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Preface

This guide is the primary source of introduction and usage information for the Oracle Business Process Architect Suite.

Audience

This document is intended for users who want to install and use Oracle Business Process Architect.

Documentation Accessibility

Our goal is to make Oracle products, services, and supporting documentation accessible to all users, including users that are disabled. To that end, our documentation includes features that make information available to users of assistive technology. This documentation is available in HTML format, and contains markup to facilitate access by the disabled community. Accessibility standards will continue to evolve over time, and Oracle is actively engaged with other market-leading technology vendors to address technical obstacles so that our documentation can be accessible to all of our customers. For more information, visit the Oracle Accessibility Program Web site at http://www.oracle.com/accessibility/.

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Related Documents

For more information, see the following documents in the Oracle Other Product One Release 7.0 documentation set or in the Oracle Other Product Two Release 6.1 documentation set:

- *Oracle BPA Suite 10.1.3 Method Guide*
- *Oracle BPA Suite 10.1.3 Installation Guide*

Conventions

The following text conventions are used in this document:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><em>italic</em></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td><strong>monospace</strong></td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
</tr>
</tbody>
</table>
Business Process Management (BPM) technology enables companies to design, simulate, automate, integrate, monitor, and optimize repetitive critical business processes to achieve business process excellence. This helps to reduce costs, improve productivity, and enhance the overall performance of the business. This Quick Start Guide introduces you to the BPM concepts and to the Oracle BPM life cycle. This documentation also includes a case study that describes modeling, simulation, implementation, and deployment of business processes.

This chapter includes the following topics:
- Section 1.1, "Terminology"
- Section 1.2, "Benefits of Business Process Management"
- Section 1.3, "Modeling Methodology for Business Process Management"
- Section 1.4, "Business Process Management Life Cycle"
- Section 1.5, "Business Process Management Stakeholders"
- Section 1.6, "Understanding the Global Company Sales Processes Case Study"

1.1 Terminology

This section includes some key terms and their definitions used in BPM technology. This section includes the following terms and definitions:
- Section 1.1.1, "Business Processes"
- Section 1.1.2, "Business Process Model"
- Section 1.1.3, "Business Process Management"
- Section 1.1.4, "Business Process Management Suites"
- Section 1.1.5, "Business Process Modeling Notation (BPMN)"
- Section 1.1.6, "Business Process Execution Language (BPEL)"

1.1.1 Business Processes

A business process is a set of related activities and tasks that create value by transforming an input into a more valuable output. Business processes are linked into a process flow, and the activities in the process can be either automated or performed by a human. A business process can reference other sub processes and can, in turn, be referenced from other processes as well. A business process consists of management
processes (for example, compliance, and strategic management), core processes (for example, purchasing, manufacturing, sales, and marketing), and supporting processes (for example, human resources).

1.1.2 Business Process Model

The Business Process Model is a graphical representation of a business process. It describes the step-by-step sequence of tasks that must be performed from initiation to completion. The purpose of a well-defined process map is to graphically illustrate the essence of the business process. By simply looking at it, you should be able to determine the purpose and overall flow of the process.

1.1.3 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 life cycle. BPM acts as an enabler for the businesses in defining and implementing strategic business goals and then measuring and managing a company’s financial and operational performance against these goals.

1.1.4 Business Process Management Suites

Business Process Management Suites is an integrated tool set, which includes process modeling, executable implementation, and BAM for improved business-IT alignment and agility required to cope with the ever-changing business requirements.

1.1.5 Business Process Modeling Notation (BPMN)

BPMN has now become the standard language for descriptive process modeling and simulation analysis of business processes. BPMN describes process orchestration in terms of activities (tasks and subprocesses) connected by sequence flows. Branches, splits, and joins in the flow are modeled by various gateway types. Events specify how processes respond to signals received from external entities or other parts of the same process. Other parts of the notation are loosely specified and used to add business context only.

1.1.6 Business Process Execution Language (BPEL)

BPEL is one of the leading standards for assembling a set of discrete services into an end-to-end process flow, radically reducing the cost and complexity of process integration initiatives.

1.2 Benefits of Business Process Management

This section describes the benefits of Business Process Management (BPM).

Business Process Management has the following benefits:

- BPM provides clarity around the processes that drive the business and provides tools to rapidly design the business process models. This makes it easier to create and change the business process models which create new business value or increase operational efficiency.
- BPM leads to business innovation and optimization by implementing business strategy through modeling, developing, deploying, and managing business processes through their entire life cycle.
- It enables businesses to obtain business information faster, respond more quickly to market trends and competitive threats, and improve operational efficiency.

- BPM establishes a common business terminology and a common process repository, making sure that all the business stakeholders are in agreement with the modeling methodology and speak the same language. This enables business and IT collaboration for continuous process improvement.

- When any business model is envisioned, it has to go through an implementation phase before it gets realized and affects the customers and partners. There is a gap between business and IT, and the ability to bridge that gap to implement new business models is a challenge. BPM allows collaboration between business and IT so that the executable business processes meets the business requirements conveyed in the business process model.

- In today’s environment, compliance is an ongoing initiative. Manually documenting business processes is both costly and expensive to maintain. BPM tools automatically generate documents and reports needed for governance.

- Where the same business process is performed with slight differences in various departments, BPM can identify and reduce variations in both these business processes, and supporting processes.

- Promotes reuse of best practices and ensures consistency in process initiatives across the enterprise.

- The process diagram is more than a static drawing. The process diagram is dynamic and can be changed in response to changing business conditions.

- Perform impact analysis on changes to existing processes and resources.

- Helps determine resource bottlenecks and optimize business processes by performing simulation.

- Promotes rapid development by meaningful and automatic translation of business process models into an executable BPEL model.

- Collaborate with different business stakeholders through the process portal.

### 1.3 Modeling Methodology for Business Process Management

The ARIS modeling methodology is used for business process modeling in Oracle BPA. For information on this modeling methodology, see the Oracle BPA Suite 10.1.3 Method documentation.

### 1.4 Business Process Management Life Cycle

Organizations wanting to stay competitive must manage their business processes effectively. This requires a systematic approach to the entire business process management (BPM) life cycle. Business Process Analysis (BPA), which includes process modeling and simulation, is a key component of the BPM life cycle. BPA, together with process execution and monitoring tools, enables complete life cycle management of business processes.

*Figure 1–1* shows the BPM life cycle.
This figure shows the BPM life cycle.

The typical BPM life cycle consists of three phases:

- **Business Process Analysis**
- **Business Process Execution**
- **Business Process Monitoring**

**Business Process Analysis**

Business Process Analysis involves Modeling and Simulation. Modeling is the first step and is used to capture and design business process models. This is a business driven activity and has its own iterative life-cycle. The business people collaborate on process design to capture what matters to businesses such as processes and policies, key performance indicators, and business events and activities. This is followed by simulation and analysis of the models in order to optimize them for reduced risk and increased flexibility. With Simulation, you can measure current performance for as-is models by using heuristic or representative data for cost and time. You can also analyze “what if” scenarios.

**Business Process Execution**

Implementation and execution constitute the next phase. The Business Process Models are abstract, and they have to be converted to concrete executable processes that can then be deployed and executed on a run-time platform. BPM allows collaboration between business and IT so that the executable business processes meet the business requirements conveyed in the business process model.

**Business Process Monitoring**

Monitoring and management constitute the third phase. This activity provides real-time visibility and captures business metrics in real time from business processes, systems, and other sources to gain visibility and analyze performance. This enables you to do context-based decision making. You can also act (design time at run time) at the right time and change the way the process behaves at run time without having to reimplement the solution. Finally, for continuous business process improvement, you must feed the business metrics back into the model to do real-data simulation and further optimize and re-engineer the business process models.
1.5 Business Process Management Stakeholders

There are both business and IT stakeholders in the BPM life cycle. They must collaborate continuously to achieve business process excellence.

*Figure 1–2 BPM Stakeholders*

This figure shows the BPM stakeholders.

Table 1–1 describes Figure 1–2.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>LOB Process Owner</td>
<td>Own the business process and establish goals and business requirements.</td>
</tr>
<tr>
<td>Business Analyst</td>
<td>Responsible for the creation and analysis of business process models. The Business Analysts run simulations to identify the optimum business process model.</td>
</tr>
<tr>
<td>Business End User</td>
<td>Day-to-day users of the business processes.</td>
</tr>
<tr>
<td>IT Developer</td>
<td>Responsible for conversion and QA of abstract process models to executable processes that can be deployed and monitored.</td>
</tr>
<tr>
<td>Process Administrator</td>
<td>Responsible for managing and monitoring the executable processes in production.</td>
</tr>
<tr>
<td>Process Architect/Business Analyst</td>
<td>Intersection of Business and IT organizations, and is responsible for ensuring that business and IT are effectively collaborating.</td>
</tr>
</tbody>
</table>

1.6 Understanding the Global Company Sales Processes Case Study

This chapter uses a case study to illustrate the process of developing business processes. The case study focuses on the sales process for Global Company.

Global Company sells electronic appliances, such as MP3 players and televisions, to consumers using a Web-based client application. The core Sales processes consist of Quote process, Order Booking and Shipping process and Invoice process. The business
processes have been simplified, and the focus is on understanding the various method objects and does not truly represent all the complexities inherent in a business process.

The first step is to identify the core business processes for the Global Company Sales organization. The second step is to define the business goals for these core business processes. The Value Added Chain diagram is used to identify the functions within a company that are directly involved in the creation of a company’s added value. These functions can be interlinked by creating a function sequence which together forms a value-added chain. The Global Company core sales processes are:

- Quote process
- Order Booking & Shipment process
- Invoice process

### Table 1–2 Descriptions of Processes and Goals

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quote Process</td>
<td>Minimize overpromise and underpricing.</td>
</tr>
<tr>
<td>Order Booking &amp; Shipment Process</td>
<td>Reduce cycle time and improve quality.</td>
</tr>
<tr>
<td>Invoice Process</td>
<td>Maintain adequate cash flow and improve Days of Sale outstanding.</td>
</tr>
</tbody>
</table>

This section includes the following topics:

- Section 1.6.1, "Quote Process Flow"
- Section 1.6.2, "Order Booking and Shipment Process Flow"
- Section 1.6.3, "Invoice Process Flow"

#### 1.6.1 Quote Process Flow

The overall process flow for the Quote system is as follows:

1. Convert Customer Inquiry into a New Quote document after validation. This contains Customer information and requirements. A Sales Representative is assigned to the Quote document, and this Sales Representative is the owner for the Quote document throughout the Quote process.

2. Identify product solutions that satisfy customer requirements. Add the solution details to the Quote document. The Sales Representative collaborates with the Sales Consultant and Product Managers to achieve this step. The Sales Representative also interfaces with the Product Catalog System to identify the Product Solutions available.

3. Update the Quote document with the pricing information for the Solution. The Sales Representative performs this by consulting the Pricing Management System.

4. Apply discounts depending on the size of the deal and the preferred status of the Customer. Platinum customers are offered deeper discounts than the Gold or Silver customers. The Sales Representative performs this by interfacing with the Discount Matrix System.

5. Quotations above $50,000 need approval from a Sales Manager.

6. Once approved by the Sales Manager, the Quote Document is updated with the discounted price and is forwarded to the Customer.
1.6.2 Order Booking and Shipment Process Flow
When an order request from the customer arrives, the following occurs:

1. A Purchase Order is created and inserted into the Order Processing System. The status of the Order is set to "Pending." The input is the "Quote" document, and the output is the "Purchase Order."

2. The Customer information (ID, name, address, and credit card information) is retrieved from the CRM system. The input is the customer name, and the output is the Customer data.

3. Credit check is then performed for the customer, and the credit service returns the credit rating. If credit is not approved, an order-canceled notification is sent to the Customer and the Sales person, and the order booking process ends. The input is Customer and the output is Credit Rating.

4. If credit is approved, the process evaluates Business Rules to determine whether the order requires approval by management. The Business Rule states the following:
   a. If the customer has a Platinum status, then no manual approval is required.
   b. If the customer has a Gold status, then manual approval is only required for orders over $1000.
   c. If the customer has a Silver status, then manual approval is required for all orders, regardless of the order amount.

5. For those orders requiring manual approval, the human workflow step is required, which routes a message to a manager.

6. If the order is approved, it is sent to Order Fulfillment. Once the order is fulfilled, the process sets the order status to complete and sends a notification to the customer by e-mail with the purchase order information.

1.6.3 Invoice Process Flow
When an invoice is required, the following occurs:

1. Once Order acknowledgment notification is received from Customer, the next step is to book withdrawal of good to correct inventory.

2. An Invoice is then generated and sent to the Customer for payment.
Introducing the Oracle BPM Solution

Oracle Business Process Analysis Suite provides the means for detailed process analysis. It provides an integrated and comprehensive toolset, powered by the industry-leading ARIS Platform to model, simulate, and publish your business processes. Oracle BPA supports Enterprise Architecture, process improvement, and change management initiatives and provides for alignment of Business Process Modeling (BPM) and SOA initiatives. In addition, the suite is integrated with Oracle SOA Suite, BPEL Process Manager, and BAM to provide closed loop BPM capability.

Oracle BPA Suite consists of the following components:

- **Oracle Business Process Architect** - The Oracle Business Process Architect is the modeling and simulation component. It provides a rich and intuitive graphical modeling environment tailored to business users for defining process maps and detailed process flows consisting of human, automated, and rule steps that span across organizational boundaries. The Oracle Business Process Architect, in addition to business process modeling, supports data modeling (rich support for UML models), organizational modeling, IT system landscapes, impact analysis, and rich report generation. It can be used to analyze as-is and future processes by running simulations based on different scenarios. Simulations can be used to perform throughput analysis, activity-based costing, and average cycle time analysis. The Oracle Business Process Architect is a diagnostic tool for uncovering critical paths, resource bottlenecks (both human as well as systems), and structural problems with the process. Through simulation, you can quickly determine the performance of the process under certain hypothetical conditions.

  The Oracle Business Architect is a versatile tool and can be used by business users of varying skill sets. The tool provides a predefined set of perspectives also known as filters and easily allows creating new perspectives, as well.

- **Oracle Business Process Publisher** - This tool is used for publishing Business Process Models to a process portal and offers role-based and secure access to process content. This fosters collaboration among the various team members and promotes sharing and review of process models on an enterprise wide scale.

- **Oracle Business Process Repository** - The Oracle Business Process Repository is used for storing process metadata.

- **Oracle Business Process Repository Server** - Used for multiuser scenario for collaborative development of process models with a shared repository. It also provides a centralized process management store with role-based access and versioning, check-in/check-out, and load balancing capabilities.

This section includes the following topics:

- **Section 2.1, "Oracle SOA Suite"**
Oracle SOA Suite

2.1 Oracle SOA Suite

Oracle SOA Suite enables a services and events architecture built on a modular interoperable infrastructure that leverages existing applications and other IT assets. By shifting development from coding to component assembly, it simplifies implementation, increases development productivity, and shortens deployment time. The SOA suite improves enterprise agility by continuous blending of business insight and adaptable business processes. The SOA Suite is comprehensive in its breadth of functionality and lowers customers’ total cost of ownership (TCO) by providing standards-based, well-integrated, and unified architecture, governance, and experience.

Oracle SOA Suite is a standards-based best of breed suite that enables you to build Service-Oriented Applications and deploy them to your choice of middleware platform. It consists of:

- An Integrated Service Environment (ISE) to develop services
- A multiprotocol Enterprise Service Bus (ESB) to integrate applications
- A services registry for discovering and managing the life cycle of services
- A BPEL-based orchestration engine to tie services into business processes
- A business rules engine to enable business policies to be captured and automated
- A Web services management and security solution to enforce authentication and authorization policies on services and to monitor services and processes for compliance to SLAs
- A Business Activity Monitoring (BAM) solution to gain real-time visibility into business entities and their interactions, and to enable services to be optimized
- An Enterprise Portal for employees, customers, and partners to access content, access relevance performance metrics, and collaborate and take actions through interaction with business processes.

Oracle SOA Suite is a standards-based best-of-breed technology suite that consists of the components described in the following sections:

- Section 2.1.1, "Oracle BPEL Process Designer (Implement and Deploy)"
- Section 2.1.2, "Oracle BPEL Process Manager (Execute)"
- Section 2.1.3, "Oracle Business Activity Monitoring (BAM)"
- Section 2.1.4, "Oracle Business Rules"

2.1.1 Oracle BPEL Process Designer (Implement and Deploy)

This is used for developing and deploying executable BPEL-based processes. It integrates with the Oracle Business Process Repository and uses the business process models developed in Oracle Business Process Architect as a starting point to generate rich BPEL artifacts. It is used to develop services and orchestrate services into composite applications and business processes. The tool can be used to test the BPEL processes and deploy the same on the execution platform, the Oracle BPEL Process Manager.
2.1.2 Oracle BPEL Process Manager (Execute)

Oracle BPEL Process Manager is the Process Execution engine for the Oracle BPM solution. It provides a comprehensive, standards-based, and easy-to-use solution for creating, deploying and managing composite business processes with content, automated and human workflow steps, all in a Service Oriented Architecture. Its native support for standards such as BPEL, XML, XSLT, XPATH, JMS, JCA, and Web services makes this an ideal solution for creating integrated business processes that are truly portable across platforms.

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

The Oracle BPEL Process Manager supports the interactions mentioned in the following sections:

- Section 2.1.2.1, "Human Interactions"
- Section 2.1.2.2, "Content Interactions"
- Section 2.1.2.3, "System Interactions"

2.1.2.1 Human Interactions

The Oracle Process execution component has comprehensive support for human participation in end-to-end processes. The human workflow features include a rich role-based customizable work-list application, out-of-box workflow patterns for sophisticated routing and assignment, extensive support notifications and escalations policies, and easy to use declarative modeling. The Task services created are reusable across multiple business processes, as well. The Work-list application can generate various reports to monitor and optimize work execution. Reports may include work items that require attention, current workloads and distributions, cycle times, and productivity. Reports include data based on the user profile, such as the Supervisor reports, which include data for the staff. In addition to routing modeled in the process diagram, Oracle BPM supports routing patterns suited for human to human workflows. Such support includes the ability of participants to invite other participants, request information from other participants, and delegate or reassign tasks to other participants. These capabilities available at run time may be restricted in the process model, if appropriate.

2.1.2.2 Content Interactions

Oracle BPM enables both structured and unstructured interactions between human participants. Participants may add comments and attachments to a Task that are then available to all other participants. Documents in Content Management system may also be used for structured communication. Oracle BPM also brings in discussion forums and other unstructured communication such as chat and VOIP.

2.1.2.3 System Interactions

The Oracle Process execution component has comprehensive support for system integration in end-to-end processes. It provides a plug-and-play, standard-based infrastructure for exposing systems as services and orchestrating these services into easy-to-change process flows. It can be used to deliver both composite applications (Web service orchestration, J2EE process flows) and data integration applications through more than 300 connectivity solutions and integrates with partners through B2B connectors.
2.1.3 Oracle Business Activity Monitoring (BAM)

BAM is used to monitor services and disparate events and provide real-time visibility into the state of the enterprise, business processes, people, and systems. The BAM component gives business executives the ability to monitor service level agreements (SLAs) across various services and business processes in the enterprise, to correlate key performance indicators (KPIs) down to the actual business process themselves, and most importantly, change the business processes much more quickly and efficiently to take corrective action if the business environment changes. Business users can quickly create highly effective dashboards and reports showing critical business measures and KPIs that update in real time with capability to drill into detailed information, all with a few clicks. The user can also model alert conditions and rules that can be used to alert as the conditions occur.

2.1.4 Oracle Business Rules

Oracle Business Rules is a rule design tool and inference engine to capture business policies. The Business Rules component of the Oracle BPM Platform is a high-performance inference based Rules Engine and enables business rules to be explicitly specified and managed by business users in a declarative fashion (that is, statements versus procedural logic). The Rules Engine is based on industry standard Rete algorithm. For more information about this algorithm, see http://en.wikipedia.org/wiki/Rete_algorithm.

2.2 Oracle BPM Solution

Oracle BPA Suite in conjunction with Oracle SOA Suite offers a comprehensive closed-loop BPM life cycle for continuous business process improvement. The Oracle BPM Solution comprises Oracle BPA Suite and Oracle SOA Suite.

Figure 2–1 Oracle SOA Suite Architecture

This figure shows the Oracle SOA Architecture.

The Oracle BPM solution comprises the following:

- Model: Oracle Business Process Architect is the modeling component. This tool can be used to model processes, business data, IT systems, and organizational
structures. It supports over 50 model types, including Business Process Management Notation (BPMN) and Event Process Chain Model (EPC).

- Simulate: Oracle Business Process Simulation is the simulation component. It allows modelers to analyze processes by running simulations based on different scenarios. Simulations can be used to do timing, cost analysis, and to find process and resource bottlenecks. This tool is used for process reengineering.

- Publish: Oracle Business Process Publisher is used for publishing Business Process Models and offers role-based and target group-oriented access to process content. This tool allows for processes to be organized and published as models onto a portal. It includes high performance report generation and on-demand publication facilities.

- Implement: Oracle JDeveloper is an Integrated Development Environment (IDE) for developing executable BPEL-based processes. It is used to develop services and orchestrate services into composite applications and business processes. It uses Oracle Web Services Manager (OWSM) to secure and manage authentication, authorization, and encryption policies on services that are separate from your service logic.

- Deploy and execute: Uses Oracle BPEL Process Manager to monitor services and disparate events and provide real-time visibility into the state of the enterprise, business processes, people, and systems. It is used for composing both automated and human tasks. Oracle Business Rules for dynamic decisions at runtime that can be managed by business users or business analysts.

- Manage: Oracle Application Server Control for managing services, processes, and systems.

- Monitor: Oracle Business Activity Monitoring (BAM) to monitor services and disparate events and provide real-time visibility into the state of the enterprise, business processes, people, and systems.

Note: Currently, Oracle BPM Solution is sold as Oracle BPA Suite 11g in conjunction with Oracle SOA Suite 11g.

2.3 Key Concepts and Terms

Here are the key concepts and terms used in Business Process Management:

- **Business Process Model**: This represents the abstract business process and contains the business definition. Business processes are a set of related activities and tasks that fulfill a finite set of business requirements. The Business Process Model is essentially independent of the technical architecture required to support the business. It may include processes and activities but these are generally for documentation purposes.

- **Executable Process**: Implementation details are added to the abstract business process by IT and the Business Model is converted to a physical executable process. This executable process can be deployed and monitored.

- **Process Blueprint**: This model is the intersection of common metadata between the Business Process Model and executable process. Only those artifacts that are of interest to both business and IT are included in the process blueprint. The process blueprint uses the business level as requirements and articulates a conceptual but technical means of achieving those requirements. The design is still abstract, enabling an implementation by various technologies.
Figure 2–2 Oracle BPM Solutions Concepts

This figure shows the Oracle BPM Concepts
This chapter describes the Oracle BPM life cycle.

Oracle BPM includes best-in-breed tools for both business and IT, with unparalleled depth in both areas. The Oracle BPA Suite is the modeling tool targeted at business users and Oracle SOA Suite is the execution and monitoring platform targeted at IT developers. Traditionally, such attempts to bring together best-in-breed tools for analysts and IT have been plagued by broken round-tripping between modeling and implementation. The process model is not just a business requirements specification meant for one-time hand off from business to IT. The process models change vividly along with the frequently changing business requirements, and the business process model must be a continuous view of the implementation. Changes to the business process model must immediately be reflected in the implementation, and any changes in implementation that affect the business flow must be reflected back in the business process model. Oracle has defined a shared meta model between the analyst tooling and developer tooling named Process Blueprint for synchronization of business and IT models throughout the business process life cycle. This unique approach enables both business and IT to work off a shared process definition.

The Oracle BPM life cycle comprises the following phases, as shown in Figure 3–1.

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**Figure 3–1 Oracle Active Process Modeling Method**

This figure shows the Oracle Active Process Modeling method.

The BPM life cycle includes the following steps:

- Section 3.1, "Planning and Strategic Analysis"
3.1 Planning and Strategic Analysis

Often, there is a gap between the level at which the corporate strategic plans are defined and what the lines of business do on a day-to-day basis. Strategic planning is the responsibility of senior management and is usually carried out by a corporate planning department reporting to senior management.

Strategy Maps helps in propagating the corporate objectives from the enterprise level all the way to well-defined business objectives that can in turn be mapped to Business Functions and business processes. It provides the ability to prioritize efforts, justify decisions, and trace the progress of BPM Projects to strategic goals of the business, hence improving business/IT alignment. This adds tremendous value to BPM initiatives as it offers a clear understanding of which processes are currently most strategic to the company, which process optimizations return the maximum Return on Investment (ROI), and which services are most aligned with business strategy.

Figure 3–2 shows the levels of typically how corporate strategic plans are defined.
**Figure 3–2   Defining Corporate Strategic Plans**

This figure shows how corporate strategic plans are defined.

Strategy Maps often involves Functional Modeling - decomposing Business areas as a set of Business Functions and Core processes, as shown in Figure 3–3.

**Figure 3–3   Defining Strategy Maps**

This figure shows how strategy maps are defined.
3.2 Modeling the As-Is Process Flows (Process Discovery)

Once the BPM process candidates are identified, the next step is to decompose the relevant business functions and core processes into detailed process flows. This is the Process Discovery step and during this step, the Business Analyst designs business process models by collaborating with the different stakeholders such as business users and line of business owner to capture the different aspects of a process.

Decompose core processes into subprocesses and determine process boundaries. Link subprocesses together so that the output of one becomes the input of the other. Using a combination of top-down and bottom-up approaches, map out the entire end-to-end process in detail. Model and organize roles, data, and services to create a shared library for reuse across business processes.

Figure 3–4 shows how processes are decomposed.

Figure 3–4  Decomposing Processes

This figure shows how processes are decomposed.

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Once processes are broken into activities, each activity must be taken up in detail, defining the "role" that will execute the action, the "input data(s)" and "output data(s)" associated with the activity, whether the data will be manually entered or electronically picked up. The following aspects are captured at the detailed process level:

Process Flow
Sequence of activities from start to end along with their interdependencies and interrelationships.

Activity Description
Description of process steps.
**Human Versus System**
Whether the data will be manually entered or electronically picked up.

**Forms**
Required by the business user to carry out the human steps.

**Data Flow**
Input and output for each of the activities mapped as part of activity flow.

**Business Rules**
Business policies and conditions governing the flow of business process.

**Participants**
A person, a group of persons, or a system that participate in the activities.

**Message Flow**
Messages sent to and received from other processes.

**Simulation**
Parameters such as processing time, cost, and resource allocation for the various activities.

**Business Exceptions and Alternative Tasks**
Business Exceptions are created when processes break and if not addressed, exceptions will reduce operational profitability and can become obstacles to organizations realizing their vision of fast, efficient, and error-free processes. Hence, it is key to model the alternative tasks that are triggered when business exceptions occur in the process.

Figure 3–5 shows how processes are broken into activities.

**Figure 3–5  Breaking-Down Processes into Activities**

![Diagram of process flow](image)

This figure shows how processes are broken into activities.
As the iterative process of BPM unfolds, workers develop a more nuanced understanding of their business processes. At the same time, IT gains a more sophisticated understanding of the business processes they are supporting. For their part, business managers develop a better understanding of how technologies can support their needs, which increases their abilities to suggest targeted changes to the functionality of the composite application supporting their needs.

**Note:** The process content is stored in the Business Repository. Multiple users can access and work concurrently on the process content and simultaneous access of several users to the same model is provided through implicit check-in and checkout capabilities.

### 3.3 Simulation and Analysis of the As-Is Process Model

Modeling is followed by simulation and analysis of the models in order to optimize the business process for reduced risk and increased flexibility. Simulation and Analysis are usually done by a sophisticated business analyst to produce innovative and optimal business process models. With Simulation, you can measure current performance for as-is models by using historical or real-time operational data for cost and time. You can also analyze what-if scenarios. The time parameters can be either constant or expressed as a statistical distribution.

In addition to cost and time parameters for each activity, the simulation allows specifying probability for the different process paths as well as the rate at which the instances are expected. The simulation component can also be used to perform role-based simulation and determine the utilization rate for the role across a set of business processes.

Animated and graphical simulation assist the business user to determine the following:

- **Average Cycle Time**
  Average time calculated across a set of instances.

- **Throughput Analysis**
  The number of instances processed in a given time.

- **Activity-Based Costing**
  The total money spent in producing and maintaining a product or service.

- **Critical Path**
  The path that takes the longest time.

- **Weak Point**
  The task at which the instances are queued up due to resource contention.

- **Resource Utilization**
  The utilization of process participants.

*Figure 3–6* shows the results of a simulation.
3.4 Publish and Review Process Models

The business process models meant for review can be published to a secure portal. The portal provides role-based access to process content (including simulation results) to the business community distributed across different geographic locations. The different business stakeholders can review and provide feedback on the process content, and the business analyst incorporates the feedback back in the process model.

Note that Planning and Strategic Analysis and Modeling the As-Is Process Flows (Process Discovery) are business-driven activities and iterative in nature.

3.5 Generate Process Blueprint and Share with IT

Once an optimal Business Process Model is reached, it can be shared with IT for conversion into an executable process. Marking the Business Process Model ready for sharing with IT automatically generates the Process Blueprint. Both the Business Process Model and the Process Blueprint are saved to the Oracle BPA Repository. The Business Process Blueprint is a BPEL-based metadata format supplemented with the "annotation" support of the BPEL language. The process activities are transformed into BPEL scopes that need to be filled by IT.

Figure 3–7 shows the process of generating blueprints.
3.6 Open Blueprint in JDeveloper

The Process Blueprint is used as a starting point in Oracle JDeveloper where it is converted into an executable BPEL process that can be deployed on top of the Oracle SOA run-time platform. The IT developer can create the executable BPEL process from an existing Process Blueprint by connecting to the BPA Repository Server. A BPEL skeleton is created, and the IT developer can then add execution details to it to make it concrete.

3.7 Create executable BPEL Process

The IT developer accesses the Blueprints by connecting to the Business Repository and uses it as a starting point to create executable BPEL model from within the IT tool, the BPEL Designer component of Oracle JDeveloper. The IT developer is presented with two views, the Blueprint view showcasing the BPMN-based business process and the BPEL view showcasing the executable BPEL model. The BPEL Designer offers a rich visual design paradigm with standard BPEL save format. BPEL artifacts are generated from the Blueprint, promoting rapid and meaningful process automation and reducing the strategy-to-implementation gap by translating the business requirements directly into almost ready to deploy BPEL process definitions. The next step is to complete the generated BPEL skeleton and deploy it on top of BPEL Process Manager, the run-time engine of the Oracle SOA Suite. The IT developer creates business services, and wire together services into end-to-end business processes and composite applications.

3.8 Merge with Newer Versions of Process Blueprints

Business Process Models are usually refined continuously, and the corresponding executable BPEL processes have to be kept in sync. This occurs more often during development and less often when the processes are put in production. The IT developer can merge the existing BPEL process that he is currently working on with a newer version of the Blueprint Process Model by connecting to the BPA Repository Server. The execution details for any activities that are in the merged model are the
same as they were before the merge, and the implementation changes by IT are retained.

3.9 Save BPEL Executable Process to BPA Repository

The IT developer can save the BPEL processes after adding implementation details to the BPA repository from Oracle JDeveloper. The IT Developer can make minimal changes to overall structure. The IT Developer can add new scopes in between existing scopes but cannot delete scopes that have been created by the business user. These appear as "Improvement Proposals" to the business user within Oracle Business Process Architect. The business user can accept or reject these proposals.

3.10 Continuous Process Development

The sharing of Business Process Model with the IT developer is not a one-time hand-off but rather iterative in nature. Business can continuously refine and enrich the process models while at the same time preserving business-IT alignment through the shared metadata - Process Blueprint. The executable process is always in lock step with the business process model throughout the process life cycle. The IT developer gets real-time alerts on creation of new versions of the Process Blueprint and can view and modify these processes in parallel using the BPEL Process Designer component of the Oracle SOA Suite. Business level changes can automatically be merged with any changes done by the developers to ensure that the implemented process is in line with the expectations of the business users. Meaningful implementation work done by the IT is preserved during the merge process, promoting rapid development and prototyping. In addition, the IT developer can make changes to the business flow inside the Blueprint view, and these in turn are reflected in the Business Architect tool when the executable BPEL model is saved to the Business Repository. The Business user can review these changes and incorporate them in the business process model to produce a newer version.

3.11 Deploy and Test

The IT developer can deploy and test the executable processes on top of the Oracle BPEL Process Manager.

3.12 Monitor and Manage

The deployed and running processes can be managed using Oracle Application Server Control and monitored using Oracle BAM. Oracle BAM provides real-time visibility and captures business metrics in real time from business processes, systems, and other sources to gain visibility and analyze performance. This gives business executives the ability to constantly measure actual performance, and monitor service level agreements (SLAs) across various services and business processes in the enterprise. The tool allows correlation of the key performance indicators (KPIs) with the option of drilling down to the actual business processes themselves, if desired. Business managers can understand process bottlenecks and process delays very effectively by using dashboards and can take corrective action if the business environment changes.

Figure 3–8 shows how to monitor and manage the BPA model.
This figure shows how to monitor and manage a BPA model.

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This chapter describes the Oracle BPA method filter.
This chapter includes the following sections:

- Section 4.1, "Overview of the Oracle BPA Method"
- Section 4.2, "Transforming a Business Process into a BPEL Process"

4.1 Overview of the Oracle BPA Method

Oracle BPA Suite contains over fifty model types for modeling business processes, business data, business services and organizational structure. Filters are an effective way to customize as well as to tone down the number of model types and the objects within the model type exposed to the user. Filters can be used to create different views for different sets of business users. Filters can be easily created, modified, exported and imported using the Filter wizard. Use online help in the Business Process Architect for usage information on the Filter wizard. Oracle BPA Suite is prepackaged with set of filters and Oracle BPA Method is one such filter. It contains a subset of model types such as BPMN, EPC and includes Oracle SOA modeling objects for rich BPEL code generation from the Business Process Diagrams.

Oracle has extended the modeling objects present in the underlying ARIS product to better integrate with Oracle SOA Suite. The ARIS EPC and BPMN method types have been extended to include Automated activity, Human workflow activity, Notification activity and Business Rules activity. Automated activity represents interaction with a system and refers to a Business Service, it’s input and output. Business processes often require human interactions as well. The users who participate in the business process have roles and privileges to perform tasks in the business process. The Human workflow activity represents the human/manual tasks.

Notifications are sent to alert users of changes to the state of a task. Notifications can be sent through any of the following channels: e-mail, telephone voice message, fax, pager, or SMS. This is captured by the Notification Activity.

Business rules are statements that describe the policies of a company. A business rule engine is a system that manages and executes business rules. A business rule system typically consists of a rule repository, rule author, and rule engine. The rule author allows business rules to be specified separately from application code. Separating the business rules from code allows business analysts to change business policies quickly with graphical tools. The rule engine evaluates the business rule and returns decisions or facts that are then used in the business process. The rules are typically stored in a rule repository in a database or file system. The Business Rule activity in the Oracle BPA Modeling tool is used to point to the Business Rule defined using the Rules Editor of a Rules Engine.
Figure 4.1.1 shows the Oracle BPA Method Filter.

**Figure 4–1  Oracle BPA Method Filter**

This figure shows the Oracle BPA Method filter.

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### 4.1.1 Creating a BPMN Model

In addition to the standard elements available on Business Process Modeling Notation (BPMN) diagrams, you can also add automated activities, human tasks, notification activities, and business rules.

---

**Note:** With the elements described in the following sections, the Business View tab in the various property dialogs contains editable fields for the business analyst to add details of the various elements. The IT View is the implementation detail, which is editable in JDeveloper, but read-only in Oracle BPA.

---

**4.1.1.1 Automated Activity**

These are activities executed automatically by the system.

---

**Note:** The Automated activity can represent either an invocation of a Business Service or the receipt of a business event from a Business Service.

---

Properties of automated activities are as follows:

**Standard Properties - Automated Activity**

- **Name** - Enter a unique name for the automated activity.
- **Represented by** - Select how you want to represent the activity:
  - **Empty** - No other details can be specified for this activity.
– **Abstract BPEL activity** - Select to specify that it is not known whether the automated activity is an "invoke service" versus "receive event" type.

– **Invoke** - Select to specify that the automated activity invokes the Business Service.

– **Receive** - Select to specify that the automated activity receives event from a Business Service.

- **Service name** - Represents a Business Service. Enter the name of the Business Service or select an existing Business Service. The Business Services are browsed from the IT systems models. The Business Services can be linked to a concrete WSDL.

- **Input** - Represents the Input message of the Business Service. It is a Business Data. Enter the input (as free text) or select items from a Data Model in the project. The Business Data can also be linked to a UML class and concrete XSD.

- **Output** - Represents the Output message of the Business Service. Output is Business Data. Enter the output (as free text) or select items from a Data Model in the project. The Business Data can also be linked to a UML class and concrete XSD.

---

**Standard Properties - Sensor definition**

---

**Note:** This defines BPEL Sensors that enable you to monitor BPEL process activities, variables, and faults during runtime. Sensor definitions becomes probes in the executable business process and send data to Business Activity Monitoring dashboards.

---

- **When to watch** - Select from "At the beginning", "At the end", or "Exception".

- **What to watch** - Variables separated by commas.

- **Action** - Enter a description (in free text) of the action taken by this BPEL Sensor when the watch conditions are met.

---

**General Properties**

- **Description** - Free text field. This appears as annotation in the corresponding scope upon BPEL transformation.

---

**4.1.1.2 Human Task**

Tasks performed by individuals rather than systems. Properties of human tasks are as follows:

---

**Standard Properties - Human task**

- **Name** - Enter the name for the human task.

- **Description/Definition** - Free text. This appears as annotation in the corresponding scope upon BPEL transformation.

- **Priority** - Enter the priority number for the task. Priority can be 1 through 5, with 1 being the highest. By default, the priority of a task is 1.

- **Expiration** - Enter expiration duration for the human task. If the user does not act on the task before the expiration duration has been reached, the task will be escalated to the manager for further action.
Standard Properties - Assignee

- **<name field>** - Click Add to enter or select the title of the person or persons assigned the task in the Assignees dialog, in which you can set the following:
  - **Workflow pattern** - Select the participant type you require for the assignee or assignees.
    * **Single approver** - This participant type requires a single user to act on a task. If the task is assigned to a role or group with multiple users, one of the members must claim the task and act on it. Based on the user’s action, you define what the business process does.
    * **Group vote** - Used when multiple users, working in parallel, must take action simultaneously, such as in a hiring situation when multiple users vote to hire or reject an applicant. You specify the voting percentage that is needed for the outcome to take effect, such as a majority vote or a unanimous vote.
    * **Management chain** - Routes tasks for approval to multiple users in a management chain hierarchy. You specify the task participants as a management chain list or a list of users.
    * **Sequential list of approvers** - Enables you to create a list of sequential participants for a workflow. For example, if you want a document to be reviewed by John, Mary, and Scott in sequence, use this participant type. This is similar to the management chain participant type, except that with that type, the users are part of an organization hierarchy. For the sequential list of approvers participant type, they can be any list of users or groups.
    * **FYI assignee** - Used when a task is sent to a user, but the business process does not wait for a user response; it just continues. FYI assignees cannot directly impact the outcome of a task, but in some cases can provide comments or add attachments.
    * **External routing service** - Enables you to configure an external routing service that dynamically determines the participants in the workflow. If this participant type is specified, all other participant types are ignored. It is assumed that the external routing service provides a list of participant types (single approver, list of approvers, group vote, and so on) at run time to determine the routing of the task.
  - **Assignees** - Enter or select the roles of the assignees.
  - **Remark** - Enter a comment (in free text) to describe this assignment.

---

**Note:** It is recommended that instead of creating a new assignee in this field, add the new assignee to the Organizational chart, then return to this property and select the assignee from the list of available items listed in the Organizational chart.

---

Extended Properties - Human task

- **Subject** - Enter the title for the human task. The title is displayed as the task in the Oracle BPEL Worklist Application at run time.
- **Notification/Reminder** - Enter instructions to specify the notification/reminder used by business users. Notifications indicate when a user is assigned a task, or informed that the status of the task has changed. Task reminders are sent either at the time the task was assigned to a user, or at the expiration time of a task. The
number of reminders and the interval between the reminders can also be configured.

- **Allow participants to invite others** - Ad hoc routing of tasks.
- **Owner** - Enter or select the role who owns the task. You can either enter the role as free text, or select roles from the organizational chart.
- **Task parameters** - Enter business data items to be used as the task parameters.
- **Attachment** - Enter the name of the attachment(s) to be used as part of the human task. For example, a checklist or sign-off document.

**Extended Properties - Restricted actions**
These are actions the assignee is prohibited from doing. Select from:

- Show
- Withdraw
- Delegate
- Escalate
- Request information
- Push back
- Reassign
- Suspend

**4.1.1.3 Notification Activity**
Issues a notification. Properties of notification activities are as follows:

**Standard Properties - Notification**

- **Name** - Enter the name of the notification activity.
- **Channel** - Select from "Email", "Fax", "Pager", or "SMS".
- **Receiver** - Enter or select who will receive the notification.
- **Subject** - Enter the subject line to be used in the notification.
- **Text** - Enter the message text to be used in the notification.

**Standard Properties - Sensor Definition**

---

**Note:** This defines BPEL Sensors that enable you to monitor BPEL process activities, variables, and faults during runtime. Sensor definitions become probes in the executable business process and send data to Business Activity Monitoring dashboards.

- **When to watch** - Select from "At the beginning", "At the end", or "Exception"
- **What to watch** - Variables separated by commas.
- **Action** - Enter a description (in free text) of the action taken by this BPEL Sensor when the watch conditions are met.
Extended Properties - Notification

- **Description/Definition** - Enter a description for the notification activity.
- **CC** - Enter a valid e-mail account to be copied with this notification message.
- **BCC** - Enter a valid e-mail account to be blind copied with this notification message.
- **Reply to** - Enter a valid e-mail account to be used in the Reply To field for this notification message.
- **From** - Defaults to the account used to send system notifications or enter a custom account from which to send the notification message.
- **Attachment** - Enter the name of the attachment(s) to be sent with the notification.

### 4.1.1.4 Business Rules

Defines the behavior of the business process. A business rule engine is a system that manages and executes business rules. A business rule system typically consists of a rule repository, rule author, and rule engine. The rule author allows business rules to be specified separately from application code. Separating the business rules from code allows business analysts to change business policies quickly with graphical tools. The rule engine evaluates the business rule and returns decisions or facts that are then used in the business process. The rules are typically stored in a rule repository in a database or file system.

Properties of business rules are as follows:

**Standard Properties - Business rule function**

- **Name** - Enter the name for the business rule.
- **Rules** - Enter the description that defines the Business Rules set.

**Standard Properties - Input (facts)**
Enter (free text) the business data to be the inputs for the business rule, or select business data identified in the Data Models.

**Standard Properties - Output (watch)**
Enter (free text) the business data to be output by the business rule, or select business data identified in the Data Models.

**Standard Properties - Sensor Definition**

---

**Note:** This defines BPEL Sensors that enable you to monitor BPEL process activities, variables, and faults during runtime. Sensor definitions becomes probes in the executable business process and send data to Business Activity Monitoring dashboards.

- **When to watch** - Select from "At the beginning", "At the end", or "Exception".
- **What to watch** - Enter a description (in free text) of which items of Business Data need to be monitored.
- **Action** - Enter a description (in free text) of the action taken by this BPEL Sensor when the watch conditions are met.
Extended Properties - Business rule function
- **Description/Definition** - Enter a description of the business rule function.

4.1.1.5 Importing Data Structures from XSD
Data structures in Oracle BPA can be imported from XSD files.

1. Select a folder under a database node in the Explorer tree in Designer pane.
2. Select **SOA > Import data structures** from the main menu.
   The Import data structures - Specify source and location page is displayed.
3. Specify the source the XSD file containing the definitions for the data structures in the **Source** field.
   Note that the location filed is automatically populated with location value.
4. Click **Next**.
   The Import data structures - Select XSD elements page is displayed.
5. Select the XSD elements for which you want to create technical terms.
6. Click **Finish**.

4.2 Transforming a Business Process into a BPEL Process
To make a blueprint available for use in the Blueprint Editor in JDeveloper, while viewing or editing an EPC or BPMN diagram in Oracle BPA select **SOA > Share Blueprint with IT**.

The blueprint can now be used to create a BPEL process in JDeveloper. For more information on using the Blueprint Editor in JDeveloper, see Chapter 7, "Using Process Blueprints in JDeveloper."

BPEL transformation generates Process Blueprint and associated skeletal BPEL code. The IT developer needs to add implementation details to the BPEL code to convert it into an executable process that can be deployed on the run-time engine (BPEL Process Manager).

The transformation a business process into a BPEL process comprises the following:
- Notification Services are transformed into a Business Scope upon BPEL transformation. The corresponding Notification service as well as the BPEL artifacts for invoking the Notification service are created within the business scope.
- Human tasks are converted to a human workflow business scope upon BPEL transformation. The Task Service gets automatically generated as well as the BPEL artifacts for invoking the Task service also gets generated. The Notification/Reminder notes get translated to business annotations.
- Automated activities are converted to a business scope upon BPEL transformation.
- Business Service is converted to a Partner Link upon BPEL transformation. If the Business Service is associated with a concrete WSDL, it is converted to a concrete Partner Link. Otherwise it is converted into an abstract Partner Link. If Represented by is set to "invoke", an invoke activity is created inside the business scope and is linked to the Partner Link. If Represented by is set to "receive", a receive activity is created inside the business scope and is linked to the Partner Link. The Sensor definition is converted in to a business annotation.
- XOR, AND and OR gateways are converted to switch and case statements upon BPEL transformation.

- All Business Data in the Business Process Diagram are converted to Variables upon BPEL transformation. If the Business Data is associated with an XSD, the XSD is exported and the Variable in the BPEL skeletal process generated is then set to the XSD type. Otherwise, the Variables are set to String type.

- Business Rules are converted into a Decision Service. The free text in the Rules field is converted into business annotation.
This chapter describes how to use the BPA Quick Start sample.

This chapter includes the following topics:

- Section 5.1, "Understanding the Quick Start Sample BPA Project"
- Section 5.2, "Setting Up the OBPA Release 11 Quick Start Sample"
- Section 5.3, "Starting the BPA Quick Start Sample Project"
- Section 5.5, "Associating Services in Oracle BPA Architect"
- Section 5.6, "Simulating the Process Model"
- Section 5.7, "Modeling the Future Process"
- Section 5.8, "Performing Simulation Experiment"
- Section 5.9, "Transforming a Business Process into a BPEL Process"

5.1 Understanding the Quick Start Sample BPA Project

The objective of the Quick Start sample (OBPA Release 11 Quick Start) is to take you through the complete end-to-end business process life cycle. The following business process life cycle tasks are illustrated in this sample project:

- Strategic analysis and determination of BPM process candidates
- Modeling the process
- Analyzing the process
- Publishing the process to portal
- Implementing the process
- Continuous process development and round-trip integration between business and Information Technology (IT)
- Deploying the process
- Monitoring the process

The business scenario is simplified to capture the different stages of a process life cycle in a concise document. The case study describes a fictitious company called Global Company that offers computer parts and electronic goods. The company is looking to improve the revenue and net profit of their product line. They would like to align their
core business processes to support the above strategic objective using the Oracle BPM solution.

5.2 Setting Up the OBPA Release 11 Quick Start Sample

This section describes the prerequisites and the different tasks that you must perform before starting the Quick Start sample.

This section includes the following topics:

- Section 5.2.1, "Installing the Products"
- Section 5.2.2, "Creating Database Schemas"
- Section 5.2.3, "Creating Database Connection in Oracle JDeveloper"

5.2.1 Installing the Products

You must install the following software products before starting the OBPA Release 11 Quick Start sample.

This section includes the following topics:

- Section 5.2.1.1, "Installing Oracle XE Universal Edition Database"
- Section 5.2.1.2, "Installing Oracle Business Process Analysis Suite"
- Section 5.2.1.3, "Installing Oracle Business Process Architect 11gR1"
- Section 5.2.1.4, "Installing Oracle JDeveloper"
- Section 5.2.1.5, "Downloading the Quick Start Sample"

5.2.1.1 Installing Oracle XE Universal Edition Database

You must install the Oracle XE Universal Edition Database, available at the following location:


5.2.1.2 Installing Oracle Business Process Analysis Suite

You must install Oracle Business Process Analysis Suite 11g, available at the following location:


For more information about installing Oracle Business Process Analysis Suite 11g, see the Oracle BPA Suite Installation Guide for your operating system.

5.2.1.3 Installing Oracle Business Process Architect 11gR1

To install Oracle Business Process Architect:

1. Unzip the file CD1-11.xxxxxx.zip.
3. Select the default installation options.
For more information about installing Oracle Business Process Architect, see the Oracle Business Process Architect Installation section in the Oracle BPA Suite Installation Guide.

### 5.2.1.4 Installing Oracle JDeveloper

To install Oracle JDeveloper 11.1.1.0 Studio Edition:

1. Unzip Oracle JDeveloper into a location on your host.
2. Double-click `jdeveloper.exe`.

For more information about installing Oracle JDeveloper 11g Studio Edition, see the Oracle JDeveloper Installation Guide.

### 5.2.1.5 Downloading the Quick Start Sample

You must download the Quickstart.zip file from the `samples` folder in the installation directory and extract it to a working directory.

### 5.2.2 Creating Database Schemas

This section describes how to create the database schemas that are required for working with the OBPA Release 11 Quick Start sample. Note that in this guide `JDEV_HOME` refers to the location of the Oracle JDeveloper installation in your computer.

You must perform the following steps to install Oracle Database schema:

1. Connect to your database and create a user named `bpmdemo`, by executing the `build.sql` stored procedure available in the `samples` folder.
2. Connect to the database as user `bpmdemo`, as shown in the following example:

   ```sql
   SQL> CONNECT bpmdemo/bpmdemo
   ```

   **Note:** Ignore any issues that you encounter when you run these scripts the first time during which the objects are dropped. These errors are expected as the objects have not been created yet.

### 5.2.3 Creating Database Connection in Oracle JDeveloper

You must create a database connection in Oracle JDeveloper.

To create a database connection in Oracle JDeveloper:

1. Start Oracle JDeveloper.
2. From the **File** menu, click **New**.

   The New Gallery dialog is displayed, as shown in **Figure 5–1**.
3. In the **All Technologies** tab, under **General** categories, select **Connections**.

   A list of the different connections that you can make is displayed in the Items pane on the right side of the New Gallery page.

4. Select **Database Connection**, and then click **OK**.

   The Create Database Connection page is displayed, as shown in Figure 5–2.
Figure 5–2  The Create Database Connection Page

This figure shows the Create Database Connection page.

5. Enter the following details in the Create Database Connection page:
   - **Connection Name**: Enter a connection name, for example, `bpmdemo`.
   - **Connection Type**: Retain the default, `Oracle (JDBC)`.
   - **User Name**: Enter `system`.
   - **Password**: Enter `manager`.
   - **Driver**: Select the driver type.
   - **Hostname**: Enter the host name.
   - **SID**: Enter the SID value.

6. Click **Test** to test the connection. A success message is displayed in the Status pane.

7. Click **OK**.
   You have created a database server connection.

5.3 Starting the BPA Quick Start Sample Project

This section describes how to start the OBPA Release 11 Quick Start sample project. This section includes the following topics:

- Section 5.3.1, "Starting Oracle Business Process Architect"
- Section 5.3.2, "Restoring the OBPA Release 11 Quick Start Sample Project"
Starting the BPA Quick Start Sample Project

5.3.1 Starting Oracle Business Process Architect

The first task in starting the Quick Start sample is to start Oracle Business Process Architect.

To start Oracle Business Architect:

1. Click **Start** in the taskbar.

2. Select **All Programs, Oracle BPA Suite, 11g**, and then click **Oracle Business Process Architect 11g**.

   The Oracle Business Process Architect 11g home page is displayed, as shown in Figure 5–3.

![Figure 5–3 The Oracle Business Process Architect 11g Home Page](image)

This figure shows the Oracle Business Process Architect 11g home page.

5.3.2 Restoring the OBPA Release 11 Quick Start Sample Project

This section describes how to restore the OBPA Release 11 Quick Start sample project.
1. Click **Explorer** in the Modules pane, as shown in Figure 5–4.

   This starts the local business repository.

   **Figure 5–4  The Modules Pane**

   ![Modules Pane Diagram]

   This figure shows the Modules pane from where you click **Explorer**.

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   **Note:** The process metadata and associated artifacts are stored in the Business Repository (also known as the BPA Repository). The Business Repository is a database and can be local or remote. In a local deployment, the Architect (client) directly connects to the database. In a remote deployment, the Architect connects to a BPA Repository Server, which in turn connects to the database. You will be referring to local deployment throughout the case study.

   ***************************************************************************************

2. In the tree view, click the plus (+) sign before **LOCAL**.

   The green triangle symbol indicates that the database is up and running.

3. In the Modules bar, click **Administration** and then the name of the server on which you want to restore the database.

   The connection is established.

4. Right-click the **server** and select **Restore**.
Starting the BPA Quick Start Sample Project

The Restore Wizard is displayed, as shown in Figure 5–5.

**Figure 5–5 The Restore Wizard - Select backup file Page**

This figure shows the Restore Wizard - Select backup file page.

5. Click **Select** to browse and select the Quick Start sample file.
6. Select the folder where the database backup file (.adb) is stored.
7. Select the backup file (**OBPA Release 11 Quick Start.adb**) you want to restore and click **Finish**.

The database is restored to the selected server.

For more information about restoring models in Oracle Business Process Architect, see the *Oracle BPA Suite Installation Guide*.

5.3.3 Logging In to the Database

You must log in to all databases of the server for the configuration update to take effect.

To log in to the database:

1. Right-click **OBPA Release 11 Quick Start**, and then click **Log in** from the menu that appears, as shown in Figure 5–6.
This figure shows the menu that appears when you right-click the OBPA Release 11 Quick Start sample.

The Login Wizard is displayed.

2. Enter the user name and the password, as shown in Figure 5–7. In this example, retain the default user name and password.

   The default user name and password are `system` and `manager`, respectively.

3. Click Next.

   The Login Wizard - Select Options page is displayed, as shown in Figure 5–8.
**Figure 5–8  The Login Wizard - Select Options Page**

This figure shows the Login Wizard - Select Options page, where you select the setting for opening the database.

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4. Select **Entire Method** from the Filter list, and then click **Finish**.

You have logged in to the Quick Start project.

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**Note:** A filter acts like a view, using which you can filter the information you want to see. The Entire Method filter shows all the methods available in the OBPA Release 11 Quick Start project.

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**5.3.4 Viewing the Entry Model**

To view the entry model, you must be in the Designer view.

To go to the Designer view:

1. From the **View** menu, select **Modules**, and then click **Designer**, as shown in Figure 5–9.

**Figure 5–9  Selecting the Designer View**

This figure shows how to select the Designer view from the View menu.
2. The Oracle Business Process Architect 11g page appears in the Designer view, as shown in Figure 5–10.

**Figure 5–10  The Oracle Business Process Architect 11g Page in Designer View**

This figure shows the Oracle Business Process Architect 11g page in Designer view.

The following folders are available in the BPA project:

- **Strategy**
  Created for containing strategy and artifacts related to the business architecture.

- **Processes**
  Created for containing process artifacts.

- **Process Participants**
  Created for containing the roles and organization artifacts that participate in the business processes.

- **Business Services**
  Created for containing service artifacts that the business processes interface with.

- **Data**
Created for containing data artifacts that are consumed and produced by the processes.

The entry model is the starting point for the Oracle BPA Project.

To view the Global Company Entry Model:

1. Double-click **Global Company Entry model [Structuring model]**.

   The Global Company Entry Model is displayed, as shown in Figure 5–11.

---

**Figure 5–11  The Global Company Entry Model**

This figure shows the Global Company Entry Model.

2. From the entry model, you can navigate to the Global Company processes and process-related artifacts.

---

### 5.3.5 Viewing the Strategic Analysis

The Objective Diagram model type can be used to decompose strategic goals (objectives at the highest level) into more detailed granular objectives that can be tied to actionable business and IT projects. Optimizing business processes is an actionable business project. This strategic analysis links and justifies BPM projects to strategic goals.

To view the strategic analysis:

1. Double-click the FAD icon located at the bottom right of the Strategy box in the Global Company Entry model.

   The Global Company strategic goals is displayed, as shown in Figure 5–12.
2. View the strategic goals.

5.3.6 Viewing the Process Participants for the Quote to Cash Business Process

The Quick Start project is prepopulated with resources such as process participants (roles), services, and data.

To view the process participants:

1. Select the Navigation check box on the tool bar, as shown in the following figure, or click Navigation from the View menu to view the OBPA Release 11 Quick Start project Navigation tree.

2. Double-click Quote to cash roles [Organizational chart] listed in the Process Participants folder.

The Quote to cash roles model is displayed, as shown in Figure 5–13.
This figure shows the Quote to cash roles model.

The Quote to cash roles model is an Organization Model chart for capturing process participants. It is a container model for capturing organizational units and roles (person type).

The following process participants are involved in the Quote to cash process:

- **Customers**
  Customers place sales quote request and thereafter, accept or reject the sales quote, and acknowledge the shipment of the order. The expectation of the Customers are quick generation of sales quote and fulfillment of orders. Further, they need to be notified of where their quote or order is stuck.

- **Sales Representatives**
  The Sales Representatives are responsible for generating a quote in the Quote system, following-up with the extended Sales team to refine the quote, and securing approvals from the Sales Executive to convert the quote to sales orders.

- **Sales Executives**
  The Sales Executives are responsible for approving the price, and working with the structure of the quote.

- **Supervisors**
  The Supervisors are responsible for approving the sales orders.

- **Fulfillment Clerks**
  The Fulfillment Clerks are responsible for packing and shipping the order. In addition, they are responsible for handling exceptions in the “Process Order” business process.
5.3.7 Viewing Data for Quote to Cash Process

Business processes produce and consume data. Data can be structured or unstructured and is held in varying sources such as legacy, packaged applications, business processes, spreadsheets and personal databases such as Microsoft Access.

The Data Models in Oracle BPA Architect capture the data used in process models. The Data (also referred to as Technical Term) object is used for representing all kinds of business information. It represents the highest level of data abstraction. The Technical Term represents the inputs/outputs of a process step, such as a Business Service.

The Technical Term model type is the simplest informal data model type and consists of technical term objects that are linked together by choosing from a set of relationships. It is synonymous with the conceptual data model and is independent of both the storage architecture and the implementation technology. It serves as the focus of communication between technical and business stakeholders.

The following are the steps to view the Data Model for the Quote to cash process.

1. Navigate to the Data folder in the Global Company folder in the navigation tree.
2. Click the plus (+) sign before the Data folder to expand it.
3. Double-click Quote to cash data model [Technical terms model].

The Quote to cash data model is displayed, as shown in Figure 5–14.

**Figure 5–14 The Quote to cash data model Page**

This figure shows the Quote to cash data model page.

The following is some of the data present in the data model:

- Quote Request
The Quote Request message from the customer triggers the Process Quote process.

- **Quote**
The Quote record is generated and then approved in the Process Quote process. It contains the deal structure, pricing information, and information about Customers and the Sales Representatives.

- **Order**
A list of product items requested by the customer and contains customer information such as name, shipping, and billing address. The Order record is generated and fulfilled in the Process Order process.

- **Customer**
The Customer record contains details such as name, ID, credit card information, social security number, shipping, and billing addresses.

### 5.3.8 Viewing the Services for Quote to Cash Process

The Quote to cash process interfaces with the following services:

- **Customer Service**
  A business service that encompasses operations such as (i) create customer (ii) get customer details given the customer name or ID (iii) update customer, and (iv) delete customer.

- **Credit Rating Service**
  A business service that returns the credit rating given the social security number of the customer.

- **Order Processing Service**
  A business service that encompasses operations such as (i) Create Order (ii) Update Order (iii) Delete Order, and (iv) Cancel Order.

In the OBPA Release 11 Quick Start sample, the BPA project is already preseeded with services, such as to Business Service, Customer Service, and Credit Service. In this example, the Order Service is an abstract service defined by the business analyst and needs to be created by the IT Developer. The Quote to Cash process drives the requirements for the Order Service.

To view the business services:

1. Navigate to the **Business Services** folder in the Global Company folder in the navigation tree.
2. Click the **plus (+) sign** before the Business Services folder to expand it.
3. Double-click **Global Company Services Map [Application system type diagram]**.

The Global Company Services Map is displayed, as shown in **Figure 5–15**.
5.4 Global Company Functional Decomposition

This chapter describes the technique of functional decomposition of the Global Company.

The technique of functional decomposition represents the activities of a business area as a hierarchy of functions and processes. The hierarchy is independent of organizational structure and represents the basic functions that have to be carried out, regardless of what organizational groups or departments exist. A function or process may cross organizational boundaries. Each level in the functional model hierarchy has a specific purpose with respect to functional granularity. Each decreasing level is finer grained with respect to functional representation when compared to the levels above it. Each node in the graph may have exactly one parent (excluding the root node, which has no parent). The number of levels in the functional decomposition in the OBPA Release 11 Quick Start sample project is intended as a guide and can be customized to fit individual needs.

The following are the levels in the functional decomposition in the Quick Start BPA project:

- Section 5.4.1, "Level-0 Enterprise Map"
- Section 5.4.2, "Level-1 Value Chains"
- Section 5.4.3, "Level 2 - Main Process"
- Section 5.4.4, "Level 3 - Sub-processes"

5.4.1 Level-0 Enterprise Map

The Enterprise Map is the central entry point to the entire Business Process Hierarchy. There is only one Enterprise Process Map per organization. It is a catalog of processes model that make up the enterprise. The Enterprise Process Map serves as an entry...
point for the process architecture and is defined: the single highest level of process mapping for an organization. The Value Added Chain Diagram model type can be used to represent the Process Map. Given the many processes to choose from, a general classification of three types is suggested:

- Core Process
- Management Processes
- Operations Management Processes

**Core Process**

The core processes are used to bring new products and services to the market. These processes represent the main business activities of an enterprise. They represent the core competencies that can differentiate the organization in the market. They involve sales, marketing, and development processes that identify new product opportunities, manage R&D, design and develop products, and develop new markets.

**Management Processes**

Management process includes strategic planning as well as compliance processes.

**Operations Management Processes**

Processes that play a supporting role in the organization often fall into the Operations Management category.

The following are the steps to navigate to the Enterprise Map for the Global Company case study:

1. Click the plus sign before the Process folder under the Global Company folder to expand it.
   
   The Process folder is expanded.

2. Double-click **00-Enterprise Process Map**, as shown in Figure 5–16.
Figure 5–16  Clicking 00-Enterprise Process Map

This figure shows the 00-Enterprise Process Map Business Process Diagram being selected.

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The Enterprise Map for the Global Company case study is displayed, as shown in Figure 5–17.

Figure 5–17  Enterprise Map for the Global Company Case Study

This figure shows the Enterprise Map for the Global Company case study.
5.4.2 Level-1 Value Chains

The main functional areas in the Enterprise Map can be further broken down into more granular functional areas. The Value Chains show the activities that make up the value stream and its interaction with other Functional Areas. A Value Chain Diagram model represents a value stream. A value stream is a set of activities wherein each activity produces results that is of value to the enterprise. It is an end-to-end collection of activities that creates a result for the customer who may be external or an internal customer with the goal of fulfilling the customer requirements in a satisfactory manner. The Value Added Chain Diagram model connects the value stream to other enterprise entities (such as Data, Roles, Systems) and other Value streams.

Consider the Global Company case study for understanding Value Chains. From the Enterprise Map, you can drill down to the Marketing & Sales function.

To reach the Marketing & Sales case study:

1. Double-click the Marketing & Sales Value Added Chain Diagram, as shown in Figure 5–18.

Figure 5–18 Selecting the Marketing & Sales Value Added Chain Diagram

This figure shows how to select the Marketing and Sales Value Added Chain Diagram.
2. The Marketing & Sales Value Added Chain Diagram is displayed, as shown in Figure 5–19.

The Marketing & Sales is of type Value Added Chain Diagram model type and is used to depict the processes that produce value in the Marketing & Sales functional area.

**Figure 5–19 The Marketing & Sales Value Added Chain Diagram**

This figure shows the Marketing & Sales Value Added Chain Diagram.

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At this level, you can also represent details such as Organization that carry out these functions and the data and products that these functions produce and consume. You can also associate business artifacts such as risk and controls, and objectives at this level.

5.4.3 Level 2 - Main Process

Each activity in the value stream can be decomposed into business process. Business Process Modeling Notation (BPMN) is recommended for capturing business process flows. This level is referred to as the main process because it usually is a sequence of process steps with each process step decomposing into a subprocess.

To reach the Level 2 -Main Process:

1. Double-click the Assignment icon beside the Quote to cash process in the Marketing & Sales Value Added Chain Diagram.
The Quote to Cash main process is displayed in the Designer window, as shown in Figure 5–20.

**Figure 5–20  The Quote to Cash - Main Process**

This figure shows the Quote to Cash process in the Designer Window.

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2. Notice that the main Quote to cash process consists of the following subprocesses:
   - Customer Inquiry
   - Process Quote
   - Process Order
   - Invoice

   In the Customer Inquiry process, the Sales Representative engages with the customer to convert the customer interest into a quote. In the Process Quote process, the Sales Quote document is generated by the Sales Representative, which then gets approved by the Sales Executive. The quote is then sent to the Customer for his acceptance. In the Process Order process, the order is generated from the quote, the customer credit information is verified, and the order is fulfilled. In the Invoice process, the invoice is generated and sent to the Customer.

**5.4.4 Level 3 - Sub-processes**

The process steps in the main process often decompose into subprocesses. When a parent process calls a subprocess, a new incident of a subprocess is invoked in response. Data from the parent process is passed to the subprocess that uses it for
routing and decision-making. When the subprocess is complete, data from the subprocess is returned to the parent process.

To reach a subprocess, in this example, to reach the Process Order sub-process, click the Assignment icon beside the Process Order process. The Order Booking As-Is Process is displayed, as shown in Figure 5–21.

Figure 5–21 The Order Booking As-Is Process

This figure shows the he Order Booking As-Is Process model.

The Order Booking As-Is Process model includes the following steps:

- Create Order, Get Customer Information, and Get Credit Information automated steps.
- Approve Order by Supervisor.
- Fulfill Order by Clerk.
- The Approve Order step has two possible output paths, the approved path leads to Fulfill Order step and the not approved path leads to Cancel Order step.

The following is the flow of the Order Booking As-Is Process model:

1. The Order request from the Quote process triggers the "Process Order" flow
2. An Order is created and inserted into the Order Processing System. This includes the following steps:
   a. The status of the Order is set to "Pending."
b. The Input is the "Quote" and the output is the "Order.

c. This is an automated step.

d. The Fulfillment Clerk enters the order manually into the Order Processing system if the invocation of Order Processing service fails. This can happen if the Order Processing service is down or if the service returns "bad data" error.

e. The Customer information in the "Quote" is mapped to the Customer fields in the "Order".

3. The complete Customer record is retrieved by invoking the Customer service. This includes the following steps:

a. The input is the customer name and output is the Customer record.

b. The customer information is then manually entered by the Fulfillment Clerk if the invocation of Customer Service fails. This can occur if the Customer service is down or if the Customer record does not exist in the Customer system.

4. Credit check is then performed by invoking the Credit Rating service. This includes the following steps:

a. The input is the Customer record.

b. The output contains the credit rating information.

5. The order is further manually approved by the Supervisor.

6. If the order is approved, then it is sent to the Order Fulfillment process. This includes the following steps:

a. Once the order is fulfilled, the process sets the order status to complete, and sends a notification to the customer by e-mail with the purchase order information.

b. If the order is not approved, then the order is canceled and a notification is sent to the customer regarding order cancellation.

5.5 Associating Services in Oracle BPA Architect

This section describes how to associate services with automated process steps.

Service encapsulates technical or business function and is specified as a well-defined interface. The Service Implementation implements the interface of a service. A Business Service is an abstraction layer that denotes a service from a business perspective. It is coarse grained and represents a business function. It may or may not be associated with a Service Implementation. The Service Implementation in Oracle BPA Suite is also referred to as Software Service and is represented by an UML model of the WSDL file. An automated process step in a business process is associated with a Business Service and a specific operation. The automated process step invokes the underlying Application System through the Business Service.

You can associate services with automated process steps, by using any one of the following methods:

- Section 5.5.1, "Importing WSDL Files"
- Section 5.5.2, "Creating a UDDI Connection"
- Section 5.5.3, "Creating a WSIL Connection"
5.5.1 Importing WSDL Files

One of the ways to associate services with automated processes is by browsing the file system, and importing a WSDL file.

To import a WSDL file:

1. Right-click the Business Services folder in the Global Company folder in the navigation tree.
   A menu is displayed.
2. Select SOA, and then click Import service description, as shown in Figure 5–22.

*Figure 5–22 Importing Service Description*

![Importing Service Description](image)

This figure shows how to import the service description for a business service.

The Import Service dialog box is displayed.

3. Enter the following details in the Import Service dialog box, as shown in Figure 5–23.
   - **Name**: Enter Customer Service.
   - **Service URL**: Click Browse to select the CustomerService.wsdl file. This sample WSDL file is located in the samples folder provided with the Oracle BPA Architect.
Where do you want to insert the service information?: This field is automatically populated with the value Global Company\Business Services. Retain the default value.

Category: This is an optional field. Enter the category to which the service belongs. In this example, enter Customer.

Service Capabilities: Click Add to add the service capabilities. In this example, add the following capabilities:
- Add Customer
- Delete Customer
- Get Customer Information

Service description: Enter a description for the service. In this example, enter Customer-related operations.

Figure 5–23  The Import Service Dialog Box

This figure shows the Import Service dialog box where you enter the details of the service that you are importing.

4. Click OK.

A message stating that the WSDL import was successful is displayed, as shown in Figure 5–24.
Figure 5–24  A Message Stating that the WSDL import was Successful

This figure shows the message stating that the WSDL import was successful.

5. Click Close to close the message box.

You have successfully imported a WSDL file.

Note that a UML Component diagram is created in the Business Services folder.

The Access Diagram is the Business Service model, and the UML Component diagram is the associated Software Service model.


The CustomerService.wsdl diagram is displayed, as shown in Figure 5–25.

Figure 5–25  The CustomerServices.wsdl UML Component Diagram
5.5.2 Creating a UDDI Connection

Another way to associate services with automated processes is by creating a UDDI connection.

To create a UDDI connection:

1. From the View menu, click Options.
   The Options page is displayed, as shown in Figure 5–26.

   Figure 5–26  The Options Page
   ![Options Page](image)

   This figure shows the Options page.

2. Select Connections from the navigation tree in the left pane.
3. Click Add in the Connections pane, which is on the right side of the Options page.
   The Connection page is displayed, as shown in Figure 5–27.

   ![Connection Page](image)
4. Enter a name for the connection in the **Connection name** field, for example, **myConnection**, and then click **Next**.

   The Connection - Authentication page is displayed, as shown in **Figure 5–28**.

**Figure 5–28  The Connection - Authentication page**

5. Click **Next** without specifying any details in the Authentication page.

   The Connection - Connection page is displayed, as shown in **Figure 5–29**.
6. In the Connection page, select only UDDI, and then specify the following details:
   - In the **Host name** field, enter the host name.
   - In the **HTTP port** field, enter the port details.

7. Click **Next**.

   The Connection - Test connection page is displayed, as shown in Figure 5–30.

8. Click **Test** to test the connection.
No message is displayed if the connection is successful. However, an error message is displayed if the connection fails.

9. Click Finish.

You have created a UDDI connection.

5.5.3 Creating a WSIL Connection

Another way to associate services with automated processes is by creating a WSIL connection.

To create a WSIL connection:

1. Perform steps 1 through 5 mentioned in Section 5.5.2, "Creating a UDDI Connection."

   Note that the connection name must be unique. So, in Step 4 enter a name for the connection that is different from what you had specified for the UDDI connection.

2. In the Connection page, select WSIL and then specify the following:
   - In the Host name field, enter the host name.
   - In the HTTP port field, enter the port details.

   Figure 5–31 shows the Connection page in which the WSIL option is selected.

   ![Figure 5–31 The Connection - Connection Page](image)

   This figure shows the Connection - Connection page in which the WSIL option is selected.

3. To continue, perform steps 8 and 9 mentioned in Section 5.5.2, "Creating a UDDI Connection."

   You have created a WSIL connection.
5.6 Simulating the Process Model

This section describes how to simulate a process model. The process model provided with OBPA Release 11 Quick Start sample is called the Order Booking As-Is Process.

Process simulation is a quantitative process analysis. Simulation is performed to evaluate the following:

- Throughput and process analysis
- Activity-based costing
- Resource allocation

Thereby, simulation helps to:

- Improve and optimize process quality and performance
- Reduce process cost
- Discover weak points and bottlenecks
- Create benchmarks and compare process alternatives
- Quantify the impact of organizational changes (decision and argumentation support)
- Activity-based costing – determine the true cost of a product or service (to pinpoint money makers versus losers)

This section describes the benefits and the parameters for simulation. This section also describes how to create simulation for the process model.

This section includes the following:

- Section 5.6.1, "Benefits of Simulation"
- Section 5.6.2, "Simulation Parameters"
- Section 5.6.3, "Simulating the Order Booking As-Is Process Model"

5.6.1 Benefits of Simulation

Simulation in Oracle BPA Suite offers the following benefits:

- Offer simulation capabilities so that a Business Analyst or Developer can work with assumptions and predict ahead of time the behavior of the business processes to be executed under different conditions.
- Offers the ability to define multiple scenarios for a given process so that different conditions can be analyzed. This allows you to create different simulations based on different combinations of resource allocations and activity behavior.
- It offers the ability to run multi-process simulation. This is important because from a resource-contention perspective it is important to know the impact on the people working in multiple business processes.
- Offers round-trip simulation capabilities where it is possible to generate a process simulation model out of the actual execution time of instances flowing through a given process version.
- The simulation algorithm is based on discrete events that can process events in a serial fashion as they occur in time.
A process simulation does not execute the actual code of each activity within the process. However, by configuring parameters within the process and project simulation models, you can mimic the behavior of your business process.

5.6.2 Simulation Parameters

The following are the simulation parameters:

**Process Level**
This parameter includes the instantiation frequency or arrival rate of instances for a process, and the amount and rate of instances created in the process. This parameter is specified at Start event of a process.

**Activity Level**
The following are the activity level parameters for simulation:

- **Time Properties**
  This includes processing, orientation, and warm-up time distributions.

- **Cost**
  This includes the cost for activities.

- **Human Step**
  This includes the number of people allocated to each process participant role, shift calendars for the various people, holiday schedule, and skill levels for various people. A role/person can be allocated to more than one process and hence priority of a process is used to determine the order in which the role will carry out process-related tasks.

**Gateways (Routing)**
This includes the probability of one path versus the other. That is, the probability percentage of instances routed through the different outgoing transitions.

5.6.3 Simulating the Order Booking As-Is Process Model

In this section, you will perform throughput analysis of the Order Booking As-Is subprocess, and then identify critical paths and resource bottlenecks along the way. Every activity in the process model has a rich set of simulation attributes.

Simulating the process model includes the following tasks:

- Section 5.6.3.1, "Setting the Processing Time for All Activities"
- Section 5.6.3.2, "Setting the Cost Parameter for All Activities"
- Section 5.6.3.3, "Setting the Frequency for the Processes"
- Section 5.6.3.4, "Setting the Probability for Conditional Branches and Decision Points"
- Section 5.6.3.5, "Specifying Simulation Parameters for the Process Participants"
- Section 5.6.3.6, "Configuring the Simulation Run Options"
- Section 5.6.3.7, "Running the Simulation"
- Section 5.6.3.8, "Analyzing the Simulation Results of the Order Booking As-Is Process"
5.6.3.1 Setting the Processing Time for All Activities

Each activity is associated with a rich set of time parameters to indicate the following:

- **Processing Time**
  
  This is the actual time spent in the activity.

- **Wait Time**
  
  This is the wait time before a particular activity can commence after the previous activity has completed.

- **Orientation Time**
  
  This is the orientation time that can be one-time only or for a certain number of times or every time.

The simulation parameters also include a wide variety of cost-based parameters for performing activity-based costing analysis.

To set the time parameters for all process-related activities:

1. In this example, select **Order Booking As Is Process** in the Order Process folder located in the Process folder of the Quick Start project folder, as shown in Figure 5–32.

**Figure 5–32  Selecting the Order Booking As Is Process**

In this figure the Order Booking As Is Process is selected.

**********************************************************************************************
To set the simulation properties for all activities (human/automated/notification) at one time, right-click on any activity.


The Order Booking As Is Process model is displayed, as shown in Figure 5–33.

**Figure 5–33 The Order Booking As Is Process Model**

![Order Booking As Is Process Model](image)

This figure shows the Order Booking As Is Process model.

3. Right-click **Create Order** in the Order Booking As Is Process model.

   A menu appears.

4. Select **Select**, and then **Select all of this type**, as shown in Figure 5–34.
In this figure the Select > Select all of this type options are selected.

**All the related activities are selected.**

5. Press F8.

The Attributes page is displayed.

6. Select **Business Simulator attributes** in the Attributes navigation tree in the left pane.

The Attributes for the process-related activities is displayed, as shown in **Figure 5–35**.
This figure shows the Attributes page in which the processing time for all activities is displayed.

7. Set the processing time for all the activities. The time format is days: hours: minutes: seconds.

In this example, the default option of constant is selected for the processing time for all activities. You can choose a non-constant value and specify one of the seven statistical distributions available, as shown in the Figure 5–36.

You have set the processing time for all activities.
5.6.3.2 Setting the Cost Parameter for All Activities
This section describes how to set the cost parameters for all the activities.

To set the cost parameters for all the activities:

1. Perform Steps 1 through 5 mentioned in Section 5.6.3.1, “Setting the Processing Time for All Activities.”

2. In the Attributes page, select Total Costs under Costs.

   The Attributes page displaying the cost parameter for all the activities appears, as shown in Figure 5–37.

Figure 5–37 The Attributes Page - Setting the Cost Parameter

This figure shows the Attributes page in which the cost parameter for all activities is displayed.

**********************************************************************************************
You have set the cost parameter for all activities.

5.6.3.3 Setting the Frequency for the Processes
The next step is to specify the number of instances expected in a certain amount of time. The Start event of the process has Frequency attributes to specify the instantiation rate of the process.

To set the frequency for the processes:

1. Select Start in the Order Booking As Is Process model, and then press F8.

   The Attributes page is displayed.

2. Select Frequency in the Attributes navigation tree.

   The frequency attributes for the Start event is displayed, as shown in Figure 5–38.
This figure shows the frequency attributes of the Start event.

3. In this example, set the daily frequency to 100.

4. Click Save in the toolbar, and then click Close to close the Attributes page.
   
   You have set the frequency attribute for the Start event.

5.6.3.4 Setting the Probability for Conditional Branches and Decision Points

The Approve Order, which is a human activity can have two possible output paths - the happy path (where all the orders are approved) and the exception path (where none of the order is approved).

The probability parameter is used to capture the probability of taking the happy path versus the exception path. In the Global Company sample, the happy path is taken 80% of the time.

To set the probability parameter for the Approve Order activity:

1. Select the Not Approved conditional branch, and then press F8.
   
   The Attributes page is displayed.

2. Select Analysis attributes in the Attributes navigation tree, and enter 0.2 as the probability for the orders to be not approved, as shown in Figure 5–39.
Simulating the Process Model

Figure 5–39  Setting the Probability for the Not Approved Conditional Branch

This figure shows the Attributes page in which a probability of 0.2 is set for the Not Approved conditional branch.

3. Click Save, and then close.

4. Select the Approved conditional branch, and press F8 to open the Attributes page.

5. Select Analysis attributes in the Attributes navigation tree, and enter 0.8 as the probability for the orders to be approved.

   The paths are mutually exclusive and the sum of the probabilities across the paths is equal to 1 in the mutually exclusive case.

   You have set the probability for the conditional branches for the Approve Order activity.

5.6.3.5 Specifying Simulation Parameters for the Process Participants

The next step is to configure the number of people associated with the "Supervisor" and "Fulfillment Clerk" roles for the Approve Order and Fulfill Order human activities respectively.

---

**Note:** Process Participants, and person type refer to the roles involved in the human activities. For example, you can refer to the role of a Supervisor as a process participant, person type or role.

---

In the Global Company example scenario, there is one Supervisor and three Fulfillment Clerks. By default, the number of people associated with a role is set to 1.

**Setting the Number of People Associated with the Supervisor Role**

To set the number of people associated with the Supervisor role:
1. Double-click the FAD icon beside the Approve Order activity in the Order Booking As Is Process model.

The Approve Order activity appears in the Design view, as shown in Figure 5–40.

*Figure 5–40  The Approve Order Activity*

![Approve Order Activity Diagram]

This figure shows the Approve Order activity.

2. Select the Carries Out activity (the line that directly connects the Approve Order activity to Supervisor) in the Approve Order activity page.

   The Attributes page is displayed.

4. Select Business Simulator attributes in the Attributes navigation tree.
5. Enter 1 in the Number of required employees field, as shown in Figure 5–41.
Figure 5–41  Specifying the Numbers of Employee Required

This figure shows the Attributes page in which the No of required employees is assigned the value 1.

Note: By default the Number of required employees field is blank. By default, the value assuming is 1 when this field is left blank. However, you can explicitly specify 1.

6. Click Save, and the close.

You have set the number for the Supervisor role to 1.

Setting the Number of People Associated with the Fulfillment Clerk Role

To set the number of people associated with the Fulfillment Clerk role:

1. Double-click the FAD icon beside the Fulfill Order activity in the Order Booking As Is Process model.

The Fulfill Order activity appears in the Design view, as shown in Figure 5–42.
Figure 5–42  The Fulfill Order Activity

![Fulfill Order Activity Diagram]

This figure shows the Fulfill Order activity.

**********************************************************************************************

2. Select the Carries Out activity (the line that directly connects the Fulfill Order activity to the Fulfillment Clerk role) in the Fulfill Order activity page.

   The Attributes page is displayed.

4. Select Business Simulator attributes in the Attributes navigation tree.

5. Enter 3 in the Number of required employees field.
   You have set the number for the Fulfillment Clerk role to 3.

5.6.3.6 Configuring the Simulation Run Options

You have configured the process model for simulation. The next step is to run the simulation against the model. And to run the simulation, you must set the run-time parameters.

To set the run time parameters for the simulation:

1. From the Main menu, select View, and then Options.
   The Options page is displayed.

2. Select Models included under Simulation in the Selection navigation tree, as shown in Figure 5–43.
   The Models included section is displayed.
Figure 5–43 Selection Models for Simulation

This figure shows the Models included option selected under Simulation in the Section navigation tree. And on the right is the Models included section where you specify the models that you want to include for the simulation.

3. Select Assigned processes, up to assignment level, and set the value to 1.

4. Select Period under Simulation.
   The period section is displayed.

5. Select Relative, and set the duration in the Duration field to 3 days, as shown in Figure 5–44.
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**Figure 5–44 Setting the Time Period for the Simulation**

![Diagram showing simulation settings](image)

This figure shows the Period option selected under Simulation in the Selection navigation tree. And on the right is the Period section where you specify the duration for the simulation.

***********************************************************************************************

6. Select **Statistics** under Simulation.
   
   The Statistics section is displayed.

7. Select the following options:

   a. Select the following options under **Cumulative statistics**:

      - Functions (cumul.)/Activities (cumul.)

      This option is selected to find the time taken for each process steps in the Order Booking activity.

      - Processes (cumul.)

      This option is selected to find out how many process are successful, and how many are terminated.

      - Human Resources (cumul.)

      This option is selected to ascertain the degree of utilization of the human resources, such as the Supervisor and the Fulfillment Clerks.

      - Functional costs/Activity costs

      This option is selected to ascertain the cost involved for each process.

   b. Select **Weak point statistics** under **Other Statistics**.

      Selecting this options shows how many instances in the process are queued without having got processed.

**Figure 5–45** shows the options that you must select in the Statistics section.
**Figure 5–45 Selecting the Statistics for the Simulation**

This figure shows the Statistics selection under the Simulation in the Options page.

8. Select **General Animation** in the Animation option under Simulation.

   The General Animation section is displayed.

9. Perform the following steps in the General Animation section, as shown in Figure 5–46:
   
   a. Select **Activate animation**.

   b. Set the animation speed to **100%**.

   c. Under Model selection, select **Animate open models only**.
5.6.3.7 Running the Simulation

The next step is to run the simulation.

To run the simulation:

1. click the Start simulation button (shown in Figure 5–47) on the main toolbar.

Figure 5–47 The Start simulation Button

This figure shows the Start simulation button.

A simulation report stating the simulation is initialized is displayed at the bottom of the Oracle Business Process Architect window, as shown in Figure 5–48.

10. Click OK, and then click Save.

You have configured the run time parameters for the simulation.
Simulating the Process Model

Figure 5–48  Status Report Stating that the Simulation is Initialized

This figure shows the Simulation report stating that the simulation is initialized for the Order Booking process.

2. Click the Play button (shown in Figure 5–49) to start the simulation.

Figure 5–49  The Play Button

This figure shows the Play button that you must click to run the simulation.

The Start Simulation Options dialog box is displayed, as shown in Figure 5–50.

Figure 5–50  The Start Simulation Options Dialog Box

This figure shows the Start Simulation Options dialog box.

3. Click OK.
The simulation result is displayed.

### 5.6.3.8 Analyzing the Simulation Results of the Order Booking As-Is Process

This section describes how to analyze the processing time spent in the various activities and the throughput of the processes.

This section includes the following:

- Analyzing the Process Time of the Order Booking As-Is Process
- Analyzing the Throughput of the Order Booking As-Is Process

#### Analyzing the Process Time of the Order Booking As-Is Process

This section describes the total processing time spent in the various activities across 300 instances sent in a period of 3 working days.

To analyze the total processing time spent in the various activities:

1. In the Statistics section, click the **Activities (cumul.)** tab.

   The statistical result for each individual step is listed.

2. Scroll towards the right, and select all the values in the **Processing time sum** tab in the Activities (cumul.) tab, as shown in Figure 5–51.

   ![Figure 5–51 The Processing Time Spent for all Processes](image)

   This figure shows the processing time taken for all the processes in the Order Booking As-Is Process.

   The Processing time sum tab lists the total processing time spent in the various activities across 100 instances sent in a period of 3 working days.

3. Right-click while the Processing time column is still selected.

   A menu is displayed, as shown in Figure 5–52.
Simulating the Process Model

Figure 5–52  Selecting a Chart

This figure shows the menu that appears when you right-click the processing time column.

4. Select Generate column chart.

A column chart is generated in the Chart section, as shown in Figure 5–53.

Figure 5–53  The Column Chart of the Order Booking As-Is Process

This figure shows the column chart of the processing time spent in the various activities across 100 instances sent in a period of 3 working days.

Figure 5–53 shows the processing time displayed as a column chart. As you can see from the chart, considerable time is spent in Approve Order activity.

Analyzing the Throughput of the Order Booking As-Is Process

This section describes how to analyze the throughput of the process.

To calculate the throughput of the process:

1. In the Statistics section, click the Process (cumul.) tab.

The throughput of the process is displayed.

2. Observe the following results:
   - The total number of process instances is 301.
   - Completed process instances in 3 days is 142.
   - The total number of pending process instances is 156.
Figure 5–54 shows the throughput of the Order Booking As-Is Process.

**Figure 5–54  The Throughput of the Order Booking As-Is Process**

<table>
<thead>
<tr>
<th>Events (cumul.)</th>
<th>Activities (cumul.)</th>
<th>Gateways (cumul.)</th>
<th>Processes (cumul.)</th>
<th>Weak point statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Created processes</td>
<td>Completed process</td>
<td>Terminated process</td>
<td>Processed activities</td>
</tr>
<tr>
<td>Order Booking As Is Process</td>
<td>301</td>
<td>142</td>
<td>0</td>
<td>1,296</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>156</td>
</tr>
</tbody>
</table>

This figure shows the throughput of the Order Booking As-Is Process.

The simulation results reveal that the total number of pending orders at the end of the 3 days is 156, only about half the incoming orders are approved, and the total time taken for processing the order violates existing Service Level Agreements (SLAs) and degrades customer experience. Additionally, the cost incurred in the Approve Order process is the highest.

### 5.6.3.9 Managing Different Versions of the Order Booking As Is Process

Oracle Business Process Architect 11g supports creating multiple versions of the processes. Versioning can be done at all levels of granularity such as BPA project, models, and groups.

In Oracle Business Process Architect 11g, you can create new versions, view previous versions, and compare versions.

This section includes the following topics:

- Section 5.6.3.9.1, "Viewing Different Version of the Order Booking As Is Process Model"
- Section 5.6.3.9.2, "Creating a New Version of the Order Booking As Is Process Model"
- Section 5.6.3.9.3, "Navigating to Older Versions of the Order Booking As Process Model"

#### 5.6.3.9.1 Viewing Different Version of the Order Booking As Is Process Model

To view the different version of the Order Booking As Is Process:

1. Select the **Order Booking As Is Process** model in the **Explorer module**.
2. Click the **Versions** tab in the right pane.

The four versions of the Order Booking As Is Process model are displayed, as shown in Figure 5–55.
This figure shows the different versions of the Order Booking As Is Process model.

3. Right-click any version, and select **List information** to view the change list information for that version.

The Properties - change list dialog box displaying details about the modification made for the overall process as well as the individual process steps is displayed, as shown in **Figure 5–56**.

---

**Figure 5–55 The Different Versions of the Order Booking As Is Process Model**

**Figure 5–56 Viewing the Change List of the Versions**
4. After viewing the change details, click OK to close the Properties - Change list dialog box.

5. In the Version tab of the Order Booking As Is Process model, select any two version. For example, select version 2 and version 3 of the Order Booking As Is Process.

6. Right-click, and then select Compare, as shown in Figure 5–57.

**Figure 5–57 Comparing Two Versions of the Order booking As Is Process Model**

This figure shows how to compare two versions of the Order Booking As Is Process model.

Version 2 and Version 3 of the Order Booking As Is Process model are displayed.

7. Notice that in Version 3, the Approve Order step is followed by a conditional branch, as shown in Figure 5–58.
5.6.3.9.2 Creating a New Version of the Order Booking As Is Process Model

You can create versions of the process blueprints each time you share it with the IT. To create a new version of the Order Booking As Is Process Model:

1. Right-click the Order Booking As Is Process model, and select Version in the menu that appears.

The Versioning Wizard appears, as shown in Figure 5–59.
2. Select the **Order Booking As Is Process model** in the Select models pane of the Versioning Wizard, and then click **Next**.

   The Versioning Wizard - Description page is displayed.

3. Enter a description for the version in the **Description** field, and then click **Finish**.

   You have created a new version of the Order Booking As Is Process model.

### 5.6.3.9.3 Navigating to Older Versions of the Order Booking As Process Model

To navigate to older versions of the Order Booking As Process model:

1. In the Explorer module, right-click the version of the Order Booking As Is Process model that you want to navigate to. In this example, select **Version 2**.

   A menu appears.

2. Click **Open**.

   The version of the Order Booking As Is Process model that you selected is displayed in the Designer module, as shown in **Figure 5–60**.
Figure 5–60  Viewing an Older Version of the Order booking As Is Process Model

This figure shows the Version 2 of the Order Booking As Is Process model.

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5.6.4 Generating Simulation Reports

You can generate reports for the simulation that you created. A report presents the simulation result in a format that is easier to understand than the bar chart. Also it provides more information about the result.

To generate simulation reports:

1. Select all the process in the Order Booking As-Is Process (in Design view.)

2. Click the Start simulation button.

   The simulation is initialized.

3. Click the Start button to start the simulation.

   The Start Simulation Options dialog box is displayed.

4. Select Use current attributes, and then select Order booking as normal, as shown in Figure 5–61.

   Note: The lock icon before the title of the version denotes that this version is locked. All older versions are locked, which means that they are meant only for read-only purpose. To restore the current version to the older version, you must export the old version, and the import it as the current version.
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Figure 5–61 The Start Simulation Options Dialog Box

This figure shows the Start Simulation Options dialog box.

5. Click OK.

The simulation is completed.

6. From the SOA menu, click Analyze simulation results, as shown in Figure 5–62.

The Analyze Simulation Results dialog box is displayed.

Figure 5–62 Selecting the Analyze simulation results Option

In this figure the Analyze simulation results option is selected from the SOA menu.

7. Enter a name for the result in the Analyze Simulation Results dialog box, as shown in Figure 5–63, and then click OK.
5.7 Modeling the Future Process

This section describes how to create a model process for the future that will address the drawbacks faced by the current mode (the Order Booking As Is process). In this section you will create a future model to enhance the process to yield optimum results.

The future model process provided with the OBPA Release 11 Quick Start sample is called the Order Booking To-Be Process.

All the results that you noticed in the Order Booking As-Is Process imply that the Approve Order activity requires improvement because it consumes most of the time, resource, and cost.
The following are the two possible solutions for improving the Approve Order activity:

- By reducing the frequency of the "Approve Order" step where possible. This would reduce the cost incurred and the time spent on this activity, thereby improving the whole Order Booking process.
  
  In a normal scenario, about 80% of the customers have good credit rating and there is no requirement to have a manual approval for customers with good credit rating. Given this case, you can reduce the frequency of the "Approve Order" step to a great extent.

- Increase the number of people associated with the Supervisor role but this would have cost implications.

It is obvious that the option of reducing the frequency of the Approve Order step is the best solution. In addition to by passing the Approve Order process for customers with good credit rating, the business analyst in conjunction with the other business stakeholders came up with the following business policies:

- Platinum customers with orders < $10,000 do not require manual approval.
- Gold customers with orders < $5,000 do not require manual approval.

Modeling the future process (the Order Booking T-Be process) includes the following steps:

- Section 5.7.1, "Creating the Future Model From the Existing Order Booking As Is Process Model"
- Section 5.7.2, "Setting the Probability for Conditional Branches and Decision Points"
- Section 5.7.3, "Running the Simulation"
- Section 5.7.4, "Analyzing the Simulation Results of the Order Booking To-Be Process"

### 5.7.1 Creating the Future Model From the Existing Order Booking As Is Process Model

This section describes how to create the future model (Order Booking To Be Process model) from the existing Order booking As Is Process model.

Note that in the OBPA Release 11 Quick Start sample, the Order booking As Is Process Model is already created for your use. This section is intended to take you through the steps that were followed to arrive at the future model (Order Booking To Be Process model) from the existing Order booking As Is Process model.

Table 5–1 lists the steps that you must follow to create the Order Booking To Be Process model (Order Booking To Be Process model) from the existing Order booking As Is Process model.
### Table 5–1 The Steps for Creating the Future Model

<table>
<thead>
<tr>
<th>Step</th>
<th>Screen/Page</th>
<th>Task</th>
</tr>
</thead>
</table>
| 1    | Business Process Architect | Perform the following tasks:  
1. Navigate to Simulation Scenarios folder in the Processes folder, and then right-click the **Order Booking As Is Process [Business process diagram (BPMN)]**.  
2. Select the **Copy** option.  
3. Right-click the **Simulation Scenarios** folder and select the **Paste** option.  
The Order Booking As Is Process (1) [Business process diagram (BPMN)] is created.  
4. Rename this process to **Order Booking To Be Process**. |
|      | Business Process Architect | After creating the **Order Booking To Be Process** process, perform the following steps:  
1. Double-click the **Order Booking To Be Process** process.  
The Order Booking To Be Process process opens in the Designer view.  
2. Click and paste an XOR (data-based) symbol in the Supervisor lane after the **Get Credit Information** activity. |
|      | Object Properties: Attributes | After pasting the gateway object, perform the following steps:  
1. Right-click the gateway object, and click **Properties** from the menu that appears.  
The Object properties dialog box is displayed.  
2. Enter **Manual Approval Required?** in the **Name** attribute field. |
|      | Object Properties: Add attributes | After entering the name in the Name attribute field, perform the following steps:  
1. In the Object properties dialog box, select **Attribute placement (objects)** under Format.  
2. Click the **Add** button in the Attribute placement (objects) section.  
The Add attributes dialog box is displayed.  
3. Select the **Show maintained attributes only** option.  
A complete list of attributes associated with the **Manual Approval Required?** object is displayed.  
4. Select **Name**, and then click **OK**.  
The Name attribute is added to the Placed attributes list in the Object Properties dialog box. |
|      | Attribute placement (objects) | To select where to place the Name attribute, select the centre-most square in the Placement section in the Object Properties dialog box. |
5.7.2 Setting the Probability for Conditional Branches and Decision Points

This section describes how to set the probability and the condition expression for the Approve Order activities that require manual approval.

To set the condition expression and probability parameter for the Approve Order activity:

1. Double-click Order Booking To Be Process (Business Process Diagram) under the Simulation Scenarios folder in the Order Booking folder, as shown in Figure 5–65.
This figure shows how to select the Order Booking To Be Process from the Order Booking folder.

2. The Order Booking To-Be Process opens in the Designer view, as shown in Figure 5–66.
3. Select the Yes conditional branch that connects the Manual Approved Required condition to the Approve Order activity.

   The Assignment dialog box is displayed.

5. Select BPMN in the Attributes navigation tree.
   The condition expression for the Yes conditional branch is displayed in the right pane, as shown in Figure 5–67.
This figure shows the condition expression for the Yes conditional branch of the Approve Order activity.

Note: The condition expression displayed in Figure 5–67 is already created in the sample. However, you can create your own condition expression.

6. Click Close to close the Assignment dialog box.

You have created a conditional expression, which when matched would require manual approval.

7. To set the probability for manual approval, click Analysis attributes in the Attributes dialog box.

8. Notice that the probability set for a manual approval of the Approval Order process is 0.1, as shown in Figure 5–68.
5.7.3 Running the Simulation

Follow the same steps as mentioned in Section 5.6.3.7, "Running the Simulation."

5.7.4 Analyzing the Simulation Results of the Order Booking To-Be Process

This section describes how to analyze the processing time spent in the various activities and the throughput of the processes.

This section includes the following:

- Analyzing the Process Time of the Order Booking To-Be Process
- Analyzing the Process Time of the Order Booking To-Be Process

Analyzing the Process Time of the Order Booking To-Be Process

This section describes the total processing time spent in the various activities across 300 instances sent in a period of 3 working days.

To analyze the total processing time spent in the various activities:

1. In the Statistics section, click the Activities (cumul.) tab.
   
   The statistical result for each individual step is listed.

2. Scroll towards the right, and select all the values in the Processing time sum tab in the Activities (cumul.) tab, as shown in Figure 5–69.
Figure 5–69  The Processing Time Spent for all Processes

This figure shows the processing time taken for all the processes in the Order Booking To-Be Process.

The Processing time sum tab lists the total processing time spent in the various activities across 100 instances sent in a period of 3 working days.

3. Right-click while the Processing time column is still selected.
   A menu is displayed.

4. Select Generate column chart.
   A column chart is generated in the Chart section, as shown in Figure 5–70.

Figure 5–70  The Column Chart of the Order Booking To-Be Process

This figure shows the column chart of the processing time spent in the various activities across 100 instances sent in a period of 3 working days.

Figure 5–72 shows the processing time displayed as a column chart. As you can see from the chart, considerable time is spent in Approve Order activity.

Analyzing the Throughput of the Process

This section describes how to analyze the throughput of the process.

To calculate the throughput of the process:

1. In the Statistics section, click the Process (cumul.) tab.
Performing Simulation Experiment

The throughput of the process is displayed.

2. Observe the following results:
   - The total number of process instances is 301
   - Completed process instances in 3 days is 298
   - The total number of pending process instances is 0.

   Figure Figure 5–71 shows the throughput of the process.

**Figure 5–71 The Throughput of the Order Booking To-Be Process**

This figure shows the throughput of the Order Booking To-Be Processes.

You can notice that the number of completed process has risen to 298 from 142, which is an improvement. Also notice that the process in waiting is zero.

However, simulation results of the Order Booking To-Be process show that the time taken and the cost incurred for the Fulfillment order activity is high, and must be reduced.

5.8 Performing Simulation Experiment

Modeling and simulation are iterative activities. Further improvements can be introduced to reduce time spent in Fulfill Order and this cycle of modeling and simulation leads to continuous process improvements.

Instead of creating a new model each time, you can experiment with the same model by varying the factors, thereby arriving at the right set of factors that yield optimum results.

This section describes how to perform simulation experiment. In this section you vary the load of the incoming instances, and the number of people associated with the Fulfillment Clerk role. And then you select the responses, such as the number of process created, completed, and the degree of utilization of the Fulfillment Clerk that you get after making the variations.

To start a simulation experiment:

1. Click the Start simulation experiment button from the main menu.

   Figure 5–72 shows the Start simulation experiment button.

**Figure 5–72 the Start simulation experiment Button**
Performing Simulation Experiment

This figure shows the Start simulation experiment button.

The Experiment Wizard is displayed, as shown in Figure 5–73.

Figure 5–73 The Experiment Wizard

2. Select Experiment with factor variation, and then select New experiment.
3. Click Next.

The Select database section is displayed, as shown in Figure 5–74.

Figure 5–74 The Select database Section

This figure shows the Select database section of the Experiment Wizard page.
4. Accept the default values, and then click Next.
   The Select model section is displayed, as shown in Figure 5–75.

**Figure 5–75  The Select model Section of the Experiment Wizard Page**

This figure shows the Select model section of the Experiment Wizard page.

5. Select Order Booking To Be Process in the Models list, and then click Next.
   The Select factors section of the Experiment Wizard page is displayed, as shown in Figure 5–76.

**Figure 5–76  The Select factors Section of the Experiment Wizard Page**

This figure shows the Select factors section of the Experiment Wizard page.
6. Click **Add factor**.

The Select objects dialog box is displayed, as shown in **Figure 5–77**.

*Figure 5–77  The Select objects Dialog Box*

This figure shows the Select objects dialog box.

7. Scroll down the list of objects, select **Fulfillment Clerk**, and then click **Add**.

The Fulfillment Clerk object is appended in the Select factors section, as shown in **Figure 5–78**.

*Figure 5–78  Adding the Fulfillment Clerk Object*

In this figure the Fulfillment Clerk object is added in the Select factors section.

8. Change the value in the **High** column for the Fulfillment clerk to 6.
9. Follow Step 7 and add the **Start** object.

10. Change the following values for the Start object in the **Select factors** section:
   - In the **Attributes** list, Select **Frequency, daily**.
   - In the **High** column, enter **1000**.
   - In the **Step** column, enter **250**.

   **Figure 5–79** shows the Select factors section of the Experiment Wizard page after you have added the Fulfillment Clerk object and the Start object, and after you have modified their values.

   **Figure 5–79 The Select factors section of the Experiment Wizard Page**

![Select factors section](image)

This figure shows the Select factor section of the Experiment Wizard page after you have added the Fulfillment Clerk object and the Start object, and after you have modified their values.

*******************************************************************************

11. Click **Next**.

   The Select responses section of the Experiment Wizard page is displayed, as shown in **Figure 5–80**.

   You specify the kind of response that you want in the Select responses dialog box.
Performing Simulation Experiment

**Figure 5–80  The Select responses Section of the Experiment Wizard Page**

This figure shows the Select responses section of the Experiment Wizard page.

12. Click **Add model**.

   The **Select models** dialog box is displayed, as shown in **Figure 5–81**.

**Figure 5–81  The Select models Dialog Box**

This figure shows the Select models dialog box.

13. Select **Order Booking To Be Process**, and then click **Next**.

   The Order Booking To Be Process model appears in the Select responses section of the Experiment Wizard page, as shown in **Figure 5–82**.
Performing Simulation Experiment

Figure 5–82 Adding the Order Booking To Be Process Model

This figure shows the Order Booking To Be process model added in the Select response section.

14. Click Add model, and add the Order Booking To Be Process model again.

15. In the Response list in the Select response section, select Completed processes for the second instance of the Order Booking To Be Process model, as shown in Figure 5–83.

Figure 5–83 Specifying the Responses

This figure shows the Order booking To Be Process with the Completed Process as response.

16. Click Add object.
Performing Simulation Experiment

The Select objects dialog box is displayed.

17. Select **Fulfillment Clerk**, and then click **Add**.

The Fulfillment Clerk object is added in the Select responses section of the Experiment Wizard page.

18. Select **Degree of utilization** in the **Response** list.

*Figure 5–84* shows the Select response section of the Experiment Wizard page after you have added the Order Booking To Be Process model (twice), and the Fulfillment Clerk object.

*Figure 5–84  The Select response Section of the Experiment Wizard Page*

This figure shows the Select response section of the Experiment Wizard page.

19. Click **Next**.

The **Select output options** section of the Experiment Wizard page is displayed.

20. Perform the following in the **Select output options** section:

- Specify the name and location to save the experiment in the **Save Output as** field. In this example, save the experiment as *OrderBooking_ToBe_Experiment_Results*.

- Select **Display experiment results**.

- Select **Create Statistics**.

- Click **Save experiment** to save the experiment with the varying factors that you provided. For example, you can save the file with a file name, *OrderBooking_FulfillmentClerk_Frequency_Experiment*.

21. Click **Finish**.

The experiment results opens as a worksheet, as shown in *Figure 5–85*. 
Transforming a Business Process into a BPEL Process

5.9 Transforming a Business Process into a BPEL Process

The business process models are abstract and have to be implemented before they can be realized. Once business decides that a specific version of the process model is ready for implementation, the model is marked for IT implementation and saved in the Business Process Repository.

The blueprint can now be used to create a BPEL process in Oracle JDeveloper. For more information on using the Blueprint Editor in Oracle JDeveloper, see Chapter 6 - Using Process Blueprints in JDeveloper.

BPEL transformation generates Process Blueprint and associated skeletal BPEL code. The IT developer needs to add implementation details to the BPEL code to convert it into an executable process that can be deployed on the run-time engine (BPEL Process Manager).

The transformation a business process into a BPEL process comprises the following:

- Notification Services are transformed into a Business Scope upon BPEL transformation. The corresponding Notification service as well as the BPEL artifacts for invoking the Notification service are created within the business scope.
- Human tasks are converted to a human workflow business scope upon BPEL transformation. The Task Service gets automatically generated as well as the BPEL

This figure shows the Order Booking To Be Process experiment results.

You have created an experiment for the Order Booking To Be Process with varying factors to determine how to reduce the time and cost involved for the Fulfillment Clerk role in the Approval Order activity.
artifacts for invoking the Task service also gets generated. The Notification/Reminder notes get translated to business annotations.

- Automated activities are converted to a business scope upon BPEL transformation.
- Business Service is converted to a Partner Link upon BPEL transformation. If the Business Service is associated with a concrete WSDL, it is converted to a concrete Partner Link. Otherwise, it is converted into an abstract Partner Link. If Represented by is set to "invoke", an invoke activity is created inside the business scope and is linked to the Partner Link. If Represented by is set to "receive", a receive activity is created inside the business scope and is linked to the Partner Link. The Sensor definition is converted in to a business annotation.
- XOR, AND and OR gateways are converted to switch and case statements upon BPEL transformation.
- All Business Data in the Business Process Diagram are converted to Variables upon BPEL transformation. If the Business Data is associated with an XSD, the XSD is exported and the Variable in the BPEL skeletal process generated is then set to the XSD type. Otherwise, the Variables are set to String type.
- Business Rules are converted into a Decision Service. The free text in the Rules field is converted into business annotation.

To make a blueprint available for use in the Blueprint Editor in Oracle JDeveloper, while viewing or editing an EPC or BPMN diagram in Oracle BPA:

1. Go to the Designer module, and select the Order Booking To Be Process model.
2. From the SOA menu, click Share Blueprint with IT.

   The Information dialog box asking you to confirm if validation is required is displayed, as shown in Figure 5–86.

   **Figure 5–86  The Information Dialog Box**

   ![Information Dialog Box](image)

   This figure shows the Information dialog box.

   ***********************************************************************************************

3. Click Yes.

   An HTML report of the validation is displayed in the Web Browser. This step automatically highlights the semantic errors in the model and guides the user in fixing the errors.

   The Share Blueprint with IT dialog box is displayed, as shown in Figure 5–87.
4. In the **Description** field, enter a description for the blueprint. For example, *This is the 1st version of the Order Booking To Be Process Blueprint*.

5. Click **OK**.

   Note that by default **Asynchronous** is selected. Retain this selection.

   The Message dialog box stating that the transformation was successful is displayed, as shown Figure 5–88.

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**Figure 5–87**  *The Share Blueprint with IT Dialog Box*

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**Figure 5–88**  *The Message Dialog Box*

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You have created a BPEL transformation that generates Process Blueprint and associated skeletal BPEL code.
This chapter describes how Information Technology (IT) developers connect to the Business Repository within the Oracle JDeveloper - BPEL Process Designer (the IT tool) and access the business process model that was shared in Section 5.9, "Transforming a Business Process into a BPEL Process".

The business process model is used as a starting point to generate the BPEL implementation model. This chapter also describes how to generate an executable BPEL model based on the BPMN process model that you created and simulated in the previous chapters.

In addition, this chapter describes the steps to work with the OBPASuite_R11_Quickstart_CompletedBPEL process model in Oracle JDeveloper.

This chapter includes the following sections:

- Section 6.1, "Prerequisites"
- Section 6.2, "Opening the BPEL Implementation Model"
- Section 6.3, "Setting the Input Message of the Order Booking Process"
- Section 6.4, "Understanding the BPEL Implementation of the Create Order Process"
- Section 6.5, "Understanding the BPEL Implementation of the Get Customer Information Process"
- Section 6.6, "Understanding the BPEL Implementation of the Get Credit Information Process"
- Section 6.7, "Understanding the BPEL Implementation of the Manual Approval Required Activity"
- Section 6.8, "Understanding the BPEL Implementation of the Fulfill Order Activity"
- Section 6.9, "Understanding the Update_Order Scope"
- Section 6.10, "Understanding the End_2 Scope"

6.1 Prerequisites

This section describes the prerequisites for implementing the Order_Booking_To_Be_Process BPEL process. However, in your case, a complete implementation of the Order_Booking_To_Be_Process BPEL process is available in the samples folder that you get with the Oracle Business Process Architect.
6.2 Opening the BPEL Implementation Model

To open the BPEL implementation model, double-click the OBPA_R11_QuickStart_BPEL_Project.jws file located in the samples folder.

The OBPA_R11_QuickStart_BPEL_Project project opens in Oracle JDeveloper.

6.3 Setting the Input Message of the Order Booking Process

The input to the Order Booking process is PurchaseOrder and is captured in the OrderBookingPO.xsd file provided in the samples folder. So, you must set the input message of the Order_Booking_To_Be_ProcessRequestMessage process to the PurchaseOrder type.

To set the input message of the Order_Booking_To_Be_ProcessRequestMessage process to the PurchaseOrder type:

1. Double-click Order_Booking_To_Be_Process.bpel listed under the OrderBookingProcess project.

The Order_Booking_To_Be_Process BPEL process opens in the BPA view by default, as shown in Figure 6–1.
Figure 6–1 The Order_Booking_To_Be_Process BPEL Process - BPA View

This figure shows the Order_Booking_To_Be_Process BPEL process in BPA view.

The Structure of the Order_Booking_To_Be_Process BPEL process appears on the lower half on the left side in the Oracle JDeveloper window.

2. Select BPEL from the Available Views menu.

The Order_Booking_To_Be_Process BPEL process appears in the BPEL view, as shown in Figure 6–2.
Figure 6–2  The Order_Booking_To_Be_Process BPEL Process - BPEL View

This figure shows the Order_Booking_To_Be_Process BPEL process in BPEL view.

3. From the View menu, click Structure to view the structure of the Order_Booking_To_Be_Process BPEL process.

4. In the Structure window, select payload under Order_Booking_To_Be_ProcessRequestMessage, as shown in Figure 6–3.
This figure shows the structure of the Order_Booking_To_Be_Process BPEL process.

5. Right-click payload, and click Edit Message Part from the menu that appears.
   The Edit Message Part - payload dialog is displayed, as shown in Figure 6–4.

This figure shows the Edit Message Part - payload dialog.

6. Click the Browse Elements icon at the end of the Element field.
   The Type Chooser dialog is displayed.

7. Click the Import Schema File icon, which is the first of the two icons located on the top right corner of the Type Chooser dialog.
   The Import Schema File dialog is displayed, as shown in Figure 6–5.

This figure shows the Import Schema File dialog.
8. Click the **Browse Resources** icon located at the end of the URL field. The SOA Resource Browser dialog is displayed.

9. Select **OrderBookingPO.xsd**, as shown in Figure 6–6 and then click **OK**. The Import Schema File dialog is displayed, with the URL field populated.

![Figure 6–6 The SOA Resource Browser Dialog](image)

This figure shows the SOA Resource Browser dialog in which the OrderBookingPO.xsd file is selected.

10. Click **OK** to close the Import Schema File dialog. The Type Chooser dialog is displayed again.

11. Select **PurchaseOrder** under OrderBookingPO.xsd in the Project Schema Files folder, as shown in Figure 6–7.
Figure 6–7  The Type Chooser Dialog

This figure shows the Type Chooser dialog, with the Purchase Order schema file selected.

12. Click OK to close the Type Chooser dialog.

13. Click OK to close the Edit Message Part - payload dialog.

You have set the input message of the Order_Booking_To_Be_ProcessRequestMessage process to the PurchaseOrder type.

6.4 Understanding the BPEL Implementation of the Create Order Process

This section describes the Create Order Process. Understanding the Create Order process includes the following steps:

- Section 6.4.1, "Viewing the Create Order Process"
- Section 6.4.2, "Getting a Unique Order ID"
- Section 6.4.3, "Processing the Order"
- Section 6.4.4, "Creating the Get_Order_Id Embedded Scope Within the Create_Order Scope"
- Section 6.4.5, "Creating the Set_order_id Assign Activity"
- Section 6.4.7, "Creating a Transform Activity"

6.4.1 Viewing the Create Order Process

This section describes how to navigate to the Create Order process and view it.

To view the Create Order process:

1. Double-click the Create_Order BPEL scope.

The Create Order process is displayed, as shown in Figure 6–8.
6.4.2 Getting a Unique Order ID

This section describes how to get a unique order ID. Before you can insert order information in the ORDERS table in the database, you must retrieve an order ID from the database. The order ID is generated from a database sequence.

In this example, a unique OrderId must be generated before inserting the Order record. The Order table is part of the BPMDemo schema located in the samples folder.

The Order records are written to the database tables that are precreated. You use an Oracle Database Adapter for writing the order information to the ORDERS table in the database. During run time, the database adapter connects to the database through the eis/DB/bpmdemo connection. (This run-time connection has been preconfigured during the installation and configuration time). Before entering the Order in the ORDERS table, you must generate a unique identifier for the Order Id. In the completed BPEL implementation that you receive with the BPA CD, a unique identifier for the Order id is already generated.

To generate a unique identifier for the Order Id:

1. From the View menu, click Component Palette, as shown in Figure 6–9.
Figure 6–9  Selecting Component Palette from the View Menu

The Component Palette appears on the right side of the Oracle JDeveloper window.

2. From the Component Palette, under BPEL Services, drag and drop Partner Link (Web Services/Adapters) to the Partner Links swimlane. The Create Partner Link dialog is displayed.

3. Click the Define Service icon.

The Adapter Configuration Wizard Welcome page is displayed, as shown in Figure 6–10.
4. Click Next.
   The Service Name page is displayed.
5. Enter OrderSequence in the Service Name field, as shown in Figure 6–11.

Figure 6–10  The Adapter Configuration Wizard - Welcome Page

This figure shows the Adapter Configuration Wizard - Welcome page.

Figure 6–11  The Adapter Configuration Wizard - Service Name Page

This figure shows the Adapter Configuration Wizard - Service Name page.
This figure shows the Adapter Configuration Wizard - Service Name page.

6. Click **Next**.

   The Service Connection page is displayed.

7. Click the **Create a New Database Connection** icon.

   The Create Database Connection dialog is displayed.

8. Enter the details mentioned in the following table in the Create Database Connection dialog:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value to Be Entered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Name</td>
<td>BPAQuickStart</td>
</tr>
<tr>
<td>Connection Type</td>
<td>Oracle (JDBC)</td>
</tr>
<tr>
<td>Username</td>
<td>bpmdemo</td>
</tr>
<tr>
<td>Password</td>
<td>ORACLE</td>
</tr>
<tr>
<td>Host Name</td>
<td>localhost</td>
</tr>
<tr>
<td>SID</td>
<td>XE</td>
</tr>
</tbody>
</table>

9. Click **Test Connection**.

   A success message is displayed in the Status pane.

   Figure 6–12 shows the Create Database Connection dialog, with all the fields filled in.

**Figure 6–12 The Create Database Connection Dialog**
This figure shows the Create Database Connection dialog, with all the details filled in.

10. Click **OK**.

   The Connection field is populated with the **BPAQuickStart** connection, and the JNDI field is populated with **eis/DB/BPAQuickStart**.

11. Click **Next**.

   The Operation Type page is displayed, as shown in Figure 6–13.

*Figure 6–13  The Adapter Configuration Wizard - Operation Type Page*

This figure shows the Adapter Configuration Wizard - Operation Type page.

12. From the list of operation types, select **Execute Pure SQL**, and then click **Next**.

   The Adapter Configuration Wizard - Custom page is displayed.

13. Enter the following SQL statement in the SQL field:

   ```sql
   select order_seq_id_gen.nextval from dual
   ```

   The XSD field is automatically populated with the appropriate SQL statements, as shown in Figure 6–14.
This figure shows the Adapter Configuration Wizard - Custom SQL page, with the SQL and the XSD fields populated with SQL statements.

14. Click Next.

The Advanced Options page is displayed, as shown in Figure 6–15.
This figure shows the Adapter Configuration Wizard - Advanced Options page.
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15. Retain the default values, and then click **Next**.
   The Finish page is displayed.

16. Click **Finish**.
   You have finished defining a Database Adapter to fetch the unique order ID.
   The Create Partner Link dialog is displayed, with all the fields populated, as shown in **Figure 6–16**.

**Figure 6–16  The Create Partner Link Dialog**

This figure shows the Create Partner Link dialog, with all the details of the OrderSequence Database Adapter.
**********************************************************************************************

### 6.4.3 Processing the Order

This section describes how to process the order after fetching the unique **Order Id**.

After fetching the unique **Order Id**, the next step is to insert the Order record into the **ORDERS** table. To achieve this, you must create another Database Adapter. In this example, you will create a Database Adapter, **Order_Processing_Service**.

To create the **Order_Processing_Service** Database Adapter:

1. Repeat Step 1 through Step 4 mentioned in **Section 6.4.2, "Getting a Unique Order ID."**

2. In Step 5, enter **Order_Processing_Service**.

3. Repeat Step 6 through Step 11 mentioned in **Section 6.4.2, "Getting a Unique Order ID."**

4. In the Operation Type page, select **Insert or Update (Merge)** under Perform an Operation on a Table to insert or update rows in the table.

5. Click **Next**.
   The Select Table page is displayed.
6. Click the **Import Tables** button.
   The Import Tables dialog is displayed.

7. Click **Query**.
   A list of the available Tables in the **BPMDEMO** schema is listed in the Available field, as shown in **Figure 6–17**.

**Figure 6–17  The Import Tables Dialog**

![Import Tables Dialog](image)

This figure shows the Import Tables dialog, with the list of tables listed in the Available field.

8. Select **ORDERS** and **ITEMS**, and then click the right arrow to move them to the Selected box.

9. Click **OK**.
   The database adapter will write to these tables.

10. Select **ORDERS** as the root database table for the query and then click **Next**.
    The Relationships dialog displaying the relationships defined between the two tables appears.

11. Click **Next**.
    The Attribute Filtering dialog is displayed, as shown in **Figure 6–18**.
**Figure 6–18  The Adapter Configuration Wizard - Attribute Filtering Dialog**

This figure shows the Adapter Configuration Wizard - Attribute Filtering dialog.

12. Accept the default values, and then click **Next**.

   The Advanced Options page is displayed.

13. Accept the default values, and then click **Next**.

   The Finish page is displayed.

   You have created a Database Adapter to process the order.

14. Click **Finish**.

   The Create Partner Link dialog is displayed with all the fields populated, as shown in Figure 6–19.
6.4.4 Creating the Get_Order_Id Embedded Scope Within the Create_Order Scope

This section describes how to create the Get_Order_Id scope within the Create_Order scope.

To create the Get_Order_Id scope:

1. Expand Create_Order scope.
2. In the Component Palette, select **BPEL Activities and Components** from the drop down menu, and then drag and drop the **Scope** icon inside Create_Order scope.
3. Name the new scope **Get_Order_Id**.
4. Delete the empty **Create_Order** activity within the Create_Order scope.
5. Expand the **Get_Order_Id** scope, and then drag and drop an invoke activity inside the Get_Order_Id scope in the **Drop Activity Here** area.
6. Point the Invoke activity to the **OrderSequence** service, using the arrow on the left side of the Invoke activity.
7. Click the **Automatically create Input variable** icon at the end of the Input field.
8. Enter **Get_Order_Id_OrderSequence_InputVariable**, as shown in **Figure 6–20**, and then click **OK**.

---

**Figure 6–19 The Order Process Partner Link**

This figure shows the Create Partner Link dialog, with all the fields populated.

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9. Click the **Automatically create Output variable** icon at the end of the Input field. The Create Variable dialog is displayed.

10. Enter `Get_Order_Id_OrderSequence_OutputVariable`, and then click **OK**. Figure 6–21 shows the Invoke dialog after you have entered all the details.

### 6.4.5 Creating the Set_order_id Assign Activity

In this step, you will assign a unique **Order Id** and set it as input to the Order Service. This activity creates the following two values for insertion into the database:

- It sets the order ID that was returned from the `Get_Order_Id` Invoke activity.
- It sets the order status to "pending."

To create the **Set_order_id** Assign activity:

1. Drag and drop an **Assign** activity from the **Component Palette** below the `Get_Order_Id` Invoke activity in the **Create_Order** scope.
2. Rename the Assign activity to `set_order_id`.

3. Double-click the Assign activity.
   The Assign dialog is displayed.

4. In the **Name** field under the **General** tab, enter `set_order_id`, as shown in Figure 6–22.

   **Figure 6–22 The Assign Dialog.**

   ![Assign dialog image]

   This figure shows the Assign dialog.

5. Click the **Copy Operation** tab in the Assign dialog.

6. Click the plus icon, and then click **Copy Operation** from the menu that is displayed, as shown in Figure 6–23.

   **Figure 6–23 Selecting the Copy Operation**

   ![Assign dialog with Copy Operation selected]

   This figure shows how Copy Operation is selected in the Assign dialog.
The Create Copy Operation dialog is displayed.

7. In the From section, select variable NEXTVAL, and in the To section, select variable ID, as shown in Figure 6–24.

**Figure 6–24  Configuring the Copy Operation.**

8. Click OK.

9. Click the plus (+) icon, and then click Copy Operation from the menu that is displayed to create another copy operation.

10. In the From section, select Expression from the Type drop down menu.

11. In the Expression section, enter "Pending" (within the double quotation marks.)

12. In the To Section, select OrderComments under OrderInfo, as shown in Figure 6–25.
13. Click OK.

14. Click OK to complete the Assign activity.

You have created the `set_order_id` Assign activity. Figure 6–26 shows the Assign dialog, with all the details of the `set_order_id` activity filled in.
6.4.6 Inserting the Order Information into the Database

The next step is to create an Invoke activity to insert the Order information into the database.

To create an Invoke activity:

1. Drag and drop Invoke from the BPEL Services menu in the Component Palette below the set_order_id Assign activity.
2. Double-click the Invoke scope.
   The Invoke dialog is displayed.
3. Point the Invoke activity to the Order_Processing_Service partner link.
   The Edit Invoke dialog is displayed.
4. In the Name field, enter Create_Order.
5. The Partner Link field is automatically populated with Order_Processing_Service. Retain the default value.
6. The Operation field is populated with Merge, by default. Retain the default value.
7. Click the Automatically Create Input Variable icon at the end of the Input field.
   The Create Variable dialog is displayed.
8. Enter Create_Order_merge_InputVariable in the Name field, as shown in Figure 6–27, and then click OK.

Figure 6–27   The Create Variable Dialog

This figure shows the Create Variable dialog.

The Edit Invoke dialog is displayed again.

9. Click OK in the Edit Invoke dialog.
   You have created an Invoke activity to the Order information in the database.
   Figure 6–28 shows the Edit Invoke dialog after you have filled in all the details.
6.4.7 Creating a Transform Activity

You must map the incoming Purchase Order details to the Order Record. Data pertaining to this order made must be written to the database. The database expects the data in a certain format (for example, the fields must have the same name as the database columns). But the data in the BPEL process is in a different format. So, you must do a transformation to change the data from what you have to what the database expects.

Transformations are common because as you invoke different services and move data between them, most of them will have different data formats. In this transform activity, you create a file called TransformOrder.xsl to map the incoming order information to the schema.

To create a Transform activity:

1. Drag and drop a Transform activity from the Components palette to the empty scope in between the set_order_id Assign activity and the Create_Order Invoke activity.

2. Double-click the transform activity.
   The Transform dialog is displayed.

3. In the General tab, enter Assign_Create_Order_Input in the Name field, as shown in Figure 6–29.
Figure 6–29  The Transform Dialog - General Tab

This figure shows the Transform dialog.

4. Specify the following details in the Transformation tab.
   
   a. Click the Create button to specify the source variable.
      
      The Source Variable dialog is displayed.
   
   b. In the Source Variable menu, inputvariable is selected, by default. Retain the default selection here.
   
   c. By default, the value in the Source Part field is Payload. Retain the default value here.
   
   d. Click OK.
      
      The Transform tab of the Transform dialog is displayed again with the source details populated.
   
   e. In the Target Variable menu, select Create_Order_merge_InputVariable.
   
   f. The Target Part field is automatically populated with OrdersCollection.
   
   g. Click the Browse Mapping button to locate the Transformation_1.xsl file.
      
      The SOA Resource Browser dialog is displayed.
   
   h. Select Transformation_1.xsl, as shown in Figure 6–30, and then click OK.
**Figure 6–30  The SOA Resource Browser Dialog**

![SOA Resource Browser](image)

This figure shows the SOA Resource Browser dialog, in which the Transformation_1.xsl file is selected.

The Mapper File field is populated with the mapper file name.

1. Click **OK** in the Transform dialog.

   The data mapping tool opens in the Oracle JDeveloper window.

   Figure 6–31 shows the Transform dialog after you have specified all the details.

**Figure 6–31  The Transform Dialog - Transformation Tab**

![Transform](image)
This figure shows the Transformation tab in the Transform dialog with all the details populated.

5. In the data mapping tool, expand OrderInfo in the Source side and Orders in the Target side, and then create the simple mappings shown in Table 6–1.

The left column in the data mapping tool in Oracle JDeveloper shows the source side and the right column shows the target side. You create a simple mapping by dragging and dropping the labels from the source side to the target side.

<table>
<thead>
<tr>
<th>Source client: SOAOrderBookingProcessRequest &gt; po:PurchaseOrder</th>
<th>Target &gt; OrdersCollection &gt; Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>po:CustID</td>
<td>custid</td>
</tr>
<tr>
<td>po:ID</td>
<td>ordid</td>
</tr>
<tr>
<td>po:OrderItems</td>
<td>itemsCollection</td>
</tr>
<tr>
<td>po:OrderInfo &gt; po:OrderDate</td>
<td>orderdate</td>
</tr>
<tr>
<td>po:OrderInfo &gt; po:OrderPrice</td>
<td>price</td>
</tr>
<tr>
<td>po:OrderInfo &gt; po:OrderStatus</td>
<td>status</td>
</tr>
<tr>
<td>po:OrderInfo &gt; po:OrderComments</td>
<td>comments</td>
</tr>
</tbody>
</table>

Figure 6–32 shows the data mapping tool in Oracle JDeveloper window after you have completed mapping OrderInfo with Orders.
6. To process all items in the order, create a "for-each" element in the XSL file by performing the following steps:
   a. On the target side in the Oracle JDeveloper window, expand `itemsCollection` and `Items`.
   b. In the Components Palette, select the XSLT Constructs menu, as shown in Figure 6–33.
This figure shows the XSLT Constructs menu selected in the Component Palette.

- Drag and drop **for-each** in the XSLT Constructs menu to **Items** in the target side. The "for-each" label appears between **itemsCollection** and **Items** on the target side, as shown in Figure 6–34.
This figure shows the for-each label between itemsCollection and Items.

******************************************************************************************************

d. Expand po:OrderItems and po: Item in the Source side in the data mapping tool.

e. Drag the mouse pointer from po:Item on the source side to the "for-each" item on the target side.

A line connecting po:Item on the source side to the "for-each" item on the target side appears.

f. Map the item fields as suggested in Table 6–2.

### Table 6–2 Mapping Details

<table>
<thead>
<tr>
<th>Source</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>client:SOAOrderBookingProcessRequest &gt; po:PurchaseOrder &gt; po:OrderItems &gt; po:Item</td>
<td>OrdersCollection &gt; Orders &gt; itemsCollection &gt; for-each &gt; Items</td>
</tr>
<tr>
<td>po:ProductName</td>
<td>productname</td>
</tr>
<tr>
<td>po:partnum</td>
<td>partnum</td>
</tr>
<tr>
<td>po:price</td>
<td>price</td>
</tr>
<tr>
<td>po:Quantity</td>
<td>quantity</td>
</tr>
</tbody>
</table>

7. Map itemid on the target side to the position() function.

8. Click File, and then click Save All to save the Transformation_1.xsl file.

You have completed mapping the data between the source and the target.

Table 6–35 shows the data mapper with complete mappings for the Transformation activity.
6.5 Understanding the BPEL Implementation of the Get Customer Information Process

This section describes BPEL implementation of the Get_Customer_Information process.

This Get_Customer_Information scope invokes the CustomerSvc service to retrieve information about the customer. Part of the input to this process is a field called CustID, which is the ID of the customer who made the purchase. However, you require additional information about the customer, such as address to ship purchased items and credit card information to charge the purchase. The credit card details are part of the customer’s account information in the database. This information is not passed into the process, but you can retrieve this information because you have the CustID from the incoming Purchase Order record. To retrieve the credit card information, you invoke a service called CustomerSvc, which takes the customer id as input and returns information about that customer. The BPEL process uses this data later.

Figure 6–36 shows the completed Get_Customer_Information process in the Order_Booking_To_Process sample.
The BPEL implementation for the Get_Customer_Information process includes the activities mentioned in the following sections:

- Section 6.5.1, "The Invoke_Get_Customer_Information Invoke Activity"
- Section 6.5.2, "The Assign_Get_Customer_Information_Input Assign Activity"

### 6.5.1 The Invoke_Get_Customer_Information Invoke Activity

Double-click the Invoke_Get_Customer_Information Invoke activity to understand how it is designed.

**Figure 6–37** The Invoke_Get_Customer_Information Invoke Activity

This figure shows the Invoke_Get_Customer_Information Invoke activity.
The **Invoke_Get_Customer_Information** Invoke activity accesses the CustomerService partner link and invokes the findCustomerById operation. The operation is invoked with the customer ID assigned in the **Assign_Get_Customer_Information_Input** Assign activity. The results of the operation are stored in the GetCustomerOutput variable.

### 6.5.2 The **Assign_Get_Customer_Information_Input** Assign Activity

Double-click the **Assign_Get_Customer_Information_Input** Assign activity to understand how it is designed. In this assign activity, the customer ID is assigned to the findCustomerById operation.

The **Assign_Get_Customer_Information_Input** Assign activity assigns the customer ID information to the GetCustomerInput variable. This variable is then used as the input variable in the **Invoke_Get_Customer_Information** Invoke activity.

---

**Note:** Though the Assign activity precedes the Invoke activity in the Oracle JDeveloper Designer page, the Invoke activity is created first, and then the Assign activity is created.

---

### 6.6 Understanding the BPEL Implementation of the Get Credit Information Process

This section describes the BPEL implementation of the Get Credit Information process.

The **Get_Credit_Information** scope uses the ValidateCredit partner link, which is the interface to the ValidateCredit partner link.

**Figure 6–38** shows the completed **Get_Credit_Information** process of the Order_Booking_To_Be_Process sample.

**Figure 6–38  The **Get_Credit_Information** Process**

This figure shows the completed Get_Credit_Information process of the Order_Booking_To_Be_Process sample.

---

The **Get_Credit_Information** process includes the activities mentioned in the following sections:

- Section 6.6.1, “The **Invoke_Get_Credit_Information** Invoke Activity”
6.6.1 The Invoke_Get_Credit_Information Invoke Activity

Double-click the Invoke_Get_Credit_Information Invoke activity to understand how it is designed.

Figure 6–39 shows the Invoke_Get_Credit_Information Invoke activity.

6.6.2 The Assign_GetCredit_Input Assign Activity

In the Assign_GetCredit_Input Assign activity, the Credit Card Number and Credit Card Type information are assigned.

The Assign_GetCredit_Input Assign activity copies the credit card number and type (which were retrieved from the CustomerSvc partner link by using the findCustomerById operation) to the validateCreditInput variable.

The Assign_GetCredit_Input Assign activity includes two copy operations, as shown in Figure 6–40.
Understanding the BPEL Implementation of the Get Credit Information Process

**Figure 6–40** The Assign_GetCredit_Input Assign Activity

This figure shows the Assign_GetCredit_Input Assign activity.

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**Figure 6–41** shows the first copy operation of the Assign_GetCredit_Input Assign activity.

**Figure 6–41** The Assign_GetCredit_Input Assign Activity - Copy Operation

This figure shows the first of the two copy operations of the Assign_GetCredit_Input Assign activity.

***********************************************************************************************
Figure 6–41 shows the second copy operation of the Assign_GetCredit_Input Assign activity.

Figure 6–42  The Assign_GetCredit_Input Assign Activity - Copy Operation

This figure shows the second of the two copy operations of the Assign_GetCredit_Input Assign activity.

6.7 Understanding the BPEL Implementation of the Manual Approval Required Activity

This section describes the BPEL Implementation of the Manual_Approval_Required activity.

The Manual_Approval_Required activity includes the activities mentioned in the following sections:

- Section 6.7.1, "The Approve Order Human Task"
- Section 6.7.2, "The Yes or No Switch"

6.7.1 The Approve Order Human Task

This section describes the Approve Order human task. This section includes the following topics:

- Section 6.7.1.1, "Viewing the Approve Order Human Task"

6.7.1.1 Viewing the Approve Order Human Task

To view the Approve Order human task:
1. Expand the Manual_Approval_required scope in Oracle JDeveloper.
   The activities within the Manual_Approval_required scope are displayed, as shown in Figure 6–43.

   **Figure 6–43  The Manual_Approval_Required Scope**

   ![Diagram of the Manual_Approval_Required scope showing activities]

   This figure shows the activities within the Manual_Approval_Required scope.

   2. Double-click the Approve_Order_1 human task.
      The Human Task dialog is displayed, as shown in Figure 6–44.
This figure shows the Human Task dialog.

The Human Task dialog includes the following details:

- Task Definition: Approve_Order
- Task Title: Approve Order
- Task Parameters: Purchase order

6.7.1.2 Viewing and Understanding the Approve Order Human Task Definition

To view the Approve Order task definition, in the Human Task dialog, click the **Edit Task Definition** icon located at the end of the Task Definition field.

The Approve Order task definition page is displayed, as shown in **Figure 6–45**.
This figure shows how the Approve Order human task is defined.

The Approve Order task definition page includes the following sections:

- Human Task
- Parameters
- Assignment and Routing Policy

**Human Task**
In this section, you find the Title and the definition of the task in the **Title** and **Description** fields.

**Parameters**
This section comprises the parameters for the Approve Order human task.

To view the task parameters, click **Edit Task Parameter** (represented by a pencil icon) in the Parameters section.

The Edit Task Parameter dialog is displayed, as shown in Figure 6–46.
Figure 6–46  The Edit Task Parameter Dialog

This figure shows the Edit Task Parameter dialog.

Notice that the type of parameter for the Approve Order task is Purchaseorder.

Assignment and Routing Policy

To view the assignment and routing policy details, select Stage1.SingleApprover and then click the Edit button (represented by a pencil icon.)

The Edit Participant Type dialog is displayed, as shown in Figure 6–47.

Figure 6–47  The Edit Participant Type Dialog

This figure shows the Edit Participant Type dialog.
Note that the Participant Type is Single and the Participant name is Supervisor.

6.7.2 The Yes or No Switch

The Approve Order process can have two paths: when the task outcome is "APPROVE" and when the task outcome is "REJECT."

Expand the Approved Decision Gate to view the switch. The Approve Order Decision Gate is displayed, as shown in Figure 6–48.

Figure 6–48 The Approve Order Decision Gate

This figure shows the tasks within the switch.

To view the condition expression, click the View Condition Expression button. The condition expression is displayed, as shown in Figure 6–49.

Figure 6–49 The Condition Expression Dialog
This figure shows the condition expression for the Approve Order task.
******************************************************************************

The **Approved** switch includes the following scopes:
- Section 6.7.2.1, "The Cancel_Order Scope"
- Section 6.7.2.2, "The End Scope"

### 6.7.2.1 The Cancel_Order Scope

Expand the **Cancel_Order** scope to view it. It includes the following activities:
- The **Cancel_Order Invoke Activity**
- The **Assign_Cancel_Order_Input Assign Activity**

#### The Cancel_Order Invoke Activity

The **Cancel_Order Invoke** activity is mapped to the **Order_Processing_Service** partner link.

To view the details of the **Cancel_Order Invoke** activity:
1. Double-click the **Cancel_Order Invoke** activity.
   
   The Invoke dialog is displayed, as shown in **Figure 6–50**.

![Figure 6–50 The Invoke Dialog](image)

This figure shows the Invoke dialog of the Cancel Order activity.
******************************************************************************

Notice that the input is **Cancel_Order_merge_InputVariable** and the operation is **merge**.

### The Assign_Cancel_Order_Input Assign Activity

To view the **Assign_Cancel_Order_Input Assign** activity:
1. Double-click the **Assign_Cancel_Order_Input Assign** activity.

   The Assign dialog is displayed, as shown in **Figure 6–51**.
2. Select the first copy operation, and then click the Edit button.

The Edit Copy Operation dialog displaying the copy operation between the Create_Order_merge_InputVariable and the Cancel_Order_merge_InputVariable variables appears, as shown Figure 6–52.

Figure 6–51  The Assign Dialog

Figure 6–52  The Edit Copy Operation Dialog
3. Click **Cancel** to close the dialog.

4. Select the second operation in the Assign dialog, and then click the **Edit** button. The Edit Copy Operation dialog displaying the copy operation between the Cancel expression and the Status field in the Cancel_Order_merge_InputVariable variable appears, as shown in Figure 6–53.

**Figure 6–53   The Edit Copy Operation Dialog**

This figure shows the Edit Copy Operation dialog.

5. Click **Cancel** to close the dialog.

### 6.7.2.2 The End Scope

Expand the **End** scope to view it. The **End** scope includes the following activity:

**Invoke_End**

The **Invoke_End Invoke** activity is mapped to the order_booking_to_be_process_client partner link. Double-click the **Invoke_End Invoke** activity to view it. The Invoke dialog is displayed, as shown in Figure 6–54.
**6.8 Understanding the BPEL Implementation of the Fulfill Order Activity**

The **Fulfill Order** activity is a human task. After the orders are approved, the next task is to fulfill the orders.

Expand the **Fulfill Order** scope. The activities within the **Fulfill Order** human task is displayed, as shown in **Figure 6–55**.

**This figure shows the Invoke dialog.**

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The **Fulfill Order** human task includes the activities mentioned in the following sections:
6.8.1 The initiateTask_Fulfill_Order_1 Invoke Activity

To view the initiateTask_Fulfill_Order_1 Invoke activity:

1. Double-click the initiateTask_Fulfill_Order_1 Invoke activity.

The Invoke dialog is displayed, as shown in Figure 6–56.

Figure 6–56 The Invoke Dialog

This figure shows the Invoke dialog.

Notice that the initiateTask_Fulfill_Order_1 Invoke activity is mapped to the Fulfill_Order.TaskService_1 partner link.

2. Click Cancel to close the Invoke dialog.

6.8.2 The Fulfill_Order_1_AssignTaskAttributes Assign Activity

To view the Fulfill_Order_1_AssignTaskAttributes Assign activity:

1. Double-click the Fulfill_Order_1_AssignTaskAttributes Assign activity.

The Fulfill_Order_1_AssignTaskAttributes Assign activity is displayed, as shown in Figure 6–57.
This figure shows the Assign dialog.

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Notice that the Fulfill_Order_1_AssignTaskAttributes Assign activity contains three copy operations.

2. Select the first copy operation, and then click the Edit button.

The Edit Copy Operation dialog displaying the copy operation between the Fulfil Order expression and the title element in the initiateTaskInput variable appears, as shown in Figure 6–58.

Figure 6–58 The Edit Copy Operation Dialog
This figure shows the Edit Copy Operation dialog.

3. Click **Cancel** to close the Edit Copy Operation dialog.

4. Select the second copy operation, and then click the **Edit** button.

   The Edit Copy Operation dialog displaying the copy operation between the `number(1)` expression and the `priority` element in the `initiateTaskInput` variable appears, as shown in Figure 6–59.

   **Figure 6–59 The Edit Copy Operation Dialog**

   ![Edit Copy Operation Dialog](image)

   This figure shows the Edit Copy Operation dialog.

5. Click **Cancel** to close the Edit Copy Operation dialog.

6. Select the third copy operation, and then click the **Edit** button.

   The Edit Copy Operation dialog displaying the copy operation between the `PurchaseOrder` element in the `inputVariable` variable and the `payload` element in the `initiateTaskInput` variable appears, as shown in Figure 6–60.
This figure shows the Edit Copy Operation dialog.

7. Click Cancel to close the Edit Copy Operation dialog.
8. Close the Assign dialog.

6.8.3 The receiveCompletedTask_Fulfill_Order_1 Receive Activity

To view the receiveCompletedTask_Fulfill_Order_1 Receive activity:
1. Double-click the receiveCompletedTask_Fulfill_Order_1 Receive activity.

The Receive dialog is displayed, as shown in Figure 6–61.
Figure 6–61 The Receive Dialog

This figure shows the Receive dialog.

***********************************************************************************************

Notice that the receiveCompletedTask_Fulfill_Order_1 Receive activity is mapped to the Fulfill_Order.TaskService_1 partner link. The operation is onTaskCompleted, and the variable is Fulfill_Order_1_globalVariable.

2. Click Cancel to close the Receive dialog.

6.9 Understanding the Update_Order Scope

Expand the Update_Order scope to view it. The Update_Order scope includes the activities mentioned in the following sections:

■ Section 6.9.1, "The UpdateOrder Invoke Activity"
■ Section 6.9.2, "The Assign_UpdateOrder_Input Assign Activity"

6.9.1 The UpdateOrder Invoke Activity

To view the UpdateOrder Invoke activity:

1. Double-click the UpdateOrder Invoke activity.

   The Invoke dialog is displayed, as shown in Figure 6–62.
Understanding the Update_Order Scope

Figure 6–62  The Invoke Dialog

This figure shows the Invoke dialog.

Notice that the UpdateOrder Invoke activity is mapped to the Order_Processing_Service partner link. The operation is merge, and the input variable is UpdateOrder_merge_InputVariable.

2. Click Cancel to close the Invoke dialog.

6.9.2 The Assign_UpdateOrder_Input Assign Activity

To view the Assign_UpdateOrder_Input Assign activity:

1. Double-click the Assign_UpdateOrder_Input Assign activity.

The Assign dialog is displayed, as shown in Figure 6–63.

Figure 6–63  The Assign Dialog

This figure shows the Assign dialog.
2. Select the first copy operation, and then click the Edit button.

The Edit Copy Operation dialog displaying the copy operation between the OrdersCollection element in the Create_Order_merge_InputVariable variable and the OrdersCollection element in the UpdateOrder_merge_InputVariable variable appears, as shown in Figure 6–64.

**Figure 6–64 The Edit Copy Operation Dialog**

![Edit Copy Operation Dialog](image)

This figure shows the Edit Copy Operation dialog.

3. Click Cancel to close the Edit Copy Operation dialog.

4. Select the second copy operation, and then click the Edit button.

The Edit Copy Operation dialog displaying the copy operation between the Completed expression and the status element in the UpdateOrder_merge_InputVariable variable appears, as shown in Figure 6–65.
Figure 6–65  The Edit Copy Operation Dialog

This figure shows the Edit Copy Operation dialog.

5. Click Cancel to close the Edit Copy Operation dialog.
6. Close the Assign dialog.

6.10 Understanding the End_2 Scope

This section describes the End_2 scope. Expand the End_2 scope to view it. This scope includes the Invoke_End Invoke activity.

6.10.1 The Invoke_End Invoke Activity

To view the Invoke_End Invoke activity:
1. Double-click the Invoke_End Invoke activity.

The Invoke dialog is displayed, as shown in Figure 6–66.
This figure shows the Invoke dialog.

Notice that the Invoke_End Invoke activity is mapped to the order_booking_to_be_process_client partner link. The operation is processResponse and the input variable is outputVariable.

2. Click Cancel to close the Invoke dialog.
This chapter describes how to develop BPEL processes in JDeveloper using process blueprints created in Oracle Business Process Architect.

This chapter includes the following sections:

- Section 7.1, "Creating a BPEL Process Using a Blueprint"
- Section 7.2, "Merging with Newer Versions of a Process Blueprint"

### 7.1 Creating a BPEL Process Using a Blueprint

This section describes how Information Technology (IT) developers can connect to the Business Repository within the Oracle JDeveloper - BPEL Process Designer (the IT tool) and access the business process model that was shared in the Section 5.9, "Transforming a Business Process into a BPEL Process." The business process model is used as a starting point to generate the BPEL implementation model. This section also describes how to generate the BPEL executable model.

This section includes the following topics:

- Section 7.1.1, "Create an Oracle BPA Connection"
- Section 7.1.2, "Creating an Application and an SOA Project"
- Section 7.1.3, "Understanding Blueprint and BPEL-Generated Artifacts"
- Section 7.1.4, "Adding Implementation Details to the BPEL Code"

#### 7.1.1 Create an Oracle BPA Connection

To create a BPEL process using the BPA blueprint, the Oracle Business Process Architect must be up and running. Also note that the BPA project that you are connecting to must be open while creating a BPEL process.

You must define connections to an Oracle BPA Server using the Connection Navigator in Oracle JDeveloper to create a BPEL process.

To define a BPA connection:

1. Open Oracle JDeveloper.
2. In the File menu, click New.

The New Gallery page is displayed, as shown in Figure 7–1.
3. Select **Connections** under General in the Categories section on the left, and then select **BPA Server Connection** from the Items list on the right, as shown in Figure 7–2.

4. Click **OK**.

   The BPA Server Connection dialog is displayed, as shown in Figure 7–2.
5. Enter the following details in the BPA Server Connection dialog:
   - In the Name field, enter a name for the BPA server connection, for example, connection1.
   - For Location, select Local Server.
   - For Database, select OBPA Release 11 Quick Start.
   - For Locale, retain the default value United States.
   - In the Username field, enter the user name. In this example, enter system.
   - In the Password field, enter manager.
   
   Figure 7–3 shows the BPA Server Connection dialog with all the details filled in.

Figure 7–3  The BPA Server Connection Dialog with all Details Populated

This figure shows the BPA Server Connection dialog with all the details filled in.

6. Click the Test tab, and then click Test Connection.

Details of the test are displayed in the Connection Diagnostics area. If the test succeeds, a success message appears in the status text area, as shown in Figure 7–4. If the test does not succeed, then an error message is displayed.
7. When the test succeeds, click **OK**.

You have created a new BPA server connection.

### 7.1.2 Creating an Application and an SOA Project

You must create an Oracle JDeveloper application to contain the SOA composite. Use the following steps to create a new application and an SOA project:

1. In the **Application Navigator** of Oracle JDeveloper, click **New Application**.

   The Create Generic Application - Name your application page is displayed.

2. Enter **BPMBPELSample** in the **Application Name** field, and then select **SOA Application** in the Application Template list.

   **Figure 7-5** shows the Create Generic Application - Name your application page after you have specified the application name and selected the application template.
Figure 7–5  The Create Generic Application - Name your application Page

This figure shows the Create Generic Application - Name your application page.

3. Click Next

The Create Generic Application - Name your project page is displayed.

4. Enter OrderBooking in the Project Name field, as shown in Figure 7–6.

Figure 7–6  The Create Generic Application - Name your project Page

This figure shows the Create Generic Application - Name your project page.
5. Click Next.

The Create Generic Application - Configure SOA settings page is displayed, as shown in Figure 7–7.

**Figure 7–7  The Create Generic Application - Configure SOA settings Page**

This figure shows the Create Generic Application - Configure SOA settings page.

6. Select **Composite From Oracle BPA Blueprint** from the Composite Template list, and then click Finish.

You have created a new application and an SOA project.

The Create BPA Blueprint Composite page is displayed.

7. Select **Order Booking To Be Process (BPMN)** under connection 1 BPA server, as shown in Figure 7–8.

Note that this is the BPA server connection that you created in Section 7.1.1, "Create an Oracle BPA Connection."
8. Click OK.

The composite.xml page appears, as shown in Figure 7–9.

You have selected the BPA composite model that you want to use as a base model for the new SOA composite application.
7.1.3 Understanding Blueprint and BPEL-Generated Artifacts

The BPEL implementation model has two views, the BPA view also referred to as the "Blueprint View" and the BPEL view.

This section includes the following topics:

- The BPA View
- The BPEL View

The BPA View

The BPMN model (Order_Booking_To_Be_Process process) is displayed in the BPA view. The BPMN attributes defined in the BPA Suite are carried over as information that IT can use to add implementation artifacts.

The Process Blueprint comprises business scopes with business annotations for IT to refer to when converting the abstract BPEL process into a concrete BPEL process.

Figure 7–10 shows the BPA view of the Order_Booking_To_Be_Process process, which includes the process blueprint with business scopes and annotations.
This figure shows the BPA view of the Order_Booking_To_Be_Process process.
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The BPA view comprises the following:

- The business activities represented by lock icons to indicate that the IT developer cannot delete these steps. The IT developer can add implementation details to the steps but cannot delete them.

- The business annotations represented by sticky notes icon. The sticky notes contain the properties that you have assigned to the processes. You can click the stick notes icon to see the properties, as shown in Figure 7–11.
Figure 7–11  Clicking the Sticky Notes Icon

This figure shows the properties that you see when the stick notes icon is clicked.

- The condition expressions are represented by the condition expression icon. You must click the condition expression icon to see the condition expression, as shown in Figure 7–12.

Figure 7–12  The Condition Expression

This figure shows the condition expression that you set for the customer status in the Oracle BPA Architect.

The BPEL View

The BPEL View includes the auto generated BPEL artifacts. Automated steps in BPMN are converted into BPEL partner links and a BPEL scope with invoke/receive BPEL activity depending on whether the automated activity is an Invoke or a Receive activity. If the automated activity in the BPMN is associated with a concrete service (associated with a WSDL), then the BPEL Partner Links generated are also concrete. The IT Developer has to choose the correct operation for the service and perform data mapping as required for invoking or receiving messages from the partner link. Similarly, human activity, notification, decision service (Business Rules), and the BPEL artifacts for invoking these Services are auto generated from the BPMN model.

Figure 7–13 shows the BPEL view of the Order_Booking_To_Be_Process process.
**Figure 7–13  The BPEL View of the Order_Booking_To_Be_Process Process**

This figure shows the BPEL View of the Order_Booking_To_Be_Process process.

The generated BPEL project contains the following:

- BPEL process source (*projectname.bpel*)
- Web services description language (WSDL) client interface (*projectname.wsdl*)
- BPEL process deployment descriptor (*bpel.xml*)
- Sensor definition, if defined in the BPD
- Task Service and BPEL artifacts to invoke a workflow if a Human Workflow activity is contained in the BPD
- Decision Service and BPEL artifacts to invoke a Decision Service if a Business Rule activity is specified in the BPD
- Notification Service and BPEL artifacts to invoke a Notification Service if a Notification Service is specified in the BPD
- Partner Link and BPEL artifacts to invoke a partner link if an automated activity is specified in the BPD
- XSD files of all the activities in the *Order_Booking_To_Be_Process* process
Notice that the Create Order process is empty, whereas some processes such as the Fulfill Order and Get Customer processes are completed. You (the IT Developer) must fill the empty process with the missing details. Having the process completed leads to rapid process development and prototyping.

As an IT developer, you must determine what must be done to complete the empty Create Order process.

To complete the empty Create Order process:

1. Check the business annotation for the Create Order process by using either of the following methods:
   - Navigate to the BPA view, and click the sticky notes icon beside the Create Order process.
     The business annotation for the Create Order process is displayed, as shown in Figure 7–14.

     **Figure 7–14  The Business Annotation for the Create Order Process in BPA View**

     This figure shows the business annotation for the Create Order process in BPA view.

   - Alternatively, double-click the Create Order process in the BPEL view.
     The Scope dialog box is displayed. In the Annotations tab, click Analysis to see the business annotation for this process, as shown in Figure 7–15.

     **Figure 7–15  The Business Annotation for the Create Order Process in BPEL View**

     This figure shows the business annotation of the Create Order process in the BPEL view.
2. Right-click Create Order process in the BPEL view, and then click Delete from the menu that appears.

   The Confirm Delete dialog is displayed.

3. Click Yes to delete the Create Order process.

   You have deleted the Create Order Process.

4. Drag and drop Invoke from the BPEL Activities list in the Component Palette in the scope from which you deleted the Create Order process in the preceding step.

5. Rename the Invoke activity to InsertOrder.

6. Drag and drop Assign from the BPEL Activities list in the Component Palette above the Invoke activity.

7. Rename the Assign activity to InsertOrderInput.

7.1.4 Adding Implementation Details to the BPEL Code

Implementation details must be added to the BPEL code to convert the abstract BPEL process into an executable process that can be deployed to the BPEL server.

For information about creating or defining an executable BPEL process in Oracle JDeveloper, see the Oracle BPEL Process Manager documentation available on the Oracle BPEL Process Manager site at Oracle Technology Network (OTN):

http://www.oracle.com/technology/bpel/

7.2 Merging with Newer Versions of a Process Blueprint

The Oracle BPA Suite and the Oracle SOA Suite have been integrated to enable business and IT to perform parallel developments. This section shows changes made to the business process model in BPA Suite being propagated in real time to the IT tool, Oracle BPEL Process Designer. You can generate newer versions of the Process Blueprint in the BPA Repository and merge with the local Process Blueprint version in the Oracle JDeveloper project.

The following sections describe how to merge an existing version of a process blueprint with a newer one:

- Section 7.2.1, "Changing the Business Process Model and Regenerating the Process Blueprint"
- Section 7.2.2, "Merging with a Newer Version of a Process Blueprint"

7.2.1 Changing the Business Process Model and Regenerating the Process Blueprint

This section describes how to change the Business Process model.

To change the Order_Booking_To_Be_Process process model:

1. In Oracle Business process Architect, add a step called SOX Compliance before the Get Customer Information step in the Order_Booking_To_Be_Process process, as shown in Figure 7–16.
Merging with Newer Versions of a Process Blueprint

**Figure 7–16  Adding the SOX Compliance Step in the Order_Booking_To_Be_Process Process**

This figure shows the new Step SOX Compliance in the Order_Booking_To_Be_Process process model.

******************************************************************************

You have added the SOX Compliance step.

2. Select **Share Blueprint with IT** from the SOA menu.

3. A newer version of the Process Blueprint is generated and saved in the BPA Repository.

### 7.2.2 Merging with a Newer Version of a Process Blueprint

Merging with a newer version of the process blueprint in done in Oracle JDeveloper.

To merge the new version of the process blueprint:

1. In the composite.xml window, click the **Refresh from BPA Server** icon.

   The Refresh From BPA Server dialog is displayed.

   **Figure 7–17** shows the Refresh from BPA Server icon.

 **Figure 7–17  The Refresh from BPA Server Icon**

This figure shows the Refresh from BPA Server icon.

******************************************************************************

2. Select the BPA server from the list of servers in the **Server** list.

3. Click **Compute Model Differences** to analyze the differences between the local blueprint and the version on the BPA server.
4. The differences between the local and server versions of the blueprint are displayed, as shown in Figure 7–18.

**Figure 7–18 Merge Differences Between Process Blueprint in BPA Repository and Process Blueprint in Local JDeveloper Project**

This figure shows the merge differences between process blueprint in BPA repository and process blueprint in local JDeveloper project.

***********************************************************************************************

Notice that the SOX Compliance step has been added.

**Figure 7–19 Merged Process Blueprint After Accepting the Changes**

This figure shows the merged process blueprint after accepting the changes.

***********************************************************************************************

5. Click **View Process Differences** or the **Visual Differences** icon to display the differences between the local and server versions of the blueprint visually.
This figure shows the Visual Differences icon.

The visual difference after merging the two processes is displayed, as shown in Figure 7–21.

This figure shows the visual difference after merging the two processes.

6. Click OK to accept the changes on top of the BPEL process.

   The SOX Compliance step is added Order_Booking_To_Be_Process process, as shown in Figure 7–22.
Figure 7–22 The Order_Booking_To_Be_Process with the SOX Compliance Step

This figure shows the Order_Booking_To_Be_Process process with the SOX Compliance step.

**********************************************************************************************
This chapter describes how to model the Order Booking As-Is Process in detail. This chapter includes the following topics:

- Section 8.1, "Understanding the Order Booking As-Is Process Flow"
- Section 8.2, "Creating the Order Booking As-Is Process Model"

### 8.1 Understanding the Order Booking As-Is Process Flow

Table 8–1 describes the processes in the Order Booking As-Is Process model, and their inputs and output details.

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
<th>Input Argument</th>
<th>Output Argument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Order</td>
<td>Uses Database Adapter to create two services - one to obtain a unique id (Order_Sequence) and the other to insert the Order record in to the Orders table (Order_Processing_Service). Further, the incoming Purchase Order message is mapped to the Order - record before invoking the Order_Processing_Service.</td>
<td>OrderId</td>
<td>OrderId</td>
</tr>
<tr>
<td>Get Customer Information</td>
<td>The findCustomerById operation of the CustomerSvc partner link is used to obtain the Customer record given the Customer Id. The Assign_Get_Customer_Information_ Input activity maps the CustId field in the incoming PurchaseOrder-message to the input of the CustomerSvc invocation.</td>
<td>Customer Id</td>
<td>Customer Id</td>
</tr>
<tr>
<td>Get Credit Information</td>
<td>The VerifyCC operation of the CreditService is used to obtain the credit rating given the credit card type and the credit card number.</td>
<td>Credit card type and credit card number.</td>
<td>Credit rating</td>
</tr>
</tbody>
</table>
### 8.2 Creating the Order Booking As-Is Process Model

This section describes how to create the Order Booking As-Is Process model.

This section includes the following topics:

- **Section 8.2.1, “Creating the Business Process Diagram for the Model”**
- **Section 8.2.2, “Creating the Activities for the Order Booking As-Is Process”**

#### 8.2.1 Creating the Business Process Diagram for the Model

To create a business process diagram:

1. Right-click the **Order Process** folder in the Process folder, select **New** and then **Model** from the menus that appear, as shown in Figure 8–1.

The Create model dialog box is displayed.
This figure shows the menus that appear when creating a new model.

2. Select Business process diagram (BPMN) as the model type and enter Order Booking As-Is Process in the Name field, as shown in Figure 8–2.

An empty BPMN model, Order Booking As-Is Process, appears in the Designer window.
8.2.2 Creating the Activities for the Order Booking As-Is Process

To create the activities for the Order Booking As-Is Process model:

1. In a typical scenario, the Order Booking As-Is Process would comprise the following automated activities and human tasks:

   **Automated Activities:**
   - Create Order
   - Get Customer Information
   - Get Credit Information
   - Cancel Order
   - Update Order

   **Human Tasks:**
   - Approve Order
   - Fulfill Order

2. To see the list of BPMN objects, select **Symbols** on the menu bar, as shown in Figure 8–3.
Creating the Order Booking As-Is Process Model

3. Create the objects listed in Table 8–2 on the Business Process diagram by selecting them in the Symbols Palette and then clicking on the diagram.

Table 8–2 Creating Objects from the Symbols Palette

<table>
<thead>
<tr>
<th>Model Object</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Lane" /></td>
<td>The Lane object for creating swimlanes to demarcate the steps in the process.</td>
</tr>
<tr>
<td><img src="image" alt="Start event" /></td>
<td>The Start event object to mark the start of the event.</td>
</tr>
<tr>
<td><img src="image" alt="End event" /></td>
<td>The End event object to mark the end of the order processing event.</td>
</tr>
<tr>
<td><img src="image" alt="Connection" /></td>
<td>The Connection objects to link the different activities in the Order Booking As-Is Process model.</td>
</tr>
<tr>
<td><img src="image" alt="Automated activities" /></td>
<td>The Automated activities object for representing automated activities.</td>
</tr>
<tr>
<td><img src="image" alt="Human task" /></td>
<td>The Human task object for representing activities that involve the role of human beings.</td>
</tr>
<tr>
<td><img src="image" alt="XOR" /></td>
<td>The XOR objects for representing gateways.</td>
</tr>
</tbody>
</table>

4. Drag and drop a Lane object in the Business process Diagram to create a swimlane for the Order Management System, and then perform the following steps:

a. To format the Lane for color, location of attributes such as name with respect to the object, right-click the Lane object and select Properties.

   The Object properties lane wizard is displayed.
b. Select Attributes, and specify Order Management System in the Name field, as shown in Figure 8–5.

Figure 8–5 The Object properties - Lane Wizard.

This figure shows the Object properties - Lane wizard.

c. Click the Object appearance property set, and select the desired color by selecting the Fill color option, as shown in Figure 8–6.
This figure shows how to select a color for the lane.

- Click the Attribute placement (object) property set and select the location of the Name attribute with respect to the Lane Object on the business process diagram.

  In this example, the Name attribute is selected to be on the left side of the Lane object, as shown in Figure 8–7.
This figure shows how to place the Name attribute with respect to the Lane Object on the business process diagram.

**e.** Repeat steps a through e to create lanes for Customer Service, Credit Service, Clerk, and Supervisor, as shown in Figure 8–8.
Figure 8–8  The Five Lanes That You Created

This figure shows the different lanes that you created.

5. Drag a Start event from the Symbols palette and drop it onto the diagram.
   If the Start event symbol is not displayed, click the double left arrow in the Symbols palette and add the Start event symbol from the Add Symbols dialog box.

6. Drag an Automated Activity from the Symbols palette and drop in the Order Management swimlane.
   The Automated activity dialog box is displayed.

7. Enter Create Order in the Name field, and specify the description in the Description field, as shown in Figure 8–9.
   The Create Order automated activity is not associated with any Service object. It is the job of the IT developer to define this service within the IT tool based on the requirements described in the Description field.
8. Repeat steps 6 and 7 to create an Automated activity for "Get Customer Information" in the Customer Service swimlane.

9. Add a service for the Get Customer Information activity by performing the following steps:
   a. Click the Add button on the same line as the Service field.
      The Import service dialog box is displayed.
   b. In the Name field, enter Customer Service.
   c. Click the Browse button located adjacent to the Service URL field.
      The Import service dialog box is displayed.
   d. Click the Browse button located adjacent to the URL field, and select the CustomerService.wsdl file from the location where you have it.
      The URL field of the Import service dialog box is populated with the WSDL file you selected, as shown in Figure 8–10.
Creating the Order Booking As-Is Process Model

Modeling the Order Booking As-Is Process

Figure 8–10 The Import service Dialog Box

This figure shows the Import service dialog box.

e. Click OK in the Import service dialog box.

The Import service dialog box is displayed with the Service URL field populated with the CustomerService.wsdl file, as shown in Figure 8–11.

Figure 8–11 The Import Service Dialog Box

This figure shows the Import service dialog box.

Figure 8–12 shows the Automated activity dialog box after you have filled in all the details for the Get Customer Information activity.
This figure shows the Automated activity dialog box.

10. Repeat steps 6 and 7 to create an Automated activity for "Get Credit Information" in the Credit Service swimlane, as shown in Figure 8–13.
Creating the Order Booking As-Is Process Model

Figure 8–13  The Automated activity Dialog Box Populated with the Details of the Get Credit Information Activity

This figure shows the Automated activity dialog box.

11. Repeat steps 6 and 7 to create an Automated activity for "Cancel Order" in the Order Management System swimlane.

12. Repeat steps 6 and 7 to create an Automated activity for "Update Order" in the Order Management System swimlane.

13. Drag a Human task symbol from the Symbols palette and drop it in the Supervisor swimlane.

The Human Task dialog is displayed.

14. Enter Approve Order for the Human Task name, and specify other details, as shown in Figure 8–14. The process participant associated with this human step is Supervisor.
**Figure 8–14  The Human task Dialog Box**

This figure shows the Human task dialog box.

*******************************************************************************

15. Repeat steps 13 and 14 to create a Human task activity for Fulfill Order in the Clerk swimlane, as shown in Figure 8–15. The process participant associated with this human step is Fulfillment clerk.
**Figure 8–15 The Human task Dialog Box**

This figure shows the Human task activity dialog box for the Fulfill Order activity.

16. The Approve Order step can have two possible outcomes, approved and not approved. A conditional gateway can be used to evaluate the outcome of the human step and take the appropriate path.

Perform the following steps to introduce a conditional gateway after the Approve Order step.

a. Drag an **XOR** activity from the Symbols palette and drop it in the Supervisor swimlane to indicate a switch activity.

   The XOR gateway is a mutually exclusive gateway for conditional branching. The mutually exclusive gateway is used only when one of the paths can be taken.

b. Name the Gateway as **Approved?**, as shown in Figure 8–16.
c. Select the **Attribute placement** option in the Object properties wizard, and then click the **Add** button in the Place attributes section on the right-side of the wizard.

The Add attributes dialog box is displayed, as shown in Figure 8–17.

---

**Figure 8–16  The Object properties Dialog Box**

This figure shows the Object properties dialog box.

---

**Figure 8–17  The Add attributes Dialog Box**

This figure shows the Add attributes dialog box.
d. Select Name, and then click OK.

The Name attribute is added to the list of attributes, as shown in Figure 8–18.

**Figure 8–18 Placing the Attribute**

This figure shows how to place the attribute.

Note: The Add attributes dialog box lists the complete list of attributes associated with the object. Select the **Only show maintained attributes** option to display only the maintained attributes.

e. Retain the default value for the other fields, and then click **OK**.

17. Drag an **End** event from the Symbols palette and drop it to the Order Management System swimlane.

If the End event is not displayed, click **>>** in the Symbols palette and add the End event from the **Add Symbols** dialog box.

18. Connect all the activities by dragging and dropping the Connection symbol from the symbol palette, as shown in **Figure 8–19**.
Figure 8–19  The Order Booking As-Is Process Model

This figure shows the Order Booking As-Is Process model after you have created all the activities and connected them.

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