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The Process-Managed Enterprise

Case for a Business Process Management System

The Business Process Management System (BPMS) will help the Global 2000 model, deploy, and manage mission-critical business processes that span multiple enterprise applications, corporate departments, and business partners behind the firewall and over the Internet. This will open a new era of software infrastructure.

OPPORTUNITY

The Process Managed Enterprise..... 2

BENEFITS

Adaptability, Manageability, Profitability..... 4

REQUIREMENTS

Flexibility, Reliability, Security..... 6

SOLUTION

The Business Process Management System..... 10

CONSEQUENCES

A New Era of Software Infrastructure..... 14

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Opportunity

The Process-Managed Enterprise

Summer 2000—The Global 2000 has neither been “Amazoned” by the dot-coms nor doomed by the Y2K bug. Now it is time to consider the Internet as another business tool, just like the phone or the personal computer, and find out how it can be used to leverage the core assets of any enterprise: profitable business processes.

The enterprise has been using increasingly complex processes throughout the last century to maintain its operations, but we have yet to see an IT infrastructure capable of fully supporting these processes. The reason for this is twofold: first, packaged enterprise applications such as Enterprise Resource Planning (ERP) systems manage only those parts of the business process that had to be automated at any cost, typically involving materials resource planning and financial reporting; second, the deployment of these processes upon some IT infrastructures requires prior organization of enterprise data, a formidable process that has taken several decades to complete.

E-business drastically increases the need to effectively manage complex, cross-enterprise business processes.

AMR Research, 2000

The Internet is about to change this situation. Because it is a convenient medium for the automation of collaborative business-to-business processes (much more flexible than traditional EDI), enterprises will integrate their respective business processes over the Internet, enabling them to achieve greater levels of efficiency, create additional revenue opportunities, and enter new markets.

This will lead to an unprecedented opportunity for IT departments and to an even greater challenge for enterprise software vendors. If ERP packages requiring massive process reengineering could only automate processes internal to the company, it is unlikely that any packaged enterprise application will be able to automate the possible interactions between the processes of multiple business partners. The reasons for this are both theoretical and practical: from a theoretical standpoint, the complexity of integrating multiple processes increases exponentially with the number of processes and their respective complexity, therefore preventing the use of any packaged solution; from a practical standpoint, business partners have heterogeneous IT infrastructures provided by various vendors and, as a result, can not rely on any single solution.

Order management, customer care, demand planning, product development, and strategic sourcing are being radically altered by e-business.

AMR Research, 2000

The problem of integrating the IT infrastructures of multiple business partners in a vendor agnostic fashion will be solved by the standardization of collaborative business-to-business processes by organizations such as RosettaNet and BizTalk. Nevertheless, there remains the question of integrating these processes with existing IT infrastructures that consist of multiple packaged enterprise applications and will soon be complemented by new applications for the automation of additional business processes including procurement, fulfillment, and service-chain management. What characterizes this integration and makes it such an opportunity for the IT department is that it is applied at a business level rather than a purely technical level: it is all about integrating several packaged enterprise applications covering multiple departmental business processes into a coherent IT infrastructure enabling the integration of enterprise-wide processes.

Such integration will not be achieved with any packaged enterprise application or collection of pre-defined processes. The reason for that is very simple: enterprise-wide processes are basically what defines the enterprise itself and constitute its most critical assets. If an enterprise application vendor had any knowledge of such enterprise-wide processes, it is likely that the enterprise would be out of business in a matter of months.

Firms will need process integration servers that model and carry out broad business processes.

Forrester Research, 1999

This integration will be achieved with a new kind of enterprise software infrastructure that will allow business analysts to model, deploy, and manage transversal business processes that span multiple enterprise applications, corporate departments, and business partners behind the firewall and over the Internet. Twenty years ago, the enterprise found a way to manage an exploding amount of data with a Database Management System (DBMS) provided by vendors including Oracle, Sybase, and Informix. Today the enterprise will find a way to manage an exploding complexity of processes with a Business Process Management System (BPMS) provided by a vendor such as Intalio.

What is a formidable challenge for enterprise infrastructure software vendors is actually a tremendous opportunity for IT departments: for the very first time in the history of enterprise computing, a software infrastructure will provide the ability to directly implement business processes on the IT infrastructure, without the prohibitive cost of process reengineering. The Database Management System allowed the enterprise to manage its business data in a very flexible fashion. Business Process Management Systems like Intalio n³ will simply do the same for its business processes.

Benefits

Adaptability, Manageability, Profitability

A process-centric approach has many benefits over alternative approaches. Since a packaged application cannot sufficiently address the challenges raised by the integration of business processes, the lack of a new enterprise software infrastructure would require custom development involving traditional programming. This would lead to the iterative development of an unnecessarily large amount of code by software developers, based on specifications defined by software architects, and according to models provided by business analysts.

Even though this approach might be the most versatile, it has a major drawback: software code does not directly reflect business processes, and thus becomes incredibly difficult to maintain over time when these processes require modification. As long as they remain internal to the enterprise, processes can be maintained by carefully respected development methodologies. As soon as these processes span multiple business partners however, traditional approaches simply can no longer handle the complexity.

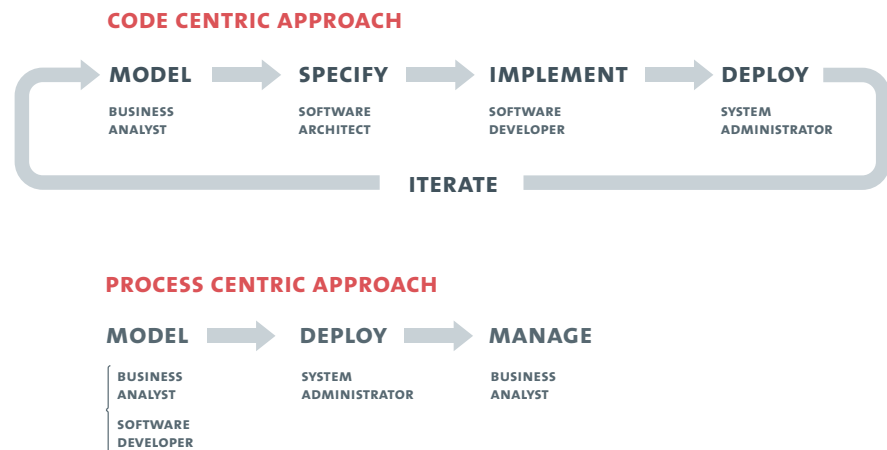


Figure 1: Straight-Through Process Integration

The BPMS will enable the enterprise to live by the adage “Say what you do, and do what you say”.

The intermediary step between the definition of business processes and their implementation upon the IT infrastructure can be avoided with an infrastructure allowing business processes to be directly deployed and managed immediately upon their definition. This, in turn, will confer to the IT infrastructure a further adaptability to the business of the enterprise and a greater manageability of constantly evolving business processes, eventually leading to higher profitability.

Adaptability

Among the many flaws of the dot-com was the constant changing of its business model. This led software vendors to develop solutions that could allow the company to sustain a breathtaking pace of change in operating the business. Such solutions are now made available to the enterprise, enabling it to embrace the unprecedented changes fostered by the Internet, adapt relationships with business partners, and keep an edge over the competition.

The BPMS is the primary business velocity engine.

By dramatically reducing the time required for the deployment of new business processes and by allowing business analysts to customize existing business processes through user-friendly business rules expressed in natural language, the Business Process Management Systems becomes the business velocity engine of choice.

Manageability

The dot-com had been operating in such a competitive environment that its business had to be entirely driven by direct measurements of its performance. The enterprise operates in the same way for most of its internal processes, but this is generally based on the analysis of data resulting from the past completion of implicitly executed business processes.

The BPMS enables business process intelligence.

By resorting to real-time process analysis, the Business Process Management System enables business analysts to directly measure the business value of explicitly defined business processes. This enables these processes to be optimized on the fly without the need for additional software developments, tremendously simplifying their management over time.

Profitability

The average dot-com has never achieved profitability and it is unlikely that any technology could be of much help in this respect. On the contrary, the enterprise has profitable business processes that can be further improved through the appropriate use of new technologies.

The BPMS enhances overall business profitability.

By providing a way to model, deploy, and manage mission-critical business processes that span multiple enterprise applications, corporate departments, and business partners behind the firewall and over the Internet, the Business Process Management System will enable the enterprise to enhance customer loyalty and lower operating costs through improved processes, resulting in new levels of profitability.

Requirements

The BPMS is the next mission-critical enterprise software infrastructure.

Flexibility, Reliability, Security

Like any enterprise software infrastructure, the Business Process Management System has two mandatory requirements: high flexibility and extreme reliability. This infrastructure must be able to model, deploy, and manage any business process, in any vertical industry, across any enterprise application, corporate department, or business partner, and therefore requires a high degree of flexibility. Moreover, the infrastructure will be used extensively by mission-critical applications for which scalability, fault-tolerance, and Quality of Service (QoS) are necessary requirements.

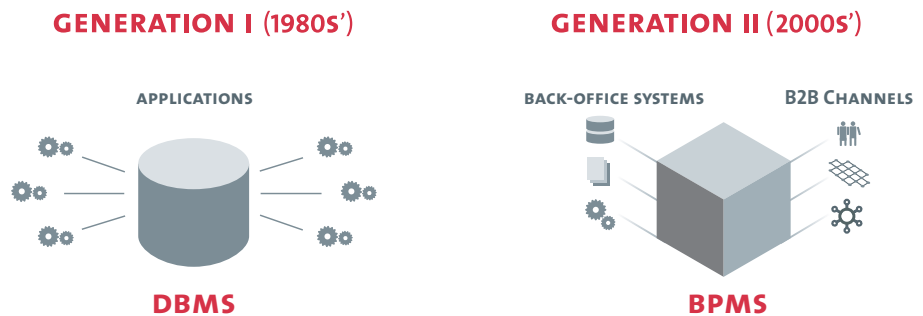


Figure 2: Mission-Critical Enterprise Software Infrastructure

A Business Process Management System is used at the boundary between the legacy IT infrastructure and the Internet, and therefore must offer advanced security features that no other enterprise software infrastructure really has ever provided before. The combination of these requirements—flexibility, reliability, and security—will impose a tremendous challenge to enterprise software vendors to deliver a full-blown Business Process Management System targeted at mission-critical applications. But the successful delivery of such an infrastructure is the condition sine qua non for its wide adoption by the enterprise as a mission-critical profitability engine.

Flexibility

Just as Relational Database Management Systems were built around a powerful relational model for the modeling, indexing, and retrieving of data, the Business Process Management System must be built around a powerful business process model for the modeling, deployment, and management of enterprise-wide business processes.

The system must enable the coordination of Enterprise Business Processes (EBP) among trading partners through mutually agreed upon Collaborative Business Processes (CBP). It must also integrate existing applications as process components¹. It must knit process components together to address new business value propositions. Finally, the system must allow the accurate measurement of business process performance through advanced Business Process Intelligence (BPI) technologies.

Within the modeling, deployment, and management of new business processes, the Business Process Management System must enable business analysts to customize existing business processes through the expression of business rules in natural language, applying to business problems² such as:

- Selection
- Assessment, Scoring, and Prediction
- Classification
- Monitoring
- Configuration Verification
- Diagnostic and Prediction
- Planning

Finally, the system must enable the enterprise to leverage its existing IT investments, offering an open architecture based on industry standards simplifying its integration with any back-office system, enterprise middle-ware, or packaged application, on any platform or operating system. Most importantly, the system must support standard business-to-business collaboration protocols including RosettaNet, BizTalk, and ebXML, without requiring business partners on every side of the value chain to be running the same Business Process Management System.

¹. Terminology suggested by Eric G. Brown in Process Integration Server, Forrester Research, Inc., March 1999.

². From Blaze Advisor, Technical White Paper, Blaze Software.

Scalability, fault-tolerance, and Quality-of-Service are mandatory requirements for the mission-critical BPMS.

Reliability

Unlike any enterprise software application, an enterprise software infrastructure is generally used as the foundation for other mission-critical applications, which rely on it to gain access to core services that would be significantly difficult to develop from scratch. This has been the case for Enterprise Resource Planning packages that typically rely on an external Database Management System provided by a third party. In such a context, the Business Process Management System, which will be used as the foundation for next-generation enterprise applications, must offer an extreme degree of reliability.

Reliability is usually the result of multiple factors, including scalability, fault-tolerance, and Quality of Service. Scalability must be offered in both scope and complexity in order to enable the Business Process Management System to support a broader range of business processes that span an increasing number of enterprise applications, corporate departments, and business partners. Fault-tolerance should be provided through a proper architecture that minimizes the number of single-points-of-failure and supports the redundancy of critical components. Quality of Service must be guaranteed based on mutually agreed upon terms defined by business partners.

Security

In any open environment, security is not an optional feature that can be added over time. It is a mandatory requirement that should be addressed at the early stages of development. The Internet is an open environment for the enterprise and the Business Process Management System lays at the boundary between a rather unsecured IT infrastructure and a community of partners that unfortunately are not always well intentioned.

The BPMS must act as a Business Firewall to offer reliable security auditing.

In this respect, the Business Process Management System must act as a firewall working at the business activity level (Business Firewall). It must implement well-defined Collaborative Business Processes that restrict the scope of interactions that business partners can conduct with the corporate IT infrastructure. Furthermore, it should customize such interactions for each business partner according to different security roles granted to every user.

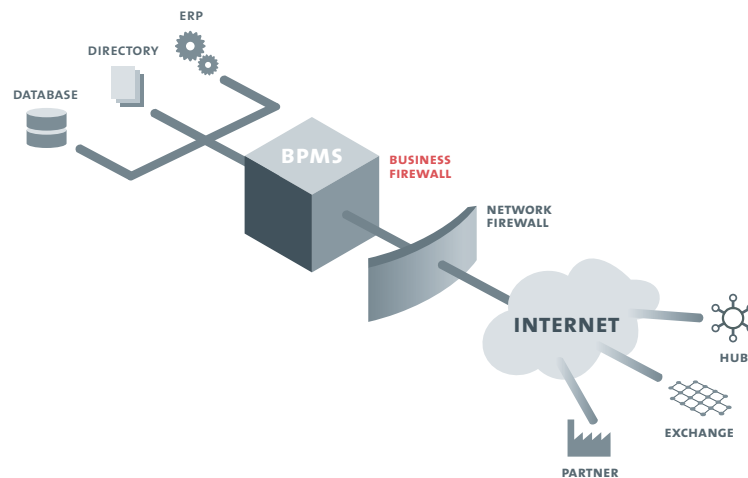


Figure 3: The BPMS as Business Firewall

The Business Process Management System as a Business Firewall will enable the enterprise to audit the security of its IT infrastructure in a reliable fashion, provided that this system is tightly integrated with existing security infrastructures. In a distributed environment, users must be identified with certitude, and therefore the Business Process Management System must support user authentication through digital certificates. Furthermore, security policies must be deployed at the enterprise level, which requires integration with existing directory services. Finally, communications with business partners must be encrypted to guarantee the proper level of confidentiality; consequently the Business Process Management System must support existing Public Key Infrastructures (PKI).

Solution

The Business Process Management System

The concept of a Business Process Management System has been invented by Intalio to address the scope of issues described above. Beyond the compliance to complex technical requirements, the Business Process Management System must provide the foundations for a Straight-Through Process Integration (STPI) methodology that will allow the modeling, deployment, and management of business processes by business analysts, software developers, and system administrators in a collaborative fashion. Most importantly, this methodology has to respect existing IT infrastructures allowing the enterprise to leverage its previous investments and should provide an evolutionary path for the support of future business-to-business collaboration protocols that will dramatically evolve in scope and complexity over the coming decade.

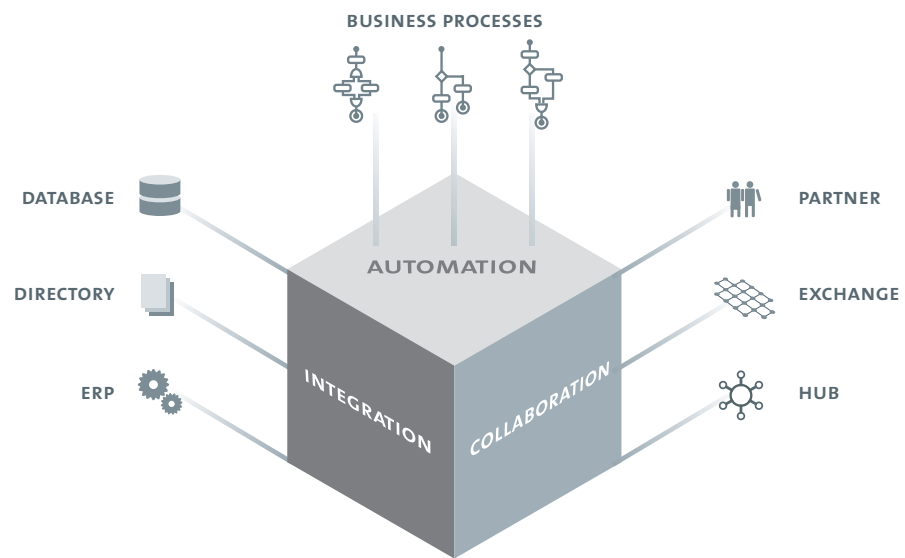


Figure 4: The Business Process Management System (BPMS)

Ultimately, the Business Process Management System covers ten areas:

1. Process Modeling
2. Collaborative Development
3. Process Documentation
4. Process Simulation
5. Application Integration
6. Process Automation
7. B2B Collaboration
8. End-User Deployment
9. Process Analysis
10. Knowledge Management

Source: AMR Research, 2000

Model, Deploy, Manage

The Business Process Management System enables a three-step Straight-Through Process Integration methodology for the integration of business processes. Each step involves different categories of users, with the constant participation of business analysts over the entire lifecycle of business processes.

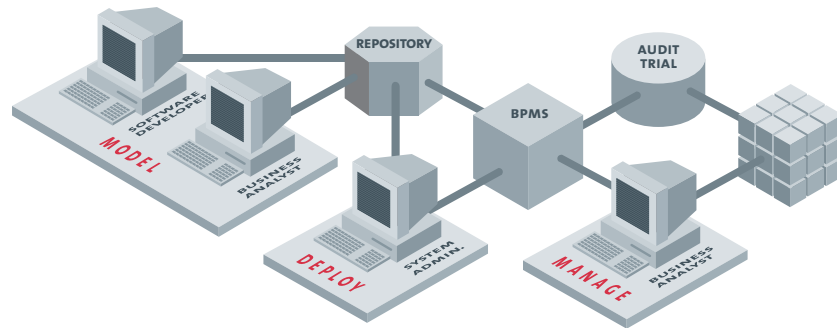


Figure 5: The Model, Deploy, Manage Methodology

The lack of interoperability between data standards and application standards is one of the tallest hurdles facing e-Business Process Management. The lack of interoperability between business process semantics is equally forbidding.

AMR Research, 2000

First, business analysts and software developers model business processes with a Graphical User Interface (GUI) and store them into a process repository using the standard Business Process Modeling Language (BPML). Business processes are integrated with any back-office system, enterprise middleware, and packaged application, and also made interoperable with any business-to-business collaboration protocol. The process repository is responsible for the distributed authoring of business processes by multiple users over the Internet.

Second, business analysts and system administrators deploy business processes from the process repository to the Business Process Management System with process management tools accessible from any browser. Processes can be deployed and updated in real-time, without any interruption to the server.

Finally, business analysts and system administrators manage business processes with system management tools using the standard Business Process Query Language (BPQL). Users can dynamically query the state of any process instance, as well as the status of the Business Process Server itself.

Integration, Automation, Collaboration

Model Once,
Deploy AnywhereSM

In order to support such a methodology, the Business Process Management System must provide a high-level abstraction of the peripheral entities with which it must interact. A major benefit of such a system is to allow the modeling, deployment, and management of business processes that are totally independent of the mundane details related to any specific back-office system or business-to-business collaboration protocol. This Model Once, Deploy AnywhereSM philosophy is permitted by a three-tier architecture comprised of an Integration Tier, an Automation Tier, and a Collaboration Tier.

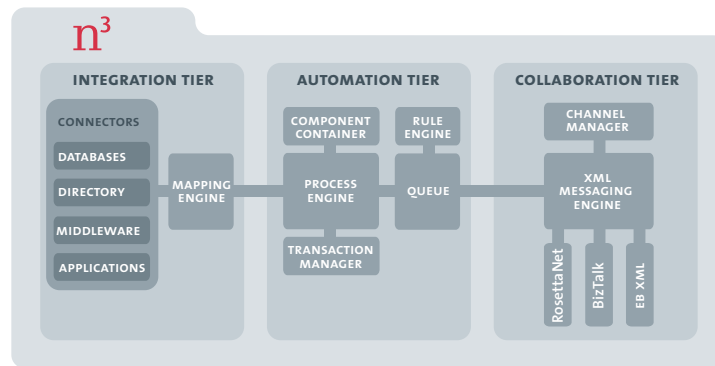


Figure 6: The BPMS 3-Tier Architecture

The Integration Tier is responsible for the integration with any back-office system, enterprise middleware, and packaged application. It offers a schema-driven object-mapping framework and off-the-shelf connectors to leading databases, directory servers, message-oriented middleware, transaction processing monitors, application servers, and packaged enterprise applications.

The Automation Tier is responsible for the reliable execution of business processes and the processing of business rules. It relies on advanced distributed computing technologies including a message queue, a transaction manager, a component container, a rule engine, and a process engine.

The Collaboration Tier is responsible for the support of business-to-business collaboration protocols like RosettaNet, BizTalk, and ebXML, as well as any future standard or custom protocol. It is built on top of a versatile XML messaging engine and offers customizable implementations of leading business-to-business collaboration protocols as well as a hierarchical channel manager.

Process Integration Environment

The Business Process Management System is not a simple engine for the reliable execution of business processes, but rather a complete platform for their modeling, deployment, and management. As such, it provides an advanced process integration environment for the modeling of business processes, integration with existing IT infrastructures, and coordination with business-to-business collaboration protocols. While this environment is specifically targeted at business analysts and supports distributed collaborative development, it is also designed to interoperate with existing Integrated Development Environments (IDE) used by software developers. Completing the platform are system management tools designed for system administrators.

Integrated Solution

The Business Process Management System is an integrated solution rather than a best-of-breed approach. There are three main reasons for this. First, an integrated solution reduces implementation time by ensuring that every component of the solution is designed to work directly with the others, without the need for any additional integration between them. Second, an integrated solution offers a greater level of manageability by exposing a single management interface supporting a native access to every component of the solution. Finally, an integrated solution is the only way to reduce the risk of failure in a distributed environment, and therefore is a mandatory requirement for a Business Process Management System targeted at mission-critical applications.

Mission-Critical Infrastructure

Fundamentally, the key characteristic of the Business Process Management System is its unique ability to be used for mission-critical applications. Compared to existing e-Business process management solutions, the Business Process Management System is designed from the ground-up as a mission-critical enterprise software infrastructure, leveraging advanced technologies for the reliable processing of distributed transactions and clustering capabilities to offer the proper level of scalability, fault-tolerance, and Quality of Service. The Intalio n³ Business Process Management System offers these capabilities, as described in the technical dual of this business white paper:

- The Business Process Management System
- Case for a New Mission-Critical Enterprise Software Infrastructure
- <http://www.intalio.com/literature/>

Why a best-of-breed solution would not work outside the scope of buzzword matching.

Consequences

A New Era of Software Infrastructure

The BPMS will become the center of gravity of modern corporate IT infrastructures.

The introduction of the Business Process Management System will lead to major changes in the corporate IT infrastructure. First, new packaged enterprise applications will leverage the Business Process Management System as a mission-critical process execution facility. Second, the Business Process Management System will act as a Business Firewall, federating multiple directory services across the enterprise into the foundations of future Enterprise Process Repositories (EPR). Finally the Business Process Management System will be tied to future Process Analysis Servers (PAS) that will be the cornerstone of forthcoming Business Process Intelligence technologies. As a result, the Business Process Management System will become the center of gravity of the modern corporate IT infrastructure.

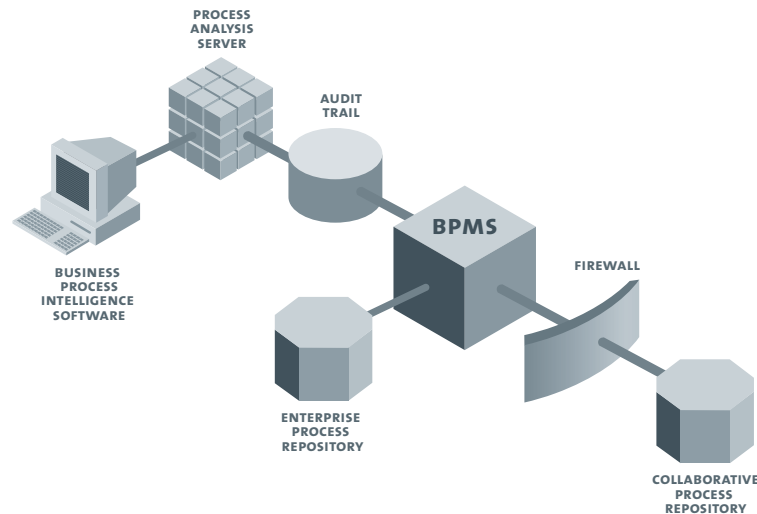


Figure 7: The BPMS-centric Enterprise Software Infrastructure

The Process-Managed Enterprise

The first step in the recent history of the process-managed enterprise was for the enterprise to discover, understand, and model its business processes over the last two decades. The next step, with the adoption of the Business Process Management System as the primary mission-critical enterprise software infrastructure, will enable the enterprise to actually deploy and manage these processes in the most efficient way. One could reasonably argue that the outcome of this evolution will exceed every expectation.

Glossary

- BPI Business Process Intelligence
- BPMI Business Process Management Initiative
- BPML Business Process Modeling Language
- BPMS Business Process Management System
- BPQL Business Process Query Language
- CBP Collaborative Business Process
- DBMS Database Management System
- EBP Enterprise Business Process
- EDI Electronic Data Interchange
- EPR Enterprise Process Repository
- ERP Enterprise Resource Planning
- GUI Graphical User Interface
- IDE Integrated Development Environment
- PAS Process Analysis Server
- PKI Public Key Infrastructure
- QoS Quality of Service
- STPI Straight-Through Process Integration

References

- Integrating Business Processes, *by Eric G. Brown*
The Forrester Report, March 1999, Forrester Research
- E-Business Process Management, *by Pierre Mitchell*
The Report on Enterprise Applications, February 2000, AMR Research

Resources

- BizTalk <http://www.biztalk.org/>
- BPMI <http://www.bpmi.org/>
- ebXML <http://www.ebxml.org/>
- RosettaNet <http://www.rosettanet.org/>

Summary

The Business Process Management System (BPMS) will help the Global 2000 model, deploy, and manage mission-critical business processes that span multiple enterprise applications, corporate departments, and business partners behind the firewall and over the Internet. This will open a new era of software infrastructure that will actually enable the project of the process-managed enterprise.

About the BPMI.org Initiative

Intalio and several software vendors, consulting firms, and e-Businesses have created the Business Process Management Initiative (BPMI) to develop the industry standards that will enable the Business Process Management System. See <http://www.bpmi.org/> for more information.

About Intalio, Inc.

Intalio provides enterprise infrastructure software for the integration, automation, and management of mission-critical business processes behind the firewall and over the Internet to enable companies to extend and strengthen their business relationships with customers, suppliers, and other trading partners. Founded in July 1999 by seasoned entrepreneurs and recognized innovators in enterprise software development, Intalio is a privately held, venture-backed company located in Burlingame, CA. Intalio can be reached at (650) 259-9995, at info@intalio.com, or www.intalio.com.

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