IBM

Business Process Management
enabled by SOA for i5/OS

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Introduction

It is a fast-paced, global business world. Agile companies need to be able to adapt to changes quickly and do more with less. You need to improve your company's ability to respond to unpredictable market forces — such as mergers and acquisitions, expanding regulatory requirements and globalization. Couple this with pressures to reduce costs and overhead. How can you meet these challenges?

These challenges can be addressed head on by Business Process Management (BPM) enabled by a service oriented architecture (SOA). *BPM enabled by SOA* improves business processes and hastens business innovation through the combination of business acumen and software capabilities. WebSphere delivers BPM enabled by SOA. It provides a flexible architectural style in support of efficient process change and rapid process deployment — the attributes required by an agile, globally integrated enterprise.

Streamlining business processes allows organizations to overcome the obstacles posed by today's environment and respond rapidly to changing conditions. Creating a responsive environment requires integrating all of an organization's resources — people, applications and information — into business processes. This integration, combined with the IBM System i™ and IBM i5/OS® solutions (**ibm.com**/systems/i/advantages/), provides an integrated operating environment that offers a secure and reliable deployment platform for BPM solutions.

BPM enabled by SOA reduces the resources required to update or automate integration solutions. It enables the composition of business processes from services and exposes them, in turn, as business services. The engine driving BPM enabled by SOA is IBM WebSphere® Process Server, the cornerstone of the IBM WebSphere BPM software platform, which supports integration-centric and human-centric business processes in a truly integrated, services-based and transaction-supported way. IBM's BPM solutions for System i and i5/OS offer the reliability and security to help you simplify your IT and reduce cost, enabling you to invest in growing your business.

What WebSphere BPM technologies are available on i5/OS?
WebSphere delivers BPM enabled by SOA capability in building blocks that are aligned to the life cycle. This permits a company to deploy its BPM platform as slowly or as rapidly as needed. It can start with basic projects and progress into more advanced uses, such as processes that include customers and suppliers. By taking this approach, WebSphere clients are able to limit their initial investment and risk while maintaining the flexibility to grow in sophistication.

Process automation is a key component in this approach and, often, process automation projects are the first step in approaching BPM for an organization. Many processes are based on the collective knowledge of a few key people and are often not formalized or documented. This usually means that they are performed in an inconsistent manner and that the details about who or what was involved in any given instance can easily be lost. There are many ways to improve, automate and optimize a process, but first, you must understand its current use. From that understanding, processes can be optimized for efficiency and future growth.

So what is process automation? Process automation is defined as supplementing a manual process with an automatically controlled alternative through the orchestration and integration of technology and human assets to reduce costs, increase efficiency and enable compliance.

Businesses need to be able to take a process that they have designed, and align and orchestrate the services that represent steps in that process. They must also be able to deploy the process in a secure, stable and scalable environment. They need a methodology to help deliver an SOA solution based on a common model to orchestrate, mediate, connect, map and run underlying IT functions as part of their business processes. This methodology should enable flexible business processes.

BPM enabled by SOA is a discipline enhanced by a flexible IT architecture to accelerate the creation and reuse of business services in support of efficient process change , rapid process deployment and effective process execution. BPM can speed the rate of business change and increase IT effectiveness. However, to implement BPM solutions, tools to assemble, deploy and manage processes are needed. To that end, IBM, through its WebSphere software platform, offers a comprehensive suite of tools to implement BPM solutions on the System i platform.

Building your BPM solution to ensure interoperability and flexibility is critically important. WebSphere BPM tools provide these important features as part of your SOA through adoption of popular standards, such as business process execution language (BPEL), Web services, Java™ Message Service (JMS), extensible markup language (XML) and many more. Built on industry standards and SOA principles, IBM WebSphere Integration Developer provides an integrated development experience. Architects and developers can discover, assemble, mediate, orchestrate and integrate reusable services with minimal coding.

At the heart of the WebSphere BPM offering is IBM WebSphere Process Server, designed to be a high-performance, business-process engine that runs critical business processes securely, consistently and with transactional integrity. WebSphere Process Server helps orchestrate the assets of a business to form highly optimized and effective processes. This capability can help you meet your business goals, for example, by automating manufacturing processes, by efficiently processing insurance claims and financial payments, or by running an efficient supply chain. Through these processes, it helps to ensure compliance with the latest industry regulations. WebSphere Process Server contains IBM WebSphere Enterprise Service Bus, which mediates disparate services, helping to maximize reuse of assets wherever they are — regardless of vendor or platform, or whether they are built by companies themselves or provided as part of packaged applications.

To allow as many of a company's assets to participate in their business processes as possible, IBM provides IBM WebSphere MQ – a messaging backbone for your SOA – connecting applications, Web services, Web 2.0 and data sources together. WebSphere MQ provides a service interface to resources, abstracting the physical location and implementation of the service. With support for over 80 different platform configurations, more of your investments can be integrated into the process. This, coupled with support for different programming languages, application programming interfaces (APIs) and programming models, enables customers to get started using their existing skills investments. WebSphere MQ is a fully compliant JMS engine, providing transactional integrity, reliable assured delivery of information, scalability and security.

With the delivery of Version 6.1 levels of the WebSphere BPM solution, support for i5/OS has been added for IBM WebSphere Process Server, IBM WebSphere Enterprise Service Bus and IBM WebSphere Integration Developer. While the BPM products already support System i configurations using the IBM AIX® and Linux® operating environments, now native i5/OS support is also available. WebSphere Process Server and WebSphere Enterprise Service Bus functions can now operate within the scalable, multiuser, i5/OS operating environment with its integrated IBM DB2® database and enterprise-class reliability, availability and security. We know that business logic and data interactions are most efficient when they are collocated. The same is true for SOA process and data interactions. Having WebSphere Process Server and WebSphere Enterprise Service Bus running natively on i5/OS, and exploiting the integration of DB2 in i5/OS, enables a more efficient and effective BPM solution. The WebSphere Integration Developer, being Eclipse-based, is a natural extension to the Integrated Language Environment (ILE) programmer's working environment, allowing the integration of application and process development on a common platform.

Developing flexible business processes based on an SOA enables you to optimize business processes and functions, integrate business processes with the underlying infrastructure, and make changes on the fly without rewriting all your code. And building BPM capabilities on top of SOA enables you to achieve these advantages fast with reduced risk – without breaking the bank. Doing so within the closely integrated execution environment of i5/OS provides an optimum SOA solution.

WebSphere Process Server and i5/OS cooperative efforts go a step further by providing remote DB2 support for i5/OS, which allows WebSphere Process Server instances running on other platforms to leverage relational-database management servers running i5/OS. Support for i5/OS and remote DB2 support for System i enable integration with i5/OS applications and leverage relational-database management servers running i5/OS as a common repository for both the application and SOA services information.

What does i5/OS contribute to the SOA environment?

It has been said that SOA is a team sport. This is no less true for IBM providing the enabling software for the SOA solution. While WebSphere brings the BPM portfolio to i5/OS, i5/OS is responding to client demands to make it significantly easier for the Integrated Language Environment (ILE) programming community to create and deploy Web services for their business services. This capability is in step with our Smart SOA™ initiatives.

Specifically, the System i platform extends Web services integration and SOA enablement on i5/OS by simplifying the implementation of Web services for ILE products. It does this by integrating a Web services server and client. This allows for extended SOA enablement with new SOA-related offerings.

A key element of i5/OS Web services integration and SOA enablement is the inclusion of an integrated Web application server as part of the i5/OS operating system. This provides the basics for i5/OS applications to be up and running quickly and effectively on the Web. The integrated Web application server is a good place to prototype new applications or run existing small-footprint or low-use applications. For applications that require a high degree of scalability, IBM WebSphere Application Server Express is recommended. WebSphere Application Server Express continues to be part of the Web Enablement package of i5/OS, 5722-WE2, which is provided, entitled, with each i5/OS license.

The integrated Web application server can be considered an on-ramp to the more scalable solution. This Web container is easy to use and configure, does not require any additional products to install and uses minimal system resources. The integrated Web application server can be completely administered using the Web Administration for i5/OS GUI. You can create, start, stop and manage servers using this commonly available interface.

The integrated Web services provide a convenient way to externalize existing programs running on i5/OS, such as RPG and COBOL programs, as Web services. Web service clients can then interact with these i5/OS program-based services from the Internet or intranet using industry-standard communication protocols, such as SOAP. Clients can be implemented using a variety of platforms and programming languages, such as C, C++, Java and .NET. An easy-to-use wizard is provided to configure the Web services server and the services for i5/OS program objects. Other management functions — such as starting, stopping and deleting services — are also provided.
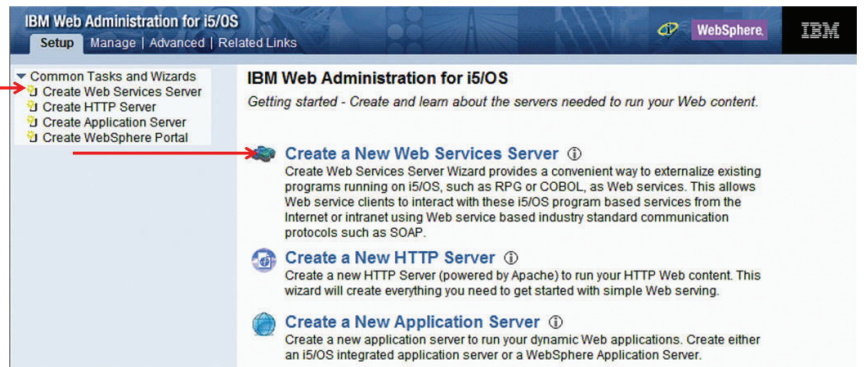
Figure 1. Click the Create a New Web Services Server link.

The wizards are set in the context of the ILE programmer's environment and cater to information they know and are comfortable with. They empower the ILE programmer to extend the application without having to work through a major new learning curve. Further, and this is a powerful point for the i5/OS community, the facilities come already installed, fully integrated into i5/OS.

The infrastructure needed to deploy the Web services created by the wizards is an integral part of i5/OS. No separate installation is required to gain access to the Web services container. The configuration process is also in the context of the i5/OS administration wizards. Additionally, the execution footprint is smaller.

Figure 2. When created, the server and the deployed service are started.

More services development tools for the i5/OS environment
IBM WebSphere Development Studio for System i is a complete set of server and workstation components designed for i5/OS development. WebSphere Development Studio Client includes the IBM Rational® Software Delivery Platform and a subset of Rational Application Developer tools. Rational Software Delivery Platform provides the base for a robust, integrated development environment.

Rational tools extend some of the i5/OS capabilities (IBM Toolbox for Java and IBM XML Toolkit) and offers graphical development environment to integrate System i applications and data with Web applications and business processes. Rational tools allow you to service-enable System i applications and data through various easy-to-use wizards.

Web Services tackle the problem of inefficient distributed computing, because system components need to be loosely coupled and dynamically bound to provide greater flexibility, scalability, lower overhead costs, and hence, better business growth. The architecture involves a relationship between service providers, brokers, and requesters. More specifically, service requesters submit a request to a service broker, which finds the right service from a service provider.

It is important to point out that these integrated facilities are basic, *getting-started* functions. They work and work well, but they are not full function. If you are ready or in need of the additional capabilities of IBM WebSphere Application Server (for example, full Java Enterprise Edition [JEE] capabilities, Enterprise JavaBeans [EJBs], multiple data access paths, JMS, cross-platform support or high availability support), you can move up to WebSphere Application Server Express, which is entitled, or WebSphere Application Server Network Deployment packages. The integrated facilities produce *real services*, capable of being handled and used by any standards-compliant Web services consumer, enterprise service bus and process server, and forming the foundational investment in an SOA solution for the i5/OS client.

Web services integration and SOA enablement by i5/OS offers an easy-to-use and practical SOA on-ramp for the ILE programmer. Working in a familiar environment, ILE programmers can invoke SOA services from within the ILE job, leveraging open standards-based interfaces that include SOAP and Web Services Description Language (WSDL). Getting started was never easier with integrated functions configurable through wizards using only existing System i skills.

As these services are used, their value, in terms of providing newfound agility for the i5/OS application, will become recognized. This will drive their reuse and the creation of new services as a means for gaining increased access to the business value of i5/OS applications. It will not be long before you will be faced with a growing collection of services that need to be organized. You will need to orchestrate the use of these services as the processes they can deliver become apparent. This is where the capabilities of WebSphere BPM can come into play as a way to make the most of these assets. Using WebSphere Integration Developer and WebSphere Process Server will enable the orchestration of these services, together with the necessary human tasks, into practical business processes providing new and innovative business services to the company.

Mission-critical qualities of service for your SOA messaging backbone

When you need mission-critical qualities of service, such as assured delivery, reliability and transactional integrity of business data and transactions, WebSphere MQ goes well beyond the capabilities of the Web Services Reliable Messaging (WS-RM) specification. WebSphere MQ puts the System i platform center stage in your SOA by enabling all other assets to link to the processes running thereon. WebSphere MQ enables clients to start quickly and simply by connecting one or two key applications together while enabling the infrastructure to grow as the business dictates without rearchitecting. Sample applications to test connectivity of services across the backbone, along with battle-tested sample source code in multiple programming languages, help speed the time to value for a business. WebSphere Application Server integrates with WebSphere MQ as the underlying JMS engine. WebSphere MQ provides Java 2 Platform, Enterprise Edition (J2EE) Connector architecture (JCA) support, enabling multiple application servers that are compliant with Java Enterprise Edition (JEE)-compliant to interoperate at the JMS level by standardizing on the message format used by WebSphere MQ—the industry's leading, mission-critical, messaging engine (Wintergeen 2007).

BPM enabled by SOA on i5/OS: A scenario

Integrated and automated business processes can begin with the right development environment. WebSphere Integration Developer is a development tool that, with minimal programming skills, provides a way of discovering, creating and cataloging services so that creating a process is just a case of dragging and dropping services on to a canvas and wiring them together. Now, reverse this thought and start from the process that needs to be automated. Draw the process with the appropriate steps and wire them together. At each step of the process, use a set of tools to discover and create services, and bind them to the process model using powerful mediation and orchestration capabilities.

Users can import business model artifacts from other tools, such as importing from WebSphere Business Modeler into WebSphere Integration Developer to add technical implementation details to the process that will allow it to be deployed to WebSphere Process Server. WebSphere Integration Developer provides the tooling necessary to create and assemble a process from existing services or add human interaction to a process, implement business rules, easily integrate other applications or systems, and carry out many other tasks.

The discipline embedded within the tools can deliver SOA easily for developers. SOA delivers the ultimate flexibility and reuse for IT and, of course, the business process owner. WebSphere Integration Developer also enables you to define orchestrations between processes, construct mediations between services, and truly integrate the capabilities previously locked away in packaged business applications.
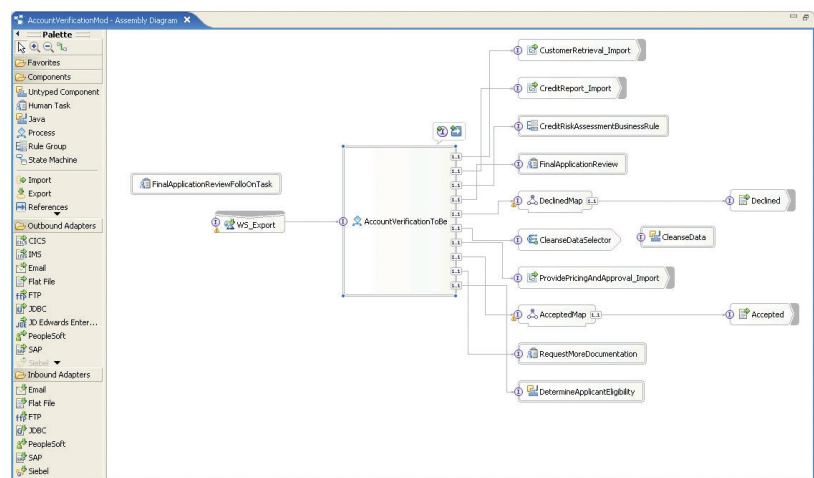

Figure 3. WebSphere Integration Developer enables rapid and easy construction of business-process and integration solutions.

Technological roots of WebSphere Process Server

WebSphere Process Server inherits a rich set of integration-centric capabilities from IBM WebSphere InterChange Server and WebSphere Business Integration Server Foundation. These capabilities include built-in support for transactions, recovery, error handling and capabilities to connect with all major systems and applications through a variety of interfaces.

A set of adapters is available with WebSphere Process Server that connect business processes with other commonly used technologies or packaged applications. WebSphere Process Server also provides WebSphere MQ bindings, enabling processes to access services reliably.

In addition, all major human-workflow capabilities of WebSphere MQ Workflow are included in the business-flow manager and the human-task manager of WebSphere Process Server. HTM is the component that handles human-centric BPM in WebSphere Process Server. In many areas, HTM goes far beyond the support for human workflow that was provided by WebSphere MQ Workflow.

With the arrival of WebSphere Process Server on i5/OS, you might want to, over time, migrate your solutions that existed previously on WebSphere Business Integration Server Express to WebSphere Process Server. IBM has service teams that can help.

The next step is to deploy the processes. WebSphere Process Server delivers a unique integration framework that simplifies existing IT resources. Often, as IT assets grow to support business demand, so too does their complexity and manageability requirements. WebSphere Process Server helps deliver an SOA infrastructure that provides a common model to orchestrate, mediate, connect, map and run the underlying IT functions. With this, WebSphere Process Server helps simplify integration of business processes by leveraging existing IT assets as reusable services, but without the complexities associated with traditional integration methodologies. Business flexibility is achieved through standard-izing, automating and integrating key business processes and managing the performance of these processes.
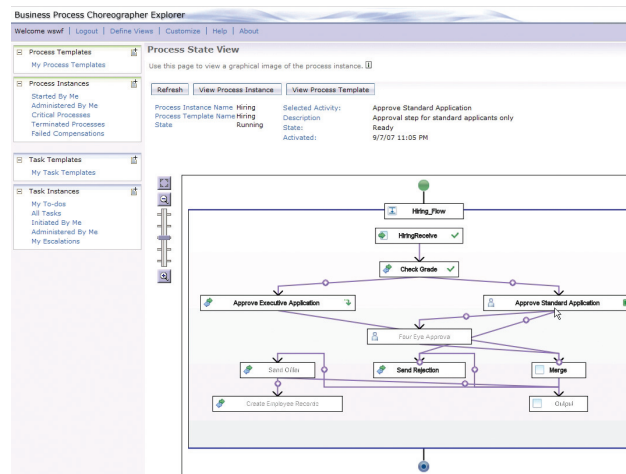

Figure 4. WebSphere Process Server enables you to graphically view the state of running processes.

The majority of integration-centric processes require human interaction and human workflow to process exceptions or make critical decisions. You need seamless integration and interchangeability between automated, IT-level steps and human-facing steps in your business processes. WebSphere Process Server is designed to meet that requirement.

Summary
BPM enabled by SOA for i5/OS makes it easier to create services. WebSphere BPM solutions make it not only easier to integrate those services into effective business processes, but a natural part of the i5/OS environment. WebSphere BPM is enabled by SOA on i5/OS and provides solutions that enable the composition of business processes from services and exposing them, in turn, as business services. The engine driving BPM is IBM's WebSphere Process Server,

the cornerstone of the WebSphere BPM software platform, which supports integration-centric and human-centric business processes in a truly integrated, services-based and transaction-supported manner. By making this capability available natively on i5/OS and leveraging the i5/OS integrated DB2 database, you can make SOA-structured business processes viable within the i5/OS environment. IBM WebSphere BPM solutions for System i and i5/OS are designed to offer the reliability and security you need to simplify your IT and reduce cost, enabling you to invest in growing your business.

The System i platform and i5/OS stands for integration. It allows you to run multiple applications on one server, helping to lower your overall operational costs dramatically. By using WebSphere BPM solutions, with WebSphere Process Server leading the way, you can take your System i or i5/OS environment to the next level. Run all your applications on System i and i5/OS while integrating all your processes across your company and outside your company.

For more information

To find out more about the technologies and products behind WebSphere BPM solutions, contact your IBM representative or IBM Business Partner, or visit the following sites:

- BPM enabled by SOA
  ibm.com/software/info/bpmsoa/
- WebSphere Process Server
  ibm.com/software/integration/wps/
- WebSphere Integration Developer
  ibm.com/software/integration/wid/
- Global WebSphere Community
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