



Sybase® Enterprise Portal™
A Technical Whitepaper

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Introduction

This technical white paper examines in detail the elements and features of the Sybase Enterprise Portal. An enterprise portal integrates the business-computing environment, personalizes it, and presents it through the Web. Analysts expect the enterprise portal market to reach into the tens of billions of dollars over the next few years as companies strive for ways to simplify information flow and improve customer relationships. Sybase is the first company to produce and market an enterprise portal as a complete, end-to-end solution.

Enterprise Portals

The demand for enterprise portals has developed as businesses search for ways to unlock corporate data stores and provide a single gateway to the personalized information stakeholders need in order to make informed decisions, to act on those decisions, and relate with others making similar decisions. The advent of the Internet has provided the obvious medium for information dissemination, but it alone cannot provide the unification and personalization enterprises need. Most companies migrate to the Web with an array of legacy systems and applications that are not integrated. These systems represent a significant investment in data and resources on the part of a company, and to undertake a wholesale replacement poses a costly, time-consuming challenge with potential complications. What is needed is a way to bring legacy systems to the Internet without replacing them.

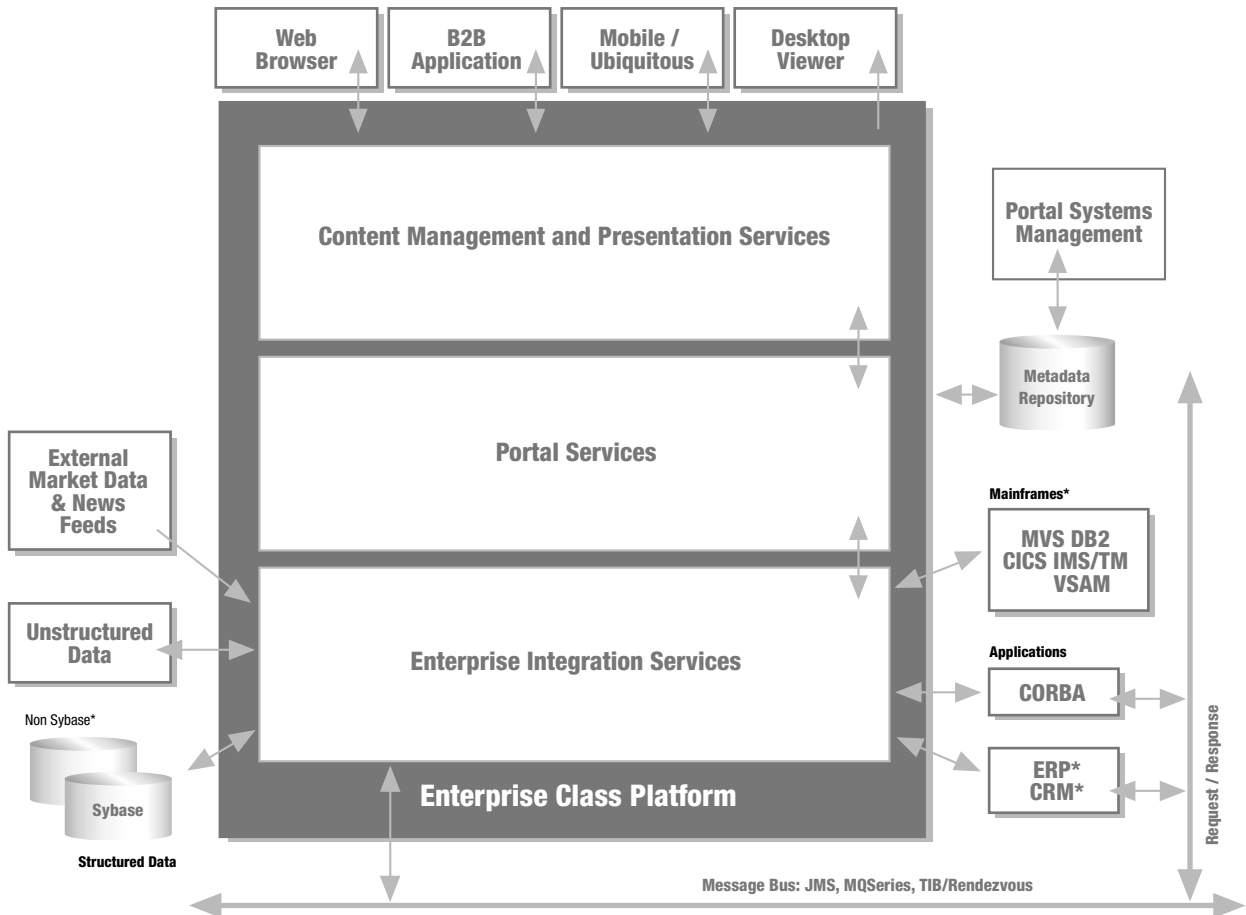
Sybase developed its Enterprise Portal to integrate all of a company's existing IT systems, and provide access to those systems through a single, customizable source on the Web, so users can get to the information and applications they need, immediately and easily. An enterprise portal provides companies with the unified infrastructure that enables them to react quickly to market changes and reduce their time to market. The personalization features of the portal allow companies to offer unprecedented levels of service and enhance customer relationship management.

A requirement for any viable IT system is that it be continuously available in the face of system failures and the unpredictable demands of the Internet. The Sybase Enterprise Portal has an enterprise class platform that features load balancing, cluster support, and transparent client fail-over for absolute reliability. It unifies content management, content organization, personalization and security into its framework. It is scalable to accommodate rapid growth. By designing its Enterprise Portal as a complete, end-to-end solution, Sybase has eliminated the struggle of integrating multi-vendor patchworks, thus reducing the complications, costs, and duration of implementation.

Sybase Enterprise Portal

Sybase Enterprise Portal is a comprehensive product solution for the development and deployment of enterprise portals. It unifies personalization and integration into a product offering that is coupled with continuous availability. The Sybase Enterprise Portal also provides the full spectrum of technologies required to support the operations of a portal, including unified systems management, end-to-end security services, content management, and personalization services. Also provided is an extensive array of integration options for integrating external data, events, and applications into the portal.

The following picture provides an overview of Sybase Enterprise Portal's architecture.



Non-Sybase : Oracle, DB2, Microsoft, Informix

ERP: SAP, PeopleSoft, Baan

CRM: Siebel, Vantive

Mainframe (data and event) integration: IMS, VSAM, DB2, IDMS, CICS

Protocol support: HTTP, IIOP, SSL, X.509

Language support: XML, HTML, JSQ, Java, C, C++, TCL, Perl

Object Models: EJB, COM, CORBA

Within this paper, Sybase Enterprise Portal's product features are grouped into four categories: Content Management and Presentation Services, Portal Services, Enterprise Integration Services, and Enterprise Class Platform. Provided below is a brief description of these categories. The key features for each of these categories are described in the Product Features section.

Content Management and Presentation Services

Sybase Enterprise Portal provides the complete spectrum of services for content management, personalization, content workflow and production management, categorization, dynamic publishing, and subscription management.

Portal Services

Portal services are those services that are needed across the portal, such as security, search, transaction management, and system management.

Enterprise Integration Services

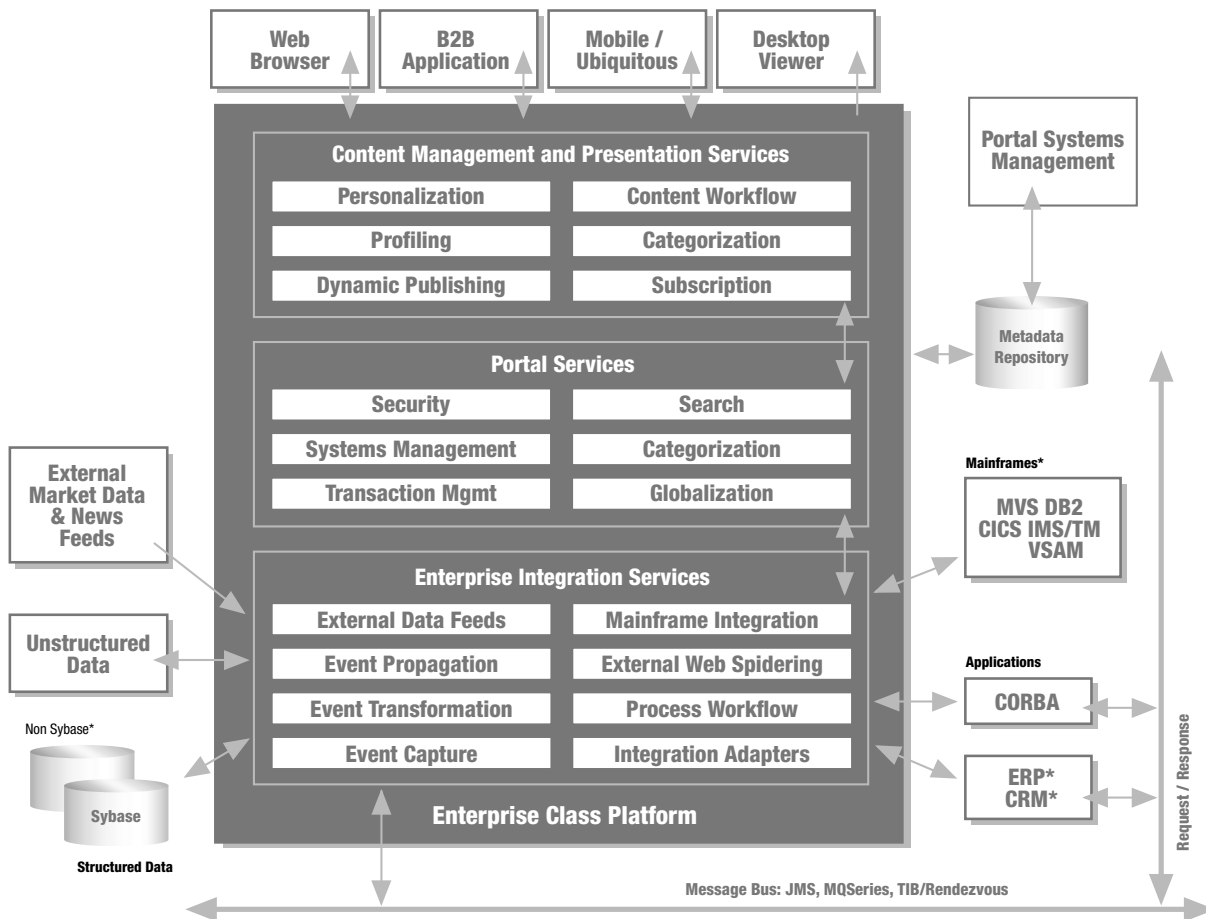
Enterprise integration services enable the integration of enterprise data, events, applications, and mainframes.

Enterprise Class Platform

Sybase Enterprise Portal is built on an enterprise-class foundation. Inherent to this foundation are multi-CPU scalability; a wide choice of platform support; support for clustering and load-balancing for scalable capacity and predictable performance; automatic client fail-over for maintaining service availability; and open Internet standards like XML, Java, EJB, CORBA, LDAP, and JSQL.

Product Features

Provided below is the Sybase Enterprise Portal architecture diagram with additional boxes for each of the product features we will discuss in this section.



Content Management and Presentation Services

Sybase Enterprise Portal provides the complete spectrum of services for content management, personalization, content workflow and production management, categorization, dynamic publishing, and subscription management.

Content Management

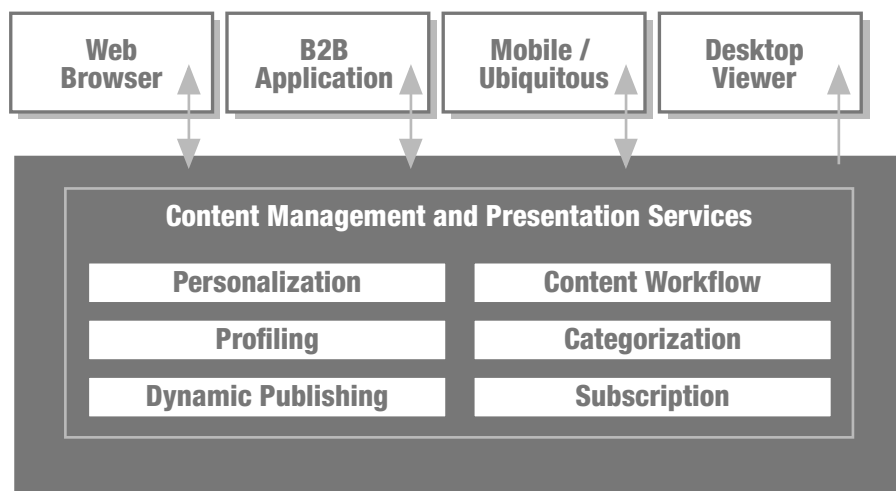
Sybase Enterprise Portal provides a complete content management infrastructure to support the life-cycle management of content from conception through approval and publishing.

Personalization

With Sybase Enterprise Portal's personalization, portal owners can increase their competitiveness by more accurately targeting each user with relevant products, services, and content; increase user productivity by presenting relevant content; and increase retention by attracting, engaging, and retaining customers and online users.

Sybase Enterprise Portal provides the technologies to help direct optimal combinations of content to end-users. It provides three methods for achieving personalization: role-based, automatic, and explicit. The portal can simultaneously use any combination of these methods to provide the right level of personalization for each situation.

- **Role-Based** – Role-based personalization is easier to administer and provides better security since a user is assigned a pre-configured role that determines what they can see and do within the portal.
- **Automatic** – Automatic or implicit personalization is useful for automatically adapting the site's presentation, navigation, and content to a user's environment based on observed behavior. Automatic personalization enables real-time personalized content for each portal user.
- **Explicit** – Explicit personalization is useful for driving the choices of content based on explicitly stated preferences. With this model the choices of content are driven by the user.



Profiling

Profiling refers to the collection of information about a user's behavior. Sybase Enterprise Portal provides two methods for collecting data: explicit data that a user provides, and implicit data that is gathered by tracking a user's actions, e.g. which content they are looking for and selecting.

Several of the benefits of profiling are:

- attract, engage, and retain customers by better targeting content or services
- increased understanding of customer relationships
- increased competitiveness by targeting relevant products, services, and content

Dynamic Publishing

Sybase Enterprise Portal provides services for the intelligent serving of dynamic content.

- Caching – Improves portal performance by caching common Web templates.
- Virtual Hosting – Improves efficiency by enabling multiple Web sites to share the same content.
- Platforms – Support for delivering content to different platforms, e.g. browsers, PDAs, mobile devices, and operating systems.

Content Workflow and Production Management

Sybase Enterprise Portal provides the tools to automate the planning, development and production of content for a Web site.

- Project Management – To make it easier to control and monitor the activities required for deployment.
- Document Management – To make it easier for team members to collaborate, develop, and authorize content.
- Version Control – To support the rollback or forward to earlier or later versions.
- Staged Deployments – To automatically control the deployment of the portal.

Categorization

Categorization refers to the classification and presentation of content into hierarchical groups to assist users with browsing content. Sybase Enterprise Portal provides the two primary methods of categorization:

- Automatic Categorization – Automatically sorts documents into meaningful categories, both at the organization level and at the individual user level, based on a defined taxonomy. This feature is implemented as channel agent technology in which the system is trained to recognize categories based on existing examples of content. This form of categorization reduces the costs of labor to support the portal by automating the process of categorization for specific types of portal content, e.g. real-time news feeds, desktop documents, etc.
- Manual Categorization – For higher accuracy, manual categorization involves having someone manually tag each item of content with keywords. This is typically done by the content's author or by a domain expert.

Several of the benefits of categorization are:

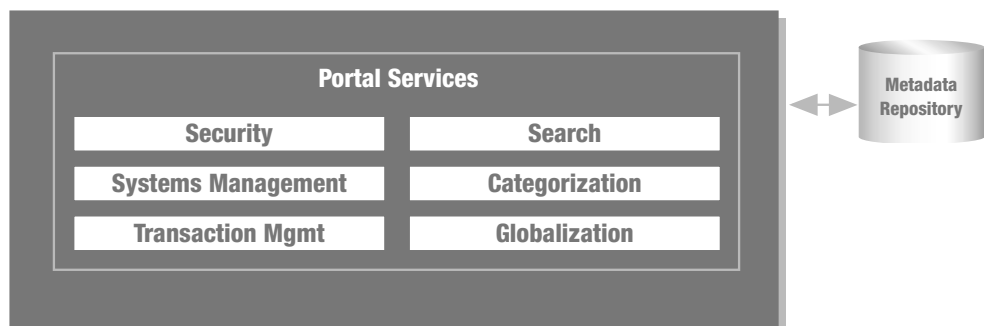
- increases productivity by enabling users to quickly navigate and find relevant content
- increases productivity by facilitating business decisions based on finding the right information
- increased competitiveness

Subscription Services

Sybase Enterprise Portal supports dynamic subscription services and events by enabling users to subscribe to interest channels. Interest channels provide alternative sources of information without incurring development costs, and they also make users more productive since users can subscribe to the information that interests them. Through a variety of dynamic content delivery options, users may receive information as soon as it is available based on their desired delivery. Delivery options can range from immediate notification on the desktop to periodic email update and mobile device synchronization.

Portal Services

Portal services are those services that are needed across the portal, such as security, search, transaction management, and system management.



Search

Sybase Enterprise Portal includes industry-leading content-retrieval technologies.

- Natural Language Search – Superior natural language content-retrieval capabilities based on pattern matching techniques. This increases ease-of-use because users do not need to think in terms of keywords.
- Automatic Categorization – Dynamically categorizes documents into meaningful categories based on a defined taxonomy. This reduces the cost of labor to support the portal.
- Automatic Hyperlinking – Automatically suggests alternative content to create a more personalized experience for the user. This feature is driven by the profiling data for the user.
- Index structured and unstructured – Indexes all popular desktop document formats as well as structured data sources like ODBC-accessible databases, Lotus Notes databases, and Microsoft Exchange folders.
- Web Spider – Automatically indexes internal and external Web sites.
- Personalization – Users can create their own categories of interest and have the engine automatically track relevant content.
- Implicit Profiling – Automatically observes and suggests relevant content to the user based on their most recent searches and areas of interest.
- Community – Users can identify other users in their organization that share the same areas of interest.

Categorization

The categorization feature within portal services refers to automatic categorization.

Automatic categorization sorts documents into meaningful groups, both at the organization level and at the individual user level, based on a defined taxonomy. This feature is implemented as channel agent technology in which the system is trained to recognize categories based on existing examples of content. This form of categorization reduces the costs of labor to support the portal by automating the process of categorization for specific types of portal content: real-time news feeds, desktop documents, etc.

Security Framework

Sybase Enterprise Portal's security framework provides the comprehensive set of security features required for today's business portals.

- All sensitive communications with the portal are protected by SSL encryption for confidentiality and integrity.
- Single sign-on is supported across the portal.
- Sybase Enterprise Portal authentication can be linked to enterprise login authentication, eliminating the need for a separate portal login.
- Stored data can be encrypted for additional protection.
- Data can be digitally signed for non-repudiation of business transactions.
- A minimum authentication strength can be specified for a component to ensure that only strongly authenticated users can access particularly sensitive data.
- The security framework takes care of all access control decisions so component developers don't have to.
- The portal administrator can define a fine-grained access-control security policy for the portal through the use of the access permissions in the entitlements database.
- The administrative interface supports both interactive account management and programmatic bulk-loading of account information.

Systems Management

Sybase Enterprise Portal provides a unified systems-management administration console to reduce the resources required to support the portal. This console maintains a central configuration repository to control and monitor all of the individual processes running within the portal: Web server, application server, database server, replication server, etc. In addition to the predefined portal component types, the console can easily be extended to manage additional third-party portal components.

To make it easier to manage the portal, the portal administrator can visually manage the portal using a customizable tree-structured view of the portal's topology. With this interface the administrator can

- administer portal components
- control portal components
- monitor portal status
- drilldown to portal component status detail information
- monitor performance and tune the portal

Systems Management Services API

To enable integration with existing enterprise systems management tools, Sybase is publishing a portal systems management services API. ISVs can also use this API to create new tools that work with Sybase Enterprise Portal's system management services.

Transaction Management

Sybase Enterprise Portal provides comprehensive transaction management capabilities.

Two-Phase Commit

Two-phase commit to heterogeneous databases and shared connections for managing the execution of multiple transactional components. This feature utilizes IBM/Transarc Encina.

Open

Supports multiple transaction coordinators and DBMSs.

Asynchronous Transaction Management

Provides support for both traditional synchronous transactions as well as asynchronous queue-based transaction processing.

Implicit Transactions

Hides virtually all the complexity of transaction management and coordination from application component developers with "implicit transactions." With implicit transaction management, developers at deployment time simply specify whether or not a component is transactional. At runtime, Sybase Enterprise Portal automatically manages transaction boundaries and ensures transactional consistency across all transactional components and the underlying DBMS.

Connection Management

Provides connection caching to improve performance by reducing the total number of physical database connections.

Globalization

Sybase provides the tools and services to enable a business's real-time interface to the world, and to enable global companies to integrate their distributed operations worldwide. Using Unicode™ technology, Sybase Enterprise Portal is able to transparently handle data and information from virtually any country, language, or culture. Multilingual, multi-currency information can be published simultaneously in most local formats.

Unicode Library

Provides automatic character set conversion between source and target applications to enable the interchange of non-English data.

XML Character Set Converter

Converts an XML data stream into any other character set to enable the interchange of non-English data.

Global Sort Component

Provides standard sorting in any language or mix of languages, so that a portal user may see data from any source sorted according to their expectations.

Multi-Currency Support

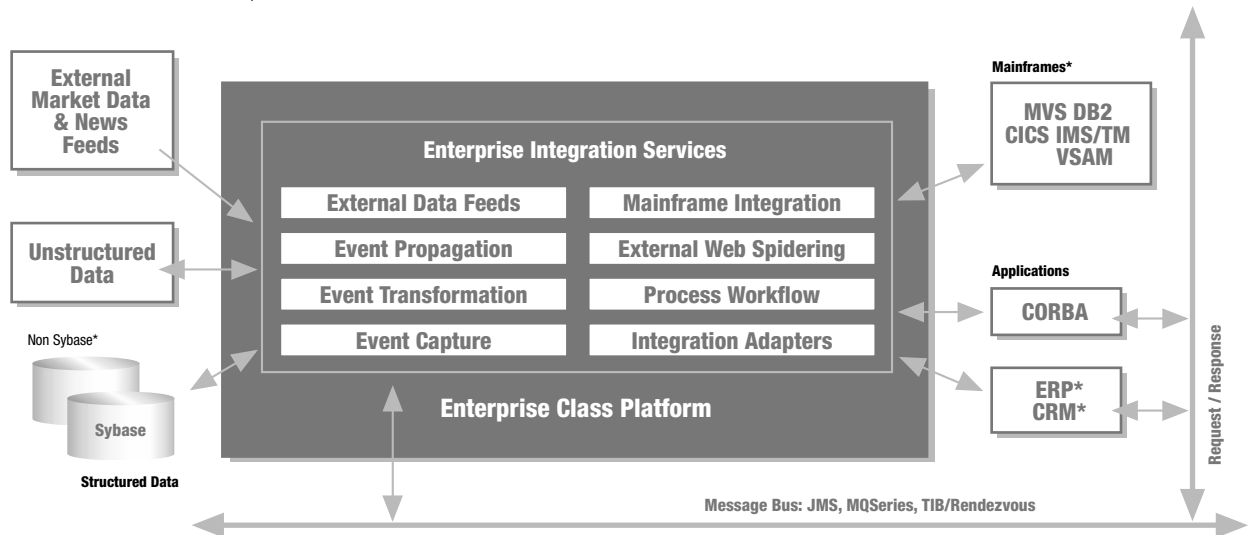
Provides automatic currency conversions sensitive to date/time and application usage function to make global e-Commerce easier.

Locale Formatting Library

Formats date, time, numbers, and currency to present data from any source formatted according to user expectations.

Enterprise Integration Services

Sybase Enterprise Portal has the most comprehensive set of back-end integration options, which makes it easier to integrate enterprise data, events, and applications into the enterprise portal without requiring the reengineering of existing systems and business processes. This enables faster time to a successful portal implementation, and more flexibility to adapt to future change.



Data

Sybase Enterprise Portal can seamlessly integrate a wide variety of distributed enterprise legacy data. Sybase, Oracle, DB2 (MVS/UDB/400), Microsoft, and Informix data is transparently accessible as if it were all coming from a single data source.

Events

Sybase Enterprise Portal provides support for the capture, transformation, and propagation of business events in the enterprise.

- Integrates with messaging systems such as TIBCO's TIB/Rendezvous, IBM's MQSeries, and Java Message Service (JMS).
- Allows customers to define their own transforms to better meet the needs of their enterprise requirements.
- Supports the translation and generation of XML and other messaging events, which is essential for integrating back-end systems and for business-to-business processing.
- Allows database applications to capture, transform, and propagate business events and information to the enterprise in real time.
- Provides the technology to capture business events from database applications and deliver them to the enterprise for the purpose of notifying end-users, integrating applications, and automating business processes.

Sybase Enterprise Portal can also integrate with external feeds, such as real-time news feeds and quote servers.

Applications

Sybase Enterprise Portal can seamlessly integrate legacy and packaged applications into the enterprise portal.

Legacy Applications – The Sybase Enterprise Portal "Application Integrator" family provides seamless integration with a wide variety of data and application logic residing in legacy applications. The critical resources contained in mainframe CICS applications, Sybase Open Server applications, CORBA applications, and database-orientated stored procedures are now available for simple graphical integration. Stored procedures can be from any source: Sybase, Oracle, JDBC, OmniConnect, Open Server Connect, etc.

Packaged Applications – Sybase Enterprise Portal provides a powerful integration toolkit for creating a seamless integration between key ERP and CRM applications and the enterprise portal. The mission critical resources in SAP, Peoplesoft, Siebel, Oracle, Vantive, Clarify, Kenan, and other popular applications are now ready for real-time participation in the enterprise portal.

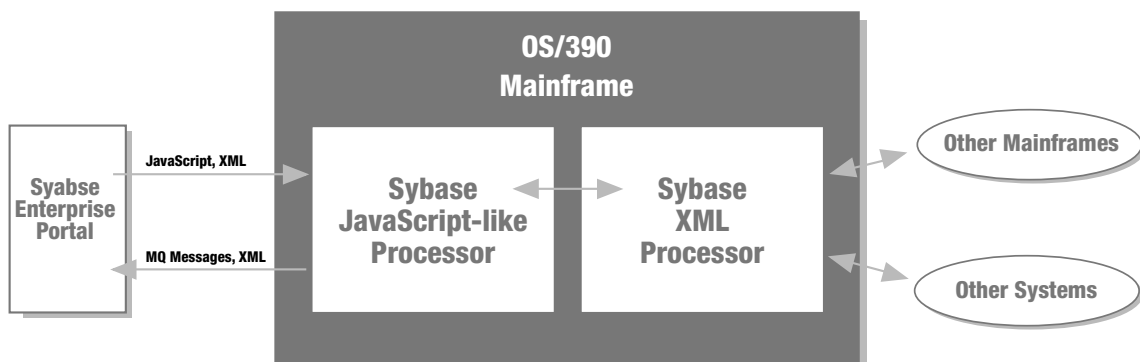
Graphical Application-Integration Component Builder Tools – Sybase Enterprise Portal provides graphical application-integration component builder tools to create standard component wrappers for the integration services defined through the tools. This enables services such as event flow services or message brokers, or other business logic, to be developed in a consistent component-based model, irrespective of the integration source or target.

Using these tools a developer can extract metadata from database catalogs, CICS application definitions, CORBA IDL, or other self-describing definition sources. Next, this extracted metadata is refined as required by the developer, and then deployed as an Enterprise Java Bean for use by other business components in the portal. This model insulates the portal business process developer from the unique characteristics of each integration source for higher productivity and control.

Mainframes

Sybase Enterprise Portal provides seamless portal integration with mainframe data, events, and applications. Sybase Enterprise Portal's mainframe services bring "Web time" development speeds to MVS application environments. These services enable LAN and Web-based clients and servers access to data and applications on the mainframe, and enable the mainframe to coordinate Sybase Enterprise Portal activities across an enterprise.

OS/390 Applications – Sybase Enterprise Portal provides XML and JavaScript-like processors that run natively on OS/390. Sybase Enterprise Portal solutions can execute JavaScript procedures on OS/390 to enable portal access to OS/390 applications, data, and events. The high-speed JavaScript-like processor is also used to provide the scripting and control flow logic needed to run various elements of the system.



These processors coupled with other Sybase Enterprise Portal software enable capabilities such as

- mainframe business-to-business processing by providing a common method of self-describing data exchange
- mainframe Web scripting – the enterprise portal can control the mainframe: initiate mainframe operations, send mainframe messages, broadcast mainframe messages via MQ to other backend mainframes, send messages from the mainframe via MQ to other systems including the Sybase Enterprise Portal solution, etc.
- XML access to mainframe data and resources
- sending XML queries to mainframe databases: DB2, IMS, VSAM, etc.
- the quick and easy creation of RPCs
- the reuse of code across all mainframe environments: OS/390, IMS, CICS, and Open Edition (Unix System Services)

A high-speed mainframe scripting engine provides a productivity improvement over 3GL COBOL and PL/1 programs. The JavaScript-like language was chosen as the scripting language because it is an industry standard, it has a simple lightweight syntax that can be easily parsed, and it can quickly and easily be learned. For extremely performance-critical applications, developers can still write Sybase Open Server applications using the portal-enhanced Sybase Open Server API to drive the system.

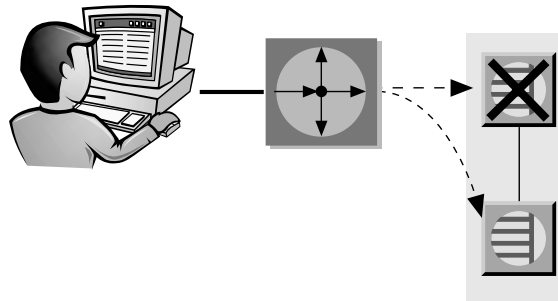
Mainframe Event Capture – Sybase Enterprise Portal can capture and replicate DB2 for OS/390 database transactions to the MQ queue: insert, update, delete, commit, and rollback. The database events are transformed into XML format using the XML processor for OS/390 before they are published using MQ. These messages can then be sent to the portal's event broker for integration with the rest of the solution.

Process Workflow

Providing integration points to a variety of enterprise resources (data, events, and applications) is only half of the battle. Integrated data does not begin to show high value until it is combined with information from the rest of the enterprise. Sybase Enterprise Portal provides a powerful and flexible component workflow engine to integrate the right data and business processes at the right time to reduce the amount of time required to complete a business process. This component workflow engine can access any application or data resource available to the enterprise portal. The output of this engine is a comprehensive and seamless portal experience for a business's partners, employees, customers, and suppliers.

Enterprise Class Platform

Sybase Enterprise Portal is built on an enterprise-class foundation. Inherent to this foundation is multi-CPU scalability; a wide choice of platform support; support for clustering and load-balancing for scalable capacity and predictable performance; automatic client fail-over for maintaining service availability; and open Internet standards like XML, Java, EJB, CORBA, LDAP, and JSQL.



Continuous Availability

Sybase Enterprise Portal provides a set of proven technologies to ensure continuous availability.

Automatic Client Fail-over

Sybase Enterprise Portal supports transparent client fail-over to ensure service availability to the end user. If a

backend system fails, it transparently migrates client connections to backup servers, without requiring the end-user to re-login or relaunch their applications.

High Service Availability

Any server component can be configured with redundant components to ensure service availability during both unplanned downtime and scheduled maintenance. Because there is no single point of failure, Sybase Enterprise Portal provides true 24x7 availability for all portal components.

High Availability Architectures

Sybase Enterprise Portal's high availability (HA) software directly integrates with and complements the hardware vendors' HA options for enterprise-class systems: UNIX (HP, IBM, Sun, etc.) and NT. For example, if a HA hardware node should fail, that hardware vendor's HA software would automatically send a node failure event to Sybase Enterprise Portal's HA software.

Online Administration and Maintenance

Sybase Enterprise Portal can be configured and managed while online.

Scalable Architecture

Sybase Enterprise Portal provides scalable capacity and consistent performance to meet the unpredictable demands of the Internet. Features include:

- platforms: UNIX (Sun SPARC Solaris, HP HP-UX, IBM AIX), and Microsoft Windows NT 4.0
- application server clusters
- database server clusters
- built-in dynamic load balancing
- support for SMP architectures
- dynamic content caching to improve portal performance by caching common Web templates
- mainframe options that enable the enterprise portal solution to control mainframe systems

Open Architecture

Open

Sybase Enterprise Portal supports open Internet standards, like Java, XML, EJB, and CORBA. Sybase Enterprise Portal's approach allows the enterprise portal to interface with other vendors' products and technologies; it enables the developer to interface with a wide variety of technology platforms; and it makes it easier for the portal to adapt to new requirements: newer business models and applications, etc.

XML

Sybase Enterprise Portal supports XML throughout its architecture and provides the technologies to parse, transform and build XML messages. Data stored in most databases generally contains no concept of the business object associated with the data. For example, a purchase order object may be stored in normalized form within several relational tables: Customer, PurchaseOrder, and LineItem. It is then up to the application using the data to recompose the purchase order object from the database. Sybase Enterprise Portal provides the technologies to dynamically assemble this object into either a Java Bean object or XML document. XML is an ideal representation for the object if it needs to be transmitted to other internal or external processes, such as for business-to-business processing.

Development Tools

Sybase Enterprise Portal includes development tools to create static and dynamic Web pages, develop Java applications, and design databases and applications. Sybase Enterprise Portal includes graphical application-integration component builder tools to allow developers to create standard component wrappers for the integration services (data, application, and events). This methodology insulates portal business-process developers from the unique characteristics of each integration source, thus increasing their productivity.

Summary: Sybase Enterprise Portal Features

Sybase Enterprise Portal provides the comprehensive set of features required for today's business portals.

These features are:

- **Content Management** to manage and deliver personalized dynamic content.
- **Personalization** to provide higher-value content to users in order to improve user productivity, increase customer retention, and turn more prospects into customers.
- **Subscription** services to access more sources of content.
- **Search** to make it as easy as possible for portal users to have what is important to them; and to enable the indexing and categorization of structured and unstructured data, and data from internal and external sources.
- **Security Framework** to ensure the confidentiality and integrity of enterprise data.
- **Unified Systems Management** to reduce the resources required to support the portal.
- **Comprehensive Transaction Management** capabilities to enable the development of robust applications, and improve developer productivity.
- **Globalization** to enable a business's real-time interface to the world, and to enable global companies to integrate their distributed operations worldwide.
- **Comprehensive Integration Options** to enable faster time to a successful portal implementation, increase the portal's ability to successfully adapt to change, and eliminate the need to re-engineer access to legacy data and applications.
- **Superior Mainframe Integration** to enable seamless integration with mainframe systems, and bring "Web time" development speeds to MVS application environments.
- **Process Workflow** to integrate the right data and business processes at the right time to reduce the amount of time required to complete a business process.
- **Nonstop Continuous Availability** to enable maximum access with the fewest end-user interruptions.
- **Scalable Architecture** to enable predictable performance and continuous availability.
- **An Open Architecture** to make it easier to plug in newer standards-based business models and applications as they become available, and to enable portal developers to interface with a wide variety of technology platforms.



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