Part 1

Introduction

In this part we introduce the concepts of business process management, the IBM process integration products that support business process management, and the case study, a company named *ClipsAndTacks*, that we use throughout the rest of the book.

1

Business process management

In this chapter we introduce the concepts and benefits of business process management (BPM) and service-oriented architecture (SOA) that enables business value through operational flexibility, responsiveness and reuse.

We also introduce the Service Component Architecture (SCA) and Services Data Objects (SDO) as building stones for the SOA architecture.

What is a business process?

If you search the Web for a definition of *business process*, you find many definitions. All these definitions contain certain common elements:

- A business process is triggered by a business event.
- A business process has an input and creates an output that is of value to the organization, its stake holders, or its customers.
- A business process is composed of related structural activities. Material and/or information flows between the process activities.
- A business process can be part of a larger process and can include or depend on other business processes.
- A business process can be viewed as the workflow for a use case.
- A business process usually depends upon several business functions for support, for example, IT, personnel, and accommodation.

What is business process management?

Business process management (BPM) leads to business innovation and optimization by implementing business strategy through modeling, developing, deploying and managing business processes throughout their entire lifecycle. BPM acts as an enabler for the businesses in defining and implementing strategic business goals and then measuring and managing company's financial and operational performance against these goals. The power of optimal results from the BPM lifecycle activities is derived from the integrated set of the robust technology infrastructure and tools.

Business process management provides a convergence of technology that removes business and IT constraints through integration and enhanced technology to help streamline business transformation. These capabilities provide tight integration of operational and analytical environments, business and IT environments, and strategy with daily operations.

Business process management combines business processes, information, and IT resources, aligning your organization's core assets—people, information, technology, and processes—to create a single integrated view, with real-time intelligence, of both its business measurements and IT system performance. This integration of resources allows your organization to obtain business information faster, respond more quickly to market trends and competitive threats, and improve operational efficiencies and business results—all attributes of an on demand enterprise.

Benefits of BPM

BPM allows for an enterprise to be flexible and responsive to the ever changing on-demand business through the optimization and automation of the business processes to:

- Identify and eliminate redundancies and bottlenecks
- Reduce risk by gaining an understanding of process impacts prior to operationalizing
- Decouple business integration logic from its underlying implementation code
- Increase portability and decrease mainteance cost by being based on industry standards
- Automate process implementation, eliminate manual deployment tasks
- Immediately execute new business rules and processes
- Visualize actual process performance against key performance indicators
- Pinpoint future process improvements

The robust business process management solution will provide powerful tools for the business and IT side of the business to meet their challenges:

- The **business executive** needs:
  - Revenue growth with cost containment
  - Responsiveness to business conditions and ability to pursue new market opportunities
  - Improving internal skills, capabilities and leadership as first step toward growth
- The challenges for the **IT executive** are:
  - Aligning IT and business goals to grow revenue and contain costs
  - Building responsiveness and agility into the organization through IT
  - Enabling people and teams to be more effective through IT

Information on business process management

You can find definitions and more information on business process management on the Internet, for example:

- Wikipedia:

  http://en.wikipedia.org/wiki/Business_Process_Management
- Business Process Management Initiative:

  http://www.bpmi.org/

IBM business process management solution

The IBM process integration portfolio provides capabilities required for the delivery of the comprehensive enterprise wide business process management strategies and solution. It offers a holistic approach to transform and manage a business by aligning strategic and operational objectives with business activities and supporting IT services.

The IBM BPM solution includes development tools, used to implement custom artifacts that leverage the infrastructure capabilities, and business performance management tools, used to monitor and manage the runtime implementations at both the IT and business process levels.

Business process management allows companies to implement the continuous end-to-end business process lifecycle in an open environment (Figure 1-1).

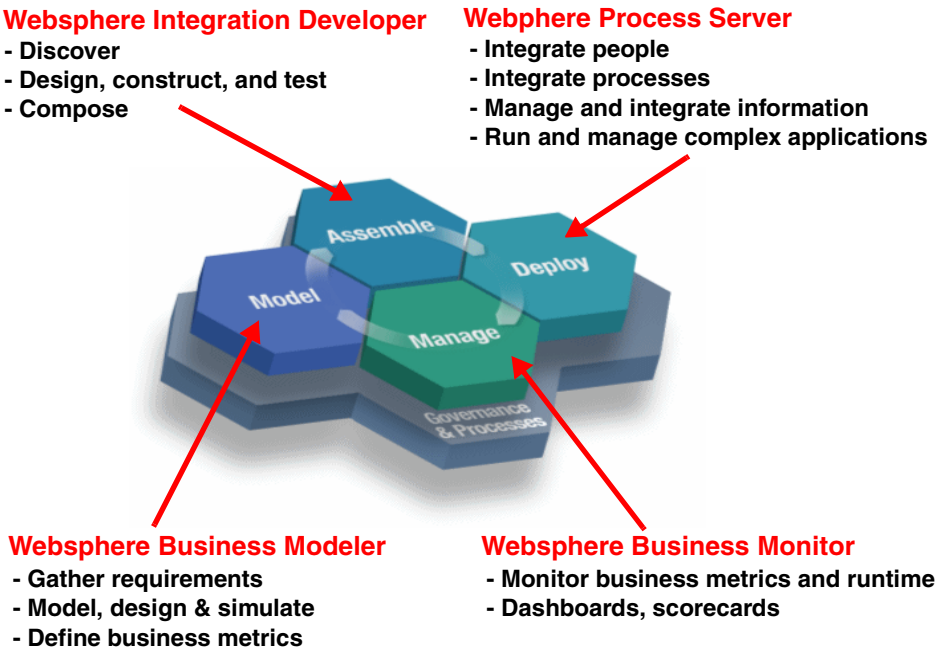

Figure 1-1 Business process management lifecycle

The IBM BPM solution component tools support the following major activities:

- **Model**—Capture, simulate, analyze and optimize business models to reduce risk and increase flexibility
- **Assemble**—Develop, assemble and test integrated solution

- **Deploy**—Direct deployment of models and policies to realize business intent
- **Manage**—Manage the deployed models:
  - **Monitor** and correlate metrics and alerts in real-time from internal and external sources to gain visibility into the business and IT performance
  - **Analyze performance** results to gaining insight into the business metrics and information for contextual based decision making
  - **Act** by responding at the right time to insights through collaboration, optimization, and automation to excel

One key feature of the IBM business process management is the linkage between the development platform and the business performance management services. It is addressed in the Governance & Processes section in Figure 1-1:

- Governance reflects all corporate guidelines
- Processes covers the business performance management area

This functionality enables the delivery of runtime data and statistics into the development environment to allow for the completion of the analyses that drives iterative process re-engineering through a continuous business process improvement cycle.

Buisiness performance management

Business performance management tools incorporate monitoring capabilities that aggregate operational and process metrics in order to efficiently manage systems and processes. Managing these systems requires a set of capabilities that span the needs of IT operations professionals and business analysts who manage the business operations of the enterprise.

These capabilities are delivered through a set of comprehensive services that collect and present both IT and process-level data, allowing business dashboards, administrative dashboards, and other IT- level displays to be used to manage system resources and business processes.

Through these displays and services, it is possible for line-of-business (LOB) and IT personnel to collaborate to determine, for example, what business process paths may not be performing at maximum efficiency, the impact of system problems on specific processes, or the relationship of system performance to business process performance.

This collaboration allows IT personnel and assets to be tied more directly to the business success of the enterprise than they traditionally have been.

For more information on business performance management, refer to:

- IBM business performance management community:

  http://www.ibm.com/software/info/topic/perform/partnerpage.html

- Wikipedia:

  http://en.wikipedia.org/wiki/Business_performance_management

IBM business process management products

The BPM solution consists of four separate products:

- WebSphere Business Modeler
- WebSphere Integration Developer
- WebSphere Process Server
- WebSphere Business Monitor

Together, these products enable businesses and other organizations to plan and implement a unified business process strategy based on realistic simulations and observed data.

At a high level, here is how you use these products together to get the right BPM solution for your business needs:

- With **Modeler** you to begin the cycle by designing the optimal business process for a particular case. Typically, Modeler is used by a business analyst.
- With **Integration Developer** you implement the model by creating the application code to automate the model and to access subsystems, such as databases and enterprise information systems. Integration Developer is used by a developer who integrates services to create an application, and an application programmer who focuses on the development of particular services.
- **Process Server** provides the production server to run and manage the application you create. Typically, a system administrator works with Process Server.
- **Monitor** provides real time performance monitoring of the application. Monitor is usually set up and administered by a system administrator.

Once built, improvements to the model and application are on-going.

For more information on the IBM business process management products, refer to:

http://www.ibm.com/developerworks/websphere/zones/businessintegration/

Service-oriented architecture (SOA)

Service-oriented architecture (SOA) is the IT model which enables business value through operational flexibility, responsiveness, and reuse. SOA is an application framework that takes everyday business applications, breaks them into individual business functions and processes, called services, and then inter-relates them through well-defined interfaces and contracts. The interfaces are defined in a neutral manner that is be independent of the hardware platform, the operating system, and the programming language in which the service is implemented. This allows services, built on a variety of such systems, to interact with each other in a uniform and universal manner.

SOA is an evolution as opposed to a revolution. The growing market momentum around SOA means that companies that compete with you are adopting SOA for strategic advantage. SOA would be impossible without industry standards. While there have always been standards proposed and declared in the IT world, finally there are the critical mass of very broad industry support to firmly establish that the current SOA standards are real, meaningful, and are here to stay.

Benefits of SOA

Establishing a service-oriented architecture can help prepare both IT and business processes for rapid change. Even in the early stages of adopting an SOA, your organization will benefit from:

- Increase revenue—Create new routes to market and create new value from existing systems
- Provide a flexible business model—React to market changes more quickly
- Drive down cost—Eliminate duplicate systems, build once and leverage, and improve time to market
- Reduce risk and exposure—Improve visibility into business operations

The SOA approach can bridge the gap between what you want your business to accomplish and the infrastructure tools you need to get there:

- Decrease development and deployment cycle times by using pre-built, reusable services building blocks
- Integrate across the enterprise—even historically separate systems—and facilitate mergers and acquisitions of enterprises
- Reduce cycle times and costs by moving from manual to automated transactions
- Make it easier to do business with business partners by increasing your flexibility

- Brings adaptable, scalable solutions to complex business problems by using best practices, such as layering and loosely-coupled components

IBM SOA foundation

The IBM SOA foundation is an integrated, open set of software, best practices and patterns that provides you with what you need to get you started with SOA. The SOA foundation provides full support for the SOA lifecycle through an integrated set of tools and runtime components that allow you to leverage skills and investments across the common runtime, tooling, and management infrastructure.

The components are modular allowing you to pick and choose the pieces you need to deliver an immediate impact while knowing that what you pick will work with pieces you add later on. In addition, the SOA foundation is scalable allowing you to start small and grow as fast as your business requires. The SOA foundation provides extensive support for business and IT standards; facilitating greater interoperability and portability between applications. It can also help you to leverage SOA to extend the value of the applications and business processes that are running your business today.

The SOA reference architecture (Figure 1-2) is a way of looking at the set of services that go into building an SOA. These capabilities can be implemented on a build as-you-go basis allowing capabilities and project level solutions to be easily added as new requirements are addressed over time.

The backbone of the reference architecture is the enterprise service bus (ESB) that facilitates communication between services. he reference architecture is a great tool for laying out roadmaps for pursuing SOA.

Every components included in this architecture is provided by separate IBM products. The highlighted parts show the components which address the business process management area.

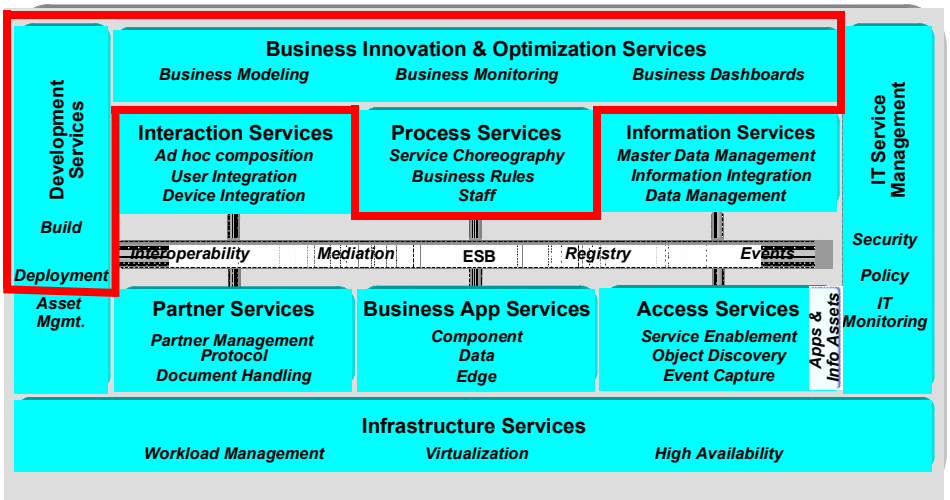

Figure 1-2 IBM SOA reference architecture

This service-oriented architecture provides a modular, scalable, portable and interopable environment to support the equivalent aspects in the business area.

The reference architecture shows the tight integration with the others IT critical aspects such as security, IT monitoring, virtualization, and workload management.

IBM BPM solution on the SOA foundation

The BPM solution available from IBM enables service-oriented, end-to-end process management for your organization based on SOA. Its SOA component applications enables businesses and organizations to plan, develop, implement, and improve their processes.

This solution lets organizations closely scrutinize costs, scheduling, resources, workflow, and other factors that affect the efficiency and viability of a given process, and determine the most effective methods for revising and improving that process.

Service Component Architecture (SCA)

Service Component Architecture takes advantage of the emerging computing trend called service-oriented architecture (SOA), which structures IT assets as a series of reusable services that perform a business function.

Service Component Architecture (SCA) is a new technology to simplify application development and implementation in a service-oriented architecture (SOA). With SCA, customers will be able to more easily create new and transform existing IT assets into reusable services that may be rapidly adapted to changing business requirements. Furthermore, these new technologies greatly reduce complexity associated with developing applications by providing a way to unify these services regardless of the programming languages they were written in and the platforms used to run them.

By structuring applications as a series of services, IT assets become more agile and organizations are better able to align their investments in dynamic business environments. In addition, adopting these new standards will provide organizations a higher degree of investment protection, as they will be able to reuse services with a variety of middleware technologies.

SCA provides an open, technology-neutral model for implementing IT services defined in terms of a business function, and do not unnecessarily expose the programmer to the complexity of traditional middleware programming. SCA also provides a model for the assembly of business solutions from collections of individual services, with control over aspects of the solution such as access methods and security.

SCA gives developers and architects the ability to represent business logic as reusable components that can be easily integrated into any SCA-compliant application or solution. The resulting application is known as a composite application.

Service Data Objects (SDO)

Service Data Objects is a technology that was originally developed as a joint collaboration between BEA and IBM and is now being developed by BEA, IBM, Oracle, SAP, Siebel, Sybase and XCalia. SDO is designed to simplify and unify the way in which applications handle data. Using SDO, application programmers can uniformly access and manipulate data from heterogeneous data sources, including relational databases, XML data sources, Web services and enterprise information systems.

SDOs specify a standard way to access data and can be used to modify business data regardless of how it is physically accessed. Developers and architects do not need to know the technical details of how to access a particular back-end data source in order to use SDO in their composite applications. Consequently, they can use static or dynamic programming styles and obtain connected as well as disconnected access.

SDO complements SCA by providing a common way to access many different kinds of data. The specification reduces the skill levels and time required to access and manipulate business data. Today, a multitude of APIs are used to manipulate data. These APIs tend to tightly couple the source and target of the data making their use error-prone and subject to breaking as business requirements evolve. SDO makes it easier to use and realize the value of these APIs without having to code directly to them.

Information on SCA and SDO

In response to requests from customers and independent software vendor partners, IBM is jointly delivering two specifications for building systems that use a service-oriented architecture (SOA), which aim to provide developers with simpler and more powerful ways of constructing applications based on SOA: Service Component Architecture (SCA) and Service Data Objects (SDO).

These specifications are available at:

http://www.ibm.com/developerworks/webservices/library/specification/ws-scasdosumm/

http://www.ibm.com/developerworks/webservices/library/specification/ws-sca/

http://www.ibm.com/developerworks/library/specification/ws-sdo/

More on business performance management

There is no standardization of terms in this area. For example, Meta Group and Aberdeen use business performance management (BPM), Gartner refers to corporate performance management (CPM), and companies such as PeopleSoft and Business Objects use the term enterprise performance management (EPM). IBM has adopted the business performance management term when referring to performance management practice and solutions.

As a first deliverable, the business performance management standards group has developed a common definition of business performance management that provides appropriate context for performance management, including the following principles:

- BPM is a set of integrated, closed-loop management and analytic processes, supported by technology, that address financial as well as operational activities.
- BPM is an enabler for businesses in defining strategic goals, and then measuring and managing performance against those goals.

- Core BPM processes include financial and operational planning, consolidation and reporting, modeling, analysis, and monitoring of key performance indicators (KPIs) linked to organizational strategy.

The business performance management addresses metrics, methods, processes and associated systems used for the purpose of monitoring and managing the business performance of an enterprise including :

- Encompasses balanced scorecards, operational dashboards, business activity monitoring, budgeting/planning/forecasting,
- Leverages business intelligence, systems dynamics, Sarbanes-Oxley (SOX), six sigma, value creation, process management, and organizational design,
- Requires a holistic vision of how to align business decisions and activities with strategic and operational objectives, though Implementation is typically along an incremental route-map.

Summary

In this chapter we introduced business process management and the IBM business process management solution. We also touched on the relationship between business process management and business preformance management.

2

Product overview

This chapter provides an overview of the core WebSphere process integration products. These products support complete business process management lifecycle with modular approach.

WebSphere process integration products enable you to:

- Model, simulate, and analyze complex business scenarios quickly and effectively before they are implemented.
- Transform existing processes to be dynamic and adaptive to deliver cost effective business agility.
- Allow users to monitor the business processes they have implemented so that they can continuously make improvements to them.

In this chapter we introduce these products:

- WebSphere Business Modeler Version 6
- WebSphere Integration Developer Version 6
- WebSphere Process Server Version 6
- WebSphere Business Monitor Version 6

WebSphere Business Modeler Version 6

IBM WebSphere Business Modeler (Figure 2-1) is a business process modeling tool that enables you to model, design, simulate, analyze and generate reports for your business processes, integrate your new and revised process, and define your organizations, resources and business items.

Accurate definition and modeling business processes is a critical factor in improving business performance. A business process is defined by interactions that occur between an organization's components and its environment as the organization pursues its business objectives. Business processes are often complex because of numerous incremental changes that are made in reaction to business circumstances. Without formal process documentation and process management systems, these process complexities can burden an organization with unnecessary hindrances and bottlenecks. A well-constructed business process model can help you locate and eliminate those hidden inefficiencies, costs and delays.

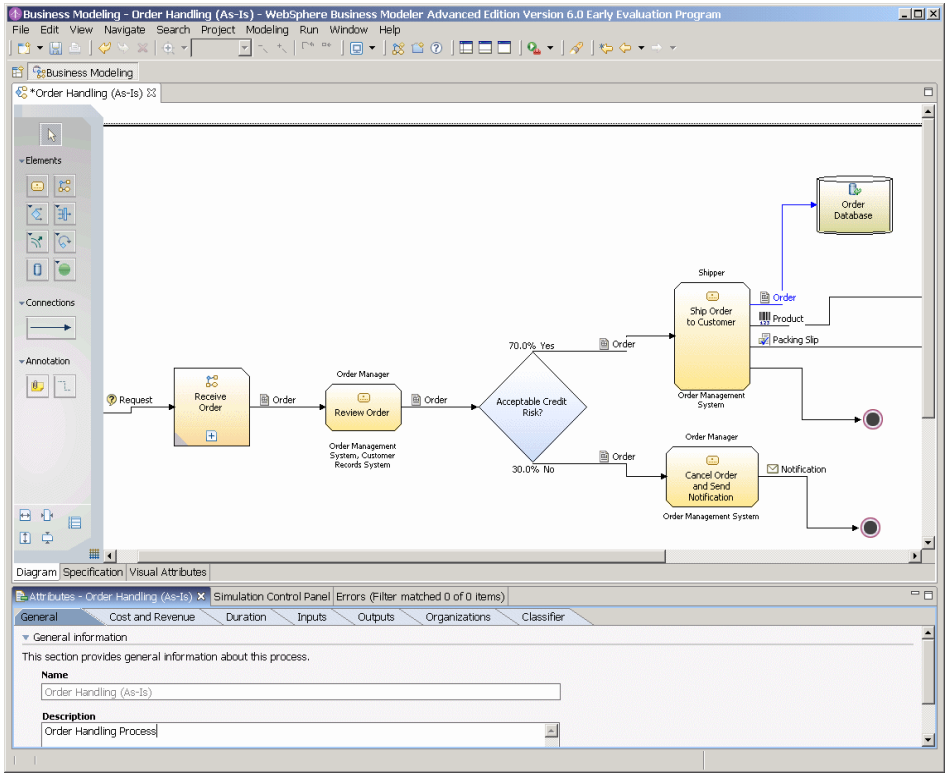

Figure 2-1 WebSphere Business Modeler

Complete and robust process modeling tool

A business process model is a visual representation of a process that contains supporting information. To create effective models, you must have a well-designed modeling structure that ensures consistent and complete representation of relevant information, including normal operations as well as alternatives and exceptions to standard procedures. You can use business process models to achieve many goals, including the following:

- Documenting existing procedures
- Determining requirements for staff, systems, and facilities
- Planning changes to existing processes and systems
- Testing and analyzing existing and proposed processes

WebSphere Business Modeler enables you to:

- Transform business process for automation
- Separate your business process model from its underlying implementation
- Create business processes that are based on industry standards
- Leverage skill sets of business and IT professionals
- Collaborate with team members
- Simulate and analyze business process

Leverage skill sets of business and IT professionals

Whether you are a business generalist or an IT specialist, WebSphere Business Modeler provides the versatility to fit your particular set of skills. Using WebSphere Business Modeler, professionals with different scopes of interest and expertise can build process models to meet a wide range of business objectives. From the business analyst who requires a high-level view of a process to drive strategic decisions, to the program developer who uses a process model as the framework for a new application, competitive businesses require a versatile modeling tool that has the flexibility to meet the needs of both business and technical professionals.

Collaborate with team members

WebSphere Business Modeler provides a built-in capability to connect with a separate product, WebSphere Business Modeler Publishing Server.

WebSphere Business Modeler Publishing Server enhances WebSphere Business Modeler by providing a way to publish business processes and related business information, such as organization diagrams, to a secure Web site. This capability supports the development, documentation, and dissemination of business process models on an enterprise and worldwide scale. By publishing business processes in a Web-based format, multiple people on multiple teams around the globe can view and contribute to the development of the business processes.

Simulate and analyze business process

WebSphere Business Modeler provides a simulation function that lets you simulate and analyze your processes under any set of circumstances. When you simulate runtime processing, WebSphere Business Modeler provides an animated view of the business process in action. You can specify a wide variety of different conditions for the simulation, including the rate and composition of process inputs and the number of personnel and system resources available to handle the process. Through simulation you can quickly determine how the performance of your business process is affected in various real or hypothetical conditions.

Transform business process for implementation

WebSphere Business Modeler enables you to transform business process models to IT-level models. You can export a Business Process Execution Language (BPEL) version of a business process model, then use WebSphere Integration Developer to import the BPEL model and use this as a basis to create an application.

Revolutionize business flexibility

Because business environments are constantly changing, requiring continual fine-tuning of processes, business improvement is a perpetual race. WebSphere Business Modeler facilitates communication between business organizations by allowing you to create a process model that has far broader uses than a static drawing. Furthermore, WebSphere Business Modeler delivers cost saving benefits by providing a single tool that effectively utilizes the same process information for many purposes, reducing the duplication of effort required by using multiple, incompatible tools.

More information

For more information on WebSphere Business Modeler, refer to:

http://www.ibm.com/software/integration/wbimodeler/

WebSphere Integration Developer Version 6

IBM WebSphere Integration Developer (Figure 2-2) is the integration tool you use for all your process integration requirements. It allows you to build flexible, composite applications by wiring service components with minimal skills based on service-oriented architecture (SOA).

IBM WebSphere Integration Developer, Version 6 software is Eclipse technology-based tooling designed to enable you to rapidly assemble business solutions based on a composite application development framework and using minimal programming skills.

With WebSphere Integration Developer, you can author SOA-based services and choreograph them into business processes that you can deploy on IBM WebSphere Process Server. WebSphere Integration Developer offers a role-based development experience that specifically targets the integration developer on a single and integrated Eclipse platform.

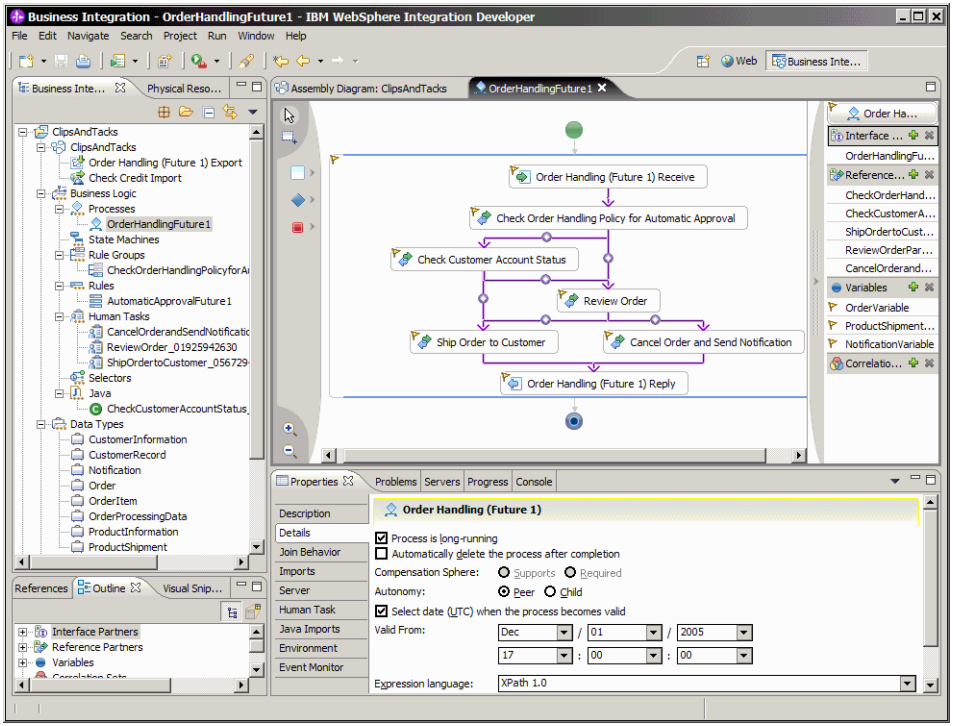

Figure 2-2 WebSphere Integration Developer

WebSphere Integration Developer is the tool for all your integration requirements and fully implements the SOA. SOA and the Service Component Architecture (SCA) enable you to convert and use your existing IT architecture as reusable service components. The framework is comprehensive and extensive, which helps you transform your enterprise to SOA by leveraging your existing IT architecture. Because WebSphere Integration Developer is based on standards-based technologies, such as Web Services Description Language (WSDL), XML Schema Definition (XSD) and Business Process Execution Language (BPEL), you can model, implement and deploy complex composite applications without extensive knowledge of the underlying implementation.

WebSphere Integration Developer is a fully integrated development environment based on the Eclipse 3 platform. Its graphically rich interface allows developers to create composite business applications by wiring service components with minimal skills and agnostic of underlying programming implementations. It has fully integrated testing, debug and deployment environment that allows you to easily deploy to WebSphere Process Server. Once deployed, you can dynamically change and adapt to changes with its rich features, such as business rules, selectors, and state machines.

WebSphere Integration Developer complements IBM WebSphere Business Modeler Version 6, and can be used in conjunction with IBM Rational Software Architect Version 6 and IBM Rational Application Developer Version 6. When combined into a single integrated development environment (IDE), these products provide a complete suite of tools to model, simulate, author, and deploy composite SOA applications.

WebSphere Integration Developer delivers a rich set of features to assemble, deploy, and manage business processes:

- Import business models from WebSphere Business Modeler and transforming to BPEL flows to automate the business processes
- Drag and drop features to create business processes
- Widgets to wire service components including:
  - Business processes
  - Human tasks
  - Business state machines
  - Business rules
  - Supporting services
  - Interface maps
  - Business object maps
  - Relationships
  - Selectors
  - Java™ objects

- Online library to browse and reuse service components
- Import services from ERP and EIS systems, such as PeopleSoft, SAP, CICS®, and IMS™

In addition, WebSphere Integration Developer enables:

- Composite application development:

  WebSphere Integration Developer allows you to render existing applications as standards based services. Services can be assembled together without the associated complexities of the underlying IT required for complex business applications. Now, you start building a solution from the services available to you and build only the services that don't exist, enabling true incremental solution.

- Flexibility for managing deployed processes:

  WebSphere Integration Developer allows you to test and debug business processes, and deploy them on WebSphere Process Server with a few mouse clicks.

  WebSphere Integration Developer's rich GUI intensive features allow for change and management of deployed processes with minimal skills and disruption.

More information

For more information on WebSphere Integration Developer, refer to:

`http://www.ibm.com/software/integration/wid/`

WebSphere Process Server Version 6

IBM WebSphere Process Server (Figure 2-3) is a business integration server. It is built to support solutions created based on service-oriented architecture (SOA). You can use it to build advanced business processes and traditional business integration such as enterprise application integration. WebSphere Process Server is based on WebSphere Application Server and best of the breed WebSphere Business Integration technologies.

By building on top of WebSphere Application Server Network Deployment, WebSphere Process Server can take advantage of all the mature capabilities it provides, such as clustering, high availability, embedded messaging and transaction management.

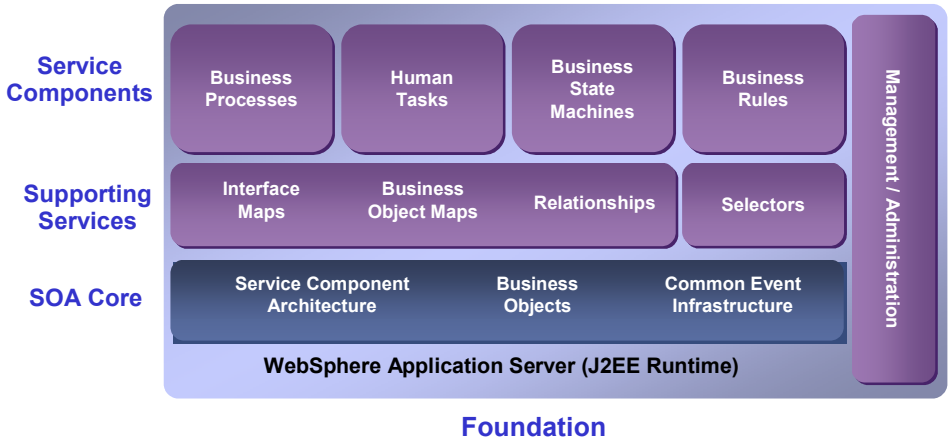

Figure 2-3 WebSphere Process Server architecture

WebSphere Process Server includes three layers:

- SOA core
- Supporting services
- Service components

SOA core

SOA core consists of Service Component Architecture (SCA), business objects, and the common event infrastructure (CEI).

Service Component Architecture (SCA)

SCA is a unified service oriented programming model. SCA defines how one can abstract and represent a service without close coupling with the details of the implementation. It defines a simple unified client programming model, as well as defining how services can be composed together to form a solution. Service Component Architecture is a universal model for business services that publish or operate on business data. Service Data Objects (SDO) provides the universal model for business data.

An SCA component is a component that runs on a SCA enabled run-time. An SCA component needs to specify its interface, implementation, as well as references (Figure 2-4).

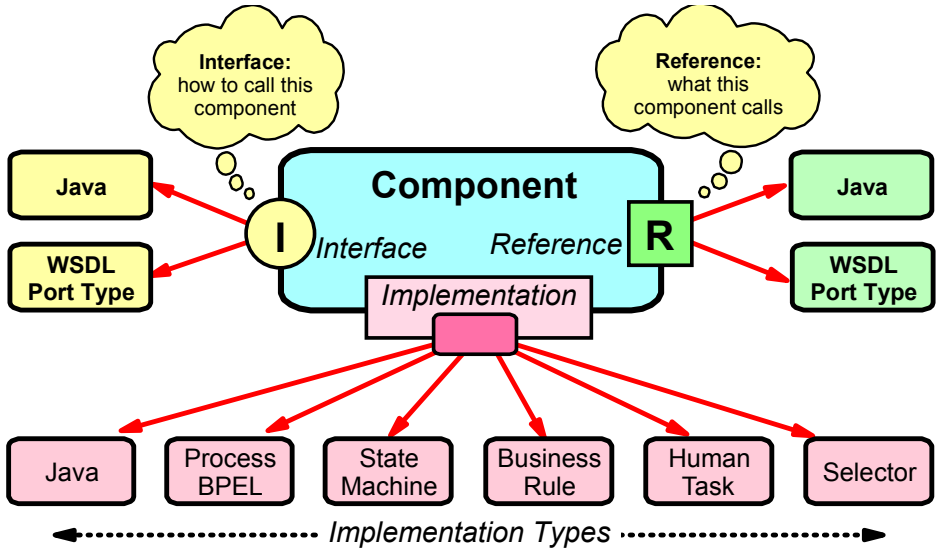

Figure 2-4 Service component

- **SCA interface**

  By definition, an interface is the place at which independent and often unrelated systems meet and communicate with each other. An interface can be defined by any programming/interface definition language.

  WebSphere Process Server currently supports a Java interface definition and an XML definition (WSDL port type). Arguments described in an XML Schema are exposed to programmers as SDO data objects.

  The WebSphere Integration Developer tooling primarily generates interfaces using the WSDL representation.

- **SCA implementation**

  The SCA implementation specifies the implementation type of the component's interface. Developers can implement business services in their language of choice (for example, Java, BPEL, or state machine).

  Current implementation types include business process, human task, interface map, selector, business rules, business state machine, and Java.

- **SCA references**

  An SCA reference specifies other SCA services that a component uses. These can be softlinks, which do not have to specify which specific component will be used.

Business objects

Business objects provide an abstraction for data access and is an important concept for integrating applications and is used to interact within Service Component Architecture. Business objects provide rich features to map, manage and transform data to underlying IT and are described through standards based XML Schema (XSD).

Common event infrastructure (CEI)

The common event infrastructure allows service component to emit events that can be captured by business monitors such as WebSphere Business Monitor for real-time monitoring of business processes.

Common business events (CBE) is a common business event model that captures the basic business event information, such as the date/time an event is created, correlation IDs (relevant business events), IBM has also proposed CBE for consideration as a new standard to the Organization for the Advancement of Structured Information Standards (OASIS).

Supporting services

On top of the runtime infrastructure and the SOA core, WebSphere Process Server offers a variety of service components. Supporting services are components that are needed in any integration solution including data transformation and synchronization services.

Implementing the main features of WebSphere Enterprise Service Bus (ESB), a mediation component can be used to convert XML-based data formats. It can also be used to mediate between various transports, for example JMS and Web services. A mediation component contains a “message flow” that operates on a message including transformation, logging and filtering and custom Java operations. Above and beyond the ESB mediation component, WebSphere Process Server contains higher-level transformation capabilities.

Interface maps

Interface maps let you invoke components by translating these calls. It is possible for interfaces of existing components to match semantically but not syntactically (for example, *updateCustomer* versus *updateCustomerInDB2*). This is especially true for components that already exist and services that need to be accessed. Additionally, you can use business objects to translate the actual business object parameters of a service invocation.

Business object map

A business object map lets you translate one type of business object into another type of business object. You can use these maps in a variety of ways, for example, in an interface map to convert one type of parameter data into another.

Relationship

A relationship can be used to establish relationship instances between objects in disparate backend systems. You may want to access the same data within business integration scenarios, for example, customer records, or in various backend systems, such as an ERP system and a CRM system. A common problem for keeping business objects in sync is that different backend systems use different keys to represent the same object. These relationships are typically accessed from a business object map when translating one business object format into another.

Selector

A selector can be used for dynamic selection and invocation of different services, which all share the same interface. For example a customer support process could use different human tasks implementations during holidays than during regular working days. WebSphere Process Server offers a Web-based interface to enable dynamic updates to the selection criteria and target services, which means that a module that has been deployed at a later time can still be called by this selector component enabling dynamic changes to the integration solution.

Service components

WebSphere Process Server provides business processes, human tasks, business states machine and business rules service components.

Business process

A business process component in WebSphere Process Server implements a Web services Business Process Execution Language (BPEL) compliant process engine. You can develop and deploy business processes that support long and short running business processes and a compensation model within a scalable infrastructure. You can create BPEL models in WebSphere Integration Developer or import from a business model that you can create in WebSphere Business Modeler.

Human tasks

Human tasks are stand-alone components in WebSphere Process Server that you can use to assign work to employees or to invoke any other service. Additionally, the human task manager supports the ad hoc creation and tracking of tasks. You can use existing LDAP directories (as well as operating system

repositories and the WebSphere user registry) to access staff information. WebSphere Process Server also supports multi-level escalation for human tasks including e-mail notification and priority aging. WebSphere Process Server includes an extensible Web client that you can use to work with tasks or processes. This Web client is based on a set of reusable JavaServer™ Faces (JSF) components that you can use to create custom clients or embed human task functionality into other Web applications.

Business state machines

Business state machines provide another way of modeling a business process. This lets you represent your company's business processes based on states and events, which sometimes are easier to model than a graph-oriented business process model. One example would be an ordering process where you can modify or cancel the order at any time during the order process until the order is actually fulfilled.

Business rules

Business rules are a means of implementing and enforcing business policy through externalization of business function. This enables dynamic changes of a business process for a more responsive businesses environment.

Business rule authoring is supported with Eclipse-based desktop tooling. Business analysts can use the Web-based runtime tooling included in WebSphere Process Server to update business rules as business needs dictate without affecting other services.

Imports and exports

An import is a way of representing an external service in the SOA environment. For example, retrieving data from an ERP system can be turned into a service using the enterprise service discovery wizard. An export is the reverse, a way of representing an SOA service to an external service, such as a Web client.

Note: WebSphere Process Server also includes support for business-to-business (B2B) scenarios by including the IBM WebSphere Partner Gateway.

More information

For more information on WebSphere Process Server, refer to:

http://www.ibm.com/software/integration/wps/

WebSphere Business Monitor Version 6

WebSphere Business Monitor is a Web application that is deployed and run on WebSphere Process Server Version 6. It displays dashboards, which are containers (portals) that enable you to monitor different aspects of business performance.

You can use the WebSphere Business Monitor to capture real-time, work-in-progress items and perform corrective actions by reassigning or suspending activities or processes. You can display real-time data from work items produced as the monitored process is running, and can also retrieve and view the historical data of the process.

Dashboards serve a wide audience, essentially all line-of-business and systems management users in addition to business executives, enabling them to perform these tasks:

- Monitor and manage business performance indicators
- Retrieve information quickly and efficiently
- Personalize the analysis and display of business performance reports, and compress information to focus on the business objectives and the key performance indicators (KPI)
- View business-critical information graphically, using visual cues such as color to improve the probability of timely problem determination and the speed of decision making
- Visualize performance data such as KPIs and metrics, which may be summarized in reports and graphs
- Analyze and investigate business situations by using drill-down capabilities to trace situations to individual events and inspect event details
- Set up actions and alerts that are part of the management phase of a business performance management solution

Each dashboard is composed of one or several data snapshots, referred to as views. The dashboards run within the WebSphere Portal Server environment, and for each dashboard, a portal page is created and a set of views (portlets) are laid out in the portal page. The dashboard administrator can set up the following types of dashboard views in WebSphere Business Monitor:

- **Active instances**—Display the values of all the business measures (KPIs, metrics, stopwatches, and counters) that you defined in the business measures model.
- **KPIs**—Display the values of KPIs relative to their acceptable limits (below limits, within limits, or above limits).

- **Gauges**—Display KPI values in the form of a gauge, like a speedometer or tachometer, relative to their acceptable limits or margins.
- **Scorecards**—Monitor KPIs grouped by the scorecard perspectives that you select. By default, a scorecards view displays four perspectives: Financial, Customer, Learning and Growth, and Internal Business Process. Within each perspective, you can choose to monitor one or more KPIs.
- **Alerts**—Display notifications that are sent when a business situation occurs.
- **Dimensions**—Provide a multidimensional view of business performance data. You can pivot on any defined business dimension to analyze different aspects of the historical performance.
- **Reports**—Display performance reports relative to a time axis. Such reports typically contain tables and graphs with textual descriptions summarizing the analysis.
- **Process diagrams**—Display a process model with visual cues showing the status of each run of the process.
- **Organizations**—Display the business organization units and their employees, in the form of a navigation tree. This information is stored on a user registry (such as LDAP) that WebSphere Portal is configured to use, and is not taken from WebSphere Business Modeler.
- **Export values**—Enables you to export the values resulting from the running processes to an XML file that can be imported by WebSphere Business Modeler.

More information

For more information on WebSphere Business Monitor, refer to:

`http://www.ibm.com/software/integration/wbimonitor/`

Summary

In this chapter we introduced the four products that are part of the IBM business process management solution. We will use the four products in our scenario to move a business process application from modeling to implementation to monitoring.

The online Information Center documentation of the four product can be found at:

`http://publib.boulder.ibm.com/infocenter/dmndhelp/v6rxmx/index.jsp`

3

Case study: ClipsAndTacks

This chapter describes a business process management (BPM) scenario, that shows how a business can use a full IBM WebSphere Business Integration solution to complete the following end-to-end business process lifecycle tasks:

- Model and simulate a business process
- Define key performance indicators
- Develop and test an application to implement the business process
- Deploy and run the application on a server.
- Monitor the application to observe pre-determined key performance indicators
- Import the observed data to make required revisions to the original process model in the Modeler.

The business scenario described in this document has been simplified in order to provide a full description of each stage of the BPM end-to-end process lifecycle. To avoid an overly large and unwieldy document, the authors' focus is on specific tasks, elements, and details, and not on presenting all possible facets of a complex business process. Each IBM software product included in the full BPM cycle has a large number of features and capabilities. For details on all of the available functions of these products, see the help documentation included with each product.

Case study: ClipsAndTacks Office Supplies Ltd.

This case study describes a fictional company that is seeking to improve one of its business processes. It shows how a business can quickly respond to the needs of its customers using an IBM business process management solution. The business described in this scenario, ClipsAndTacks Office Supplies Ltd. (abbreviated as *ClipsAndTacks* from now on) is experiencing a business problem that is negatively impacting its bottom line. The company needs to plan and implement a revised process that will address the business problem. To complete this business transformation, ClipsAndTacks will use the component products of IBM's business process management solution.

Background

ClipsAndTacks is a medium-sized office supply company operating in eastern Canada and the northeastern United States. The company has grown slowly and has achieved a significant customer base through its excellent customer service practices and reputation for quality products. Most ClipsAndTacks customers are businesses; ClipsAndTacks does not allow accounts for non-business customers.

Business problem

ClipsAndTacks has been losing customers to Office Market, its main competitor. Office Market is a national office supply chain which provides an online catalog and ordering process for its customers. From Office Market's Web portal, customers can view available products and submit an order 24 hours a day, 7 days a week.

Although it has been losing customers, and consequently revenue, ClipsAndTacks' costs have remained constant relative to the order handling process. They have maintained the same number of customer representatives to avoid introducing further delays into the ordering process due to longer call-waiting times. Each customer representative traditionally receives an increase in their hourly wage each year. The company also continues to maintain separate customer and product management systems, neither of which have been upgraded in several years. Both systems are prone to problems and outages, and require considerable maintenance.

Several customer surveys have indicated that ClipsAndTacks' customers are not satisfied with the ordering process. The telephone ordering procedure is time-consuming, and customers are frustrated at being placed on hold while waiting for the next available representative. Regular customers are frustrated at the amount of time it takes to receive their orders.

The delays are most often caused by the order review process, requiring each order over $500 to be reviewed by an order manager for any credit risk before it is sent on to be filled. Customers repeatedly cite Office Market's online order process as a quicker and more convenient method for ordering their office supplies, and their comparatively quicker delivery time as a major advantage over ClipsAndTacks.

Summary of problems:

- Call center hours of operation are not convenient
- Telephone order submission process is too long
- Order review process delays shipments
- Regular customers, in particular, resent delays due to order reviews
- Company losing customers and revenue

Business objectives

As a result of the customer surveys, ClipsAndTacks' management has decided that the order handling process has to be updated so that it can fill orders in a shorter amount of time. Company management wants to establish an automated process that shortens order turnaround time, especially for trusted repeat customers.

The planned improvements include a new Web-based ordering system, which is a customer's access point to an almost totally automated ordering application. Simply put, it is an order handling application available 24 hours a day over the Internet.

The high-level business objectives of ClipsAndTacks are to increase revenue and reduce costs.

Note: Costs are currently not available for monitoring in WebSphere Business Monitor. We do not monitor and analyze costs in this document.

Specifically, management wants to achieve the following objectives:

- Reduce the average time from when orders are received to the time they are shipped to 3 days
- Achieve an order approval rate of 90% or better

Current order handling process

ClipsAndTacks publishes a product catalog which is mailed to its existing account customers. Customers can only place orders by telephone, with calls routed through the company call center. The call center is staffed by customer representatives and takes calls between the hours of 8:00 a.m. and 5:00 p.m. Eastern Time, Monday to Friday.

For new customers, a customer service representative manually enters the contact and address information to the customer database and assigns a customer number. Existing customers have to provide their customer number so that the representative can retrieve the customer record containing the customer's information. When the customer information is retrieved, the customer provides the details of the order.

All orders are forwarded to an order manager. If an order total is $500 or more, the order manager must review it before sending it to the warehouse to be filled. The order manager assesses the credit risk of each order: if the order is deemed an acceptable risk, it is sent on to the warehouse to be filled; if it is not deemed an acceptable risk, the order manager cancels the order and sends an e-mail notification to the customer. All approved orders are sent to the warehouse to be filled.

Summary of business rules:

- Customers can only order by telephone
- Orders are accepted only from 8:00 a.m. to 5:00 p.m. Eastern Time, Monday to Friday
- Customer service representatives handle all inbound order requests
- All orders are forwarded to the order manager for review
- Orders over $500 must be approved by the order manager

Planned revisions to the order handling process

ClipsAndTacks' management wants to implement an order submission process that will allow ClipsAndTacks to compete with Office Market. In response to a common complaint in the customer surveys, the new process will eliminate the need for contact between customers and customer service representatives when an order is placed. Customers will be able to browse the ClipsAndTacks product catalog and enter their own order information using a Web application. New customers will be able to enter their company information and receive a customer account number immediately.

Customers who have a customer number will be able to enter it and prompt the Web application to retrieve their information and pre-fill the Web form with their address and preferred shipping information. The new Web application, including the product catalog and order form, will be available 24 hours a day, 7 days a week.

When the customer submits the order, a business rules engine will be checked to ensure appropriate action on the order. In response to comments from regular customers, the threshold for order review will be raised to $750. If an order is for an amount under $750, it is approved automatically, pending a check of the account status (that is, are there any outstanding charges against the account that have not been paid). If the account is in good standing, the order is sent for shipping. If the account is not in good standing, it is sent to an order manager for review. If an order is for an amount greater than $750, it is sent for to an order manager for review. Based on the review, the order manager decides whether to send the order for fulfilment or to cancel the order and notify the customer.

Summary of revisions:

- Customers can order online (shorten order process)
- Orders are accepted 24 hours a day, 7 days a week
- Implementation of rules/policy engine
- Threshold for order review has been raised to $750
- Orders over $750 must be approved by the order manager (shorten average order time and increase percentage of approved orders).

Note: We will have to reiterate that we are presenting a simplified process. The outright cancellation of an order is less likely than a request for prepayment, or some other arrangement between the companies. A simplified scenario is presented in order to show details of each phase of the full cycle.

Key performance indicators

Key performance indicators (KPI) are the detailed specifications required to track business objectives. Each KPI is associated with a specific process, and is quantifiable, measurable, and results-oriented.

The ClipsAndTacks management team wants to be able to measure the results of the revised process when it is implemented to ensure that it is helping to meet the company's business objectives. To measure the revised order handling process, management has identified two key performance indicators that will measure the success of the new process. Each of these key performance indicators will comprise at least one metric.

To gauge the performance of the revised process and determine if it helping to achieve the company's business goals, the ClipsAndTacks management team will set the following KPIs:

- **Average order fulfilment time is 3 days or less:**
  - Target: 3 days
  - Lower margin: 1 day
  - Upper margin: 3 days

  Required business measures elements:

  - Order Fulfillment Timer stopwatch
  - New Order Trigger
  - Ship Order to Customer Trigger
- **Number of approved orders is greater than 90%**
  - Target: 90%
  - Lower target margin (%): 85.5%
  - Upper target margin (%): 90%

  Required business measures elements:

  - Total Orders aggregate metric
  - Shipped Orders aggregate metric
  - Order Counter
  - Shipped Order Counter
  - New Order Trigger (reuse)
  - Ship Order to Customer Trigger (reuse)

Roles

The following key roles take part in the ClipsAndTacks BPM scenario:

- **Customer**

  Typically, ClipsAndTacks customers are business professionals who purchases office supplies for a company. Customers are comfortable with Web processes, and expect an order process to be quick and simple. They also expect that orders will be delivered promptly.
- **Business analyst**

  ClipsAndTacks employs a business analyst on staff. The business analyst is responsible for understanding the company's existing processes and designing ways to improve those processes. The analyst gathers and documents information about the company's processes by reviewing reports, interviewing employees, and observing performance. The analyst then models and simulates current and planned practices.

The business analyst also defines the business measures, such as the key performance indicators, that will be monitored. In our scenario the business analyst uses WebSphere Business Modeler to model, simulate, and analyze the business process.

- **Order manager (order approver)**

  A ClipsAndTacks staff member who has the authority to accept or reject a purchase order. Orders that are over the limit of $750 are routed to the order manager, who either approves or declines the order. ClipsAndTacks management provides guidelines to the order manager that help making the decision.

- **System architect (integration developer)**

  The system architect is responsible for designing, building, and testing the implementation of the revised process that has been modeled by the business analyst. In our scenario the architect uses WebSphere Integration Developer to implement the business process and WebSphere Process Server to test the implementation.

- **Application programmer**

  The application programmer is responsible for implementing some of the specific services that the systems architect has specified at a higher level. For example, the programmer writes the Web application to be used by the customers, and the Java code to interface with external services.

- **System administrator**

  The system administrator is responsible for deploying the finished application in a production environment using WebSphere Process Server and for monitoring the runtime process using WebSphere Business Monitor. The administrator ensures that the component programs operate as they are designed. The administrator records relevant data about the process and produces performance reports for company management.

Throughout this redbook, key roles will be described for each stage in the process.

Subsystems

Figure 3-1 shows the abstract logical subsystems that comprise the solution architecture. The essential subsystems for the ordering process are shown in green with a bold border.

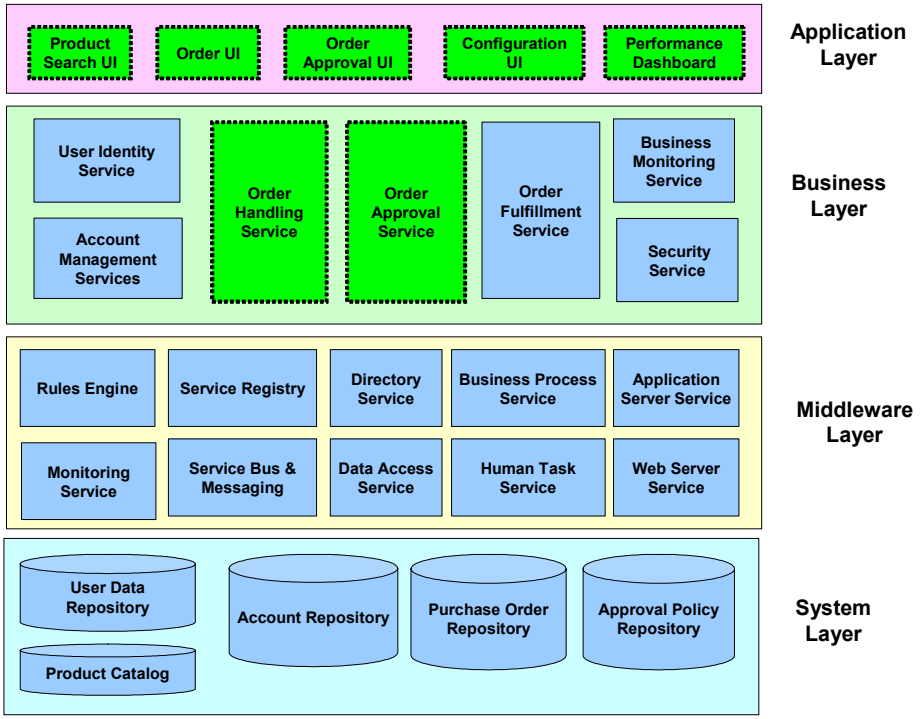

Figure 3-1 Solution architecture

Table 3-1 describes the essential subsystems.

Table 3-1 Abstract logical subsystems that comprise the solution architecture

Subsystem	Description
Product Search UI	Web-based user interface for customers to search and/or select products from an integrated product catalog.
Order UI	Web-based user interface for customers to enter order information, such as quantity and shipping method, or to view the details of existing orders.
Order Approval UI	User interface for the order approver to view and authorize orders.
Configuration UI	User interface for ClipsAndTacks' staff to configure the ordering process, specifically, the order approval process.

Subsystem	Description
Performance Dashboard	Web-based user interface for Business Performance Analyst to query and view business performance results
Order Handling Service	A business process that responds to the Order UI and creates new orders or displays existing order status. The process determines whether an order can be automatically processed according to the procurement policies.
Order Approval Service	A workflow process that is used by the order approval staff to validate and approve orders.

Hardware prerequisites

You must have installed and configured the full BPM suite of products before completing the set of tasks described in this redbook. See the individual product documentation for installation and configuration instructions. System hardware requirements are shown in Table 3-2.

Table 3-2 Hardware requirements

WebSphere Business Modeler	
Processor	Pentium® III 500 MHz (or equivalent) or faster
RAM	768 MB (1 GB recommended)
Disk Space	500 MB to install
Display	Minimum 1024 by 768 resolution
WebSphere Integration Developer	
Processor	Pentium IV 1 GHz (or equivalent) or faster (2.5 GHz recommended)
RAM	1 GB (1.5 to 2GB recommended)
Disk Space	4 GB to install
Display	Minimum 1024 by 768 resolution
WebSphere Process Server	
Processor	Pentium IV 1 GHz (or equivalent) or faster
RAM	1 GB
Disk Space	2 GB to install

Display	Minimum 1024 by 768 resolution
WebSphere Business Monitor	
Processor	Pentium IV 1 GHz (or equivalent) or faster
RAM	1 GB
Disk Space	2 GB to install
Display	Minimum 1024 by 768 resolution

More information

For more information on system requirements, refer to these Web sites:

- WebSphere Business Modeler:

  http://www.ibm.com/software/integration/wbimodeler/advanced/sysreq/

- WebSphere Integration Developer:

  http://www.ibm.com/software/integration/wid/sysreqs/

- WebSphere Process Server:

  http://www.ibm.com/software/integration/wps/sysreqs/

- WebSphere Business Monitor:

  http://www.ibm.com/software/integration/wbimonitor/requirements/

Summary

In this chapter we introduced the ClipsAndTacks company. We will use their order handling business process to demonstrate how the IBM business process management products can be used to model, implement, run, and monitor the ClipsAndTacks application.