

Oracle Fusion Middleware and
Microsoft Interoperability:
Addressing Enterprise-wide Needs

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Oracle Fusion Middleware and Microsoft Interoperability

EXECUTIVE OVERVIEW

The majority of organizations today have a wide diversity of applications and technology that comprises their enterprise IT infrastructure. These may be older legacy applications, or even more modern applications built using Web and Java standards. Many of these organizations also use Microsoft products and technologies to varying degree. It may be at the level of using Windows as a core platform; it might be using .Net to build custom applications; it may be using Windows Server products such as BizTalk, SharePoint, SQL Server; or it may very well be using Microsoft Office Suite. The challenge is how to effectively bridge the wide set of products and technologies that organizations use which are not Microsoft-based with those products and technologies that are Microsoft-based in order to solve enterprise-wide requirements and needs.

These needs are often in the following areas: Creating business processes which span multiple applications and organizations; Establishing a comprehensive identity management infrastructure to provide single sign-on, access control, provisioning; Providing a unified enterprise portal to simplify access to applications, structured and unstructured content, and information; Gaining better business insight through comprehensive analytics and easy access to this information. While not an exhaustive listing of an organization's needs, this does highlight some critical areas where it is important to create solutions that can accommodate the wide diversity of systems that an enterprise possesses.

This paper outlines how Oracle Fusion Middleware provides strong support and interoperability for Microsoft products and technologies to help enterprises address achieve greater flexibility and speed in their business and IT infrastructures.

INTRODUCTION

Microsoft provides a wide array of products and technologies, and Oracle Fusion Middleware provides extensive support for leveraging these products across a wide range of middleware capabilities. Discussing Microsoft support and interoperability can be organized into three key areas:

- *Microsoft Windows Platform*. Maximizing performance and scalability on these platforms along with effectively leveraging associated capabilities such as

Microsoft IIS, Microsoft Active Directory, Microsoft Cluster Services and Network Load Balancing, and Microsoft Operations Manager

- *Microsoft .Net and Window Server System Products:* Effectively working with applications built using .Net and Web Services, as well as products such as Microsoft BizTalk, SharePoint, etc to create an enterprise-wide Service-Oriented Architecture (SOA).
- *Microsoft Office:* Enabling the effective utilization of Microsoft Office – Word, Excel, PowerPoint, Outlook, InfoPath –with enterprise applications, Web Services, and custom applications for users and scenarios where there are benefits of using Microsoft Office in the context of enterprise applications and solutions.

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

OVERVIEW OF ORACLE FUSION MIDDLEWARE

Oracle Fusion Middleware is a unified suite of standards-based middleware components that provides a comprehensive technology foundation – an Application Platform Suite (APS) – and an extensive set of best of breed capabilities for solving enterprise IT challenges.

- Uniquely ranked as Leader in
All Gartner Middleware Magic Quadrants
-
- Application Platform Suites
 - Development Tools
 - Application Server
 - Web Services Platform
 - Enterprise Portal
 - Business Integration
 - Identity Management
 - Web Services Management
 - ETL Data Integration

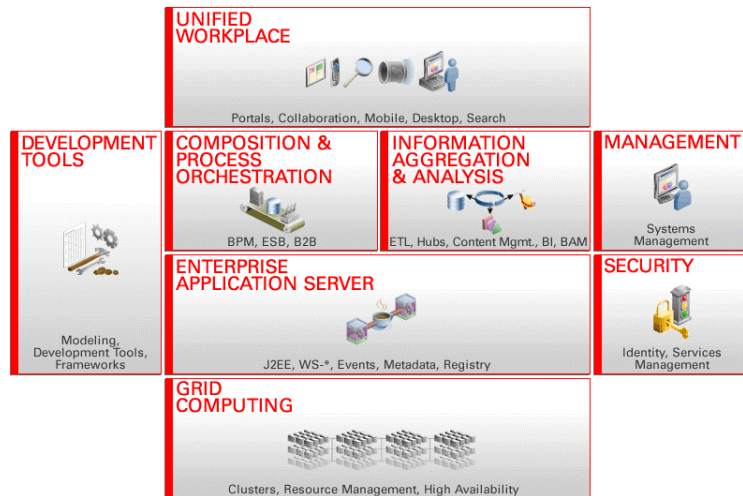


Figure 1: Oracle Fusion Middleware

While based on J2EE standards, Oracle Fusion Middleware provides extensive capabilities for effectively bridging Microsoft/.NET based applications with non-Microsoft products and technologies.

Comprehensive, Unified Suite of Middleware

Oracle Fusion Middleware 10g offers the industry's most comprehensive and cohesive platform for service-oriented computing. Oracle Fusion Middleware offers a number of technology solutions based on service-oriented architecture:

- A J2EE-based service-oriented architecture platform to develop, deploy, and manage Web services
- Enterprise integration services for data integration, business process automation, and business activity monitoring
- Enterprise portal services to aggregate content and services and to provide users with multi-channel access from wireless devices
- Business intelligence services to query and analyze, perform OLAP, and report on enterprise data
- Security and identity management services to manage access to systems, to enforce consistent policies, and ensure compliance and auditability

These solutions share a common grid computing infrastructure, enabling them to be deployed on large numbers of low-cost, modular servers and storage with industry-leading performance, scalability, and availability. They share a common security and identity management infrastructure to unify security administration. And they share a common systems management infrastructure to monitor and manage systems and applications centrally. Oracle Fusion Middleware is designed to be modular, open, and pluggable – even with other vendor's products – so that you use only what you need but get greater value the more you use.

Delivers Value for Enterprise IT

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

Oracle Fusion Middleware has been the fastest growing middleware suite in the world for the past three years. Today more than 26,600 organizations run their businesses using Oracle Fusion Middleware. Regardless of your organization's size, the complexity of your IT infrastructure, or the increasing demands of your business, Oracle Fusion Middleware can provide an edge in today's competitive business environment.

WINDOWS PLATFORM

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

- Strong support Windows OS as a core platform
- Maximizing utilization of Active Directory

- Leveraging Microsoft Cluster Services and Network Load Balancing for scalability and performance
- Simplifying system management of Microsoft products along with Oracle products through Oracle Enterprise Manager

Strong Support for Windows OS

Windows is one of the base development platforms of Oracle's server products and is core platform for each product release. There is a dedicated Windows platform team within Oracle's Server Technology organization that works closely with Microsoft to ensure early support of Microsoft Windows versions as they are released and to work collectively to resolve any issues. As such Oracle Fusion Middleware is available on Microsoft Windows NT, 2000, XP and 2003, and will support Microsoft Vista when it becomes available. In addition Oracle Containers for J2EE (OC4J) which is part of Oracle Application Server is available on 64bit (IA64) Microsoft Windows.

- Support all core Windows platforms - Windows 2000, Windows XP, Windows 2003 Server; Microsoft Vista when it becomes available. Concurrent testing ensures availability of Oracle Fusion Middleware releases on MSFT-Windows. As a core platform, initial releases of all middleware components are usually available on Windows
- Focus on performance and scalability – Oracle Fusion Middleware provides exceptional performance and scalability, and has established numerous industry benchmarks attesting to these capabilities. There is a strong focus on delivering this level of performance on Windows platforms.

Active Directory

Oracle Fusion Middleware provides a number of capabilities to enable easy integration of Active Directory to leverage this directory store. Some advanced capabilities, such as provisioning, will be further discussed later in this paper around Enterprise Identity Management, but in this section, we will explore how Active Directory and Windows Native Authentication can be leveraged by any applications running on Windows platforms.

- Use of Active Directory as Identity Store
- Integration with Desktop Login
- Synchronization of Active Directory across an Enterprise

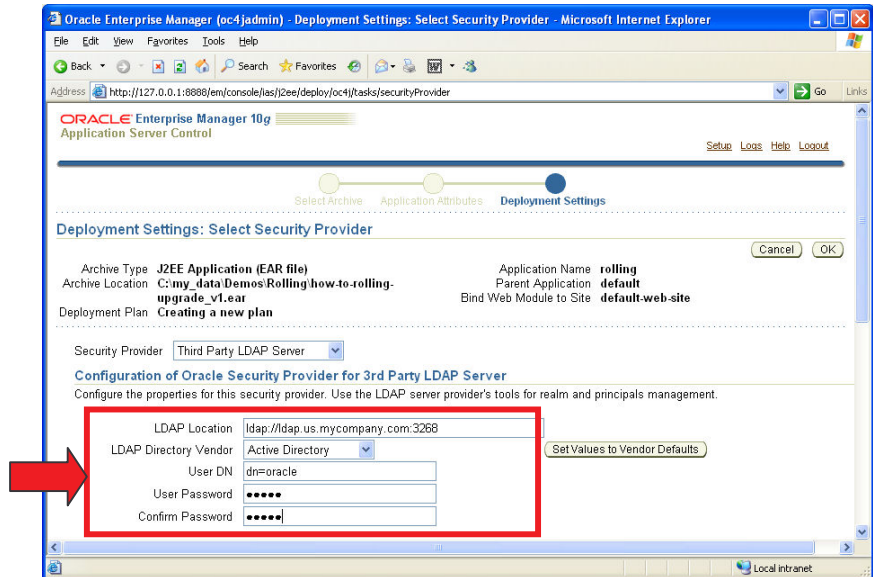


Figure 2: Using Active Directory as LDAP Provider for J2EE Application

Use of Active Directory as Identity Store

Applications built using Oracle Fusion Middleware, and many middleware components can choose to use Active Directory as their identity store. This is beneficial for organizations that have standardized on Active Directory as their LDAP standard. The figure above shows Active Directory can be easily selected as the LDAP provider for this deployed J2EE application. Similarly, middleware components such as Oracle BPEL Process Manager, Oracle BAM, Oracle Portal, etc can be deployed using Active Directory as the source LDAP.

Integration with Desktop login/WNA for Easier Enterprise Access and Single Sign-On

Further, since Active Directory and Windows Native Authentication provide the basis for most users logging onto their Windows desktop systems, integration with these features can be used to simplify access to other enterprise systems. Oracle Single Sign-On enables native authentication in a Microsoft Windows environment, using the user's Kerberos credentials that are provided once a user logs into a Windows-based system. This allows users to leverage their Windows logon information to more easily access other systems without having to retype their passwords and simplifies administrators' duties since fewer password stores have to be maintained.

Active Directory Synchronization with Other Directories for an Unified Directory Infrastructure

In situations where there are multiple directories being used within an organization, Oracle Directory Integration and Provisioning enables out-of-the-box synchronization with Microsoft Active Directory through a provided Active Directory Connector. Using this mechanism Active Directory can be synchronized

with a wide range of third-party LDAP directories. In organizations using a mix of Microsoft and non-Microsoft based systems, the ability to synchronize identities across directories can provide an unified environment for users and applications.

Web Tier

For organizations that use the IIS web server included with Windows, there are many capabilities provided in Oracle Fusion Middleware to make it easier to use this web server as well as to boost its' performance and scalability.

- *IIS Reverse HTTP Proxy Plug-in* – There is a reverse HTTP proxy that forwards incoming HTTP requests from IIS to an Oracle Application Server 10g instance. Because Oracle Application Server 10g provides this IIS plug-in, administrators can use the Oracle Single Sign-On (SSO) to manage security and authentication.
- *IIS Plug-in* – Oracle Application Server 10g also provides a native plug-in so administrators can use IIS as the web server in Oracle Application Server 10g environments.
- *Web Cache* – Oracle Web Cache increases the performance of Microsoft ASP applications while remaining transparent to the application Web server, IIS. IIS treats HTTP requests from Oracle Web Cache the same as any other HTTP request coming directly from the browser. In turn, IIS generates the response and sends it back to Oracle Web Cache as an HTTP message. Administrators can cluster Oracle Web Cache for high availability systems.

Microsoft Cluster Services and Network Load Balancer

Oracle Application Server 10g can natively take advantage of Microsoft Cluster Services and Network Load Balancer to address high availability and scalability requirements. For Windows customers, this enables leveraging of existing skill sets and resources while taking advantage of the optimized capabilities provided by Microsoft. Oracle Application Server 10g seamlessly works with Microsoft Cluster Services and Network Load Balancer to simplify the configuration and operation of different deployment topologies.

- Automatic installation, configuration, provisioning, and patch management of cluster nodes
- Automatic failover of nodes
- Death detection and restart of middle tier and infrastructure processes

Systems Management

Comprehensive Management Across Heterogeneous Infrastructure

Oracle Enterprise Manager combines support for Microsoft products with the system management capabilities provided for Oracle Database, Oracle Fusion

Middleware, and Oracle Applications, to further deliver a comprehensive system management view that spans the typically heterogeneous IT infrastructure.

- Lower TCO through comprehensive view of all server and system components in an enterprise environment involving Microsoft and non-Microsoft based systems.
- Faster problem resolution for customers with diverse infrastructure by integrating performance information of windows server system and .NET framework with that from J2EE applications, Oracle Database, Oracle Fusion Middleware, and Oracle Applications.

Broad Support for Microsoft Products

Oracle Enterprise Manager supports Windows platforms and other Microsoft products in order to provide a comprehensive system management view of middleware components along with information originating at Windows level (alert logs, etc). Some of the support available for Microsoft products is:

- Windows Platform – monitors performance and log information.
- Microsoft Active Directory – monitors Active Directory service’s product performance and collects configuration data for historical change tracking and configuration comparisons.
- Microsoft .NET Framework – monitors performance data for the Common Language Runtime (CLR) and any of its deployed applications.
- Microsoft BizTalk Server – monitors performance data for BizTalk Server transactions, orchestrations, and business activity service.
- Microsoft SQL Server – enables customers to efficiently manage and monitor Oracle and SQL Server databases and their applications in environments featuring the two databases.
- Microsoft Internet Information Server (IIS) – monitors data for WWW, Web services, FTP, SNMP, ASP, as well as many other network protocols, and collects configuration data for historical change tracking and configuration comparisons.
- Microsoft Internet Security and Acceleration Server (ISA) – monitors the server’s performance data related to bandwidth control, cache performance, firewalls, and Web proxies
- Microsoft Commerce Server – monitors business data, catalogs, pipelines, user profile management, and related hardware performance.

Additionally, work is underway to increase support for Microsoft Operations Manager (MOM) to better provide bi-directional exchange of information between MOM and Oracle Enterprise Manager for customers who use that system management tool.

MICROSOFT .NET AND WINDOWS SERVER SYSTEMS

Oracle Fusion Middleware provides strong support both for .Net Web Services and other technologies/products in the .Net product line, which Microsoft often describes as Windows Server Systems such as – BizTalk, SQL Server, SharePoint, Active Directory, etc.

- Easier integration and interoperability through support for .NET and Web Service Standards
- Simplified discovery through UDDI
- Better integrated processes and workflow through support of Microsoft BizTalk and BPEL
- Easy information access and content sharing through enterprise portals
- Comprehensive enterprise identity management for better security, compliance, and auditability

.NET and Web Services Standards Support

Oracle and other industry leaders formed the Web Services-Interoperability Organization (WS-I) to promote the interoperability of Web Services technologies across a variety of platforms, operating systems, and programming languages. These standards promote easier interoperability through Web Services and diminish the impact on of whether a Web Service was implemented in .NET, J2EE, PL/SQL, or other languages. Oracle continues to promote and author industry standards, and participates with Microsoft in most of these industry standards setting bodies.

Ensuring Interoperability

Common standards are really just the starting point. It is always important to do real-world testing to ensure that products implementing these common standards do truly interoperate.

- *Real-World Testing* – There is a strong focus on ensuring that Web Services/Protocols standards that are jointly supported by Oracle and Microsoft do actually deliver interoperability. Oracle Application Server 10g is tested with Microsoft .NET products to confirm this interoperability. In addition, Oracle participates in interoperability tests hosted by Microsoft that they call “PlugFests”.
- *Support for Microsoft Implementation of Web Service Standards* – Oracle Fusion Middleware components provide support for standards across the WS-* range, such as WS-I Basic Profile, which are included in .Net 1.1 (.Net 2.0 as it is released), and Web Service Enhancements (WSE) 2.0 (WSE 3.0 as it is released).

Leveraging .NET, J2EE, PL/SQL Web Services

In a Services-Oriented Architecture, services can be easily used, and reused, by different applications and business processes, even if different technologies were used to implement those services. For example, a J2EE application could use, or consume, a Web Service that was implemented in .NET, and conversely a .NET application could leverage a Web Service that was implemented in PL/SQL.

In order to find Web Services that can be reused in this fashion, UDDI registries provide a catalog of available Web Services. This catalog also provides useful metadata about available services so that developers can easily incorporate them into their applications and appropriate validation can be done.

- *Using Microsoft UDDI Browser* – With Oracle JDeveloper, developers can consume WSDL generated by third Web Services tools or query Web Services from public UDDI registry including Microsoft UDDI. In a JDeveloper wizard, developers can search UDDI registry by name or category. Microsoft UDDI Browser support ensures .NET Web Services can be easily discovered and reused.
- *Leveraging Oracle UDDI Registry* – Developers can also publish and discover Web services using Oracle UDDI Registry, and use it for governance across a SOA environment. Similarly, Microsoft Visual Studio developers can access Oracle UDDI Registry for Web Service metadata maintained there.
- *Consuming .NET Web Services* – .NET Web Services can be easily consumed by a wide range of Oracle Fusion Middleware components and SOA infrastructure – building applications with Oracle JDeveloper and using Oracle Application Development Framework (ADF) Model Layer to bind .NET Web Services to Views; integrating services with Oracle ESB; orchestrating processes with Oracle BPEL Process Manager, accessing services with Oracle Portal; managing services with Oracle Web Services Manager, etc.
- *Publish J2EE and PL/SQL Web Services to Microsoft Visual Studio .NET and Microsoft Office* – Web Services implemented and published by Oracle Fusion Middleware can be easily incorporated into applications developed with Visual Studio .NET and Microsoft Office documents.
- *Other Ongoing Areas of Support for Microsoft Infrastructure* – Oracle JDeveloper and Oracle Application Development Framework also have ongoing efforts to make it easier to work in a Microsoft environment in a number of other ways as well – using Microsoft SQL Server as data source, leveraging Microsoft Visual Source Safe for source code management, using Active Directory for security/identity management, etc.

Process Integration, Workflow, and Microsoft BizTalk

A critical requirement for most organizations with a diverse technology infrastructure is how to create integrated business and workflow processes that can span multiple applications and organizations.

There are a number of key Microsoft products and technologies that are typically used to address this need. Services and applications may be exposed via .NET Web Services, processes might be orchestrated with Microsoft BizTalk, people might be linked through workflow processes involving Microsoft WinForms or Microsoft Office InfoPath documents, and transactions might be integrated through using Microsoft MSMQ for a messaging infrastructure.

All of this range of Microsoft capabilities are supported in Oracle Fusion Middleware so that integrated processes can be developed that mix and match these Microsoft-enabled elements of a process or workflow with elements that are not supported by Microsoft.

- *Microsoft Web Services* – As previously described above, Oracle Fusion Middleware supports through WSE and .NET implementations of Web Services to enable these services to be incorporated into a larger Service-Oriented Architecture.
- *Orchestration with BizTalk* – BizTalk has the ability to import and export BPEL so that process models can be exchanged. In a runtime environment, BizTalk typically relies on adapters, web services, and messaging to interact with other components. BizTalk processes can be exposed and initiated as a web service (using WSE Adapter) itself enabling a BizTalk process to be a sub-process in a larger process. Alternatively, BizTalk can be integrated at the messaging layer through using its' messaging adapters such as bridging JMS to MSMQ..
- *Human Workflow and Exchanging Documents/Forms* – Microsoft WinForms, Microsoft Office documents/InfoPath, XML documents, etc can be used to interact with users and integrate people into workflow processes. Information can be collected or displayed, along with approvals, redirections, etc. through these mechanisms. Oracle Fusion Middleware provides support for all these to leverage existing workflow mechanisms to create larger workflows that might involve these sub-workflows. An example involving Microsoft Office in a workflow is described below in the section on Microsoft Office.

Oracle BPEL Process Manager provides a user-friendly and reliable solution for designing, deploying, and managing business processes defined using the BPEL industry standard. The built-in integration services enable you to use advanced connectivity and transformation capabilities of standard BPEL processes, which support XSLT and XQuery transformation, and bindings to legacy systems through Java connector architecture (JCA) adapters and native protocols. Human-centric workflow is enabled through a user task service that is provided as a built-in BPEL

service to support the integration of people and manual tasks into BPEL flows. Oracle BPEL Process Manager provides extensive Microsoft support:

- .NET clients can be used to access Oracle BPEL processes
- Oracle BPEL PM can orchestrate interactions between .NET based web services – sync and async (via WS-Addressing)
- BPEL PM can be integrated with MS Sharepoint via web services
- Oracle Integration can use SQL Server as its dehydration store
- Out-of-the-box DB Adapter supports SQL Server
- Oracle BAM can use Microsoft SQL Server as event store
- Active Directory can be used as the user repository for BPM users

Portals

Including Microsoft Content in Oracle Portal

Oracle Portal provides a collaborative workplace across an entire enterprise, which enables you to aggregate content, and information from your entire enterprise into a single personalized portal, making it easier to find the information and to collaborate with others — both inside the company and with business partners. It creates a secure environment through providing Single Sign-on (discussed further in Identity Management below) to included applications and content.

- *Integrating Portals through Portlets* – Oracle Portal and Microsoft SharePoint support industry standards such as WSRP for enabling portlets to be used across portals. For example, a departmental portal implemented in Microsoft SharePoint could expose portlets which could be leveraged by an enterprise portal implemented with Oracle Portal. Additionally, portlets from .NET applications can be leveraged across portals – deploy any existing .NET/Web Part
- *Integrating Portals through Web Services* – Oracle Portal can be both provider and consumer of Web Services, as well as supporting ASP.NET, J#, C#, VB.
- *Microsoft Desktop and Microsoft Office Documents* – Oracle Portal and Content Management content can be accessed from Microsoft desktops through WebDAV so that they appear as folders making it easier for users to add and remove content. Similarly content such as Microsoft Office documents can be managed and viewed through Oracle Portal.
- *Microsoft Exchange 2000/2003* – The OracleAS Provider for Microsoft Exchange 2003 provides three portlets that expose Microsoft Exchange 2003 content within OracleAS Portal: Inbox portlet, Calendar portlet, and Contacts portlet. Each of these portlets renders information associated with a user's Microsoft Exchange account. The OracleAS Provider for Microsoft Exchange 2000 provides similar capabilities for Microsoft Exchange 2000.

- *Additional Areas of Support* – Some other areas Oracle Portal supports Microsoft environment are using Active Directory to store user information, and using the provided Plug-in for FrontPage for web editing.

Including Content from Oracle Portal & J2EE apps in Microsoft SharePoint

Oracle Fusion Middleware can also be used to enable content to be included with a Microsoft SharePoint portal.

- *Sharing Portlets and Web Services* – J2EE applications and Oracle Portal can similarly expose web services and portlets that Microsoft SharePoint can include.
- *Sharing Other Content through WebDAV* -- Content in Oracle Content Management through WebDav
- *Additional Areas of Support* – Oracle Identity Management can be integrated with Active Directory to ensure shared users have access to content in Microsoft SharePoint, and Oracle Web Cache can be used to improved performance and scalability of IIS web server supporting SharePoint.

Enterprise Identity Management

Having a comprehensive Identity Management infrastructure has become increasing important to organizations as regulatory, compliance, and audit requirements have increased and the complexity of security/password management has made life difficult for users and administrators.

Identity management involves all aspects of managing users in the enterprise application environment. This includes how users are created, how they are granted access privileges, how their access to applications is controlled and managed, and how these events are tracked and reported.

While a LDAP directory store is an important component of this infrastructure, it is really just the starting point. Oracle Identity Management provides an extensive set of capabilities that can both utilize Active Directory as well wrap around it and integrate non-Microsoft assets into a comprehensive, robust solution that is easily managed.

- *Directory Integration and Synchronization* – As discuss previously, Active Directory can be used as the underlying LDAP store for many middleware components. Additionally, Oracle Identity Management enables integration and synchronization across directories.
- *Enterprise Access and Single Sign-on* -- Access and identity are the means for administering users and their privileges and controlling their access to enterprise resources. Oracle Identity Management delivers access control and identity management through Oracle COREid Access and Identity, Oracle Application Server Single Sign-On and Oracle Delegated Administration Services. These components work together to provide centralized, fine-grained access management for heterogeneous application environments.

Oracle SSO and COREid Access provide native integration with Microsoft Active Directory and Windows Native Authentication/login to provide a seamless experience for Windows users.

- *Provisioning and Leveraging HR applications to Drive Access Control* -- Oracle Xellerate Identity Provisioning is a powerful and flexible enterprise identity management system that automatically manages users' access privileges across enterprise IT resources and applications. Its flexible architecture addresses IT and business requirements, without requiring change to existing infrastructure, policies or procedures. It manages user access privileges through the entire identity management lifecycle—from initial creation of access privileges, to dynamically adapting, to changes in business requirements, to capturing and maintaining an audit trail of changes. Enterprises can incorporate necessary business/organizational changes at minimal cost. By integrating with an organizations HR application, it is possible to use that as the system of record, and drive any user changes out to affected systems. Oracle Xellerate provides the following Microsoft connectors: Exchange 5.5, Exchange 2000, Active Directory, Active Directory Password synchronization. There is also an extensive set of application and technology connectors that are available.
- *Directory Virtualization* – Creating a secure application environment requires integration of existing user identity information. Not all this information is always managed in LDAP directories, such as Active Directory or Windows Domains. For some companies, that information is contained in databases. For most, this information is scattered across multiple locations and multiple services. Oracle Virtual Directory provides Internet and industry standard LDAP and XML views of existing enterprise identity information, without synchronizing or moving data from its native locations. This accelerates the deployment of applications and reduces costs by eliminating the need to constantly adapt those applications to a changing identity landscape as user populations are added, changed, or removed.
- *Federate Identity* - As more companies move their business processes to the web, many organizations have a greater need to extend the boundaries of their enterprise to include partner applications. Federating identity data allows each company to operate independently and cooperate for business purposes. Oracle COREid Federation is an identity federation server that provides cross domain single sign-on and helps large corporations securely link their business partners into the corporate portal or extranet while also increasing their compliance with privacy and security regulations. COREid Federation enables customers to manage multiple partners and choose from industry standard federated identity solutions all from within one self-contained software product that companies can easily distribute to their partners. COREid Federation supports integration with Microsoft ADFS.

- *Define and Enforce Policies Consistently* -- Oracle Web Services Manager is a comprehensive solution for adding policy-driven best practices to all your existing or new Web services – .NET, J2EE, Legacy, etc – and provides the key security and management capabilities necessary to deploy Service-Oriented Architectures across your line-of-business applications. Oracle Web Services Manager allows IT management to centrally define policies that govern Web services operations (such as access policy, logging policy, and load balancing), and then wrap these policies around Web services without requiring modification to those services. In addition, Oracle Web Services Manager collects monitoring statistics to ensure quality of service, uptime, and security threats and displays them in a Web dashboard. As a result, Oracle Web Services Manager brings better control and visibility over Web services. Oracle Web Services Manager can use Active Directory for authentication and authorization, and a native .NET agent is provided for local policy enforcement of .NET web services.

MICROSOFT OFFICE

Oracle Fusion Middleware is used by many organizations to develop Enterprise Applications that automate Transaction Processing; streamline Business Processes; and access and deliver information within their organizations. Many organizations increasingly want to use their traditional desktop productivity applications – specifically Microsoft Office – within the context of their Enterprise Applications.

- *Fusing User-managed Information with Enterprise Information* – There is generally a separation between user-managed information that executives and employees within companies primarily manipulate using the Microsoft Office Suite of products; and the business data that they access and manipulate through the Enterprise Applications. In many ways, the separation between these two kinds of information are blurring so that users would like to use the Microsoft Office Suite of products to more easily manipulate data that they access from the Enterprise Applications.
- *Streamlining and Automating Enterprise Business Processes* – There is also a very strong need to further streamline and automate enterprise business processes. There are two requirements that customers have today – (i) First, there are several tasks within the context of Enterprise Business Processes that require Human Participation. Examples include handling workflow alerts and notifications received in e-mail. Customers would like this Human Participation to occur from within the Microsoft Office Suite of Applications. (ii) Second, there are also requirements to drive Enterprise Business Processes from the Microsoft Office environment itself.
- *Simplifying and Improving User Experience* – Even though most Enterprise Applications have web-based User Interfaces, many business users still find in many cases that these user interfaces and interaction models are both (i) less intuitive for them, since they many not be frequent users of these applications; and (ii) interrupts their daily task flow between the work they do

within the Microsoft Office technologies and their online Enterprise Applications.

To address these needs, there is an extensive range of capabilities provided in Oracle Fusion Middleware to enable the use of Microsoft Office – Word, Excel, Powerpoint, Outlook, InfoPath – along with enterprise applications, Web Services, and custom applications. These leverage much of the functionality provided within Microsoft Office to make it easier to use Microsoft Office along with XML and Web Services, and build upon the capabilities already expanded upon earlier in this paper.

Leveraging Microsoft Office Interoperability Capabilities

Microsoft Office 2003 provides many capabilities, which are fully accessed through Oracle Fusion Middleware, to make it easier to integrate Microsoft Office documents in enterprise setting.

- *XML Reference Schemas* - Simplifies publishing and consuming Microsoft Office formatted documents: With Microsoft Office 2003, each of the Microsoft Office Applications supports XML Reference Schemas. This makes it easier to create or consume Microsoft Office formatted documents (Word, Excel, InfoPath, etc). Additionally, older Microsoft Office formats for documents are supported in many places in the middleware offering: e.g. Oracle XML Publisher with Office 2000/XP, Oracle Business Intelligence with .xls excel files, etc.
- *Web Services* - Office 2003 provides support Web Services to enable Microsoft Office Smart Documents, which allow intelligent information transfer (such as links to external applications). Therefore, Microsoft Office documents can act as a client to applications in a richer way. Documents can retrieve the latest information directly from an application when they are opened. Alternatively, information entered into a document could be posted, via a Web Service, back into an external application.
- *Microsoft Office Smart Documents* – Microsoft Office Research Task Pane, which is provided in all Microsoft Office applications, can access Web Services exposed/enabled via Oracle Fusion Middleware. This provides an easy mechanism to allow Microsoft Office documents to act as simple clients for applications that expose Web Services. Also provide support for Smart Tags, which provides a mechanism for easy and quick in-context access to information.

Supporting Key User Needs and Scenarios

Oracle Fusion Middleware enables key scenarios involving Microsoft Office that require interoperability between Microsoft Office and enterprise applications. In many situations, it is easier for knowledge workers to interact with enterprise applications through Microsoft Office.

Self Service Information Entry Driving Business Processes/Workflow

To simplify day-to-day task flows such as submitting Expense Reports, Time Sheets and Time Management reports; and Travel Requests, many business users would like to fill out familiar Word/Excel based templates which they can fill in and then submit, which would then appropriately route through appropriate approvals/workflows, and interact with the necessary enterprise applications.

- Ability to generate and parse Microsoft Office formatted templates
- Ability to incorporate Microsoft Office documents into business processes and workflow, along with interaction with enterprise applications
- Integrate workflow routing and approvals with appropriate identities and roles, potentially stored in Microsoft Active Directory

Live Data Entry and Forms

In other situations, to simplify day-to-day task flows, there is a need to use the Microsoft Office document as the connected client to an enterprise application in real-time, such as scheduling a business trip and needing to check an itinerary and availability. This allows two kinds of interactivity: (i) First, as the user fills in the Forms set in Microsoft Office, and goes through a sequence of steps to “order the flight”, live data is updated to the “client” document with choices of different routes and prices. (ii) Secondly, the user can make changes to the information or selections that are then posted back into the attached application.

- Ability to enable Microsoft Office documents to effectively incorporate, and interact with Web Services created or exposed with Oracle JDeveloper and Application Development Framework.
- Embed appropriate security and access control provided with Oracle Identity Management into Microsoft Office Documents so that data is not inappropriately shared, or transmitted without appropriate security

Business Process and Business Activity Monitoring Alerts

Many business executives and operational managers would like to manage by exception critical business processes and activities involving important customers and suppliers. Specifically, this means that instead of having business users constantly monitor the status of relevant business processes or activities, it allows these users to receive alerts from Oracle BPEL Process Manager and Oracle BAM into their Microsoft Outlook clients. These alerts can be sophisticated with embedded documents received as e-mail attachments that highlight the specific condition and response.

- Ability to share critical events and identify specified situations within Oracle BPEL Process Manager and Oracle BAM to generate appropriate alerts and notifications.
- Ability to integrate with Microsoft Exchange users and Oracle Identity Management to target alerts and notifications to appropriate users and roles

and determine what information can be shared based on user role and privileges.

- Package the appropriate information from Oracle Business Intelligence and Oracle BAM, and present information in the appropriate document format for that user.
- Deliver Document-centric Information to Outlook Inbox
- Enable smart alerts so that user can access real-time dashboards provided by Oracle BAM from the delivered alerts.

Delivering Business Information through Microsoft Office

Many users prefer to have information delivered in Microsoft Office document formats – Word, Excel, PowerPoint, often as attachments to e-mails delivered in Outlook. However, there are also situations where the user wants to have real-time access to this information since the data in an attachment might be “stale”.

- Web Services, and data objects provided by Oracle ADF and JDeveloper can query and extract information from enterprise applications that can be accessed via Microsoft Office documents, to enable live charts.
- Oracle Business Intelligence provides support for Excel to enable it to be used as the client.
- Oracle BAM provides real-time dashboards and analytics utilizing application data, as well as information originating from data warehouses.
- Oracle XML Publisher enables Microsoft Office documents to be used to create report templates as well as provides the creation of reports in Microsoft Office document formats.

Identity Information Provisioning and Alerting

Many business users need the ability to see up-to-date information about employees and business contacts, such as from a Sales Force Automation or HRMS Applications, integrated with their Outlook contacts. Similarly, they need to know when changes in the organization take place, such as when changes in an employee’s role and associated privileges, organizational moves and so on take place.

- Oracle Identity Management enables the syncing of contacts/identities between Active Directory, which is the store for Exchange contacts, and contact information maintained in enterprise applications.
- Oracle Xellerate Identity Provisioning provides support for Microsoft Exchange as well as Active Directory. In addition, it can capture changes in user in order to provide notification and audit trails.

- Oracle BPEL Process Manager can be used in conjunction with Oracle Identity Management to provide additional workflow and alerting capabilities about managing identities and contact information.

In Context Web Info Access and Enterprise Portal Launch

In many situations, a user might be in the midst of reviewing an Microsoft Office 2003 document, or reading an email in Microsoft Outlook 2003, when there is a need to get additional information from an enterprise source. An example of this might, an account manager receiving an email about a critical customer, who needs to know that status of all outstanding customer support calls. Microsoft Office 2003 Smart Documents along with application functionality exposed through web services makes this in-context information access possible.

- Web Services provided by enterprise applications enabled by Oracle JDeveloper, and potentially Oracle BPEL Process Manager, are all accessible by Microsoft Office Smart Document features – Research Task Pane, Smart Tag.
- The Research Task Pane capability in all Microsoft Office 2003 Documents/Outlook can be easily subscribed to Web Services exposed by Oracle Fusion Middleware. So therefore, highlighting the customer’s name in the received email, right-clicking, and selecting the Customer Support Status web service, could then return a list of all outstanding support calls.
- Smart Tags enables going one step further. Specific patterns and items can automatically be flagged as a highlighted item. Selecting this highlighted item would then directly invoke a web service, access a Portal page, or even launch a BAM dashboard.

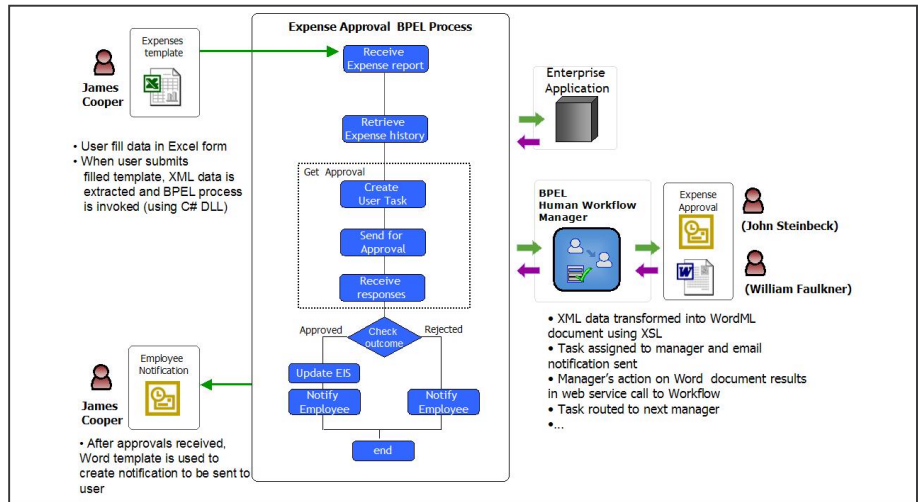


Figure 3: Microsoft Office Documents Driving Business Processes/Workflow using Oracle BPEL Process Manager

Sample Scenario Integrating Microsoft Office into a Business Process/Workflow along with Enterprise Applications

Such a scenario, as pictured in Figure 3, involves Microsoft Office 2003 and Oracle Fusion Middleware in the following ways.

- *Using a Microsoft Office Document to initiate the process* – In this case, a Smart Document was used leveraging an embedded Web Service that initiates an Oracle BPEL PM process when the user clicks submit. In this case, the information entered by the user was packaged into the web service call, and passed to Oracle BPEL Process Manager. Alternatively, a “dumb” document could have been used and submitted through email to Oracle BPEL Process Manager. In that case, the document would have been parsed for the necessary information; the document itself could also be carried along as an attachment.
- *Workflow and Approvals* – Oracle BPEL PM then routes the request to the appropriate people in the organization for approval, and can deliver the approval request in Microsoft Office format as well into their Microsoft Outlook inboxes.
- *Interacting with Enterprise Applications* – At various points in the process, data is requested from, or submitted to one or more Enterprise Applications that appropriate processes the transaction.

CONCLUSION

Oracle Fusion Middleware provides extensive support for Microsoft products and technology in each of their major product categories:

- *Microsoft Windows Platform*: Maximizing performance and scalability on these platforms along with effectively leveraging associated capabilities such as Microsoft IIS, Microsoft Active Directory, Microsoft Cluster Services and Network Load Balancing, and Microsoft Operations Manager
- *Microsoft .Net and Window Server System Products*: Effectively working with applications built using .Net and Web Services, as well as products such as Microsoft BizTalk, Microsoft SharePoint, etc to create an enterprise-wide Service-Oriented Architecture (SOA).
- *Microsoft Office*: Enabling the effective utilization of Microsoft Office – Word, Excel, PowerPoint, Outlook, InfoPath –with enterprise applications, Web Services, and custom applications for users and scenarios where there are benefits of using Microsoft Office in the context of enterprise applications and solutions.

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

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