

Construction of Information Ecosystem on Enterprise Information Portal (EIP)

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Abstract

Enterprise Information Portal as a unified display platform of Enterprise Information has the capability of integration and display with all kinds of business system. Through bottom layer supporting lots of agreement can realize interconnection of all the business system. The paper takes Life ray EE portal as the Enterprise Information Portal platform, SOA framework and Web Service as business mode. The research on target, framework and key technology of construction of information ecosystem on Enterprise Information Portal realize closed loop of information ecosystem promoting the development of all kinds of enterprise system.

Keywords: Life ray portal; Single sign-on; Virtual portal; Enterprise information ecosystem

Introduction

As the high development of computer and network technology, enterprise information control and integrated manage the information in manufacturing management activities through network and database technology on depth and breadth to realize the effective use of enterprise internal information, which promote the whole management of enterprise information and sustainable development. However, with the excellent of all kinds of information system on enterprise, new problem come out:

- The disunion of all the information system increased the cost on use and maintain;
- The disconnect and non-shared of information resource increased the cost on data consistency;
- The user can only look up the content, and not customize the content according to the demand; meantime lacking of the single sign-on function made the user sign on the repeated system many times, which limited the work efficiency and influenced the safety of the system.
- How to integrate the different information system built by different stages, by united interface to log in and out became the main problem of information system development.

As a result, the above problem made how to build Enterprise Information Ecosystem becoming the main problem of information system development. The aim is to realize connection, shared and innovation of enterprise information. Building ecological and balanced information environment and maximum use of Enterprise Information promoted evolution and development of enterprise [1].

The Summary of the Enterprise Information Portal

The paper takes Life ray EE portal as the Enterprise Information Portal platform, SOA framework and Web Service as business mode. Enterprise Portal is the display, publish and management of enterprise basic platform. To solve above problem, Enterprise Portal is taken as the interface of business information acquired and handled. Enterprise Information Portal based on the polymerization of component-based development and deployment of enterprise application system, and connection and shared of information to realize the closed loop of Information Ecosystem. Enterprise Portal as the interface of business

information acquired and handled, according to the different of enterprise deployment, the main portal connect information by cascaded and multi-application of portal was built by virtual portal.

According to framework of total enterprise portal, total technology framework of enterprise portal had database, Middleware, business processing, page display and data exchange. Multi-portal application management access business application system and function between different applications in the enterprise portal by configuration, function of business application system was accessed on the framework platform, which can be optional customized. The authority function was visited through enterprise portal, and it was no use to deal with something switching frequently in all kinds of application system [2].

Technical Framework of the EIP

The technology of Enterprise information portal almost includes all the Web technology. For framework of the EIP, total technology framework of enterprise portal had database, Middleware, business processing, page display and data exchange. From logic layer, the whole portal platform can be divided as: client, Presentation Layer, Business Logic Processing Layer, Data storage, Middleware, OS. Every logic layer has their different duty.

- Client:** Provide access to portal system for user and technology support for Presentation Layer. Support the normal browser, including IE, Firefox, and Chrome. Portal tray provides entrance to Enterprise information portal for user, new message display and affairs be deal with. It reminds user to look up latest message by the way of pupping message box. Meanwhile, it has the function of integrated address book, Enterprise Search, RSS Subscribers. Channel technology support for Enterprise information portal is provided by Mobile client.

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- b) **Presentation layer:** The system follows J2EE and portal technology specification, and considers the distributed technology, grid computing technology, information integration technology. The system follows W3C, CSS, JSR268, WSRP2.0 standard; related portal application in different portal framework is seamless transplant. It follows the integrated standard of enterprise information mode, and avoids the difference brought by different information system.
- c) **Business logic processing layer:** It includes the center business application of enterprise information portal, and center function like content management, ESNS Collaboration Application, enterprise application, integrated application, personal work station, enterprise search, grid management, security authentication.
- d) **Data storage:** It service for enterprise information portal by data storage. According to the data type, storage is divided as structured and non-structured data storage.
- e) **Middleware:** It provides environment for enterprise information portal application.

IT infrastructure service layer: It provides a stable security environment for the server operating system (Figure 1).

Physical model

The function of application execution is realized by services from all kinds of software, including container type software (Web service, application servicer software), platform type software (directory service software, development platform), and Runtime software (JVM, CLR). So, define the software environment when application executing. Suggest define the software environment from 4 levels like application

display, application services, integration services and general services [3]. As shown in Figures 2 and 3 below:

Main Function of System

Unified display portal is personalized content display platform which is achieved by internal users through user authentication. Content and processing services can be obtained in the portal through the access control, single point technology, user authentication. Daily office work function module and data for users can be integrated by enterprise portal, like business system to do work, function operation of business system, data permissions, email and SMS platform data, schedule management.

Users according to their own habits, including news subscription and index subscription, personalize the content, style show and custom function of portal. Personalized applications show more characteristics of enterprise information portal meantime improve the user's working efficiency, reduce the operation cost of enterprises.

Application function of system

Portal application is built as a multi node by grid technology and formed a grid enterprise information portal, which can realize unified monitoring and management of the application and resource. The system is based on the concept of hierarchical information. Through the integration of C/S, B/S architecture advantages to establish "information tray (C/S) + personal work station (B/S) + enterprise portal (B/S)" application system (Figure 3), a hierarchical integration platform can provide a single point login entrance, unite abeyance, enterprise search, SMS, KPI index center system the function of entrance and other functions. General layered application is as follows:

- a) **Unified display:** Display function is mainly divided into

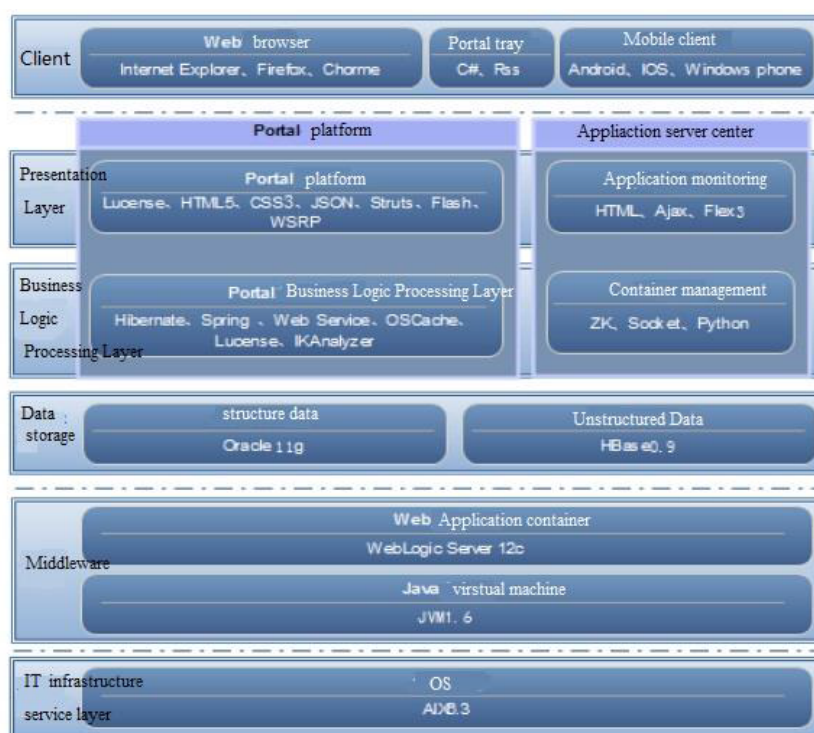


Figure 1: System technical architecture.

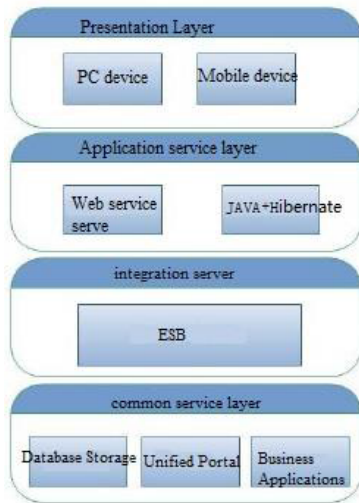


Figure 2: Web Service serve interface.

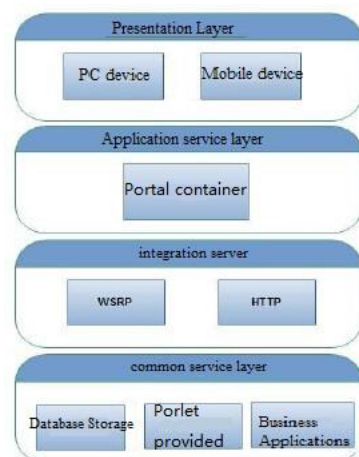


Figure 3: WSRP long-distance portal.

two parts of the portal-group and static management, which includes B2E, portal group portal project portal, knowledge portal, mobile information portal and portal four part tray. The static management including static resource management, static process two parts and operating system log management. Display function as a framework of enterprise portal, which can be used to build the whole function of enterprise portal of the whole structure of organizations and institutions.

- b) **Unified search:** Enterprise search is for enterprise search platform integration, through the search platform to achieve internal in the portal system of cross platform and cross business search, the user can be more efficient and effective access to their data of interest.
- c) **Basic function:** Basic function is the main modules of core content and user business scenarios of enterprise portal. Basic functions include collaborative application (ESNS), integrated application (EAI), content management (CMS) three most organizations. Collaborative application is mainly shows in the schedule SkyDrive, meeting management, enterprise user

daily office commonly, for assistance in daily office, application modules from various business systems or the portal itself development. Integrated application includes single sign on, KPI integration, integration, unified to display as well as the commonly used functions of entrance and so. Integration application of internal show various portal and various business systems integrated access interface set in order to achieve the business system and enterprise portal. Content management is the content of the internal enterprise portal release, news site management, content sharing, unified management [4].

- d) **Management function:** Platform management function is mainly for the enterprise portal to guarantee normal running of function, through the unified user management, log management, products help center, task management and data interface management to the supervision and monitoring of enterprise portal operation, thus a portal management staff better understand the operation of enterprise portal, integrated management for enterprise portal.
- e) **The platform function:** Portal platform function is composed of the personalization, multistage gateway management and WEB clipping, while personalization is composed of personalized, personalized and column layout content personalization three parts. The main function of the portal platform provides application modules, and there functions support the enterprise portal platform for multi-channel and multi-language.

Function of single sign on and virtual portal

Single sign on: Log on to the enterprise portal, one login can take identity roaming between enterprise portal and portal through integrated business application system, without the need to login again and repeated authentication. Single sign on (Single-Sign-on, SSO) in some degree is put forward to facilitate the users of the portal system technology. The traditional portal system because of its integrated application system allows the user to jump in the application system with multiple login. Using the single sign on system allows users to log in any system which can access other applications without the need for multiple login. Therefore, single sign on is conducive to improve the authentication efficiency and avoid security problems caused by multiple system which use the same user name and password. The concept of single sign on is shown in Figure 4.

The general process of single sign on is as follows: when the user first visit application system time (here as application system 1 for example), no documents or security context of user HTTP header file is detected by system 1, the system will redirect the user to authenticate the identity authentication system; identity authentication system based on user provided the user name, password (or other information) of user identity verification to determine whether the user legitimate. If validated, identity authentication will return to the user a certification document (usually a ticket); when the user to access other applications, the HTTP request will be sent with this certificate. The certificate is received by application system, which is unable to determine whether the user is legal, so this certificate will be sent to the authentication server to determine whether the user legitimate [5]. If the user is determined to be lawful, he can access requested the other system (in this case the application system 2) (Figure 5).

Virtual portal: A unit, all the software and hardware use the portal system, and application of resources of the unit exclusive portal system,

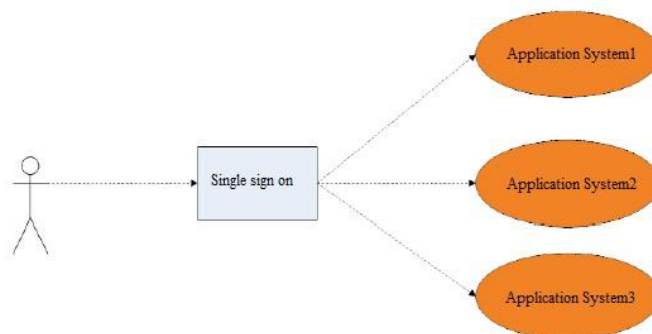


Figure 4: Single sign on.

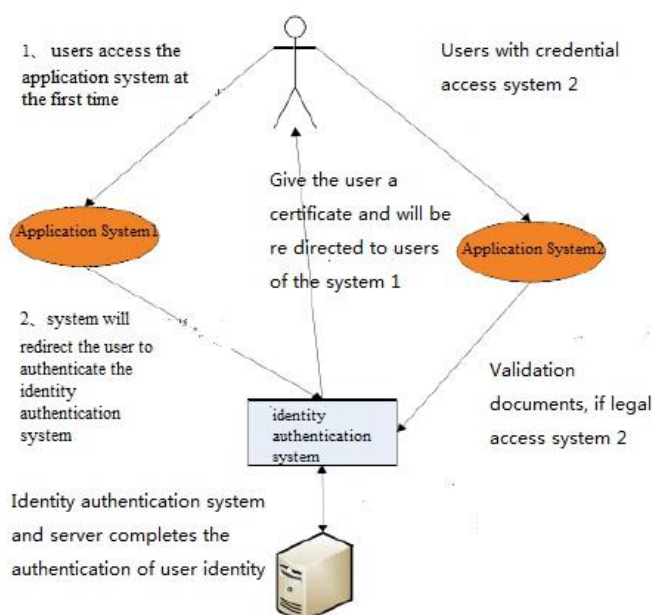


Figure 5: Flow diagram of single sign on.

the enterprise portal system is called the entity portal system. On the contrary, when multiple units sharing a set of soft, hardware and application resources, and through the virtual technology to make each unit has its own application management authority in logic, the portal system that is called the virtual portal system.

The enterprise portal to the entire system as a container and the function of the independent modular design, through the portal management console from the function simulation pool selection function module can be realized by adding virtual portals.

Application Management

Database information and component maintenance

Maintenance of database information: The basic information of database includes: node portal, the database corresponding to deploy a database server IP address, type of database, database port, database name, user name and password connection information. The maintenance of the database information is mainly on the maintenance function of information view, add, edit and delete.

Assembly maintenance: Grid environment, function modules distributed in each node of the portal can be custom by each release, function module by means of component is unified managed by each node portal Grid Service Center, at the same time the component program files into packages uploaded to the grid service center. A component can be formed by a plurality of portal applications in their Portlet composition, also can be released to the war component of Portlet portal application. Components can be divided into two categories:

- The physical components:** The current real portal environment components mainly refers to the portal development environment based on Portlet set.
- Virtual assembly:** When component of entity assembly has shared resources, share resources extracted form a virtual assembly, virtual assembly is unable to complete the business logic independent, only through the entity component to handle business. Entity component is the virtual assembly's successor, entity component inheritance virtual assembly and sharing resources of virtual assembly.

Component development process needs to comply with the uniform norm. Specification is mainly embodied in two aspects: one is the configuration information related to component according to the specification in a unified configuration file of standard format for recording; two is the component configuration file related and program files should be unified directory according to the rules stored.

Application nodes and application service monitoring

Application nodes monitoring: Application nodes monitoring: deployment environment monitoring nodes in the grid, grid service center application monitoring component is mainly responsible for the real-time collection and display node portal operation and node portal application server and database server data. Through these data, it can understand operation and usage of the whole network portal in real time, and play a big role on portal of promotion, and implement maintenance.

Application service monitoring: Large number of service interface existed in portal for data internal and external interaction, interface according to the range of data can be divided into:

- Internal interface module. Provide a unified interface for each function, the data in the module processing range.
- The interface between modules. It provides a unified interface for data interaction between the modules.
- Interface between the portal nodes. Treatment of the data sharing and push operation on grid environment between node gateways.
- Interface between the portal and business system. It mainly refers to the portal in the function and data integration of business systems, data processing interface with the business system or portal system, through the third party platform (such as: SOA platform) released.

Running state of the service interface is monitored by functions of the grid service center monitoring by scanning mechanism of unity, and the running log interface is recorded. If the interface service is not running properly, the recording interface service log and feedback abnormal interface to the system maintenance personnel or developers timely, in order to solve the problem in the first time.

Node application management

Web application management: In grid deployment environment, each portal application is deployed in grid nodes, and mutual communication between nodes is unified managed by the grid service center. Portal applications for the grid environment deployment is

unified managed by grid service center, portal web application manager client can be installed on the portal application deployment server.

The portal Web application manager client is mainly responsible for the management of portal application container, namely: portal application middleware management, data communication including the middleware start and stop, restart, and grid service center. The corresponding management portal application server is deployed in the grid service center server, the operation command from grid service center and communication with the portal application client are handled, the overall deployment architecture as shown below in Figure 6.

In the grid environment, operation log information is formed when each grid node deployed on Web Application Manager Client corresponding to any operation, and managed by grid service center after returning to the Web application manager server, log information returned, according to the classification, query interface is respectively provided for searching in different business module.

Assembly load management: After completion of node portal component customization by user, corresponding component will be released to the node of portal components by grid service center according to the customization information. Assembly load command and related component information are sent to Web application manager client of customized component node portal through the Web application manager server by Grid service center, after the client receives the command post, related packages are downloaded from grid service center according to the assembly information provided by client, component is released to Web application container of the node portal after decompression according to the component loading rules, the node portal users can use the function provided by this component after the completion of issued, and the whole process is the assembly load management [6].

The server deployment

The enterprise information ecosystem using multilevel deployment, other corresponding portal is constructed through the virtual portal mechanism by enterprise information portal in the centralized deployment, which has achieved the purpose of multistage application enterprise. The server hardware is deployed as follows (Figure 7):

- The load balancer:** A single load balancer of portal server is used to schedule user access request and the portal server response. The load balancer for HTTP requests, its main function is to monitor the load situation of the host in the portal server cluster, and when a HTTP request comes, automatically forwards the request to the least loaded server.

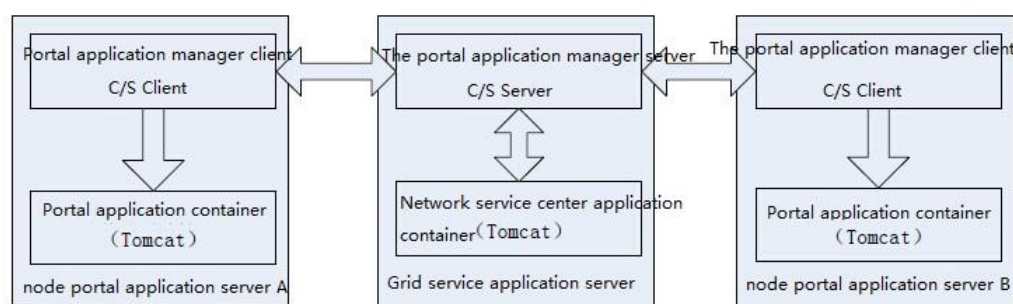


Figure 6: Application Manager Deployment architecture.

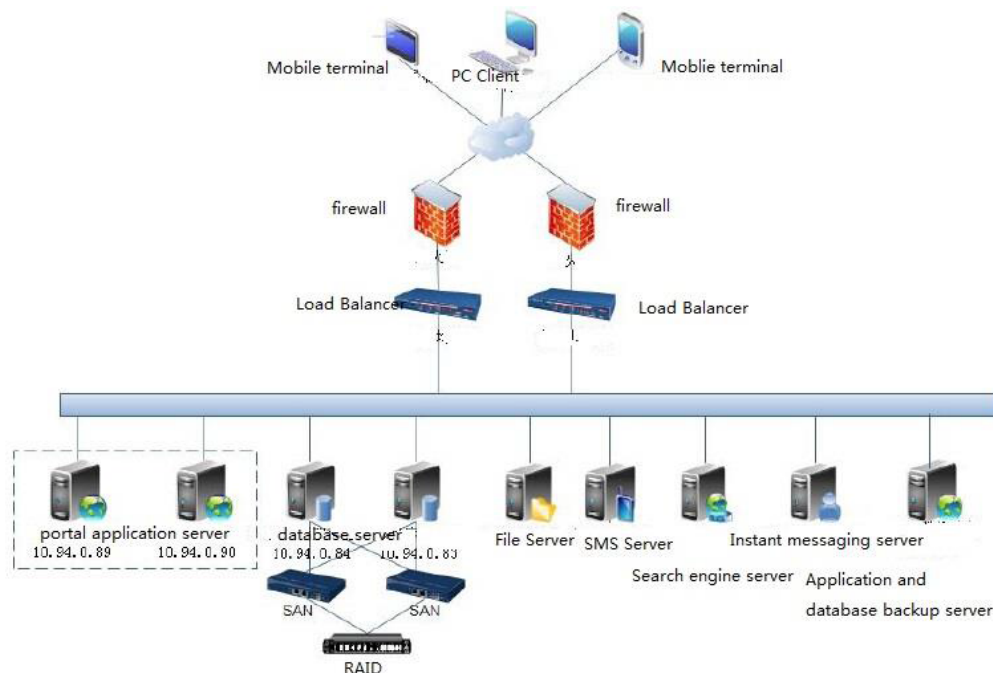


Figure 7: The server hardware deployment structure.

- b) **Portal server cluster:** Composed of several portal application server, providing specific portal business logic. Running the portal system, and handle the user service request.
- c) **The database server cluster:** Database cluster using multiple database servers, server connection SAN, the SAN connection disk array, internal links between servers. Sharing of data stored in the disk array.
- d) **The file server:** The file server, unstructured data of portal system storage, such as image, video and other content.
- e) **The SMS server:** The SMS server provided message support for the portal.
- f) **The instant communication server:** Instant communication server provides support in communication integration for portal.
- g) **Search engine server:** Search engine server provides a content indexing, retrieval and other services.
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Conclusion

In this paper, the enterprise information portal as a unified information platform is to build information ecological system centered on the enterprise information portal. This scheme makes the portal integration application more convergence and scalability, unified management of the application and information resources and integration presentence of various kinds of information are effectively realized by the information portal group and virtual portal technology, and the communication and share of information flow between application systems are realized.

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