

An Oracle White Paper
April 2010

Oracle PeopleSoft Applications and Oracle Fusion Middleware

Disclaimer

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

[

Executive Overview	1
Fusion Middleware for PeopleSoft Applications	1
Improving Security and Management of the Platform on which PeopleSoft Applications Run	3
Improving Security Within an Applications Infrastructure	3
Access Manager	3
Provide Behavioral Analysis on All Access Attempts to the System3 Advantage of Using Identity Manager	4
Federate with Business Partners as Result of Acquisition	4
PeopleSoft and Oracle Identity Management Case Study	5
Oracle Enterprise Manager Plug-in for PeopleSoft	6
System Management: Case Study	8
Improve the Productivity of the User Interface with WebCenter and Application Development Framework (ADF)	8
WebCenter as a Portal	9
WebCenter Services with PeopleSoft	9
WebCenter Spaces	11
Creating a Custom UI with Oracle Application Development Framework11	
Creating a Mobile Front End with ADF.....	13
Improve the Way PeopleSoft Applications Integrate with Other Applications	14
PeopleSoft Integration	14
FMW Complementary Technology	14
Oracle Service Bus	15
Oracle Business Rules	16
External Orchestration with BPEL.....	16
Technology Adaptors.....	16
BAM	17
Case Study: Using SOA Suite components to automate a business process	17

Application Integration Architecture (AIA)	18
Improve the Knowledge Extracted and Analyzed by PeopleSoft Applications	19
Pervasive Business Intelligence and Decision Support.....	19
BI Applications.....	20
Case Study: Improved Financial Insight.....	21
Oracle Content Management for PeopleSoft	21
PeopleSoft Financial Management	21
End-to-end Accounts Payable processing automation—from receipt to payment	22
PeopleSoft Human Capital Management.....	25
Oracle Fusion Middleware	28
Summary.....	29
Where to go for More Information	29
Appendix A: Fusion Middleware for PeopleSoft Certification	30

Executive Overview

At first glance, the proprietary nature of PeopleSoft applications might indicate that little or no advantage can be gained outside of the delivered PeopleSoft technology. That is far from the truth. There are significant advantages to leveraging Fusion Middleware with PeopleSoft applications that can improve the way PeopleSoft applications interface with other applications, improve system security and the platform that PeopleSoft applications run in, and even enhance the overall application user experience. This white paper describes advantages that PeopleSoft applications can gain by using Oracle Fusion Middleware and gives examples of how current customers are getting more from their applications.

Fusion Middleware for PeopleSoft Applications

One of the strengths of PeopleSoft applications is that they not only provide application functionality, but they run on a self-contained enterprise platform. PeopleTools, the enterprise platform, provides the basic infrastructure needs such as security, reporting, integration, user interface, and even web2.0 content. For many customers, that is sufficient.

PeopleSoft incorporates Oracle Fusion Middleware at every tier to provide a platform of agility, stability and scalability.

Changing markets, increased competitive global pressures, and evolving customer needs place demands on the business that push the capabilities that PeopleSoft provides with PeopleTools to the limits. Where do you go when you want to link PeopleSoft applications to a common enterprise security policy? Or when you want PeopleSoft applications to participate as part of a larger automated business process? Or want access to part of a PeopleSoft application on a composite UI platform? All of these questions and many more are answered by supplementing PeopleSoft applications with Oracle Fusion Middleware.

Since its launch over 10 years ago, Fusion Middleware has garnered over 90,000 customers. It is the most advanced enterprise application platform on the market and PeopleSoft applications are ready and certified to leverage its benefits. The suite of technology available with Fusion Middleware can improve PeopleSoft applications in four areas, improving the productivity of the user interface, improving the way PeopleSoft applications communicate with other applications, improving the knowledge that can be

extracted and leveraged from PeopleSoft applications, and improving security and management of the platform on which PeopleSoft applications run.

This white paper will help you understand how you can use Oracle Fusion Middleware to get more from your PeopleSoft application.

Improving Security and Management of the Platform on which PeopleSoft Applications Run

Improving Security in an Applications Infrastructure

Oracle Identity Management allows enterprises to manage end-to-end lifecycle of user identities across all enterprise resources both within and beyond the firewall.

PeopleSoft has traditionally relied on the partner ecosystem to extend the security model as the user population grew from the core of relatively sophisticated users in a tightly controlled environment to the universe of users that most organizations now support.

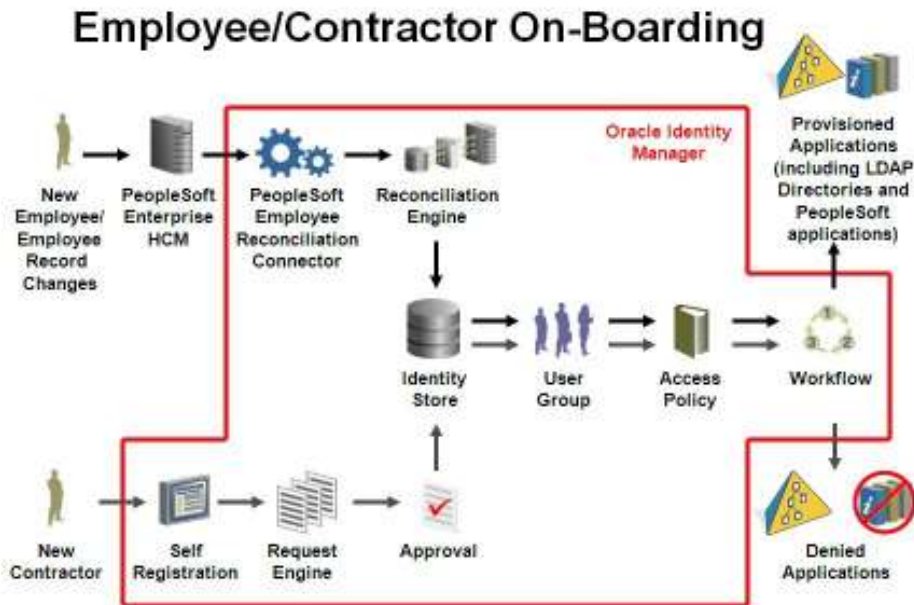
Oracle Identity Management suite provides the means of establishing a secure by default environment. Certification of PeopleSoft applications with the suite of products within Oracle's Identity Management allows PeopleSoft customers to take full advantage of the high degree of security available today.

Access Manager

Oracle Access Manager provides seamless policy-managed access to protected resources across the enterprise, traditionally referred to as Single SignOn (SSO). Users are challenged once during initial sign-on and can thereafter access any system they are authorized to access without repeating the sign-on process. Policy-managed access means that users' use of resources can be managed centrally. Oracle Access Manager has the additional benefits of stronger passwords, integration with two-factor authentication systems, and reducing the impact of forgotten passwords on an organization's help desk. Access auditing and reporting are also available.

Provide Behavioral Analysis on All Access Attempts to the System

Another product in Oracle's suite of access management products is Oracle Adaptive Access Manager (OAAM). OAAM provides risk-based evaluation and real-time fraudulent access blocking and also provides alerting features. OAAM can identify abusive or compromised credentials by inference. One of the features is geographical analysis of access attempts. For instance, OAAM will provide an alert when a user accesses the system from one location and shortly afterward attempts access from a different location many miles away.



Advantage of Using Identity Manager

Oracle Identity Manager (OIM) is the identity lifecycle and resource provisioning product within the Identity Management product family. Resource provisioning can be as simple as creating a user account in a protected resource, for example, an email account on the corporate mail server. OIM provides this and many additional features.

OIM is particularly valuable in an environment in which PeopleSoft is the main source of truth for a broad population of users, employees, temporary workers, and other persons of interest. In a typical PeopleSoft multi-application environment, each application administrator may have their own view of what rights each user or department member should have. This is often established by email chain and can be especially difficult to reconcile during an audit, or for regulatory compliance requests.

OIM manages a holistic view of the organization and what rights any user has across the organization. It includes multi-level approval workflows and comprehensive reporting capabilities. One OIM customer recently faced an audit issue that required them to produce a monthly listing of all users, the resources they had access to, and a justification for the permitted access. Prior to implementing OIM, this was a time-consuming exercise at the end of each month involving multiple personnel reconciling multiple spreadsheet lists. Oracle Identity Management provides this type of reporting out of the box.

Federate with Business Partners as Result of Acquisition

It is common when organizations come together through partnership, merger, or acquisition that each entity maintains a separate User Access Management system. Often, these systems are incompatible or extremely costly to integrate seamlessly. The most effective approach to managing a multiple domain SSO is through the use of federated identity systems.

Oracle Identity Federation provides integrations with single sign-on and access management systems, including Oracle Access Manager (OAM), and can facilitate seamless sign-on and robust signoff across multiple domains and enterprise systems. Customers can take advantage of this powerful product to employ a rich and secure sign-on solution across multiple PeopleSoft and non-PeopleSoft applications environments.

PeopleSoft and Oracle Identity Management Case Study

In fiscal year 2007–2008, a major east coast city government contracted Oracle Identity Management consultants, major auditors, and independent security consultants to assess the city's various MIS environments. One of the focused areas was the current life cycle of user identities across the enterprise and the existence of data security controls on the city's user account repositories. The findings developed two sets of goals:

1. To provide a single sign-on solution that will streamline the account life cycle by providing an automated provisioning solution along with improvements of the current authentication and authorization methods.
2. To establish a security and risk management strategy that provides controls that will satisfy regulatory compliance requirements. The solution needed to safeguard the privacy data of city residents and employees found in the various user account repositories and applications managed by the city's MIS teams.

The city implemented an integrated PeopleSoft/Oracle Identity Management solution that addressed their tactical need to automatically provision application accounts and to better manage and control application access.

Oracle Identity Management provides the city a centrally managed LDAP directory integrated with PeopleSoft HCM for automated account provisioning. This system provides direct access controls to the PeopleSoft Portal and Self-Service resources. In addition, the system is being enhanced to provide real-time access changes across multiple systems when an employee changes status or role via integration with Oracle Virtual Directory; integrate automated account provisioning and password synchronization for Windows desktop logins via Oracle Active Directory and provide attestation and recertification for nonemployee and service accounts.

This customer has seen significant benefits in this phase of the implementation, eliminating inefficient manual processes and costly in-house systems. By choosing the Oracle suite of Security and Application products they are able to rely on the collaborative

development between the Oracle internal teams without being concerned with integration issues and product mismatches between multiple vendor products.

Oracle Enterprise Manager Plug-in for PeopleSoft

Oracle Enterprise Manager Plug-in for PeopleSoft is a single tool to manage and monitor your PeopleSoft applications.

IT organizations constantly battle two competing objectives—keeping pace with rapid evolutions in business and technology while simultaneously controlling costs. Effectively achieving these goals requires solutions that simplify and lower the cost of managing systems and

applications. Oracle Enterprise Manager is one such tool that provides a single, integrated solution for resolving these problems in today's complex IT environments. Along with its ability to manage Oracle Database and Fusion Middleware environments, Enterprise Manager also enables you to manage and monitor your PeopleSoft applications and other non-Oracle technologies; all at a reduced cost.

Historically, the management of PeopleSoft applications has been done via the PSAdmin command line utility.

```

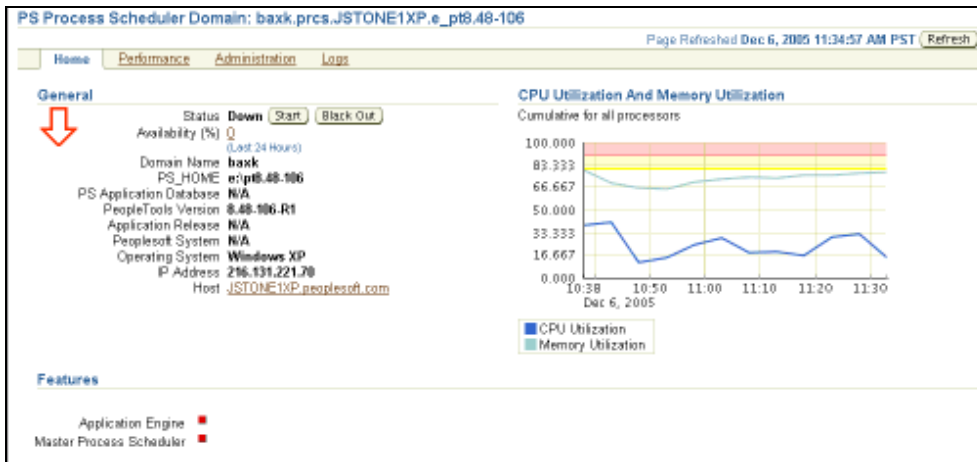
C:\PT8.44\appserv\psadmin.exe
PSADMIN -- Tools Release: 8.44
Copyright (c) 1988-2003 PeopleSoft, Inc. All Rights Reserved.
-----
PeopleSoft Server Administration
-----
1) Application Server
2) Process Scheduler
3) Service Setup
q) Quit

Command to execute <1-3, q>:

```

While the PSAdmin utility supports all system management needs, many system administrators balk at the command-line interface and the PeopleSoft-specific administration processes. Customers often create custom scripts to execute PSAdmin tasks. This approach reduces the manual burden but also introduces a new layer of complexity to PeopleSoft system management.

With Oracle Enterprise Manager, system administrators can manage all aspects of their PeopleSoft environments from a single internet browser window.



In addition to simplifying and streamlining the administration process, Enterprise Manager also provides additional capabilities that supply new levels of insight into the PeopleSoft system to help administrators and IT staff. These additional capabilities include:

- **Advanced Configuration Management.** Configuration management is much more user friendly with a metadata driven user interface that guides the administrator as configuration attributes are defined.
- **Centralized Log Management Capabilities.** Administrators can quickly view log files based on a chosen target with the option of searching, viewing, or exporting them to the local machine. Logs can be purged or archived either individually or via a scheduled job on an administrator-defined interval.
- **System Level Management Capabilities.** The Application Management Pack can automatically create a graphical topology display of a PeopleSoft environment that clearly displays the relationships between the various PeopleSoft targets. Context-sensitive actions can also be performed on specific targets from within the topology viewer to help streamline management tasks.
- **Service Level Management.** Through Service Level management, administrators can monitor services from the end users' perspective using service tests or synthetic transactions, model relationships between services, and underlying IT components, and report on achieved service levels.

Oracle Enterprise Manager is the most complete and robust solution for managing PeopleSoft environments. It provides the richest and most comprehensive monitoring and management solution for the Oracle components—from Oracle Database instances to Oracle Real Application Clusters to Fusion Middleware and PeopleSoft applications. In addition, to support the wide variety of applications built on non-Oracle platforms, Enterprise Manager continues to expand its monitoring scope by offering management plug-ins for non-Oracle components, such as third-party databases, third-party

middleware, storage, and network devices—thus providing Oracle customers a single integrated management and monitoring solution.

System Management: Case Study

System availability and performance are critical to the success of any PeopleSoft application. IT cannot rely on end users to report slow system performance or system down scenarios. These are events that should be discovered and reported quickly so that proper responses can be enacted.

A typical scenario that Oracle Enterprise Manager supports is the ability to create service scripts that simulate an end user signing in to the PeopleSoft system and performing common tasks within the application. A system administrator schedules these scripts to run on a periodic basis and generate an alert if the script does not run correctly or any steps within the script don't meet predefined performance criteria. In this manner, system unavailability or performance problems are identified proactively rather than relying on a call from end users.

This proactive approach to system availability and performance is the type of system management that is needed to maximize the value of a PeopleSoft application. The benefit is better insight and faster performance or downtime resolution for your PeopleSoft applications.

Improve the Productivity of the User Interface with WebCenter and Application Development Framework (ADF)

Oracle WebCenter Suite 11g is the industry's most comprehensive enterprise portal platform designed for business users and IT, and unified with business applications, Enterprise 2.0 services, and social communities.

Oracle WebCenter Suite is an open manageable portal platform that integrates Enterprise 2.0 capabilities inside a composite portal framework. With it, all types of portals, web sites, and composite applications can be assembled. It is designed to enable business users to evolve these applications as business requirements change.

WebCenter Suite consists of a set of tools and out-of-the-box solutions that empower business users and IT to build and deploy next-generation applications. The technology lets users build rich web applications, integrate Web 2.0 services into applications, and collaborate as workgroups.

There are three different ways that PeopleSoft applications can take advantage of WebCenter technology. The first is using WebCenter Framework as an enterprise portal that consumes portlets from PeopleSoft; the second is leveraging WebCenter Services through the PeopleSoft Related Content Framework (PeopleTools 8.50 and later), and the third is through the use of WebCenter Spaces.

WebCenter as a Portal

WebCenter Framework is a next-generation design-time extension that breaks down the boundaries between Web-based portals and enterprise applications. It integrates capabilities historically included in portal products directly into the development environment, such as the capability to bind portlets and customize applications at runtime.

Customizing applications is easy for both IT and business users. Oracle Composer enables business users to edit application pages on the fly after the application and portal are deployed.

PeopleSoft offers a portal that consolidates access to PeopleSoft applications across PeopleSoft pillars. This is a viable portal product and is used by many customers to improve productivity with their PeopleSoft applications. Customers who replace the PeopleSoft Portal with WebCenter portal are those who have extensive requirements aggregating content from multiple applications and varied sources. In those cases, WebCenter is the recommended portal solution.

WebCenter Services with PeopleSoft

PeopleSoft provides a rich set of Enterprise 2.0 capabilities, including portals, application home pages, collaborative workspaces, Application Home Pages, Collaborative Workspaces, and the Related Content Framework, that enable mashing up almost any related information in the context of PeopleSoft application pages. These capabilities include blogs, wikis, discussion forums, tagging, group calendaring, and many other functions that enable you to provide Enterprise 2.0 capabilities throughout your PeopleSoft system.

The existing PeopleSoft Enterprise 2.0 services work well within the context and scope of PeopleSoft applications. They are built and delivered as part of the PeopleSoft Enterprise platform so that they are only applicable only to PeopleSoft applications. Each of these is a powerful addition to a PeopleSoft application and, because since it is delivered with the tool, is easy deploy and use.

Oracle WebCenter social computing services include a complete set of Enterprise 2.0 services that can be embedded into applications built build with Oracle WebCenter Framework or that can be accessed through the PeopleSoft Related Content Framework. Many of these services overlap functionally with those provided in the PeopleSoft applications, such as wikis, blogs, discussions, and tags. If you are using these types of services only within your PeopleSoft environment, then you may consider using the PeopleSoft provided Enterprise 2.0 services. However, if your needs require these types of services to be shared across varied applications, you should consider using WebCenter collaborative services.

Although PeopleSoft provides a rich set of collaborative tools, there are some features it doesn't provide. An example of this is social networking applications. Imagine the power of a social network application such as Facebook that is integrated into your enterprise but with enterprise-level security and management. WebCenter offers the PeopleConnections application, which enables customers to embed social networking services in their applications, portals, or workspaces.

With this, your employees can build a network of colleagues for collaboration on common projects, and purposes. It is social networking for enterprise activities:

- It enables building a network of colleagues to share information and collaborate on projects more effectively.
- It offers enterprise-grade security—networking inside the firewall.
- It improves sharing and collaboration throughout the enterprise.



WebCenter Spaces

Oracle WebCenter Spaces is an application that lets business users to create business communities out of Business Services and WebCenter services. Users can quickly and efficiently manage their tasks, content, projects, and people without requiring IT assistance. It enables allows workers to work more effectively with project teams and work groups, including teams that span geographic areas.

Personal Spaces are personal work areas for users to efficiently organize relevant resources for the individual. A user can create a personal space that changes the way they use PeopleSoft applications. The workspace can be a productive desktop with appropriate access to enterprise applications, reference information, and Web web2.0 services all in one place.

Integrating PeopleSoft applications into WebCenter spaces is as easy as providing and consuming a portlet from a PeopleSoft system. Portlets can be added to any WebCenter space to provide valuable enterprise access. For more embedded functionality, advanced UIs built out of Application Development Framework can be developed and leveraged in WebCenter spaces.

Creating a Custom UI with Oracle Application Development Framework

Enhancing PeopleSoft applications with custom user interfaces is a very common task with PeopleSoft applications. Sometimes enhancements are simple modifications to existing user interfaces to add business function. Sometimes new components and pages are built to provide new process flows. Both are managed well through existing PeopleTools capabilities and leverage the life-cycle management tools. But there are cases in which the user interface generated by PeopleTools components and pages just isn't enough.

Oracle ADF is an end-to-end Java EE framework that simplifies development by providing out of the box infrastructure services and a visual and declarative development experience.

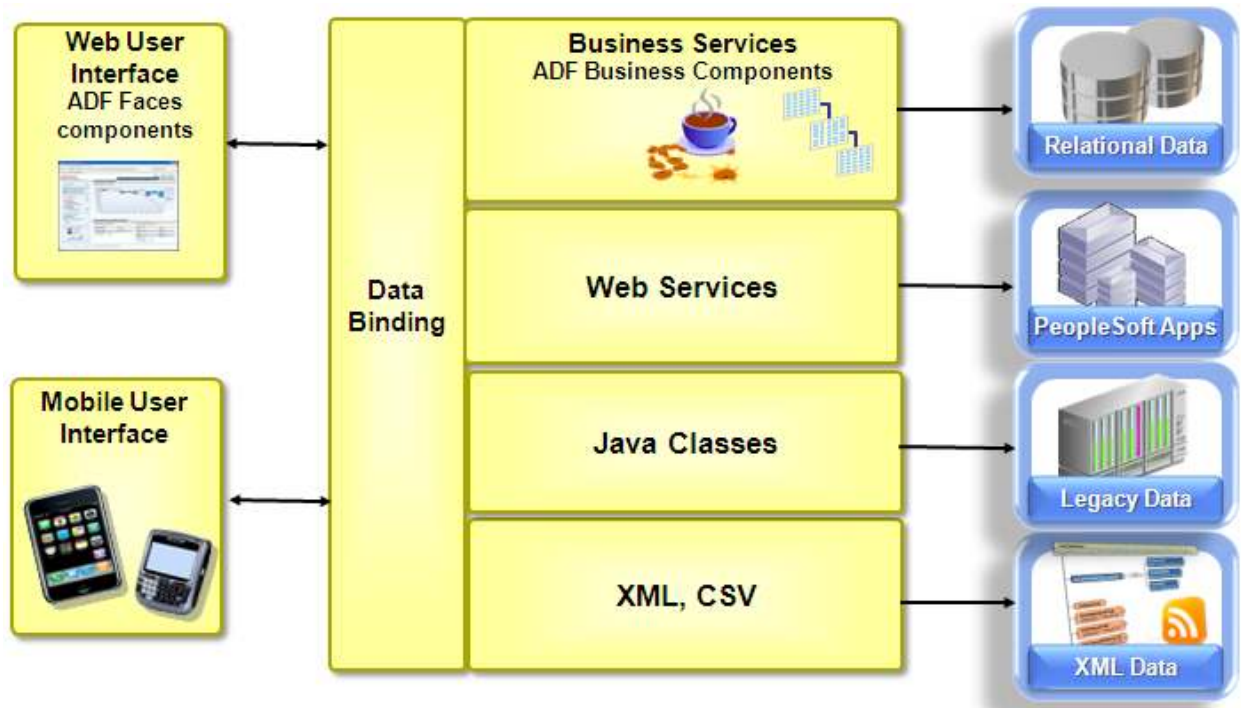
PeopleSoft enterprise applications are functionally rich, and with the breadth of business function comes complexity. Extending PeopleSoft applications to users that are not computer savvy has always been a challenge. The users' exposure to computer interfaces, if any, is with simple-to-use web applications, and the transactional nature of the PeopleTools components and pages, may not lead to a productive UI. Rather than deliver a solution that is not going to meet the needs of the users or build extremely complicated pages with abundant custom HTML, there is a solution. That is to extend the PeopleSoft User interface using Oracle Application Development Framework (Oracle ADF).

Oracle ADF is a framework that simplifies Java EE development by minimizing the need to write code that implements the application. In many ways, it can be thought of as a next generation of PeopleTools that results in a standard Java Enterprise Edition application, rather than a PeopleSoft proprietary application.

One of the great advantages of ADF is the ease of creating a user experience that binds to PeopleSoft applications through standard Web Services. ADF is based on the Model-View-Controller (MVC) design pattern. The view is the user interface, the model is the data source and business logic, and the controller manages the interaction between the two. ADF adds one more layer, the Business Service Layer that allows an open standard-based (JSR227) binding between the controller and the model. Accessing a PeopleSoft application is as easy as creating a Web Service in PeopleSoft and using the Business Service Layer to bind the UI to the web service in a visual and declarative approach.

The Oracle ADF Faces Rich Client (user interface component of ADF) is a set of over 150 AJAX-enabled JSF components. Everything from standard data entry controls to carousels, visual graphs and interactive maps that can be added to a user interface. ADF Faces also simplifies advanced client interaction in the browser with support for capabilities such as drag and drop, windowing, and can even push content to the client. These components allow developers to build highly interactive, desktop-like, web applications declaratively. The components encapsulate the difficult processing code and turn them into simple-to-use components. The development experience that Oracle JDeveloper provides for the construction of the user interface is visual and declarative using a WYSIWYG page editor, component palette, property inspector and a structure pane.

With simple binding, a feature- rich ADF-based Based UI can be built that accesses and update PeopleSoft content through Component Interface (CI) based Web Services. That means business logic that is already available with your PeopleSoft application can be used by the custom ADF UI.



Creating a Mobile Front End with ADF

Mobile devices such as smartphones, consumer phones, and PDAs are pervasive in today's world, making connectivity to end users more available than ever before. Just as Oracle ADF simplifies extending PeopleSoft applications for self-service, it also makes available technology to declaratively build and deploy applications that run on mobile devices.

Oracle ADF supports the development of Mobile Browser Applications, a connected web application running in the mobile device's Web browser. Developers use the Apache Trinidad Java Server Faces (JSF) components to declaratively construct their page. Using the Business Services Layer of ADF, the mobile web application can bind directly to PeopleSoft web services that in turn run business logic through component interfaces.

Oracle ADF can bridge the gaps in functionality provided by different browsers on different devices, allowing the developer to build a mobile application once and run on a variety of browsers. Oracle ADF will render the user interface according to the capability of the specific device, and can further customize the look and feel of the application using skins.

This simple-to-use declarative development environment opens the world of mobile computing to PeopleSoft applications as never before.

Improve the Way PeopleSoft Applications Integrate with Other Applications

PeopleSoft Integration

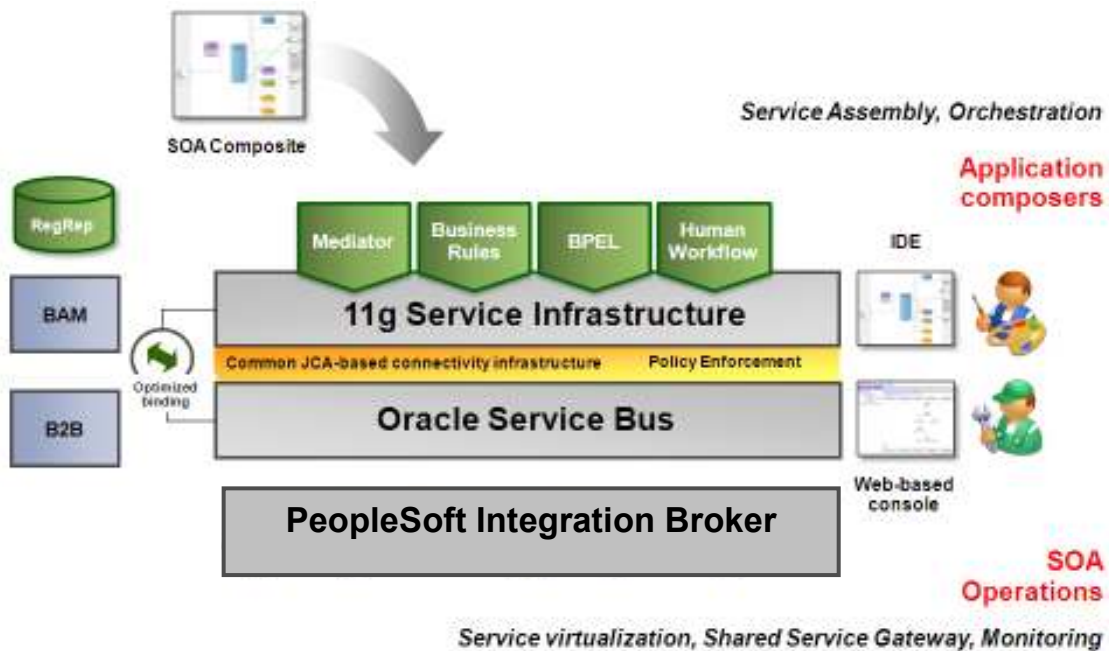
PeopleSoft applications have always been ahead of the curve with regard to external application integration. To facilitate external integration, PeopleSoft delivers a complete standards-based integration platform called Integration Broker. Integration Broker delivers three critical aspects of integration—metadata-based integration definitions for easy development and life-cycle, runtime platform complete with synchronous and asynchronous processing that is tightly integrated with PeopleSoft runtime, and adapters to several key technology interfaces such as web services, ftp, and email.

Using Integration Broker, PeopleSoft Applications can integrate with other PeopleSoft applications or with third-party applications using messages or web services. Typical integrations built between PeopleSoft pillars are point to point, meaning that they are tailored to meet the needs of the two applications rather than a general interface available for many.

Businesses today are required to adapt quickly to competitive and customer challenges and are looking to IT for a differentiator. PeopleSoft applications with Integration Broker are great for point-to-point integrations and building reusable web services, but critical components that make up a more comprehensive enterprise integration platform are missing. Technology and application connector support is limited, there is no process automation technology that can span applications, and there is limited governance to manage the complex world of integration. This comprehensive platform is called Service Oriented Architecture, or SOA, and the missing platform components are found with Fusion Middleware SOA Suite.

FMW Complementary Technology

Oracle SOA Suite provides complementary technology that makes integration with PeopleSoft applications more feature-rich and manageable. Using Integration Broker as a connector to PeopleSoft applications, you can take full advantage of the integration capabilities of Integration Broker. Using Integration to connect to vital components in SOA Suite, PeopleSoft applications can participate in a SOA initiative that spans your enterprise.



Oracle Service Bus

Oracle Service Bus is designed to connect, mediate, and manage integrations in a heterogeneous environment. In many ways, the Oracle Service Bus does for your enterprise integration needs what Integration Broker does for PeopleSoft applications. While Integration Broker can be thought of as a service bus between PeopleSoft applications, Oracle Service Bus can be thought of as the service bus for your enterprise. PeopleSoft applications will always use Integration Broker as primary integration technology, but there are times when a robust enterprise bus can be of value.

Oracle Service Bus can be used to implement a common SOA design pattern called Service Virtualization. This pattern moves your services endpoint to an abstract layer on the service bus rather than individually implementing applications such as PeopleSoft. This popular practice is proven to make enterprise services easier to manage and make developers more productive by simplifying service development and sharing services in the enterprise.

Additional features of the Oracle Service Bus such as visual debugging, fine-grained message level tracing, and advanced integration patterns make the Oracle Service Bus a valuable asset for PeopleSoft customers implementing SOA practices in their organization.

Connecting PeopleSoft applications with the Oracle Service Bus is straightforward. Simply create a Service Bus node in your PeopleSoft application and connect to it through your standard HTTP Connector with Integration Broker.

Oracle Business Rules

PeopleSoft applications can expose existing business rules through web services with a simple layer of metadata. Access to this through the integration layer is very powerful and easy to do. Exposing business functions through the integration layer allows applications to take advantage of business rules where they are needed. Cases such as conditional process flows and validation can take place in the SOA layer and can greatly enhance your application.

Oracle Business Rules enable business analysts to define, update, and manage key decisions and policies governing business processes and applications. Oracle Business Rules come with an authoring tool that presents an English-like descriptive language for analysts to declare the business rules.

External Orchestration with BPEL

Oracle Business Process Execution Language (BPEL) provides a comprehensive, standards-based solution for assembling a set of discrete services into an end-to-end process flow. By managing and controlling the state of the process flow, it can significantly reduce the cost and simplify process integration. BPEL is one of the more powerful integration technologies that PeopleSoft applications can integrate with.

Connecting a PeopleSoft application to a BPEL process is easy to do. Simply create a web service from your PeopleSoft system (an automated process using a component interface is available) and consume that web service in the BPEL process. Web services from PeopleSoft can be used to transact data, provide data, or provide decision support for BPEL processes.

PeopleSoft recognized the value of tight integration with BPEL and provides an easy-to-use PeopleCode API to initiate BPEL processes from a PeopleSoft system and interrogate the BPEL runtime system to give PeopleSoft applications visibility into the processes in progress or completed.

Technology Adaptors

Out of the box, PeopleSoft provides connectivity with the most popular technology such as HTTP, FTP, and SMTP. This low-level integration provides much of the flexibility you need for your integration purposes. There may be times when the delivered connectors are not sufficient.

PeopleSoft enables you to develop your own connector with the connector development kit, but that is developer-intensive and must be migrated forward with each upgrade. Another alternative is out-of-the-box connectors provided with Oracle Fusion Middleware. Fusion Middleware provides an extensive list of technology and application connectors for you to use. These can be accessed through a PeopleSoft application easily,

through a standard technology connector. Leveraging these FMW Adaptors provides the ultimate flexibility for your integration needs.

BAM

Oracle Business Activity Monitoring (BAM) is a complete solution for building real-time operational dashboards to monitor business processes, services, and services levels, and to track key performance indicators (KPIs) from processes and services, with capabilities to take automatic or manual corrective actions. With BAM, business users can build interactive real-time dashboards and proactive alerts in PeopleSoft applications. Personalized alerts can be triggered and delivered to users through email, fax, phone, or other convenient channels.

Case Study: Using SOA Suite components to automate a business process

A major provider of continuing education has chosen Fusion Middleware for use with their PeopleSoft applications as well as Oracle EBS Financials and other applications.

Oracle Fusion Middleware provided this customer their best opportunity to automate the target business process and still meet tight deadlines. The framework created during this project will also serve as the foundation for automating future business processes.

This customer's primary PeopleSoft application deployment is Campus Solutions, Student Financial Aid. They employed the following FMW products:

- Oracle BPEL Process Manager 10.1.3.1
- Oracle Application Server 10.1.3.1
- Oracle Rules Engine
- Oracle BPEL Human Workflow

The project automated a financial aid business process which was orchestrated to gather all the information needed to determine a student's eligibility for receiving additional loan funds. Throughout the orchestration, a canonical form was used for tracking student information as it was gathered. Student information was gathered from Oracle Financials, PeopleSoft, and multiple custom applications using the database adapter and PeopleSoft Component Interfaces.

This project provided many benefits, both short and long term:

Short-term:

- The automation of this process enabled the customer to determine the financial aid eligibility for all students and to ensure that those funds were disbursed to the students. They were able to provide their students with millions of dollars in additional financial aid funds that they would not have been able to deliver in a timely fashion if these students were all processed manually.

Long-term:

- The project created a framework of reusable services that will be used for further automation over the next few years, which will significantly reduce the cost of processing students through the Financial Aid process.
- The project implemented a Dynamic Exception Handling process based on Oracle Rules Engine, BPEL Process Manager, and Human Workflow. This process will be used at an organization level for all future web services.

ROI:

The customer achieved a 600% ROI on this project with a four-month time frame on a \$300,000 investment—essentially, a significant and immediate return.

In the future, the customer plans to leverage the framework of services created as part of this project to automate more of the Financial Aid process. Several of these projects are planned to begin in the current fiscal year.

Application Integration Architecture (AIA)

Oracle Application Integration Architecture is the most complete integration solution for orchestrating agile, user-centric business processes across your enterprise applications.

With Oracle Application Integration Architecture, organizations can:

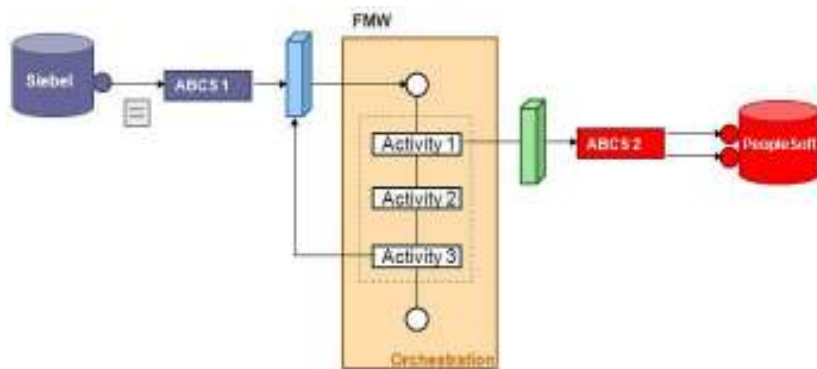
- Gain business and IT efficiencies
- Increase Agility
- Lower Total Cost of Ownership

Oracle Application Integration Architecture (AIA) is built on Oracle Fusion Middleware's market leading SOA and BPM products. These products deliver a comprehensive SOA & BPM infrastructure for connecting heterogeneous applications and business partners, managing structured and unstructured business processes and advanced management via a unified framework for governance and monitoring. Learn more about Oracle's SOA and BPM Products.

Oracle Application Integration Architecture (AIA) provides a standards-based framework for integrating enterprise applications. Customers can capitalize on prebuilt AIA integrations to extend the functionality of their PeopleSoft systems to other applications.

With Oracle Application Integration Architecture and Oracle's SOA and BPM Products, organizations are able to leverage a complete set of tools, templates, content and methodologies to do more with their existing IT investments, provide business and IT agility, and lower the total cost of ownership.

Case Study: AIA solves enterprise integration problem at retail customer



A large retail Customer analyzed their existing CRM implementation and discovered that a lack of connection between the CRM system and PeopleSoft system had led to levels of customer

satisfaction that were below the target level. Careful examination of the reasons for this indicated that the overall system needed to provide access to real time stock levels in order to give inbound call center agents better and more timely information about the products being up-sold and cross-sold to callers.

The customer worked with a System Integrator (SI) in order to implement an Application Integration Architecture (AIA) Foundation Pack based solution that included an “Availability to Promise” or ATP process leveraging Fusion Middleware components including SOA Suite in order to retrieve stock level information from their PeopleSoft system.

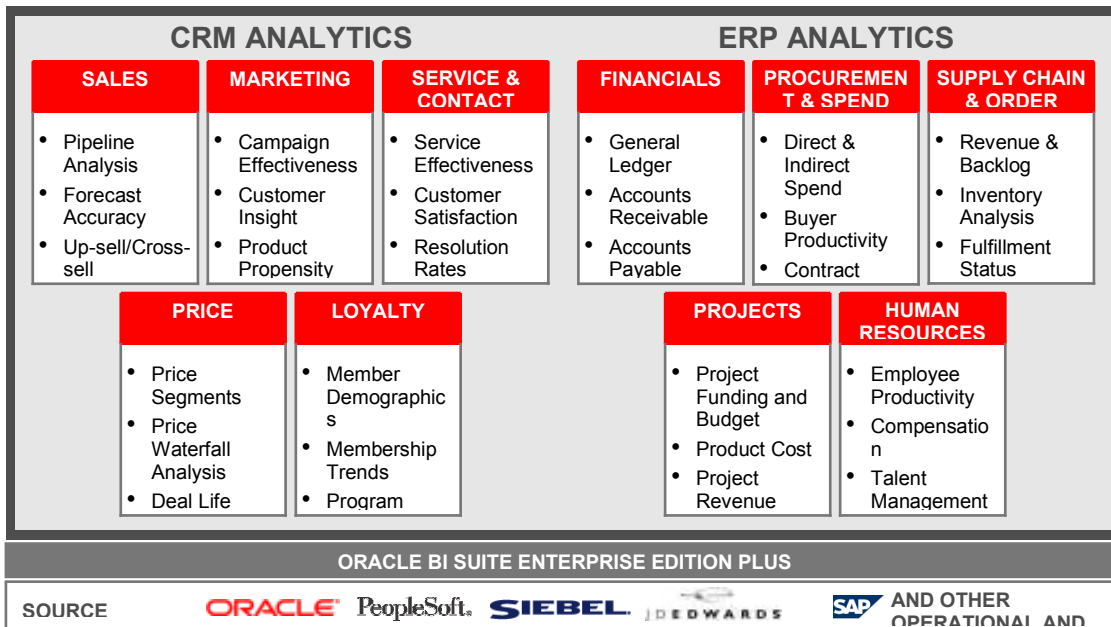
By implementing this solution the customer eliminated scenarios where call centre agents sold callers products that were not available and showed a 30% increase in customer satisfaction with call center interactions 3 months after introduction. Additionally the improved information flowing between systems delivered both increased profit and efficiency for the business that was directly attributable to the improved conversion rate achieved by their inbound call center.

Improve the Knowledge Extracted and Analyzed by PeopleSoft Applications

Pervasive Business Intelligence and Decision Support

Oracle Business Intelligence comprises a highly scalable BI Foundation that is hot pluggable with the Fusion Middleware stack. Based on an integrated, scalable, Web Services architecture, the open Oracle Business Intelligence foundation can reduce your cost of ownership and provide pervasive BI through efficient self-service access to diverse data sources, and a common information model with multichannel information delivery. This integrated platform together with Oracle’s market leading pre-packaged analytics, Oracle BI Applications, provide role based insight into operational performance, processes and customers to whoever needs it, whenever they need it.

Oracle Business Intelligence foundation allows you to maximize the value of your existing IT investments and resources. With it you can leverage your investment in PeopleSoft using certified adapters and extraction, transformation, and loading (ETL) mappings. With Oracle Business Intelligence foundation you can access data in any relational and multidimensional sources, including IBM DB2, Teradata, Microsoft SQL Server, Oracle, SAP BW, Oracle’s Hyperion applications, and others



BI Applications

Oracle BI Applications reduce the risk and amount of effort PeopleSoft customers must expend to rapidly deploy business intelligence.

Oracle Business Intelligence Applications are complete, prebuilt BI solutions that provide timely, fact-based insight into activities across the entire organization. They gather relevant data and aggregate it into the most appropriate metrics and formats for the business user. Because data is pulled from multiple systems, siloed views are eliminated and cross-functional analysis becomes possible. Everyone—from executives to front-line employees—gets complete and in-context insight that is personalized, relevant, and actionable. Built on an open foundation, Oracle Business Intelligence Applications enable flexibility, extensibility, and standardization – thereby reducing risk and TCO.

Oracle BI Apps offer prebuilt integration to the Oracle family of transactional applications including PeopleSoft Enterprise. Extensive knowledge of the application business rules and data is used to provide the quickest and most efficient access to the information. Only BI Apps leverage the roles profiles and security setups of a PeopleSoft application so that business users can securely and contextually drill all the way to a transactional level of detail. When using oracle BI apps, you can leverage functional

industry best practices that are built into reports, dashboards, metrics, and guided analytics.

Oracle BI Applications' Common Enterprise Model with conformed dimensions and facts enable incremental deployment of BI. The model starts with a single line of business such as Finance and then expands seamlessly to support other areas such as HR, Supply Chain, and others to deliver a consistent view of enterprise information.

The benefit of accessing data across the enterprise and delivering deep insight directly to business user is faster and more informed decisions that help the organization optimize resources, reduce costs, and improve the effectiveness of front- and back-office activities. Best practices for eleven different functional applications including Financial, Supply Chain and Order, Human Resources, Sales, Pricing, and others are available to help your organization today.

Case Study: Improved Financial Insight

A leading university with over 35k students and 8,000 employees had reached its limits with financial reporting problems. Among the pain points was the inability to track budget, expenses, encumbrances and remaining balances across different levels of the University. End users were unable to interact with the data and drill into the data without the help from IT. To compound problems, they were not able to provide HR-based data for demographic and regulatory reporting in a timely fashion.

Their solution was to select Oracle BI Intelligence Suite enterprise edition for PeopleSoft financial, supply chain, and human resources. They selected Oracle BI to empower users and to provide detailed information in an easy-to-access format.

After the project was completed on time and within budget, the university employees can view multiple levels of data quickly and efficiently. They are much more capable of tracking expenses across all levels of the university and have a university-wide consistent view of financial performance and HR costs.

Now that end users can access complex integrated data in a meaningful fashion without custom development by IT, they have seen a dramatic reduction in custom report requests

Oracle Content Management for PeopleSoft

PeopleSoft Financial Management

Financial processes are often distributed in nature, require many approvals, and generate very large document volumes that are difficult to effectively manage. As organizations seek to reduce costs and improve efficiency, paper-intensive processes such as Accounts Payable (AP) and Expense Management (T&E) are ideal places to start. Oracle's Fusion Middleware Content Management offerings include a productized PeopleSoft Adapter that integrates Oracle Imaging and Process Management (I/PM) with PeopleSoft Financial Management to optimize process automation by coupling document capture and

imaging technology with advanced Oracle Fusion Middleware BPEL workflow and BAM process monitoring. As a result, financial departments are able to dramatically decrease costs and cycle times, while increasing process visibility and compliance-readiness.

An organization that has already deployed PeopleSoft Financial Management understands the benefits that can be achieved by automating key pain point aspects of procure-to-pay operations, from gaining early control of outstanding liability and expected cash flow requirements, to ensuring that early payment discounts are realized. However, complete process optimization cannot be achieved as long as paper handling dictates the process, and systems like PeopleSoft Financial Management do not have efficient integration of electronic images within the context of their operations. The continued reliance on paper can have adverse impact on a PeopleSoft Financial Management customer's bottom line in a number of ways:

- **Storage and transportation costs:** Many filing cabinets or rooms are filled with archived paper invoices, purchase orders, and expense reports, taking up real estate that could be used for more productive purposes. Money and time is wasted on interoffice shipping of paper invoices or receipts from regional offices to a central location, or even back and forth between people in the same building or campus.
- **Departmental productivity:** Significant time is lost while processing paper invoices or expense reports as they make their way along the approval chain. When process exceptions occur, such as the inability to enter data into the financial management system or a missing purchase order number, days can be lost while trying to get documents into the right person's hands so that they can correctly handle the processing exception, placing the ability to maximize vendor discounts at risk.
- **Compliance and audits:** It is often very time-consuming to search for and locate archived paper invoices or expense reports once they have been filed away if the department is subject to a corporate audit. Organizations are often not able to exercise the necessary control over their financial documents, ensuring that they are being retained only for the required period of time before they can be destroyed.

Oracle Content Management solves these issues by complementing PeopleSoft Financial Management by providing document process automation and removing paper from the picture. Documents are captured electronically, converted to images and a BPEL workflow manages the entire process. Financial departments can increase the speed of operations using document capture, imaging, and workflow to automate some of the most time-consuming and mundane tasks of procure-to-pay operations.

End-to-end Accounts Payable processing automation—from receipt to payment

Only Oracle is able to offer PeopleSoft customers end-to-end process automation, where their financial, content management and workflow systems are all integrated as a solution from a single vendor. This means not only that you benefit from a solution where all the pieces have been designed to work together, but where it is also flexible and easily

configurable to meet the needs of each customer—since no two organizations’ procure-to-pay processes are exactly alike.



Integrated, flexible document capture meets all levels of automation:

PeopleSoft customers can increase the speed of operations using Oracle Document Capture, I/PM, and BPEL workflow to automate some of the most time-consuming and mundane tasks of procure-to-pay operations. When it comes to scanning and indexing documents that need to be managed through financial operations, a one size fits all approach doesn’t work given the wide variety of sizes, geographical reach, and processing volume of organizations. Oracle offers a range of capture solutions in which customers choose what level of automation they want to achieve. All documents can be scanned at a central location with Oracle Document Capture, and then routed to Accounts Payable clerks for processing by, for example, regional or priority classification. As a complementary solution, Oracle Distributed Document Capture enables remote offices to scan their documents at the point of entry into the company or organization, thereby saving both time and money related to interoffice paper shipping.

For the highest level of automation, customers can leverage optical character recognition (OCR) and intelligent document recognition (IDR) technology, provided by the Oracle Forms Recognition product, to extract and index all required data from images, thereby bypassing the need for the human key-from-image entry step later. The combination of Oracle Document Capture, Oracle Forms Recognition, and Oracle I/PM from the Oracle Fusion Middleware family, in conjunction with PeopleSoft eSettlements and PeopleSoft Financial Management, provides the highest possible degree of AP process automation. With this solution digitized, originally paper-based AP processes can even be combined with the electronic supplier self-service or EDI-based features of PeopleSoft eSettlements to ensure maximum efficiencies no matter how AP process documentation enters the company or organization.

Complete document lifecycle management—from capture through destruction:

Once invoices, purchase orders, expense receipts, or other documents are captured and archived into I/PM, the system takes over to manage the imaged content throughout its life cycle. As an enterprise-class content repository, Oracle Content Management can hold billions of imaged documents, so no matter what the customer’s processing volumes are, or how many PeopleSoft modules they image-enable, Oracle Content Management can scale to meet those needs. It also helps customers to meet their corporate retention and

security requirements, with the ability to attach policies to imaged content that dictates how long they should be kept and who has access to view them until they can be destroyed. Oracle's Universal Records Management product helps companies who have to meet regulatory compliance requirements with respect to their PeopleSoft Financial Management-related documents.

Faster data entry and searches with direct access to documents from PeopleSoft:

PeopleSoft customers can make better use of their departmental resources by greatly reducing the time they spend on tasks like data entry and searches so that they can add more value to the bottom line. Oracle Content Management exposes imaged documents using search-based integration directly from the PeopleSoft interface to maintain a familiar user experience, while enhancing it with the ability to quickly call up imaged documents to speed up heads-down functions such as key-from-image invoice entry. The I/PM viewer provides image annotation and mark-up functionality with security settings and roles to ensure that items such as redactions are only viewable by appropriate parties. All data entry and searching is done via PeopleSoft screens, enabling users to leverage business rules and validations provided by PeopleSoft.

Shorter Accounts Payable cycle times with exception handling workflows and real-time process visibility:

Oracle Content Management offers powerful sample BPEL workflows that augment, but do not duplicate, native PeopleSoft functionality, such as the automated routing of invoice images to AP processors for viewing, data entry, and exception handling. Oracle Content Management's exception handling sample BPEL workflows help customers save valuable cycle time in instances in which, for example, invoice processing exceptions need to be managed. These sample BPEL workflows are fully customizable to map to an organization's specific processes. Real-time business monitoring capabilities are provided via customizable BAM dashboard views, offering visibility into in-flight processes to enable workloads to be monitored and process bottlenecks to be identified, thereby facilitating continuous process improvement.

Easy approvals from within and outside PeopleSoft:

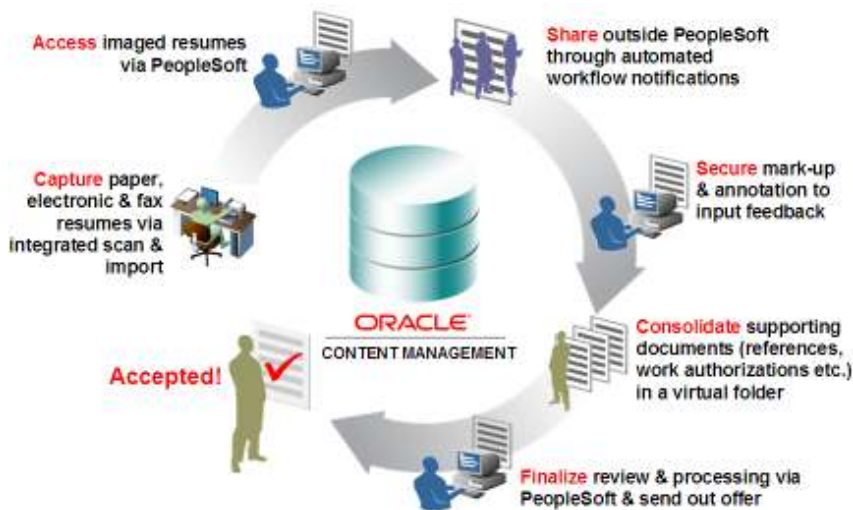
Once an invoice or expense report is ready to be approved, Oracle Content Management provides fast and easy access to imaged documents for review by both PeopleSoft and non-PeopleSoft users. The Oracle Fusion Middleware BPEL Process Management system sends approval notification emails with an embedded URL that provides quick access to the corresponding document task view, which then allows image review and annotation, as well as task approval, rejection, or request for more information actions (all configurable). With this ability to provide seamless access to all users involved in the approval chain, Oracle Content Management reduces the time required before invoices, expense reports, or other AP items are ready for payment.

PeopleSoft Human Capital Management

Successful Human Resources (HR) management depends on putting the right programs and procedures in place to maximize the effectiveness of employees. However, as long as HR initiatives remain paper-driven, inevitably too much time and cost is spent on managing paper rather than people. Oracle’s Fusion Middleware Content Management offerings include a productized PeopleSoft Adapter that integrates with PeopleSoft Human Capital Management (HCM). Oracle Content Management enables the capture of documents associated with personnel records, storage in a secure, centralized document repository, and automatic routing to the right person for retrieval from within or outside of the PeopleSoft system. As a result, HR departments save time and money by eliminating delays and inefficiencies in document-driven processes, while strengthening compliance and controls.

Streamline your HR Processes with Capture, Image & Document Management, and Workflow:

Many HR processes are bogged down with paper. From recruiting and on-boarding to performance appraisals and benefits processing, the time and effort spent managing paper documents decreases departmental productivity while increasing costs. Ideally, PeopleSoft HCM users should be able to quickly locate and access an electronic copy of an applicant’s resume instead of hunting through a filing cabinet, or access online all of an employee’s documentation attached to their PeopleSoft HCM record, rather than having to access disparate systems to try to find the associated documents.



HR employee record attachments: Unstructured content such as Office documents, PDFs, and scanned images are integral to supporting the different HR processes. The PeopleSoft Adapter for Oracle Content Management offers a flexible, scalable, and secure solution that enables employees to access and contribute content associated with PeopleSoft HCM records. The adapter integrates Oracle Content Management with PeopleSoft HCM to provide an enterprise-class content management infrastructure for centralizing the management of all employee-related documents and enabling the insertion of documents into workflows to drive process efficiency. With a full array of content

management functionality provided by Oracle Content Management products, including search, security, workflow, metadata, revision control, content conversion, and document capture capabilities, organizations can effectively and efficiently upload, scan, process, share, and distribute electronic and originally paper-based HR documents via PeopleSoft HCM, portals, or other applications.

The PeopleSoft Adapter provides direct access to content attached to PeopleSoft entities, as well as associated content management services, through familiar PeopleSoft screens. Any HR-related document can be checked into Oracle Content Management via PeopleSoft HCM, at which time it is automatically converted to a web-accessible format such as PDF/HTML for online viewing and printing without requiring the original application with which it was created. The document is also assigned a unique URL to make it easy to access and share via different application interfaces.

Role-based permissions ensure that content can be viewed or modified only by the intended parties. When content needs to be modified, the native document can be checked out and locked to maintain its integrity, and then checked in as a new revision once edits are completed. An automatic check out, open, and edit in the native application feature that is available via the PeopleSoft interface further simplifies this process for the end user. Full revision tracking is available and provides access to all previous versions of content items. Built-in content-centric workflow manages document review and approval processes, including tracking comments and related revisions. Advanced content searching functionality uses both metadata and full text indexing to allow the retrieval of content stored in the repository.

Sensitive documents attached to PeopleSoft entities can be automatically sealed to a specific security context based on document type or other metadata via Oracle's Information Rights Management (IRM) solution, ensuring the security of these documents even if the PeopleSoft user downloads and distributes them via email or other means. For these sealed, sensitive documents, PeopleSoft users will be required to authenticate the IRM server before gaining their assigned rights, such as the ability to view, edit, or print a document. To ensure that IRM security is maintained, the web accessible rendition of a sealed document is automatically sealed as part of the conversion process.

Wide range of document capture capabilities: Oracle Content Management offers flexible capture services that let PeopleSoft customers choose from a range of options to best suit your HR processes. They can use Oracle Document Capture to scan and import paper or faxed documents, such as resumes or benefit forms at a central location, and route them to HR staff for processing.

For those organizations that wish to have their PeopleSoft HCM end users convert paper documents to digital format and link them directly to HR records as attachments, the PeopleSoft Adapter for Oracle Content Management is integrated with web-based Oracle Distributed Document Capture for ad-hoc scanning and indexing of paper documents from wherever the user is located. The scanned content is attached to the user's current PeopleSoft record while being stored and managed in the centralized Oracle Content

Management repository. In this way PeopleSoft user's ad-hoc scanning needs, such as attaching documents from performance appraisals conducted at remote offices, can be met. This integrated scanning invoked directly from within the PeopleSoft HCM interface saves time and money related to inter-office shipping of paper documents.

Oracle Forms Recognition allows the automated extraction of information from scanned forms and documents to drive HR processes requiring a high degree of automation.

Achieve High ROI Today — Meet the Content Management Needs of Tomorrow

The PeopleSoft Adapter in conjunction with Oracle Content Management provides an enterprise-wide infrastructure that scales to meet the document management requirements of multiple departments, that is capable of storing millions of content items, and that forms part of a PeopleSoft customer's Oracle Fusion Middleware platform implementation and integration strategy.

Oracle is uniquely positioned to provide PeopleSoft customers with an end-to-end business process automation solution, of which Oracle Content Management provides the key components of capture, image & document management, and workflow to augment the native automation already provided in PeopleSoft Enterprise. Customers have the flexibility to further automate their systems using technologies such as Oracle Forms Recognition and PeopleSoft eSettlements to achieve complete business process optimization – all on one unified platform, with the value of a single vendor solution from Oracle.

Oracle Content Management is the strategic platform for managing unstructured information in both Oracle Fusion Applications and Oracle Applications Unlimited. Leveraging this Oracle Fusion Middleware content management solution ensures your infrastructure is synchronized with the future of Oracle Applications. Additionally, the broader Oracle technology stack offers the flexibility to further enhance your applications, such as utilizing Oracle Identity Management for consolidated user authentication and authorization roles across applications, or the Oracle Database Secure Files feature that provides automated de-duplication of content at the database level, allowing you to achieve storage cost savings in an environment with explosive content growth.

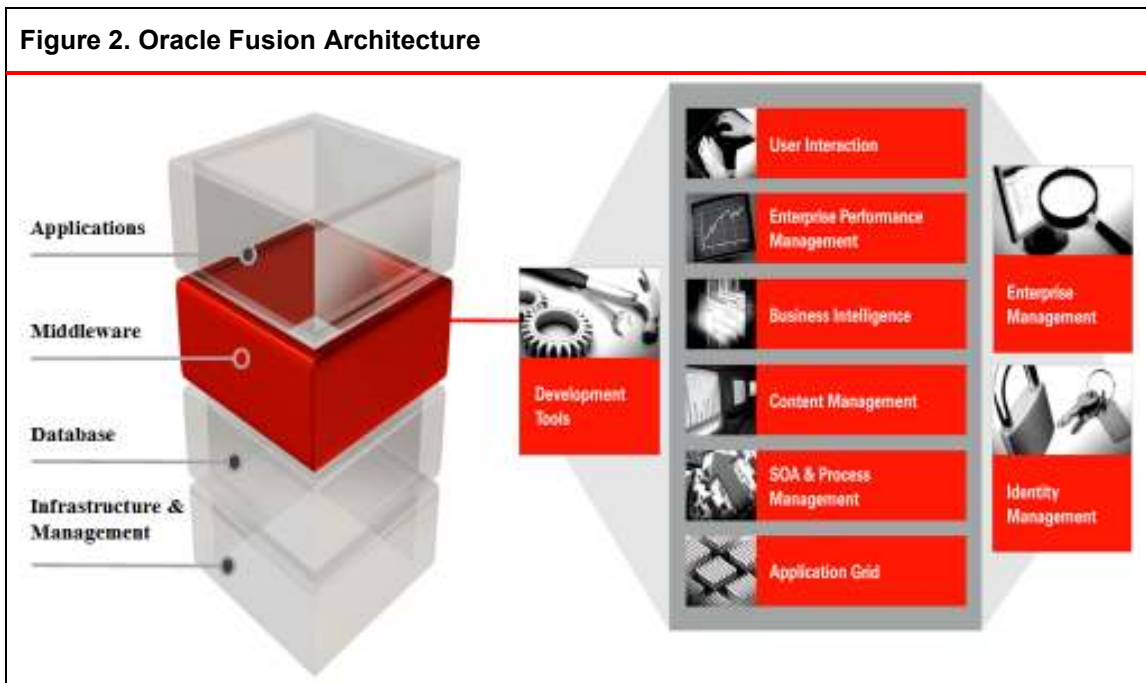
The fusion of Oracle Content Management and PeopleSoft Enterprise is achieved through a modular architecture with a minimal footprint on the PeopleSoft side, ensuring that ongoing maintenance and future system upgrades will not require high services costs, custom integration “updates”, or jeopardize the ability to upgrade one system without impacting the other. By delivering the integration as a productized and supported solution based on the Oracle Fusion Middleware platform, “one-off” or “band-aid” integrations are eliminated, thereby minimizing application maintenance and support costs

Oracle Fusion Middleware

Oracle Fusion Middleware is a pre-integrated portfolio of software for applications infrastructure, development tools and business intelligence.

Oracle Fusion Middleware is a comprehensive and cohesive application platform suite built with a pre-integrated portfolio of software spanning portals and process managers to application infrastructure, developer tools, and business intelligence. It includes industry-leading, open-standards middleware products such as a highly-scalable messaging and transaction processing platform, the leading application server, a comprehensive business process management suite, service-oriented architecture (SOA) infrastructure, and an Enterprise 2.0 user interaction environment. Oracle Fusion Middleware’s “hot-pluggable” capability lets customers “drop and deploy” products into their existing IT environments.

Figure 2. Oracle Fusion Architecture



Summary

A great deal of value can be added by supplementing your PeopleSoft application with Fusion Middleware. Improvements to the User Interface, Security and Platform, Business Reporting and Analytics, and Integrating with Other Systems are available with Fusion Middleware now. Many customers have seen the benefits of leveraging Fusion Middleware with PeopleSoft Applications.

Where to go for More Information

For additional technical information about Fusion Middleware and integrating with PeopleSoft Applications, visit the PeopleSoft – Fusion Middleware Best Practice Site at: <http://www.oracle.com/technology/tech/fmw4apps/peoplesoft/index.html>

Stay current with technical PeopleTools technical discussions at the PeopleSoft technology blog:
<http://blogs.oracle.com/peopletools/>

Appendix A: Fusion Middleware for PeopleSoft Certification

Key Technology	PeopleTools 8.50
Service Oriented Architecture, SOA Suite	
Oracle Service Bus (OSB)	10g, 11g
Business Process Execution Language (BPEL)	10g, 11g
Business Activity Monitoring (BAM)	11g
Business Intelligence and Performance Management	
Oracle Data Integrator	11g
Oracle Business Intelligence Suite Enterprise Edition Plus	11g
Oracle Hyperion Planning (Essbase)	11g
Enhanced User Productivity	
Application Development Framework(ADF)	11g
Portlets with WebCenter	10g, 11g
Business Intelligence and Workflow Notifications (OBIEE, and BPEL PM)	11g
Security and Platform	
Weblogic	10.3.1
Oracle Identity Management	11g
Oracle Enterprise Manager Plug-in	10.2.0.5
Oracle Internet Directory	10.1.4.1

** Information shown in the matrix may refer to integrated, certified or supported status and changes periodically. For current information refer to My Oracle Support at <http://support.oracle.com>.



White Paper Title
[Month] 2010
Author: [OPTIONAL]
Contributing Authors: [OPTIONAL]

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com



Oracle is committed to developing practices and products that help protect the environment

Copyright © 2010, Oracle and/or its affiliates. All rights reserved.
This document is provided for information purposes only and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. UNIX is a registered trademark licensed through X/Open Company, Ltd. 0110