



SAS[®] Information Delivery Portal

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Introduction

The SAS Information Delivery Portal is the only portal that combines the strengths of the world's leading information delivery system with an open Java portal platform, which lets you selectively and securely disseminate information throughout the organization.

The SAS Information Delivery Portal leverages the business intelligence capabilities of SAS software to extend your reach throughout an entire enterprise. Furthermore, the personalization capabilities of the portal let you tailor information sources required to efficiently perform your job. The portal's ability to facilitate information access and data analysis with ease increases your ability to make informed business decisions.

The power of the SAS Information Delivery Portal is based on an application model that enables flexibility and adaptability. The ability to integrate the portal with third-party applications adds value to existing technology investments and enables an enterprise to quickly adapt the portal to the changes that are necessary for information delivery within the enterprise. Finally, the open architecture supports an enterprise's ability to extend the portal with minimal investment.

The State of Enterprise Information

Enterprises are experiencing information overload. Transaction-oriented systems generate reports daily. Data warehouses and analysis tools slice and dice data in hundreds of ways. Enterprise resource planning (ERP) tools collect data on every possible data point within the enterprise. Productivity tools and the information available over the Internet add to the information overload.

To compound the information problem, today's enterprises exist in a global marketplace, which means that their data and applications are geographically distributed: every department has its own application and data warehouse. Enterprises are implementing ERP tools from beginning to end — HR products, financial systems and production-oriented systems for manufacturing. The information used by the ERP tools is stored in disparate data sources, such as relational databases, application-specific formats and multidimensional data sets.

Employees who must access these applications and their associated data are often referred to as *knowledge workers*. Knowledge workers waste a significant amount of time trying to find the right information instead of analyzing the information to support the business decisions.

Information supply chain technologies should help to alleviate the problems of information overload; however, most vendors have stopped short of supplying a complete solution. Instead, they have developed systems that focus only on the early stages of the information supply chain, such as data creation, collection, transformation and analysis (see the section *Information Supply Chain Technologies* on the next page). The SAS Information Delivery Portal completes the chain by supplying an effective information delivery mechanism.

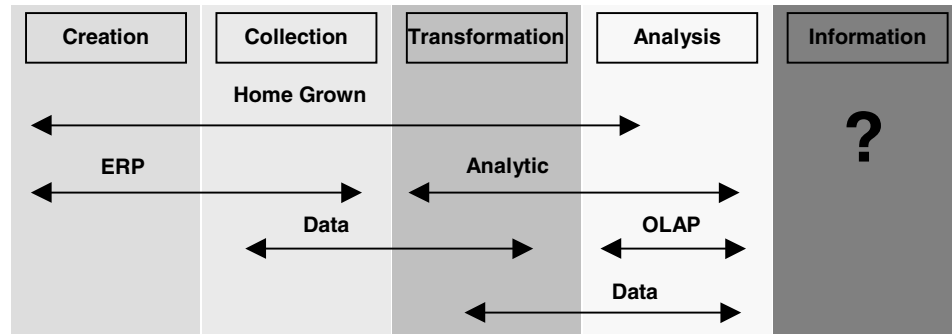


Figure 1: Information Supply Chain Technologies

Enterprises are beginning to see how effective delivery and sharing of information improves the process of making informed business decisions. The SAS Information Delivery Portal provides an enterprise-wide information delivery vehicle that puts the highest quality information in the right person's hands when it is needed.

The SAS Information Delivery Portal:

- Facilitates the knowledge worker's ability to make effective business decisions.
- Ensures delivery of the right information to the right people.
- Allows enterprises to create communities of interest.
- Enables the highest quality information through integration with SAS technologies.
- Provides a flexible and adaptable architecture that will grow and adjust as the enterprise changes.
- Ensures enterprise information confidentiality through a highly granular role-based security model.
- Integrates within other collaborative environments.

Information Supply Chain Technologies

The information supply chain is a set of phases that information follows. As information migrates up a supply chain, its value to the enterprise increases. Ultimately, the right information is delivered to the right person in a timely manner to foster informed business decisions. The five phases of the information supply chain are creation, collection, transformation, analysis and consumption. Most of the phases benefit from the application of state-of-the-art technologies. These benefits have resulted in increased quality of products, shortened time to market and greater user satisfaction.

For example, ERP tools from SAP, PeopleSoft and other vendors have paved the way for creating information for the day-to-day operation of enterprises. Tools like the industry-leading SAS/Warehouse Administrator collect the information and provide a platform for transformation

and analysis. Finally, Enterprise Miner and OLAP tools from SAS help knowledge workers analyze the information they gather.

In the past, other vendors have fallen short in the area of effective information-delivery technologies. SAS fills this void through the SAS Publishing Framework, which the SAS Information Delivery Portal uses. The SAS Publishing Framework consolidates the publishing functionality of SAS Integration Technologies components into a manageable architecture that lets you efficiently create, deliver and retrieve knowledge within your enterprise. You can use this framework to generate and deploy packages of information that fulfill your business needs.

The remainder of this paper explores and discusses the features, functionality and benefits of the SAS Information Delivery Portal.

Making Informed Business Decisions

The rapid movement and competitive nature of today's marketplace allow no room for making mistakes. In this environment, making informed business decisions is a requirement. While this may seem simple, finding all the information necessary to make informed decisions is a complex issue because these decisions must draw on information produced and stored throughout the organization. To empower decision makers, organizations need to develop an infrastructure that supports timely information delivery and sharing.

Gathering Business Intelligence Data

This section describes features that the SAS Information Delivery Portal provides for accessing and exploiting an organization's information. These facilities ensure that future business decisions are informed and encompass an enterprise-wide view.

Quality Information

A portal is only as good as the information that it delivers to the knowledge worker. Although many portal solutions provide broad access to varied data sources, their analytical tools are limited to simple queries and OLAP drill-downs. The knowledge worker is left to perform manual aggregation of data. The SAS Information Delivery Portal overcomes these limitations by exploiting other SAS technologies to provide effective information delivery for industry-leading analysis. The quality of the information surfaced from an integrated SAS solution results in a competitive advantage.

Single Point of Focus

Knowledge workers must access a wide source of information when attempting to find the information needed for making informed decisions. The SAS Information Delivery Portal provides a single focal point for accessing business intelligence throughout the enterprise. The portal leverages a centrally managed enterprise directory for locating and accessing information metadata, which is used to seamlessly access information from various systems and on numerous servers throughout the enterprise.

Dynamic Reporting

Many business decisions are based on static information that gives knowledge workers a false feeling about the current situation. To make the correct business decisions in an ever-changing global marketplace, knowledge workers need access to information in real time. The SAS Information Delivery Portal provides access to real-time information using dynamic reports, interactive query capabilities and OLAP.

Information in Context

The structured information used and produced by applications must be complemented by unstructured information in order to convey context of meaning. This unstructured information can take the form of any digital content, including word processing documents and audio/video clips. The information-delivery model surfaced through the SAS Information Delivery Portal supports the retention and presentation of such information.

Security

Much of the information held within the enterprise is considered sensitive and must be secured. The SAS Information Delivery Portal provides a flexible, role-based security model that limits information access based on group or individual permissions through the use of open standard LDAP enabled enterprise directory servers.

Custom Portals

The features of the SAS Information Delivery Portal provide the foundation for creating *communities of interest* — groups of workers with similar information needs. By creating a custom portal, you surface only the information and applications a community needs. If you incorporate the capabilities of collaboration applications, you create a community in which the workers share knowledge and information.

Delivering the Right Information to the Right Person

Business intelligence is just one important aspect of an enterprise's information needs. Information must be shared throughout an organization if it is to function effectively and efficiently; otherwise, members of the organization duplicate efforts and do not achieve a consensus understanding.

To effectively implement information sharing, a model for distribution must be designed. The SAS Information Delivery Portal leverages the distribution model of the SAS Publishing Framework (see *SAS Publishing Framework* below) as the foundation for ensuring that information can be freely shared.

Accessing Enterprise-Wide Information

In today's network-centric environment, information is spread throughout an enterprise on disparate operating systems, relational databases and various application platforms. When this information is published using the SAS Publishing Framework, metadata about the location and methods of retrieval are stored in the enterprise directory. When a knowledge worker requests access to a piece of information, the portal reads the metadata from the enterprise directory and utilizes the portability and access capabilities of the SAS solutions to retrieve the information.

SAS Publishing Framework

Publishing is the process of delivering electronic information to interested users in a timely fashion. You probably publish information on a regular basis. Many of us do this by sending e-mail to the people in our organization to inform them that we recently updated a business report, an inventory list or an application.

The type of publishing usually done today requires that you know all of the people who want to receive updates. You are also responsible for sending your updates or notifications. The SAS Publishing Framework enables you to leave these manual requirements behind and automate publishing. The framework also allows users to express their interest in a particular type of information by subscribing to that information.

Data and information that you publish using the framework is delivered as a package. Entries in the package can be output from SAS software or files you created using some other software.

A package can be published directly to a user or user list via e-mail, to a message queue, to a channel for delivery to subscribers, or to an archive. The framework provides an enterprise with tremendous flexibility in delivering information to users.

Customizing to Meet Your Needs

The days of one-model-fits-all are gone because of the unique culture and nature of today's enterprises. The customization capabilities of the SAS Information Delivery Portal allow an enterprise to mold the portal to its culture. You can accomplish customization on two levels: *enterprise-wide* and *personal*.

- **Enterprise-Wide Customization** — You can configure the SAS Information Delivery Portal to reflect the natural or desired flow of information within the enterprise by using filters, security policies and organization of information channels. Portal administrators determine and implement customization at this level.
- **Personal Customization** — Individuals within the enterprise can personalize the portal to focus on the information resources they need for making timely and informed decisions. The SAS solution provides tools for personalization of the portal through keyword searching, channel subscriptions, event notification and other features.

Analyzing the Data

While a knowledge worker might have the right information, additional manipulation of the data is often necessary. The SAS Information Delivery Portal provides access to industry-leading SAS solutions with extensive capabilities for aggregation and analysis of information. Other portals provide a broad range of access, but none matches the extensive data access and management services, rich statistical methods and unparalleled applied analyses that are available through the SAS Information Delivery Portal.

Exploiting Operational Data

Over the last several years, enterprises have implemented a number of systems (ERP systems, for example) that have resulted in higher productivity efficiencies and in a streamlined operational environment. While these systems have had an impact, they do little to increase the competitive advantage of the enterprise. Enterprises using SAS analytical solutions to exploit the data within operational systems generate information that creates a competitive advantage. The SAS Information Delivery Portal provides the vehicle by which the information surfaced in these solutions is delivered to the appropriate knowledge workers.

Flexible and Adaptable

To maintain a competitive edge, today's business environment demands software applications that can be modified quickly. This need for speed has shortened application implementation cycles and has increased the requirement for flexibility and adaptability in application design. The SAS Information Delivery Portal can adjust and grow with an enterprise as the business environment changes.

Portal Architecture

The following steps walk you through a transaction and show how the individual components of the portal interact (see Figure 2 below for a graphic representation of these steps).

1. A user interacts with the portal through an HTTP client, generally a browser. After a request is made, information from the client is passed to the SAS Portal Web application.
2. The middle tier consists of a Servlet container that runs Java Web applications consisting of Java Beans, Java Servlets and Java Server Pages (JSPs). The SAS Information Delivery Portal Web application manages the user's session and is responsible for processing requests. Depending on the request and the state of the middle-tier cache, the request may need to be processed by the back tier.
3. The back tier queries the Enterprise Directory, which is a directory containing metadata about documents and other information resources. The directory returns the metadata necessary to fulfill the request to the middle-tier portal application. The portal application caches the metadata for future reference.
4. Depending on the nature of the request (for example, a request to retrieve content, to run a stored process or to run an application), the middle tier leverages the metadata to fulfill the request. In the case of content retrieval, if the content is not cached on the Web-tier file system, the application uses the location and method-of-access metadata to service the request. The portal uses the SAS IOM server on the back-end portal enabled SAS server to retrieve the requested information, which can reside on any platform in the enterprise including Windows NT, UNIX and OS/390.
5. If content is retrieved from the back tier before returning the information to the client, the content is cached on the Web-tier file system for future reference. This content is tagged with an expiration date so that the information expires at the end of its useful life.
6. Through a servlet, the application streams content back to the client. In order to know how to display the content, the browser looks at the MIME type of the content and either displays the content or selects the appropriate viewer to display the content.

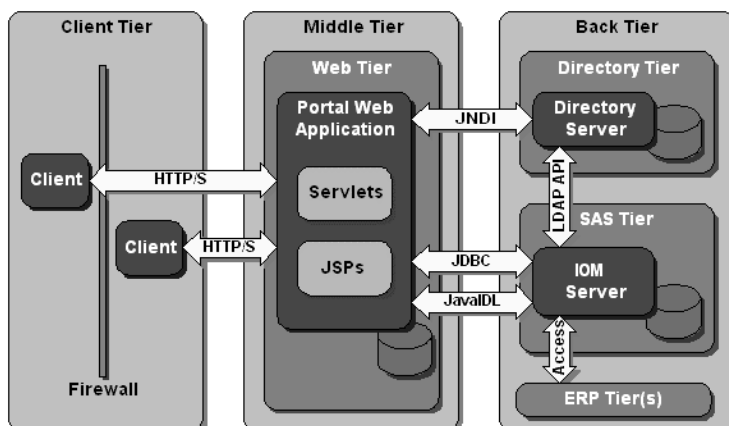


Figure 2: Portal Architecture

Portal Functionality

The SAS Information Delivery Portal is a Web-accessible application that provides data encapsulation and access to enterprise-wide information from a single focal point. In addition, the solution is based on an n -tiered topology and supports open standards that facilitate integration into various environments. The SAS Information Delivery Portal is delivered with an application development environment that lets programmers leverage existing functionality while extending the portal with new functionality. All of this technology is hidden from the knowledge worker by the portal's middle tier.

N -Tier Topology

The SAS Information Delivery Portal follows an n -tier topology with each tier made up of a number of components and each component providing and encapsulating a piece of functionality. This type of topology provides significant flexibility and adaptability, which are needed in today's changing enterprises. For example, the n -tier topology shields clients from the complexities of dealing with databases and back-end processing. Clearly drawing the line between the client tier and the middle tier allows multiple clients (browsers, client/server, handheld devices, etc.) to leverage the functionality provided in the middle tier. The separation of the middle tier from the client tier also allows an enterprise to increase security by moving the middle tier within their firewall.

Open Standards

In order to achieve interoperability between vendor products and provide enterprises with true end-to-end solutions, vendors need to adopt open standards. This has never been more important than it is today. SAS believes in the power of open standards and has designed the portal to support many standards. The foundation architecture of the portal incorporates Java 2 Platform, Enterprise Edition technologies (JSP, JNDI, JavaIDL and JDBC) as well as internet and enterprise standards such as HTTP/S, HTML, XML, MIME and LDAP.

Scalability

The SAS Information Delivery Portal scales to meet the continued growth in enterprise information needs. The portal's middle-tier Java technologies operate in a multi-threaded environment. The portal also supports two levels of caching to help speed access to information: enterprise directory and content caching. In addition, the LDAP-based enterprise directory supports strong authentication to scale with the growing user base.

Metadata Exploitation

Workers encounter many problems in their attempts to find and exploit information resources that support informed decisions. These problems could be eliminated if the solutions leveraged metadata. SAS analytical solutions save metadata about business and technical data, operational systems and processes. The use of metadata enables knowledge workers to capitalize on the wealth of information available to them. For example, the SAS data warehouse shares metadata

with the SAS Information Delivery Portal, which allows knowledge workers to navigate through the data warehouse hierarchy, and view and analyze the information from the portal.

Extendibility

Enterprises may require functionality that is not currently available in the portal. The SAS Information Delivery Portal addresses these additional requirements by enabling enterprises to add functionality using an application development environment, which is delivered with the portal, to develop additional components within the portal framework.

Portal Administration

Using the following SAS Information Delivery Portal administration features, enterprises can further configure the portal to reflect the natural information flow of the enterprise.

Role-Based Security

Role-based security gives the SAS Information Delivery Portal the ability to adapt and grow with an enterprise as information becomes more sensitive. To implement role-based security, the security administrator grants users or groups of users access to objects. The permissions granted to the user or group are determined when the user logs on to the portal. The information that is protected by security permissions can be surfaced in the same portal view as the public information that does not require log on validation.

Object Definitions

Objects must also be defined in the enterprise directory in order to implement role-based security. Objects can include a SAS server that is accessible on the back end, a channel to which static information is published, a dynamic report that delivers real-time information and metadata from a data warehouse. Everyone and everything that can interact with the portal has an object in the enterprise directory. This makes the relationship between users and objects in the role-based security model possible.

Centralized Management

Storing information on the entire enterprise in a centralized directory reduces costs for management. Regardless of where the server, application, report or user resides on the enterprise network, management for all objects is centralized, thus making normal configurations more cost effective.

SAS Information Delivery Portal Roadmap

To be competitive, leading enterprises must utilize technologies that encourage communication and enhance decision support throughout the organization. The SAS Information Delivery Portal is a key tool in this environment. To continue to address these needs, SAS plans enhancements to the basic functionality of the portal so that it better supports the collaborative tools that are available to enterprises.

The portal's middle tier will be enhanced to integrate with collaborative offerings from infrastructure providers, such as Lotus and Microsoft, as well as leading information vendors in the knowledge management space. The following benefits will be realized with this integration.

Unstructured Information Support

The SAS Information Delivery Portal currently provides effective tools for surfacing structured information. Structured information is information that is analyzed in the sense that the information is divided into component parts, which in turn have components, and so on. Through integration in a collaborative environment, the SAS Information Delivery Portal will also be able to surface unstructured information.

Collaboration With Communities of Interest

The SAS Information Delivery Portal provides enterprises with the flexibility to create communities of interest for sharing common information. For example, through integration with collaborative environments, including the Intraspect's Knowledge Management Server and Microsoft SharePoint Portal Server, enterprises will have access to additional tools for exchanging information among teams of experts. For example, a team would have access to discussion groups, collaborative document editing facilities, online meetings and joint calendars.

Content Management

The SAS Information Delivery Portal provides enterprises with an infrastructure, through metadata, for organizing and delivering the highest quality information to the right person. Through integration in a collaborative environment, enterprises will have access to tools for content management, such as document version control and workflow processing.

Infrastructure Support

The enterprise will benefit from the integration of the portal's rich middle tier and the infrastructure services provided by collaborative environments. These services include:

- Centrally managed enterprise security that supports the entire environment.
- Extensive search capabilities for structured, unstructured and dynamic data.
- An enterprise directory that stores all the metadata for the entire environment.
- A presentation infrastructure that provides for the design of dynamic, easy-to-use interfaces.

Scenario

ABC Corporation is the proud maker of widgets, a little device that does this and that. ABC widgets are sold around the world with global sales offices supporting individual regions. The headquarters are in New York City, research and development efforts are in California, and production is in Texas. As a long-time user of many SAS solutions, ABC Corporation is implementing the SAS Information Delivery Portal to gain the benefits of effective information delivery.

ABC Corporation suffers from the same problem faced by numerous corporations throughout the world: information overload and ineffective information delivery.

Before implementing the SAS Information Delivery Portal, ABC Corporation plans and defines a security model that aligns the portal with the company's natural flow of information. Through the planning process, they realize that the company has a number of different information needs. Instead of trying to make everyone fit one enterprise view, they decide to create custom portals for each community of interest. One portal will be established for each regional sales office and one each for research and development, production, and senior management.

Let's look at the custom portal created for senior management.

The information needs of senior management are more strategic in nature than other groups. In addition, the information surfaced in a senior management view contains competitively sensitive information that requires greater security than other information in the enterprise. Out of the planning process came the following information requirements for a senior management view to support enterprise-wide strategic planning:

- Access to all information.
- Collaborative tools to facilitate strategic planning among senior managers.
- Access to the enterprise's key strategic planning balanced scorecard system.

SAS Information Delivery Portal

By providing these information requirements through one focal point, the SAS Information Delivery Portal gives senior management a holistic view of the enterprise's efforts to meet the strategic plan (see Figure 3 below).

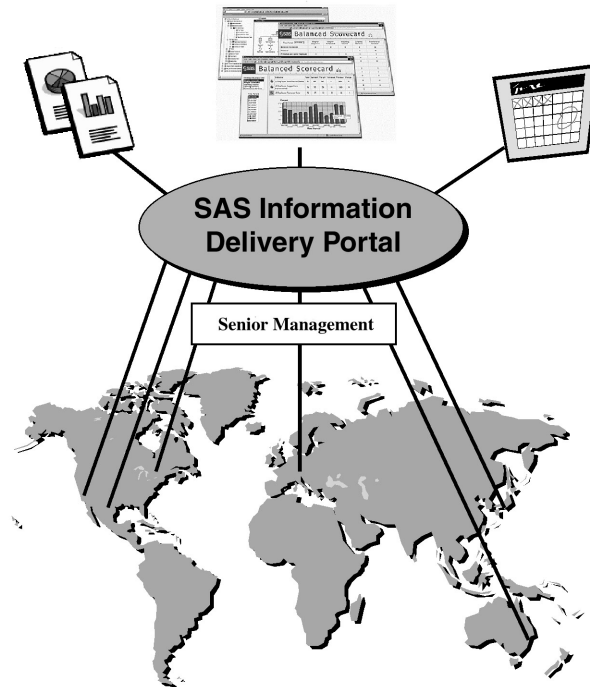


Figure 3: Senior Management Portal Scenario

At the center of the customized portal sits a balanced scorecard system, senior management's tool for tracking the enterprise vision and the key indicators on enterprise efforts to fulfill that vision. The corporate IT group will limit access to the application in the enterprise. Using the portal administration tools, they will define the security surrounding access to the application, establish the location of the application and define the access methods necessary to launch the application within the portal.

To limit accessibility, the corporate IT group will also establish unique channels (within the SAS Publishing Framework) for the delivery of business intelligence. The business intelligence generated by applications will be redirected to the new channels for consumption by senior management only. To support the static information delivered through the channels, dynamic reports run as stored procedures will also be created, allowing senior management access to real-time information.

As a final effort in the customization of the senior management portal, the IT group will establish discussion groups, facilities for collaborative document editing, facilities for net meetings and a shared calendar functionality through the collaborative environment in which the portal operates. These facilities will be set up in the enterprise directory with the appropriate security for senior management use only.

With customization complete on the enterprise- and domain-specific levels for senior management, the portal provides a secure focal point for their strategic planning efforts. After the

portal is rolled out, senior managers can personalize the portal to further fine tune the information delivered.

Conclusion

As the above scenario shows, the SAS Information Delivery Portal provides a focal point for effective information delivery. The quality of the information, which is surfaced through integration with SAS solutions, is the portal's key differentiator. By bringing all these sources of information together, a true community of interest is formed. For the enterprise, this translates into more time spent analyzing data — not finding it — and more effective and timely business decisions based on all of the enterprise's information resources.



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