

**SAP Solution in Detail
SAP Enterprise Portal**



SAP® ENTERPRISE PORTAL

PORTAL INFRASTRUCTURE

THE BEST-RUN BUSINESSES RUN SAP



© Copyright 2003 SAP AG. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP AG. The information contained herein may be changed without prior notice.

Some software products marketed by SAP AG and its distributors contain proprietary software components of other software vendors.

Microsoft®, WINDOWS®, NT®, EXCEL®, Word®, PowerPoint® and SQL Server® are registered trademarks of Microsoft Corporation.

IBM®, DB2®, DB2 Universal Database, OS/2®, Parallel Sysplex®, MVS/ESA, AIX®, S/390®, AS/400®, OS/390®, OS/400®, iSeries, pSeries, xSeries, zSeries, z/OS, AFP, Intelligent Miner, WebSphere®, Netfinity®, Tivoli®, Informix and Informix® Dynamic Server™ are trademarks of IBM Corporation in USA and/or other countries.

ORACLE® is a registered trademark of ORACLE Corporation.

UNIX®, X/Open®, OSF/1®, and Motif® are registered trademarks of the Open Group.

Citrix®, the Citrix logo, ICA®, Program Neighborhood®, MetaFrame®, WinFrame®, VideoFrame®, MultiWin® and other Citrix product names referenced herein are trademarks of Citrix Systems, Inc.

HTML, DHTML, XML, XHTML are trademarks or registered trademarks of W3C®, World Wide Web Consortium, Massachusetts Institute of Technology.

JAVA® is a registered trademark of Sun Microsystems, Inc.

JAVASCRIPT® is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.

MarketSet and Enterprise Buyer are jointly owned trademarks of SAP AG and Commerce One.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, SAP NetWeaver, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other product and service names mentioned are the trademarks of their respective companies. Data contained in this document serves information purposes only. National product specifications may vary.

CONTENTS

Executive Summary	4
Key Capabilities of SAP Enterprise Portal	4
Portal Infrastructure	5
SAP Enterprise Portal Infrastructure: Detailed Functionality	6
Business-Ready Integration	6
iViews	6
– Types of iViews	6
– Eventing	7
– Developing iViews – The Portal Content Studio	7
– Developing iViews – Portal Development Kit	7
– Developing iViews – Portal Runtime Functions	7
– Portlet Standards	8
KM: Integration of Unstructured Data	8
Business Intelligence	8
Unification	8
Application and Data Unifier	9
Roles and Personalization	9
– Roles	9
– Personalization	9
Managing the Portal Infrastructure	10
Backup and Restore	10
Security	10
– Portal Infrastructure Architecture	11
Web Services and Web Content	11
Scalability and Availability	11
SAP Enterprise Portal	12
Feature Overview	12
Conclusion	12

EXECUTIVE SUMMARY

SAP® Enterprise Portal (SAP® EP) unifies enterprise applications, information, and services from SAP and non-SAP sources into one system to support business processes, both within and across company boundaries.

SAP Enterprise Portal is a building block of SAP NetWeaver™ – a total integration and application platform designed to unify and align people, information, and business processes across technologies and organizations.

SAP NetWeaver is a comprehensive integration and application platform that helps to reduce a company's total cost of ownership (TCO). It facilitates the integration and alignment of people, information, and business processes across organizational and technological boundaries. It easily integrates information and applications from virtually any source and forms the basis of an Enterprise Services Architecture. It inter-operates with and can be extended using the primary market standards – Microsoft .NET and IBM WebSphere.

SAP NetWeaver is the technical foundation for the mySAP™ Business Suite family of business solutions and the SAP® xApps™ portfolio of packaged composite applications. It ensures maximum reliability, security, and scalability to enable a company's mission-critical business processes to run smoothly. SAP NetWeaver is a Web services-based platform that offers a comprehensive, tightly integrated set of capabilities. By providing preconfigured business content, SAP helps reduce the need for custom integration and lowers your TCO. And it sets a course for the future by laying the foundation for innovative, cross-functional business processes that help a company grow.

SAP NetWeaver is structured into three integration layers and an underlying application platform that provide the following key capabilities:

- **People integration** – Comprises all technology geared to bring the right functionality and the right information to people. The key capabilities include the appropriate infrastructure – portal, collaboration, and multichannel access, such as mobile and voice

- **Information integration** – Summarizes all the management of structured (business intelligence, master data management) and unstructured (knowledge management) information
- **Process integration** – Includes the different capabilities required to run processes across systems, from elementary services (routing and transformation) to full blown business process management
- **Application platform** – Supports J2EE and ABAP in one common environment, and provides abstraction from specific databases and operating systems

KEY CAPABILITIES OF SAP ENTERPRISE PORTAL

SAP Enterprise Portal provides key information integration capabilities to SAP NetWeaver. The portal supplies the enterprise's entire value chain – employees, customers, partners, and suppliers – with a single point of access to all the content and applications they need to carry out their assignments, interact with one another, and make informed decisions.

This personalized, interactive gateway can be accessed by a wide variety of devices – anytime, anywhere – eliminating traditional barriers to productivity and dramatically accelerating business throughput. Portal content is targeted specifically to the main functional area users have within their organization – driving flexible, end-to-end business processes and creating a seamless user experience.

SAP Enterprise Portal improves user decision making and management processes through:

- Enabling increased user productivity
- Providing role-based and relevant information, applications, and services
- Providing personalized content

The portal technology lowers total cost of ownership by providing:

- An open, scalable, secure, and high performance architecture
- A single solution that combines the portal infrastructure with powerful knowledge management and collaboration functions

- Support for open standards to provide high levels of integration, interoperability, and portability
- Simultaneous access to multiple internal and external user communities
- Device independence, ranging from desktop workstations and wireless enabled laptops to PDA's and WAP phones

PORTAL INFRASTRUCTURE

The infrastructure of SAP Enterprise Portal, powered by the SAP NetWeaver integration platform, provides the versatile tools needed for the integration of applications, transactional systems, databases, and legacy systems. This includes the patented SAP unification technology, enabling a powerful navigation scenario. The portal infrastructure delivers these capabilities:

- **Standards support** – The portal supports a variety of Internet and Web services standards, such as Java, J2EE, XML, JCA, JAAS, X.509, LDAP, WSDL, WSRP, SOAP, and UDDI, as well as support for Microsoft .NET.
- **iViews** – Small but powerful iViews are a key SAP Enterprise Portal feature. These modular portal components organize the content on portal pages and support the integration of information and functions from a wide range of sources. Each portal page is composed of iViews that can present information from internal or external Web sites, integrate functions from business software, or provide content search and navigation. iViews can be used to connect to virtually any content application or service, and SAP provides pre-defined iViews that access systems like Microsoft Outlook, mySAP Business Suite, and Oracle 11i.
- **Eventing iViews** – Eventing iViews can coordinate content across iViews on the same or different portal pages by sending and responding to messages. This allows for more dynamic and intelligent portal interfaces that react to user interactions and optimize common business processes.
- **The iViews Web site** – Over 2,500 predefined iViews are available to SAP customers at the iView Web site, <http://www.iViewStudio.com>, where users can

download portal content and developers can share what they have learned, as well as access tools, technical guides, and sample code.

- **Knowledge management (KM)** – The open architecture supporting the knowledge management capabilities provides people-centric collaboration and content management across the entire value chain. The knowledge management capabilities handle both structured and unstructured “raw” data across heterogeneous platforms and applications.
- **Unification** – The portal also includes SAP's patented unification technology, which enables proactive, user-directed context navigation across multiple applications. Unification integrates various data and application sources into a seamless user experience and simplifies user access to large, complex systems.
- **User roles** – The role is one of the central concepts of SAP Enterprise Portal. A role consists of a collection of tasks, services, and information associated with a specific group of users. The role definition determines user access to content, the activities that the user can perform, how the contents are visualized, and the navigation structure within the portal.
- **The PDK** – The Portal Development Kit (PDK), an open development platform, provides all the tools for rapid portal development and deployment, including Portal Content Studio for code-free development of portal content.
- **Necessary tools** – The portal infrastructure also enables a variety of management and administrative tools, including backup and restore, software logistics, monitoring, and various state-of-the-art security and identity features. The infrastructure also provides all the necessary portal runtime (PRT) features, including a portal server, user management engine, connector and client frameworks, and the unification server.

All together, SAP Enterprise Portal provides users with centralized, easy-to-use access to the information, applications, and services they need to make informed decisions and streamline business processes.

SAP ENTERPRISE PORTAL INFRASTRUCTURE: DETAILED FUNCTIONALITY

BUSINESS-READY INTEGRATION

To provide users with a personalized experience and access to the specific information and applications they need, the portal administrator and portal users go through a series of easy steps:

- The enterprise customizes the look-and-feel of the portal to achieve a uniform look using its standard logos, colors, and graphics.
- The company determines the content for various roles, which determines the particular worksets and portal pages each user can access.
- The users personalize their page layouts. Users can change how the iViews associated with their role appear on the page, based on individual preferences.
- The users can personalize the content of individual iViews; for example, a user can customize the “Industry News” iView to show the target markets he wants to track.

iVIEWS

iViews, the basic unit of portal content, are small applications that display information in any format, such as text, figures, graphs, reports, tables, and charts. They go far beyond just pushing static content to the user: iView capabilities allow the user to modify the content, to execute business functions, and to frame and receive responses to requests such as:

- “Show me the top ten customers whose shipments are late.”
- “Show me last year’s sales figures for my district.”
- “Give me a list of customers who have not ordered a product in the past three months.”

Because iViews are able to integrate any kind of application, they interactively allow users access to a wide range of business functions.

For example, iViews provide integration for ERP applications, such as CRM, PLM, HR, FI, and legacy systems. They integrate business applications, like document management systems, office applications, and collaboration tools. And they allow users to access and integrate content from outside sources, such as the Internet and news providers. iViews are based on open standards. They are processed in parallel, both on the client and the server side.

iViews are used to create pages. Pages are then put together in worksets – a collection of task-related pages that make sense to the user.

Types of iViews

iViews are one of the basic building blocks of portal content and can be written in virtually any programming language, including JSP, Java, XML, Microsoft .Net, SAP® Business Server Pages (BSP), and SAP® Web Dynpro.

iViews support a template concept: Once a new iView is created, it inherits all the properties from the template on which it is based. This enables a fast creation of new iViews based on other iViews. Furthermore, once you create such an iView instance, each instance has a delta link relationship to its source objects. This means that if the source object is changed, all dependent objects will be changed automatically.

Instead of developing iViews, customers can reuse portal content provided by SAP: Along with roles and worksets, iViews are used to create business packages that address role specific business problems.

Business packages are previously configured collections of premium portal content designed to serve specific roles within the enterprise. Business packages deliver ready-to-use solutions that minimize time to deployment, streamline common processes, and return immediate productivity gains. For a detailed look at the business packages, visit

www.sap.com/solutions

Eventing

Eventing technology provides a seamless user experience, automatically synchronizing portal content by allowing iViews to send and respond to internal messages. Eventing enables iViews to communicate both on a single page and across portal pages. For example, when a user selects an employee record in one iView, the same employee's information can be retrieved in other iViews on the same or different portal pages.

Developing iViews – The Portal Content Studio

The Portal Content Studio provides a central environment for developing and managing portal content from within the Portal AdminCenter. In addition to iViews, this content includes pages, layouts, roles, worksets, and transport packages.

Beginners can use existing iView templates to create their own content by simply providing the necessary iView properties. They can also create simple portal pages by assigning existing and self-created copies. Advanced users, using the many tools offered in the portal, can create advanced portal pages and iViews.

Developing iViews – Portal Development Kit

Besides the visual tools, SAP also provides a powerful development environment – the Portal Development Kit for the SAP Enterprise Portal – available through the iViewStudio. It contains a PDK for Java, for IBM WebSphere, and for Microsoft .NET.

The PDKs run as business packages within an SAP Enterprise Portal installation and include developer and API documentation, sample code, and tips-and-tricks related to developing iViews.

The PDK for Java allows developers to develop content and connectors. It provides access to nearly all portal components and services, including portal elements like pages and iViews.

The PDK for IBM WebSphere allows developers to integrate WebSphere applications into SAP Enterprise Portal while, at the same time, using selected portal services.

The PDK for Microsoft .NET allows developers to easily develop iViews for SAP Enterprise Portal that use the .NET framework and integrate .NET applications into the portal.

Developing iViews – Portal Runtime Functions

Developers can create iViews that use functions of the Portal Runtime to improve performance or security. These functions include:

- **iView caching** – This is a server caching mechanism that improves performance by reducing response time and increasing total transactions per second. iView Caching also reduces the load on data sources.

- **iView caches** – There are two cache modes: shared cache and personalized cache. The shared cache presents the same content to all users – one entry per iView is created. The personalized cache creates an entry for each user. The iView cache also supports iView expiration and testing.
- **iView isolation** – An isolation level refers to the way that iViews are embedded in pages. Each level has its advantages and disadvantages. This capability allows the administrator, using the iView Editor, to set the level that is most suitable for a particular iView.
- **Portal compression** – A mechanism that compresses all output from the Web server, making the output understandable by most browsers. Compression is used to reduce network traffic from server to client and improve response time, especially in low bandwidth environments.

Portlet Standards

The Java Specification Request 168 (JSR 168) Portlet Specification and the OASIS Web Service for Remote Portals (WSRP) are two attempts to define standards for portlets and portal interoperability. The JSR 168 Portlet Specification defines a Portlet API that provides the means for aggregating several content sources and applications front ends. It also addresses the handling of security and personalization. The WSRP is targeted at enabling federation and integration in a heterogeneous portal environment. SAP Enterprise Portal will support both upcoming standards.

KM: INTEGRATION OF UNSTRUCTURED DATA

The knowledge management capabilities of SAP Enterprise Portal help companies manage all facets of unstructured information – from collaborative authoring and publishing to advanced search and navigation. This open knowledge management platform offers user-centric services that provide a single access point to third-party repositories and SAP’s own content management systems.

The KM capabilities include:

- Simple document authoring and publishing
- Robust version management
- Powerful search and navigation through taxonomies
- Intelligent publishing, classification, and subscription
- State-of-the-art business collaboration
- An open framework for applications, content, and services

For a detailed look at the knowledge management functionality, see SAP Enterprise Portal – Knowledge Management, an SAP Solution in Detail.

BUSINESS INTELLIGENCE

SAP® Business Intelligence (SAP® BI) offers a unique, closed-loop capability by integrating information, applications, and services through SAP Enterprise Portal. SAP BI seamlessly integrates information across both SAP and non-SAP solutions. It combines data warehousing with comprehensive analytics for the entire mySAP Business Suite – all delivered through the role-based SAP portal.

Key functional areas include:

- **Data Warehouse management** – Includes the creation and control of data warehouses; extraction, integration, and transformation of data from multiple sources; and business modeling
- **Business intelligence** – Includes online analytical processing (OLAP), data mining, and exception alerting
- **Measure and management** – Includes business performance management; reporting and analysis tools for handling business content; and metadata management

UNIFICATION

Unification allows users to seamlessly navigate across independent systems with a portal interface that stores similar data in different formats, all behind the scenes. One powerful unification application is the ability to drag a piece of information from one application and use it to search for and retrieve information in another application. For example, a user might select

an object, such as a sales order number, and relate it to another object, such as a Display Sales Document transaction. This automatically triggers an activity – the generation of a sales order.

APPLICATION AND DATA UNIFIER

Although SAP Enterprise Portal allows integration of applications through iViews, some companies may need more powerful application capabilities. The solution is to place a unifier on top of existing applications – both SAP, non-SAP, and database legacy applications – to enable a unified access.

An Application Unifier extends the capabilities of unification and allows it to work with a specific type of application – for example, the SAP unifier enables the unification of mySAP ERP into the portal.

The Database Unifier unifies standard databases, rather than applications. Supported databases include:

- Oracle v7x and later
- IBM DB2 R4V4 and later
- Microsoft SQL 7, SQL 2000
- Sybase 11.9.2 and later
- Infomix 7.3 and later

ROLES AND PERSONALIZATION

Roles

SAP Enterprise Portal uses a very powerful role model to generate a role-based user interface, simplifying application and information access. Companies define roles according to user's responsibilities and field of interests.

From the business perspective, a role describes a user's task. For example: a "user" role could be created covering the general company news and the Employee Self-Service, while a "sales manager" role could provide the latest sales statistics and reports, as well as competitor information. User access to content is determined by role definitions. Roles define the

subset of content accessible to each functional role within the organization. Users are assigned to one or more roles and have access to the content that has been assigned to those roles.

Roles also determine how a user navigates the navigation structure within the portal – the configuration of both the top-level and detailed navigation trees are determined by role definition. Users can easily navigate to the desired portal content or service by clicking on tabs in the top-level navigation bar and on nodes in the detailed navigation tree.

Roles and all the objects necessary to build roles are stored in the Portal Content Directory (PCD). Technically, roles consist of worksets, which consist of portal pages and iViews. The Role Editor is used to create and modify new and existing roles.

Personalization

Personalization extends beyond the content provided by roles. Personalization can determine the page layout, the look-and-feel of the portal, and even which information users receive and how they receive it. For users, this means they receive pertinent information in the format that is most usable to them.

Personalization can be defined in three ways: at the administrator level, the user level, and automatically through predictive technology.

Administrators can define personalization for each user by changing the design of the portal structure for different users. Administrators can also determine how to configure the layout of the portal to be most effective for users. For example, a customer may have portal access only through a WAP phone or pocket PC, so administrators can ensure portal pages available to those customers are only in those formats. Or administrators might lock specific iViews to certain pages for suppliers that can customize the portal or change a view.

Administrators can also alter styles outside the portal. Administrators can implement a unified style across applications that are accessed through the portal. Using a style-sheet editor, administrators can pass portal settings through APIs to the applications accessed through the portal.

Users can also personalize their content through the browser, although the administrators always control the extent to which users can customize their screens. Users can change the location and order of pages and iViews, as well as the layouts used for a page and the look-and-feel of their portal, if permitted by the administrators.

Predictive technology allows for automatic personalization based on the user, their location, or the event being handled. Some of the qualities the portal can leverage include the user type, the browser type, the device type, whether the user is outside or inside a firewall, and the bandwidth of their connection.

Also note that Portal Runtime provides APIs for personalizing iViews.

MANAGING THE PORTAL INFRASTRUCTURE

Administering the portal is made more efficient and effective through the SAP concept of “delegated administration.”

Delegated administration is the process of distributing the administrative tasks and content in the portal to one or more administrators or group administrators. This capability allows companies to confine to each administrator or group of administrators the tools, tasks, and data restricted to that specific user or group. (In a nondelegated portal environment, all administration tools, company data, and connected systems are exposed to each administrator without restriction.)

Delegated administration enables companies to:

- Organize the administration framework entirely according to the company’s business scenario
- Control the distribution of portal-related administrative tasks, thus reducing TCO (this is key for a “global portal” scenario)
- Manage large-scale portal implementations

BACKUP AND RESTORE

Backup and restore strategies for SAP Enterprise Portal must be carefully developed to achieve a consistent state for the system upon recovery. This may involve backup at the component level, or a full backup of the entire system. SAP Enterprise Portal infrastructure for customers differ, but performing a full backup is a comprehensive solution that can easily restore portal components and allow the portal to recover from a complete system loss.

In general, all operations of SAP Enterprise Portal that use some type of storage for saving business information must be considered for backup. The backup type selected depends on the type of data storage. Backup of configuration data – including the SAP J2EE Engine and other components – should also be part of the backup and restore procedure.

SECURITY

SAP Enterprise Portal include a wide range of security features:

- **Authentication** – Confirms or denies user identity through user ID and password, X.509 digital certificates, or external authentication services
- **Single Sign-On (SSO)** – Authenticates users to multiple data resources and applications with a single sign-on
- **Authorization** – Enforces role-based authorization for all portal content and prevents unauthorized access
- **Integrated User management** – Provides centralized user administration and leverages existing infrastructure by accessing user-related data on existing corporate directory, database, or SAP system

- **Secure communication** – Delivers strong encryption and integrity protection for all communications using Secure Sockets Layer (SSL) protocol or Generic Security Services API interface

Portal Infrastructure Architecture

This open architecture supports Internet standards, such as LDAP, Java, X.509, .NET, XML, JCA, JAAS, and Web services standards, such as WSDL, WSRP, SOAP, and UDDI.

The architecture provides a Portal Runtime for executing components, services, and applications as per specific user request.

Portal components, such as Page Builder, and various administrative tools gather pages and activate generic templates and connectors to operation systems. Page Builder provides aggregate, caching, and navigation.

Portal Content Directory (PCD) provides all metadata, personalization (role, workset, page, iView), and data caching.

User management and security provides:

- Authentication, including Single Sign-On (SSO) through the use of SAP logon tickets, certificates, a trust center, and user mapping
- Authorization, including role assignment, LDAP-based authorization, and ACLs

WEB SERVICES AND WEB CONTENT

SAP Enterprise Portal provides simple integration of Web services, both through its internal capabilities and its use of the SAP® Web Application Server (SAP® Web AS). The server provides a convenient, easy-to-use environment for Web services by implementing basic Web services standards, such as SOAP, WSDL, and UDDI.

The major benefit for SAP customers is that every self-contained, modularized functionality – whether provided as part of an SAP solution or developed by a customer or partner-can be made available as a Web service. The functionality can be used across the Internet employing standard protocols and can be easily integrated into any development framework. This includes SAP® Business Application Programming Interfaces®, as well as Remote Function Modules, IDocs, and Enterprise JavaBeans.

All necessary steps to develop, deploy, and configure a Web service are integrated into the SAP development environment. This provides developers and administrators with stable and efficient Web-services tools to ensure Web services can be implemented with the same mechanisms and tools as other SAP applications. The wizards-based approach to configuration and deployment assures high productivity in making Web services available.

SCALABILITY AND AVAILABILITY

SAP Enterprise Portal scalability and availability is accomplished through load balancing and “fail-over” mechanisms. You can implement either hardware or software load balancing solutions to achieve highly available, reliable, and enhanced performance for the portal. SAP Enterprise Portal scales linearly and supports the most common load-balancing tools on the market.

By implementing persistence layers in a cluster – two or more servers configured to run a common set of applications and resources, as if they are on a single system – the central storage or shared resources are highly available and reliable. In addition, when a failure occurs in a persistence layer, resources can be redirected and the workload distributed to other machines. Also included is automatic deployment in the SAP J2EE Engine Cluster environment.

SAP ENTERPRISE PORTAL

FEATURE OVERVIEW

Feature Group	Features
Business Packages	– Role-oriented business packages jump-start the creation of applications by providing targeted content for user roles across the entire value chain
iViews	– iViews allow the integration of information from heterogeneous sources – Eventing coordinates the content displayed across iViews
Role Definition	– Content and application access is determined by role definitions based on the user's function within the organization – Provides all necessary tools for portal administration, including the delegation of administering tasks and content to one or more administrators or group administrators
Security	– Provides authentication, single sign-on, authorization, integrated user management, and secure communications
Customization	– Easily modify the portal design to fit a specific corporate image; provides design templates for users to choose from
Personalization	– Levels of personalization by the user to the portal theme, language, password, and so on, is determined by the portal administrator; applies to page and iView properties as well
Unification	– Provides technology that allows users to drag information from one applications and use it to retrieve information from another application, and trigger an automated response – R/3 Unifier supports drag and relate operations for standard SAP components, such as HR, SD, and FI
Content Development	– Portal Content Studio provides a central administrative environment for developing and managing portal content – Portal Development Kit (PDK) for Java and .NET is a collection of information and tools used by content developers to develop customized portal content
Load Balancing & High Availability	– Supports distributed and load-balanced environments with no single point of failure to provide high availability
Backup & Restore	– Integration into existing IT backup methodologies, including online and offline backup
Language Support	– Supports a wide range of languages; see http://service.sap.com/pam60
Mobile Portal	– Full support for mobile devices and applications
Accessibility	– Provides accessibility for visually and mobility impaired users

CONCLUSION

As the leading enterprise portal, SAP Enterprise Portal provides employees and external stakeholders, such as customers, suppliers, business partners, and investors, with a role-based, central access point to personalized information, applications, and services. It is a powerful, people-centric integration

solution that eliminates barriers to productivity, reduces TCO, and dramatically accelerates business throughput by empowering people to collaborate effectively on any given task – anytime, anywhere.

www.sap.com/contactsap