimize them using Business Rules.

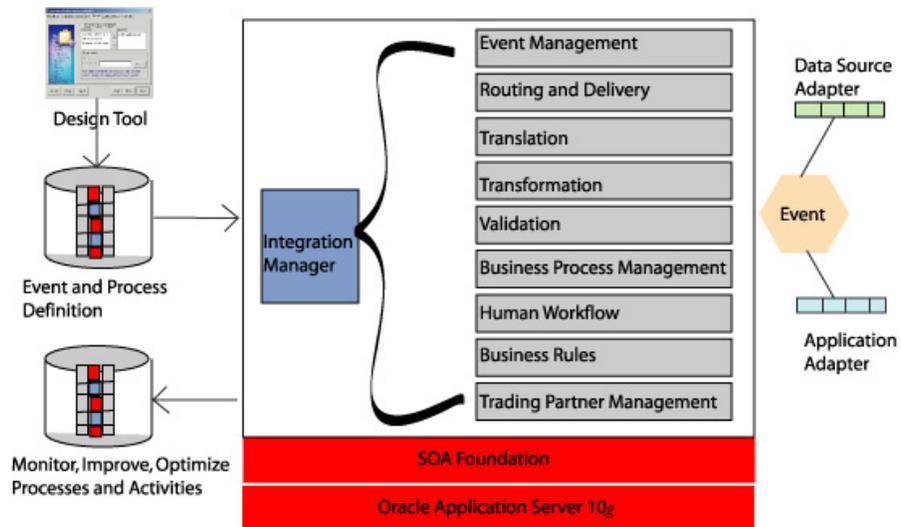


Figure 3: Oracle Application Server Integration

In the remainder of this section, we will discuss the new Enterprise Integration features of Oracle Application Server 10g in three parts – (i) Synthesize and Reconcile data between multiple systems, (ii) Business Process Automation, and (iii) Business Process Monitoring and Business Activity Monitoring.

### 3.2.1. Synthesize and Reconcile Data Between Multiple Systems

**Comprehensive Design Tool:** Oracle Application Server 10g provides a comprehensive design tool to develop key functions such as: data type designer, graphical business process modeler, mapping and transformation designer, validation rule editor, and trading partner administration.

**Integration Services:** Oracle Application Server ProcessConnect provides an improved collection of services that address the unique requirements of integration including:

- *Dictionary Management* - Oracle Application Server provides an enhanced dictionary facility to maintain message/document types that may be imported from external sources, such as XML DTDs and Schemas, enterprise applications, or databases.
- *Translation* – Provides a formal translation facility that converts the external format/syntax of documents to a common internal XML-based syntax.
- *Transformation* – A new and improved transformation facility converts the semantics of messages/documents from one form to another. Document maps are defined through a visual mapping tool. Custom transformation functions may be created using calls to external Java functions.
- *Validation* – A new validation facility provides the ability to validate documents against user-specified rules. Custom validation functions may be implemented via external Java functions.

**J2EE Connector Architecture based adapters:** Oracle Application Server ProcessConnect provides support for the J2EE Connector Architecture (JCA) 1.0 standard. While Oracle Application Server ProcessConnect complies with the JCA 1.0 specification, extensions are provided to overcome current limitations. This includes support for bi-directional communication, asynchronous notification, and improved metadata interfaces. These extensions are implemented in a manner consistent with the JCA framework.

There are six categories of adapters. The following out of box adapters are available with Oracle Application Server 10g (9.0.4):

- Transport adapters: SOAP, HTTP, HTTP(s), SMTP,FTP, Flat file
- Messaging adapters: Oracle AQ, MQ Series, TIBCO, JMS
- Database adapters: Oracle8i, 9i, SQL Server, IBM DB2

- Legacy adapters: CICS, VSAM, ISM/DB, IMS/TM
- Packaged application adapters: Oracle E-business Suite 10.7, 11.5.x, SAP, PeopleSoft, Siebel, JD Edwards
- B2B adapters: RosettaNet, EDI

In addition, several other adapters are certified and available through our partners. You can find a complete list of all these adapters from <http://otn.oracle.com> website.

### 3.2.2. Business Process Integration

**Web Services Integration:** Oracle Application Server ProcessConnect adds support for web service integration. Business processes may incorporate web services located on internal networks or over the Internet. Conversely, business processes defined in Oracle Application Server ProcessConnect may be published to customers and other trading partners via web services standards. Web services communication is enabled through support for SOAP 2.2 packaging. The design tool has the ability to import and export WSDL, and can read from and publish to UDDI repositories.

**Business Process Management (BPM):** Oracle Application Server ProcessConnect is a business process centric solution for e-business integration addressing the full spectrum of business process management requirements in one product. It provides support for automated event processing using user-specified business rules. It enables modeling and management of B2B collaborations such as RosettaNet PIPs. It also includes support for human interactions, such as notifications via email. Oracle Application Server ProcessConnect enables modeling in business terms through process “roles” that maintain a separation between business concepts and application/protocol specific logic. Oracle Application Server ProcessConnect executes business processes using Oracle’s enterprise-proven BPM engine, Oracle Workflow.

The transport, packaging, signing, and document exchange layers are extensible via an open, java-based plug-in API. Custom collaborations may be created through the product’s visual modeling tool.

**Trading Partner Management:** Oracle Application Server ProcessConnect includes a comprehensive trading partner management system that speeds provisioning and streamlines administration of trading partners for B2B collaboration. The trading partner system maintains:

- *Profiles:* Overall information and contact details for trading partner entities
- *Organizations:* Specific organizations within a profile that will participate in various collaborations
- *Agreements:* The specific collaborations, roles and communication options that dictate how two or more parties will interact

OracleAS ProcessConnect supports a variety of industry standards for import and export of profiles and agreements including XML and RosettaNet. Oracle Application Server ProcessConnect includes an extensible, layered B2B protocol engine that provides the following capabilities:

- *Transport:* HTTP/S, SMTP, FTP/S, JMS
- *Packaging and Signing:* SMIME 2.0/3.0, SOAP 1.1
- *Document Exchange:* XML, RNIF 1.1/2.0
- *Collaboration:* RosettaNet PIPs, Custom Collaborations

### 3.2.3. Business Process and Activity Monitoring

**Business Activity Monitoring:** Enables on-line business-level monitoring of the entire integration process including document tracking, collaboration status, and alerts. Oracle Application Server ProcessConnect provides a set of pre-built reports suited for business users. These reports may be exposed externally to trading partners.

**Process Intelligence:** Enables on-line reporting and analysis of the complete history/audit trail maintained by the run-time repository. The product provides pre-built reports that enable the user to evaluate integration activity over time to identify opportunities to improve business processes.

**Event Monitoring through Enterprise Manager:** In Oracle Application Server 10g (9.0.4), the Workflow Manager is integrated with Oracle Enterprise Manager 10g Application Server Control, allowing system administrators to manage Oracle Workflow from a single console.

**Executive Dashboards:** The Business Activity Monitoring and Process Intelligence data can be integrated with Oracle Application Server Portal to provide key performance indicators to help lines of businesses and executives track important metrics to reduce cost and improve efficiency.

Table 2 summarizes the key integration new features of Oracle Application Server 10g.

<p><b>Business Process Optimization – BPM</b></p> <ul style="list-style-type: none"> <li>• Centralized business process management</li> <li>• Separation of data flow and control flow</li> <li>• Dialogue Management – Short lived state</li> <li>• Process Management – Long, multi step state</li> <li>• Topic or content based routing</li> <li>• Sequencing – Simple, composite rules, In-Order delivery</li> <li>• Correlation – Events Content based</li> <li>• Human workflow and worklist management</li> <li>• Graceful quiescence of existing flows</li> <li>• Process portlets with OracleAS Portal</li> </ul> <p><b>Business Process Optimization – Metadata Management</b></p> <ul style="list-style-type: none"> <li>• Model driven integration</li> <li>• Centralized Metadata Repository</li> <li>• Fine grained version control</li> <li>• Design time vs runtime separation</li> <li>• Metadata lifecycle management</li> <li>• Export/Import of metadata support</li> <li>• Human readable formats</li> </ul> <p><b>Business Process Optimization – Tools</b></p> <ul style="list-style-type: none"> <li>• Single integrated visual modeling and monitoring tools</li> <li>• Integrated systems management</li> </ul> <p><b>Business Process Optimization – Portal plugins</b></p> <ul style="list-style-type: none"> <li>• Executive reporting thru OracleAS Portal</li> </ul>	<p><b>Business Process Optimization – Translation, Transformation and validation</b></p> <ul style="list-style-type: none"> <li>• Translation support from any XSD</li> <li>• Translation support from any other data sources via D3L</li> <li>• 70+ pre built transformations</li> <li>• N to M transforms</li> <li>• Pre-built Oracle E-business Suite 11i Mappings</li> <li>• Simple transformation support – copy, concat and others..</li> <li>• Complex transformation support – Objects, Arrays, Iterators and others..</li> <li>• Conditional transformation support</li> <li>• Domain value maps</li> <li>• Custom code extensibility support</li> <li>• Validation of events and data types</li> <li>• Validation of syntax and semantics</li> </ul> <p><b>Business Process Optimization – BAM</b></p> <ul style="list-style-type: none"> <li>• Event management and classification</li> <li>• Native, application and business events</li> <li>• Event correlation</li> <li>• Alerts – Domain, System</li> <li>• Enhanced Error handling</li> <li>• Event warehousing and analysis</li> <li>• Real time monitoring reports of events, processes and others..</li> <li>• Historical reports over time</li> <li>• Aggregate reports about groups of items</li> </ul>	<p><b>Business Process Optimization – Trading Partner Agreement</b></p> <ul style="list-style-type: none"> <li>• Manage B2B integration via trading partner agreements</li> <li>• Modeling – Creation, management, versioning</li> <li>• Profiles – 1 to X partners with 1 to Y agreements</li> <li>• Agreements – CPA based, import/export, negotiation</li> <li>• Identity – TP, Role, TP Manager</li> <li>• Communication – Support for multiple protocols</li> <li>• Security – Certificate, CA, Non-repudiation</li> <li>• Doc. Exchange facilities – Idempotent, Retries, Security</li> <li>• Validity management</li> </ul> <p><b>Business Process Optimization – Connectivity</b></p> <ul style="list-style-type: none"> <li>• Standard J2CA based</li> <li>• Bi directional, asynchronous</li> <li>• Guaranteed deliver once</li> <li>• Out of box pre-packaged app connectivity – Oracle 11i, 10.7, SAP R/2, Peoplesoft, JD Edwards, Siebel 6,7</li> <li>• Adapter SDK for custom</li> <li>• DB connectivity – Oracle8i, 9i, MS SQL SERVER, IBM DB2, Sybase, Informix</li> <li>• Messaging connectivity – AQ, MQ Series, JMS</li> <li>• Legacy connectivity – CICS, VSAM, IMS, 3270 screen scraping</li> <li>• B2B Protocol support – Rosettanet, EDI, EDIfact, HL7</li> <li>• Standard transport support – SOAP, SOAP over SSL, FTP, FTP-S, SMTP, Flat file</li> </ul>
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**Table 2: Oracle Application Server 10g – Integration New Features**

### 3.3 Enterprise Portals and Multi Channel Access - Enhancements

Oracle Application Server 10g is designed to enable organizations to design and deploy Enterprise Portals and make them pervasively accessible to users through *Multiple Channels* (i.e. using many different devices). The Enterprise Portal is designed to provide users with a single place to access Enterprise Information and Business Intelligence; Enterprise Applications and Services; and Corporate Business Processes. The multi-channel Wireless Delivery facilities are designed to make users productive providing them with a rich user experience in accessing information and executing transactions from mobile devices. Together, Oracle Application Server Portal and Oracle Application Server Wireless are (Figure 4) designed to meet three objectives:

- *Provide Aggregated Access to Information, Web Services, and Business Processes* – Oracle Application Server Portal provides users with centralized and personalized access to all data, applications, and business processes.
- *Provide Pervasive Access to Information and Services* – Oracle Application Server Wireless provides users access to Enterprise Applications and Portals from a wide variety of continually connected wireless devices (such as GPRS-enabled mobile phones and WIFI devices) and intermittently connected wireless Internet devices (such as Palms, iPAQs, and PDAs).
- *Provide Users with a Productive Workplace* – Oracle Application Server 10g's Enterprise Portal and Wireless Services are also designed to provide users with a consolidated workplace to receive notifications, and to execute transactions and approvals. Further, Oracle Application Server maintains a user's presence and identity across channels and modes of access allowing users to do work with interruptions no matter what device they use to access Portals.

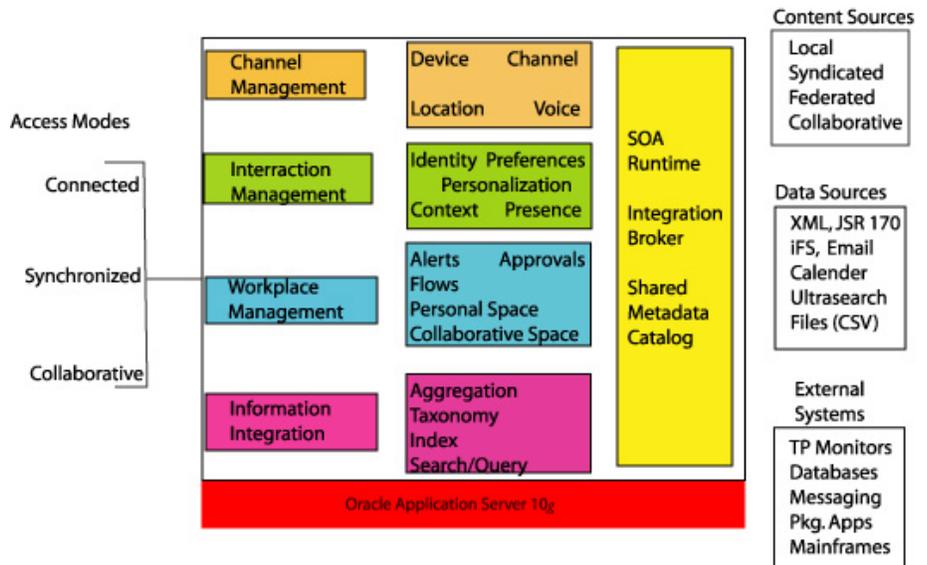


Figure 4: Oracle Application Server Portal and Wireless Platform

New Features for Enterprise Portal and workplaces include:

- OmniPortlet: to improve how information is rendered
- Web Clipping: to make content integration more productive
- Search Enhancements for Portal Search and Ultrasearch
- Portal Export/Import Improvements
- WebDAV and Content Management Enhancements
- Content Routing and Approval Workflow Improvements
- **Web Cache Integration for Optimized Page Assembly**

### 3.3.1. Oracle Application Server Portal

Oracle Application Server Portal introduces a number of new features to enhance information accessibility.

**Ease the Integration Challenge (Omniportlet):** Oracle Application Server 10g (9.0.4) introduces two new capabilities for integrating data into OracleAS Portal: OmniPortlet and Web Clipping. The OmniPortlet incorporates a feature set for building portlets that render data in a variety of formats like charts, forms, tables, and bullet lists from different data sources including Web Services, XML data, and spreadsheets (CSV). Using OmniPortlet, non-technical page developers simply follow a series of steps in a wizard to access data without having to understand all the technical details of Web Services and XML. Specialized adapters for Omniportlets, called *Searchlets*, make it easy to search and publish content from search systems and content management systems. Out-of-the-box searchlets planned for upcoming releases include Google, Ultrasearch (available with Oracle Application Server 10g) and WebDAV.

**Ease of Integration Challenge (Web Clipping):** Web Clipping provides a quick and easy way for page designers to capture existing public and secure web page content and present it as portlets. Web Clippings may also be personalized through parameters. In addition to Omniportlet and Web Clipping, Oracle Application Server Portal introduces a new set of integration and collaboration portlets: UMS portlet, Discussion forum portlet, Telnet portlet, SAP portlets, Site indexing portlet, Lotus Notes portlet and IMAP portlet.

**Search Improvements:** Oracle Application Server Portal provides the ability to include one or more page groups in a single search. The search submission form is now cached for 24 hours. In addition, one can choose whether or not to cache the results from an automatic search query that can span multiple custom search portlets. It is also possible to scope search results with perspectives as a means. Custom search portlet is redesigned to make it easier to use.

**Export/Import:** Oracle Application Server Portal includes enhanced logging capabilities during export/import process. The import/export dependency manager ensures that all dependencies of objects in the transport set are correctly extracted. The dependency information can be used to control import mode at a granular level. To allow control over the export/import of shared objects, two new privileges are defined at the infrastructure level: Any Transport Set – Manage and Any Transport Set – Execute.

**Developer Productivity and Flexibility:** Significant usability improvements have been made in the Portal design-time environment. New and revised portlets and builder pages speed access to objects throughout the portal and make Portal administration more efficient. Updates to wizards and portlet defaults in the WebDAV, search, content publishing and content approval components make it easier for page designers to create pages and manage portal content.

New Features for Wireless and multi channel access include:

- Broader Device, Network, & Protocol support through XHTML Integration
- Multimedia Messaging and Adaptation Services for Wireless Devices
- J2ME Development and Provisioning Services
- Web Clipping Facilities to make it easier to extract Web Content for Wireless Devices
- Location-based Services (LBS) improvements
- Content Routing and Approval Workflow Improvements
- **Wireless Developer SDK integrated with Oracle JDeveloper 10g**

**Portal Dependency Settings File:** The Portal Dependency Settings File and Portal Dependency Settings tool (ptlconfig) simplifies dependency settings for portal administrators.

**Optimized Page Assembly:** In Oracle Application Server 10g (9.0.4), Web Cache can be used as Portal's primary cache and page assembly engine. This enables Portal page to be assembled and delivered quickly to the end user.

**Approval Routines and Notifications:** Oracle Application Server Portal enables you to create an item that is not available for other users to view until the item is approved by authorized approvers. The approvers get notified about items that are awaiting approval through the Notification portlet. They also use the Notification portlet for approving or rejecting the item. The Status portlet displays the status of all item approvals for the item creator.

### 3.3.2. Oracle Application Server Wireless

Oracle Application Server Wireless introduces a host of new features to enhance access to a wide variety of devices, protocols and networks through XHTML, deliver J2ME support, provide intelligent messaging and enable support for these new capabilities through the new Wireless Toolkit.

**Device, Protocol and Network Support through XHTML:** Wireless supports applications written in XHTML, an accepted W3C standard for building multi-channel applications. Applications created in XHTML have the flexibility to adapt to a wide variety of devices, protocols and networks – maximizing development efforts by easing the complexity of wireless development.

XHTML applications let developers write an application once, using an open standard, and deliver it to any device. XHTML applications can be delivered through voice technology, through messaging such as SMS, and through any micro-browser.

**Multimedia Messaging and Adaptation Services (MMS):** Oracle Application Server Wireless Multimedia Adaptation Services provide device-specific adaptation of images, ringtones, voice grammars and audio/video streams. Devices support different image formats and have different screen sizes and color depths.

**J2ME Development and Provisioning:** Oracle Application Server Wireless includes the J2ME Provisioning system, support for J2ME access to web services, and new functionality that allows for advanced J2ME development.

**Wireless Development Toolkit:** The Oracle Application Server Wireless Toolkit will integrate with any IDE, including Oracle JDeveloper, and allow fast development and testing of wireless applications. This small footprint toolkit allows fast and easy development of applications with multi-channel XHTML, J2ME, voice, mobile browser, and SMS. With Oracle JDeveloper, mobile developers can utilize code templates, point-and-click-development and automatic deployment to the application server.

**Web Clipping:** New in Oracle Application Server 10g (9.0.4), Web clipping for wireless allows wireless service developers to quickly extract Web-based content for direct presentation in wireless devices. Web Clippings can also be used programmatically by client applications over Java APIs or the JCA Common Client Interface.

**Location Based Services (LBS):** Oracle Application Server 10g (9.0.4) introduce many additional LBS features through the wireless application tool and the wireless portal tool that augment the existing APIs.

### 3.3.3. Business Intelligence

Many portal implementations require tools to create detailed analysis and reports on enterprise data. Pre-integrated business intelligence components, Oracle Reports and Oracle Application Server Discoverer support ad-hoc query, reporting and analysis of the enterprise data – both on real time data as well as on historical data. These can be easily exposed as portlets in your portal. In this section we take a look at some of the enhancements introduced in these two business intelligence components.

#### Oracle Reports

Oracle Application Server Reports Services is Oracle's award-winning enterprise reporting solution that allows you to publish any data in any format to virtually any destination. In Oracle Application Server 10g, we have enhanced the enterprise reporting capabilities of the Oracle Application Server even further. We have extended the list of available output destinations by adding WebDAV and FTP destinations to the ones that were already available (file, OracleAS Portal, printer, etc.).

For installations that require multiple languages, your Reports Server can now run with multiple environments defined. Thus, one single server can serve all of your different language and character set environments, rather than having a separate server for each environment. When processing a job, the server will select the right environment in which to execute the job.

Workflow Integration: Oracle Reports can now be used from within Oracle Workflow. Executing a report can be added to the workflow as an activity. Oracle Application Server Reports Services will notify the workflow when the job is finished.

Other Enhancements: In an effort to provide the best available PDF output, we now provide the capability to set PDF document properties, like Author, at runtime. The server environment can be switched on a per-job basis to change attributes. This is very useful in customizing output based on, for example, NLS settings. OracleAS Reports now support publishing your report output to any WebDAV or FTP server. OracleAS Reports Services can be accessed from any J2EE container or from the command-line using the Reports J2EE Thin Client. For integration of OracleAS Reports Services into your application architecture, we now provide a

Web service that allows you to submit, monitor, and manage jobs on the server. In addition, you can leverage our complete set of plugin APIs to extend your enterprise-reporting infrastructure to fit your exact needs. Oracle Reports SDK provides developers ultimate flexibility by enabling them to create their own data sources, destinations, notifies, engines, etc.

### **Oracle Application Server Discoverer**

*Java Command-Line Tool for EUL Maintenance:* Oracle Application Server 10g (9.0.4) introduces a new Java Command Line Tool to install, manage and maintain the EUL, business area and workbooks without the need to install Oracle Developer Suite 10g. All Discoverer customers, especially those using Oracle Warehouse Builder 10g, benefit from this feature as they can manage their EULs by simply running commands from commonly used platforms including Solaris 2.8 and 2.9, HP-UX, IBM AIX, Linux, Windows NT / 2000 / XP.

*Optimized Performance for Complex Folders:* OracleAS Discoverer offers an excellent way to present users with very easy-to-understand concepts. Oracle Discoverer Administrator provides simple, complex and custom folder options in a business area. Complex folders contain items from one or more other folders, which enable you to create a combined view of data from multiple folders. This is analogous to a view in the database. OracleAS Discoverer generates highly optimized SQL that runs faster when using complex folders.

Table 3 lists the key Portal, Wireless, Business Intelligence features of Oracle Application Server 10g.

<p><b>Multiple Channel Portal – Content Management</b></p> <ul style="list-style-type: none"> <li>• Search and publish content from search and content management systems using searchlets</li> <li>• Fast searchlet for OracleAS Portal</li> <li>• Content Management APIs</li> <li>• System level caching</li> <li>• New content list view</li> <li>• Web DAV enhancements</li> <li>• New survey wizard</li> <li>• Export/import enhancements</li> <li>• Improved search capabilities</li> <li>• Fine grain control of page group selection</li> <li>• Xythos webfile client for OracleAS Portal (to be released with 9.0.4.1.0)</li> </ul> <p><b>Multiple Channel Portal – Portal tools</b></p> <ul style="list-style-type: none"> <li>• Omniportlet</li> <li>• New data source (SQL, Web page)</li> <li>• Secure data</li> <li>• Vertical scrolling layout</li> <li>• Filter and sort any data</li> <li>• Web Clipping</li> <li>• Full page clipping</li> <li>• Restricted clipping of external web sites</li> <li>• Portal Developer Kit enhancements</li> <li>• Provider validation</li> </ul>	<p><b>Multiple Channel Portal – Portal tools (cont..)</b></p> <ul style="list-style-type: none"> <li>• JNDI Support Translation</li> <li>• Portlet Development from Oracle JDeveloper 10g</li> <li>• UMS portlet</li> <li>• Discussion forum portlet</li> <li>• Telnet portlet</li> <li>• SAP portlet</li> <li>• Site indexing portlet</li> <li>• Updated Lotus Notes portlet</li> <li>• Updated IMAP portlet</li> </ul> <p><b>Multiple Channel Portal – Deployment Model</b></p> <ul style="list-style-type: none"> <li>• New deployment documentation – Configuration guide, error messages guide, upgrade guide, user guide, common deployment topologies</li> <li>• OracleAS Portal mandatory configuration help</li> <li>• Oracle Enterprise Manager – Application Server Control and Grid Control integration</li> <li>• New Portal configuration assistant</li> <li>• Performance enhancements</li> </ul> <p><b>Oracle Content Management SDK</b></p> <ul style="list-style-type: none"> <li>• Starter sample web application</li> <li>• FileSync enhancements</li> <li>• Administration and management enhancements</li> </ul>	<p><b>Multi Channel Portal – Wireless</b></p> <ul style="list-style-type: none"> <li>• XHTML Support</li> <li>• Multimedia adoption services</li> <li>• J2ME development and provisioning</li> <li>• Digital rights management</li> <li>• Over the air delivery to J2ME devices</li> <li>• Wireless SDK enhancements</li> <li>• Web Clipping</li> <li>• Location based services</li> </ul> <p><b>Business Intelligence - Reports</b></p> <ul style="list-style-type: none"> <li>• Extensive image format support – PNG, GIF, BMP, JPEG, Progressive JPEG, Exif JPEG</li> <li>• PDF Taxonomy support</li> <li>• Ability to specify the order in which reports server formats different sections</li> <li>• Full integration with Enterprise Manager and Workflow</li> <li>• Web Service support</li> <li>• New Destinations</li> <li>• Multi environment server</li> <li>• Support for headless servers</li> </ul> <p><b>Business Intelligence – Discoverer</b></p> <ul style="list-style-type: none"> <li>• Improved performance using OracleAS Web Cache</li> <li>• Leverage and extend analytic features of Oracle9i Database</li> <li>• Advanced analytics support</li> <li>• Java command line tool for EUL maintenance</li> <li>• EM integration</li> </ul>
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**Table 3: Oracle Application Server 10g – Portal, Wireless, Business Intelligence New Features**

So far we have discussed the new enhancements Oracle Application Server 10g has introduced to reduce costs associated with application development processes, business process optimization and information access from anywhere and anytime. In the next section we discuss the challenges associated with grid-computing in which an application server is deployed, and how Oracle Application Server 10g addresses the QOS, Management and Security requirements.

Oracle Application Server 10g lowers the cost of deploying and managing Enterprise Applications by providing:

- Enterprise Quality of Service using Grids of low cost CPUs & storage
- Automated Grid Software Provisioning & Intelligent Systems Management
- **Comprehensive Identity & Access Management**

#### 4. APPLICATION DEPLOYMENT

Oracle Application Server 10g addresses the following challenges faced by organizations with respect to enterprise application deployment:

- *Expensive Computing Capacity* – Driven by excess computing capacity that is poorly utilized due to the need to build capacity for peaks, and the inability to use the spare capacity efficiently. This problem is compounded by the inability to add capacity quickly, when needed, and in low cost, modular units.
- *High Cost of Software Provisioning and Systems Management* – Driven by the complexity of systems; the specialized tools, procedures, and skills required; and the large amounts of human intervention needed to provision large numbers of computers and monitor and manage Applications running on them.
- *High Cost of Security and Identity Management* – Driven by the growing numbers of users accessing Applications; the number of Applications being accessed; the number of locations where security is administered; and the growing number and invasiveness of security attacks.

Oracle Application Server 10g is designed to enable Enterprise Applications, Business Processes, and Portals to be deployed and managed in a Grid Computing environment with mission-critical QOS. As was discussed earlier, *Grid Computing* is a new software architecture designed to Pool Low Cost Modular Storage and Servers to create a virtual computing resource across which work can be transparently distributed to use capacity very efficiently, at low cost, with very high performance and high availability. The resources in a grid can include storage, servers, databases, and also Application Servers and Enterprise Applications. Grid Computing enables organizations to radically lower the cost of their computing infrastructure by using lower cost components. It also reduces the need for excess computing capacity by allowing capacity to be shifted quickly and efficiently (“*Capacity-On-Demand*”) from one Enterprise Application to another as each application’s workload requirements change. Oracle Application Server 10g also has several enhancements to improve software provisioning, systems management, and security and identity management.

These enhancements are designed to enable Oracle Application Server 10g to provide a number of benefits:

- *Enterprise Quality of Service using on Commodity Computing Grids* – Oracle Application Server 10g provides enterprise Quality of Service – Performance, Scalability, and High Availability – for Enterprise Applications using commodity hardware and storage. These features save costs by lowering computing capacity requirements and enabling modular, inexpensive capacity growth.
- *Radically Lower Cost of Systems Management with Better Business Continuity* – Oracle Application Server 10g lowers system management costs and better business

continuity through automated Software Provisioning; Centralized Systems Management; and Policy-based Administration.

- *Lower Cost of Security Management* – Oracle Application Server 10g provides a secure platform for Enterprise Applications. It lowers the cost of security administration and enables users and their identities and access control privileges to be managed more effectively by providing a comprehensive identity management platform.

Specifically, Oracle Application Server 10g provides the following new features for Application Deployment.

*Provide Quality of Service by:*

- Scaling and using the existing hardware pool effectively.
- Performing consistently with high though put.
- Ensuring systems are highly available with zero down time.

*Secure systems and applications by:*

- Providing a comprehensive security framework for authorization, authentication and access control.
- Managing users, systems and applications centrally.
- Enabling interoperability with other standard based security systems.

*Manage grid environment by:*

- Providing the ability to provision and manage application server.
- Providing the ability to monitor and administer applications with zero downtime.
- Enabling ease of administration through single management tool for ongoing maintenance.

#### **4.1 Grid Computing - Enhancements**

Oracle Application Server 10g (9.0.4) addresses the following IT problems associated with application deployment on commodity hardware in the grid computing environment.

*Run Enterprise Applications Faster* – Oracle Application Server 10g has a number of performance optimizations to provide unmatched Application Performance and Scalability on a variety of hardware architectures. This includes network communication and I/O optimizations; the application runtime environment including resource scheduling, object materialization, data marshalling and serialization, and transaction management. It takes advantage of high-speed connectivity technology to access external environments such as: databases, messaging systems, and resource adapters.



*Scaling commodity systems with QOS* - Oracle Application Server 10g has a number of Resource Pooling and Workload Management optimizations to enable Enterprise Applications to run efficiently on small footprint hardware configurations while enabling them to be efficiently scaled-up and scaled-out in a variety of different hardware configurations through patented clustering advances. This enables enterprise applications to be deployed on a variety of different hardware architectures including (i) Rack-mounted and Blade-mounted configurations; (ii) Commodity CPUs connected with high-speed network Interconnects; (iii) Clustered hardware with 4-16 or above CPU SMP clusters; (iv) All Major 32-bit and 64-bit Unix, Linux and Windows Operating Systems; and (v) All major processor architectures.

*Provide Maximum Availability* – Oracle Application Server 10g (9.0.4) has a number of new features designed to provide Maximum Availability in a cost-effective manner addressing all aspects of Planned Downtime and Unplanned Downtime. These optimizations are designed to reduce or eliminate downtime that arises from carrying out planned maintenance operations on Application Servers such as configuration operations; application deployment; routine maintenance, patching, and upgrade, and software cloning. A comprehensive set of new features is also provided to eliminate unplanned downtime from failures resulting from hardware failures, software failures, human errors, and disasters.

Key Oracle Application Server Performance enhancements include:

- Exploiting System SW Features (I/O, JDK and others)
- Network Performance Improvements
- HTTP Server, Java Server, and Oracle 10g JDBC Improvements
- Web Cache Features including Cache Search, Content Compression, Online Reconfiguration, Session Binding, and Web Cache Cluster Enhancements

## 4.1 Performance Improvements

Oracle Application Server 10g (9.0.4) continues to provide industry leading performance by optimizing every aspect of the Application Server and by leveraging improvements in hardware technology. It has a number of performance improvements in (i) Every tier of the Application Server – Oracle Application Server Web Cache, Oracle HTTP Server, Identity Management infrastructure; (ii) Every component of the Application Server – J2EE Runtime, Portals, Enterprise Integration, Business Intelligence and Oracle Enterprise Manager 10g Application Control; and (iii) For every hardware architecture including specific optimizations for commodity hardware configurations (1, 2, 4 CPU configurations). In the following sections we discuss some of these features in detail.

### 4.1.1 Oracle Application Server Performance Improvements

Performance enhancements have been made across all layers of Oracle Application Server 10g (9.0.4): (i) *System Software Optimizations* include improvements in I/O operations, Java VM optimizations, threading and scheduling optimizations, and class loading optimizations. (ii) *Network Optimizations* include improvements to exploit Fast Network Interconnects such as Infiniband and Sockets Direct Protocol. Oracle Application Server 10g is certified with leading network routers and switches to provide optimal performance. (iii) *Web Server* improvements include Apache 1.3.28 enhancements, faster SSL connections, and more intelligent load balancing algorithms (iv) *JDBC* improvements include optimizations for LOBs,

BLOBs, CLOBs; abstract datatypes and collections; connection pooling optimizations; and network protocol and object marshalling optimizations.

#### 4.1.2 Oracle Application Server Web Cache

Oracle Application Server Web Cache has several performance improvements such as:

**Search Keys:** Web Cache invalidation has been extended in Oracle Application Server 10g to support *search keys*. Cached objects can now be associated with multiple application-specified search keys, with the URL-based key being the primary key. Invalidation can be based on the search keys instead of the primary URL-based key, making invalidation easier for administrators and application developers to use.

**Self-describing Compression Policies:** The ESI Surrogate-Control response header now supports a “compress” control directive to enable content compression.

**On-Line Reconfiguration:** A number of Web Cache’s configuration parameters can now be changed on the fly, without requiring a restart of the cache. This eliminates the need to re-warm the cache upon a restart.

Finally, every other component of Oracle Application Server 10g is designed to exploit the performance improvements in Oracle Application Server Web Cache and Oracle Application Server Containers for J2EE.

#### 4.1.3 Oracle Application Server 10g Performance – Proof Points

As a result of these performance optimizations, Oracle Application Server 10g is the industry’s fastest Application Server. Oracle has recently announced the industry’s leading SPECJAppserver2002 benchmarks for both performance and price-performance. Specifically, Oracle announced the following SPECJAppServer2002 results for Oracle Application Server 10g, all with the Linux operating system: (i) *Dual Node* – Best Performance on Linux and Best Price/Performance Overall; (ii) *Multiple Node* – Best Performance and Best Price/Performance. Oracle’s Dual Node results outperform the SPECJAppServer2002 results of all competitors on identical system configurations. Oracle’s Multiple Node results were achieved with half the number of processors than our competitor. The SPECJAppserver2002 results can be found at <http://www.spec.org/jAppServer2002/> website. These results underscore Oracle’s commitment to providing customers with cost-effective application server technology that delivers the highest performance.

## 4.2 Scalability Improvements

To improve application server scalability, Oracle Application Server 10g supports flexible deployment models, policy based workload management, clustering capabilities, and intelligent workload management algorithms including metric based routing, random routing, weighted routing and local affinity.

Key Oracle Application Server Scalability enhancements include:

- Grid Workload Manager
- Workload and Load Balancing Enhancements
- New Application-Specific Workload Policies
- Cluster Enhancements
- New File based Clusters
- Session Binding Features

**New Load Balancing Algorithms:** Additional load balancing algorithms have been introduced to provide greater flexibility for routing requests across all Middle Tier OC4J processes. New algorithms include random routing and round robin routing both with local affinity or weight-based and, metric-based routing. In addition, routing can be configured to favor routing to a local machine over routing to remote nodes (example: local affinity routing mechanism).

**Workload Management:** Oracle Application Server 10g is pre-instrumented with Dynamic Monitoring Service (DMS) that monitors resource usage. These can be tied to administrator defined policies for workload management, using the new load balancing algorithms discussed above.

**Cluster Improvements:** Oracle Application Server 10g (9.0.4) introduces OracleAS Clusters managed using file-based repository. It is now possible to create, configure, start, stop and manage OracleAS Cluster with file based Distributed Configuration Manager (DCM) repository.

**Session Binding in an Oracle Application Server Web Cache Cluster:** Session binding capabilities have been extended to allow affinity of sessions to a chosen origin server across cluster membership.

### 4.3 High Availability Improvements

Oracle Application Server 10g has a number of new features designed to provide Maximum Availability. *Reduction in Planned Downtime* is achieved by allowing certain maintenance operations such as: configuration tasks, application deployment, routine maintenance, patching and upgrade, and software cloning to be performed without shutting down the application server or the machines. A comprehensive set of new features is also provided to eliminate *Unplanned Downtime* from all types of unexpected failures.

#### 4.3.1 Planned Downtime Reduction

**Automated Rolling Upgrade:** Oracle Application Server supports the upgrade of infrastructure and middle-tiers from Oracle9iAS Release 2 (9.0.2) to Oracle Application Server 10g (9.0.4) with minimal operational impact. Additionally, the new check pointing capability [also known as archival and retrieval] enables one system configuration to be captured and then re-applied to another system.

**Cluster Archive and Reconfiguration:** This feature enables automatic configuration of clusters, provides the ability to undo configuration changes, perform rolling upgrades, disaster recovery and online application deployment capabilities.

#### 4.3.2 Unplanned Downtime Reduction

Oracle Application Server 10g provides a cohesive set of High Availability Solutions designed to address all types of failures including hardware failures, software failures, human errors and disasters. Some of the most important solutions are discussed below:

Key Oracle Application Server High Availability enhancements include:

- Cluster Enhancements
- Automated Piece-Wise Rolling Upgrade
- Cluster Archive and Rollback
- Fast Start Recovery
- Failover Notification
- Cold Failover Clusters
- Active Failover Clusters
- DataGuard Support
- Automated backup and point in time recovery
- Site to Site Disaster Recovery using Data Guard technology

**Automated Death Detection and Restart:** Using OPMN, Oracle Application Server 10g (9.0.4) expand the scope of death detection and restart to cover all Oracle Application Server components except for the Oracle Database Server containing the OracleAS Metadata Repository, its listener and Oracle Enterprise Manager 10g Application Server Control. To ensure the availability of Oracle Enterprise Manager components, a separate process monitors Enterprise Manager processes and restarts them if needed.

**Failover Notification (FaN):** To improve end-to-end High Availability, Oracle Application Server fault monitoring and notification service is integrated with Oracle Real Application Clusters (RAC), thus resulting in reduced application failover time. The JDBC drivers that will be part of Oracle Application Server 10g enables Fast Connection Failover (FCF) which cleans up stale connections in the JDBC connection pool, when notified by FaN.

**OracleAS Infrastructure Clustering:** Oracle Application Server 10g (9.0.4) offers two additional cluster solutions to ensure that the Oracle Application Server Infrastructure is Highly Available. The solutions are: Active Failover Cluster and Cold Failover Cluster (CFC).

**Active Failover Cluster Solution:** In contrast with Cold Failover Clusters, Active Failover Clusters allow Oracle Application Server Infrastructure to run on multiple nodes simultaneously. In this “Active/Active” setup, all Infrastructure processes are configured to run simultaneously on each node of the cluster. A load balancer sits in front of the hardware cluster to distribute incoming requests across each of the nodes, since each node is capable of handling any incoming request. If one of the nodes goes down, further incoming requests are immediately routed by the load balancer among the surviving nodes of the cluster, thus eliminating any down time. This configuration leverages the Real Application Cluster (RAC) feature of the Oracle Database for running the Infrastructure database. However, AFC also provides High Availability for the mission-critical Identity Management services that make up the Infrastructure. Initially this feature will be available through limited release program, and Oracle Corporation reserves all rights to accept customers into this limited release program.

**Cold Failover Cluster Solution:** Multiple machines (typically two) can be clustered together using cluster ware such as HP MC/Service Guard or Sun Cluster. In this solution (Figure 5) one node of the cluster is “cold” or “passive”, while the other is “hot” or “active”. When the “hot” or “active” node fails, the cluster ware restarts the software on the cold node to bring the system back online.

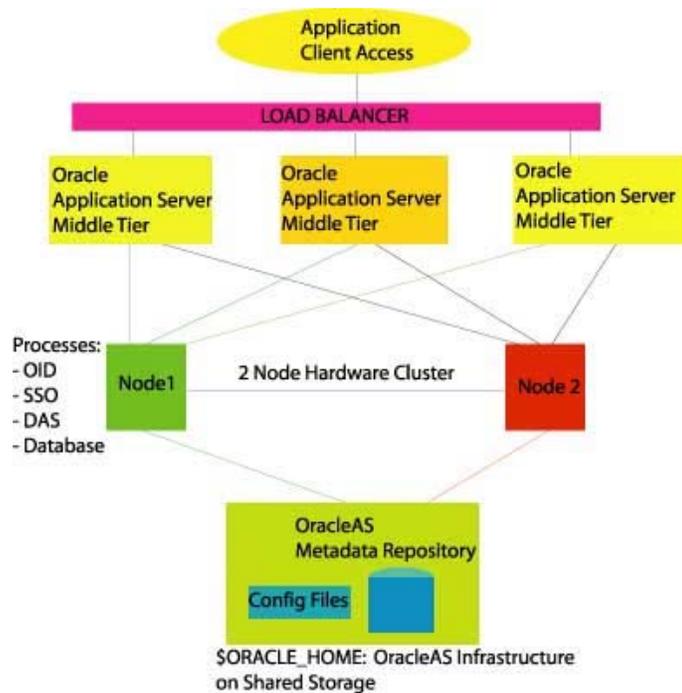


Figure 5: OracleAS Infrastructure - 2 Node Cold Failover Cluster

**Automated Backup and Recovery:** Oracle Application Server 10g (9.0.4) provides administrators with an automated backup and recovery utility that is designed to maintain backups of specific checkpoints of the Application Server’s configuration and system state.

**Site-to-Site Disaster Recovery:** When disaster, such as total power failure or earthquake strikes and disables the entire data center, most HA solutions discussed so far will be unable to prevent downtime. This type of HA solution can be accomplished using the Oracle Application Server Disaster Recovery, which provides the ability to quickly bring up services at a geographically distant “standby” location in case of total data center loss at the primary site.

Table 4 lists the key QOS new features of Oracle Application Server 10g.

<p><b>QOS – OC4J Performance</b></p> <ul style="list-style-type: none"> <li>• EJBQL optimizations</li> <li>• Transaction Manager optimizations</li> <li>• SQL Code generation optimizations</li> <li>• Deployment time optimizations</li> <li>• Java I/O and Threading optimizations</li> <li>• CMP EJB optimizations</li> <li>• Class loader optimizations</li> <li>• JMS optimizations</li> <li>• Start/Stop optimization</li> <li>• Java Caching optimizations</li> <li>• Lightweight performance logging and rotation of logs</li> </ul> <p><b>QOS – Network and data access optimizations</b></p> <ul style="list-style-type: none"> <li>• Network layer optimizations</li> <li>• Persistence Manager optimizations</li> <li>• Connection manager and pooling optimization</li> <li>• JDBC fast interconnect support</li> <li>• JDBC 3.0 optimizations</li> <li>• JDBC Thin driver PL/SQL index table</li> <li>• JDBC VARRAY Support</li> <li>• JDBC LONG to LOB optimizations</li> <li>• JDBC DOUBLE and FLOAT Datatype support</li> <li>• XML Data Access optimization</li> </ul>	<p><b>QOS – General optimizations</b></p> <ul style="list-style-type: none"> <li>• Linux OS optimizations</li> <li>• Oracle Enterprise Manager – Application Server Control performance improvements</li> <li>• OracleAS Single Sign-On, OID performance improvements</li> <li>• OracleAS Portal performance improvements</li> <li>• OracleAS Wireless performance improvements</li> <li>• OracleAS Portal and OracleAS Wireless Integration with OracleAS Web Cache</li> <li>• Oracle E-business Suite 11i speed up using OracleAS Web Cache</li> </ul> <p><b>QOS – Scalability</b></p> <ul style="list-style-type: none"> <li>• Dynamic resource monitoring</li> <li>• Dynamic resource startup/shutdown</li> <li>• Quicker and Automated cluster operations</li> <li>• Policy based workload management</li> <li>• Intelligent load balancing algorithms</li> <li>• Pre-configured policy selection</li> <li>• Process Management optimizations</li> <li>• Session migration optimizations</li> </ul>	<p><b>QOS – High Availability</b></p> <ul style="list-style-type: none"> <li>• No single point of failure</li> <li>• MAA architecture for all of 10g platform (Oracle Application Server 10g and Oracle Database Server 10g)</li> <li>• Single process manager architecture</li> <li>• Distributed process management optimizations</li> <li>• Automatic failure detection and restart</li> <li>• OracleAS Clusters managed using File based repository</li> <li>• Network outage detection</li> </ul> <p><b>QOS – Backup and Recovery</b></p> <ul style="list-style-type: none"> <li>• Backup and recovery utility</li> <li>• Incremental backup</li> <li>• Configuration changes - Archive and restore capability</li> <li>• Point in time recovery</li> </ul> <p><b>QOS – HA Solutions</b></p> <ul style="list-style-type: none"> <li>• Disaster Recovery solution for both middle tier and infrastructure</li> <li>• Cold Failover Cluster solution for OracleAS Infrastructure</li> <li>• Active Failover Cluster solution for OracleAS Infrastructure</li> <li>• Key cluster vendor certification</li> </ul>
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**Table: Oracle Application Server 10g – QOS New Features**

Now that we have looked at how Oracle Application Server 10g (9.0.4) enables deployment on commodity hardware with good QOS, let's discuss the security challenges in this environment and how they are addressed by Oracle Application Server 10g (9.0.4).

## 5. SECURITY AND IDENTITY MANAGEMENT

Oracle Application Server 10g (9.0.4) addresses the following IT problems associated with security and identity management of growing number of users in an enterprise.

*Secure Environment:* Oracle Application Server 10g (9.0.4) has a number of new security features including a comprehensive PKI based security framework for authentication, authorization, access control and privacy. This is coupled with a Java2 security framework and JAAS-based facilities to provide a complete and secure software infrastructure for Enterprise Applications.

*Central management of growing number of users:* Oracle Identity Management is part of Oracle Application Server 10g (9.0.4) and provides an integrated solution to centrally manage and provision users and identities, thus reducing the number of locations where security is administered.

*Coexist with existing security systems:* Oracle Identity Management is interoperable with the most popular non-Oracle security solutions and other open standards based solution.

In the remainder of this section, we will examine the security features of Oracle Application Server 10g in two sections – those that are designed to provide a secure software infrastructure for Enterprise Applications; and those that provide a comprehensive security and identity management infrastructure for users and applications.

### 5.1. Application Server Security - Enhancements

Oracle Application Server 10g has added many security enhancements across the entire product (Figure 6).

#### New Application Server Security Features include:

- SSL Enhancements
- FIPS- 140 Certification
- Session Renegotiation
- Secure by default
- Least Privilege Model
- NCipher Integration for SSL Acceleration
- Firewall Port Tunneling
- Web Cache Support for SSL Client Certificates

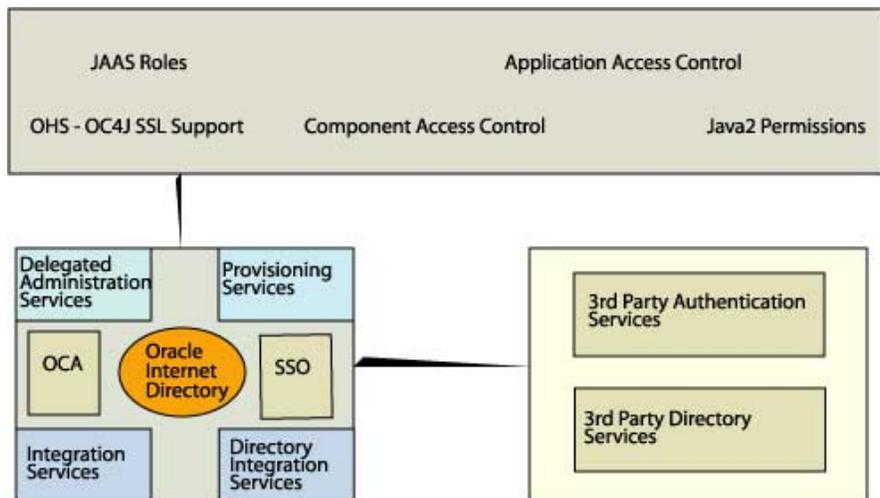


Figure 6: Oracle Application Server 10g – Platform Security

### 5.1.1. Oracle HTTP Server and Application Server

To incorporate the latest optimizations and security features of Apache, the Oracle HTTP Server (OHS) uses Apache (v1.3.28). In addition, OHS and Oracle Application Server have the following security enhancements:

**Session Renegotiation Support:** This feature will allow individual directories to be protected by different strength encryption - some with weaker encryption, while others with stronger encryption.

**Support for nCipher SSL acceleration Hardware:** In addition to third-party SSL acceleration solutions from companies like F5, Cisco and SonicWall, Oracle Application Server now supports nCipher's BHAPI-compliant hardware for deployment on servers. When applications use SSL connections, these operations place a strain on server CPU resources, causing a reduction in throughput and slower overall performance. The nCipher hardware offloads the SSL key exchange processing from a server's CPU(s), increasing the number of concurrent SSL connections and improving response times for SSL-protected content. nCipher's nFast and nForce SSL acceleration devices are available for the Solaris 32-bit, HP-UX 64-bit, Linux (Redhat and SuSe), and Windows platforms. According to nCipher, both devices support several hundred concurrent SSL connections per second. For more information about nCipher products, please visit <http://www.ncipher.com>.

**Port Tunneling:** In Oracle9iAS Release 2 (9.0.2) the AJP protocol for routing between OHS and OC4J was introduced. The firewall configuration required knowledge of several ports - especially for deployments that had several OC4J instances behind a firewall being routed to from front-end OHS. This is now simplified with the Port Tunnel, which lets all communication between OHS and OC4J happen on a single port. The port tunnel daemon routes the requests to the appropriate OC4J. Thus only one port has to be opened through the firewall, regardless of the number of backend OC4J.

**OHS to OC4J SSL Support:** OHS and OC4J communication can now be over AJP/SSL, thereby providing end-to-end SSL support for OC4J requests.

### 5.1.2. OracleAS Web Cache

**Support for client-side SSL Certificates:** OracleAS Web Cache now supports applications that require client-side SSL certificates for PKI-based authentication. For HTTPS requests that require client-side certificates, the client browser sends its certificate to Web Cache during the SSL handshake. The cache forwards the request to Oracle HTTP Server (OHS) along with the client's certificate information inserted in special HTTP request headers. OHS recognizes the headers and is able to pass user credentials to SSO for authentication purposes.

**nCipher Support:** OracleAS Web Cache now supports applications that require client-side SSL certificates for PKI-based authentication and supports nCipher for SSL hardware acceleration.

## 5.2. Identity Management - Enhancements

Oracle Identity Management is an integrated infrastructure that Oracle products rely on for distributed security. Oracle Identity Management includes the following components and capabilities: (i) *Oracle Internet Directory*: A scalable and robust LDAP V3-compliant directory service; (ii) *Oracle Directory Integration Service*: Component of Oracle Internet Directory, which permits synchronization between Oracle Internet Directory and other directories and user repositories; (iii) *Provisioning Integration Service*: Component of Oracle Internet Directory, that provides automatic provisioning of services for Oracle products and applications and, through standard interfaces, third-party applications; (iv) *Delegated Administration Service*: Component of Oracle Internet Directory, which provides trusted proxy-based administration of directory information by users and application administrators. (v) *OracleAS Single Sign-on*: This is an Oracle Application Server component, which provides single sign-on access to Oracle and third-party web applications; and (vi) *OracleAS Certificate Authority*: Generates and publishes X.509 V3 PKI certificates to support strong authentication methods. The new features and capabilities for Oracle Identity Management components are described below.

### 5.2.1. Oracle Internet Directory

**Windows Security Integration:** Oracle Internet Directory now provides a pre-configured directory synchronization solution for Windows Active Directory Services. This allows users to have a single identity and password credential across the Oracle and Windows environments.

**Flexible Password Policy:** Oracle Internet Directory supports new password policy options. In addition, a new Oracle Internet Directory plug-in support allows customers to implement an almost unlimited variety of site-specific password policies.

### 5.2.2. OracleAS Single Sign-On

OracleAS Single Sign-On (SSO) provides a common authentication model for all web applications. SSO allows customers to establish more than one authentication mechanism for a user and allows customization of the user authentication model for each single sign-on enabled application. Applications can take advantage of this to grant different degrees of privilege to users depending on how they are authenticated. For example, a user may get partial privileges if they authenticated via password, but more complete privileges if they used stronger authentication such as X.509v3. Two main features introduced in this release are:

**Multilevel authentication:** OracleAS Single Sign-On can now assign different authentication levels to different applications. This feature enables you to match authentication behavior to the security needs of a given application.

**Windows native authentication:** OracleAS Single Sign-On now supports automatic sign on from Windows workstations using Kerberos tickets.

### 5.2.3. OracleAS Certificate Authority

#### New Identity & Access Management

##### Features include:

- Oracle's own certificate authority
- Active Directory Support
- Windows Native Authentication
- Kerberos Support
- Advanced Password Policy Management
- Partial Fan-Out Replication
- LDAP Dynamic Groups
- SSO with multi level authentication
- Multi Realm Support

OracleAS Certificate Authority (OCA) is a new component in Oracle Application Server 10g (9.0.4). It completes Oracle's public key infrastructure (PKI) offering by allowing customers to create and manage X.509v3 digital certificates for use in Oracle or third party software.

#### **5.2.4. Delegated Administration Services**

Delegated Administration Services includes two sets of tools to provide a consistent interface for directory content administration. The DAS Administrative Tool supports application administration delegation and the DAS End-User tool supports operations such as Setting passwords, preferences, and white pages.

Table 5 lists key new features of Oracle Application Server 10g security and identity management.

<p><b>Overall Security Enhancements</b></p> <ul style="list-style-type: none"> <li>• Least Administrator Privilege Model</li> <li>• SSL Hardware Accelerator support</li> <li>• AJP, RMI, IIOP over SSL support</li> <li>• GSID support</li> <li>• FIPS 140 Certification</li> <li>• NCipher Support</li> <li>• Best Practice Security Topologies</li> <li>• Oracle Business Components for Java (BC4J) support for JAAS</li> <li>• OracleAS Forms Services is now more integrated with SSO</li> <li>• OracleAS ProcessConnect supports SSL,digital certificates and other Application Server inherent security features</li> <li>• Improved JAZN-OID Performance</li> <li>• Improved SSL Performance</li> </ul> <p><b>Identity Management – Oracle Internet Directory</b></p> <ul style="list-style-type: none"> <li>• Partial/fan-out replication</li> <li>• Unified User Model</li> <li>• GSID support</li> <li>• Advanced Password Policies</li> <li>• External Authentication Mechanisms</li> <li>• Dynamic groups</li> <li>• Faster LDAP Query and caching</li> <li>• Subscription Management</li> </ul>	<p><b>Identity Management – OracleAS Single Sign-On</b></p> <ul style="list-style-type: none"> <li>• Multi level authentication</li> <li>• Windows native authentication</li> <li>• 3<sup>rd</sup> party plugin support</li> </ul> <p><b>Identity Management – OracleAS Certificate Authority</b></p> <ul style="list-style-type: none"> <li>• Oracle’s own complete CA</li> <li>• Easy provisioning of X.509 certificates</li> <li>• Web based admin console</li> <li>• OracleAS Single Sign-On Integration</li> </ul> <p><b>Identity Management – Delegated Administration Services</b></p> <ul style="list-style-type: none"> <li>• Self service Identity Management web based console</li> <li>• Multi-realm support</li> <li>• Organization Chart support</li> </ul> <p><b>Identity Management – Provisioning</b></p> <ul style="list-style-type: none"> <li>• Declarative Support for JAAS login module</li> <li>• Oracle E-business Suite 11i Support</li> </ul> <p><b>Identity Management – DIP Platform</b></p> <ul style="list-style-type: none"> <li>• DIP Provisioning Registration APIs</li> <li>• DIP connector for Microsoft Active Directory</li> <li>• DIP connector for Sun iPlanet</li> </ul>	<p><b>Identity Management – Windows and 3<sup>rd</sup> Party Integration</b></p> <ul style="list-style-type: none"> <li>• Microsoft Active Directory Connector</li> <li>• Windows Native Authentication Support for automatic logon</li> <li>• Windows Native Authentication and password</li> <li>• Netegrity Support</li> <li>• Kerberos Support</li> </ul>
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**Table 5: Oracle Application Server 10g – Security and Identity Management New Features**

## 6. SYSTEMS AND APPLICATION MANAGEMENT

Oracle Application Server 10g and Oracle Enterprise Manager 10g, introduces many new features for automated software provisioning and systems management. They are aimed at lowering system management costs and providing greater business continuity by reducing the need for costly and error-prone human administration. Oracle Enterprise Manager 10g provides two types of management services (Figure 7) to Oracle products: Application Server Control and Grid Control.

For application server administration, Enterprise Manager provides **Application Server Control** – a web-based console for performing application server administration and real-time monitoring for an individual application server. This is installed with the application server and automatically configured and available for “out-of-box” administration.

For complete system management of the Oracle ecosystem, application server administrators can use Enterprise Manager **Grid Control** – a web-based console for central management of Oracle products, host systems and applications. Grid Control provides a single interface for monitoring distributed application servers and is integrated with the Application Server Console interface for performing administration operations. Grid Control is a separate, optional installation provided with the application server and other Oracle products.

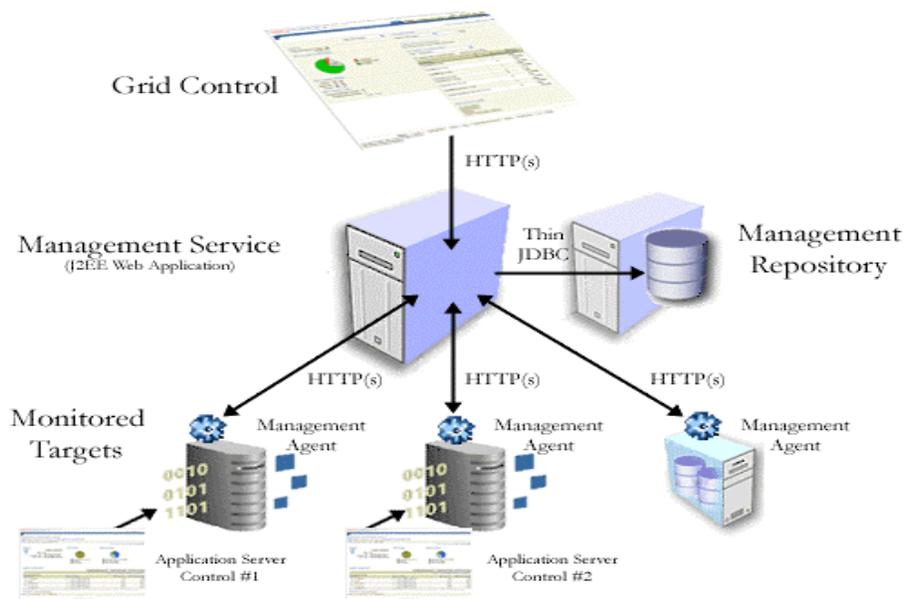


Figure 7: Oracle Enterprise Manager 10g

Oracle Application Server 10g and Oracle Enterprise Manager 10g Application Control and Grid Control addresses the following system and application management challenges:

- *Simplify and Automate Software Provisioning and configuration* – Oracle Application Server 10g and Oracle Enterprise Manager 10g, have a comprehensive set of software provisioning and lifecycle management features to automate software installation; software configuration; software life cycle management; software cloning; software patching and upgrade; and software administration such as tuning and moving a server from a test environment to a production environment.
- *Enable Business Continuity through Intelligent, Centralized Systems Monitoring* – Oracle Application Server 10g and Oracle Enterprise Manager 10g provide administrators with centralized, comprehensive, and easy to understand monitoring facilities. Oracle Application Server 10g also provides administrators non-intrusive and fine-grained Application Performance Management facilities to trace and fix performance problems.

### 6.1. Automated Software Provisioning

Oracle Application Server 10g provides many new features to more flexibly install, configure, upgrade, patch and clone Systems Software and Enterprise Applications. These new features include:

**Mid-Tier Installation and Configuration:** (i) *Enhanced Configuration Tools* -

Configuration Assistants have been enhanced to provide the ability to rerun in case of failures during the configuration phase. (ii) *Support for New System Environments* - Oracle Application Server 10g can be installed, configured, and operated in a DHCP Environment (IP address change support for both middle tiers and Infrastructure, Hostname change support for middle tier), On/Off network, NFS environments (with certain limitations), installation off DVD media, and in a multiple Firewall and DMZ environment. (iii) *Multiple middle tiers on the same host belong to different Farms* - For each middle tier installation, the user is given a choice use pick the infrastructure services they want to use, and choose to belong to a specific farm. This new enhancement provides the ability to keep development, staging and deployment environments completely isolated from each other and while sharing the same machine.

**Infrastructure Installation and Configuration:** (i) *Using an Existing Database as Metadata Repository* - Oracle Application Server 10g provides a pre-seeded database with the OracleAS Metadata Repository. However, it is also possible to use OracleAS Metadata Repository Creation Assistant to load the Metadata Repository into an existing Oracle Database (version 9.0.1.5 or above). The existing database can be a 32-bit, 64-bit, SE or EE databases, standalone or RAC-enabled Database Server. (ii) *Distributed Identity Management Installation:* Oracle Application Server 10g provides out of box deployment option to install Identity Management components of an infrastructure in many different Enterprise Configurations.

**Optional use of Infrastructure:** Oracle Application Server 10g introduces several new features that eliminate the need for a Database or an OracleAS Infrastructure. The two most important features are: (i) *File-based Clustering* – With Oracle

**Major New Automated Software Provisioning Enhancements include:**

- Installation and Configuration Enhancements
- Silent Installation Support
- Software, Configuration and Application Cloning
- Automated Software Patching & Maintenance
- End-User “Click-to-Eyeball” Performance
- Automated Software Upgrade from Oracle9i/AS
- Select Best Practice, Deployment Topologies

Application Server 10g, users can get the benefits of cluster management including automatic synchronization of configuration information and deployed applications across a cluster, cluster monitoring and management while using a file-based repository for cluster configuration information. (ii) *OracleAS ProcessConnect Installation* – OracleAS ProcessConnect requires OracleAS Metadata Repository that can exist in any database. OracleAS ProcessConnect does not require any other infrastructure services (iii) *Forms and Reports without Infrastructure* - In this release it is possible to install OracleAS Forms and Reports Services without the use of any infrastructure services.

**Software Cloning:** Oracle Application Server 10g (9.0.4) provides two mechanisms of cloning. (i) *Configuration Copy* mechanism (also referred as Archive and Restore) can be used to clone the configuration information across existing instances. (ii) *Instance Copy mechanism* can be used to clone the entire instance including the software and the configuration information. In Oracle Application Server 10g (9.0.4), it will be possible to clone non-clustered J2EE and Web Cache instances.

**Software Patching and Maintenance:** Grid Control provides facilities to examine, download and automatically apply the latest patches to your Oracle software.

**Software Upgrade:** Oracle Application Server 10g provides a graphical Upgrade Assistant to automatically upgrade Application Server instances from Oracle9iAS to Oracle Application Server 10g (9.0.4).

**Best Practice, Recommended Deployment Topologies:** Oracle provides customers with a documented set of best-practice configurations to deploy Oracle Application Server 10g and its various services. These enable users to deploy the Application Server for the best performance, security, and high availability.

In addition, Oracle Enterprise Manager 10g Application Server Control includes many new features such as: centralized log viewer, ports page, applications deployed on OC4J with drill down capability, enhanced deployment wizard among others.

## **6.2. Enable Business Continuity through Intelligent, Centralized Systems Monitoring**

Oracle Application Server 10g and Grid Control provides many new features to monitor and manage many Application Server instances from a single central console. These new features include:

**Historical Performance and Availability Metrics:** Oracle Enterprise Manager 10g Grid Control stores performance and availability information for one or more Application Server instances over time. Using this historical data you can analyze performance over time, diagnose past problems as they occurred, look for trends, and report on historical performance and availability. You can also look back over time and compare the performance of two or more instances. Grid Control

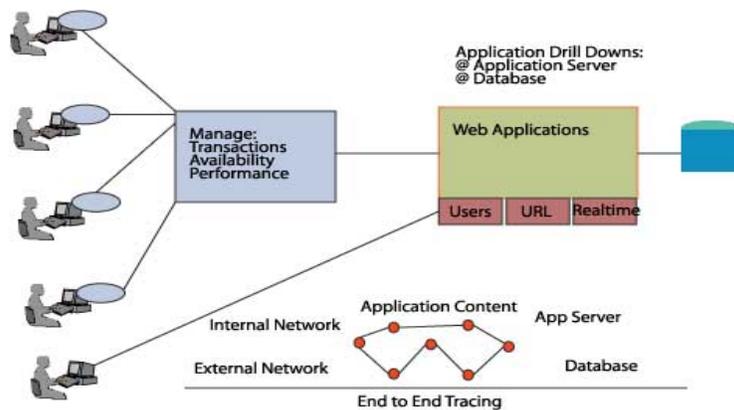
**Major New Systems Management Features included in Oracle Enterprise Manager 10g include:**

- Historical Performance
- Historical Availability
- Out of box reporting
- Pre-Instrumented Performance Metrics
- Application Performance Management
- End-User “Click-to-Eyeball” Performance
- Log Viewer and Diagnostics
- Job system
- Port Management

provides a number of pre-packaged reports that provide users with a summary view of performance and availability over various periods of time.

**Pre-Instrumented Application Server:** Oracle Application Server 10g has several new features that dramatically improve out-of-box manageability. Enhancements in the Dynamic Monitoring Service (DMS) and the instrumentation of all services in the Application Server ensure that critical performance monitoring is provided out-of-the-box without the need for invasive code changes or for specific Application Server instrumentation. Thresholds are set out-of-box on key performance metrics so you will instantly see when problems occur. Notifications and alerts can be sent via email or to SMS paging devices. The default thresholds for each metric can also be customized.

**Application Performance Management (APM):** To compliment the end-user response time metrics, Oracle Application Server 10g, Oracle Database 10g, and Oracle Enterprise Manager 10g provide users with “End-to-end Performance Tracing.” This feature (Figure 8) provides an administrator with a break-up of the total time spent to complete a specific business transaction or to render a specific URL into the time spent in the Web Server, Application Server, data access layer (JDBC), and database. This fine-grained time information can be used to diagnose and tune the Application Server and Database for optimal performance.



**Figure 8: Application Performance Tracing**

**Performance Reporting and Diagnosis:** Finally, Grid Control helps identify performance bottlenecks across all tiers of your application by providing easy-to-setup and easy-to-understand diagnostic reports.

Table 6 lists the key provisioning and management key features of Oracle Application Server 10g.

<p><b>Software Provisioning – Installation and Configuration Enhancements</b></p> <ul style="list-style-type: none"> <li>Automated Silent Installation</li> <li>Metadata Repository into existing database</li> <li>Cluster aware Infrastructure installation</li> <li>Distributed Identity Management Installation</li> <li>Reduction in Disk, Memory, Installation time</li> <li>Port Customization</li> <li>Metadata Repository Customization</li> <li>Independent farm association for every middle tier installation</li> <li>Secure Access to OID during installation</li> <li>Forms and Reports without Infrastructure installation</li> <li>File based clustering configuration without Infrastructure</li> <li>OracleAS ProcessConnect Installation without Infrastructure</li> <li>100% automated pre-requisite checks</li> <li>1-2 CPU specific pre-requisite checks</li> <li>Platform specific pre-requisite checks</li> <li>Less than 100 pages Quick Installation and Upgrade Guide</li> <li>DVD Delivery</li> <li>DHCP , NFS, On/Off Network installation support</li> <li>Virtual Host Support</li> <li>/Var/tmp restriction removed</li> <li>Multiple User installations</li> <li>Multiple Application Servers on single host in different clusters</li> <li>Oracle Developer Suite and Oracle Application Server share a single Oracle Home</li> <li>Rerunnable, point in time restart Configuration Assistants</li> </ul>	<p><b>Software Provisioning – Software Automation</b></p> <ul style="list-style-type: none"> <li>No Post Installation Steps</li> <li>Software Cloning</li> <li>Configuration Archive</li> <li>Configuration Restore</li> <li>Configuration Cloning</li> <li>Configuration Versioning</li> <li>Software Patching, maintenance</li> <li>Software Upgrade</li> <li>Hardware and software configuration management</li> </ul> <p><b>Software Provisioning – Upgrade and Migration</b></p> <ul style="list-style-type: none"> <li>Single, graphical, wizard based upgrade assistant</li> <li>Rolling Upgrade support</li> <li>User Identity Migration</li> <li>Life cycle migration support</li> </ul> <p><b>Software Provisioning – Recommended Topologies</b></p> <ul style="list-style-type: none"> <li>Developer Topologies</li> <li>Departmental Topologies</li> <li>Enterprise Data Center Topologies</li> <li>Best Practices recommendation</li> <li>Separate Documentation to discuss Enterprise Data Center deployment specific requirements</li> </ul> <p><b>System Management – Intelligent central monitoring</b></p> <ul style="list-style-type: none"> <li>Pre-instrumented Application Server</li> <li>Historical Performance Monitoring</li> <li>End user response time measurement</li> <li>Application Performance Monitoring</li> <li>Performance drill down analysis</li> <li>Performance Diagnostic Reports</li> <li>Port Management</li> <li>Dynamic target discovery</li> <li>Workload Management</li> <li>Changing Infrastructure Services</li> </ul>	<p><b>System Management – Policy based management and diagnostics</b></p> <ul style="list-style-type: none"> <li>Real time system monitoring</li> <li>Resource consumption monitoring</li> <li>User defined metrics</li> <li>Copy metric settings</li> <li>Pre-configured health checks</li> <li>Job Automation System</li> <li>Job Scheduling and Events</li> <li>Central Log Viewer</li> <li>Improved logging capabilities</li> <li>Alert Delivery</li> </ul> <p><b>Other System Management Enhancements</b></p> <p><u>Oracle HTTP Server</u></p> <ul style="list-style-type: none"> <li>Configuration change validation</li> <li>Virtual Host Configuration</li> </ul> <p><u>OCAJ</u></p> <ul style="list-style-type: none"> <li>Deployed Java Application View</li> <li>JMS, MDB, UDDI configuration</li> <li>Data Source Configuration</li> <li>Faster Application Deployment</li> </ul> <p><u>OracleAS Portal</u></p> <ul style="list-style-type: none"> <li>Portal/SSO Integration Configuration</li> <li>Portal/Web Cache Integration Configuration</li> <li>Central Monitoring</li> </ul> <p><u>OracleAS Web Cache</u></p> <ul style="list-style-type: none"> <li>Enhanced Diagnostics</li> </ul> <p><u>OracleAS Integration</u></p> <ul style="list-style-type: none"> <li>BAM</li> <li>System Alerts</li> <li>Configuration</li> <li>Performance Monitors</li> </ul> <p><u>OracleAS Forms and Reports Services</u></p> <ul style="list-style-type: none"> <li>End to end monitoring</li> <li>Enhanced diagnostics</li> </ul>
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**Table 6: Oracle Application Server 10g – Provisioning and Management New Features**

## 7. SUMMARY AND CONCLUSION

Over the past few years, the speed and unpredictability of business cycles have pushed the Information Technology infrastructure within many organizations to their limits. Rapid changes in market and competitive dynamics have forced organizations to become more responsive to change. Organizations are also faced with continued and accelerating pressure to lower Information Technology budgets. To meet their critical business needs, therefore, organizations need an Enterprise Application Infrastructure that addresses the needs for “Greater Flexibility or Responsiveness at Lower Cost”. Oracle designed the next generation of its Application Platform Suite – Oracle Application Server 10g – to provide these two benefits.

Oracle Application Server 10g offers a Responsive Software Infrastructure for Enterprise Applications that enables:

- *Service Oriented Development of Applications (SOA)* – It provides a productive and open Application Development Framework; a comprehensive J2EE standards-based SOA runtime; and facilities to service-enable existing applications and legacy systems without rewriting any of the applications.
- *Event-driven Business Process Optimization* - It provides facilities to synchronize data between systems; to integrate systems within the Enterprise (EAI) and with partners (B2B); to automate business processes (BPM); and to monitor and optimize business processes in response to events.
- *Unified Workplace with Pervasive, Multi-channel Access* – It provides pervasive access from anywhere, any time, and from any device to an Enterprise Portal that provides unified access to Information, Services, Business Processes, and Business Intelligence; and a productive and collaborative Workplace for employees.

Oracle Application Server 10g leverages Grid Computing to lower the costs of Deploying and Managing Enterprise Applications. It offers:

- *Enterprise Quality of Service on Commodity Computing Grids* – It provides enterprise-levels of Performance, Scalability, and High Availability using commodity hardware and storage. It saves costs by lowering computing capacity requirements and enabling modular, inexpensive capacity growth.
- *Lower Cost Systems Management* – It lowers management costs and provides better business continuity by automating Software Provisioning; centralizing Monitoring; and enabling Policy-based Administration of sets of systems.
- *Lower Cost Security Management* – It provides a secure platform for Enterprise Applications and lowers the cost of user management by centralizing identity and access management.



Oracle Application Server 10g – New Features Overview

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