

THE ROLE OF ENTERPRISE PORTALS IN ENTERPRISE INTEGRATION

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Today's enterprises are moving business systems to the Internet - to connect people, business processes, and people to business processes in enterprise and across enterprise boundaries. The portal brings it all together: business processes, departmental sites, knowledge management resources, enterprise management systems, CRM systems, analytics, email, calendars, external content, transactions, administration, workflow, and more. The goal of this paper is to present the role of the Enterprise Portal in internal and external enterprise integration.

Keywords: Portal, Enterprise Portal, Integration, ETL, EAI, EII

1. Introduction

As businesses become more complex and diversified, the challenges of accessing relevant information become more pronounced for the user while provision for the information becomes more difficult for the enterprise. Today's business problems faced are as stated below:

- more business information sources: Document Repositories, Enterprise Applications, Web Services;
- more systems: Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM), Knowledge Management (KM), Enterprise Application Integration (EAI);
- more people: employees, customers, partners;
- more geographic areas: multi locations, multi lingual users;

There is an ever-increasing abundance of data within enterprises. Integrating data from disparate sources and filtering the required information can be very tedious and time consuming. Enterprise Portals are the most commonly used tools that seamlessly integrate and display digital content in a highly personalized environment.

They integrate not just data and information, but also organisational knowledge and business processes, and facilitate sharing of applications, services, and core competencies among the employees, customers and business partners. A complete Enterprise

Portal solution must provide all users (employees and external communities) personalised convenient access (Point & Click, Drag & Relate, Single Sign-On) to everything needed (information, applications, services) anytime, anywhere (Web Browser, Mobile Devices) in a secure way to get their task or job done.

2. The main types of integration

Today, for integration can be used one of three types of techniques – *data consolidation* using extraction, transformation and load (ETL) technology, *data propagation* using enterprise application integration (EAI) technology, and *data federation* using enterprise information integration (EII) technology. [Imhoff, 2006] Therefore, the main targets of integration in an enterprise are: data, applications and information.

ETL – Data integration was the earliest form of integration. Data warehouses and data marts were developed to create an aggregated view of enterprise information residing in disparate systems, and to give business users better access to enterprise information.

The support of data integration has been ETL tools. They were created to extract the information, transform it into a consolidated view, and then load it into a data warehouse and data marts to be used for analytics. The problem with each of these solutions was the need to physically move large volumes of data from source systems to multiple

consolidated data stores including the data warehouse, distributed data marts, operational data stores, and analytical multi-dimensional databases. While these consolidated data sources continue to be important to enterprises, latencies and inconsistencies are the main inconvenient of such an architecture.[Gold-Bernstein, 2004]

EAI – The EAI technologies came along and solved the data latency problem by synchronising changes across systems in real time but it less adequately addressed the need to aggregate and consolidate data and information across the enterprise. EAI use a strategy or framework by which an enterprise centralises and optimises its application integration or process automation, usually through some form of data replication or message brokering mechanisms.

Therefore, EAI can effectively move data among systems in real time, but does not define an aggregated view of the data objects or business entities. For example [Gold-Bernstein, 2004], a customer service representative on the phone needs to be able to answer a customers question in real time, without having to figure out which system is involved. This requires the ability to make a query across distributed data sources as if they were a single database. EAI does not address this problem at all. Enterprise Information Integration (EII) does.

EII - When an enterprise requires a framework for real-time integration of disparate data types from multiple sources inside and outside the enterprise, EII technology fits the best. This technology empowers developers to establish an environment in which to “pull” data from anywhere bringing it together in a virtual manner.

The objective of EII is to enable applications to see dispersed data as though it resided in a single database. EII access to dispersed data involves breaking down a query issued against a virtual view into subcomponents, and sending each subcomponent for processing to the location where the required data resides. The EII product then combines the retrieved data and sends the final result to the application that issued the query. More advanced EII solutions contain sophisticated performance facilities that tune this process for optimal performance. The ultimate target is an end user who uses the technology to

request specific pieces of information. [White, 2005a]

3. Enterprise Portals and their classifications

Portals provide a personalised window into the enterprise and provide users access to relevant information. An Enterprise Portal provides users with a centralised, easy-to-use access to all the information, applications and services they need to participate in collaborative business processes. These services and content are managed and provided by five main types of applications, as well as their underlying data stores [White, 2005b]:

1. *Business transaction applications* that run day-to-day business operations.
2. *Collaborative applications*. Collaboration is the interaction among two or more individuals that can encompass a variety of actions, such as communication, information sharing, coordination, cooperation, problem solving, and negotiation. So, collaborative applications are those that provide e-mail, instant messaging, discussion groups, web conferencing and online presentations, online white boards and screen sharing and remote learning.
3. *Workgroup application*. A workgroup is a collection of individuals working together on a task. In this case, workgroup applications provide search, document sharing and workflows, the management of workgroup documents, web pages, digital media and local offline data.
4. *Enterprise content management (ECM) applications* that provide similar capabilities to workgroup applications, but at the enterprise level. These applications also support large volumes of operational documents and are able to manage the capture, storage, security, revision control, retrieval, distribution, preservation and destruction of documents and content.
5. *Business intelligence (BI) applications* are a broad category of applications and technologies for gathering, storing, analyzing, and providing access to intelligent information on a enterprise's data in order to identify significant trends or patterns that ultimately facilitate the decision-making process and provide the enterprise with a competitive advantage. BI applications include the activities of decision support, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining.

Murray [Murray, 1998] distinguishes four types of enterprise portals as follows.

Enterprise Information Portals connect people with information by organizing large collections of content on the basis of subjects or themes they contain.

Collaborative portals enable teams of users to establish virtual project areas or communities along with the tools for

collaboration they offer, and to work cooperatively within these communities.

Enterprise Expertise Portals link people together based on their skills and expertise, as well as their information needs.

Enterprise Knowledge Portals do everything the first three types do and an unspecified something "more" to deliver personalised content based on what each user is actually doing.

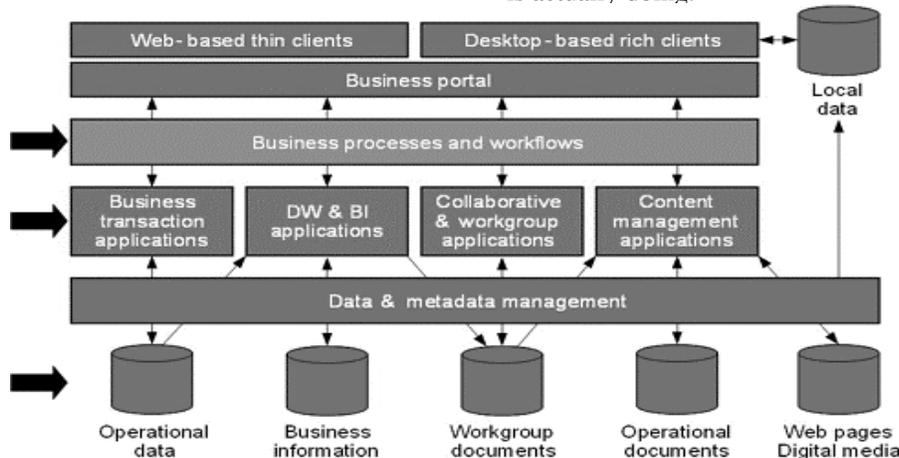


Figure 1. The environment of an Enterprise Portal [White, 2005b] Beside of this classification, White [White, 1999] makes obvious the portals duality between collaboration and decision support classifying them in:

Collaborative Processing EIP and Decision Processing EIP.

The **Collaborative Processing EIP** helps users organize and share workgroup information. This workgroup information can include e-mail, discussion group material, reports, memos, and meeting minutes.

The **Decision Processing EIP** helps executives, business analysts and managers to access corporate information for making crucial business decisions thereby helping the users organise and find corporate information in the set of systems that constitute the business information value chain. This classification isn't so strict, a portal defined as decisional may take into consideration collaborative aspects and reciprocal, but these aspects are not considered primordial.

The portals' market development suggests other classification of portals based on products (applications) starting from which the portals are developed. This classification enables also to make obvious different functionalities. While in above classifications the portals are developed for facilitate the available information access, the enterprises rapidly realised the portals' potential for enable exchanges between enterprises,

between enterprise and customers, and also between enterprise and employees. This perspective allows the classification of portals after another axis. There are two main categories encountered [Chazan, 2003]: the **Enterprise Information Portals (EIP)** and the **Role Portals**.

The **EIPs** correspond to the above classifications and are collaborative and decisional.

Role portals - are evolving to support the three business models of B2E – Business to Employee, B2C – Business to Customers, and B2B – Business to Business.

B2E Portals are designed to make people as productive and successful as possible. Their goal is to create an integrated "Home" space in which to "live" so they can get just the right information, resources and software appropriate to them whenever they need it, including while directly performing work. The intention is to increase not only efficiency, but also employee satisfaction and a sense of community within the enterprise. **B2C** Portals support the linkage and relationship between the corporation and its

customers. Role portals for B2C support the ordering, billing, service and support activities, workflow and collaboration between the corporation and its customers. These also support customer self-service.

B2B Portals support the information flow, business activities and processes across the enterprise and its suppliers and partners for distribution and supply chain management activities.

4. The main functions of an Enterprise Portal

Depending on their categories, the Enterprise Portals provide ones of (or all) the bellow functionalities.

1. *Search and navigation.* A portal should:
 - automatically present its users with the information appropriate to the user's role;
 - suggest additional information to the user, and/or allow the user to voluntarily personalise the information presented by the portal;
 - allow the user to search for information that was not previously known to be relevant to the user's role, but which may be available through the portal.

This feature makes content more accessible, increases portal usefulness, and increases user productivity.

2. *Personalisation* - is vital to the delivery of appropriate information to portal users - each user gets only the information that is specifically tailored to his/her needs. Personalisation should be based on user roles, as well as user preferences making content more relevant and useful and increasing portal use and user productivity.

3. *Notification* (push technology) is referred to as a system in which a user receives information automatically from a network server. Push technologies are designed to send information and software directly to a user's desktop without the user actively requesting it. Thus, the user has the opportunity to subscribe to active information sources (such as news feeds and periodically updated reports) and to ask to be alerted when documents are updated.

4. *Single sign-on* - simplifies software access and login. The ability to see information from multiple systems, in multiple formats all presented on a single page view is perhaps the largest benefit to a portal's user community. This results in significant reduction in employee orientation and training, as well as timesaving for the

users who can monitor and update multiple systems through a single web view of the enterprise. Since the different systems that make up a page within a portal may be secured with different user login credentials, single sign-on solutions facilitate the navigation among the systems through a single authentication scheme.

5. *Collaboration and Groupware.* This feature utilises all tools around messaging, discussion, and general group development. Groupware tools ensure that the required information is stored in the right place and in the right mode. By this means, the right persons are brought together with the right information. Groupware software assists in less formal collaboration than workflow tools. As with workflow automation, groupware increases the value delivered by many types of specialized portals; for example, it increases the attractiveness of B2E, B2C and B2B portals and enables informal communication between employees, suppliers, and customers.

6. *Task Management and Workflow.* The workflow functionality allows the automation of business processes. Thus, as part of a workflow-automated business process, a portal should be able to prompt its users when they have tasks to perform. This feature allows work to get done, contend developed and processes to take place in an automated, secure and controlled manner.

7. *Content management* uses the tools and processes by which content is gathered, created, approved, published and maintained. Trough this feature, a portal accelerates the development and publishing of content, keeping content more relevant and reducing bureaucracy.

8. *Document management* includes the tools and processes around document submission, security, versioning, and categorization. Helps users create, organize and manage documents and make them more accessible.

9. *Business Intelligence* includes the tools, technologies, applications and processes used to gather, store, and provide access to data needed for enterprise decision-making. Promotes better and more informed decisions by a wider universe of users.

5. The ways to realize the integration

Integration refers to aggregate data from internal and external systems and display it in the portal framework. It can be argued that ease of integration is the most important feature of an enterprise portal, which

becomes the central technology hub of an enterprise. More emphasis is also being placed on a portal product's ability to integrate (or talk) with other portals. The depth of possible integration can vary greatly and may include any of the aspects presented below.

URL Based Integration. This form of integration is the most basic – the portal provides a URL to an existing web page, and the exact output of that URL will be displayed in either a new browser window or that of the portal. This is the easiest and quickest form of integration, although it is technically not true “integration”, as it does not integrate the functionality of the target system into the portal. It does provide a *link* to the functionality, data, or desired information, thereby improving user productivity.

Legacy screen scraping – screen scraping is programming that translates between legacy application programs (written to communicate with now generally obsolete input/output devices and user interfaces) and new user interfaces so that the logic and data associated with the legacy programs can continue to be used. Screen scraping is sometimes called *advanced terminal emulation*. A program that does screen scraping must take the data coming from the legacy program that is formatted for the screen of an older type of terminal and reformat it for a Windows 2000 user for example, or someone using a Web browser. The program must also reformat user input from the newer user interfaces (such as a Windows graphical user interface or a Web browser) so that the request can be handled by the legacy application as if it came from the user of the older device and user interface. Although it provides inherently limited usability and lacks flexibility and scalability, legacy screen scraping does allow an enterprise to leverage existing mission critical enterprise applications improving portal relevance and flexibility.

Web-based screen scraping – Web-based screen scraping is a term that refers to a portal's ability to pull an entire web page, or specific sections of a web page, into a portal window. Usually this is done with an application that parses the HTML tags, which produces a web page and allows pulling specific sections. This form of integration

allows for greater personalisation of portal content by incorporating static content of other web-based sources. However, screen scraping creates a very inflexible interface, in the sense that the integration depends on knowing the location of data elements on the screen. Even small updates or changes to a website can cause the integration to fail.

XML/XSL - Extensible Markup Language (XML) is a markup language for documents containing structured information. Used to transfer data, it is becoming the standard for web-based integration. XML styles are defined using an XSL style sheet, and XML pages display information according to predefined tags. An XML page can call the tags, once defined, of another XML page and exchange information quickly over HTTP. An XML processor is required to read XML documents and provide access to their content and structure. XML technology is quickly gaining wide business acceptance for its simplicity, its extensibility and its flexibility. XML based integration allows to pull and manipulate data without necessarily writing custom integration code. This type of integration reduces customization costs and implementation time by creating a simple standard for integrating data and content from external sources.

API - Application Programming Interface integration involves developers writing code to pull specific information or functionality from a system. The most comprehensive form of API integration would allow for both reading from and writing to the external system. Leveraging APIs provides a way to custom link the portal directly to another enterprise application, increasing portal depth and functionality. Creating custom integration solutions may make sense if there are a limited number of systems that need to be integrated. However, as the number of systems to be integrated increases, such individual point-solutions become difficult to manage and maintain.

EAI - Enterprise Application Integration resolves the problems associated with solutions based on a point-to-point architecture. EAI solutions tie together the different systems and processes within an enterprise to create a more seamless and connected enterprise. Instead of “spaghetti-code” and a maze of API's, EAI make managing the connections and interfaces between systems simpler, more stable, and

easier to modify. EAI encompasses methodologies such as object-oriented programming, distributed, cross-platform program communication using message brokers with Common Object Request Broker Architecture and COM+, the modification of enterprise resource planning (ERP) to fit new objectives, enterprise-wide content and data distribution using common databases and data standards implemented with the Extensible Markup Language (XML), middleware, message queuing, and other approaches. An EAI solution is generally faster to implement and easier to change than a point-to-point integration solution and offers a platform for integrating enterprise applications with the portal, vastly increasing portal functionality and user productivity.

Conclusions

Concluding, what is becoming increasingly clear is that portals must now become more robust integration platforms that can support the growing list of requirements that a portal must address. Additionally to the need for greater cross-application integration, some of the more important requirements result from the following:

- As portals became more sophisticated, they grew into integration platforms for accessing both structured data (database centric) and unstructured data (documents). Users are now demanding the ability to access and mix these data types in ways that will allow them to get a more complete picture of the aspects of their business environments that they need to address in their respective jobs.

- The integration of business processes for the purposes of both internal efficiency and greater responsiveness to external communities is becoming an increasingly more important factor in the enterprise's quest for greater competitive advantage. What has resulted is a proliferation of tools and infrastructural elements aimed at supporting automation of business processes and the construction of applications that are process centric. Portals are needed to support these types of applications, as well as the collaboration and groupware functions needed to make these processes useful within an enterprise.

- Which applications and data sources are accessible to a particular portal user, regardless of the community to which that user belongs, must for the obvious reason of

security be based on identity and roles. Again, while the portal becomes a UI customised for each user, the situation becomes more complex and accentuates the requirement for a single sign-on, role-based portals' capability.

- From the standpoint of doing business with customers or other business entities, the portal is not only about information – it is also about transactions. Supporting transactions in a reliable way means replicating many of the functions that are today being performed by sophisticated, transaction-based middleware and server products. These functions have historically not been part of portal products but today they become more and more a demanding of the portals' functionality.

Therefore, the Enterprise Portal could be considered the desktop of the near future enterprises.

References

- [Azzara, 2003] Azzara, C., Garone, S. – *Portals and Integration: Infrastructure Will Rule the Day*, 2003, AlignIT Group, white paper, <http://www.ebizq.net>
- [Chazan, 2003] Chazan, M. - *Portal Design and Development*, 2003, white paper, <http://files.epsscentral.info/>
- [Firestone, 1999] Firestone, J. - *Defining the Enterprise Information Portal*, 1999, Executive Information Systems, Inc., white paper, <http://www.dkms.com/papers/>
- [Gold-Bernstein, 2004] Gold-Bernstein, B. - *Enterprise Information Integration– What Was Old Is New Again*, ebizQ white paper, 2004, <http://www.ebizQ.com>
- [Imhoff, 2006] Imhoff, C. - *Feeling SaaS-y? Software as a Service – for Data Integration*, 2006, Intelligent Solutions Inc., white paper, <http://www.intelsols.com/>
- [Kulkarni, 2005] Kulkarni, S. Nath, S., Pandian, M. – *Enterprise Information Portal: A new Paradigm in Resource Discovery*, 2005 white paper
- [White, 1999] White, C. - *The Enterprise Information Portal Marketplace*, 1999, Database Associates International, Inc, white paper, <http://eprints.rclis.org/>
- [White, 2005a] White, C. - *Data Integration: Using ETL, EAI, and EII Tools to Create an Integrated Enterprise*, 2005, TDWI white paper, <http://www.tdwi.org>
- [White, 2005b] White, C. - *Business Integration: Enterprise Portal Evolution*, 2005, white paper, <http://www.b-eye-network.com/view/1>

