



BPM2002

Market Milestone Report

Featuring a Delphi Group

Assessment of:



Overview

The only true “killer app” is that which provides greater value from existing software assets. The scrutiny of IT buyers centers on the investments that will cut out the fat, speed their processes, and allow them to do more with less.

This means the ability to collapse the business process by capturing and dynamically managing business logic with integrated application services. Every organization is looking for optimal leverage of IT resources, how to connect business processes with business partners, and how to integrate process knowledge within the business desktop.

It’s no surprise, then, that Business Process Management (BPM) is quickly emerging as the moniker for the next Killer App in enterprise software. Few areas of software will receive more attention in the coming months and years than BPM. Yet the greatest challenges to the BPM market are the very forces making it so attractive.

In order to understand the market, it is imperative to know the purpose of BPM. BPM software enables the design, analysis, optimization, and automation of business processes. It does this by separating the process logic from the applications that run them; managing relationships among process participants; integrating internal and external process resources; and monitoring process performance.

On the Cusp of a Revolution

Delphi research on the subject of Business Process Management (BPM) and Web Services leads us to predict that the next few years will be exciting ones for technology evolution. There is an important juxtaposition of company plans for BPM and Web Services versus thoughts on how the market will play out. What is clear, though, is that the evolution is happening as we speak—BPM and Web Services are taking off now.

A Market Well On Its Way

That 12% of respondents are using BPM software today is consistent with a market in its earliest stage. But with 55% of surveyed companies reporting that they are actively evaluating BPM packages, the market is evolving now. Early adopters have already leapt, and the early majority is ready to spring—of those

Contents

Overview	1-3
The Opportunity Ahead	4-7
Approaching the Market	7-8
A Look at BPM Software	7-9
Web Services: A Growing Mandate for BPM	9-13
Fujitsu: A BPM Summary Report	13-16

Fujitsu Software Corporation
i-Flow Headquarters
3055 Orchard Drive
San Jose, CA 95134-2022

p (408) 432-1300
f (408) 456-7821
www.i-Flow.com

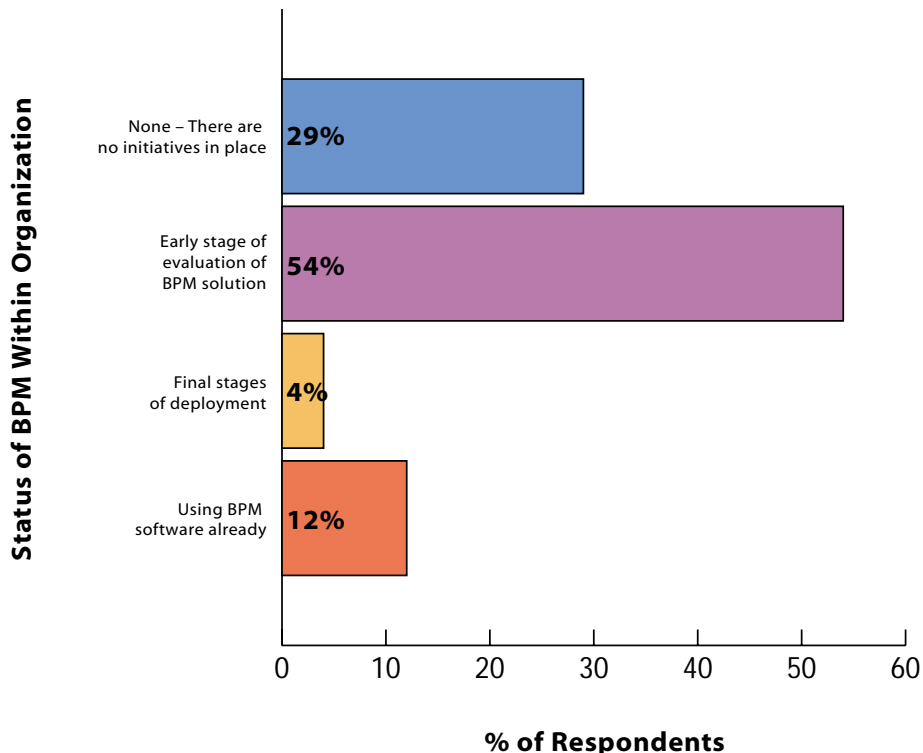
in the early stages of evaluation, approximately 63% plan to deploy a solution within the next 7-12 months and virtually all of the rest plan to deploy within 2-3 years. Thus, the market for BPM solutions is now. These numbers point to 2002 as a pivotal year for BPM.

The Market's View of BPM

When asked to pick a definition for BPM software, 19% of companies surveyed were either indifferent or unable. This indicates that the supply side of the market continues to face a learning curve in selling BPM as a concept; yet that greater than 80% of respondents are confident in their definitions shows that this is an issue already top-of-mind. Thus, the challenge is less to promote “why” BPM but rather to clearly articulate the “what” and “how” of this software movement.

A small minority (12%) of respondents take a slightly cynical view that BPM is simply the cosmetic re-branding of previous generations of workflow software. To contrast, the majority of respondents (54%) already define BPM software as a critical element of IT infrastructure, used to process-enable both new and existing applications.

Status of BPM



The close association of process and applications is not new, but the way that BPM software affects this integration is different than the first-generation workflow solutions offered a decade ago. Then, workflow required point integration between enterprise applications and the workflow solution. Developers had to hard-code the integration between individual applications. Integrations of this type were often out-of-date the minute they were deployed and typically resulted in broken connections.

To combat the inefficiencies of hard coded, individual integrations, enterprise application integration (EAI) products emerged. These provided an infrastructure for application integration and were scalable for enterprise use. However, first generation EAI products did not typically include BPM capability and employed proprietary architectures for messaging, application adapters, scripting languages, and rudimentary workflow. These products were also focused on integrating back-office applications and not inter-enterprise processes.

In the late 1990's a new class of Internet B2B “gateway” products emerged to exploit the emerging build-out of the Internet. These products began to employ low-level Internet technologies such as HTTP and XML to automate cross-enterprise application integration.

Standards development was in its infancy, however these products still implemented application interfaces and response-request messaging protocols in a proprietary way. Similar to the first-generation EAI products, the first Internet B2B gateway servers lacked a comprehensive BPM capability.

Many of today's generation of BPM and EAI solutions facilitate integration through Message Oriented Middleware (also known as “MOM”)—a technology that has been around since first-generation EAI products. MOM leverages third-party message queuing servers such as those from IBM or Microsoft or Java Messaging Services available within the J2EE platform. Messaging services offer scalable integration capabilities ideally suited for managing high-volumes of transactions and geographically distributed infrastructure. This level

of functionality, however, does not come without a price. Proprietary message-oriented middleware can be expensive to deploy and maintain. And by itself, MOM lacks BPM capability and critical integration functionality, such as translation.

Over the past two years, EAI, MOM, and B2B integration vendors have gradually added BPM to their product sets, and the industry has witnessed considerable consolidation. Today, BPM is really the cornerstone of a next-generation enterprise integration platform software that encompasses a broad and deep set of functionality: sophisticated EDI and XML translation; Internet transport and security technologies; application adapters; and messaging built on JMS and business protocols such as ebXML and the RosettaNet RNIF. Web Services is the newest addition to this mix and promises to continue the evolution towards lower cost, easier-to-use standards-based integration tools and interfaces.

A New Platform for Process Redesign

While BPM has a direct impact on the management and leverage of other software applications, it is not by nature a departmental or application-specific phenomenon. Rather, the top priority for most organizations implementing BPM software today (38% of respondents) is to redesign their processes around the computing platform comprised of the Internet and, increasingly, Web Services. This group will start with internal processes, but another 7% of respondents said they will concentrate on inter-enterprise processes and the enforcement of their associated rules.

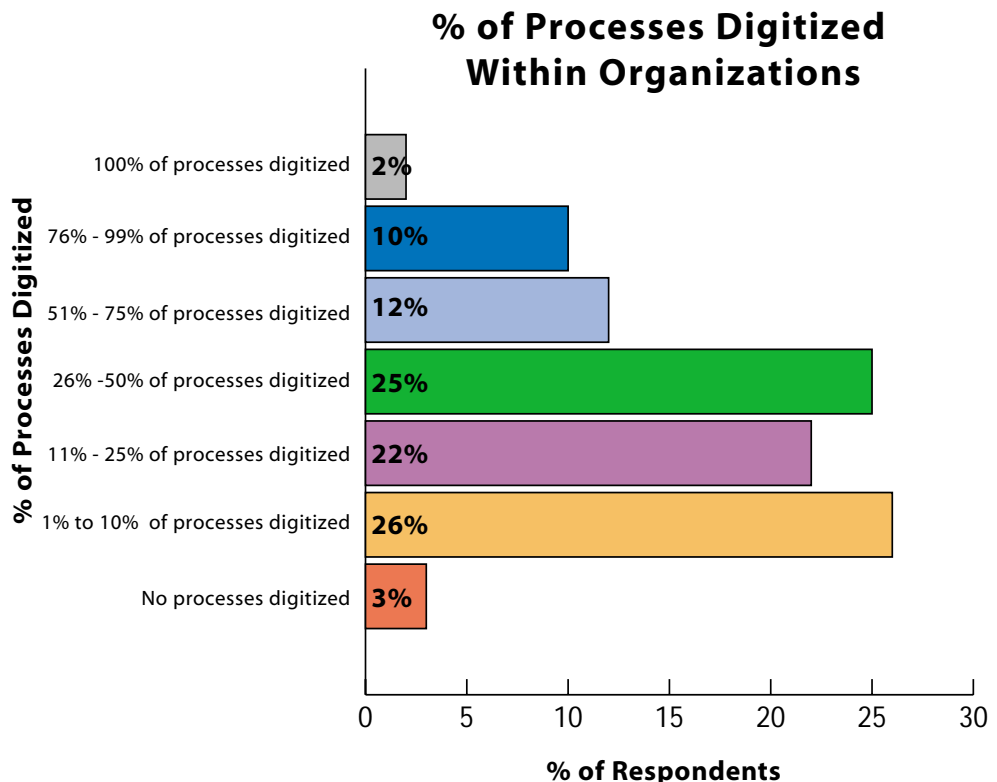
Other internal priorities for BPM deployments are “data-level application integration” (19% of respondents) and “rules-based routing of documents” (14% of respondents). The

former underscores the close relationship between BPM and Web Services, which survey respondents also intend to leverage for enterprise application integration. The rules- and event-based routing of documents can also be delivered as a Web Service, either by a BPM application or as native functionality within a content management application.

It is important to contrast the priorities for BPM with what users are hoping to achieve from it. In order of priority, respondents cite first the “automation of repetitive tasks” for the purpose of “accelerating process cycle times.” This benefit was cited more than any other, as the top priority for a third of organizations surveyed. Second on the list is “manage and monitor the performance of processes and related tasks and personnel” (25% of respondents). Third, they seek the ability of business (non-technical) personnel to change the business rules and logic of enterprise software.

The Opportunity Ahead

There is ample opportunity for BPM to significantly effect operations within today’s enterprise. Of companies surveyed, very few (only 2.5% of all respondents) have most or all enterprise processes codified into a digital form. Yet what is notable is that



more than half of the companies in the survey (62%) have currently digitized less than 25% of their processes. These organizations have much ground to cover and will look to BPM solutions to redesign and automate their processes over the next few years.

The vendors which today comprise the BPM market address needs that are critical for enterprises today. As the research shows, the market is happening now, with respondents indicating that a majority of BPM initiatives will take place within three years. That means that vendors have a limited timeframe to make a name for themselves and to prove that they solve customers' process problems. Importantly, the research shows that the BPM market is not shadowing the application server market—that is, there is not a case of vendor lockout. While the application server market is dominated largely by BEA, IBM, and Sun, the BPM market features many players. Within the market, smaller enterprises are obviously looking for the best-price vendor; large enterprises are open to working with the vendor that offers the best all around deal in terms of both price and performance.

Spending Patterns

Of the roughly 200 organizations surveyed, a combined total of approximately \$100 million is expected to be spent on BPM software (independent of all other software and services) over the next 3 years. Half of all respondents plan to spend in excess of \$100,000, and the majority of this group will budget between \$100,000 and \$500,000. A small minority (5%) envisions spending more than \$5 million on large-scale BPM efforts, with a larger group (about 17%) planning on spending between \$1 million and \$5 million. These latter groups represent the furthest along in their BPM strategies, with more realistic expectations on project sizes. Delphi Group expects that successful BPM initiatives will likely involve at least \$1 million dollar investments for medium-sized enterprises, with larger enterprises spending in excess of \$5 million. Investment plans of less than \$1 million are likely limited to pilot projects. Yet with looking just at the plans in place today, it is not unreasonable to expect the total market for BPM software to exceed \$5 Billion by 2004.

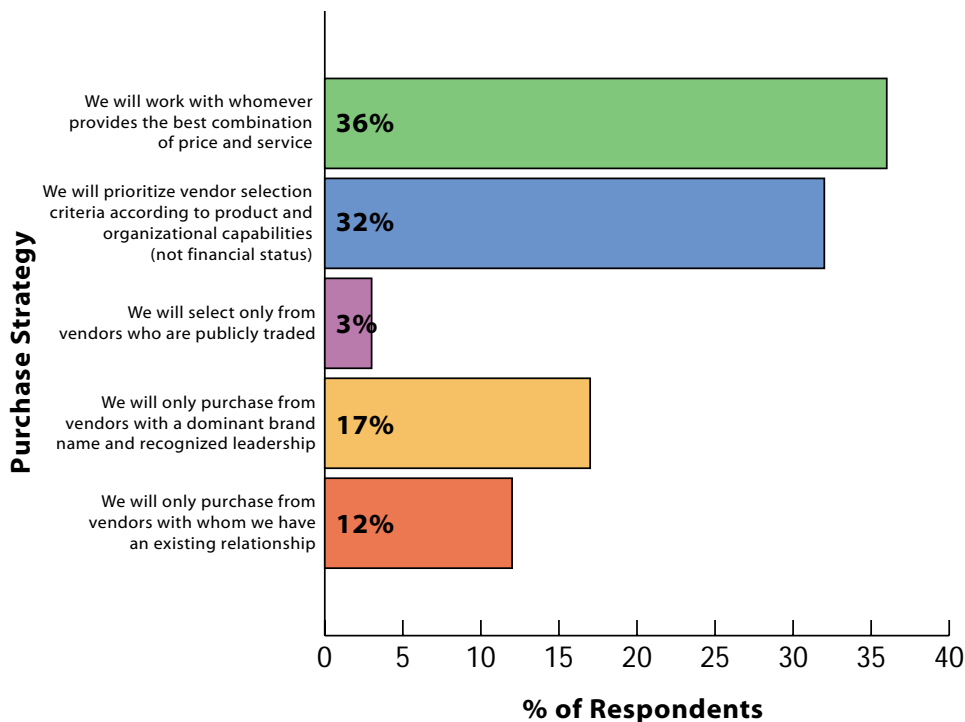
In their estimates, however, organizations may be overlooking one key issue -- the cost of integration. BPM software is integration-intensive by nature,

touching many applications and information repositories. While the delivery of business processes as Web Services promises to lower integration costs, organizations must be aware of these costs and plan accordingly when budgeting for BPM projects, particularly in the near term.

Software Pricing Models for BPM

Respondents are looking for alternative pricing models to replace the price-per-user and price-per-CPU schemes that have dominated software pricing in recent years. Many (27%) said that the fixed price development environment model followed by application server vendors would be attractive. Process design and maintenance is similar in many ways to server-based application development and

Short-term BPM Purchasing Strategies



administration, so this model makes sense for the current generation of BPM offerings.

The high ranking of service level agreements (24%) and usage-based subscription fees (18%) suggest that the Business Service Provider (BSP) model is a viable one. BSPs combine application hosting with domain-specific process knowledge and services. As Web Services and BPM become more intertwined, the attractiveness of purchasing combined application and process services from BSPs based on these pricing models increases.

Vendor Selection Priorities

The largest group of respondents (36%) will select their BPM software based on perceived value, defined as the best possible combination of price and service. Value is always an important consideration in the vendor selection process, but it becomes paramount in difficult economic times. The U.S. economy is likely to remain stalled until mid-2002, yet most respondents said that they will purchase BPM software during the next year. This combination of circumstances leads to the high priority placed on the value of BPM solutions.

Another large group of respondents (32%) said that they will base their selection of a BPM vendor on the match between available products and actual business requirements. This is the only way to choose best-fit solutions and should be considered in tandem with the value offered by the BPM vendor. Once decision-makers have narrowed the range of potential vendors and products to those that meet the process management needs of their business, then they should compare price and levels of service to make a final decision.

Expected Benefits

There is ample opportunity for BPM vendors to deliver great benefit to their customers. Respondents pointed to several significant benefits that they hoped BPM would deliver. First, they want to be able to automate repetitive tasks (30% of respondents). Second, they want the ability to manage and monitor the performance of processes (25% of respondents). Third, they want to be able to have business users modify process logic without the need for IT help (20% of respondents).

Buying Power Shifts to the Business User

Most organizations recognize that processes are best designed and executed by the managers responsible for

A BPM & Web Services Glossary

BPM (Business Process Management): enables the design, analysis, optimization, and automation of business processes. It does this by separating process logic from the applications that run them; managing relationships among process participants; integrating internal and external process resources; and monitoring process performance.

Web Services: business assets that can be shared, combined, used, and reused by heterogeneous computing resources within an organization or between firms. Technically, a Web Service is an XML object comprised of content, application code, process logic, or any combination of these, that can be accessed over any TCP/IP network using the SOAP standard for integration, the WSDL standard for self-description, and the UDDI standard for registry and discovery within a public or private directory.

API (Application Program Interface): the interface by which an application program accesses an operating system and other services and applications.

B2Bi (Business-to-Business integration): automated exchange of information between different organizations. Typically refers to the integration of information systems between an enterprise and its partners, customers, distributors, suppliers, etc.

CORBA (Common Object Request Broker Architecture): non-language-dependent integration technology for distributed applications (allowing the applications to communicate with each other); maintained by the Object Management Group (OMG)

EAI (Enterprise Application Integration): the unrestricted sharing of data throughout the networked applications or data sources in an enterprise.

J2EE (Java 2 Platform, Enterprise Edition): a single-language, multi-platform development framework for delivering enterprise applications. The J2EE platform is a collection of related technology specifications that describe required APIs and policies.

JCA (J2EE Connector Architecture): defines a way for enterprise applications to communicate with Enterprise Information Systems. The main components are the resource adapter, system contracts, and the Common Client Interface, or CCI.

JMS (Java Message Service): an API that supports messaging between computers in a network. JMS is a specification that defines the Java language interface to a messaging service and a means for exchanging XML-based transactions.

MOM (Message-Oriented Middleware): generic message router utilizing asynchronous (one-way) communication to deliver messages in a format known to both the client and the server. More complex than an RPC system, but less complex than a CORBA/RMI system.

SOAP (Simple Object Access Protocol): a protocol for exchange of information in a decentralized, distributed environment. It is an XML-based protocol that consists of three parts—an envelope that defines a framework for describing what is in a message and how to process it; a set of encoding rules for expressing instances of application-defined datatypes; and a convention for representing remote procedure calls and responses. SOAP is a key standard for delivering Web Services.

TCO (Total Cost of Ownership): calculation designed to help managers assess both direct and indirect costs and benefits related to the purchase of IT components.

UDDI (Universal Description, Discovery, and Integration): a platform-independent, open framework for describing services, discovering businesses, and integrating business services using the Internet.

VPN (Virtual Private Network): private data network making use of public telecommunication infrastructure, maintaining privacy through the use of tunneling protocols and security procedures.

WSDL (Web Services Definition Language): an XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information.

XML (Extensible Markup Language): a form of self-describing data that creates common information formats in order to share both the format and the data across the Internet, intranets, and other networks. XML frees Internet content from the browser, making it available to real applications.

them. As technology became an increasing better conduit for process management, process design began to fall more and more on IT. This led to a disconnect between business managers and IT employees—a disconnect that often led to sub-par process management initiative. Organizations are now looking to BPM solutions to work with the existing IT infrastructure (to make IT managers' lives easier) and be configurable by business analysts. Over 61% of respondents indicated that line-of-business managers are responsible for defining the rules and business logic involved with BPM; less than 12% indicated that IT is responsible—companies are starting to “get” it. The ability to separate the definition and management of business logic from the design and execution of enterprise software is one of the critical attributes of any BPM solution.

Proof that this understanding of BPM is developing: more than half of the respondents recognized BPM as a “newly emerging layer of software for building new process-based applications and leveraging resources of existing enterprise applications.” Further evidence that BPM has begun to stand on its own, only 10% of respondents view it as a subcategory of the existing EAI software segment, despite promotion of this notion by some industry analysts.

Defining the rules and logic of processes is a key aspect of BPM. It is key in the sense that BPM needs to deliver on the promise of allowing business analysts to change process rules/logic without affecting IT integration. Respondents overwhelmingly indicated that line-of-business managers or e-business managers are responsible for defining process rules and business logic. The vendor opportunity here is to provide these managers with easy-to-use graphical modeling solutions. Within a graphical modeler, vendors can offer boilerplate processes with embedded domain expertise.

Process Categories

Processes can be viewed from several different angles. Delphi first looks at process duration—whether the process is short or long-lived. Next, we look at process complexity—whether the process is simple and straightforward or highly complex.

Within Delphi's view, processes can be grouped into three categories: process-to-process; person-to-process; person-to-person. The graph below depicts these process categories around the axes of process complexity and process duration. Process complexity

refers to how complex or simple a process is. A simple process may involve an application-to-application data transfer, such as an ERP transaction, while a complex process may involve several applications and people, such as a product development process. Process duration refers to the length of the process from start to finish. An ERP transaction typically involves simple data transformation and as such, is a short duration process. The product development process, on the other hand, can take months to complete.

The process-to-process category generally falls on the low end of process complexity and the short end of process duration. These processes are discrete and focused on data transformation. The goal is to get business objects from one application to another; the challenge is defining the business logic of transforming those business objects.

Transaction-centric processes are often defined by person-to-process interactions, such as individual validation of an automated task or resolution of an exception to an otherwise scripted process. For this reason, transaction-based process management typically involves repeatable processes with few variations between instances. It is usually state-based, involving person-to-process intervention at specific steps, while the remaining steps are automated (for example, the credit approval process for loans).

Finally, there is the person-to-person category of processes. In this type of process, people are connected for the purpose of collaboration. Collaboration can be process-driven or knowledge-driven and involve explicit or tacit knowledge. While resource scheduling

may be more process-driven and based on explicit knowledge, actual project management is typically more knowledge-driven and based on tacit knowledge.

A holistic BPM initiative would ideally address all three process categories, as each serves an appropriate and necessary role within most organizations. Such a solution, however, would need to be comprised of a combination of best-of-breed product offerings as each of the vendors addressing the BPM market today has focused on a specific area of functionality.

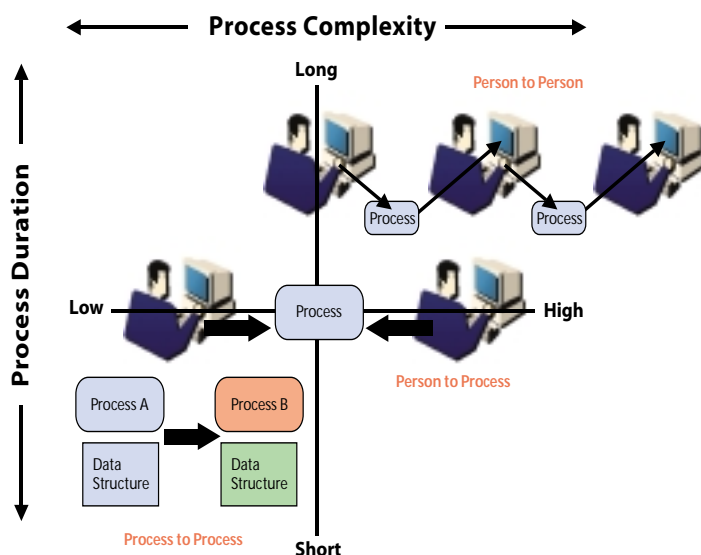
Approaching the Market

The research clearly shows that organizations deploying BPM closely associate it with other business computing initiatives, including EAI, B2B integration, process automation, process design, process monitoring and optimization, and Web Services.

Vendors in the marketplace are all approaching BPM from different points of view. Some approach BPM from an integration perspective, having previously specialized in either EAI or B2Bi. Other vendors have histories in workflow, and thus approach BPM from a process design and automation slant.

Delphi has identified several different vendor approaches to the BPM market. Some vendors have experience managing document-centric or transaction-centric processes and are building on that functionality. FileNET and Optika are two such vendors. Other vendors are coming to BPM from more of a workflow perspective, having much experience with the automation of processes. Fujitsu is one such vendor. Ultimus is a good example of a vendor that has evolved from more of a manual workflow background, building on specialized capabilities in exception handling.

Several vendors come to the BPM market with an integration background. Sterling Commerce, HP, and Staffware all take a process-centric approach to integration, while Peregrine's approach has evolved from B2Bi to internal and external process management and integration. BizFlow is an example of a product coming to the market from a collaboration background. Finally, companies like Fuego and Q-Link have specialized in separating application logic from process logic and approach the market that way. Whatever the approach, the end goal remains the same: to beef up functionality to provide holistic BPM.



Respondents indicated several drivers that will play a significant role in their selections of BPM solutions. Mentioned most by respondents (23%) was document or content management; second was EAI solutions (23% of respondents); third was enterprise applications (20% of respondents). Other drivers were e-mail environment, message broker (not related to e-mail), and transaction processor.

These findings are important in that they point out the need for BPM solutions to support several types of processes, each with varying requirements. Processes may be integration-centric, collaboration-centric, or transaction-centric. Each of these process types has individual characteristics with regard to process duration and process complexity. For example, transaction-centric processes tend to be long-duration, high-complexity processes. At the other end of the spectrum are integration-centric processes, which tend to be short-duration, low-complexity processes.

Given that enterprises run all of these types of processes, BPM solutions must become umbrellas for all of these types of processes—companies must support processes of all durations and complexity levels. For the time being, these solutions will likely come from a combination of best-of-breed vendors. BPM solutions need to develop capabilities that span the spectrum from data transformation and case management to alert notification and exception handling.

A Look at BPM Software

Each BPM software application is defined by a mix of several components. Some solutions will have all of the components, while others will specialize in offering one or two components. These components—process design, process monitoring, process operation (automation and integration), and technology platforms—will weight heavily in the selection criteria of BPM for the next few years.

Process Design

The ability for the business analyst to design processes without needing to have any programming skills is one of the major promises of BPM solutions. Current vendor offerings include graphical UIs with drag-and-drop technology to make process design as intuitive as possible for the business user. A robust process design module will support all process assets (i.e. information and people), sub-processes, parallel processes, creation of business rules, and exception handling among other things.

Process Monitoring

It is difficult to overstate the importance of process monitoring. One of the major goals of BPM is to realize continuous process improvement. Thus, BPM vendors are offering more and more capabilities in this area. Almost all vendors offer at least some sort of administrative console with metrics and reporting capabilities. Other vendors specialize in process monitoring and offer enhanced analysis functionality. Through reports and analysis, companies can take steps towards process optimization.

Process Operation

The actual operation, or execution, of a process is what most people would commonly call first-generation workflow. Still today, a traditional workflow vendor may only offer process operation capabilities. More likely, though, a vendor will build upon its workflow capabilities and offer a more holistic solution.

There are several important process operation features that vendors are prominently featuring today. First is run-time modification of processes. Users need to know that, if anything goes wrong with their process, they can quickly make changes while the process is running and not lose time by starting over from the beginning.

Second, workload balancing is a necessity. In today's hectic business environment, both people and applications will get overloaded, meaning that the BPM solution will have to balance the work between all parties in the most efficient manner.

Third, users are depending on version and change management from their BPM solutions. This can be for learning purposes (to review process iterations), legal purposes (to have a record of every activity), or simply for contingency purposes (in case a disaster occurs). Finally, users need a UI into the process, especially for the completion of manual process tasks. We will look more at the UI for process participants in the integration discussion.

There are two aspects of process operation that require an in-depth look at BPM components in and of themselves. Both automation and integration are extremely important pieces of the BPM puzzle. Both fall under the operation umbrella, yet traditional workflow does not adequately address both automation and integration.

Automation

First-generation workflow is most related to process automation. The goal of early workflow technologies was to automate repetitive tasks in order to save people time. In order to provide automation, vendors offer functionality such as:

- notification services (i.e. proactive e-mails) to automate people-intensive processes,
- support for nested processing, where sub-processes invoke other sub-processes in succession, and
- invocation of services in order to execute processes regardless of modeling language while persisting state and data between service calls.

Integration

Connecting all process participants, whether they be humans or applications, is one of the most important prerequisites to implementing successful processes. In the past, organizations have allowed applications to drive how processes are conducted, regardless of their effect on the business.

Today's enterprise is becoming smarter and realizing the benefits of a process-centric approach. In order to achieve a process-centric view of the world, a company must separate application logic from process logic so that process changes do not require reconfiguration of integration schemes. Imagine having to reintegrate every time a process needed to change—nothing would ever get done. BPM vendors are now focused on allowing this separation of application logic from business logic.

In order to meet the integration needs of consumers, vendors are either offering functionality themselves or partnering with EAI-specific vendors. At its core, integration is simply the connection of people and information within a process. To connect application information, vendors use APIs or messaging services. To connect people (and their inherent knowledge), vendors use UIs that have the look and feel of e-mail inboxes to include human users within the process.

Technology Platforms

There are two major technology platforms for BPM deployment: J2EE and Microsoft-centric. BPM vendors are choosing one, the other, or both. Some feel that J2EE

is the platform of the future, while others choose Microsoft because that's what their existing customer base demands. Most vendors, though, are aiming for deployability on both platforms. Delphi's research validates this latter strategy, that the notion of a single platform is still in its infancy and it's too early to put all the eggs in one basket.

As previously mentioned, vendors are entering the BPM market from a variety of different software segments (EAI, workflow, et al) with each offering specific experience with the management of different types of processes. The challenge for all vendors will be to develop support of all process types. For example, vendors that focus on EAI today will need to develop capabilities in managing more complex and longer-lived processes.

Web Services: A Growing Mandate for BPM

It is difficult to discuss BPM without also discussing Web Services, nor Web Services without BPM. As the impact of Web Services begins to grow within many organizations, so will the degree of complexity surrounding this new enterprise computing paradigm. To fully leverage the advantages offered by Web Services in the delivery of application resources and information requires the same type of coordination as provided by BPM software in the management of business processes. It is important to note, however, that more than half of the survey respondents felt that process management standards were missing from current Web Services offerings. This points to a fundamental relationship between BPM and Web Services.

Web Services Becoming Clearer in the Near Future

Those following the development of Web Services closely know that there are about as many definitions of the term as there are people offering one. Delphi Group defines a Web Service as an XML object comprised of content, application code, process logic, or any combination of these that can be accessed over any TCP/IP network using the SOAP standard for integration, the WSDL standard for self-description, and the UDDI standard for registry and discovery within a public or private directory. Expressed in non-technical terms, Web Services are business assets that can be shared, combined, used, and reused by heterogeneous computing resources within an organization or between firms. The user may be a human being or a machine.

BPM Standards -- BPMI.org

Delphi's research indicates a strong interest in how standards will evolve for BPM and Web Services. In fact, many corporations put initiatives on-hold as they wait to see how standards play out. One organization that is taking a lead in driving standards for BPM is BPMI.org (the Business Process Management Initiative). BPMI.org is a non-profit corporation whose goal is to empower companies of all sizes, across all industries, to develop and operate business processes that span multiple applications and business partners, behind the firewall and over the Internet. The Initiative's mission is to promote and develop the use of Business Process Management (BPM) through the establishment of standards for process design, deployment, execution, maintenance, and optimization. BPMI.org develops open specifications, assists IT vendors with marketing their implementations, and supports businesses with using Business Process Management technologies.

The Standards Push

On the back-end, technology integration standards such as XML Schema, SOAP, and J2EE enable the convergence of legacy infrastructures toward process-oriented enterprise computing. On the front-end, emerging protocols such as ebXML, RosettaNet, and BizTalk support the process-level collaboration among business partners. BPMI.org leverages those converging trends by driving the development of technologies that help companies to develop and operate business processes that span multiple applications and business partners, behind the firewall and over the Internet.

BPMI.org defines open specifications, such as the Business Process Modeling Language (BPML), Business Process Query Language (BPQL), and Business Process Modeling Notation (BPMN) that will enable the standards-based management of e-business processes.

BPMI.org and ebXML are addressing complementary aspects of e-business process management. While ebXML provides a standard way to describe the Public Interface of e-business processes, BPMI.org provides a standard way to describe their Private Implementation.

BPMI.org is driving the creation of BPML for the private implementation part (proprietary to each

business partner) of a process. The Business Process Modeling Language (BPML) is a meta-language for the modeling of business processes, as XML is a meta-language for the modeling of business data. BPML provides an abstracted execution model for collaborative & transactional business processes based on the concept of a transactional finite-state machine.

BPML considers e-business processes as made of a common public interface and as many private implementations as process participants. This enables the public interface of BPML processes to be described as ebXML business processes or RosettaNet Partner Interface Processes, independently of their private implementations.

In much the same way XML documents are usually described in a specific XML Schema layered on top of the eXtensible Markup Language, BPML processes can be described in a specific business process modeling language layered on top of the extensible BPML XML Schema. BPML represents business processes as the interleaving of control flow, data flow, and event flow, while adding orthogonal design capabilities for business rules, security roles, and transaction contexts.

Defined as a medium for the convergence of existing applications toward process-oriented enterprise computing, BPML offers explicit support for synchronous and asynchronous distributed transactions, and therefore can be used as an execution model for embedding existing applications within e-business processes as process components.

BPMI.org is driving the creation of BPQL to be a standard management interface for the deployment and execution of e-business processes. The Business Process Query Language (BPQL) is a management interface to a business process management infrastructure that includes a process execution facility (Process Server) and a process deployment facility (Process Repository).

BPMN will be a notation for the development of BPML processes at the business level. Where BPML is used to carry process semantics among computer systems and software applications, BPMN will assist the communication of business processes among business and technical users, working to bridge the gap that exists today.

There seems to be a bit more confusion surrounding Web Services than BPM. Asked to define Web Services, respondents gave answers ranging from “collaborative commerce enabler” (75% of respondents) to “Internet business model” (57% of respondents) to “Web site development environment” (42% of respondents) and “software development paradigm” (42% of respondents). As more businesses experiment with Web Services, they will begin to better understand the specific applications of this computing model and, undoubtedly, discover new ones.

It is important to understand the underlying standards that go along with Web Services. While nearly one-quarter of respondents were unfamiliar with the Simple Object Access Protocol (SOAP), the majority correctly indicated that it is a standard interface that allows applications to integrate with one another. Very few respondents (3.2%) confused SOAP with the Universal Description, Discovery, and Invocation specification (UDDI), but a significant number (15.9%) incorrectly defined it as a means to describe a Web service, which is the function of the WSDL standard.

These levels of unfamiliarity and misunderstanding are natural for a technology that is just beginning its first wave of adoption. Web Services are largely conceptual for many potential users and much education will be needed to correct misconceptions that have been formed already.

Respondents do recognize XML, SOAP, JCA, UDDI, and WSDL as having large roles in Web Services strategies. XML is clearly the foundational technology upon which Web Services will rest. The standard was nearly a unanimous choice, indicating that it is a “must have” component of Web Services. The majority (53%) of organizations taking part in the survey have begun to enable their applications to leverage information represented in XML. Respondents also seem to grasp the importance of SOAP—70% indicated that they have either already begun to enable business applications with SOAP interfaces or they will do so within the next 12 months.

The Infrastructure of Web Services

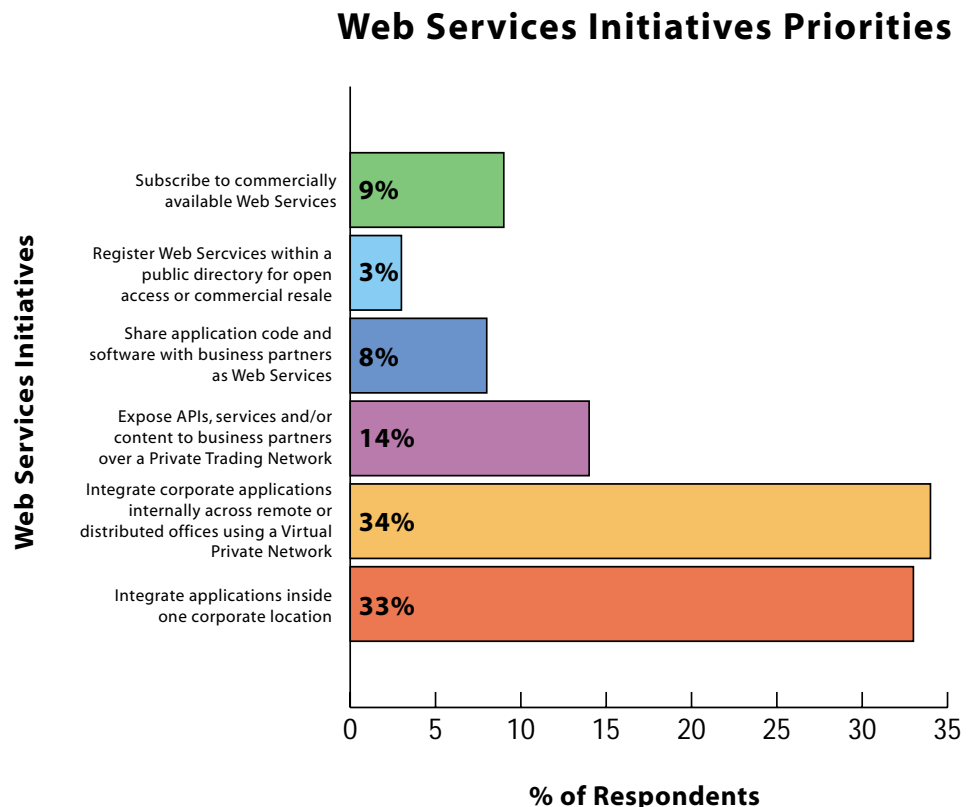
Organizations are taking varied approaches to the uncertain

infrastructure requirements. Many organizations, 41% of respondents, are creating a mixed (J2EE and Microsoft-compliant) environment for deployment. This is compared to 36% of organizations that have committed to a Microsoft-centric environment and 16% who have committed to Unix and J2EE.

Whether they are clearly understood or not, Web Services are here to stay—only 25% of survey respondents have no plans to implement Web Services. Importantly, 39% of respondents plan to implement Web Services within the project area of BPM, solidifying the relationship between the two. Other project implementation areas for Web Services include enterprise portals (53% of respondents), content management (37% of respondents), EAI (39% of respondents), CRM (29% of respondents), and e-Commerce (39% of respondents).

State of Web Services Deployments

Many organizations (34% of respondents) are not sure of when they will begin using Web Services for distributed processing of large computational tasks. For those that do know, the timeframe is quick, typically by 2003 these companies will be utilizing Web Services for distributed processing.



Where Web Services Fits

Organizations are also beginning to think about where Web Services fit within their organization. While there is no one clear department or initiative with which Web Services fit, the most popular were: enterprise portals (21% of respondents); BPM (15% of respondents); and EAI (15% of respondents). It is clear from these responses that companies are looking for EAI to deliver information, whether in a portal, in the context of a process, or between applications.

Web Services are widely viewed as a means to extend existing investments in information repositories, applications, and business processes. Therefore, we can make some assumptions about where Web Services will be applied first, based on what organizations have in place that may be shared internally and externally.

Over two-thirds of respondents (70%) have a business portal project underway. It makes sense that these organizations will use Web Services to integrate information, applications, and processes into these portals, rather than building hard-wired portlets that must be recoded each time an application or process changes. Additionally, portal deployments are reaching more frequently across the firewall. As this trend continues, the business portal will become the place where individuals build, publish, access, and use Web Services.

The concept of dynamic object integration is not new to many individuals managing unstructured enterprise content. Most content management applications are adept at creating virtual documents on the fly by assembling disparate content chunks into a single framework. Web Services provide a standards-based means to broadcast, aggregate, and use content, which will replace the proprietary methods currently used by most content management vendors.

Nearly half of the survey respondents have a Business Process Management (BPM) project underway in their organization. Process integration is the next focal point for those companies that have successfully integrated content and applications in their computing environment (often through a business portal.) As more organizations codify and modify their internal processes and those shared with external value chain members, they will use Web Services to integrate those processes with content and applications, providing best practice business context to the information used by their knowledge workers.

Integration Drives Early Evolution of Web Services

Survey respondents indicate that early Web Services initiatives will revolve around a select few areas. Application integration, whether inside one corporate location or across several locations via VPN, will be an early driver of Web Services initiatives. In fact, respondents see cost-effective integration of internal applications as the primary benefit to be derived from Web Services. Once companies are comfortable with the results of those initiatives, they will likely move on to exposing APIs and services to business partners over the Web and subscribing to commercially available Web Services.

Impediments to Web Services

Of course, there will be obstacles as companies begin to test the Web Services waters. Currently, respondents felt that there are several features missing from Web Services offerings. Process management standards, distributed authentication (between Web Services and business objects), quality of service metrics and monitoring, non-repudiation (transactional integrity and delivery guarantees), and the ability to syndicate more than data and content are chief among the features that users would like to see in a more holistic Web Services offering.

In addition to missing features, respondents site other obstacles to Web Services implementations. Multiple standards can get in the way as IT managers decide to wait to see how standards play out. Many enterprises are also cautious because of a lack of experience in building services-oriented architectures. Some are worried about the effect on corporate culture. And, many simply don't see a business case for Web Services.

Web Services Press On

Despite the lack of a coherent definition of Web Services, organizations are taking greenfield approaches to implementation, choosing to use internal resources to deploy Web Services (77% of respondents) over using business partners with greater experience (36% of respondents). They are doing this despite 19% of them seeing lack of experience in building services-oriented architecture as being the largest obstacle to the implementation of Web Services. Other perceived obstacles to Web Services implementations include multiple standards implementation methods (18% of respondents), lack of a business case (15% of respondents), and the change required in organizational culture (18% of respondents).

The lack of understanding of Web Services is not a deterrent to implementation initiatives. Predictably, organizations are taking different approaches to accounting for Web Services. One-third of companies see Web Services as being a cost center within their organization, one-third see Web Services as being a profit center, and the final third are cost-neutral at this point.

As they press on with Web Services initiatives, companies will use a variety of metrics to measure the success of their implementations. Organizations will be looking at how a Web Services architecture helps them with utilization of existing infrastructure and software assets (43% of respondents), use internal development resources (38% of respondents), deployment time (40% of respondents), initial deployment costs (25% of respondents), and ability to lower TCO (18% of respondents).

Organizations Are Thinking Small Dollars—For Now

The largest group of respondents (23%) expects to spend less than \$100,000 on Web Services projects within the next three years, and the next largest group (18%) anticipates spending less than \$250,000 during the same time period. Spending is generally proportional to the size of an IT project, so one must assume that these groups envision starting with small Web Services initiatives. However, one of the promises of Web Services is the extension of existing IT assets as opposed to wholesale replacement of systems. In many instances, deploying Web Services will not force new investments in hardware or applications and will require only limited spending on XML and SOAP coding.

IT history teaches us that most projects come in over budget, often because not all the costs were identified and planned for up front. In the case of Web Services development and deployment, it is easy to overlook necessary initial expenditures such as developer training and third-party architectural services, as well as recurring costs, such as maintenance of Web Services components. Many firms will find that their original projections for Web Services spending were overly optimistic or simply ill informed.

Pricing of Web Services

As the market evolves, vendors will learn where their services fit and how they play into the market. What is clear now is that companies do not want to pay outrageous per-CPU or per-user prices for Web Services solutions, which is the same way they feel

about BPM solutions. Most enterprises would prefer to pay either a fixed price, pay based on service level, or pay on a subscription basis. This pricing demand shows that organizations are taking a pay for play approach to Web Services. Because companies are now experienced when it comes to buying technology, they know they have the right to make sure it performs the way it should. This is an important consideration for vendors as they approach the market.

Summary

The research certainly points to an exciting few years ahead in relation to both BPM and Web Services. BPM vendors are well-positioned to ride the wave of Web Services as the evolution of that market occurs. Web Services will not replace BPM functionality; rather, Web Services will enhance the ability of BPM vendors to deliver real value to their customers.

Delphi has the unique perspective of working with both end users of these technologies as well as vendors. The evolution of BPM and Web Services is of particular interest to us because of the potential for these technologies to solve real business problems for end users.

Fujitsu: BPM Summary Report

Overview

Fujitsu's i-Flow is a 100% Java-based business process automation engine that works with the major application servers. It gives business groups the ability to collaboratively plan, automate, track, and improve business processes, all with the goal of helping enterprises become more productive. i-Flow delivers a Web-based business process automation engine that gives developers and administrators the ability to work anywhere at anytime. It can leverage existing infrastructure investments because it integrates to existing environments and was created with an open, flexible, and distributed architecture. i-Flow was developed with a set of Java APIs that facilitate the integration to existing applications.

Process Modeling

Application development can be accomplished via graphical drag-and-drop process design techniques, including run-time process editing. This is a key feature of i-Flow because it gives businesses a chance to keep up with the pace of change in today's economy—their processes can evolve in real time. Modular design allows reuse of existing components.

Business rules can be defined graphically on a process diagram. Complex conditional statements can be defined without any coding work. Complex parallel processing scenarios can be modeled in a drag-and-drop browser environment. Business rules can be further enhanced with JavaScript.

i-Flow is delivered with five out-of-the-box, customizable “clients” for users. A client is simply a user interface that is constructed with reusable components that developers can use as-is, or extend and enhance.

The Development Manager is used to design process templates, then start processes from those templates, modify processes at run-time, access tasks, and check process status and history. The Development Manager was created with process designers, business analysts, advanced users, and supervisory staff in mind. It is used by those employees who know the process best and are responsible for its execution.

The Task Manager is leveraged by users to access and respond to work items. It provides users with to-do lists and access to necessary forms and attachments. It is the standard interface for those users involved directly in process execution.

The E-mail Work Item client is used to respond to tasks and relevant documents. When a user has a new task to complete, i-Flow will proactively notify them via an e-mail with a link to the task. The E-mail Work Item is used primarily by those users that do not interact with i-Flow on a regular basis. Thus, if they have a task to do, they will be reminded by the system automatically, not have to rely on a last-minute phone call from a manager.

The New Process client is used to create new processes from existing process designs. It usually is embedded in a Web site, where a user can leverage it to begin a new process, such as submitting a complaint.

The Administration client is used to manage versioning, importing, exporting, archiving, or deleting process designs, process instances, and tasks. It is also used to modify or delete user profiles.

Access to the Model and GUI APIs that underpin the 100% Web-based clients is provided along with the source code, enabling developers to further extend existing clients or create entirely new applications. The Model API is used to encapsulate the state of client

objects and handle server interactions, while the GUI API components provide the different components of the i-Flow user interface, such as a work list. The client components are designed to easily import to visual development tools. The availability of such components for third-party tools allows reconfiguration, extension, and customization of the client.

Process designers can reuse existing process designs as sub-processes within a parent process. Sub-processes can also be created in run-time should a user realize that a single task requires more steps than initially planned. The product also enables designers to chain processes together at run-time, creating independent processes as required.

Template versioning is provided for management of process models. Users can generate new template versions and enter notes about each version. Administrators manage template states and decide when a template is ready to be published in the production environment. Administrators also determine when to make a published template obsolete.

Process Monitoring

i-Flow maintains a history of every event that occurs in a process, and the audit data can be viewed for any running or completed process. In addition, i-Flow provides reporting in charts about processes, templates, and tasks. These reports contain information about the number of processes and tasks in selected states. Managers can also see how many processes each user has started. Thus, managers can get statistics in the way they need them, whether it be by user or by task.

Process Operation Capabilities

i-Flow produces simple default forms which can be enhanced and modified using commercial HTML editing tools. This means that rather than having to learn and support another forms development environment, developers can continue to use the HTML forms development environment with which they are most familiar. The default forms can be integrated with external data in many ways.

The Document check-in and check-out feature is provided for Microsoft and Unix platforms. Users can attach and view documents of any file type using i-Flow.

i-Flow includes an organizer that provides lists of activities, processes and templates. Users can filter the work list based on many criteria (e.g., viewing only completed activities or accepted activities), giving them a customized view of process activities. Tasks can also be sorted based on priority, identifier or state. Processes can be sorted according to their name, priority and identifier.

i-Flow provides authorized users with the ability to change any aspect of an active process. Users can add or remove tasks, change the routing and business rules, add or remove data items and forms. In process editing, a user can even activate or deactivate steps of the process model. This means that they can return to a previous step in the process if it requires rework. All run-time changes can be performed from the graphical Web-based interface. The edits are stored to a private template, which can be reused later as a new version of the process.

The i-Flow server provides a RMI interface that exposes its objects to applications and client tools. A user may access the server via the i-Flow client, a customized client, or by using the API provided with i-Flow. The client components are used to encapsulate the state of the client objects and interactions with the server via RMI. The client, server, and adapter components may be installed on different machines to distribute the load, thereby enhancing the scalability of the system. RMI-based component communication exposes objects to applications and client tools.

Automation

Fujitsu came out with a Web-based workflow in the mid-1990s. Soon, the company released a Java technology-based workflow engine, followed by a 100% browser-based workflow engine. This browser-based tool put the ability to design processes back into the hands of business owners. With i-Flow, an organization can automate its practices and procedures and have the process automation system accessible to workers anytime, anywhere.

An important part of automation is supporting time parameters. A timer feature determines deadlines at both a task and process level. Time can be specified relative to a process or a task, absolutely, or periodically. When a timer expires, i-Flow can automatically notify another user or escalate the task to a manager. Timer actions can be fully customized, i.e. timer expiration could trigger an external program.

The i-Flow server is based around the workflow engine. The workflow engine negotiates interaction between clients and other components, enacts processes started by users or programs, and notifies clients of changes in status within a process. The i-Flow architecture is adapter-based to allow integration with third-party products.

Integration

Adapters enable the server to communicate with the other components. A company will only need to install those adapters that suit its configuration. i-Flow's provides several out-of-the-box adapters, and others can be customized. The adapters allow the server to communicate with the necessary IT infrastructure components required in typical process automation environments. There are adapters for such purposes as document management (to store forms, attachments and templates), directories (to hold the user's context and access the directory service to perform role resolution), databases (provides the communication mechanism between the server and a database server), and e-mail (adapter sends e-mail from the i-Flow server to any SMTP-compliant mail server).

Technology Platforms

i-Flow allows developers to rely on a 100% Java server architecture to manage processes. i-Flow's distributed server architecture utilizes industry-standard CORBA/IIOP or RMI protocols for object interaction. All components in the environment interoperate via a rigorous set of Java interfaces.

Standards Participation

Fujitsu is part of the following organizations: WfMC, OMG and BPMI.org.

Case Study

iJET Travel Intelligence packages travel-related information based on personal traveler profiles such as passport information, medical history, and itinerary and delivers alerts and reports to customers over a wireless channel or a secure Web page. The company's intelligence operations center is manned by analysts that monitor the globe for travel problems and create useful intelligence for travelers. Every piece of our proprietary intelligence passes through a stringent review process involving geographic experts, subject matter experts, and editors before becoming part of the database—and even then is subject to continual

About This Document:

The product-specific information contained in this document is intended to provide an overview of a specific product and vendor at the date of publishing. Facts presented have been verified to the best of our ability with the vendor and actual users of the product where indicated, however, Delphi cannot insure the accuracy of this information since products, vendors, and market conditions change rapidly. Delphi Group makes no implied or explicit warranties, endorsements, or recommendations in this report nor should such warranties be inferred from its contents. A complete assessment of your specific application, the method of implementation for a given product or technology, and the current state of that product must be considered in order for a recommendation to be made on any product's suitability for your purpose, needs and requirements.

Delphi Group is a leading provider of business and technology advisory services to Global 2000 organizations. With offices established around the world, Delphi has assisted professionals across disciplines and industries at nearly every major national and global organization and branch of government. Its clients and subscribers include more than half of the Global 2000.

Delphi Group
Ten Post Office Square
Boston, MA 02109-4603
v (617) 247.1511
f (617) 247.4957

review. All this in order to turn mountains of information into comprehensive, timely, accurate, precise, objective, and personalized travel intelligence.

iJET continually receives updates from more than 10,000 worldwide sources. Once the intelligence is received, it goes through editorial and approval procedures to ensure delivery of only the most accurate information in a most timely fashion. Equally important is the ability to quickly deliver vast amounts of travel information to iJET customers. Without the proper processes and technology in place, the company would not be able to accomplish this.

iJET chose to deploy i-Flow into its internal Operations Work Center. With i-Flow, iJET quickly linked its application server, quality of assurance systems, and the various proprietary software components used for its Travel Intelligence business. This allows for the management of complex, real-time intelligence creation processing and directly supports other iJET product offerings. i-Flow originates, streamlines, and automates the intelligence creation process, making sure that editorial and approval guidelines are met, and delivers the actual travel intelligence information directly to customers.

i-Flow's component-based design and comprehensive Java API were essential to iJET. Because iJET had over 125 systems that intelligence interacts with, the fact that i-Flow could integrate with just about anything played a key role in iJET's decision to use i-Flow.

With i-Flow powering the business, iJET has been able to change its processes as they run and learn about their operation through reporting tools. For example, iJET can use i-Flow's process monitoring capabilities to benchmark iJET's performance versus the leading newswire. Effective process management is what iJET needs to deliver to its employees (ease of use) and customers (timely, relevant information).