How to Integrate Enterprise Applications Into Your Portal

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# How to Integrate Enterprise Applications Into Your Portal

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EXECUTIVE OVERVIEW

As enterprise applications evolved from a client/server to an Internet computing architecture and rapidly grew in complexity, many information technology departments deployed enterprise applications using a fragmented, piecemeal middleware infrastructure. The resulting middleware complexity represents nearly 50% of the information technology costs in organizations today. Further, 60% of organizations consider their enterprise application infrastructure an impediment to their ability to meet business requirements. Enterprises are also evolving their applications from being monolithic, closed systems to being modular, open systems with well-defined interfaces. This new application architecture, called service-oriented architecture, represents a fundamental shift in the way new applications are being designed and developed, and the way in which they are being integrated with existing legacy systems and business applications.

To solve the challenge of middleware complexity, Oracle has evolved its Application Server into an entirely new class of systems known as an Application Platform Suite (APS); a comprehensive and integrated enterprise application infrastructure.
Enterprise portals are specifically designed to be the single source of interaction with corporate information and the focal point for conducting day-to-day business. Portals are also becoming a key component of any Business Process Management (BPM), Enterprise Application Integration (EAI), and Business Activity Monitoring (BAM) initiative, as they represent the easiest way to present people with intelligent, relevant, and personalized information. Oracle Application Server Portal (Oracle Portal) 10g leverages the complete web services, J2EE and application & process integration foundation of Oracle Application Server (Oracle) 10g to deliver an enterprise class portal solution that connects employees, customers, and partners securely in a role-based manner.

This paper describes multiple ways of integrating your enterprise applications with Oracle Portal 10g. This paper also describes how Oracle Portal 10g can be used to visualize your business processes.

INTRODUCTION

Enterprises often use heterogeneous solutions to run their business. A typical enterprise environment could include Oracle E-Business Suite for financial and order management; Siebel for customer relationship management (CRM); SAP for inventory management; and PeopleSoft for Human Resources, with business processes running across these multiple applications. Such an Enterprise Information System (EIS) topology tends to decrease user productivity. Users must now remember multiple logins, one for each application, and must become conversant with different platforms. For example, the work environment may well include client-server applications that use a Windows user interface, Web-based applications, as well as character mode applications executed in an emulator window.
The challenge for every enterprise is to eliminate these obstacles to improve productivity and stay competitive. As the de facto gateway to information access and management, enterprise portals are the best place to integrate enterprise applications and provide a productive and complete environment to users.

Single sign-on (SSO) is one of the core services provided by an enterprise portal. With SSO, users log in once to access multiple applications. This functionality is particularly important in three contexts:

- The integration of enterprise applications into the portal
- The retrieval of personalized data from the application using the end user profile
- The authorization of end users to directly launch applications from the portal as needed

It is also possible to use a portal page and integrated data to present information in a way that helps users drive their businesses. For example, a single portal page can display the inventory quantity of an item from SAP and statistics about how the customers order it from Oracle E-Business Suite. These two pieces of information can help marketing change the pricing to bump the sale of the item. Portal enables users to aggregate the data from different systems and transform it into business intelligence.

Oracle Portal 10g provides pre-built solution to integrate with Oracle E-Business Suite and SAP R/3 applications. It also provides a combination of declarative and programmatic solutions to achieve application and process integration.

**ORACLE PORTAL 10G AND ENTERPRISE APPLICATION INTEGRATION**

**Pre-Built Integration**

One way to integrate enterprise applications into Oracle Portal 10g is to use Portal in conjunction with the Oracle Single Sign-On Server (SSO) and pre-built portlets.

**ORACLE E-BUSINESS SUITE INTEGRATION**

Oracle E-Business Suite integration with Oracle Portal 10g is achieved through the implementation of SSO. SSO is used to access both the portal and the Oracle E-Business Suite. Once SSO is implemented, users log in to the portal and access Oracle E-Business Suite modules from the portal, without the need for additional logins. Oracle E-Business Suite provides a number of portlets and pre-built portal pages to create a personalized end user portal based on end user responsibility.

Some of the available portlets are listed below:
NAVIGATOR PORTLET
The Navigator portlet allows Oracle E-Business Suite users to navigate to their responsibilities and menus and launch any functions they have access to.

Applications Navigator
- Application Developer Common Modules
- Balanced Scorecard DBI
- Balanced Scorecard Manager
- Budget User - CEO, Vision Operations
- Business Intelligence Administrator
- Catalog Manager
- Chief Executive Officer
- Chief Executive Officer DBI

FAVORITES PORTLET
The Favorites portlet allows users to add any Oracle E-Business Suite function they have access to, as well as any internal or external URLs, to a list of favorites.

Favorites     Customise
- Custom Portal
- Contract Savings Workbook
- Performance Scorecard Viewer
- Performance Management Designer
- Performance Measures

WORKLIST PORTLET
The Worklist portlet provides a single point of interface for accessing any workflow notifications generated by any of the application modules in the Oracle E-Business Suite. Examples include expense report approvals, as well as business intelligence performance exception notifications.

My Worklist

<table>
<thead>
<tr>
<th>From Subject</th>
<th>Sent</th>
<th>Due Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Profit and Loss by Manager</td>
<td>30 Apr 2004</td>
<td>Normal</td>
</tr>
<tr>
<td>03-Jun-04 17:09 Eastern Test: Quote Management</td>
<td>02 Jun 2004</td>
<td>Normal</td>
</tr>
<tr>
<td>Sales Management Page (TFS)</td>
<td>02 Jun 2004</td>
<td>Normal</td>
</tr>
<tr>
<td>Feedback: Profit and Loss</td>
<td>01 Apr 2004</td>
<td>Normal</td>
</tr>
<tr>
<td>Feedback: Expense Management</td>
<td>30 Apr 2004</td>
<td>Normal</td>
</tr>
</tbody>
</table>

DAILY BUSINESS INTELLIGENCE (DBI) LIST OF PAGES PORTLET
The DBI List of Pages Portlet lists all the DBI Overview Pages a given user has access to. Leveraging Single Sign-on, users can easily navigate directly to any of their DBI Overview Pages.
BALANCE SCORECARD CUSTOM VIEW PORTLET

The Custom View Portlet enables customers to design highly graphical scorecard portlets by importing gif or jpg images as the background, then adding key performance indicator dynamic color alarm icons on top of them. Users can drill from the Custom Scorecard View Portlet to KPI drill-down reports to perform additional analysis.

BALANCE SCORECARD KPI GRAPH PORTLET

The KPI Graph Portlet enables users to select a specific Key Performance Indicator to display in a graphical format:
BALANCE SCORECARD KPI LIST PORTLET

The KPI List Portlet enables users to select specific KPIs from a scorecard to display in a list, which shows the color alarm icons next to the KPIs. This portlet also supports an option to display the actual and planned performance for each KPI.

<table>
<thead>
<tr>
<th>List of Indicators Portlet</th>
<th>Customize</th>
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<tr>
<td>Vision Gross Profit Strategy</td>
<td></td>
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<tr>
<td>1. Control Purchasing Expenses</td>
<td></td>
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<tr>
<td>Vision Enterprises</td>
<td></td>
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<tr>
<td>X Return on Equity</td>
<td></td>
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<tr>
<td>2. Increase Operating Margin</td>
<td></td>
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<tr>
<td>X Increase Average Sales per Customer</td>
<td></td>
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<tr>
<td>X Improve Sales Productivity</td>
<td></td>
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<tr>
<td>1. Optimize Leads Generation</td>
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ORACLE PORTAL PARTNER INTEGRATION

Oracle Portal enjoys a diversified network of partners that offer pre-built integration with standard applications. For more information, visit http://www.oracle.com/technology/products/ias/portal/partner_initiative.html

CREATE PORTLETS FOR ENTERPRISE APPLICATION INTEGRATION

Integration that is based on pre-built portlets is not necessarily sufficient to respond to all user requirements. Portal users may need to access systems that do not have any portlets, or users may want a more customized view of their application. Oracle Portal 10g provides a choice of tools and technology that empowers developers and business users to build quick integration with an enterprise application. Business users can use declarative tools such as OmniPortlet and Web Clipping, while developers can benefit from Oracle Portal Development Kit (PDK) Java and Oracle Application Development Framework (ADF) for portlet development. PDK Java and the tools for declarative portlet development are J2EE compliant, which means that portlet developers can leverage any J2EE service in their portlet.

DECLARATIVE INTEGRATION

The OmniPortlet and Web Clipping portlets empower business users to connect to or reuse enterprise application data through declarative user interfaces.

INTEGRATE EXISTING WEB APPLICATION USING WEB CLIPPING

Since many enterprise applications are now Web based, the information users need is often already accessible from the browser. The challenge is to leverage the existing application by exposing it as a portlet within your portal.
The Web Clipping portlet offers an easy, intuitive way to capture content from existing web applications and present it as a portlet. The page designer and the end user can create new portlets based on “clippings” from their browsers, without any help from their IT department. “Clippings” are pieces of existing web content that can be re-purposed in other web pages, particularly portals. The Web Clipping portlet is packaged in the Portal Tools application, which is downloadable for free from Portal Studio (http://portalstudio.oracle.com).

Page designers use Web Clipping Studio to edit the portlet. The studio assists with navigating to a web page, dividing the page into “clipped” sections, and choosing the appropriate section for presentation in the portal. Behind the scenes, the studio records all the URLs in a secured repository and “replays” the navigation portlet when the portlet is showed on the portal page.

The basic flow of using the Web Clipping portlet to capture a page is showed in the next figure:

1. Browse to the Web page
2. Choose the clipping
3. Web Clipping Portlet

INTEGRATE EXISTING APPLICATION DATA/FUNCTIONALITY USING OMNIPORETL

OmniPortlet is another declarative tool for building portlets. Page designers can use OmniPortlet to build portlets from any data source and publish the data in various layouts. An OmniPortlet can be based on almost any kind of data source, including Web Services, XML, database (JDBC), spreadsheet (CSV), an existing web application or SAP R/3 application. To retrieve personalized data, the page designer defines the parameters for each type of data source to filter the result of a query and the credential information that is used to access secured data. Out-of-the-box, OmniPortlet provides the most common layouts for portlets: tabular,
chart, news, bullet, and form. The following image illustrates an Oracle Portal page with different OmniPortlet layouts:

![Oracle Portal Page Layouts](image)

The OmniPortlet wizard guides users through:

- Selecting the type of data
- Configuring the data source
- Setting filters and sort criteria (optional)
- Setting the view and layout

For each data source, the OmniPortlet wizard assists the user with entering specific configuration information. OmniPortlet leverages end user connection information to retrieve personalized and secured data. OmniPortlet data sources are pre-configured to use portal page parameters. This enables page designers to render contextual data from any data source.

**SAP R/3 INTEGRATION**

Oracle Portal 10g provides the ability to integrate with the SAP R/3 system using a declarative mechanism called the SAP Data Source for OmniPortlet. With the SAP Data Source, business users can do the following:
• Build a number of SAP portlets quickly using a simple yet powerful browser-based wizard called OmniPortlet:

- Search any SAP BAPI (Business Application Programming Interface) in the SAP Business Objects Repository:

- Define appropriate input and output parameters for the selected BAPI function module:
• Specify filtering criteria on the retrieved result set and choose an appropriate visualization for the retrieved results:

Oracle Portal 10g also provides a set of pre-defined portlets to integrate SAP R/3. The current version of the SAP provider contains portlets from different areas:

• Human Resources portlets assist users with searching for employee details, payroll, and attendance.

• Sales portlets assist users with consulting and checking the status of customer orders.

• Inventory Management portlets assist users with mining material inventory for useful data, such as the location of material or its counted value.

• Exchange Rate portlets, from the basis technology SAP component, assist users with consulting different exchange rates for specific currency and time periods.

• A generic portlet that assists users with displaying SAP Application information in a portlet by entering any SAP BAPI and corresponding Table/Columns to be rendered.

The SAP Data Source, as well as the portlets use a Java-based SAP-proprietary technology called SAP Java Connector (JCo) to connect the portlet provider to the SAP system. SAP JCo is freely available from SAP. To use it, SAP JCo must be installed on the application server that hosts the SAP Web Provider. The Oracle SAP Web Provider is downloadable from Portal Center on OTN (http://portalcenter.oracle.com). You’ll find it under the Software Downloads / Portal Integration Solutions section. The provider is also available under an open source license that permits portlet developers to modify or reuse the source to build new portlets.
PROGRAMMATIC INTEGRATION

A major challenge for portlet developers is defining connectivity between the portal and third-party applications. OracleAS Integration allows standards based connectivity to backend applications using J2EE Connector Architecture and web services. Portlet developers can implement their point solutions based on this connectivity, or use an EIS-specific proprietary API.

OracleAS Adapter Architecture offers connectivity to more than 200 information systems using standard methods: J2EE Connector Architecture and web service interfaces. An EAI solution in a portal can be built using the OracleAS Adapter architecture through the following sequence of steps:

- Business user browses through the OracleAS Adapter Explorer in Oracle JDeveloper (or through thin client) and creates a web service for the selected business method:
- Portlet (or J2EE developer) creates client stubs for the generated web service using Oracle JDeveloper:

- Portlet developer creates provider and portlet skeleton using the portlet wizard in Oracle JDeveloper:
• Portlet developer adds a few lines of code to make a call to the client stub from the portlet JSP (or Java class):

```java
// Call to client stub
Stub stub = ...;  // Construct stub
stub.someMethod();  // Call method
```

• Page designer deploys the portlet to a portal page:

In JDeveloper 10.1.2, steps 2-4 are completely declarative. A data control could be created on the web service and dropped onto the view page.

Enterprise application vendors sometimes provide programmatic access to their systems through proprietary Java APIs. These APIs can be used in any J2EE application (such as a portlet) to invoke the application functionality. SAP Data
Source and SAP pre-built portlets have been built on top of SAP Java Connector (JCo), a proprietary Java API.

**ORACLE PORTAL 10G AND PROCESS INTEGRATION**

Most business processes incorporate user interactions at many levels, such as initiating a process, inspecting the state of processes, approving tasks in your worklist, and handling exceptions. To meet these objectives, enterprises have ended up creating custom dashboards that could be standalone applications built on proprietary architecture. All the Business Process Monitoring (BPM) and Business Activity Monitoring (BAM) reporting that was done via standalone business dashboards can be done through user specific customized views from Oracle Portal 10g. Enterprises can create portlets to display worklist, notifications, alerts, and KPIs, by pulling this information from the OracleAS Integration layer.

**COMPOSITE APPLICATIONS AND BPEL**

Web Services are changing the economies of integration. Just as standards like SQL revolutionized access to structured data, and HTTP standardized access to web content and applications, so Web Services have the potential to transform the Internet into a distributed computing platform where heterogeneous systems cooperate in a simple and reliable way.

There is, of course, one key question: How can all these services work together in a heterogeneous, networked environment? The answer is *Business Process Execution Language for Web Services (BPEL)*. BPEL provides a standard, portable language for orchestrating services (not just Web Services) into end-to-end business processes,
and builds upon a decade of progress in the areas of business process management, workflow, and integration technologies.

From a technical perspective, BPEL offers a standard language for defining how to:

- Send XML messages to remote services
- Manipulate XML data structures
- Receive XML messages asynchronously from remote services
- Manage events and exceptions
- Define parallel sequences of execution
- Undo parts of processes when exceptions occur.

Oracle offers the industry’s first BPEL 1.1 compliant business process management engine. Business processes modeled using Oracle BPEL Designer (available with JDeveloper 10.1.2) can be visualized in Oracle Portal 10g.

**BPEL INTEGRATION WITH ORACLE PORTAL 10G – AN EXAMPLE**

To visualize how Oracle Portal will play a role in the business process environment, let's consider a real-world example. Suppose there is an order management process at a large hardware manufacturer. This manufacturer accepts wholesale orders from many different sources and responds immediately with an order tracking number, but has a long running flow in the back end to process and track the order and call the client back when an invoice is ready. As shown in this figure, this flow needs to invoke synchronous services, such as looking up payment terms in an Oracle Financials package, as well as asynchronous services, such as submitting the order to a mainframe system, which will compute the invoice as part of a batch process. Such a process can be modeled using the Oracle BPEL Designer.
Modeling the process is just the first step. Custom views are also needed so that users can participate in the business process. Such views are best implemented in the portal context. In the example above, the manufacturer must process millions of these transactions a day at peak loads: tracking them, reporting on them, and handling exceptions, notifications, and manual-processing steps as needed, all of which can be done through the portal interface as follows:

Web Services for Remote Portlets (WSRP) standard enables portals to support user interactions in these business processes in a standardized way. Java Portlet API (JSR 168) has further standardized the way one can create these views from a Java environment and Oracle Portal supports both these standards. For example, to create a portlet that issues material requests into the SAP system, you could use the JSR 168 API to custom develop a standards-compliant portlet which will run in any standards-compliant portlet container. Alternatively, you could also use the Oracle Java Portlet Development Kit (JPDK) to create Oracle Portal 10g-specific portlets.

CONCLUSION

Oracle Portal 10g delivers personalized, role-based access to relevant business applications and processes. Built on the solid foundation of the OracleAS Integration platform, Oracle Portal 10g can integrate with the backend enterprise applications using standard interfaces, including Web Services and the J2EE
Connector Architecture. It also provides a rich set of tools that empower the business user and portlet/Java developer to build custom integration.

Businesses and people that work together need their applications and services to work together as well. This is driving the industry move to Web Services and BPEL, which promise significant benefits in terms of adaptability, ease-of-integration, portability, and interoperability. Oracle Portal 10g leverages the strength of Oracle BPEL platform to connect employees, customers, and partners to their business processes in a unified way.