

R12.x Implement Oracle Workflow

Volume I - Student Guide

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Preface

Profile

Before You Begin This Course

- Thorough knowledge of Oracle Database and Oracle Application Server technology
- Thorough knowledge of Oracle E-Business Suite

Prerequisites

- *Oracle Database: Introduction to SQL*
- *Oracle Database: Program with PL/SQL*

How This Course Is Organized

R12.x Implement Oracle Workflow is an instructor-led course featuring lecture and hands-on exercises. Online demonstrations and written practice sessions reinforce the concepts and skills introduced.

Related Publications

Oracle Publications

Title	Part Number
<i>Oracle Workflow Administrator's Guide</i>	E12903
<i>Oracle Workflow Developer's Guide</i>	E12905
<i>Oracle Workflow User's Guide</i>	E12906
<i>Oracle Workflow API Reference</i>	E12904
<i>Oracle Workflow Client Installation Guide</i>	E12779

Additional Publications

- System release bulletins
- Installation and user's guides
- Read-me files
- International Oracle User's Group (IOUG) articles
- *Oracle Magazine*

Typographic Conventions

Typographic Conventions in Text

Convention	Element	Example
Bold italic	Glossary term (if there is a glossary)	The algorithm inserts the new key.
Caps and lowercase	Buttons, check boxes, triggers, windows	Click the Executable button. Select the Can't Delete Card check box. Assign a When-Validate-Item trigger to the ORD block. Open the Master Schedule window.
Courier new, case sensitive (default is lowercase)	Code output, directory names, filenames, passwords, pathnames, URLs, user input, usernames	Code output: debug.set ('I', 300); Directory: bin (DOS), \$FMHOME (UNIX) Filename: Locate the init.ora file. Password: User tiger as your password. Pathname: Open c:\my_docs\projects URL: Go to http://www.oracle.com User input: Enter 300 Username: Log on as scott
Initial cap	Graphics labels (unless the term is a proper noun)	Customer address (<i>but</i> Oracle Payables)
Italic	Emphasized words and phrases, titles of books and courses, variables	Do <i>not</i> save changes to the database. For further information, see <i>Oracle7 Server SQL Language Reference Manual</i> . Enter user_id@us.oracle.com, where <i>user_id</i> is the name of the user.
Quotation marks	Interface elements with long names that have only initial caps; lesson and chapter titles in cross-references	Select "Include a reusable module component" and click Finish. This subject is covered in Unit II, Lesson 3, "Working with Objects."
Uppercase	SQL column names, commands, functions, schemas, table names	Use the SELECT command to view information stored in the LAST_NAME column of the EMP table.
Arrow	Menu paths	Select File > Save.
Brackets	Key names	Press [Enter].
Commas	Key sequences	Press and release keys one at a time: [Alternate], [F], [D]
Plus signs	Key combinations	Press and hold these keys simultaneously: [Ctrl]+[Alt]+[Del]

Typographic Conventions in Code

Convention	Element	Example
Caps and lowercase	Oracle Forms triggers	When-Validate-Item
Lowercase	Column names, table names	SELECT last_name FROM s_emp;
	Passwords	DROP USER scott IDENTIFIED BY tiger;
	PL/SQL objects	OG_ACTIVATE_LAYER (OG_GET_LAYER ('prod_pie_layer'))
Lowercase italic	Syntax variables	CREATE ROLE <i>role</i>
Uppercase	SQL commands and functions	SELECT userid FROM emp;

Typographic Conventions in Oracle Application Navigation Paths

This course uses simplified navigation paths, such as the following example, to direct you through Oracle Applications.

(N) Invoice > Entry > Invoice Batches Summary (M) Query > Find (B) Approve

This simplified path translates to the following:

1. (N) From the Navigator window, select **Invoice** then **Entry** then **Invoice Batches Summary**.
2. (M) From the menu, select **Query** then **Find**.
3. (B) Click the **Approve** button.

Notations:

(N) = Navigator

(M) = Menu

(T) = Tab

(B) = Button

(I) = Icon

(H) = Hyperlink

(ST) = Sub Tab

Typographical Conventions in Oracle Application Help System Paths

This course uses a “navigation path” convention to represent actions you perform to find pertinent information in the Oracle Applications Help System.

The following help navigation path, for example—

(Help) General Ledger > Journals > Enter Journals

—represents the following sequence of actions:

1. In the navigation frame of the help system window, expand the General Ledger entry.
2. Under the General Ledger entry, expand Journals.
3. Under Journals, select Enter Journals.
4. Review the Enter Journals topic that appears in the document frame of the help system window.

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Introduction to Oracle Workflow

Chapter 1

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Introduction to Oracle Workflow

Introduction to Oracle Workflow

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

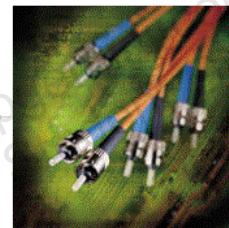
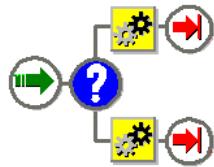
- Explain the benefits of Oracle Workflow.
- Discuss the concept of a workflow process.
- Discuss the concept of a business event.

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Enabling E-Business

Enabling E-Business

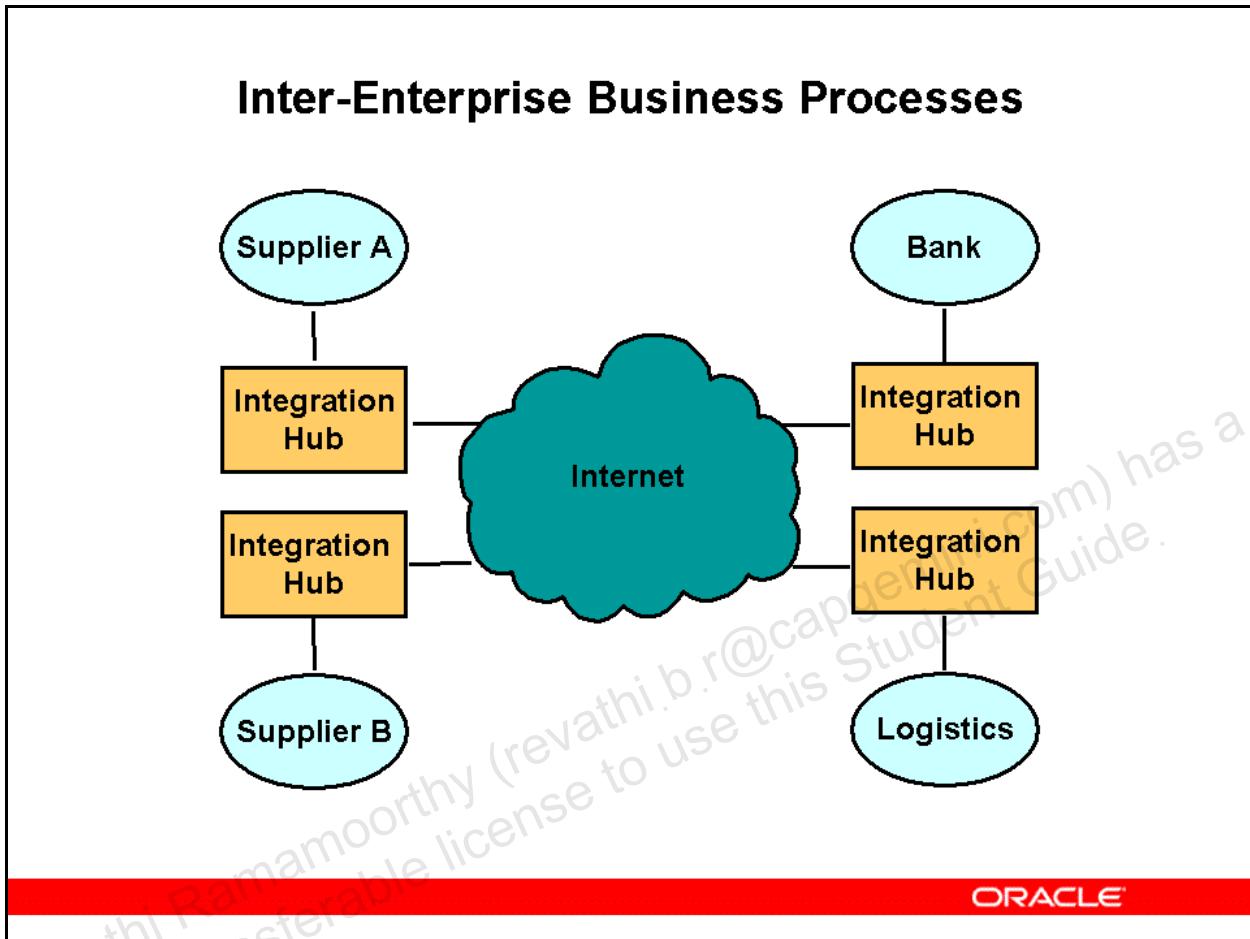
Streamlined business processes play a critical role in the transformation to e-business. Oracle Workflow delivers a complete business process definition, automation, and integration solution.



Oracle Workflow: The wiring for e-business

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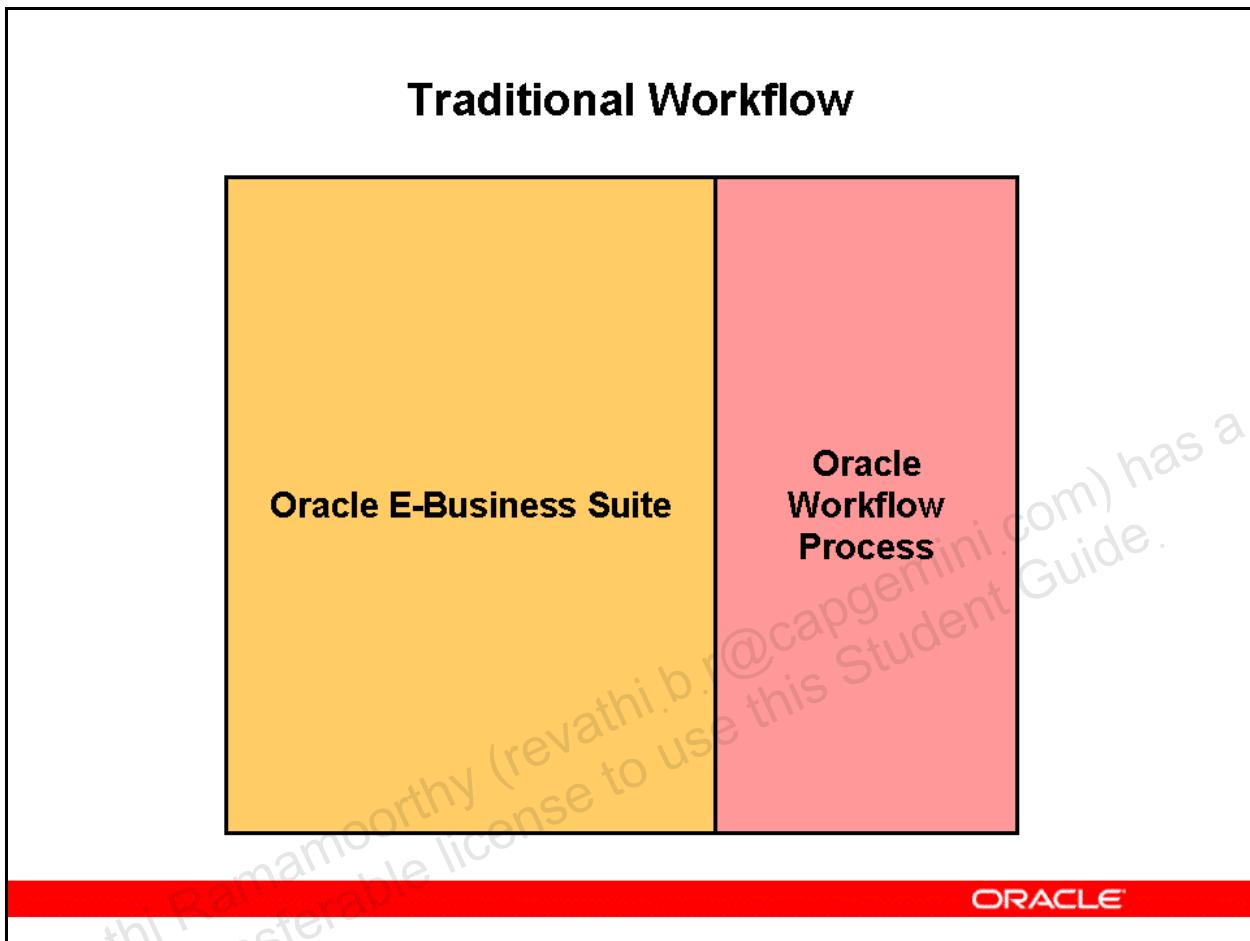
Inter-Enterprise Business Processes



Inter-Enterprise Business Processes

In e-business, different enterprises need to communicate with each other over the Internet. Oracle Workflow with the Business Event System can be used as part of an integration hub, modeling business processes that span all of the enterprises involved in an end-to-end process.

Traditional Workflow



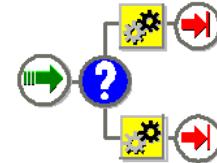
Traditional Workflow

Traditional applications-based workflow processes are launched from a business application through APIs hard-coded within the application. These processes model the business rules in the individual local application and are made up of activities executed by the Workflow Engine only in that application's system. For example, the modeling of an approval hierarchy is a common use of Oracle Workflow in this scenario.

Workflow-Driven Business Processes

Workflow-Driven Business Processes

- Oracle Workflow automates and streamlines business processes contained within and between enterprises.
- For example, you can use workflow processes to:
 - Add personalized trading partner rules
 - Validate self-service transactions
 - Achieve closed loop business intelligence
 - Approve standard business documents
 - Step through daily transaction flows
 - Integrate with trading partner systems



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Workflow-Driven Business Processes

Oracle Workflow can help save time by:

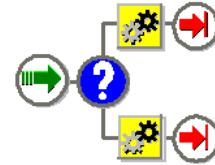
- Reducing repetitive data entry tasks
- Automating approval hierarchies
- Automatically delivering notifications and reminders of work to be done
- Providing self-service monitoring capabilities

Workflow-Driven Business Processes

Workflow-Driven Business Processes

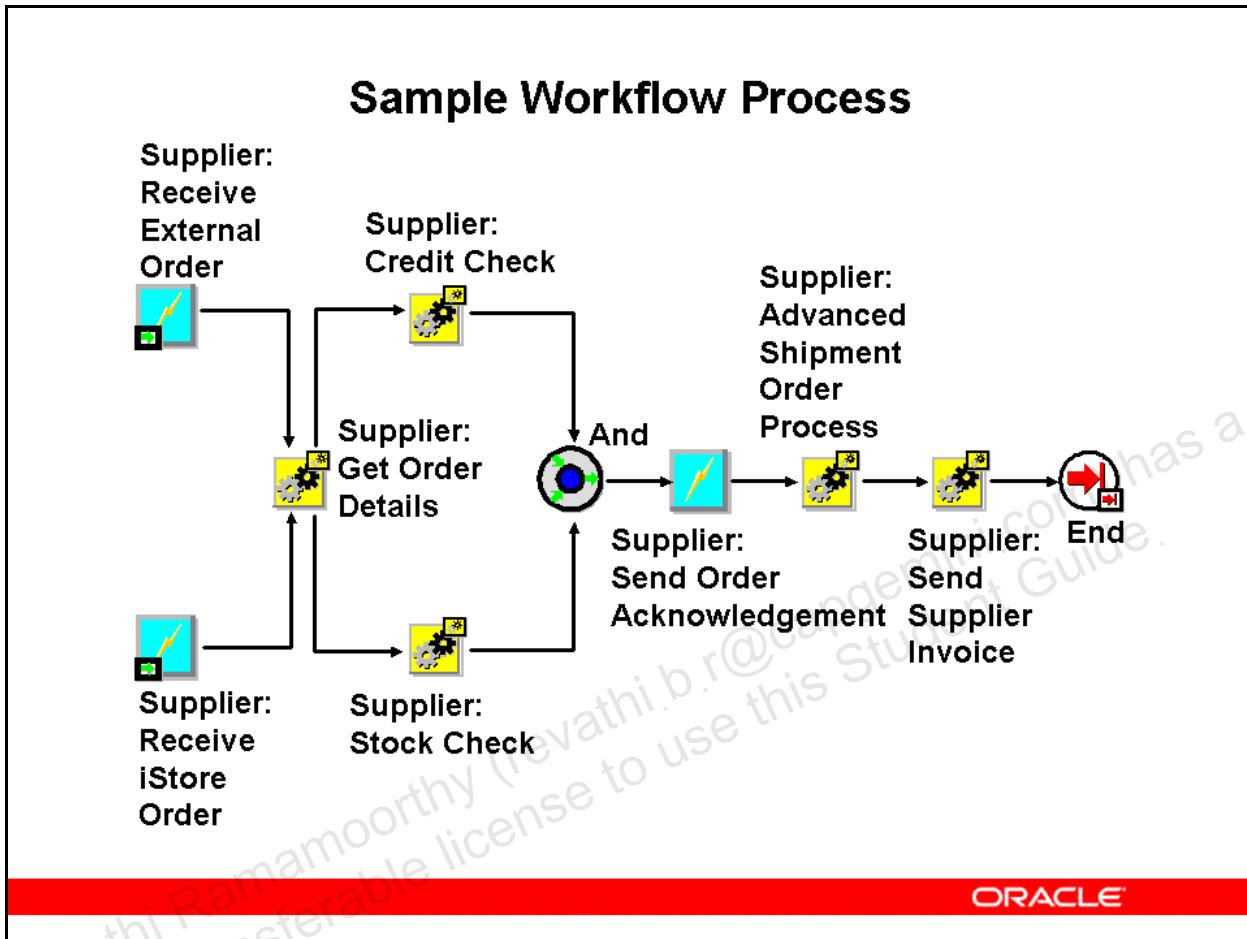
Oracle Workflow lets you focus on managing the business process, not individual transactions.

- Define and implement your business policies
- Streamline the entire process
- Route information
- Capture exceptions and take action
- Build continuous improvements directly into the process definition
- Adapt your processes as your business changes



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Sample Workflow Process

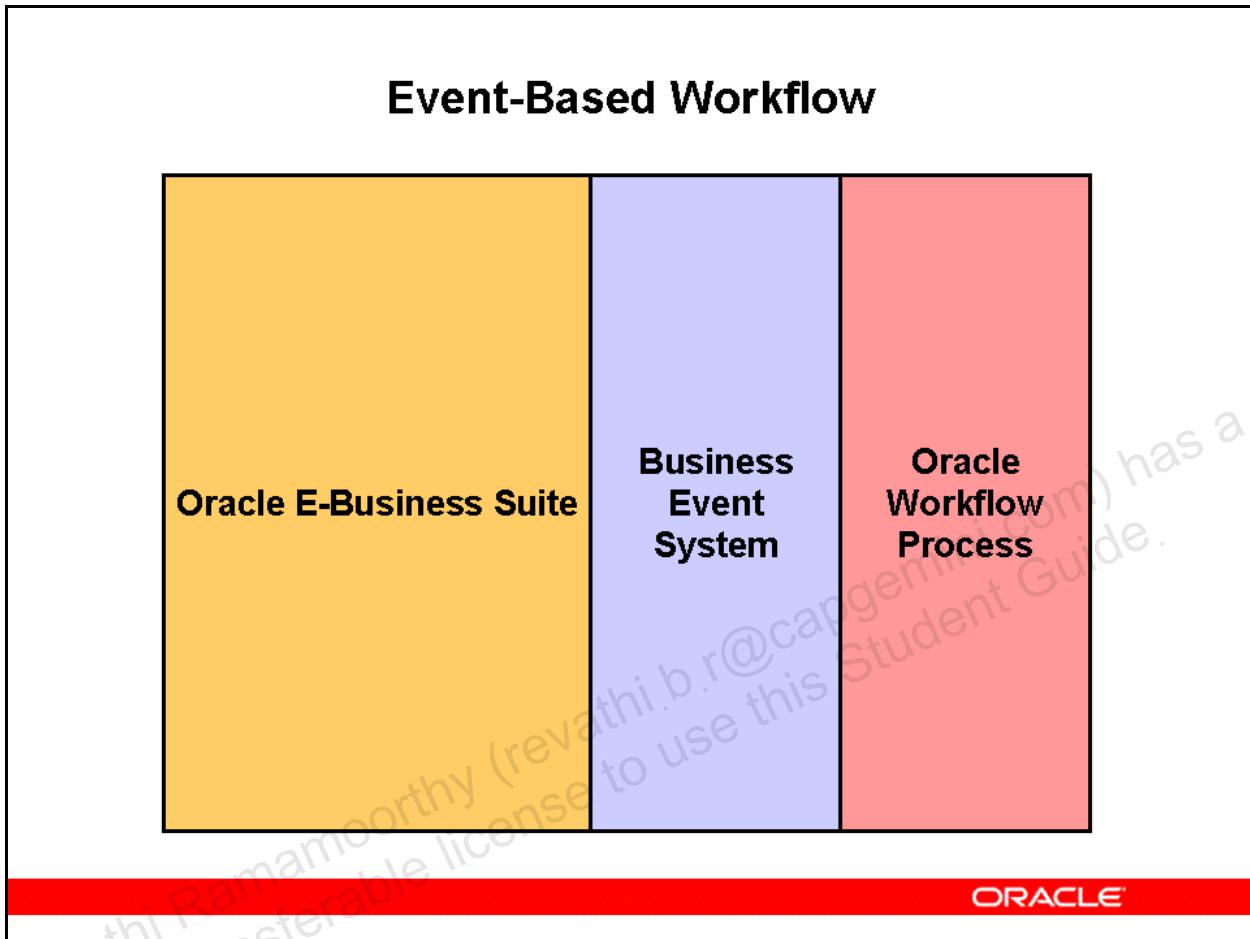


Sample Workflow Process

A workflow process consists of a sequence of activities that together make up a business flow, expressing your organization's policies and rules. The activities can include significant business events, automated functions, notifications to users, or subprocesses.

This example shows a sample order processing workflow process that includes business events.

Event-Based Workflow



Event-Based Workflow

With the Business Event System, Oracle Workflow supports both traditional applications-based workflows and event-based integration workflows.

For e-business, there is a requirement to integrate with external systems, such as sending a document to a business-to-business exchange, or other systems external to the local application. Oracle Workflow supports e-business integration workflows by allowing business analysts and developers to model business processes spanning different systems using a graphical drag-and-drop designer - the Workflow Builder - and run those processes using the Workflow Engine and the Business Event System. This support enables Oracle Workflow customers to deal with business objects in comprehensive e-business integration flows with minimal intrusion into the core application.

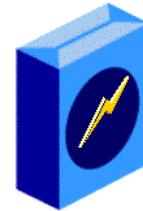
The Business Event System and the Workflow Engine can function independently of each other. However, you can achieve the most powerful and flexible processing by using the Business Event System and the Workflow Engine together to execute cross-system processes for e-business integration.

Subscription-Based Processing

Subscription-Based Processing

In the Oracle Workflow Business Event System:

- **Business events in applications trigger event subscriptions in Oracle Workflow.**
- **Subscriptions can launch workflow processes or perform other processing.**
- **Multiple subscriptions can be defined to perform different processing for the same event.**
- **Subscriptions can be enabled, modified, or disabled as necessary without intruding into applications.**



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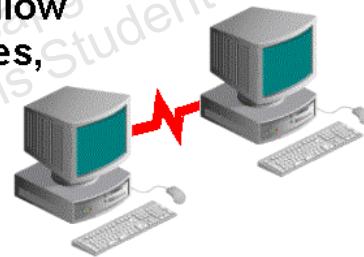
Subscription-Based Processing

The Business Event System provides increased flexibility through subscription-based processing: you raise a business event from an application, but specify the processing to perform for that event as a subscription in Oracle Workflow. For example, you can launch a workflow process when an event is raised by specifying that process in a subscription to the event. You can also define multiple subscriptions to the same event to perform additional processing for different purposes without intruding any further on the core application.

System Integration with Oracle Workflow

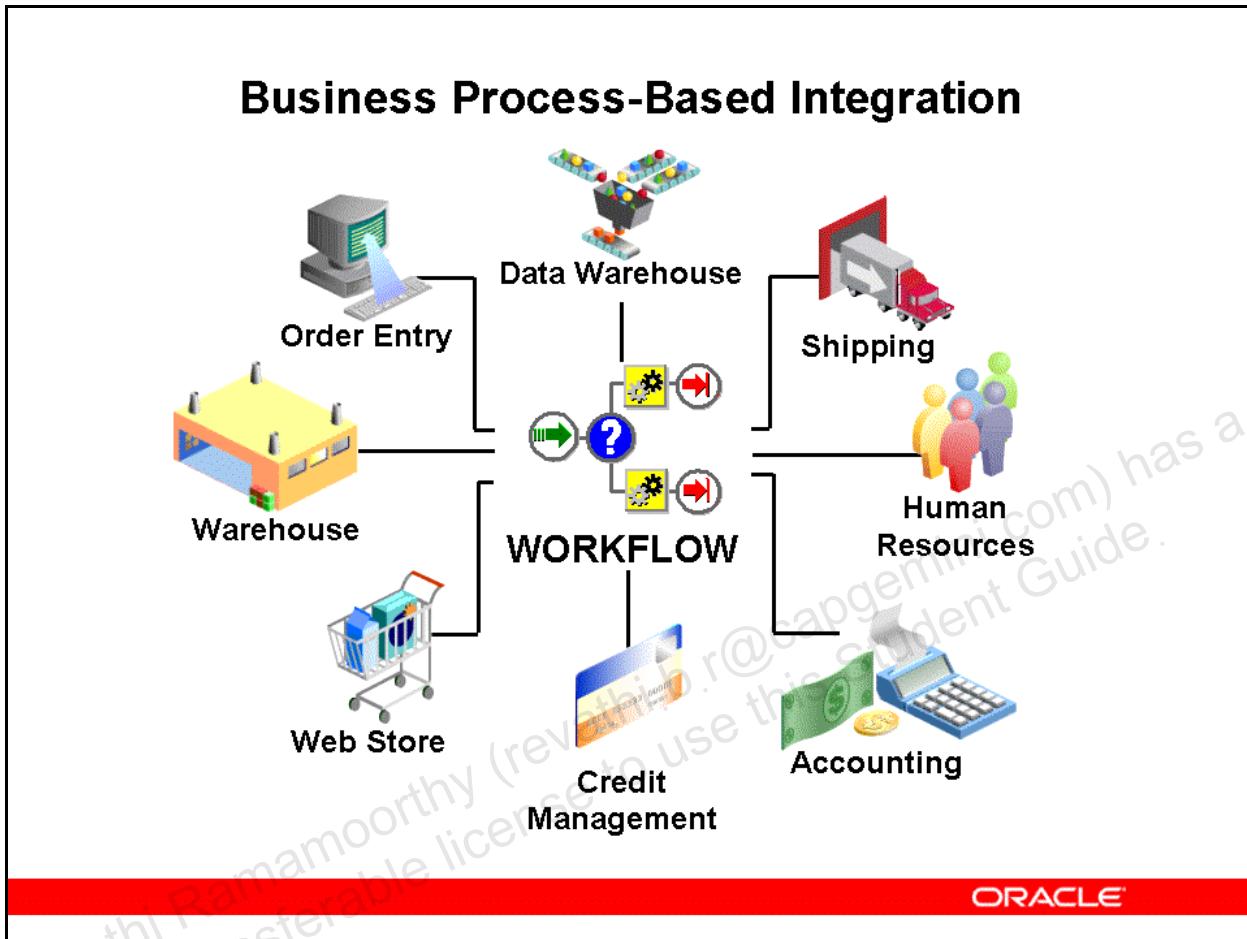
System Integration with Oracle Workflow

- **E-business accelerates the demand for system integration.**
- **Communication is required between systems both within and beyond the enterprise.**
- **Oracle Workflow can be used as part of an integration hub, with support for e-business integration workflows through the Business Event System.**
- **Business event-based workflows allow modeling of cross-system processes, enabling business process-based integration.**



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Business Process-Based Integration



Business Process-Based Integration

Business process-based integration is model-driven.

- Business rules are expressed in a process model.
- These rules define the policy for each end-to-end process.
- The process model can encompass applications both within and beyond the enterprise.

Business process-based integration provides:

- A global, enterprise-level view of business objects
- Business process automation

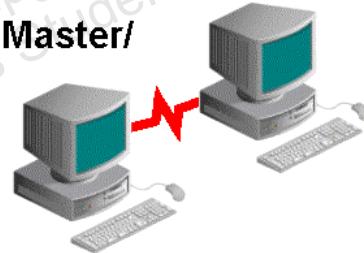
Oracle Workflow supports business process-based integration through the Business Event System.

Supported System Integration Types

Supported System Integration Types

The Business Event System supports integration in which applications are loosely coupled through asynchronous messaging.

- Point-to-point system integration: "Hardwired" communication between specified systems
- Messaging hub system integration: Intersystem communication routed through a central hub for more complex integration scenarios
- Distributed applications messaging: Master/copy replication of data for distributed applications



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Supported System Integration Types

The types of system integration supported by Oracle Workflow are message-based. By supporting the communication of messages between systems, Oracle Workflow lets you define processing across different systems encompassing both your own enterprise and your business partners. The power of this cross-system processing, together with the flexibility provided by subscription-based processing, enables you to use Oracle Workflow for e-business integration.

Designing Applications for Change

Designing Applications for Change

- **Business processes change over time.**
- **Good design in an e-business environment requires:**
 - **Dynamic processes sympathetic to change**
 - **No artificial constraints on business processes**
 - **The ability to modify business processes without changing code**
 - **A visual overview of business processes**



Designing Applications for Change

The benefits of good design include:

- Reduced cost of ownership through diminished development costs
- Ease of management and maintenance
- Visual documentation of business processes

Designing Applications for Change

Designing Applications for Change

Oracle Workflow helps you design applications for change using workflow processes, enabling continuous business process improvement.

- Complete process representation
- Graphical development tool
- Ease of management and maintenance



Designing Business Processes for Change

Complete process representation:

- A workflow process can cross organizational and company boundaries to represent an end-to-end flow.
- You can provide alternatives within a process to accommodate different situations.
- You can build management metrics and performance goals into a process.

Graphical development tool:

- The Oracle Workflow Builder separates business process definition and modeling from code development.
- Workflow diagrams provide a visual overview of your processes.
- You can easily modify a process definition.

Ease of management and maintenance:

- Oracle Workflow lets you analyze time and costs for entire business processes.
- You can refine your process definitions according to your analysis to streamline them and reduce time and costs.
- You can easily implement a modified process.

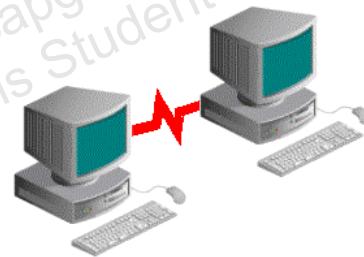
- Oracle Workflow empowers process participants by giving them access to review the progress and current status of their processes.
- Users can find the answers to many common questions themselves using these monitoring capabilities.

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Designing Applications for Integration

Designing Applications for Integration

- **System integration is increasingly required for e-business.**
- **Good design in an e-business environment requires:**
 - Availability of integration points in applications for immediate or future use
 - Noninvasive configuration
 - The ability to modify integration processing without changing code



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Designing Applications for Integration

Designing Applications for Integration

Oracle Workflow helps you design applications for integration using the Business Event System, enabling business process-based integration.

- **Business events as integration points**
- **Subscription-based processing**
- **Web-based business event and subscription management tool**



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Designing Applications for Integration

Business events as integration points:

- Applications can raise business events at any point where further processing or integration might be required.
- You can define the processing to be triggered by an event immediately after defining the event or at any later time.

Subscription-based processing:

- Use subscriptions to specify the processing you want to perform for a business event.
- You can define multiple subscriptions to the same event to perform additional processing for different purposes.

Web-based business event and subscription management tool:

- The Event Manager separates event subscription definition from code development.
- You can use the Event Manager web pages to define, update, or delete event subscriptions without intruding on the core application.

Summary

Summary

In this lesson, you should have learned how to:

- **Explain the benefits of Oracle Workflow.**
- **Discuss the concept of a workflow process.**
- **Discuss the concept of a business event.**

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Oracle Workflow Components

Chapter 2

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Oracle Workflow Components

Oracle Workflow Components

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Objectives

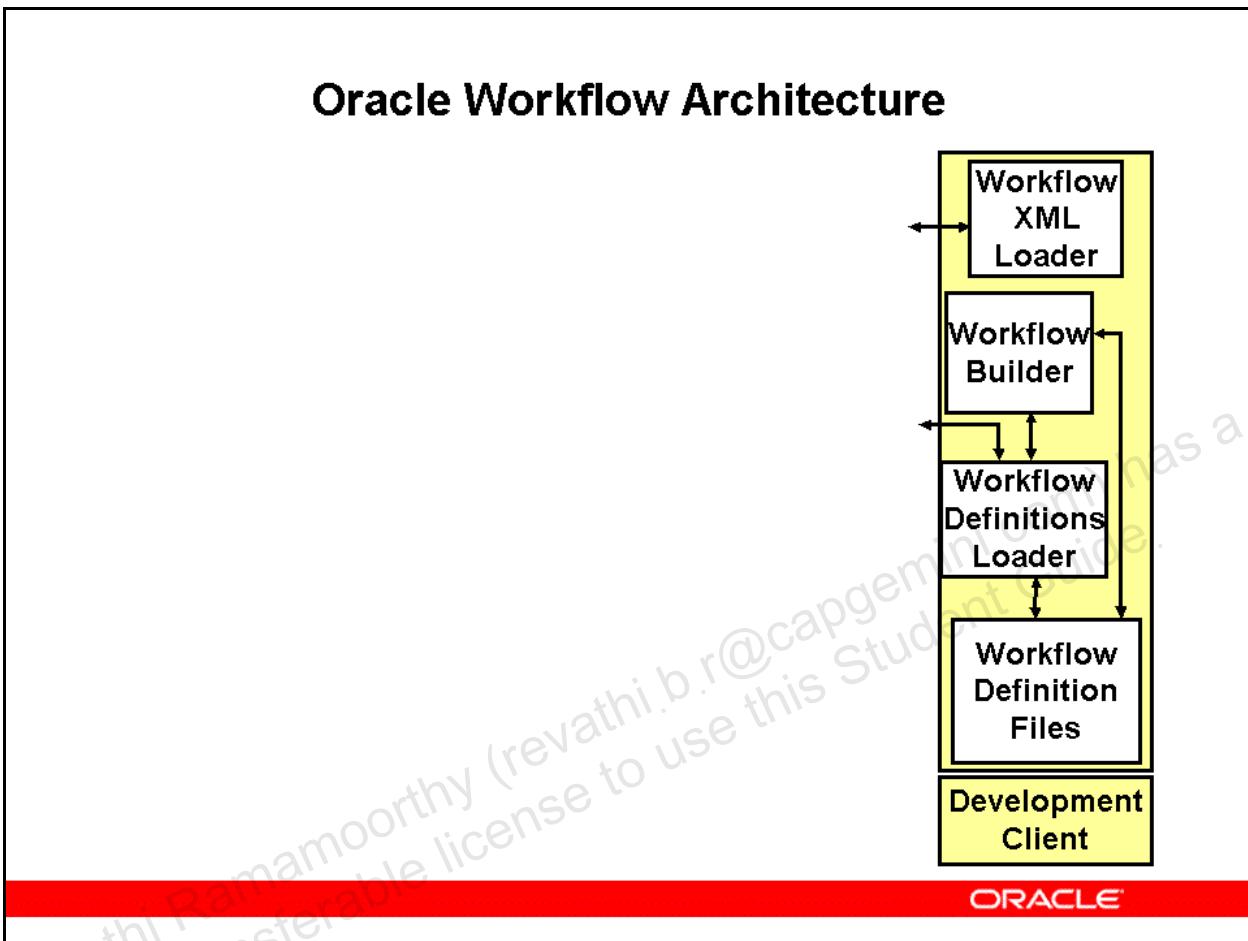
Objectives

After completing this lesson, you should be able to do the following:

- **Describe the architecture and components of Oracle Workflow.**
- **Discuss how the Business Event System communicates events between systems.**
- **Describe how the Workflow Engine executes workflow processes.**
- **Access Oracle Workflow Web pages.**

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Oracle Workflow Architecture

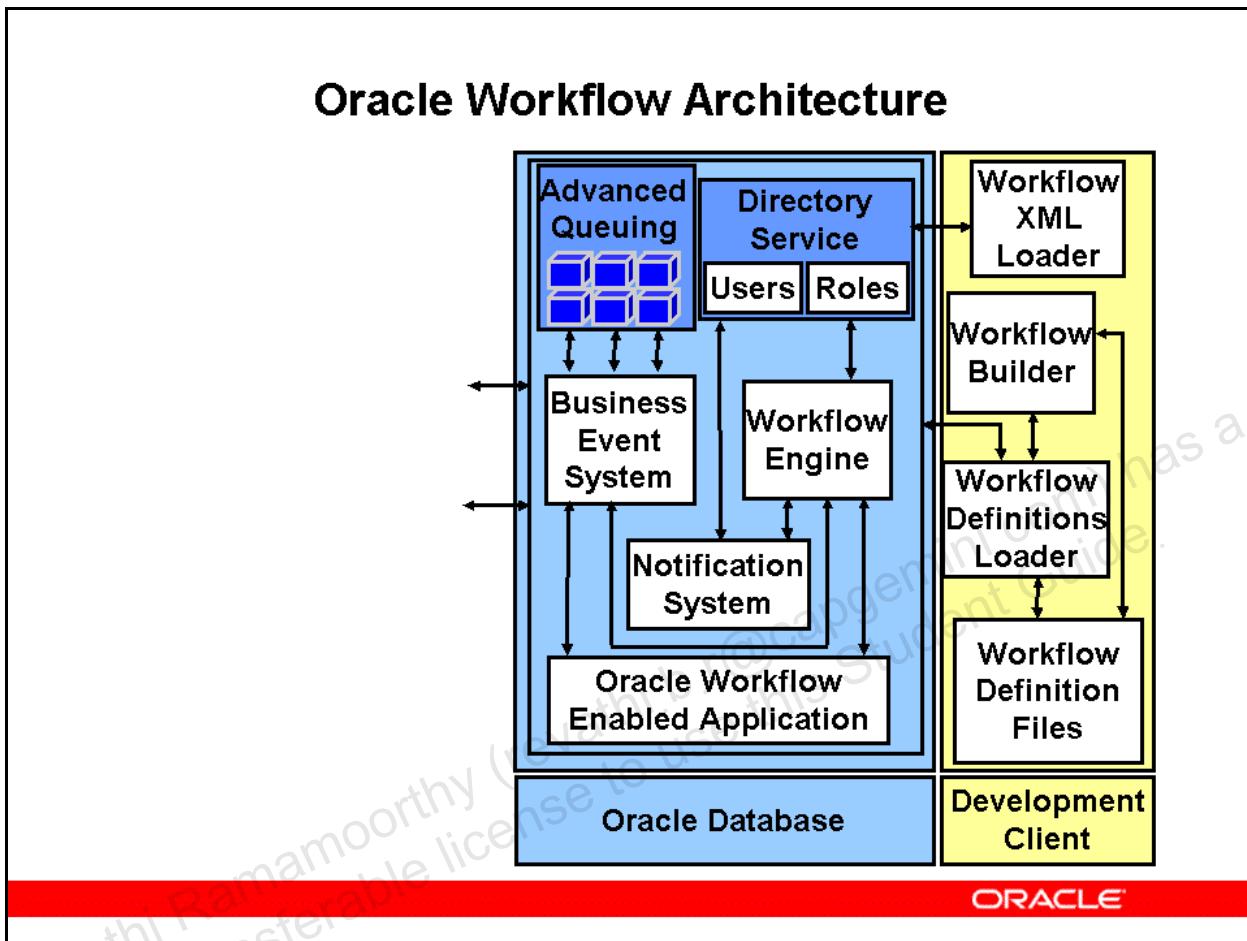


Oracle Workflow Architecture

Development Client

The development client is a Windows PC. This tier is used to create and modify Oracle Workflow process definitions, and to save and load flat files containing Oracle Workflow process definitions and XML definitions for Business Event System objects.

Oracle Workflow Architecture

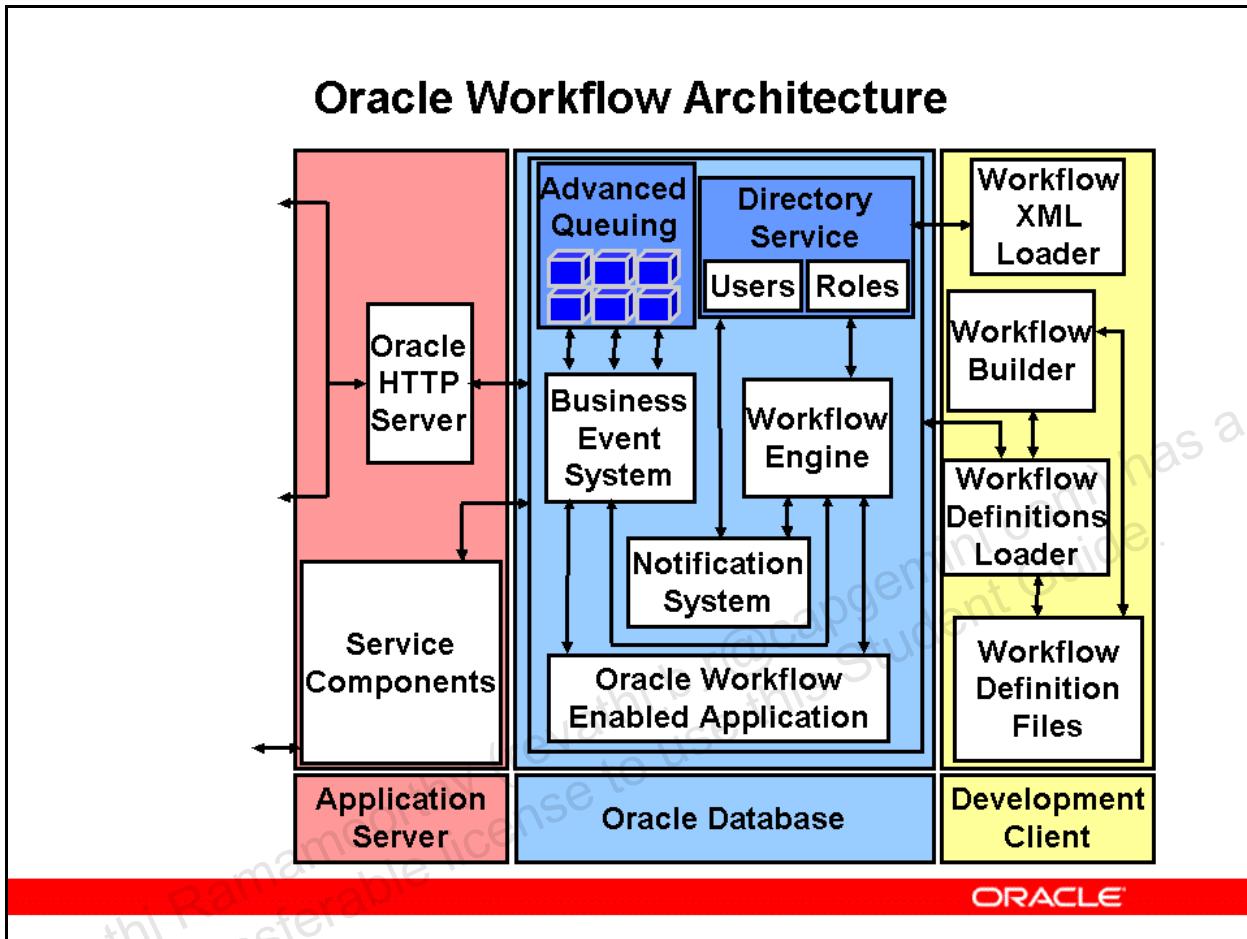


Oracle Workflow Architecture

Oracle Database

The server tier is the Oracle Database that hosts the business application integrated with Oracle Workflow, the Workflow Engine, Business Event System, Notification System, and directory service. The Business Event System leverages the Advanced Queuing feature within the Oracle Database.

Oracle Workflow Architecture

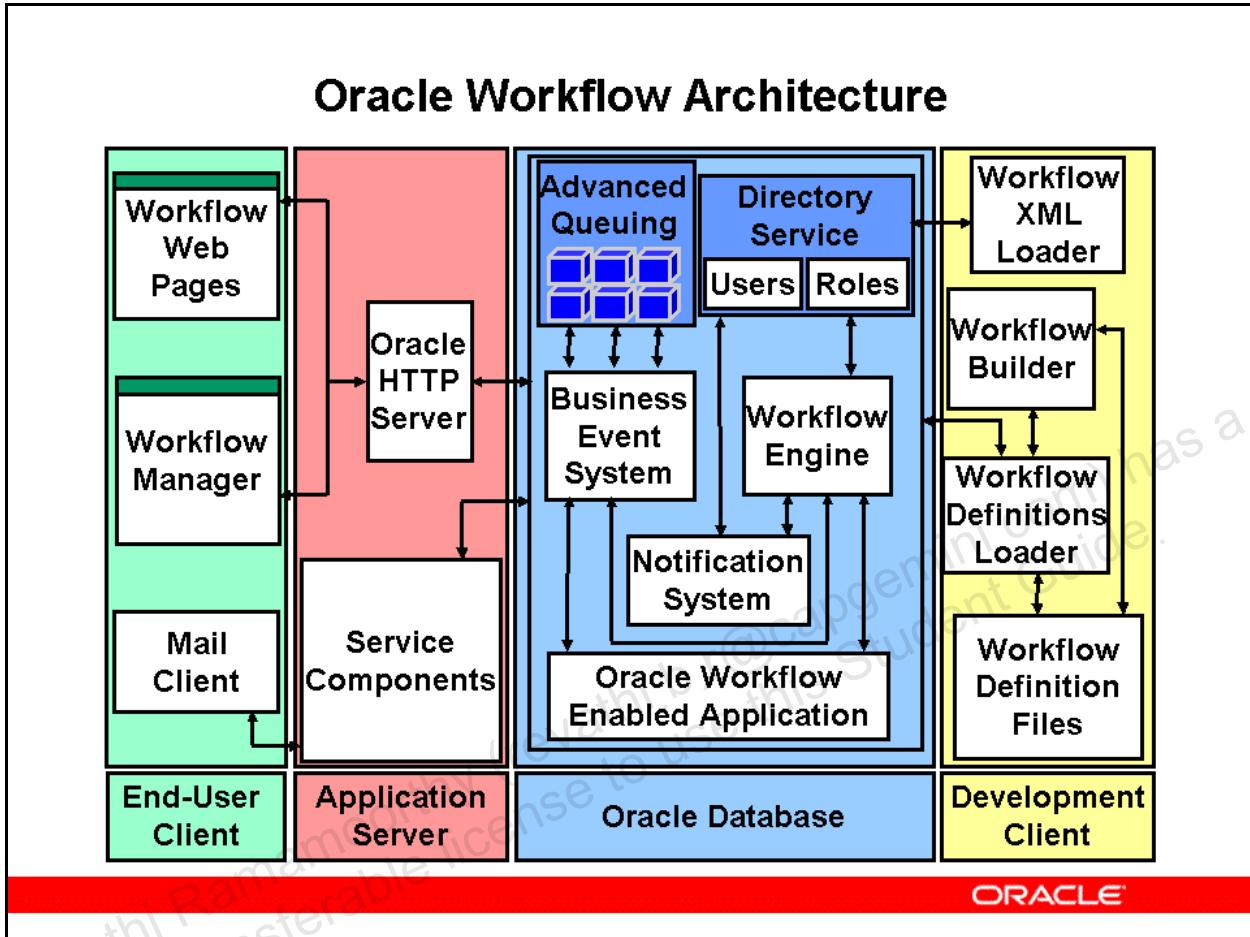


Oracle Workflow Architecture

Application Server

The application server is the middle tier environment outside of the database. This environment includes ancillary services such as Oracle HTTP Server as the Web server, and Oracle Workflow service components that run in the middle tier, such as agent listeners and notification mailers.

Oracle Workflow Architecture



Oracle Workflow Architecture

End-User Client

The end-user client is the workstation or PC that an end user uses to perform daily tasks. This client includes browser support for accessing Oracle Workflow Web pages, as well as for accessing the Oracle Workflow Manager component available through Oracle Applications Manager (OAM). The end-user client also includes a mail client application for reviewing and responding to notifications by e-mail.

Oracle Workflow Components

Oracle Workflow Components

- **Workflow Engine**
- **Oracle Workflow Builder**
- **Business Event System**
- **Notification System**
- **Notification Worklist**
- **Directory Services**
- **Status Monitor**
- **Workflow Definitions Loader**
- **Workflow XML Loader**
- **Workflow Manager**



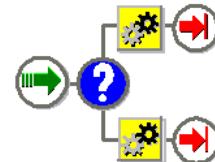
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Workflow Engine

Workflow Engine

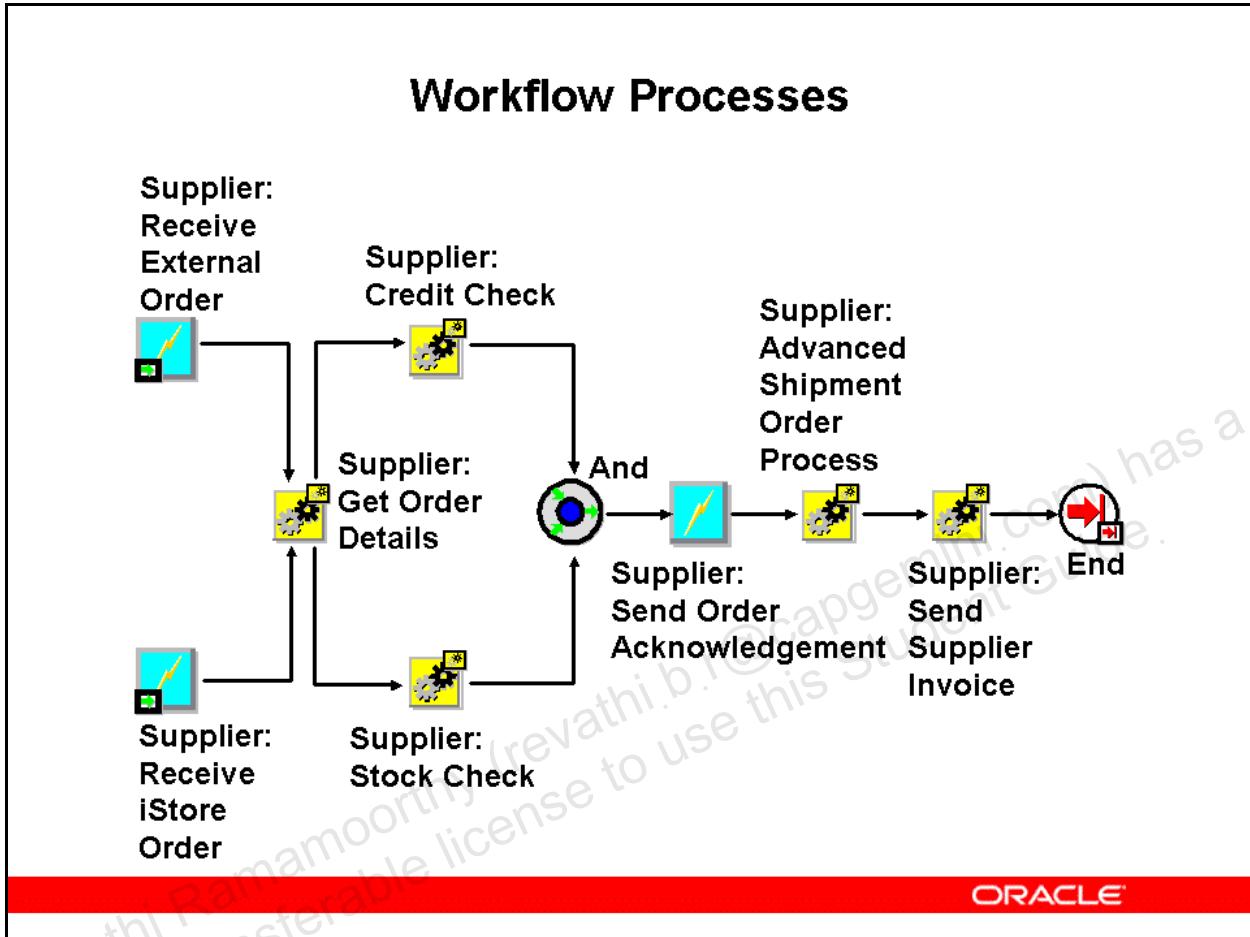
The Workflow Engine:

- Is embedded in the Oracle Database
- Uses the process definition created with Oracle Workflow Builder to coordinate the routing of activities for the process
- Monitors the state of each activity in a workflow process
- Signals any changes in the workflow state using API calls
- Guarantees consistency between the application and the workflow state because of Oracle Database transactional integrity



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Workflow Processes



Workflow Processes

A workflow process definition must be saved to the same database as the Workflow Engine. A process definition is composed of activities and the transitions between them.

- A completed application transaction or event can initiate a workflow process by raising an event or by calling a series of Workflow Engine APIs.
- The Workflow Engine locates the “Start” activity in the process definition.
- The Workflow Engine drives through the process, performing all automated steps such as function activities and Raise and Send event activities, until an asynchronous activity such as a notification, Receive event activity, or blocking activity occurs.
 - The Workflow Engine calls the Notification System to deliver a notification message to an appropriate role. Once a user of that role completes the notification response, the Workflow Engine continues to drive through the remaining activities in the process.
 - If a blocking activity is encountered, the Workflow Engine waits for an external program to complete and call the appropriate Workflow Engine API before proceeding to the next activity.

- If a Receive event activity is encountered, the Workflow Engine waits to receive the event from the Business Event System before proceeding to the next activity.
- The process completes when the Workflow Engine encounters an “End” activity.

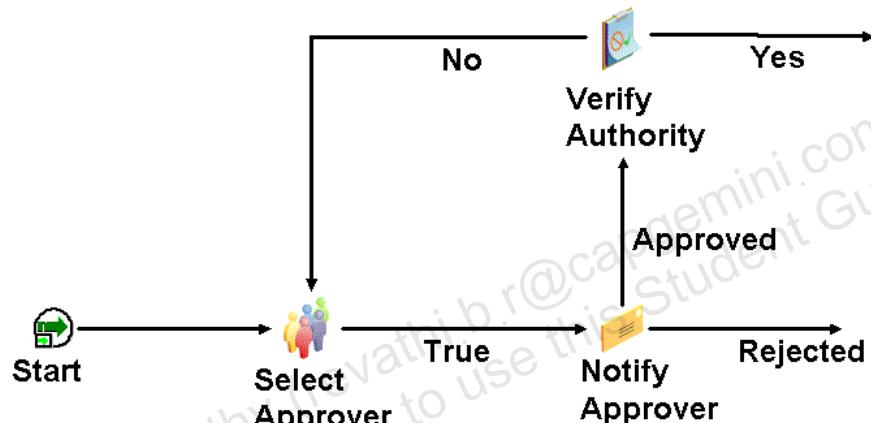
Example: Order Processing

This example shows a workflow process that includes business events.

Supported Process Constructs

Supported Process Constructs

- **Looping**
- **Results-based branching**



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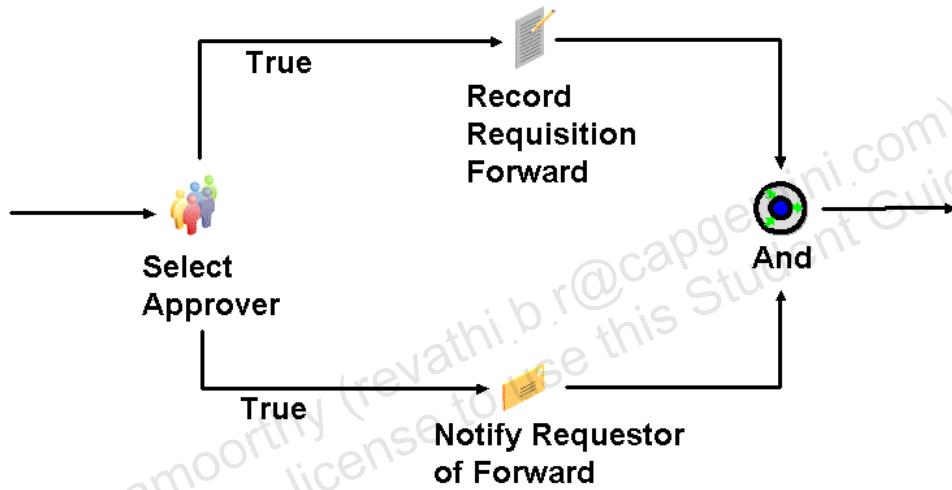
Supported Process Constructs

The Workflow Engine supports sophisticated workflow rules to model your business logic.

Supported Process Constructs

Supported Process Constructs

- Parallel flows
- Rendezvous

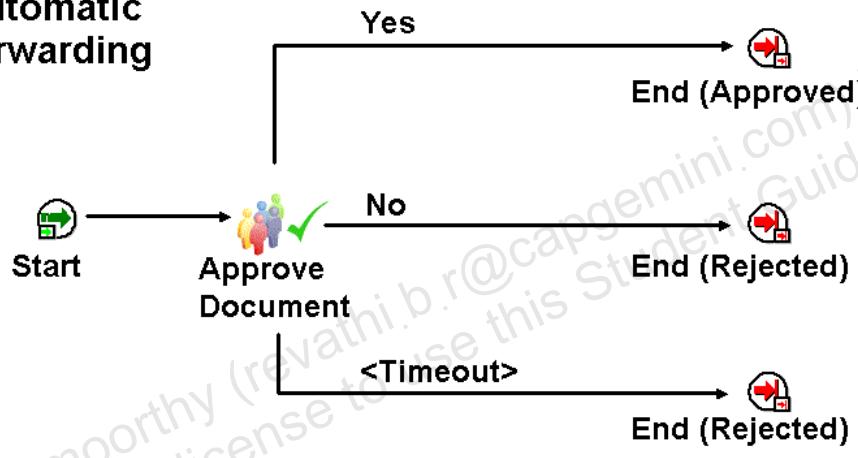


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Supported Process Constructs

Supported Process Constructs

- Voting
- Timeouts
 - Escalation
 - Automatic forwarding

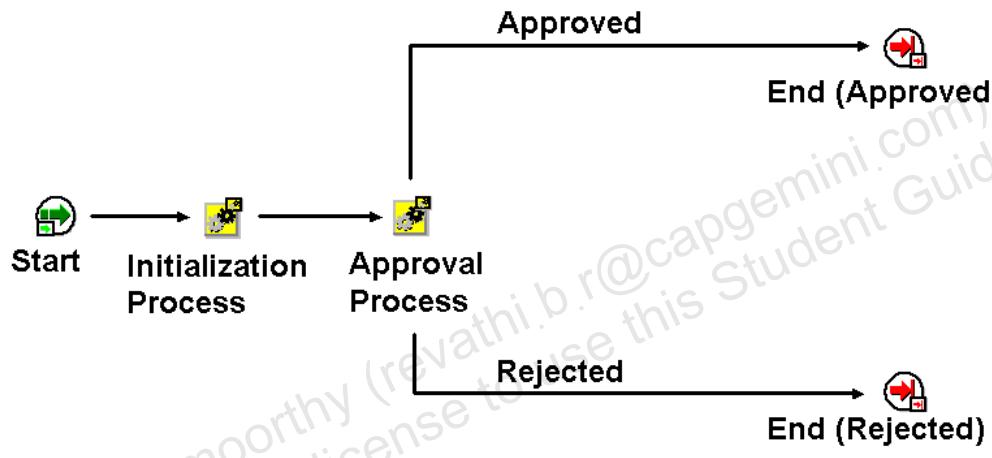


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Supported Process Constructs

Supported Process Constructs

- **Subprocesses**
(unlimited hierarchy)



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Oracle Workflow Builder

Oracle Workflow Builder

- Oracle Workflow Builder is the development tool for Oracle Workflow.
 - Lets you graphically define and customize workflow definitions
 - Requires a PC running Windows 2000 or Windows XP
- You can save workflow definitions to a database or a flat file.
- Oracle Workflow Builder consists of two parts:
 - Navigator Tree
 - Process Diagram



Oracle Workflow Builder

Saving workflow definitions as flat files on the local file system enables designers to back up their work and use source control.

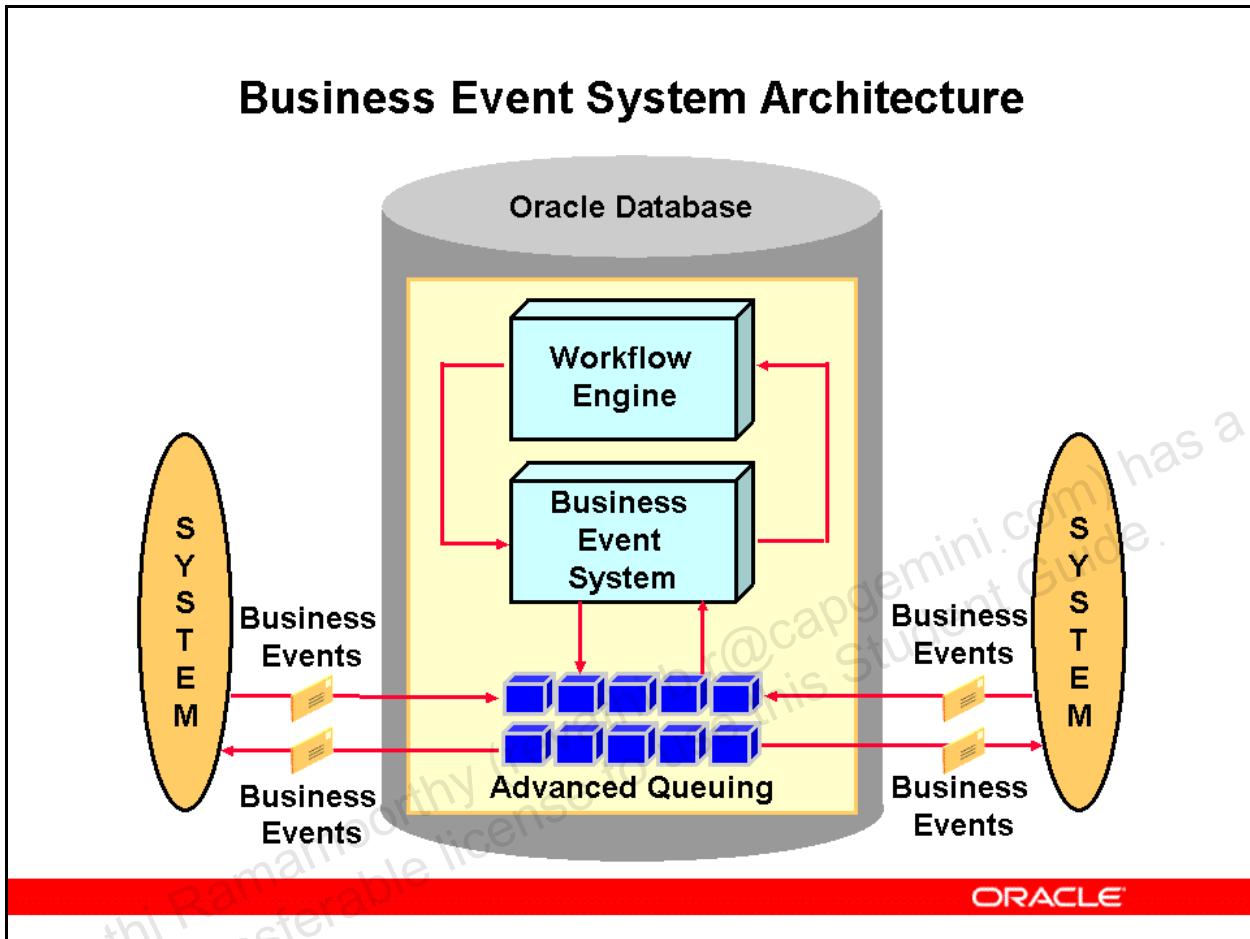
Navigator Tree

The navigator provides a tree structure for the workflow definition, with the highest level being the data store. Next is the item type, which is a grouping of workflow objects into a high-level category. The lower levels are the workflow objects themselves, such as attributes, processes, notifications, functions, events, messages, and lookup types. All these objects are organized into their respective categories within the tree.

Process Diagram

The diagram is made up of icons representing workflow objects. A diagram is built by dragging the objects from the navigator window and dropping them into the process diagram window. This method is called bottom-up design. You can also create new objects as you design the diagram and complete the definitions of those objects later. This method is called top-down design.

Business Event System Architecture



Business Event System Architecture

The Business Event System is an application service that communicates business events between systems. Oracle Workflow with the Business Event System can act as a system integration messaging hub that relays business event messages among systems.

The Business Event System leverages Oracle Advanced Queuing to send messages from one system to another.

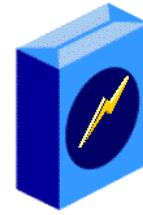
For the greatest flexibility in routing and processing business events, you can model your business process logic in powerful cross-system workflow processes that are executed by the Workflow Engine. However, the Business Event System can also function independently of the Workflow Engine.

Business Event System Components

Business Event System Components

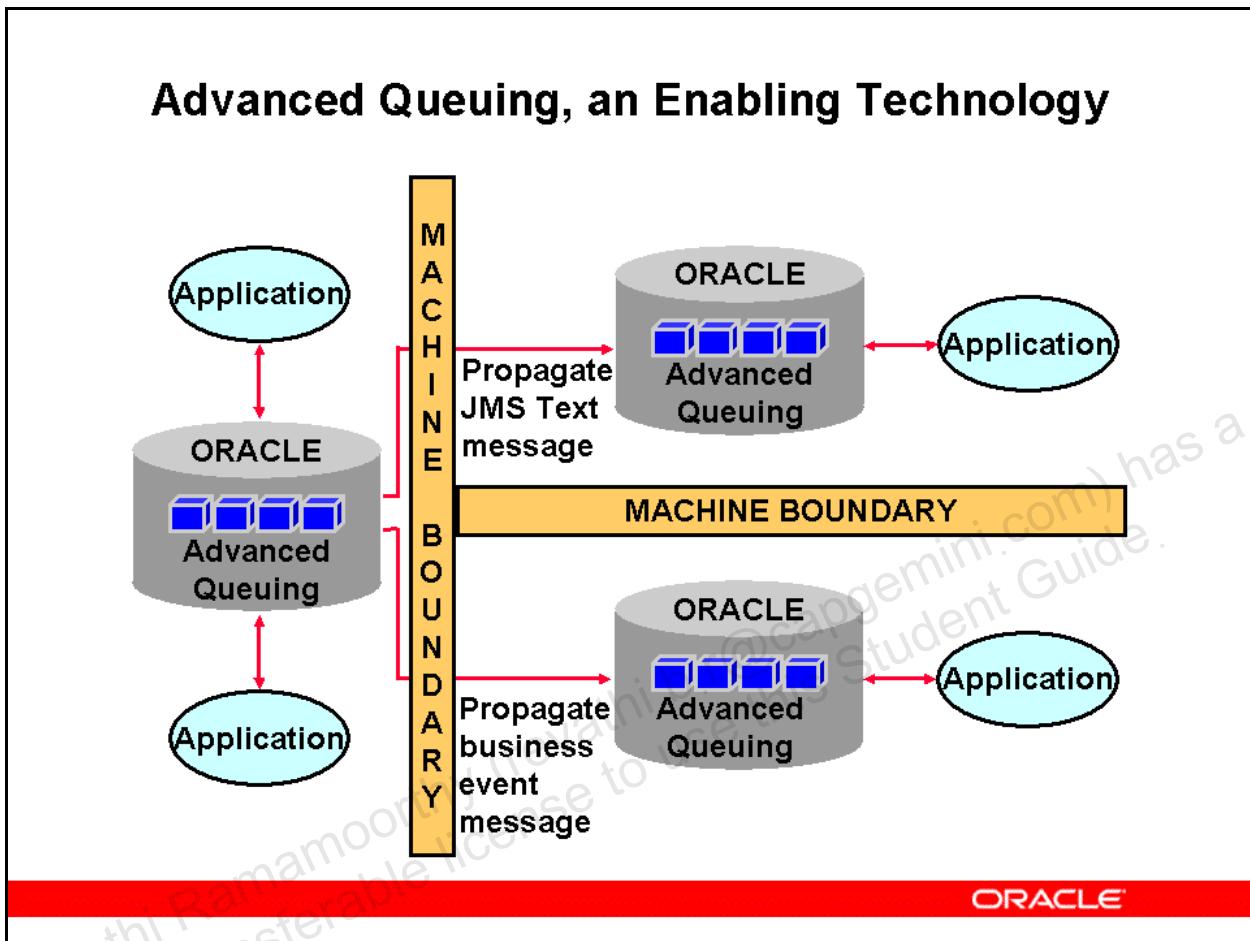
The Business Event System includes:

- The Event Manager - Lets you register:
 - Business events
 - Systems
 - Named communication agents within systems
 - Subscriptions to events that are significant to your systems
- Workflow Engine event activities - Let you model business events within workflow processes



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Advanced Queuing, an Enabling Technology



Advanced Queuing, an Enabling Technology

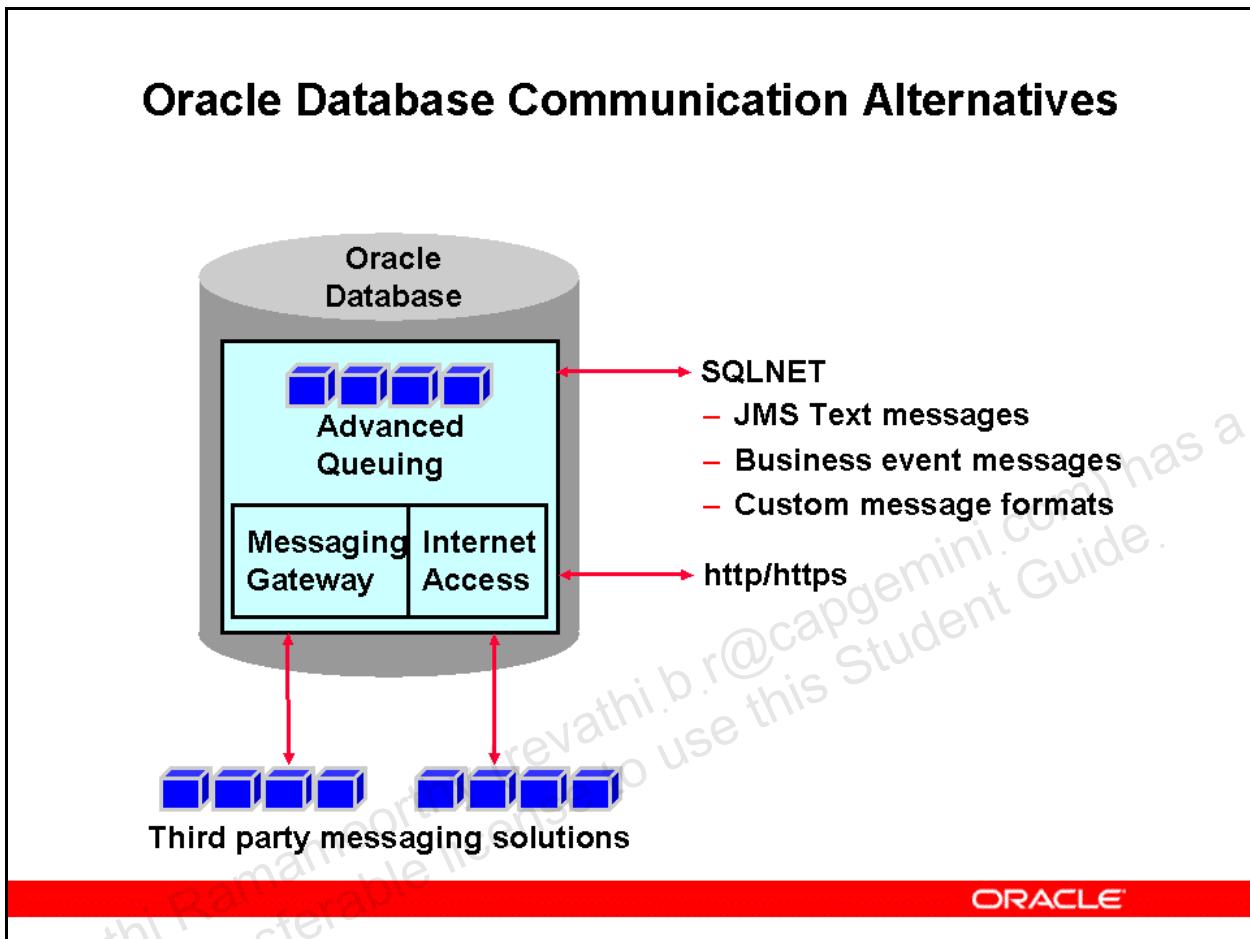
Oracle Advanced Queuing allows queue-to-queue propagation across machine boundaries. Oracle Advanced Queuing is a feature of the Oracle Database that provides database-integrated message queuing functionality, leveraging the functions of the Oracle Database to store messages persistently and transmit them using various transport protocols.

Java Message Service (JMS) is a messaging standard defined by Sun Microsystems, Oracle, IBM, and other vendors. Oracle Java Message Service (OJMS) provides a Java API for Oracle Advanced Queuing based on the JMS standard. Oracle Workflow supports communication of JMS Text messages through Oracle Advanced Queuing in a format called `SYS.AQ$_JMS_TEXT_MESSAGE`.

Oracle Workflow also supports business event messages in a standard Workflow format called `WF_EVENT_T`. You can additionally define custom message formats.

For more information, refer to the *Oracle Streams Advanced Queuing User's Guide and Reference*.

Oracle Database Communication Alternatives



Oracle Database Communication Alternatives

You can use Oracle Advanced Queuing for communication by SQLNET, HTTP, and HTTPS protocols, and for integration with third-party messaging solutions.

You can use Oracle Net Services (formerly Net8) to propagate messages by the SQLNET protocol. Oracle Workflow supports JMS Text messages for SQLNET propagation, as well as business event messages in a standard Workflow format called WF_EVENT_T. You can also define custom message formats.

The Oracle Streams Advanced Queuing Internet access functionality lets you perform Oracle Advanced Queuing operations over the Internet by using the Oracle Advanced Queuing Internet Data Access Presentation (IDAP) for messages and transmitting the messages over the Internet using transport protocols such as HTTP or HTTPS.

Messaging Gateway is a feature of Oracle Advanced Queuing that enables communication between applications based on non-Oracle messaging systems and Oracle Advanced Queuing. Standard Oracle Advanced Queuing functionality provides propagation between two Oracle Advanced Queuing queues; Messaging Gateway extends that propagation to legacy applications based on non-Oracle messaging systems.

For more information, refer to the *Oracle Streams Advanced Queuing User's Guide and Reference*.

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Accessing Oracle Workflow Web Pages

Accessing Oracle Workflow Web Pages

- Use a Workflow responsibility in Oracle E-Business Suite to access Oracle Workflow's Web pages.
- Oracle Workflow Web pages are built in the Oracle Application Framework user interface format.



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Oracle Workflow Home Pages

Oracle Workflow Home Pages

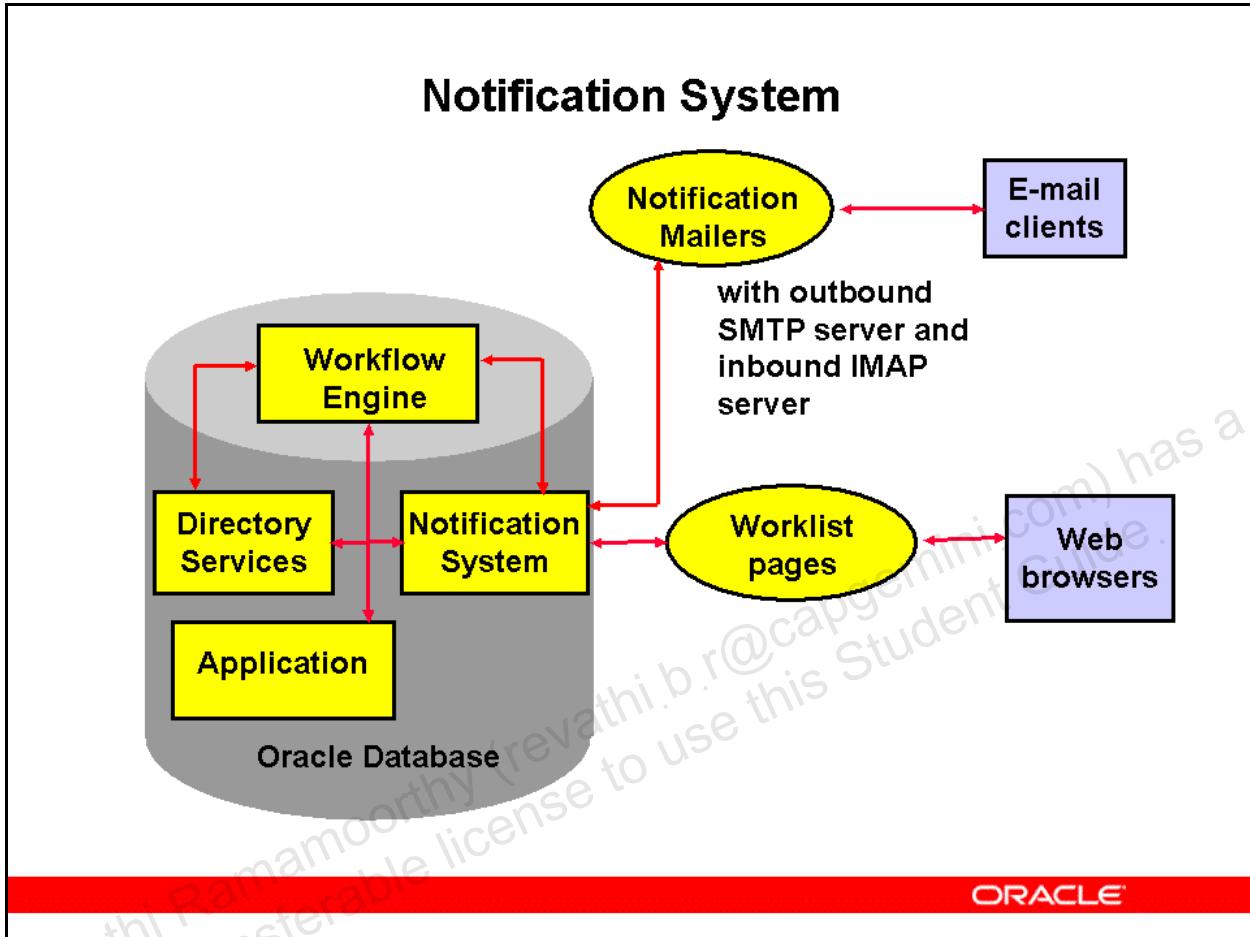
- **Administrator home page**
- **Self-service home page**



Oracle Workflow Home Pages

- Administrator home page: Lists your five highest priority notifications. Also provides tabs to the Developer Studio, Event Manager (Business Events), administrator Status Monitor, Advanced Worklist, and Administration pages.
- Self-service home page: Lists your five highest priority notifications as well as the five most recent workflows that you own that were started in the last two weeks. Also provides tabs to the Advanced Worklist and self-service Status Monitor.

Notification System



Notification System

The Notification System:

- Routes notifications to a role, which can be a single user or group of users
- Enables users to receive and respond to notifications using an e-mail application or Web browser of choice
- Sends e-mail notifications and processes e-mail responses using the JavaMail API
- Allows any users with access to the Internet to be included in a workflow process
- Provides access to the Worklist from Oracle E-Business Suite through the Worklist web pages
- Enables users to drill down from a notification in the Worklist web pages to any URL or Oracle E-Business Suite form to respond to the notification

Worklist Web Pages

Worklist Web Pages

The Worklist Web pages:

- Provide a list of open notifications for a particular user
- Let the user view notification details, including:
 - Extended HTML message formats
 - Links to URLs or Oracle E-Business Suite forms that let users research and make decisions through online inquiry
- Let the user respond to notifications that require a response



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Worklist Web Pages

Oracle Workflow includes two different versions of the Worklist:

- Advanced Worklist: Provides full notification information as well as additional options for displaying and administering notifications
- Personal Worklist: Provides additional search and filtering options for displaying notifications

E-Mail Notifications

E-Mail Notifications

- The Notification System interfaces with the notification mailer program to send e-mail notifications to users and roles.
- Users can reply to e-mail notifications using their e-mail client.
- A notification mailer can send an individual e-mail for each notification, or a summary e-mail listing all the outstanding notifications for a user.



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Directory Services

Directory Services

The directory service for Oracle Workflow is implemented as a set of views that are mapped across the user tables of the underlying applications.

- **WF_USERS:** Contains information on user names, display names, notification preferences and e-mail addresses
- **WF_ROLES:** Contains information on the roles of which users can be members
- **WF_USER_ROLES:** Contains information on the association of users with roles
- **WF_USER_ROLE_ASSIGNMENTS_V:** Contains information on assignments of users to roles, both direct and inherited through role hierarchy relationships



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Directory Services

Users can be associated with more than one role, and a role may contain more than one user. The Workflow Engine and Notification System use the directory service to determine who should receive notifications and in what format. Notifications can be delivered to an individual user or to all members of a particular role.

Note: Oracle Workflow uses a directory service model in which denormalized information is maintained in the Workflow local tables for performance gain. You should maintain synchronization between the user and role information stored in application tables by the source modules and the information stored in the Workflow local tables.

Status Monitor Web Pages

Status Monitor Web Pages

The Status Monitor Web pages:

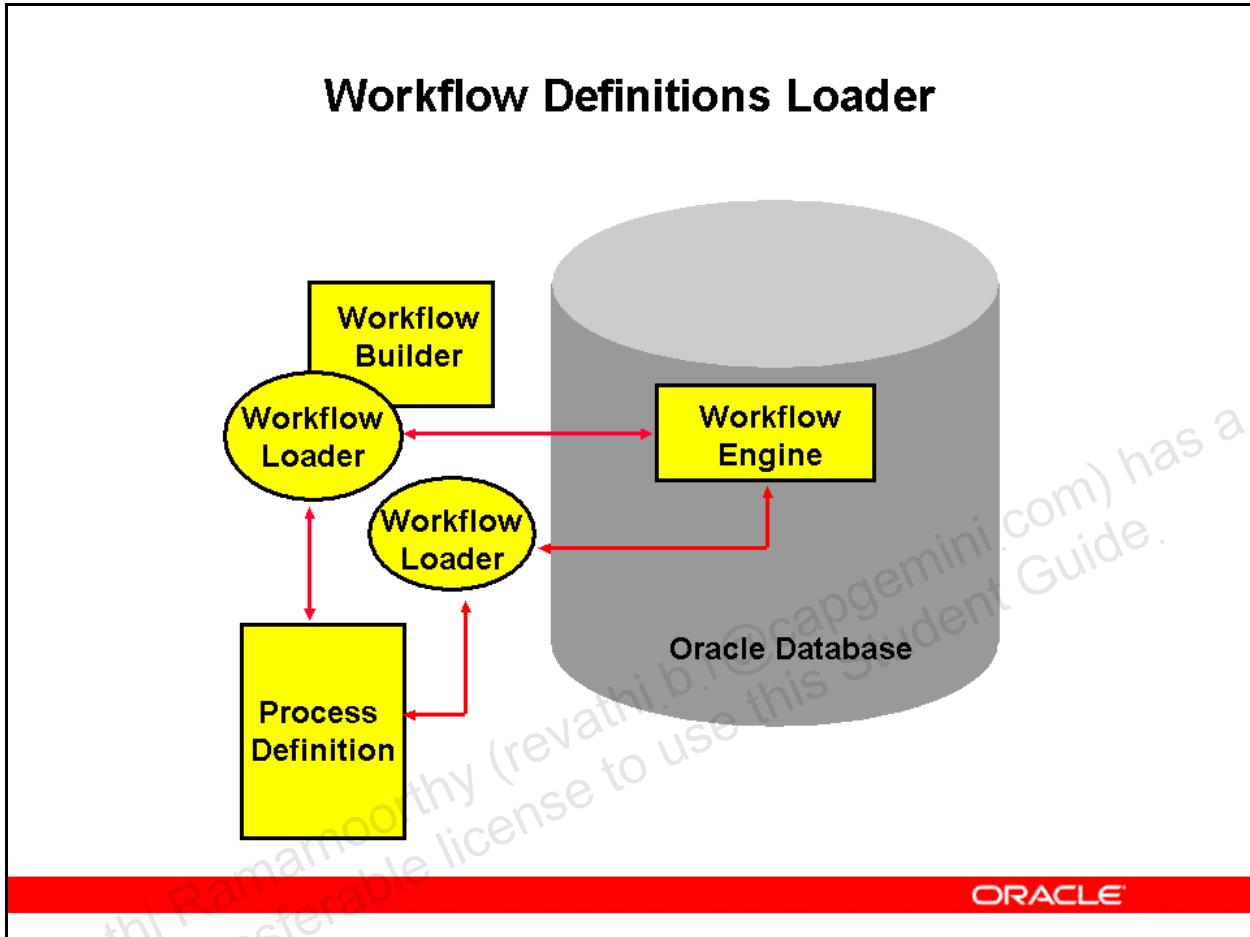
- Let you search for a workflow process instance to view
- Display status information for the process instance
 - Graphical depiction of the process status in a diagram
 - Detailed information about individual activities and about the process as a whole
- Let users view their own workflows
- Let administrators view all workflows, perform control operations, and handle errors



Workflow Monitor

Oracle Workflow includes both administrator and self-service versions of the Status Monitor in the Oracle Application Framework user interface format.

Workflow Definitions Loader

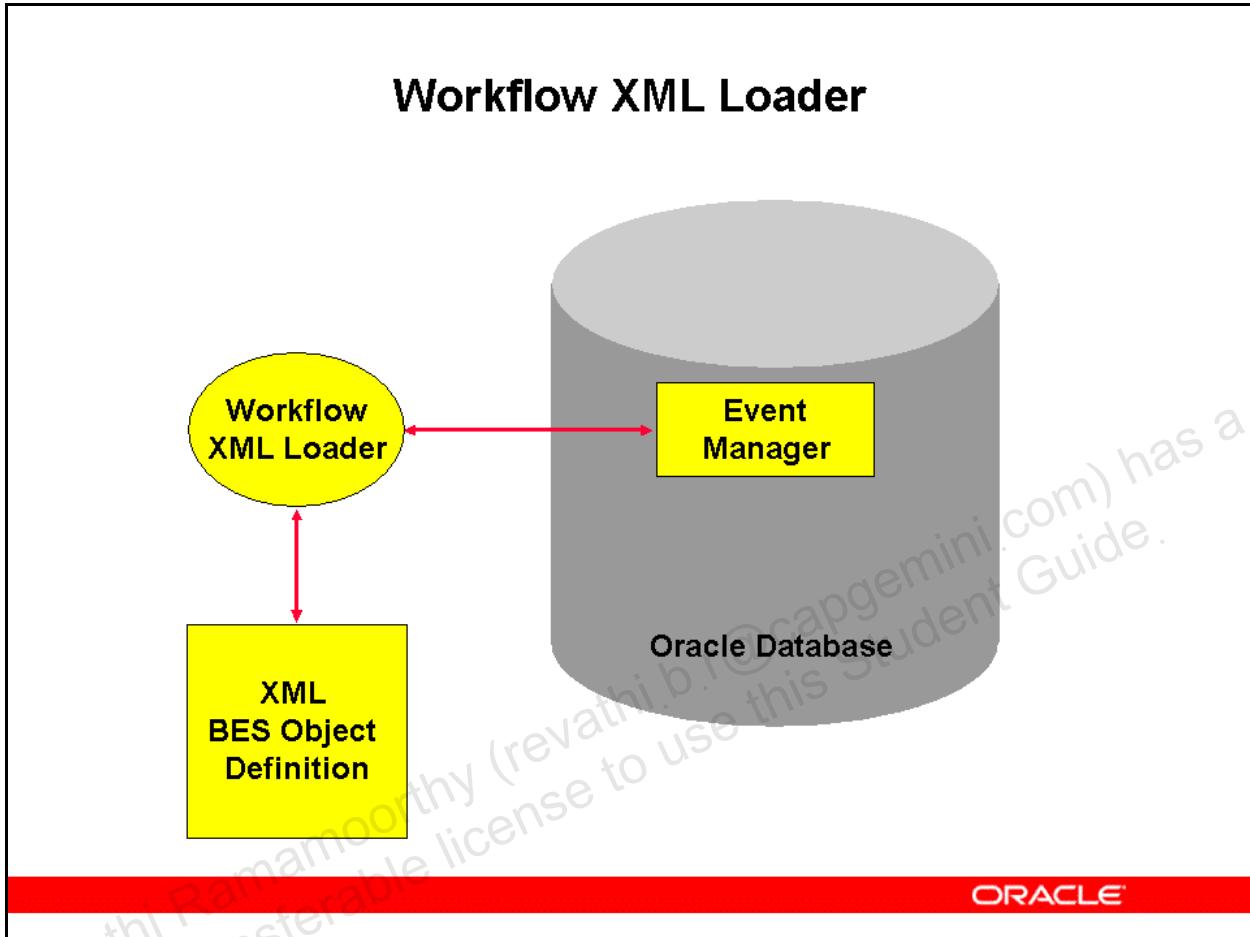


Loading Workflow Definitions

The Workflow Definitions Loader is a utility program that lets you transfer process definitions between a database and a flat file. The Workflow Definitions Loader:

- Runs on the server machine.
- Lets you upgrade a database with new versions of process definitions or upload existing process definitions after a database upgrade.
- Is also integrated into Oracle Workflow Builder.
- Allows process definitions to be source-controlled as flat files.

Workflow XML Loader



Workflow XML Loader

The Workflow XML Loader is a utility program that lets you transfer XML definitions for Business Event System objects between a database and a flat file.

- When you download Business Event System object definitions from a database, Oracle Workflow saves the definitions as an XML file.
- When you upload object definitions to a database, Oracle Workflow loads the definitions from the source XML file into the Business Event System tables in the database, creating new definitions or updating existing definitions as necessary.

Workflow Manager

Workflow Manager

- Allows administrators to manage Workflow system-level status and features from a central console
- Accessed through Oracle Applications Manager



Workflow Manager

Administrators can use Workflow Manager to perform the following tasks:

- Run Workflow service components, such as notification mailers and agent listeners.
- Control other Workflow system services, including background engines, purging obsolete Workflow data, and cleanup of the Workflow control queue.
- Monitor work item processing by viewing the distribution of all work items by status and drilling down to additional information.
- Monitor event message processing for local Business Event System agents by viewing the distribution of event messages by status and drilling down to additional agent information and individual event messages, as well as by viewing queue propagation details.

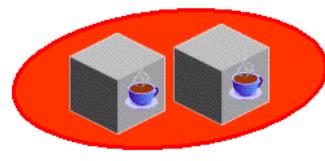
With this ability to monitor work items and event messages, a system administrator can identify possible bottlenecks easily.

Service Components

Service Components

Service components managed through Oracle Workflow Manager include:

- **Notification mailers:** Perform send and respond e-mail processing for the Notification System.
- **PL/SQL agent listeners:** Process inbound messages on Business Event System agents in the database.
- **Java agent listeners:** Process inbound messages on Business Event System agents in the middle tier.



Service Components

Oracle Workflow uses the Generic Service Component Framework (GSCF) to simplify and automate the management of background Java services. A service component is an instance of a Java program that has been defined according to the GSCF standards so that it can be managed through this framework.

Use Oracle Workflow Manager to configure and run service components.

Note: Oracle Workflow Manager also lets you manage Web services outbound components, which process outbound Web service messages for Oracle XML Gateway. For more information, see the *Oracle XML Gateway User's Guide*.

Oracle Workflow Documentation

Oracle Workflow Documentation

- **Oracle Workflow documentation includes:**
 - *Oracle Workflow Administrator's Guide*
 - *Oracle Workflow Developer's Guide*
 - *Oracle Workflow User's Guide*
 - *Oracle Workflow API Reference*
 - *Oracle Workflow Client Installation Guide*
- **Documentation is available:**
 - On the documentation library DVD for your release
 - On Oracle Technology Network:
 - <http://www.oracle.com/technology/>



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Oracle Workflow Documentation

The main Oracle Workflow documentation set includes the following:

- *Oracle Workflow Administrator's Guide*: Explains how to complete the setup steps necessary for any product that includes Workflow-enabled processes, as well as how to monitor the progress of run-time workflow processes.
- *Oracle Workflow Developer's Guide*: Explains how to define new workflow business processes and customize existing Oracle E-Business Suite-embedded workflow processes. It also describes how to define and customize business events and event subscriptions.
- *Oracle Workflow User's Guide*: Describes how users can view and respond to workflow notifications and monitor the progress of their workflow processes.
- *Oracle Workflow API Reference*: Describes the APIs provided for developers and administrators to access Oracle Workflow.
- *Oracle Workflow Client Installation Guide*: Describes how to install the Oracle Workflow Builder and Oracle XML Gateway Message Designer client components for Oracle E-Business Suite.

Summary

Summary

In this lesson, you should have learned how to:

- **Describe the architecture and components of Oracle Workflow.**
- **Discuss how the Business Event System communicates events between systems.**
- **Describe how the Workflow Engine executes workflow processes.**
- **Access Oracle Workflow Web pages.**

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Planning a Workflow Process

Chapter 3

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Planning a Workflow Process

Planning a Workflow Process

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Objectives

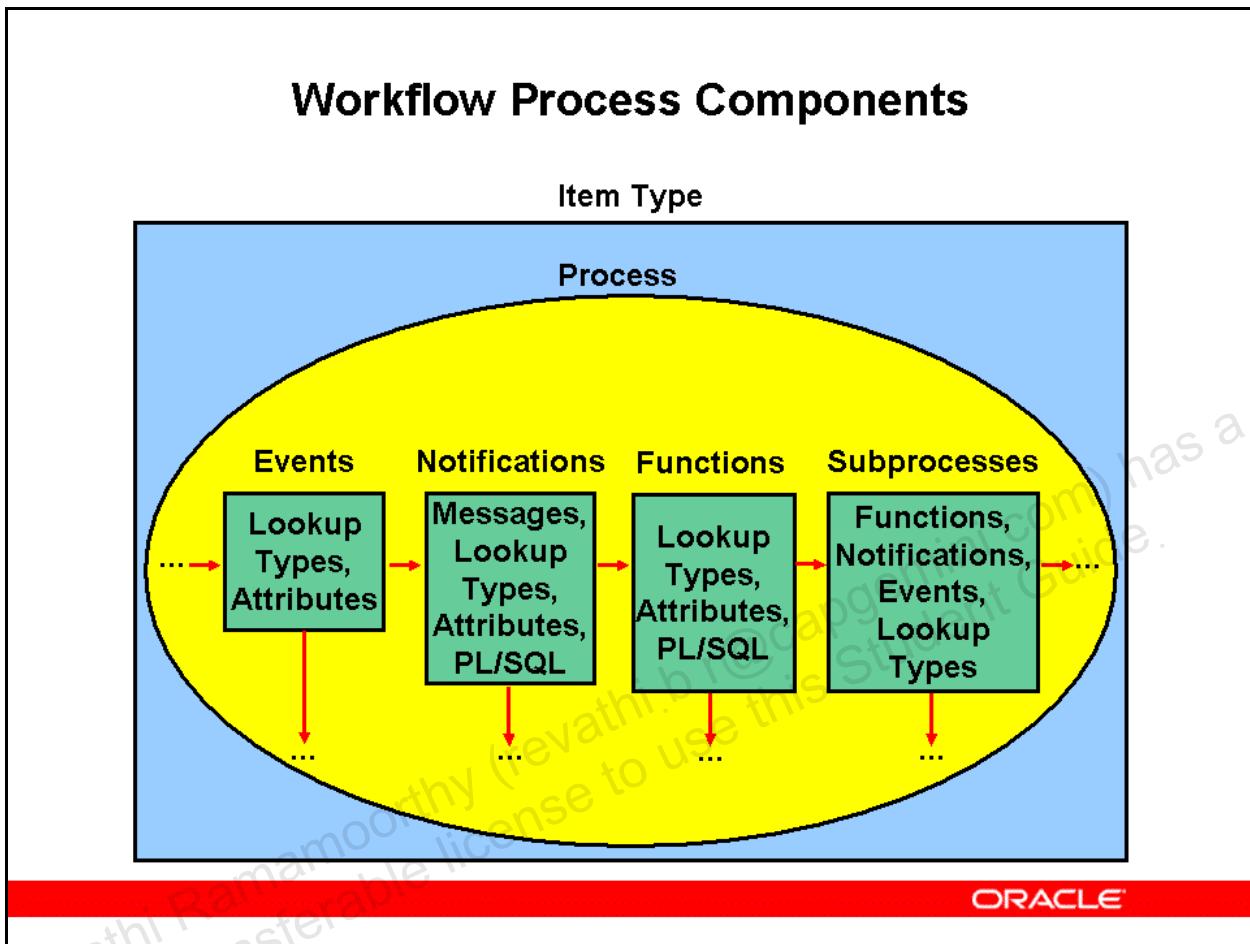
Objectives

After completing this lesson, you should be able to do the following:

- **Identify the components of a workflow process.**
- **Plan a workflow process.**
- **Incorporate standard activities within a process.**

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Workflow Process Components



Workflow Process Components

- Data Store: A database connection or flat file that holds a workflow process definition.
- Item Type: A grouping of workflow components into a high level category. All components of a workflow process must be associated with a specific item type. An item type can contain multiple processes.
- Item Type Attribute: A feature of the item type which stores information that can be globally referenced by any activity in a process. Also referred to as an item attribute.
- Process Activity: A series of actions that need to be performed to accomplish a business goal. A process is represented by a workflow diagram. A process can include function activities, notification activities, event activities, and other process activities (subprocesses), as well as the transitions between these activities.
- Event Activity: A business event modeled as an activity so that it can be included in a workflow process.
- Notification Activity: A unit of work that requires human intervention. A notification activity sends a message to a performer.
- Function Activity: An automated unit of work, usually defined as a PL/SQL stored procedure. A function activity can also run an external function.

- Message: The information sent by a notification activity. The message may request the performer (the role receiving the message) to do some work or may simply provide information.
- Lookup Type: A list of values that can be referenced by any activity in a workflow process. The values in the list are called lookup codes.
- Transition: The relationship that defines the completion of one activity and the activation of another activity within a process. In a process diagram, a transition is represented as an arrow between two activities.
- Item: A specific business document or transaction.
- Process Instance: A unique item being managed by a process.

Oracle Workflow Builder

Oracle Workflow Builder

The Oracle Workflow Builder:

- Is used to create the components of a process
- Consists of a navigator tree, which lists all process components, and a process diagram window
- Groups all components into an item type



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Oracle Workflow Builder

In the navigator tree, each item type includes the following branches:

- Attributes
- Processes (Subprocesses)
- Notifications
- Functions
- Events
- Messages
- Lookup Types

Standard Activities

Standard Activities

- Oracle Workflow provides some predefined activities for commonly used steps in a workflow process.
- These activities are associated with the Standard item type (wfstd.wft).
- The standard activities can be used in process diagrams associated within any item type you define.



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Standard Activities

The Standard item type is automatically installed on your Oracle Workflow server. You can also access the Standard item type from the file wfstd.wft located in your Oracle Workflow Builder client installation in the <ORACLE_HOME>\wf\DATA\<language>\ subdirectory.

The standard activities provided by Oracle Workflow include:

- And
- Or
- Compare Date
- Compare Number
- Compare Text
- Compare Execution Time
- Wait
- Block
- Defer Thread
- Launch Process

- Noop
- Loop Counter
- Start
- End
- Role Resolution
- Notify
- Vote Yes/No
- Continue Flow
- Wait for Flow
- Assign
- Get Monitor URL
- Get Event Property
- Set Event Property
- Compare Event Property

For a full explanation of these standard activities, see: Predefined Workflow Activities, *Oracle Workflow Developer's Guide*.

Note

If you are using Oracle XML Gateway, you can also use standard activities supporting XML messaging that are provided in the XML Gateway Standard item type. For more information, see: Integrating Oracle XML Gateway with Oracle Workflow Business Event System, *Oracle XML Gateway User's Guide*.

Planning a Workflow Process

Planning a Workflow Process

- 1. Identify your business needs.**
- 2. Identify the activities that will accomplish those needs.**
For example:
 - a. What is each activity's type: Function, Notification, Event, or Process?**
 - b. Will an activity's result affect the transition that the Workflow Engine takes? If so, define the activity's possible results as lookup codes in a lookup type.**
 - c. Which standard activities can you leverage to minimize the development work required for your process?**



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Planning a Workflow Process

Consider modeling your process so that it can be customized and extended in the future.

Planning a Workflow Process

Planning a Workflow Process

- 3. Identify how the process will be initiated. For example:**
 - a. What condition initiates the process? Is it a completed transaction, a database exception, a button on a form, or some other condition?**
 - b. Will there be an interface to initiate the process?**
 - c. Will the process begin with a Receive event activity, or with a Start function activity?**
- 4. Identify the possible results of the process. List the possible results as lookup codes in a lookup type.**



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Planning a Workflow Process

If the process will begin with a Receive event activity, the calling application must raise an event, either with the WF_EVENT.Raise API or with a Raise event activity in another workflow process. The event must trigger a subscription that sends the event message to the workflow process that has the Receive event activity, which must be marked as a Start activity node.

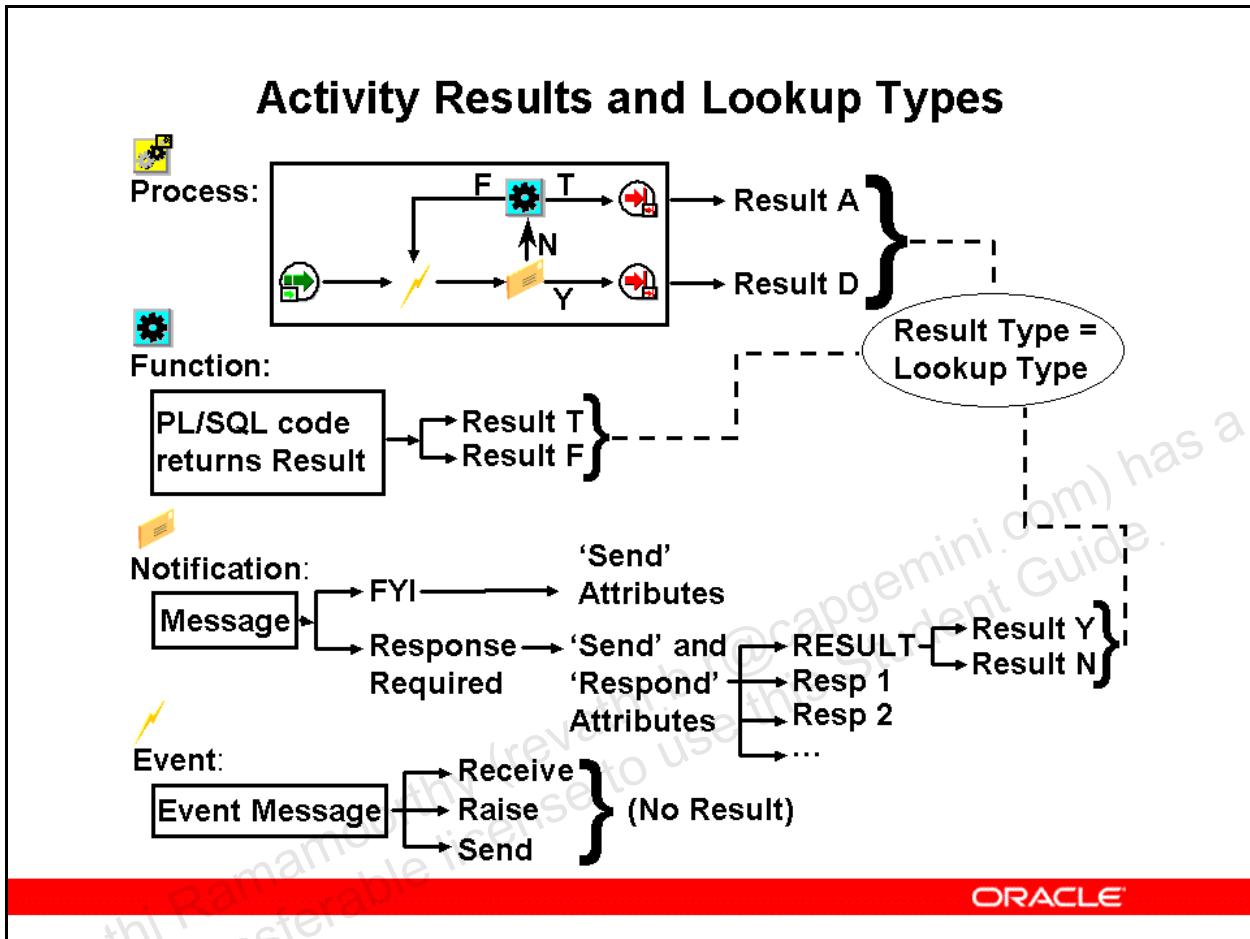
If the process will begin with a standard Start function activity, the activity must be marked as a Start activity node, and the application must execute a procedure that calls the appropriate Workflow Engine APIs, either WF_ENGINE.CreateProcess and WF_ENGINE.StartProcess, or WF_ENGINE.LaunchProcess, which is a wrapper combining the CreateProcess and StartProcess APIs. You can use WF_ENGINE.LaunchProcess if you do not need to set any other values such as item attribute values in between creating and starting the process. If you are starting several processes at once, your application can call WF_ENGINE_BULK.CreateProcess and WF_ENGINE_BULK.StartProcess or WF_ENGINE_BULK.FastForward to launch multiple processes in bulk.

Note: Using the standard Start function activity lets you visually represent the start of the process in your diagram. Alternatively, you can choose to start the process with another

function, notification, or process activity. In all cases, however, the activity must be marked as a Start activity node.

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Activity Results and Lookup Types



Activity Results and Lookup Types

Process Activities

The diagram for a process activity can include functions, notifications, events, and other processes.

A process activity can be completed with a specific result that is defined in a lookup type. For example, the sample process in the diagram above can be completed with a final result of Accepted (A) or Declined (D), both of which would be codes defined in a lookup type.

Function Activities

The PL/SQL procedure for a function activity can return some result that determines the next transition the Workflow Engine takes. That result should be defined as a code in a lookup type. For example, the function activity in the diagram can be completed with a result of True (T) or False (F), which are defined in the standard Boolean lookup type in the Standard item type.

Notification Activities

The message sent by a notification activity can simply convey information or it can require a response.

- If the message only provides information (such as a “For Your Information” (FYI) message), then create and include “Send” message attributes in the message as necessary.
- If the message requires a response, then create “Send” message attributes that provide enough information for the recipient to respond, and also create “Respond” message attributes that prompt a response. For example, the response-required notification activity in the diagram requests responses for two pieces of information called Resp 1 and Resp 2.
- If a particular response defines the actual result of the notification activity, then complete the Result tab for the message. The information you enter creates a special “Respond” message attribute that has an internal name of “RESULT”. The “RESULT” attribute has a data type of lookup and must reference a lookup type that defines the possible result codes and matches the result type for the notification activity. For example, the response-required notification activity in the diagram requires a RESULT response which must be either Yes (Y) or No (N). These codes are defined in the standard Yes/No lookup type in the Standard item type.

Event Activities

An event activity can either receive, raise, or send a business event from the Business Event System. An event activity does not have a result, but you can branch on the contents of an event message using comparison activities provided in the Standard item type.

Summary

Summary

In this lesson, you should have learned how to:

- **Identify the components of a workflow process.**
- **Plan a workflow process.**
- **Incorporate standard activities within a process.**

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Diagramming a Workflow Process

Chapter 4

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Diagramming a Workflow Process

Diagramming a Workflow Process

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Diagram a workflow process.**
- **Define an item type.**
- **Define a process activity.**

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Creating a New Workflow Process

Creating a New Workflow Process

You can create new workflow processes by two different design methods:

- **Top-Down Design:** If you prefer to approach your design from a high level, you can first sketch out the process diagram with activities, and then go back later to create the supporting objects for each activity.
- **Bottom-Up Design:** If you prefer to take a more programmatic approach to your design, you can first define each of the supporting objects of your process before beginning to create a higher level process diagram.



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Creating a New Process from Top Down

Creating a New Process from Top Down

- 1. Use the Quick Start Wizard to create the process framework, including the item type and initial process activity.**
- 2. Define function, notification, event, or process activities without underlying dependencies.**
- 3. Diagram the relationship of the activities.**
- 4. Define item type attributes for the process.**
- 5. Define lookup types and lookup codes.**
- 6. Define messages.**
- 7. Define message attributes.**
- 8. Update processes, functions, events, and notifications with underlying components.**



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Creating a New Process from Bottom Up

Creating a New Process from Bottom Up

- 1. Define the item type of the process.**
- 2. Define the item type attributes for the process.**
- 3. Define lookup types and lookup codes.**
- 4. Define messages.**
- 5. Define message attributes.**
- 6. Define function, notification, event, or process activities.**
- 7. Diagram the relationship of the activities.**



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Diagramming a Process

Diagramming a Process

1. To begin drawing a process diagram in Oracle Workflow Builder, you must display the process window by one of these methods:

- Use the Quick Start Wizard to create a process activity and initial diagram with Start and End nodes.**
- Display the process window for a process activity that is defined in the navigator tree.**
 - Double-click the process activity on the navigator tree.**
 - Select the process activity and press Ctrl + E.**
 - Select the process activity and choose Process Details from the Edit menu.**

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Quick Start Wizard

Quick Start Wizard

- If you want to use the top-down design method, you can use the Quick Start Wizard to jump-start the creation of a new item type and process.
- Initiate the Quick Start Wizard by one of these methods:
 - Select Quick Start Wizard from the File menu.
 - Click the Quick Start Wizard button on the navigator tree toolbar.
 - Select the navigator tree window and press Ctrl + Q.
- The Quick Start Wizard prompts for the minimum information necessary to create a new item type and process.



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Quick Start Wizard

New Item Type Properties

- Internal Name: Specify an all uppercase internal name with a maximum of eight characters. Do not include colons or leading or trailing spaces.
- Display Name: Enter a translatable display name for the item type.
- Persistence Type: Specify Temporary or Permanent persistence for the status audit trail of the item type. The persistence type controls when the run-time process status information is eligible for purging after the process is complete. If the persistence type is Permanent, the run-time status information is maintained indefinitely until it is specifically purged; if it is Temporary, the run-time status information is maintained for a specified number of days after the workflow completion date before it can be purged.
- Number of Days: If the persistence type is Temporary, specify the number of days from the time an item type instance completes before its status audit trail can be purged.

New Process Properties

- Internal Name: Specify an all uppercase internal name. Do not include colons or leading or trailing spaces.

- Display Name: Enter a translatable display name for the process activity.

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Quick Start Wizard

Quick Start Wizard

The Quick Start Wizard does the following:

- Creates a new data store in the Navigator window.
- Uses the information that you entered in the Workflow Quick Start Wizard window to create a new item type and process activity in the data store.
- Loads the Standard item type into the new data store so that you can include standard activities in your new process.
- Opens the process window for the new process activity you defined. The process window automatically displays a Start node and an End node.



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Defining an Item Type

Defining an Item Type

- You can also define a new item type manually without using the Quick Start Wizard.
- Item types are defined in the navigator tree within a data store.



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Defining an Item Type

To define an item type:

1. Select a data store in the navigator tree, or create a new data store by choosing New from the File menu.
2. Create a new item type by selecting New > Item Type from the Edit menu.
3. On the Item Type property page, enter an all uppercase internal name with a maximum of eight characters. Do not include colons or leading or trailing spaces.
4. Enter a translatable display name for the item type.
5. Enter a description of the item type.
6. Specify Temporary or Permanent persistence for the status audit trail of the item type. The persistence type controls when the run-time process status information is eligible for purging after the process is complete.
7. If the persistence type is Temporary, specify the number of days from the time an item type instance completes before its status audit trail can be purged.
8. Optionally enter the name of a selector/callback function for the item type.

- The item type selector/callback function is a PL/SQL procedure that the Workflow Engine can call to reset or test context information for an item type before executing an activity.
 - An item type can have multiple workflow processes associated with it. If it does, the selector/callback function can also identify the appropriate process to run.
 - Associating a selector/callback function with an item type makes the item type better suited to future customizations.
9. Choose Apply to save your changes.
10. Optionally select the Access tab to set the access levels allowed to modify this item type.

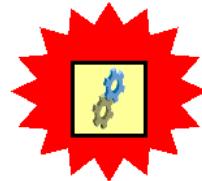
Example

For an example workflow item type, see the Requisition demonstration workflow (wf демо.wft), located in the `\<ORACLE_HOME>\wf\DATA\<language>` directory in your Oracle Workflow Builder installation. This workflow is described in detail in the Sample Workflow Process chapter in the *Oracle Workflow Developer's Guide*.

Defining a Process Activity

Defining a Process Activity

- You can also define a new process activity manually without using the Quick Start Wizard.
- A process activity must be defined before a business process can be diagrammed.
- Process activities must be associated with an item type and are created in the navigator tree beneath the Processes branch of the item type.



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Defining a Process Activity

To define a process activity:

1. In Oracle Workflow Builder, select the item type that you want in the navigator tree. Then select New Process from the Edit menu.
2. In the Activity property page, enter an internal name for the activity. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the activity.
4. Enter a description of the activity.
5. Choose an icon that identifies the activity.
6. Specify the result type that contains the possible results that the process can return.
7. Select the Runnable check box if this is a top-level workflow process that can be initiated. If the Runnable check box is selected, the process will appear in the Process Name list of values in the Initiate Workflow web page, and you can successfully pass this process internal name in a call to the Workflow Engine API WF_Engine.CreateProcess. Clear the Runnable check box if this process activity can only be executed as a subprocess called by another higher-level process.

8. Click Apply to save your changes.
9. Optionally select the Details tab to display and modify additional activity details.
10. Optionally select the Access tab to set the access levels allowed to modify this activity.

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Diagramming a Process

Diagramming a Process

2. Create a new node in the process by using one of the following methods:

- Select a process, notification, function, or event activity from the navigator tree and drag it into the process window.
- Click the New Process, New Notification, New Function, or New Event toolbar buttons in the process window.
- Select the process window and choose New Process, New Notification, New Function, or New Event from the right mouse menu.

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Diagramming a Process

Each process diagram must have one or more Start activities and one or more End activities.

Note: In the process window, you can display information about an activity by positioning your mouse over the activity. The Instance Label, Internal Name, Display Name, Comment, and Performer appear in a tool tip display.

Top-Down Design

Top-Down Design

- In top-down design, you draw the process diagram first and then define the underlying components for the activities.
- For example, you can create a function activity and place it in the process diagram without yet specifying the underlying PL/SQL function that it will execute.
- You must enter at least an internal name and a display name for a new activity in order to use the activity in the diagram.



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Top-Down Design

When you create a new activity in the process window, the property pages displayed for activities from the process diagram window include all tabs for the base activity definition as well as for the usage of the individual activity node. You must enter at least an internal name and a display name for the activity in order to use the activity in the diagram. You can also enter the remaining details in the activity and activity node property pages immediately, or you can save the activity and complete these details at a later time.

When you save a partially completed top-down process, Oracle Workflow Builder displays an error window with a list of invalid or missing information. You can save the incomplete process definition and correct the errors later.

Diagramming a Process

Diagramming a Process

- 3. Create a transition between two activity nodes by right-clicking the source activity, holding down the right mouse button, and dragging the cursor from the source activity to the destination activity.**
- 4. If the source activity has a result type defined, a list of possible result codes appears. Choose the result for this transition.**

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Diagramming a Process

If the source activity has no result type associated with it, by default no label appears on the transition. You can choose to show a label for such a transition by selecting the transition, holding down the right mouse button, and clearing the Hidden Label option. The label will display as <Default>.

If the source activity has an associated result type, you can create transitions to follow:

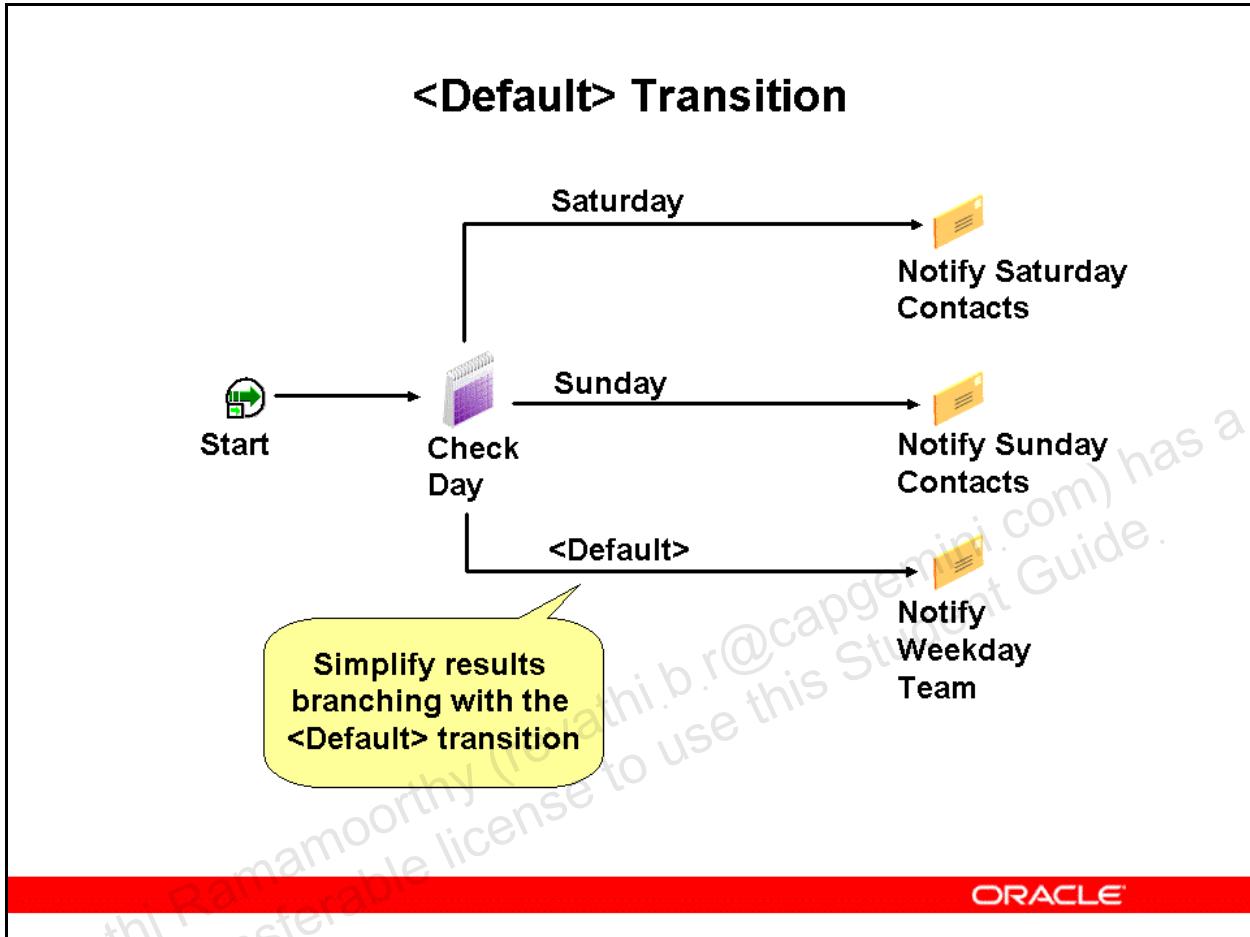
- When a specific result is returned by the activity, labeled with the result display name
- When a result returned is not covered by other transitions, labeled <Default>
- Regardless of result returned, labeled <Any>
- When the activity times out, labeled <Timeout>

Note: The Timeout property for the node must be set to enable the <Timeout> option in the list of results for the transition.

If the source activity is a voting activity, you can also create transitions to follow:

- When the vote results in a tie, labeled <Tie>
- When the vote doesn't return a result, labeled <No Match>

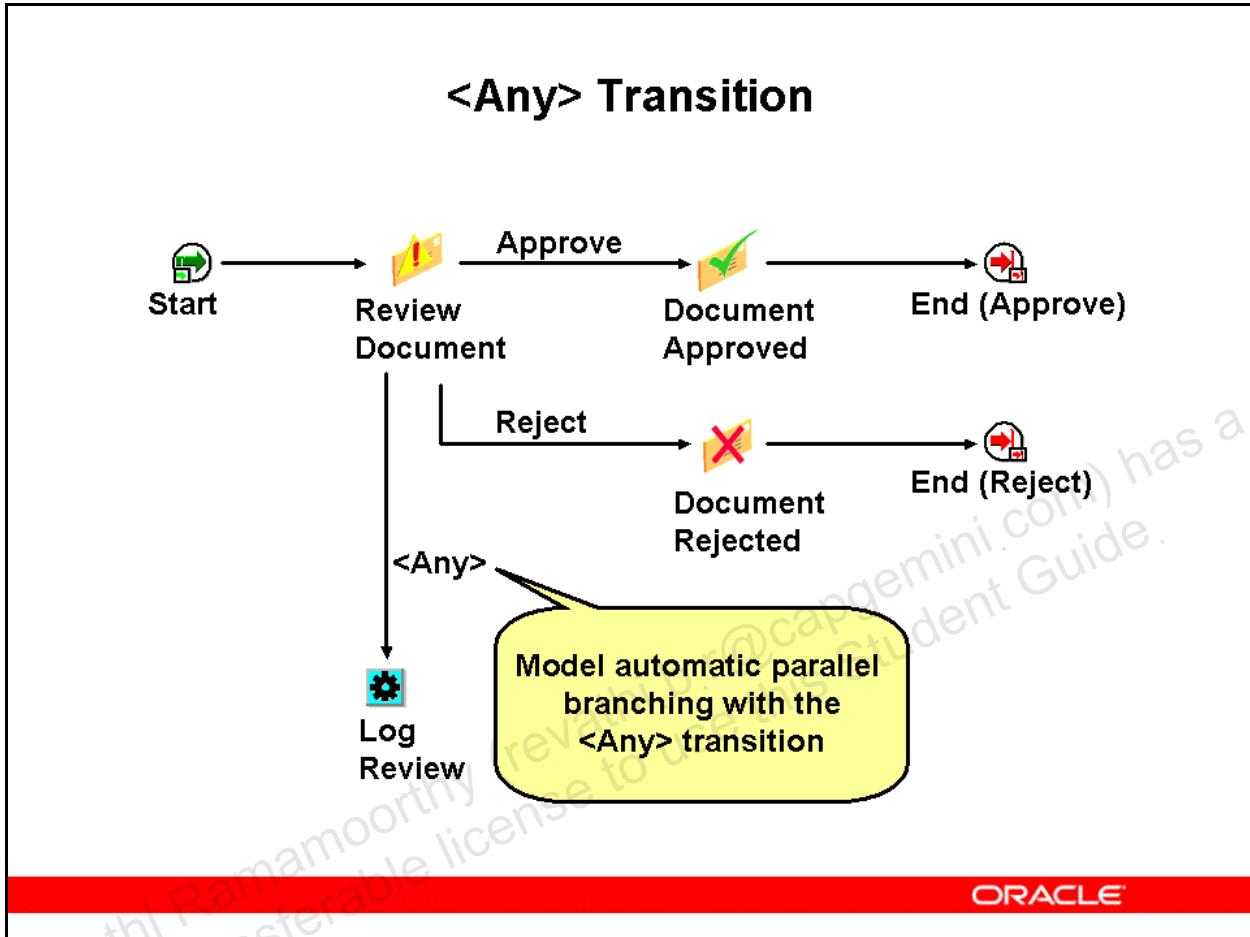
<Default> Transition



<Default> Transition

The Workflow Engine follows a <Default> transition if no other transition matching the completion result exists. This feature lets you simplify your process diagram modeling and maintenance by only drawing transitions for unique results, allowing all other results to follow the default transition.

<Any> Transition



<Any> Transition

The Workflow Engine follows an <Any> transition regardless of what completion result the activity returns. This feature lets you include a generic activity in the process that the Workflow Engine executes in parallel with any result-specific activity.

Editing a Transition

Editing a Transition

- 1. Select the transition you want to edit.**
- 2. Right-click the transition and select the edit option you want:**
 - Delete Selection: Deletes the selected transition**
 - Locked: Toggles between locking and unlocking the transition from further edits**
 - Hidden Label: Toggles between displaying and hiding the transition label**
 - Straighten: Straightens the transition by removing extra vertex points causing the bend**
 - Results: Lets you change the result label if one is already assigned**



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Editing a Transition

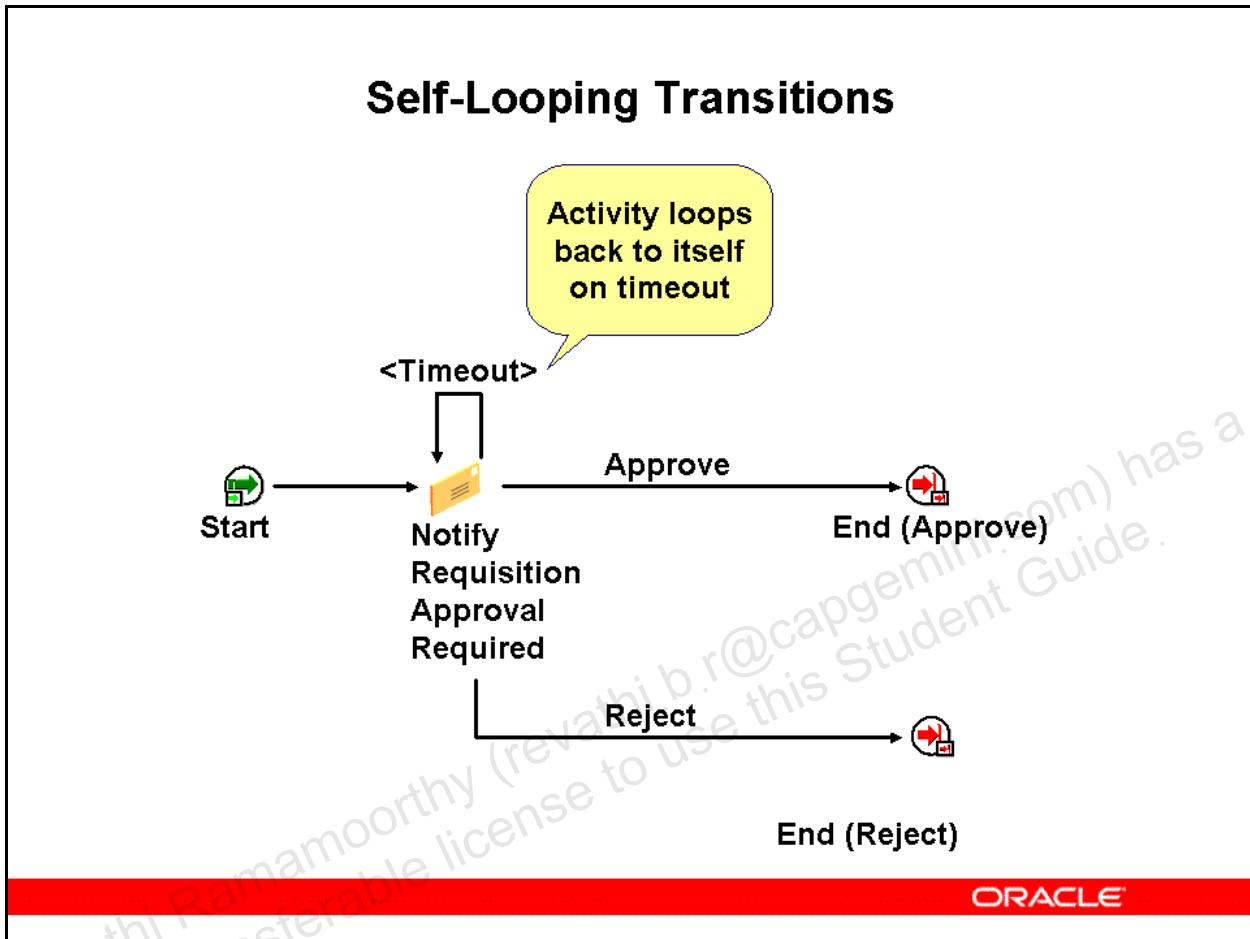
Editing a Transition

- 3. To reposition a transition label, select the label with the mouse and drag to the new position**
- 4. To bend a transition, select the transition, hold down the left mouse button, and drag the cursor to a new position to create a vertex point.**
- 5. To remove a vertex point, select the vertex point and drag over another to combine the two points.**



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Self-Looping Transitions



Self-Looping Transitions

To draw a self-looping transition:

1. Select the activity node.
2. Hold down the right mouse button.
3. Drag the cursor away from and back to the same activity node.
4. Release the right mouse button and select the transition label from the list of results.

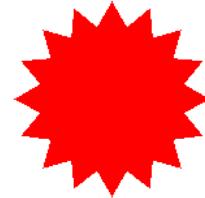
Alternatively, you can also use the following steps:

1. Draw a transition to some other activity.
2. Add a vertex point to the transition.
3. Select the arrowhead of the transition with the left mouse button and drag it back to the originating activity.

Customizing an Activity Node

Customizing an Activity Node

- An activity can be reused throughout a process.
- An activity node within a process diagram represents a single instance of that activity
- You can specify properties for an activity node that are unique to that instance of the activity.



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Customizing an Activity Node

To define node properties:

1. In Oracle Workflow Builder, double-click the activity node in the process window to display the property pages for the node. Select the Node tab.
2. Specify a label for the node. By default, the label name is the activity name. If you use an activity more than once in a process, *-N* is appended to the label name to identify each node uniquely, where *N* represents the *N*th instance of the activity in use.
3. Specify whether the activity is a Start, End, or Normal activity in the process. For an End activity, if the process itself has a result type associated with it, you should specify what the result of the process is when this End activity completes. Choose from the possible results listed in the result type of the process activity.
4. Optionally enter a comment about this node.
5. For a notification activity, a process activity, or a Receive event activity, use the Timeout region to specify whether the activity must be completed by some specified time.
6. For a notification activity or a Send event activity, optionally specify the message priority.

7. For a notification activity, specify a performer. A performer is a role that can consist of one or more users.
 - You can specify a static role. Specify Constant for the Performer Type, and select a role name. Note that you must first load roles from your database.
 - You can alternatively specify a dynamic role. Select Item Attribute for the Performer Type, and select an item type attribute that returns a role name at runtime.
8. Click Apply to save your changes.

Show Label in Designer Menu Options

Show Label in Designer Menu Options

Select Show Label in Designer from the View menu to select the type of label to display for the activity nodes in the process window.

- Instance Label
- Internal Name
- Display Name
- Performer
- Comment



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Show Label in Designer Menu Options

- Instance Label: Uses the node label for each activity node
- Internal Name: Uses the internal name of the activity as the label for each activity node
- Display Name: Uses the display name of the activity as the label for each activity node
- Performer: Uses the activity's performer as the label for each activity node
- Comment: Uses the activity's comment as the label for each activity node

Display Modes

Display Modes

- You can toggle between the following two display modes in Oracle Workflow Builder:
 - Presentation mode: Oracle Workflow Builder shows the display names and activity icons that you specify in the property page for each activity.
 - Developer mode: Oracle Workflow Builder shows internal names and standard activity icons to assist you in developing large, complex processes.
- To change modes, select Developer Mode from the View menu.



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Display Modes

In developer mode, Oracle Workflow Builder:

- Provides visual distinctions between top-level processes and subprocesses in the navigator tree
- Sets the icons for each activity and object to the default icon of its object type or subtype in both the navigator tree and the process diagram window
- Identifies each object in the navigator tree by its internal name (developer name)
- Identifies each activity in the process diagram window by its activity label

Verifying a Process Definition

Verifying a Process Definition

- When you save your work, Oracle Workflow Builder:
 - Automatically validates the process definition for any invalid or missing information
 - Displays the results of the validation in a Workflow Error verification window
- You can also verify the definitions in the current data store at any time during a Builder session.
 - Select an object such as a data store, item type, or process in the navigator tree
 - Select Verify from the File menu or click the Verify button in the Navigator toolbar



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Verifying a Process Definition

You should always validate any new process definition you create, because validation helps you identify any potential problems with the definition that might prevent it from executing successfully.

Note: The Verify option is enabled in the File menu only when the navigator tree is the current window.

Validation Performed by the Verify Command

Validation Performed by the Verify Command

- The process contains at least one Start activity and one End activity.
- A process does not contain itself as a process activity.
- The same subprocess is not being used twice in a process.
- All possible activity results are modeled as outgoing transitions.
- All activity nodes marked as End nodes do not have any outgoing transitions.



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Validation Performed by the Verify Command

Validation Performed by the Verify Command

- **Each notification activity's result type matches the lookup type defined for the message's RESULT message attribute.**
- **All message attributes referenced in a message body for token substitution exist in the message definition.**
- **If a process references objects from another item type, all required item attributes associated with the other item type exist.**

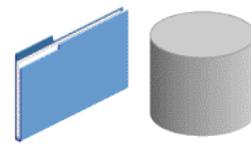


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Saving Process Definitions

Saving Process Definitions

- Always save the process definition to a flat file for source control.
- Before saving the process definition to the production database, save to a development database for testing.
- Oracle Workflow Builder uses a utility program called the Workflow Definitions Loader to move workflow definitions between databases and flat files.
- The Workflow Definitions Loader can also be used to move definitions between development and production databases, or to apply upgrades to existing definitions.



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Saving Process Definitions

If a non-unique display name is encountered when a process definition is being uploaded or upgraded in a database, the Workflow Definitions Loader automatically resolves the display name conflict by adding a “@” character to the beginning of conflicting display names.

Summary

Summary

In this lesson, you should have learned how to:

- **Diagram a workflow process.**
- **Define an item type.**
- **Define a process activity.**

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Defining Item Type Attributes and Lookup Types

Chapter 5

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Defining Item Type Attributes and Lookup Types

Defining Item Type Attributes and Lookup Types

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Define item type attributes.**
- **Define lookup types and lookup codes.**

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Defining Item Type Attributes

Defining Item Type Attributes

- An item type attribute is a property associated with a given item type.
- It acts as a global variable that can be referenced or updated by any activity within a process.
- You must define an item type before you can define the item attributes associated with it.
 - Use the Quick Start Wizard to quickly create a new process framework, including an item type
 - Define item types manually in the navigator tree



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Defining Item Type Attributes

Defining Item Type Attributes

What properties should be defined as item type attributes?

- Information required by notification messages, such as the display format of a currency value
- Information required by function activities, such as values that link back to applications data like a person_ID
- Information maintained by a workflow activity, such as data for activities that identify who to forward information to and from in a loop construct
- Business event messages required by Send or Receive event activities, or event details required by Raise event activities



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Defining Item Type Attributes

Note: Do not use item type attributes as a denormalized data store. Always refer back to the base application to retrieve up-to-date values. There is a trade-off between the convenience of storing global process data in item type attributes and the overhead incurred by loading item type attributes when a process instance is created. Minimize the number of item type attributes to improve the performance of your workflow process.

Examples

For example, the Requisition demonstration workflow includes item type attributes for the following information: Forward From Username, Forward To Username, Requestor Username, Requisition Amount, Requisition Number, Monitor URL, Requisition Description, Requisition Process Owner, Reminder Requisition Document, Note, and Note for Reminder.

Attribute Data Types

Attribute Data Types

You can assign the following data types to attributes:

- **Text**
- **Number**
- **Date**
- **Lookup**
- **Role**
- **Attribute**
- **URL**
- **Form**
- **Document**
- **Event**



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Attribute Data Types

- Text: A string of text of specified character length.
- Number: A number with an optional format mask.
- Date: A date with an optional format mask.
- Lookup: A lookup code value from a specified lookup type.
- Role: A role name from the list of roles defined in the directory service.
- Attribute: The internal name of another existing item type attribute to which you want to maintain references in a process.
- URL: A Universal Resource Locator (URL) to a network location.
- Form: The internal function name and any optional form parameters of an Oracle E-Business Suite form function.
- Document: An attached document, as specified by the document type. PL/SQL, PL/SQL CLOB, and PL/SQL BLOB documents are files representing data from the database as a character string, a character large object (CLOB), or a binary large object (BLOB), respectively. A document attribute can also be defined as a JSP call to an Oracle Application Framework region for inclusion in a notification message.

- Event: A Business Event System event message in the standard WF_EVENT_T structure.

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Defining Item Type Attributes

Defining Item Type Attributes

Item type attributes are defined in the Oracle Workflow Builder navigator tree beneath a given item type.



Defining Item Type Attributes

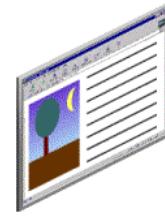
To define an item type attribute:

1. In the Oracle Workflow Builder, select the item type you want in the navigator tree. Then select New Attribute from the Edit menu.
2. In the Attribute property page, enter an internal name for the attribute. The internal name must be all uppercase without any leading or trailing spaces.
3. Enter a display name for the attribute.
4. Enter a description of the attribute.
5. In the Type field, select the data type for the attribute.
6. Depending on the data type, enter format information and a default value, if applicable.
7. Click Apply to save your changes.

URL Attributes

URL Attributes

- An attribute of type URL references a Universal Resource Locator (URL) to a network location such as a web page.
- When you create an item attribute of type URL, specify a frame target for the attribute.
- If you reference this item attribute as the default value of a message attribute in a message, the URL frame opens according to what you specified as the frame target.



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URL Attributes

When you specify a frame target, you can select from the following options:

- New Window: The URL loads in a new, unnamed browser window.
- Full Window: The URL loads into the full, original window.

Note: The Notification Details page no longer uses frames to display notifications. Consequently, selecting Same Frame or Parent Frameset is equivalent to selecting Full Window.

URL Attribute Values

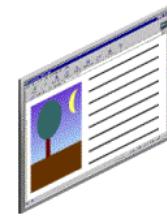
The value of a URL attribute can be a text string or can be token substituted. A URL value is specified in the format:

`http://<location>`

URL Attributes

URL Attributes

- You can also use a URL attribute to include an image in a notification.
- Define a “Send” message attribute of type URL that points to an image file with an extension of gif, jpg, png, tif, bmp, or jpeg.
- Then use a message attribute token to include the URL attribute in the HTML message body.



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URL Attributes

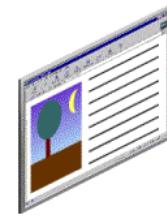
When defining a URL attribute to point to such an image, you must provide the complete URL for the image, either as a constant or as a value returned from another item attribute. You cannot token substitute any argument strings within the image URL.

Note: Oracle Workflow displays images only in the message body of a notification. If you select Attach Content for a URL attribute that points to an image file, the URL attribute appears as an attached link, just as other URLs do.

URL Attributes

URL Attributes

- **The Notification Details Web page supports message attributes of type URL.**
- **These attributes appear in a notification message body as an inline hypertext link or below the message as an attachment icon.**
- **When users view their notifications, they can click a link or attachment icon to display the referenced URL.**
- **The URL is launched in a Web browser according to the frame target specified for the attribute.**



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URL Attributes

In a plain text e-mail notification, the URL location value for an attached URL attribute is included as plain text.

In an HTML-formatted e-mail notification, a URL attribute appears as a hypertext link in the message body. For attached URL attributes, an attachment called Notification References is appended to the message. This attachment includes a link to each attached URL attribute for the message. You can navigate to a URL by clicking its link.

If you define a URL attribute for an image, when the notification is viewed from the Notification Details Web page or as an HTML-formatted e-mail, the image appears inline in the message body.

Form Attributes

Form Attributes

- An attribute of type form references an application form defined in Oracle E-Business Suite.
- Use a form attribute to let users drill down from a notification to application information stored in Oracle E-Business Suite.



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Form Attributes

Form Attribute Values

The value for an attribute of type form must be the internal function name of an Oracle E-Business Suite form function, together with any optional form parameters that should be prequeried with a value when the form is opened.

The default value for the form attribute must be entered using the following format:

function_name:parameter1=value1 parameter2=value2 ...parameterN=valueN

The value of a form parameter can be a text string enclosed in quotes (" ") or can be token substituted with another predefined item type attribute in either of the following ways:

- *parameterN = "&item_type_attribute"*
- *parameterN = "Value &item_type_attribute"*, where
&item_type_attribute represents the rest of the value

To find the internal function name for a form function, navigate to the form, select About Oracle Applications from the Help menu, and locate the internal form name in the Current Form section of the information displayed. Then log in to the Application Developer responsibility and use the Forms window to query for the user form name based on the internal

form name and the Form Functions windows to query for the form function name based on the user form name.

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Form Attributes

Form Attributes

- The Notification Details Web page supports message attributes of type form.
- These attributes appear in a notification message as a form icon.
- When users view their notifications, they can click an attached form icon to launch the referenced Oracle E-Business Suite form.



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Note

Form attributes cannot be attached to e-mail notifications. To view form attachments, you must view the notification in the Notification Details Web page.

Document Attributes

Document Attributes

- **Attributes of type document can represent data from the database in various formats, generated from a PL/SQL procedure.**
 - **PL/SQL document:** Represents data as a character string
 - **PL/SQL CLOB document:** Represents data as a character large object (CLOB)
 - **PL/SQL BLOB document:** Represents data as a binary large object (BLOB)
- **You can also use a document attribute to embed an Oracle Application Framework region in a notification.**



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Document Type Attributes

PL/SQL, PL/SQL CLOB, and PL/SQL BLOB documents are useful when document content varies. For example, these documents can be used to represent purchase orders with variable numbers of lines, or sales orders with variable lines, discounts, and shipping addresses.

Document Attribute Values

The value of a document attribute can be a text string or can be token substituted.

- A PL/SQL document value is specified in the format:
`PLSQL:<procedure>/<document_identifier>`
- A PL/SQL CLOB document value is specified in the format:
`PLSQLCLOB:<procedure>/<document_identifier>`
- A PL/SQL BLOB document value is specified in the format:
`PLSQLBLOB:<procedure>/<document_identifier>`

Replace `<procedure>` with the PL/SQL package and procedure name, separated by a period. Replace `<document_identifier>` with the PL/SQL argument string that you want to pass directly to the procedure. The argument string should identify the document.

If you want to generate the document identifier for a PL/SQL, PL/SQL CLOB, or PL/SQL BLOB document dynamically, you can token substitute the document identifier with other item type attributes. The item attribute names must be in uppercase and must be separated by a colon. For example:

```
PLSQL:PO_WF.SHOW_REQ/&REQ_TYPE:&REQ_NUMBER
```

Oracle Application Framework Regions

You can also use a document attribute to reference an Oracle Application Framework region that you want to embed in a notification message. Specify the JSP call to reference the region as the default value for the attribute.

Document Attributes

Document Attributes

- **The Notification Details Web page supports message attributes of type document.**
- **These attributes can appear in a notification message as an inline link (PL/SQL and PL/SQL CLOB documents only) or as an attachment icon (PL/SQL, PL/SQL CLOB, and PL/SQL BLOB documents).**
- **When users view their notifications, they can click a link or an attachment icon to open the referenced document.**
- **Oracle Application Framework regions are displayed inline in the notification message.**



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Document Type Attributes

In a plain-text e-mail notification, PL/SQL, PL/SQL CLOB, and PL/SQL BLOB document attributes are attached as plain text to their parent notification. Note that this may render some attachments unreadable if the attachment includes special formatting or your plain text e-mail reader does not recognize attachments. To view these attachments, you should display your notifications in the Notification Details Web page.

In an HTML-formatted e-mail notification with an attached PL/SQL, PL/SQL CLOB, or PL/SQL BLOB document attribute, the fully generated PL/SQL document is fetched and attached to the message.

An Oracle Application Framework region can only be displayed within the message body of a notification. It cannot be included as an attachment to the notification.

Deleting Item Attributes

Deleting Item Attributes

- Use the Oracle Workflow Builder to delete item attributes from a workflow definition in a database.
- You must be connected to the database to actually delete an attribute from that database. Deleting the attribute from a flat file and uploading the flat file will not delete the attribute from the database.



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Deleting Item Attributes

Deleting an item attribute from a workflow definition stored in a flat file and then uploading that flat file definition to a database will not delete the item attribute from the definition stored in the database. To delete an item attribute completely, you must delete it from your flat file definition and also delete it specifically from any databases in which that workflow item type is loaded while connected to those databases.

Defining Lookup Types

Defining Lookup Types

- A lookup type is a static list of values.
- These lists can be referenced by activities and by item type, message, or activity attributes. For example:
 - An activity can reference a lookup type for its possible result values.
 - A message attribute can reference a lookup type to provide a list of possible responses to the performer of a notification.
- Lookup types are defined in the navigator tree beneath the Lookup Types branch of an item type.



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Defining Lookup Types

Although lookup types must be associated with a given item type and are defined in the navigator tree beneath the Lookup Types branch of that item type, lookup types can be referenced by components in other item types.

To define a lookup type:

1. In the Oracle Workflow Builder, select the item type you want in the navigator tree. Then select New Lookup Type from the Edit menu.
2. In the Lookup Type property page, enter an internal name for the lookup type. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the lookup type.
4. Enter a description of the lookup type.
5. Click Apply to save your changes.

Defining Lookup Codes

Defining Lookup Codes

- **Lookup codes represent the actual values in a lookup type.**
- **The lookup codes for a lookup type are defined in the navigator tree beneath the lookup type.**



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Defining Lookup Codes

To define a lookup code:

1. In the Oracle Workflow Builder, select the lookup type you want in the navigator tree. Then select New Lookup Code from the Edit menu.
2. In the Lookup Code property page, enter an internal name for the lookup code. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the lookup code.
4. Enter a description of the lookup code.
5. Choose Apply to save your changes.

Summary

Summary

In this lesson, you should have learned how to:

- **Define item type attributes.**
- **Define lookup types and lookup codes.**

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Defining Messages and Notification Activities

Chapter 6

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Defining Messages and Notification Activities

Defining Messages and Notification Activities

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Define messages.**
- **Define message attributes.**
- **Define notification activities.**

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Notification Activities

Notification Activities

- A notification activity is a step in a workflow process used to communicate with a human being.
- A notification activity sends a message to a user containing the information needed to complete the work.
- The notification may or may not require a response from the recipient.



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Defining a Message

Defining a Message

- A message specifies the information that is sent to a user by a notification activity.
- Messages must be associated with an item type and are created in the navigator tree under the **Messages** branch of the item type.



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Defining a Message

To create a new message:

1. In the Oracle Workflow Builder, select the item type you want in the navigator tree. Then select New Message from the Edit menu.
2. On the Message property page, enter an internal name for the message. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the message.
4. Enter a description of the message.
5. Select the priority for the message (High, Normal, or Low). Message recipients can sort their notifications based on the priority.
6. Click Apply to save your changes.

Defining a Message

Defining a Message

- After creating a new message, you must define the subject and body of the message.
- You can optionally include message attributes in the subject or body.
 - In the subject or body of the message, specify the internal name of the message attribute and precede that internal name with an ampersand (“&”).
 - Message attributes are token substituted with a run-time value when the message is sent.



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Defining a Message

To define the body for a message:

1. In the message property pages, select the Body tab.
2. Enter the subject line for the message.
3. Enter the plain text message body in the Text Body tab.
4. Enter the HTML-formatted message body in the HTML Body tab.
5. Choose Apply to save your changes.

Defining a Message Attribute

Defining a Message Attribute

- A message attribute is a variable that you define for a particular message to either provide information or prompt for a response when the message is sent in a notification.
- Message attributes must be associated with a message and are defined in the navigator tree beneath that message.



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Defining a Message Attribute

To define a message attribute:

1. In the Oracle Workflow Builder, select the message you want in the navigator tree. Then select New Attribute from the Edit menu.
2. On the Attribute property page, enter an internal name for the attribute. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the attribute.
4. Enter a description of the attribute.
5. In the Type field, select the data type for the attribute.
6. Depending on the data type, enter format information, if applicable.
7. Specify either Send or Respond in the Source field to indicate whether the attribute should send information to the recipient or prompt the recipient for a response, respectively. You should set the source to Send for any message attributes that you include in the message subject and message body for token substitution.

8. Set the default value of a Send attribute to reference either a constant or the run-time value of an item type attribute. You can optionally set a default value for a Respond attribute as well.
9. Choose Apply to save your changes.

Note: To define a message attribute that references an existing item attribute, you can also select the item attribute in the navigator tree and drag it onto the message you want in the navigator tree. Then edit the property page that appears, making sure that the message attribute has the appropriate source. The default type is automatically set to Item Attribute and the default value references the originating item attribute.

Defining a Respond Attribute

Defining a Respond Attribute

- If you want the message to prompt for a response from the recipient, then define a message attribute with the source set to Respond.
- The Notification System uses a message's Respond attributes to generate the response section of the notification.
- A message can have multiple Respond attributes.
- If you define a result for a message, the result is automatically defined as a special Respond attribute with the internal name RESULT.



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Defining a Respond Attribute

The icon for a Respond attribute in the navigator tree includes a red question mark in its lower left corner to distinguish it from Send attributes.

The Notification System uses the Respond attributes defined for the message to generate the response section of the notification sent to the recipient. The response section is composed differently depending on whether the recipient receives the notification as a plain text e-mail notification, as an HTML-formatted e-mail notification, or through the Notification Details Web page. For plain text e-mail notifications, the response section is also composed differently depending on whether your organization uses the direct response method or the templated response method. (HTML e-mail notifications always use the templated response method.)

Defining a Message Result

Defining a Message Result

Define a message result if you want the message to prompt for a response and then use that response as the result of its notification activity.



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Defining a Message

The icon for a message in the navigator tree includes a red question mark in its lower left corner when the message has a result defined for it.

To define the result for a message:

1. On the message property pages, select the Result tab.
2. Enter a display name for the result. Oracle Workflow uses the display name as the response prompt in some notification formats, including e-mail notifications and the pull-down menu that appears in the Notification Details page if there are more than four possible result values.
3. Enter a description for the result.
4. Select a lookup type to provide the possible result values. The lookup type associated with the message result should be the same as the result type of the notification activity that sends the notification message.
5. Optionally, set the default value of the result to reference either a constant or the run-time value of an item type attribute.
6. Choose Apply to save your changes.

Notification Details Web Page

Notification Details Web Page

The response section of a notification in the Notification Details Web page is generated by information drawn from the properties of the Respond attributes.

- The response prompts are drawn from the display names of the Respond attributes and specify the response values expected.
- Each response prompt also links to information about the properties of that Respond attribute.



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Notification Details Web Page

Images in an HTML message:

If you define a “Send” message attribute of type URL that points to an image file with an extension of gif, jpg, png, tif, bmp, or jpeg, and you embed the URL attribute in the HTML body of the message, then Oracle Workflow displays the image inline in the Notification Details page.

HTML E-mail Notifications

HTML E-mail Notifications

- **HTML e-mail notifications always use the templated response method.**
- **The response section of an HTML e-mail notification includes links for the possible result response values at the end of the notification.**
- **When a user clicks one of the response links, the link automatically generates a plain text e-mail reply that contains the correct Reply To: e-mail address as well as a response template in the message body.**



HTML E-mail Notifications

The response template consists of the required notification ID and access key that identify the notification the user is responding to and a response prompt edited with the result response that the user selected.

Depending on the notification, the auto-generated e-mail response template may also prompt the user for other information in addition to the selected result response. Any additional prompts and values are generated by information drawn from the properties of each Respond attribute, similarly to the response section for plain text templated response.

The user supplies responses by editing the response value text between the quotes following each prompt.

Images in an HTML message:

If you define a “Send” message attribute of type URL that points to an image file with an extension of gif, jpg, png, tif, bmp, or jpeg, and you embed the URL attribute in the HTML body of the message, then Oracle Workflow displays the image inline in HTML-formatted e-mail notifications.

Plain Text E-mail Notifications Using Templatized Response

Plain Text E-mail Notifications Using Templatized Response

The response section of a plain text e-mail notification using templated response is generated by the following boilerplate text and by information drawn from the properties of the Respond attributes.

```
<Description>
<Display Name>: " "
    <list of lookup codes>
```

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Plain Text E-mail Notifications Using Templatized Response

- Description: The description of the Respond attribute; this description provides optional information on how to complete a response.
- Display Name: The display name of the Respond attribute; this name specifies the response value that is expected.
- List of lookup codes: If the attribute is of type lookup, the lookup codes that are the possible response values are listed.

Plain Text E-mail Notifications Using Direct Response

Plain Text E-mail Notifications Using Direct Response

The response section of a plain text e-mail notification using direct response is generated by the following boilerplate text and by information drawn from the properties of the Respond attributes.

Enter the <Display Name> on line <Sequence>. <Description>. <Type Hint>

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Plain Text E-mail Notifications Using Direct Response

- Display Name: The display name of the Respond attribute; this name specifies the response value that is expected.
- Sequence: The sequence position of this Respond attribute among all the Respond attributes of the message, as listed in the navigator tree.
- Description: The description of the Respond attribute; this description provides optional information on how to complete a response.
- Type Hint: A standard hint that is provided based on the attribute's type:

Type	Type Hint
Lookup	Value must be one of the following: <list of lookup codes>
Date	Value must be a date in the form "<format>".
Number	Value must be a number in the form "<format>".
Text	Value must be <format> bytes or less.

Defining a Notification Activity

Defining a Notification Activity

Notification activities must be associated with an item type and are created in the navigator tree beneath the Notifications branch of the item type.



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Defining a Notification Activity

To define a notification activity:

1. In Oracle Workflow Builder, select the item type that you want in the navigator tree. Then select New Notification from the Edit menu.
2. On the Activity property page, enter an internal name for the activity. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the activity.
4. Enter a description of the activity.
5. Select an icon that identifies the activity.
6. Optionally specify a PL/SQL stored procedure in the Function field. The procedure is known as a post-notification function and can be used to couple processing logic to the notification activity.
7. Specify the result type that contains the possible results that the notification can return. If the message for the notification includes a result, then the result type of the notification activity must be the same as the lookup type that the message result references.
8. Select the message that this notification sends.

9. Select the Expand Roles check box if you want to send this notification to a multiuser role and ensure that each user receives an individual copy of the notification. You should always select the Expand Roles check box for FYI-type notifications.
10. Choose Apply to save your changes.
11. Optionally select the Details tab to display and modify additional activity details.
12. Optionally select the Access tab to set the access levels allowed to modify this activity.

Standard Voting Activity

Standard Voting Activity

- **Vote Yes/No is a predefined notification activity associated with the Standard item type.**
- **This activity can be customized.**
- **Use this activity to send a notification to all users in a role and tally the Yes/No responses of the users.**
- **The tallied responses determine the final result of the notification activity.**



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Standard Voting Activity

The activity sends a message called “Default Voting Message Yes/No” that includes a message result. The message prompts the recipient to reply with “Yes” or “No.” The possible results of this notification activity are stored in the lookup type called Yes/No.

Choose “Expand Roles” for the notification activity to ensure that all users in the role receive a copy of the notification.

When the activity receives responses, it executes a PL/SQL procedure called WF_STANDARD.VOTEFORRESULTTYPE to tally the Yes/No responses.

Vote Yes/No has three activity attributes associated with it:

- Voting Option: Specifies when and how to tally the votes
- Percent Yes: Specifies what percentage of Yes responses are required for a Yes result
- Percent No: Specifies what percentage of No responses are required for a No result

Defining a Notification Activity Node

Defining a Notification Activity Node

- When you add a notification activity node to a workflow process, define the properties for that individual instance of the activity in the Node tab of the activity property pages.
- Important properties for a notification activity node include:
 - Timeout
 - Priority
 - Performer



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Defining a Timeout for a Notification

Defining a Timeout for a Notification

The timeout value for a notification activity node specifies whether the notification response must be received by a certain time.

- No Timeout
- Relative Time
- Item Attribute



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Defining a Timeout for a Notification

- Choose “No Timeout” if the notification does not have to be completed by a certain time.
- Choose “Relative Time” if you want the notification to be completed by some constant relative time. You can enter any combination of days, hours, and minutes to specify when the activity times out. The value you enter is interpreted as a relative offset from the begin date of the activity, in the unit of minutes.

Note: A relative timeout value of zero means there is no timeout.

- Choose “Item Attribute” if you want the notification to be completed by some relative time or date that is determined dynamically at run time. You must first create an item attribute of type number or date to store the dynamic timeout value and then reference that predefined item attribute here. The dynamic timeout value stored in this attribute is interpreted as a relative offset from the begin date of the activity, in the unit of minutes.

Defining a Dynamic Priority for a Notification

Defining a Dynamic Priority for a Notification

- By default, the Notification System assigns a priority to a notification based on the priority value set for the message associated with the notification.
- You can set a new priority for an individual notification activity node that overrides the default priority of the message it sends. At run time, the notification is assigned the override priority.



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Defining a Dynamic Priority for a Notification

You can set the override priority as a constant of High, Normal, or Low, or you can reference an item attribute. The item attribute must be of type number, and the following ranges apply:

- High: 1-33
- Normal: 34-66
- Low: 67-99

Defining a Performer for a Notification

Defining a Performer for a Notification

- **The performer is the role to whom the notification is sent.**
- **You can select either a constant role name or an item type attribute that dynamically determines the role at run time.**
- **Note that you must first create an item attribute of type role or text to store the dynamic role name before you can reference that item attribute in the Performer field.**



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Special Message Attributes

Special Message Attributes

- **#HIDE_REASSIGN:** Hides or displays the Reassign button in the Notification Details Web page
- **#FROM_ROLE:** Specifies the role that is the source of a notification



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Special Message Attributes

You can define special message attributes to specify how a notification is displayed or handled. When you define a special message attribute, you must usually enter its internal name beginning with the # symbol as listed here, and assign the attribute a source of Send. You can enter a display name and description of your own choosing. For information on additional special message attributes, see the *Oracle Workflow Developer's Guide*.

#HIDE_REASSIGN

Use #HIDE_REASSIGN to hide the Reassign button in the Notification Details Web page. The response section in the Notification Details page includes the Reassign button by default. If you want to restrict users from reassigning a notification, you can add the #HIDE_REASSIGN attribute to control whether the Reassign button is displayed or hidden.

The #HIDE_REASSIGN attribute also controls whether a notification can be reassigned using the Reassign button in the Advanced Worklist, Personal Worklist, or self-service home page. The Reassign button in these pages will still be displayed, but an error message will appear if users attempt to reassign notifications for which the #HIDE_REASSIGN attribute has been set. Additionally, you can specify whether or not the notification can still be reassigned through vacation rules. You can choose to both hide the Reassign button and prevent reassignment.

through vacation rules. In this case Oracle Workflow does not apply any vacation rules to reassign those notifications, but simply delivers the notifications to the worklist of the original recipient. You can also choose to hide the Reassign button but still allow reassignment through vacation rules.

The #HIDE_REASSIGN attribute must be either of type text or lookup.

- To hide the Reassign button in the Notification Details page, and to prevent reassignment from the Advanced Worklist, Personal Worklist, and self-service home page, as well as through vacation rules, set the value of this attribute to Y.
- To hide the Reassign button in the Notification Details page, and to prevent reassignment from the Advanced Worklist, Personal Worklist, and self-service home page, but still allow reassignment through vacation rules, set the value of this attribute to B.
- To display the Reassign button in the Notification Details page, and to allow reassignment from the Advanced Worklist, Personal Worklist, self-service home page, and vacation rules, set the value to N.

#FROM_ROLE

Use #FROM_ROLE to specify the role that is the source of a notification. For example, if you have a notification that informs an approver that a requisition was submitted, you can set the requisition preparer as the From Role for the message.

The From Role for each notification is displayed in the Worklist Web page and in e-mail notifications to give users additional information for reviewing and responding to the notifications. Additionally, Oracle E-Business Suite Personal Worklist lets you search for notifications based on the From Role.

The #FROM_ROLE attribute must be of type role. You should specify an item type attribute as the value for the #FROM_ROLE attribute and include logic in your workflow process that dynamically sets that item type attribute to the role you want at run time.

Special Message Attributes

Special Message Attributes

- **#WF_SECURITY_POLICY:** Controls whether sensitive notifications can be sent in e-mail
- **Notification mailer attributes:** Override mailer configuration parameters for a specific notification



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Special Message Attributes

#WF_SECURITY_POLICY

Use #WF_SECURITY_POLICY to control whether notifications that include sensitive content can be sent in e-mail. If you specify that a notification's content must not be sent in e-mail, users receive an e-mail message that only informs them that they must access the notification through the Notification Details Web page instead to view its content and respond.

The #WF_SECURITY_POLICY attribute must be of type text. To prevent notification content from being sent in e-mail, set the value of the #WF_SECURITY_POLICY attribute to NO_EMAIL. If you set the value to EMAIL_OK or DEFAULT, leave the value blank, or if you do not define a #WF_SECURITY_POLICY attribute for the message, Oracle Workflow sends the full notification content in e-mail to users whose notification preference is set to receive e-mail.

Notification Mailer Attributes

Use these attributes to control how a notification mailer generates the e-mail message for a notification, if the recipient has a notification preference to receive e-mail notifications. For example, if you want to customize notifications from a particular department, you can define these attributes for those notifications. Values that you specify in these attributes for a

particular notification override the default values for the notification mailer specified in the mailer's configuration parameters. Some of the most commonly used notification mailer attributes are:

- #WFM_FROM: Lets you specify the value that appears in the From field of the message header when the e-mail notification message is delivered to a user.
- #WFM_REPLYTO: Lets you specify the address of the e-mail account that receives incoming messages, to the which e-mail notification response should be sent.
- #WFM_HTMLAGENT: Lets you specify the base URL that identifies the HTML Web agent that handles HTML notification responses. This URL is required to support e-mail notifications with HTML attachments. The default URL is derived from the Applications Servlet Agent profile option. You can override this default by defining a different value for this attribute.

Special Message Attributes

Special Message Attributes

- **#WF_REASSIGN_LOV:** Specifies the users to whom a message can be reassigned
- **#HIDE_MOREINFO:** Hides or displays the Request Information button in the Notification Details page
- **#WF_SIG_POLICY:** Requires that a user's response to a notification must be authenticated by an electronic signature



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Special Message Attributes

#WF_REASSIGN_LOV

Use #WF_REASSIGN_LOV to specify the users to whom a message can be reassigned. Create a role whose members are all the users that you want to allow as possible new recipients when the notification is reassigned, and assign this role as the value for the #WF_REASSIGN_LOV attribute. Then, when the notification recipient attempts to reassign the notification, only the users that belong to that role will appear in the list of values for the Reassign field.

The #WF_REASSIGN_LOV attribute must be of type role and must have a source of Send. If no existing role meets your needs, you can include logic in your process to create an ad hoc role at run time and add the users you want to that role.

#HIDE_MOREINFO

When users view a notification that requires a response in the Notification Details page, the response region includes the Request Information button by default. If you want to prevent users from requesting more information about a notification, you can add the #HIDE_MOREINFO attribute to control whether the Request Information button is displayed or hidden.

The #HIDE_MOREINFO attribute must be either of type text or lookup. To hide the Request Information button, set the value of this attribute to Y. To display the Request Information button, set the value to N. It is recommended that you define the #HIDE_MOREINFO attribute with a type of lookup and assign it the predefined Yes/No lookup type that is provided in the Standard item type.

#WF_SIG_POLICY

Use #WF_SIG_POLICY to require that a user's response to a notification be signed electronically. This electronic signature is analogous to a written signature. If you define a notification to require an electronic signature, users must respond to the notification from the Notification Details Web page and enter the appropriate type of signature. Otherwise, the response will not be considered valid.

- If you define a notification to require a password-based signature, users must sign their response by entering their Oracle E-Business Suite user name and password.
- If you define a notification to require a certificate-based digital signature, users must sign their response with a valid X.509 certificate issued by a certificate authority.

The signed response text for both types of signatures contains the notification header information and the response values entered by the user. You can optionally require the signed response text to include the notification message body as well.

Note: If the message body contains a link or an image, the signed response text includes the HTML code used to reference the link or image, rather than the content of the referenced file itself. The signed response text does not include notification attachments.

The #WF_SIG_POLICY attribute must be either of type text or lookup.

- To require a password-based signature without including the message body in the signed response text, set the value to PSIG_ONLY.
- To require a password-based signature and include the message body in the signed response text, set the value to PSIG_BODY.
- To require a certificate-based digital signature without including the message body in the signed response text, set the value to PKCS7X509_ONLY.
- To require a certificate-based digital signature and include the message body in the signed response text, set the value to PKCS7X509_BODY.
- If you set the value to DEFAULT, leave the value blank, or if you do not define a #WF_SIG_POLICY attribute for the message, Oracle Workflow performs the default response processing that does not require a signature.

It is recommended that you define #WF_SIG_POLICY with a type of lookup and assign it the predefined Signature Policy lookup type provided in the Standard item type.

Oracle Workflow records the status of requested and submitted signatures in the Signature Evidence Store. You can search for signatures in the Signature Evidence Store to check the status of a signature request and review details that provide evidence of the signature. If your business logic requires a signature to be validated as a prerequisite for other activities, your workflow can include a notification to an administrator to confirm the signature status before continuing.

To preserve electronic signature evidence for future reference, the Purge Obsolete Workflow Runtime Data concurrent program and the Oracle Workflow purging APIs by default do not delete any notifications that required signatures or their associated signature information. If

you anticipate needing access to signature evidence after the associated workflow processes are complete, ensure that you choose to preserve signature data when purging. If you do not need to maintain signature evidence, you can choose to delete signature-related information when purging.

Action History

Action History

- An action history table shows what actions users have performed on the notification to date.
- In some cases notifications automatically include the action history table.
- You can also manually include the action history table by calling the special WF_NOTIFICATION() message function in the message body.



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Action History

The action history table contains a row for each previous execution of the same notification activity node in a process, as well as a row for the initial submission of the process.

- For example, for a requisition approval notification activity that sends a certain notification to several approvers in turn, the action history table would contain a row for each approver to whom the notification was sent, as well as a row for the process owner.
- Additionally, if a notification is reassigned to another user in either delegate or transfer mode, or if one user requests more information about the notification and another user answers that request, the action history contains rows for those actions also.

Including the Action History Table

- If the notification requires a response, then Oracle Workflow automatically includes the action history table in the notification.
- If the notification does not require a response, then Oracle Workflow only includes the action history table automatically if the notification has been reassigned at least once or if at least one recipient has requested more information about the notification. However, you can manually include the action history table by calling the special message function WF_NOTIFICATION(HISTORY) in the message body.

Special Message Function

Special Message Function

- You can use a special message function called **WF_NOTIFICATION()** to add context-sensitive content to a message body.
- The **WF_NOTIFICATION()** function can produce either a table of message attributes or the action history table for the notification.



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Special Message Function

Oracle Workflow creates the tables as Oracle Application Framework regions, unless the message body also includes any message attribute tokens that reference values other than Oracle Application Framework regions. In this case, the tables are created in a standard Oracle Workflow format.

Note: WF_NOTIFICATION() is not a PL/SQL function, but rather a special message function that can only be called within an Oracle Workflow message body.

Message Attribute Table

To include a table of message attributes in a message body, call WF_NOTIFICATION() with the ATTRS option followed by the internal names of the message attributes, separated by commas. Use the following format:

`WF_NOTIFICATION(ATTRS,<attribute1>,<attribute2>,<attribute3>,...)`

Note: Do not include any spaces or carriage returns in the call to WF_NOTIFICATION(). You only need to use a comma to delimit the parameters in the list.

The message attribute table contains a row for each message attribute listed in the WF_NOTIFICATION() call, showing the display name and the value for each attribute.

Action History Table

To include an action history table in a message body, call WF_NOTIFICATION() with the HISTORY option in the following format:

```
WF_NOTIFICATION(HISTORY)
```

Embedding Oracle Application Framework Regions in Notifications

Embedding Oracle Application Framework Regions in Notifications

- You can embed Oracle Application Framework regions in notification messages.
- Define a message attribute of type document whose value is a Java Server Page (JSP) call that references the region.
- To build custom regions, you must have Oracle Application Framework set up in Oracle JDeveloper for custom development.



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Embedding Oracle Application Framework Regions in Notifications

For more information, see the *Oracle Workflow Developer's Guide* and the *Oracle Application Framework Developer's Guide*, available from My Oracle Support Knowledge Document 744832.1.

Summary

Summary

In this lesson, you should have learned how to:

- **Define messages.**
- **Define message attributes.**
- **Define notification activities.**

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Testing and Monitoring Workflow Processes

Chapter 7

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Testing and Monitoring Workflow Processes

Testing and Monitoring Workflow Processes

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Launch a test process.**
- **Check the progress of a workflow using the Status Monitor.**

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Testing Workflow Processes

Testing Workflow Processes

- For testing purposes, you can manually launch workflow processes from the Developer Studio Web page.
- In a production environment, your application should launch your workflow processes programmatically.



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Testing Workflow Processes

Testing Workflow Processes

- **Navigate to the Developer Studio.**
- **Search for the process you want to test.**
- **Select the icon in the Run column for that process.**
- **In the Run Workflow page, specify:**
 - An optional process owner
 - A unique item key for the process instance
 - A user-defined key that you want to use to identify the process
 - The name of the process to test
 - Values for any required item type attributes
- **Click the Run Workflow button.**



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Testing Workflow Processes

Use a Web browser to navigate to the Developer Studio, using a responsibility and navigation path specified by your system administrator. Some possible navigation paths in the seeded Workflow responsibilities are:

- Workflow Administrator Web Applications: Developer Studio
- Workflow Administrator Web (New): Developer Studio
- Workflow Administrator Event Manager: Developer Studio

You can navigate to the Developer Studio from other Oracle Workflow administrator Web pages by selecting the Developer Studio tab or clicking the Developer Studio link at the end of the page.

Note: You must have workflow administrator privileges to run a test workflow from the Developer Studio.

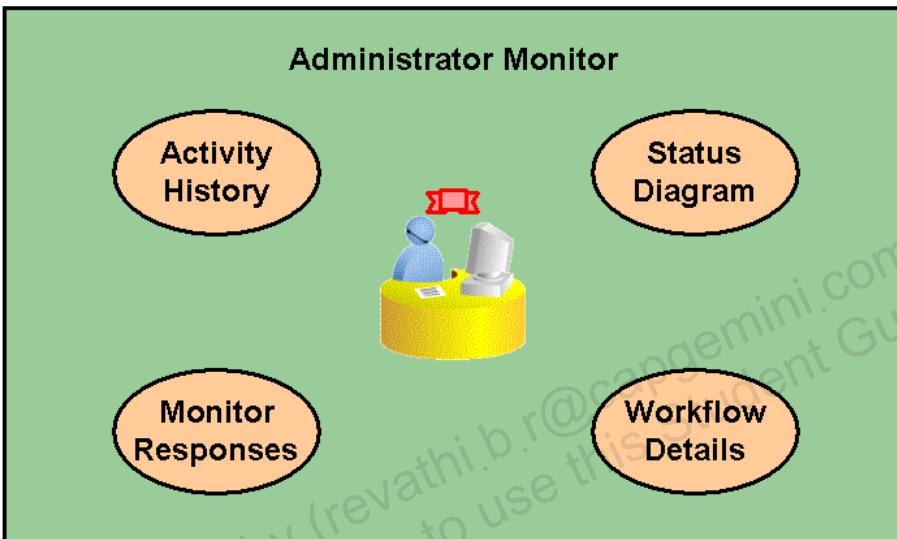
In the Search region of the Developer Studio, enter search criteria to locate the workflow process definitions you want to display. You can search by the workflow item type display name and internal name. You can enter a partial value for the internal name to search for workflow types whose internal names begin with that value. Select the Go button to perform your search.

Note: If a workflow process begins with a Receive event activity, you cannot use the Developer Studio to test the process. Instead, you should raise a test event from the Event Manager to trigger an event subscription that launches the process.

After you launch a process, you can review the progress of the process in the Status Monitor and respond to any notifications using the Worklist.

Administrator Monitor

Administrator Monitor



The diagram illustrates the Administrator Monitor interface. It features a central yellow circular icon containing a blue figure sitting at a desk with a computer monitor, positioned above a red ribbon banner. Surrounding this central icon are four orange rounded rectangular buttons, each containing a different monitoring function: "Activity History" (top left), "Status Diagram" (top right), "Monitor Responses" (bottom left), and "Workflow Details" (bottom right). The entire interface is set against a light green background with a black border around the main content area.

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Administrator Monitor

The administrator version of the Status Monitor lets you view and administer runtime workflows. You can:

- Review the activities performed for a workflow.
- Check the status of the workflow by viewing the status diagram.
- Examine responses to notifications sent by the workflow.
- Review the workflow definition and attributes.
- If you have the appropriate workflow administrator privileges, you can also perform control operations for a workflow or handle an error.

Workflow Administrator Privileges

Users have workflow administrator privileges if they belong to the Oracle Workflow administration role, which is defined in the Workflow Configuration Web page.

Oracle Workflow also allows users to be assigned specialized workflow monitoring privileges with restricted access to workflow data. If you have specialized workflow monitoring privileges, you can only view workflows and perform administrative actions to which you have been granted access. For example, you may only have access to monitor workflows belonging

to particular item types, and you may be able to suspend and rewind workflows but not to skip activities.

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Viewing Workflows in the Administrator Monitor

Viewing Workflows in the Administrator Monitor

- **Navigate to the Administrator Monitor.**
- **Search for the workflows you want to display.**
- **Drill down to additional information by selecting a workflow and clicking a monitor button.**
 - **Activity History**
 - **Status Diagram**
 - **Participant Responses**
 - **Workflow Details**



Viewing Workflows in the Administrator Monitor

Use a Web browser to navigate to the administrator Status Monitor, using a responsibility and navigation path specified by your system administrator. Some possible navigation paths in the seeded Workflow responsibilities are:

- Workflow Administrator Web Applications: Status Monitor
- Workflow Administrator Web (New): Status Monitor
- Workflow Administrator Event Manager: Status Monitor

You can navigate to the administrator Status Monitor from other Oracle Workflow administrator Web pages by selecting the Status Monitor tab or clicking the Status Monitor link at the end of the page.

Searching for Workflows

In the Search region of the Workflows page, enter search criteria to locate the workflows you want to display. The main search options are workflow item type display name, item type internal name, owner, item key, user key, status, and start date.

- Workflow Owned By: If you have workflow administrator privileges, select the user who owns the workflows you want to review. If you do not have workflow administrator privileges, you can only search for workflows that you own.
- Item Key and User Key: You can enter a partial value to search for workflows whose keys begin with that value.
- Workflow Started: All the start date ranges include the current date; for example, Last 2 Weeks includes today as well as the previous thirteen days.

Note: You must enter at least one of the following criteria when you search in order to limit the size of the results list.

- Workflow Type
- Type Internal Name
- Workflow Owned By
- Workflow Started: If you search only by this option, you must select a specific start date range. You cannot use Workflow Started with the Any Time value as your only search option.

You can also enter additional search criteria to search for workflows by activity characteristics. The additional search criteria are activity status, activities waiting for a response from a particular user, and days without progress.

Click the Go button to perform your search.

Viewing Workflows

- To send e-mail to the owner of a workflow, click the user link in the Owned By column.
- For an errored workflow, click the error icon or the error link in the Status column to view error details.
- For a parent workflow, click the icon in the Child Workflows column to view its children.

Viewing Activity History in the Administrator Monitor

Viewing Activity History in the Administrator Monitor

- The Activity History page shows information about the activities executed for a workflow.
- Search for the activities you want to review.
- If you have the appropriate workflow administrator privileges, you can:
 - Use the activity icons to reassign notifications or suspend or resume process activities
 - Select an activity and use the activity buttons to skip or retry the activity
 - Use the workflow buttons to update the workflow attributes or rewind, suspend, resume, or cancel the workflow



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Viewing Activity History in the Administrator Monitor

A hierarchical grid displays the process hierarchy formed by the selected workflow and any child workflows associated with it.

Searching for Activities

All activity types and statuses are selected by default. To search for specific activities, deselect any activity types and statuses you do not want to view and click the Go button. At least one activity type and one activity status must be selected for a search to be performed.

Viewing Activities

- To view details about the definition and current status of an activity, click the activity name link in the Activity column.
- To send e-mail to the performer of a notification, click the user link in the Performer column.

Viewing a Status Diagram in the Administrator Monitor

Viewing a Status Diagram in the Administrator Monitor

- The Status Diagram page shows the process diagram for a workflow, including graphical cues about the status of the workflow and its activities.
- It also shows a detail tab window with additional information about the selected process or activity.
- If you have the appropriate workflow administrator privileges, you can use the workflow buttons to update the workflow attributes or rewind, suspend, resume, or cancel the workflow.



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Viewing a Status Diagram in the Administrator Monitor

Above the process diagram, the process title displays the workflow process name, type, and user key, or item key if no user key has been set. If you drill down to a subprocess in the process diagram, the process title displays the subprocess name.

Process Diagram

- An activity can be highlighted with a colored box to indicate a distinctive state:
 - Red: The activity is in an error state.
 - Green: The activity is active or in progress.
 - Yellow: The activity is suspended.
- A transition arrow can have a thick green line to indicate that it has been traversed, or it can have a thin black line to indicate that it has not been traversed.
- Click an activity icon to display information about it in the detail tab window.
- Click any empty space in the diagram to deselect a selected activity and display information about the process as a whole in the detail tab window.

- Double-click a subprocess activity icon to drill down and display the diagram of the subprocess and its information in the detail tab window. You can also select the subprocess activity icon and then choose Zoom In.

The process diagram is view-only. You cannot edit the diagram in the Status Monitor.

Detail Tab Window

- Definition: Displays the properties of the activity or process.
- Usage: Displays the properties for the activity as a node in the process.
- Status: Displays status and result information about the activity. Also shows error information if the activity status is ERROR.
- Notification: Displays notification details for the selected notification activity.

Viewing Responses in the Administrator Monitor

Viewing Responses in the Administrator Monitor

- The **Monitor Responses** page shows information about notifications sent by a workflow and responses from workflow participants.
 - Select **Response Notifications** to view response-required notifications, **FYI Notifications** to view information-only (FYI) notifications, or both.
 - Select **Closed Notifications** to view only closed notifications of the selected type. Deselect this option to view both open and closed notifications.
- To view details about a response, click the icon in the **View Response Details** column.



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Viewing Responses in the Administrator Monitor

You can use the Monitor Responses page to drill down to responses to a particular notification. For example, you can use this page to view individual responses to a voting activity.

A hierarchical grid displays the process hierarchy formed by the selected workflow and any child workflows associated with it.

To view and respond to a notification in the Notification Details page, click the subject link in the Notification Subject column.

To send e-mail to the respondent for a notification, click the user link in the Respondent column.

Notification Response Details

The Notification Response Details page displays the following:

- The subject line of the notification
- The user who responded to the notification
- The user to whom the notification was originally sent
- The date and time when the notification was sent
- The date and time when the response was received

- The response value that is the result of the notification
- Whether the notification required an electronic signature
- Any further response values requested in the notification in addition to the result response

For a notification that required a signature, the page also displays further signature details.

To send e-mail to the respondent or original recipient for a notification, select the corresponding user link.

Viewing Workflow Details in the Administrator Monitor

Viewing Workflow Details in the Administrator Monitor

- The Workflow Details page shows detail information about a selected workflow.
- If you have the appropriate workflow administrator privileges, you can use the workflow buttons to update the workflow attributes or rewind, suspend, resume, or cancel the workflow.



Viewing Workflow Details in the Administrator Monitor

A hierarchical grid displays the process hierarchy formed by the selected workflow and any child workflows associated with it.

The Workflow Definition region displays the workflow type internal name, workflow type description, the persistence type, number of persistence days, and the selector/callback function that determines which process activity to run for the workflow type in a particular situation.

The Workflow Attributes region lists the names and values of the item attributes for the workflow. For an attribute of type event, click the event message link to view the event message details.

Updating Workflow Attribute Values

To change the values of any item attributes, click the Update Attributes button. In the Update Workflow Attributes page, enter the new values you want and click Apply.

Note: You cannot update attributes of type event. However, you can click the event message link to view the event message details.

Viewing Error Information in the Administrator Monitor

Viewing Error Information in the Administrator Monitor

- **The Workflow Errors page shows error information for an errored workflow.**
- **If the Workflow Errors page shows only one errored activity, and you have workflow administrator privileges, you can:**
 - **Reassign an errored notification activity**
 - **Suspend or resume an errored process activity**
 - **Skip or retry any type of activity**



Viewing Error Information in the Administrator Monitor

The Workflow Errors page displays the name of the activity that encountered an error, the activity type, the internal name of the error, the error message describing the error, and context information to help you locate the source of the error.

Note: If you navigated to the Workflow Errors page from an error status link for a workflow, the page shows details for each errored activity within the workflow. If you navigated to the page from an error status link for a single errored activity, the page shows details for only that activity.

Viewing Child Workflows in the Administrator Monitor

Viewing Child Workflows in the Administrator Monitor

- The Child Workflows page shows the workflows that are designated as children of a particular workflow.
- Drill down to additional information by selecting a workflow and clicking a monitor button.
 - Activity History
 - Status Diagram
 - Participant Responses
 - Workflow Details



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Viewing Child Workflows in the Administrator Monitor

- To send e-mail to the owner of a workflow, click the user link in the Owned By column.
- For an errored workflow, click the error icon or the error link in the Status column to view error details.

Self-Service Monitor

The diagram illustrates the Self-Service Monitor interface. At the top center, the title "Self-Service Monitor" is displayed in bold black font. Below the title is a green rectangular area containing three orange rounded rectangles, each labeled with a function: "Notification History" on the left, "Status Diagram" on the right, and "Monitor Responses" at the bottom. In the center of the green area is a purple cylindrical icon featuring a yellow figure standing on top of it, with a small grey cylinder next to it. A red horizontal bar runs across the bottom of the green area, with the "ORACLE" logo in white text on the right side.

Self-Service Monitor

The self-service version of the Status Monitor lets you view and administer workflows that you own. You can:

- Review the notifications sent by a workflow
- Check the status of the workflow by viewing the status diagram
- Examine responses to notifications sent by the workflow
- If you have workflow administrator privileges, you can also perform certain control operations for a workflow

Workflow Administrator Privileges

Users have workflow administrator privileges if they belong to the Oracle Workflow administration role, which is defined in the Workflow Configuration Web page.

Viewing Workflows in the Self-Service Monitor

Viewing Workflows in the Self-Service Monitor

- **Navigate to the Self-Service Monitor.**
- **Search for the workflows you want to display.**
- **You can only search for workflows that you own.**
- **Drill down to additional information by selecting a workflow and clicking a monitor button.**
 - **Notification History**
 - **Status Diagram**
 - **Participant Responses**



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Viewing Workflows in the Self-Service Monitor

Use a Web browser to navigate to the self-service Status Monitor, using a responsibility and navigation path specified by your system administrator. Some possible navigation paths in the seeded Workflow responsibilities are:

- Workflow User Web Applications: Status Monitor
- Workflow User Web (New): Status Monitor

You can navigate to the self-service Status Monitor from other Oracle Workflow self-service Web pages by selecting the Status Monitor tab or clicking the Status Monitor link at the end of the page.

Searching for Workflows

In the Search region of the Workflows page, enter search criteria to locate the workflows you want to display. The main search option is the workflow status. You can also search by the workflow start date, workflow item type, and workflow identifier.

- All the start date ranges include the current date; for example, Last 2 Weeks includes today as well as the previous thirteen days.

- You can enter a partial value in the Workflow field to search for workflows whose identifiers begin with that value.

Click the Go button to perform your search.

Viewing Workflows

For an errored workflow, click the error icon or the error link in the Status column to view error details.

Viewing Notification History in the Self-Service Monitor

Viewing Notification History in the Self-Service Monitor

- The **Notification History** page shows information about the notifications sent by a workflow.
- If you have workflow administrator privileges, you can:
 - Reassign a notification
 - Cancel the workflow process



Viewing Notification History in the Self-Service Monitor

To send e-mail to the recipient of a notification, click the user link in the Notification Recipient column.

Viewing a Status Diagram in the Self-Service Monitor

Viewing a Status Diagram in the Self-Service Monitor

- The Status Diagram page shows the process diagram for a workflow, including graphical cues about the status of the workflow and its activities.
- It also shows a detail tab window with additional information about the selected process or activity.



Viewing a Status Diagram in the Self-Service Monitor

Above the process diagram, the process title displays the workflow process name, type, and identifier. If you drill down to a subprocess in the process diagram, the process title displays the subprocess name.

Process Diagram

- An activity can be highlighted with a colored box to indicate a distinctive state:
 - Red: The activity is in an error state.
 - Green: The activity is active or in progress.
 - Yellow: The activity is suspended.
- A transition arrow can have a thick green line to indicate that it has been traversed, or it can have a thin black line to indicate that it has not been traversed.
- Click an activity icon to display information about it in the detail tab window.
- Click any empty space in the diagram to deselect a selected activity and display information about the process as a whole in the detail tab window.

- Double-click a subprocess activity icon to drill down and display the diagram of the subprocess and its information in the detail tab window. You can also click the subprocess activity icon and then choose Zoom In.

The process diagram is view-only. You cannot edit the diagram in the Status Monitor.

Detail Tab Window

- Definition: Displays the properties of the activity or process.
- Usage: Displays the properties for the activity as a node in the process.
- Status: Displays status and result information about the activity. Also shows error information if the activity status is ERROR.
- Notification: Displays notification details for the selected notification activity.

Viewing Responses in the Self-Service Monitor

Viewing Responses in the Self-Service Monitor

- The **Monitor Responses** page shows information about notifications sent by a workflow and responses from workflow participants.
 - Select **Response Notifications** to view response-required notifications, **FYI Notifications** to view information-only (FYI) notifications, or both.
 - Select **Closed Notifications** to view only closed notifications of the selected type. Deselect this option to view both open and closed notifications.
- To view details about a response, click the icon in the **View Response Details** column.



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Viewing Responses in the Self-Service Monitor

You can use the Monitor Responses page to drill down to responses to a particular notification. For example, you can use this page to view individual responses to a voting activity.

To send e-mail to the respondent for a notification, click the user link in the Respondent column.

Notification Response Details

The Notification Response Details page displays the following:

- The subject line of the notification
- The user who responded to the notification
- The user to whom the notification was originally sent
- The date and time when the notification was sent
- The date and time when the response was received
- The response value that is the result of the notification
- Whether the notification required an electronic signature
- Any further response values requested in the notification in addition to the result response

For a notification that required a signature, the page also displays further signature details. To send e-mail to the respondent or original recipient for a notification, click the corresponding user link.

Viewing Error Information in the Self-Service Monitor

Viewing Error Information in the Self-Service Monitor

- **The Error Summary page shows error information for an errored workflow.**
- **You can optionally display the error stack, which provides context information to help an administrator locate the source of the error.**



Viewing Error Information in the Self-Service Monitor

The Workflow Errors page displays the name of the activity that encountered an error, the activity type, the internal name of the error, and the error message describing the error.

Note: If you navigated to the Error Summary page from an error status link for a workflow, the page shows details for each errored activity within the workflow. If you navigated to the page from an error status link for a single errored notification activity, the page shows details for only that activity.

Summary

Summary

In this lesson, you should have learned how to:

- **Launch a test process.**
- **Check the progress of a workflow using the Status Monitor.**

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Viewing and Responding to Notifications

Chapter 8

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Viewing and Responding to Notifications

Viewing and Responding to Notifications

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Respond to notifications from the Worklist Web pages.**
- **Respond to notifications using e-mail.**
- **Define vacation rules.**

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Viewing Notifications from a Web Browser

Viewing Notifications from a Web Browser

- The Oracle Workflow Worklist Web pages let you view and respond to your notifications.
- All users can view their notifications in these Web pages, regardless of the notification preference they have set on the User Preferences page.
 - If your notification preference is set for e-mail, then you can both receive e-mail notifications and access your notifications through the Worklist pages.
 - If your notification preference is set to “Do not send me mail,” then you can access your notifications only through the Worklist pages.



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Worklist Pages

Worklist Pages

Two versions of the Worklist are available:

- **Advanced Worklist:** Provides an overview of notifications as well as options for displaying and administering notifications
- **Personal Worklist:** Provides the most detailed options for searching for and displaying notifications



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Worklist Pages

The Advanced Worklist is available by default from some of the seeded responsibilities in Oracle E-Business Suite. A system administrator can also add the Advanced Worklist to the menu for another responsibility.

The Personal Worklist is not available on a seeded responsibility. Before you can access the Personal Worklist, a system administrator must add it to the menu for an Oracle E-Business Suite responsibility that is assigned to you.

Advanced Worklist

Advanced Worklist

- **Navigate to the Advanced Worklist.**
- **Select the type of notifications you want to display from the View pull-down menu and click Go.**
- **To navigate to the full details of any notification, click the notification's Subject link, or select one or more notifications and choose Open.**
- **To collectively reassign, respond to, or close a group of notifications, select the notifications you want and click the corresponding button.**



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Advanced Worklist

Use a Web browser to navigate to the Advanced Worklist, using a responsibility and navigation path specified by your system administrator. Some possible navigation paths in the seeded Workflow responsibilities are:

- Workflow User Web Applications: Advanced Worklist
- Workflow User Web Applications: Notifications
- Workflow User Web (New): Notifications
- Workflow Administrator Web Applications: Notifications
- Workflow Administrator Event Manager: Notifications
- Workflow Administrator Web (New): Notifications

You can also navigate to the Advanced Worklist from other Oracle Workflow Web pages by selecting the Notifications tab or clicking the Notifications link at the end of the page, if you are viewing the page in the context of an Oracle Workflow responsibility.

Accessing Notifications from the Advanced Worklist

- In the View pull-down menu, you can choose to view:
 - Open Notifications

- FYI Notifications
 - To Do Notifications
 - All Notifications
 - Notifications From Me
- To define vacation rules, click the Vacation Rules link.
 - To grant access to your worklist to another user, click the Worklist Access link.
 - To view another user's worklist, click the Switch User button. On the Switch User page, select the user whose worklist you want to view. If a user granted you access only to selected item types, then when you view that user's worklist, the page displays only notifications that belong to those item types.
 - To collectively reassign a group of notifications, select the notifications you want and click the Reassign button. The Reassign button may be replaced by the Delegate button or the Transfer button, depending on the access you have been assigned in the WF: Notification Reassign Mode profile option.
 - The Reassign button appears if you have access to reassign notifications to another user either by delegating the notifications or by transferring complete ownership of the notifications.
 - The Delegate button appears if you only have access to delegate the notifications.
 - The Transfer button appears if you only have access to transfer ownership of the notifications.
 - To respond to a group of notifications collectively, select the notifications you want and select the Respond button. The Respond button appears only if your workflow administrator has enabled it. The notifications must all belong to the same workflow type and message definition so that the response values you provide will match all the notifications in the group. You can only use the Respond button to respond to notifications that are open, require a response, do not require a digital signature, and do not contain a request from another user for more information about another notification.
 - To collectively close a group of FYI notifications, select the notifications you want and select the Close button. In the confirmation page, choose Apply. You can only use the Close button to close notifications that are open and do not require a response.
 - If you select more than one notification to open, only one notification is displayed at a time. You can navigate among the open notifications by clicking the Next or Back buttons on the Notification Details page.

Notification Details

Notification Details

- **Navigate to the Notification Details page.**
- **Review the notification header and body as well as any attachments.**
- **You can:**
 - **Respond to a notification that requires a response**
 - **Close a notification that does not require a response**
 - **Reassign the notification to another user**
 - **Request more information about the notification from another user**
 - **Respond to a request for more information**



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Notification Details

- You can access the Notification Details page from the Advanced Worklist, from the Personal Worklist, or from e-mail notifications.
- In Oracle E-Business Suite, nonstructured data such as images, spreadsheets, or video can be linked to structured application data, including Oracle Workflow notifications seeded by other Oracle E-Business Suite applications. If a notification includes such Oracle E-Business Suite attachments, the notification header displays an Attachment(s) heading with links to the attachments. Click a link to view the attached data.
- The message body may include embedded links to additional information sources pertinent to the notification. A reference URL link connects to a specified URL, either in the same Web browser window or in a new window, depending on the notification.
- The Related Applications section may include attachment icons. These icons link to additional information sources for the notification. There are three types of attachment links:
 - A reference URL link that connects to a specified URL.

- A PL/SQL, PL/SQL CLOB, or PL/SQL BLOB document link that displays the contents of a document generated from a PL/SQL function. Such documents can contain text, HTML, images, or application files such as PDF or RTF documents.
 - An Oracle E-Business Suite form link that drills down to an Oracle E-Business Suite form or Oracle Application Framework page.
- Note:** You must use a responsibility with the appropriate security to open a linked form or Oracle Application Framework page. If the form link or URL link is defined to use a particular responsibility, you must have that responsibility assigned to you to open the form or page. Otherwise, Oracle E-Business Suite displays a list from which you can select the responsibility you want to use.
- If you want to view your next notification on the Notification Details page after responding to this notification, select the Display Next Notification After My Response check box. Otherwise, Oracle Workflow displays your worklist after you respond to a notification.
 - Use the Response section to act on the notification.
 - If a notification requires a response, but none of the responses affect the result of the notification activity, enter your response values and submit your response by clicking Submit.
 - If a notification requires a response with a result, enter your response values and click the button for the result value you want, or if there are more than four result values, enter your response values, select the result value you want from the pull-down menu, and submit your response by clicking Submit.
 - The Response section can also display an attached form icon that lets you drill down to an Oracle E-Business Suite form to complete your response.
 - If a notification does not require a response, click the Close button when you have finished reviewing it so that it does not appear in your worklist the next time you view your open notifications.
 - If you want another user to respond to the notification instead of you, click the Reassign button. The Reassign button may be replaced by the Delegate button or the Transfer button, depending on the access you have been assigned in the WF: Notification Reassign Mode profile option.
 - To request more information about this notification from another user or role, click the Request Information button.
 - If another user sent you this notification with a request for more information, the Response section displays the user who made the request and the request details. Enter the information you want to provide and click Submit.
 - If this notification requires a password-based electronic signature, a confirmation page appears after you submit your response. This page displays notification header information and the response values that you entered to let you review the response you are signing. If the notification requires the signed response to include the message body, then the confirmation page also displays the message body for you to review. To affix your electronic signature to your response, enter your Oracle E-Business Suite user name and password and click Submit.

- If this notification requires a certificate-based digital signature, a confirmation page appears after you submit your response. This page displays notification header information and the response values that you entered to let you review the response that you are signing. If the notification requires the signed response to include the message body, then the confirmation page also displays the message body for you to review. Click the Sign button and use your Web browser to enter your X.509 certificate as your signature. For detailed instructions, please refer to the online help for your Web browser. If you have multiple certificates installed, ensure that you enter a certificate that is assigned to the Oracle E-Business Suite user name with which you logged in.

Reassigning Notifications

Reassigning Notifications

- **Navigate to the Reassign Notifications page.**
- **In the Assignee fields, select the type of user to whom you want to reassign the notification. Then select the user you want within that type.**
- **Select whether to delegate or transfer the notification.**
- **Enter any comments to the new recipient.**
- **Click Submit.**



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Reassigning Notifications

Navigate to the Reassign Notifications page by one of the following methods:

- In the Advanced Worklist or Personal Worklist, select one or more notifications and choose the Reassign button.
- On the Notification Details page for a single notification, click the Reassign button.
- Choose to reassign a notification from the Status Monitor.

The Reassign button may be replaced by the Delegate button or the Transfer button, depending on the access you have been assigned in the WF: Notification Reassign Mode profile option.

The assignee types correspond to the originating system partitions in the Oracle Workflow directory service.

If you have access either to delegate or transfer notifications, select one of these reassign modes on the Reassign Notifications page to specify how you want to reassign the notification.

- “Delegate your response”: Select this option if you want to give the new user authority to respond to the notification on your behalf, but you want to retain ownership of the notification yourself. For example, a manager might delegate all vacation scheduling approvals to an assistant.

- “Transfer notification ownership”: Select this option if you want to give the new user complete ownership of and responsibility for the notification. For example, use this option if you should not have received the notification and you want to send it to the correct recipient or to another recipient for resolution.

Note: If you only have access to one reassign mode, Oracle Workflow automatically uses that mode (either delegate or transfer) when you reassign notifications.

Responding to a Group of Notifications

Responding to a Group of Notifications

- **Navigate to the Respond to Notifications as Group page.**
- **Review the selected notifications.**
- **Submit your response to the notifications.**



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Responding to a Group of Notifications

Navigate to the Respond to Notifications as Group page by selecting one or more notifications in the Advanced Worklist or Personal Worklist and choosing the Respond button.

To view the full details of a notification and act on the notification individually, click the subject link for the notification.

The Respond to Notifications as Group page does not display any default values for the response prompts. You must enter the response values you want to submit. The response that you enter is applied to all the selected notifications.

- If the notifications require a response, but none of the responses affect the result of the notification activity, enter your response values and submit your response by clicking Go.
- If the notifications require a response with a result, enter your response values and click the button for the result value you want, or if there are more than four result values, enter your response values, select the result value you want from the pull-down menu, and submit your response by clicking Go.

Requesting More Information

Requesting More Information

- **Navigate to the Request More Information page.**
- **Specify the user or role from whom you want to request information.**
- **Enter details about what information you are requesting.**
- **Click Submit.**



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Requesting More Information

You can choose to request information from another user or role previously involved in this workflow process, or from any user listed in the Oracle Workflow directory service. When you select the Any User option, you first select a type of user, and then select the user you want within that type. The user types correspond to the originating system partitions in the Oracle Workflow directory service.

Certificate-Based Digital Signatures

Certificate-Based Digital Signatures

- A notification may require you to sign your response with a valid X.509 certificate issued by a certificate authority.
- You must have your certificate installed in your browser and loaded into Oracle E-Business Suite before you can sign notifications.



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Certificate-Based Digital Signatures

To set up for certificate-based digital signatures:

- Obtain an X.509 certificate and private key from a certificate authority. The certificate and key should be provided in a PKCS 12 file with an extension of .p12 or .pfx.
- Obtain the certificate authority's root certificate and any intermediate certificates required for your type of certificate. Also, for each root and intermediate certificate, obtain a URL specifying the location from which the corresponding Certificate Revocation List (CRL) can be downloaded. If your system administrator has already obtained and installed the root certificate for your certificate authority and the intermediate certificates for your type of certificate, you can skip this step.
- Load the file containing your personal certificate and key onto the file system of your client PC, and import the certificate into your browser. For detailed instructions, please refer to the online Help for your browser.
- Use the certificate management functions in your browser or operating system to export your personal certificate in the DER encoded binary X.509 format, as a file with an extension of .cer.

- Give your system administrator the exported file for your personal certificate, as well as the root certificate for your certificate authority and the intermediate certificates for your type of certificate, if necessary. The system administrator must load these certificates into Oracle E-Business Suite.

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Granting Worklist Access

Granting Worklist Access

- You can grant access to your worklist to another user.
- That user can then handle the notifications in your list on your behalf.
- You can either grant a user access for a specific period or allow the user's access to continue indefinitely.
- You can either grant access to all your notifications, or only to notifications belonging to selected item types.



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Granting Worklist Access

The worklist access feature lets you allow another user to handle your notifications without giving that user access to any other privileges or responsibilities that you have in Oracle E-Business Suite. However, note that a user who has access to your worklist can view all the details of your notifications and take most actions that you can take on the notifications. Ensure that you take all necessary security considerations into account when you choose to grant worklist access to another user.

If another user has granted you access to his or her worklist, you can switch the Advanced Worklist or Personal Worklist to display that user's notifications instead of your own.

- Your own assigned notification reassign mode still applies when you are viewing another user's worklist.
- If the other user has a notification marked as being sent from you, you can only view that notification and cannot take any action on it. For example, you cannot respond to a notification that you reassigned to the other user, nor to a notification marked as being sent from you by the special #FROM_ROLE message attribute, such as an expense report that is marked as having been submitted by you. (However, if you have workflow

administrator privileges, those privileges override this restriction so that you can respond to all notifications, even notifications from you.)

- You cannot define vacation rules for the user whose worklist you are viewing. You also cannot grant access to that user's worklist to anyone else.

Granting Worklist Access

Granting Worklist Access

- **Navigate to the Worklist Access page.**
- **Click the Grant Worklist Access button.**
- **Select the user you want, and enter an optional description.**
- **Specify the start date when the user can begin accessing your worklist.**
- **Optionally, specify an end date after which the user will no longer have access.**
- **Choose whether to grant the user access to notifications from all item types or only from selected item types.**



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Granting Worklist Access

Navigate to the Worklist Access page by navigating to the Advanced Worklist or Personal Worklist and clicking the Worklist Access link.

- If a user has an e-mail address defined in Oracle E-Business Suite, you can click the link in the User Name column to send e-mail to that user.
- The start and end dates for each user determine the access period when the user can view and act on your worklist. The user's active or inactive status depends on whether the current date is within the access period. Leave the end date blank to grant access indefinitely.
- If you are granting access only to selected item types, select the item types you want in the Available Item Types list and move them to the Selected Item Types list. By default, the Available Item Types list displays those item types for which you have previously received at least one notification. Your workflow administrator can also add item types to this list to let you grant a user access to handle other notifications that you may receive in the future.

- To update the description for a user, the start and end dates of the user's access period, or the item types to which the user has access, click the Update icon for that user and enter your changes.
- To revoke a user's access, click the Delete icon for that user. The user will no longer have access to your worklist, even if the user's access status was previously Active.

Note: When you delete a user, the record of the user's access no longer appears in your Worklist Access page. If you want to keep this record for reference, you can simply set the end date to end the user's access, rather than deleting the user.

Administrator Search for Notifications

Administrator Search for Notifications

- Use the Notifications administrator page to access notifications sent to other users.
- Search for the notifications you want to access.
- To view a notification, click the notification subject link in the Subject column.
- If you respond to another user's notification, the notification's action history shows that you performed that action.



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Administrator Search for Notifications

Navigate to the Notifications page by selecting the Administration tab on the Oracle Workflow administrator home page and selecting Notification Search in the horizontal navigation.

You must have workflow administrator privileges to access other users' notifications on the Notifications page. If you do not have administrator privileges, you can only search for and access your own notifications. Workflow administrator privileges are assigned on the Workflow Configuration page.

Searching for Notifications

The following search criteria are available only if you have workflow administrator privileges:

- Notification ID: If you specify a notification ID, all other search criteria are ignored.
- Owner
- To: Usually, the Owner role and the To role for a notification are the same. However, you can specify different roles in the Owner field and the To field to search for notifications that were reassigned in Delegate mode.

The following search criteria are always available:

- From

- Status
- Workflow Type
- Type Internal Name
- Subject: This field is case-sensitive. You can use the percent sign (%) as a wildcard character.
- Sent: All the sent date ranges include the current date. For example, Last 2 Weeks includes today as well as the previous 13 days.
- Due Date: All the due date ranges include the current date.
- Priority

If you have workflow administrator privileges, you must enter at least one of the following criteria when you search in order to limit the size of the results list.

- Notification ID
- Owner
- To
- From

Reviewing Electronic Signature Details

Reviewing Electronic Signature Details

- Use the **Electronic Signature administrator page** to review details about electronic signatures that have been requested or submitted for notifications.
- Search for the signatures you want to review.
- Check the status of a signature request.
- Review details that provide evidence of a submitted signature.



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Reviewing Electronic Signature Details

Navigate to the Electronic Signature page by selecting the Administration tab on the Oracle Workflow administrator home page and selecting Signature Evidence Store in the horizontal navigation.

You can only review signatures for notifications that have not been purged.

Searching for Signatures

The following search criteria are available:

- Notification ID: If you specify a notification ID, all other search criteria are ignored.
- Signature Policy: The policy that identifies the type of signature and signed text required by the notification.
- Requested Signer
- Status
- Creation Date: The date when the request for a signature was created.
- Signed Date: The date when the user submitted the signature.

- Verified Date: The date when Oracle Workflow confirmed that the signature was well formed, that it was created with a private key corresponding to the offered signing certificate, and that it signed the plain text that it purported to sign.
- Last Validation Date: The most recent date when Oracle Workflow attempted to check that the certificate used to create the signature was valid at the time the signature was received.
- Validated Complete Date: The date when Oracle Workflow successfully validated the signature against a certificate revocation list issued by the certificate authority after the time the signature was received.

You must enter at least one of the following criteria when you search in order to limit the size of the results list.

- Notification ID
- Requested Signer
- Creation Date
- Signed Date
- Verified Date

Personal Worklist

Personal Worklist

- **Navigate to the Personal Worklist.**
- **To perform a one-time search to locate notifications that match your criteria, click the Simple Search button.**
- **Select the type of notifications you want to display from the View pull-down menu and click Go.**
- **To maintain your personalized views, click Personalize.**
- **To navigate to the full details of any notification, click the notification's Subject link, or select one or more notifications and click Open.**



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Personal Worklist

The Personal Worklist is not available on a seeded responsibility. Before you can access the Personal Worklist, a system administrator must add it to the menu for an Oracle E-Business Suite responsibility that is assigned to you. Then you can use a Web browser to navigate to the Personal Worklist in that responsibility.

- From the Simple Search page, you can also navigate to the Advanced Search page.
- In the View pull-down menu, you can choose from the preconfigured views, or you can create your own personalized views to display notifications that match criteria that you specify. The views that are available may depend on the responsibility through which you access the Personal Worklist.
- To collectively reassign a group of notifications, select the notifications you want and click the Reassign button. The Reassign button may be replaced by the Delegate button or the Transfer button, depending on the access you have been assigned in the WF: Notification Reassign Mode profile option.
- To respond to a group of notifications collectively, select the notifications you want and select the Respond button.

- To collectively close a group of FYI notifications, select the notifications you want and select the Close button. In the confirmation page, choose Apply.
- To define vacation rules, click the Vacation Rules link.
- To grant access to your worklist to another user, click the Worklist Access link.
- To view another user's worklist, click the Switch User button. On the Switch User page, select the user whose worklist you want to view. If a user granted you access only to selected item types, then when you view that user's worklist, the page displays only notifications that belong to those item types.

Simple Search for Notifications

Simple Search for Notifications

- **Navigate from the Personal Worklist to the Simple Search page.**
- **Enter your search criteria and click Go.**
- **To save your current search criteria as a personalized view for the worklist, click Save Search.**
- **To perform a search with more complex criteria, click Advanced Search.**



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Simple Search for Notifications

You can search for notifications by subject, from role, and sent date. You can enter a partial value for the subject or from role to search for notifications whose subjects or from roles contain those values, respectively. The Subject and From fields are case-insensitive.

When you have displayed a set of notifications on the Simple Search page, you can open, reassign, respond to, or close those notifications, define vacation rules, or grant access to your worklist to another user, as in the Personal Worklist.

To navigate back to the Personal Worklist, click the Worklist Views button.

Advanced Search for Notifications

Advanced Search for Notifications

- **Navigate from the Simple Search page to the Advanced Search page.**
- **Specify whether notifications must meet all or only one of your search criteria to be displayed.**
- **Enter your search criteria and click Go.**
- **To save your current search criteria as a personalized view for the worklist, click Save Search.**
- **To perform a search with less complex criteria, click Simple Search.**



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Advanced Search for Notifications

The following search options are displayed by default: Subject, From, Message Attribute, and Sent. To display additional search options, select the notification property you want from the Add Another pull-down menu and click Add.

For each search option, select a filter operator and then enter a filter value to specify the notifications you want to display.

- For the **is** filter operator, you should enter a complete filter value that you want to match.
- For the other filter operators, you can enter a partial value, unless you are using the Sent, Due, and Closed search options, which always require a complete date in the date format you chose in your Oracle E-Business Suite general preferences.
- The filter value fields for all search options are case insensitive.

If you leave the filter operator and filter value blank for a search option, that option will not be included in the search.

Note: The greater than, less than, after, and before filter operators are not inclusive. For example, a search on the Sent option with the **after** operator displays only notifications sent after the date you specify, not notifications sent on that date itself.

- Subject: Enter the subject line of the notifications.
- From: Enter the role from which the notifications were sent.
- Message Attribute: Enter the value of a message attribute belonging to the notification. Message attribute values can be numbers, dates, or text.
- Sent: Enter the date when the notifications were delivered.
- Type: Enter the display name of the item type to which the workflow process that sent the notification belongs.
- Status: Enter open, closed, or canceled as the notification status.
- To: Enter the role to which the notifications were sent.
- Information Requested From: Enter the role to which notifications that are requests for more information were sent.
- Due: Enter the date by which the notifications should be completed.
- Closed: Enter the date when the notifications were closed or canceled.
- Priority: Enter high, normal, or low as the notification priority.
- Response Required: Enter yes or no to specify whether the notifications require a response from the recipient.
- FYI: Enter yes or no to specify whether the notifications are for your information (FYI) only and do not require a response.
- Notification ID: Enter the numerical notification identifier.
- From Me: Enter yes or no to specify whether the notifications are sent from you.
- Type Internal Name: Enter the internal name of the item type to which the workflow process that sent the notification belongs.
- Message Name: Enter the internal name of the message sent by the notification.

When you have displayed a set of notifications on the Advanced Search page, you can open, reassign, respond to, or close those notifications, define vacation rules, or grant access to your worklist to another user, as in the Personal Worklist.

To navigate back to the Personal Worklist, click the Worklist Views button.

Creating a Personal Worklist View

Creating a Personal Worklist View

- **Navigate from the Personal Worklist to the Personalize Views page.**
- **Click the Create View button.**
- **On the Create View page, specify the properties for the view:**
 - General properties
 - Column properties
 - Sort settings
 - Search criteria to filter notifications displayed in the view
- **Click Apply.**



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Creating a Personal Worklist View

You can also navigate to the Create View page by clicking Save Search on the Simple Search or Advanced Search pages.

The Personalize Views page displays all existing views for the role you are logged in as, including both preconfigured views provided by Oracle Workflow and your personalized views.

- In the Display View column for a personalized view, select Yes to include the view in the View menu in the Personal Worklist, or select No to exclude the view from the View menu. Then click Apply.

Note: Preconfigured views always appear in the View menu. You cannot change this setting for those views.

- To update a view, click the icon in the Update column for that view.
- To delete a view, click the icon in the Delete column for that view.

Note: You can update and delete only personalized views that you created. You cannot update or delete preconfigured views.

- To create a view that is a duplicate of an existing view, select the existing view that you want to copy and click the Duplicate button.

Create View/Update View/Duplicate View

- Enter a display name to identify your personalized view.
- Select the number of notification rows you want to display in the view.
- If you want to make this view your default view, select the Set as Default check box. Only one view can be set as the default at any time, so if you select Set as Default for the current view, this option is automatically deselected for any view you previously set as the default.
- Enter an optional description for the view.
- In the Column Properties region, specify the notification property columns you want to display in the view and the order in which to display them.
 - To add a column to the view, select the column in the Available Columns list and click the Move button. You can also click the Move All button to add all available columns.
 - To remove a column from the view, select the column in the Columns Displayed list and click the Remove button. You can also click the Remove All button to remove all the columns.
 - To specify the order in which the columns are displayed, select a column in the Columns Displayed list and use the top, up, down, or bottom arrow buttons to move the column to the position you want in the list.
- If you want to change the display names for the notification property columns in the view, click the Rename Columns/Totaling button. In the Rename Columns/Totaling page, enter the new name for each column and click Apply.
- In the Sort Settings region, you can specify up to three levels of sorting for the notifications in the view. For each level of sorting, select the notification property column by which you want to sort and specify whether to sort in ascending or descending order.
- Specify whether notifications must meet all or only one of your search criteria to be displayed.
- The search criteria you can specify to locate notifications to display in the view are similar to the search criteria in the Advanced Search page.

Viewing Notifications Through E-mail

Viewing Notifications Through E-mail

- You can receive individual e-mail notifications if your workflow administrator sets up a notification mailer to run and your notification preference is set to one of the following:
 - Plain text mail
 - HTML mail
 - Plain text mail with HTML attachments
 - HTML mail with attachments
- An e-mail notification contains all the details of the notification, including instructions on how to respond to the notification.



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Viewing Notifications through E-mail

Set your notification preference in the Preferences page in Oracle E-Business Suite.

- Plain text mail: The notification message appears as plain text, with no attachments. If the message requires a response, you can respond by replying to the e-mail message. If the notification message has “Content–Attached” URL or document message attributes (meaning the Attach Content check box was selected when the attributes were defined in the Workflow Builder), they are included as plain text. Note that this may render some attachments unreadable if the attachment includes special formatting or your plain text e-mail reader does not recognize attachments. To view these attachments, you should display your notifications in the Notification Details page.
- HTML mail: The notification message appears as HTML-formatted text, with no standard attachments. If the notification message has “Content–Attached” message attributes; however, these attributes appear as attachments to the message. If the message requires a response, you can respond by clicking one of the response links.
- Plain text mail with HTML attachments: The notification message appears as plain text, with at least two other attachments. One attachment is an HTML-formatted version of the message, and the other is a link to the notification in the Notification Details page. If the

notification message has “Content–Attached” message attributes, these attributes appear as additional attachments to the message. If the message requires a response, you can respond by replying to the e-mail message or by opening the HTML-formatted version of the message and clicking one of the response links, or you can navigate to the Notification Details page and respond there.

- HTML mail with attachments: The notification message appears as HTML-formatted text, with at least one other attachment that is a link to the notification in the Notification Details page. If the notification message has “Content–Attached” message attributes, these attributes appear as additional attachments to the message. If the message requires a response, you can respond by clicking one of the response links, or you can navigate to the Notification Details page and respond there.

Note

- If you view your notifications through e-mail, you can only reassign a notification by using the Forward function in your e-mail client, which performs similarly to the Delegate reassign mode.
- Oracle E-Business Suite form attributes cannot be attached to e-mail notifications. To view form attachments, you must view the notification in the Notification Details page.

E-mail Response Methods

E-mail Response Methods

- Your workflow administrator determines the response method for plain text e-mail notifications when setting up a notification mailer.
 - Direct response: Enter your response values directly as the first lines of your reply.
 - Templated response: Reply using the template of response prompts provided in the notification and enter your response values between the quotes following each prompt.
- HTML-formatted notifications always use the templated response method.



E-mail Response Methods

The Notification System interprets your response values in a case-sensitive manner.

HTML-Formatted E-mail Notifications

HTML-Formatted E-mail Notifications

- **HTML e-mail notifications always use the templated response method.**
- **The response section of an HTML e-mail notification includes links for the possible result response values at the end of the notification. After reviewing the message body of the notification, click one of them response links.**
- **Each response link automatically generates a plain text e-mail reply that contains the correct Reply To: e-mail address as well as a response template in the message body.**



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HTML-Formatted E-mail Notifications

The response template consists of the required notification ID and access key that identify the notification you are responding to and a response prompt edited with your selected result response. Depending on the notification, the autogenerated e-mail response template may also prompt you for other information in addition to your selected result response. Supply responses by editing the response value text between the quotes following each response prompt.

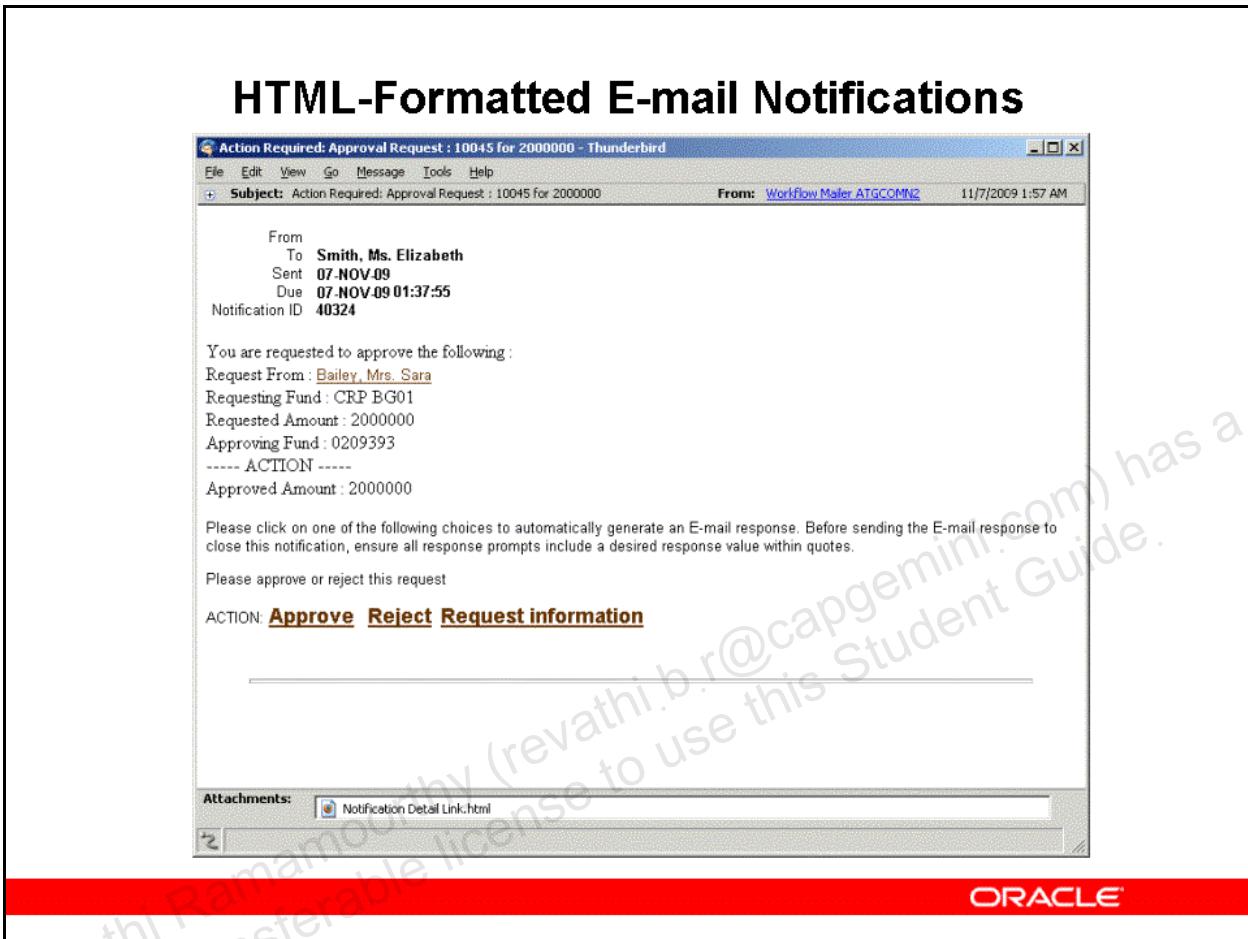
If this notification includes sensitive content that cannot be sent in e-mail for security reasons, the notification e-mail message directs you to access the online version of the notification instead. Navigate to the Notification Details page to view the content of the notification and submit your response.

- In addition to the response links, an HTML-formatted notification can also include a Request Information link to request more information about the notification from another user before you respond to the notification. The Request Information link automatically generates a plain text e-mail reply. The reply contains the correct Reply To: e-mail address as well as a request template in the message body. The request template contains the required notification ID and access key that identify the notification you are responding to. It also contains a prompt for you to enter the user from whom you want to request

information, along with a list of users who have previously participated in the workflow process, and a prompt for you to enter the question you want to ask that user.

- If another user sent you this notification with a request for more information, click the response link and enter the information you want to provide between the quotes following the response prompt.
- If this notification requires a password-based signature or a certificate-based digital signature in your response, you cannot respond to the notification through e-mail. In this case the notification informs you that an electronic signature is required and directs you to access the online version of the notification instead. Navigate to the Notification Details page to submit your response. Depending on the configuration of your Oracle Workflow installation, the notification may include a "Click here to respond" link that you can click to navigate to the Notification Details page. You must log in to Oracle E-Business Suite before you can access the Notification Details page.

HTML-Formatted E-mail Notifications



Plain Text E-mail Notifications Using Templatized Response

Plain Text E-mail Notifications Using Templatized Response

- Use the Reply function in your mail application to respond.
- Include the response template from the original notification in your reply. The response template includes response prompts as well as the special notification ID and access key that the notification mailer requires to identify the notification you are responding to.
- Follow the response template instructions and insert your response values between the quotes following each response prompt.



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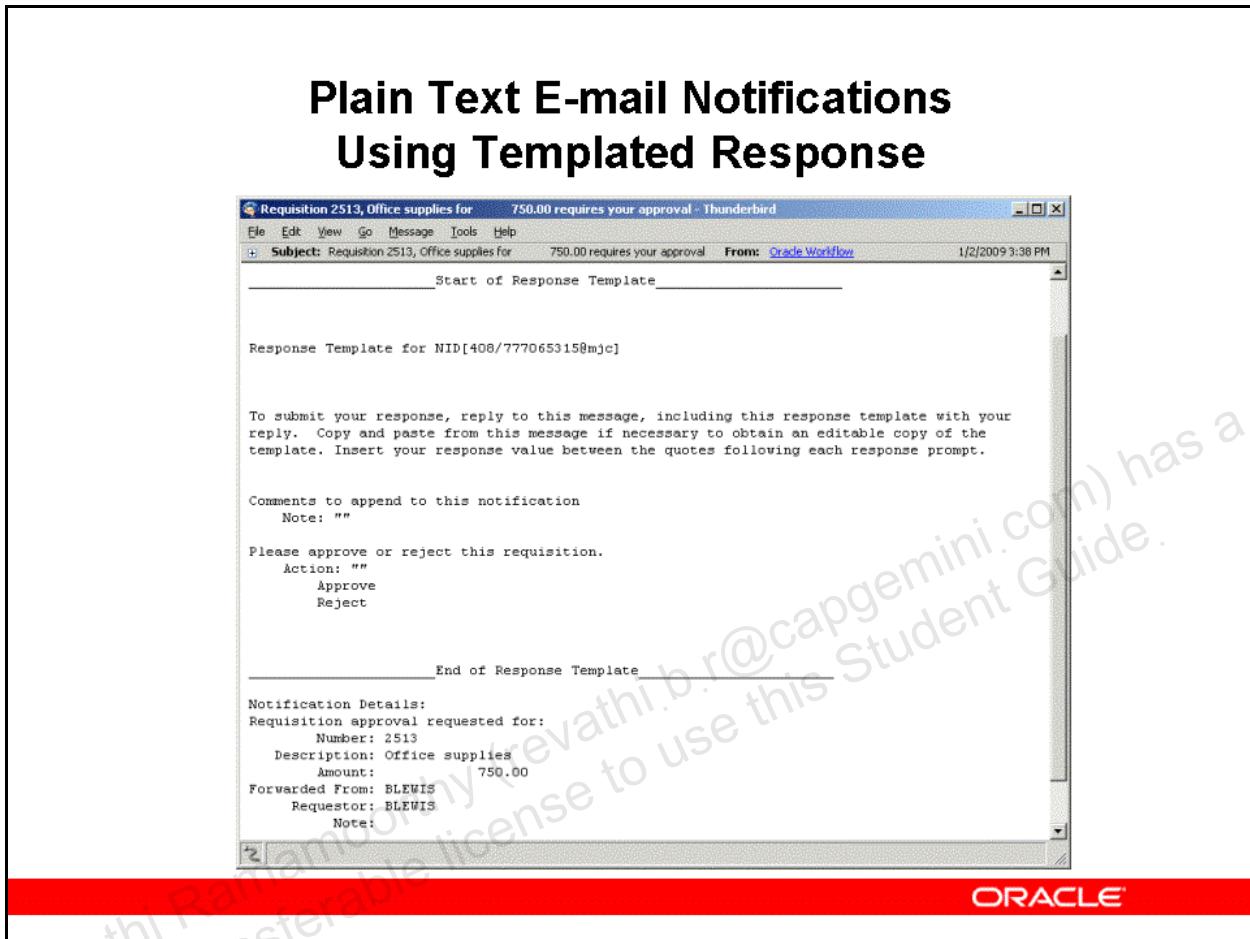
Plain Text E-mail Notifications Using Templatized Response

If your mail application includes an editable copy of the original message when it generates the reply message, you can use that copy to enter your response values. Otherwise, copy and paste from the original message to obtain a copy of the response template that you can edit.

If this notification includes sensitive content that cannot be sent in e-mail for security reasons, the notification e-mail message directs you to access the online version of the notification instead. Navigate to the Notification Details page to view the content of the notification and submit your response.

- If another user sent you this notification with a request for more information, include the response template in your reply and insert your response values between the quotes following the response prompt.
- If this notification requires a password-based signature or a certificate-based digital signature in your response, you cannot respond to the notification through e-mail. In this case the notification informs you that an electronic signature is required and directs you to access the online version of the notification instead. Navigate to the Notification Details page to submit your response.

Plain Text E-mail Notifications Using Templatized Response



Plain Text E-mail Notifications Using Direct Response

Plain Text E-mail Notifications Using Direct Response

- **Use the Reply function in your mail application to respond.**
- **Include the text of the original notification in your reply to ensure that you include the special notification ID and access key that the notification mailer requires to identify the notification you are responding to.**
- **The first lines of your reply are interpreted as your notification response, where each line represents a separate response value listed in the same order as its corresponding response prompt.**



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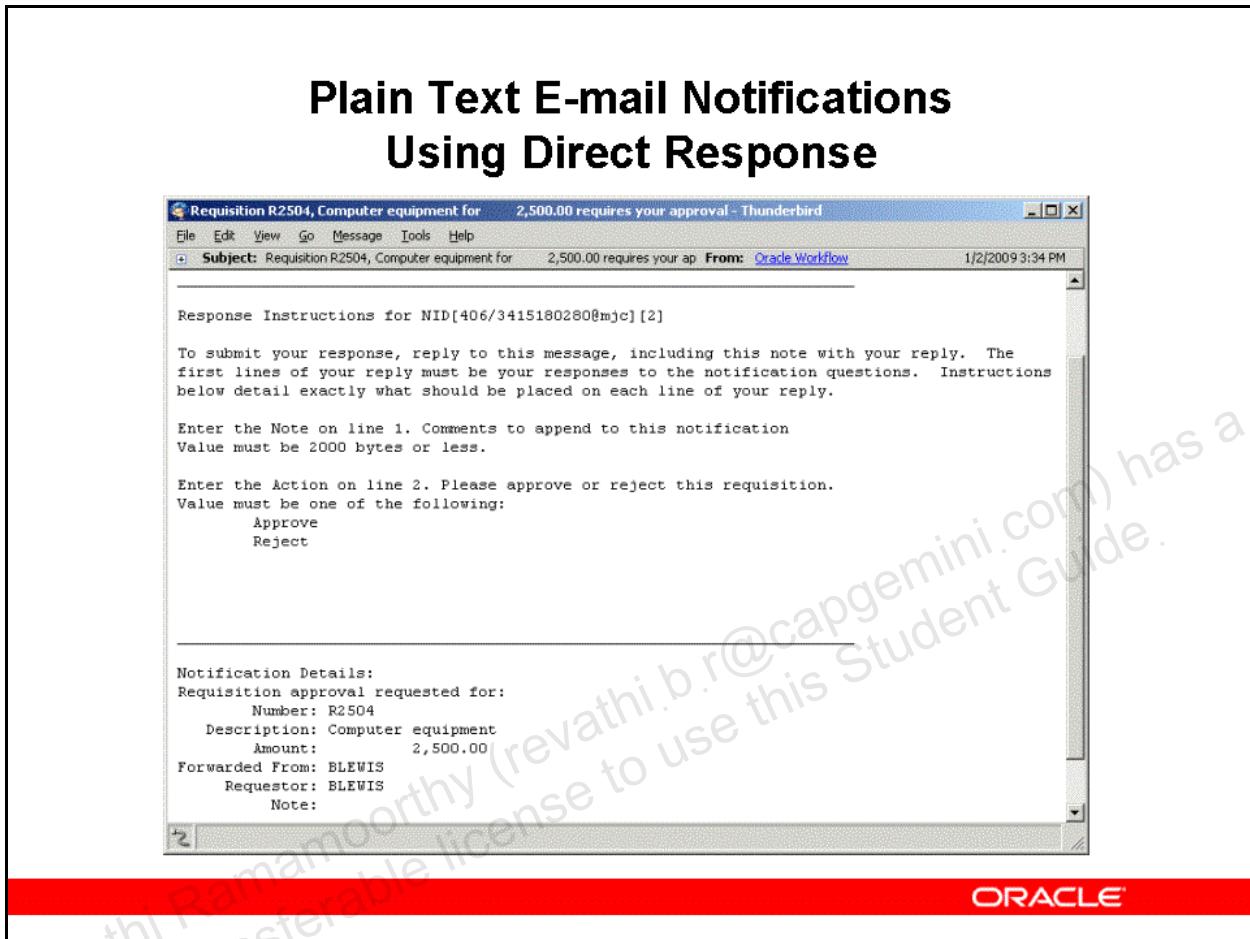
Plain Text E-mail Notifications Using Direct Response

If a response value requires more than one line, enclose the entire response value in double quotes. If a response prompt provides a default value, then you can accept the default value by leaving the appropriate response line blank.

If this notification includes sensitive content that cannot be sent in e-mail for security reasons, the notification e-mail message directs you to access the online version of the notification instead. Navigate to the Notification Details page to view the content of the notification and submit your response.

If this notification requires a password-based signature or a certificate-based digital signature in your response, you cannot respond to the notification through e-mail. In this case the notification informs you that an electronic signature is required and directs you to access the online version of the notification instead. Navigate to the Notification Details page to submit your response.

Plain Text E-mail Notifications Using Direct Response



Viewing an E-mail Summary of Notifications

Viewing an E-mail Summary of Notifications

- You can receive an e-mail summary of notifications if your workflow administrator sets up a notification mailer to run and your notification preference is set to one of the following:
 - Plain text summary mail
 - HTML summary mail
- A summary notification is a single e-mail message showing your current list of open notifications.
- To respond to individual notifications listed in the summary, you must use the Notification Details page.



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Viewing an E-mail Summary of Notifications

Your workflow administrator determines how frequently summary notifications are sent when setting up a notification mailer.

The plain text and HTML-formatted versions of the e-mail notification summary are based on the Workflow Summary Mail (HTML) template defined in the System: Mailer item type. To view the details of a notification or respond to or close the notification, you should use the Worklist Web pages. In the HTML-formatted version of the summary, you can click a subject link to navigate directly to the Notification Details page for that notification. The HTML-formatted summary also includes a link to the Worklist page, from which you can access all your notifications.

Vacation Rules

Vacation Rules

- You can automatically handle notifications during a planned absence by defining vacation rules.
- A rule can apply to messages of all item types, to all messages of a specific item type, or to a specific type of message in a specific item type.
- A rule can have one of three actions:
 - Reassign the notification to another role
 - Respond to or close the notification
 - Deliver to the original recipient with no further action



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Automatic Notification Processing

Each time a notification is sent to you, Oracle Workflow tests the notification against your vacation rules.

- First, Oracle Workflow checks whether you have any active rules for that specific message type.
- If not, it checks whether you have any active rules for that specific item type.
- Finally, it checks whether you have any active rules for messages of all item types.

As soon as it finds a match, Oracle Workflow applies the rule and discontinues any further rule matching.

If a rule reassigns a notification, Oracle Workflow performs rule matching again against the new recipient's list of rules. Oracle Workflow maintains a count of the number of times it forwards a notification to detect perpetual forwarding cycles. If a notification is automatically forwarded more than ten times, Oracle Workflow assumes that a forwarding cycle has occurred and ceases executing any further forwarding rules, marking the notification as being in error.

Maintaining Vacation Rules

Maintaining Vacation Rules

- **Navigate to the Vacation Rules page from the Vacation Rules link in the Advanced Worklist or Personal Worklist.**
- **To define a new rule, click the Create Rule button.**
- **To update a rule, click the Update icon for that rule.**
- **To delete a rule, click the Delete icon for that rule.**



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Maintaining Vacation Rules

The list of your vacation rules includes rules that you defined yourself as well as any rules defined for you by an administrator. A rule's active or inactive status depends on whether the current date falls within the rule's effective dates.

Defining Vacation Rules

Defining Vacation Rules

- Navigate to the Vacation Rules page and click Create Rule.
- Specify the item type to which the rule applies, and click Next.
- Specify the name of the notification message to which the rule applies, and click Next.
- Specify the start and end dates, comments, and action for the rule, and click Submit.



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Defining Vacation Rules

Vacation Rule: Item Type

- By default, the list of values for the Item Type field displays those item types for which you have previously received at least one notification. Your workflow administrator can also add item types to this list to let you create vacation rules to handle other notifications you may receive in the future.
- If your workflow administrator has enabled creating generic vacation rules, you can select the All option in the Item Type field. In this case the rule applies to notifications associated with any item type.

Vacation Rule: Notification

- Messages are listed by subject name.
- Select All if you want the rule to apply to all messages within the selected item type.
- Skip this step if you selected All as the item type.

Vacation Rule: Response

- The options in this page vary depending on the item types and messages to which each rule applies.

- If you leave the Start Date field blank, the rule is effective immediately. If you leave the End Date field blank, the rule is effective indefinitely.
Note: Ensure that rules for the same notifications do not overlap in their effective dates. If multiple rules are effective for the same notification, Oracle Workflow picks one rule at random to apply.
- The comments you enter in the Message field appear in a special comments field when the notification is reassigned or automatically responded to.
- You can choose the following actions:
 - “Reassign”: Forward the notification to a designated user.
 - “Respond”: Respond to the message with a set of predefined response values.
 - “Deliver notifications to me regardless of any general rules”: Leave the notification in your worklist with no automatic processing. You can define a rule with this action to exclude a certain subset of notifications from a more encompassing rule.
- If your rule action is “Reassign,”, select the type of user to whom you want to reassign the notifications. Then select the user you want within that type. Finally, specify whether you want to delegate or transfer the notifications.
Note: The assignee types correspond to the originating system partitions in the Oracle Workflow directory service.
- Then If your rule action is “Respond,” set the values with which you want to automatically respond.

Defining Vacation Rules

Defining Vacation Rules

- Administrators can use the Vacation Rules administrator page to define rules for other users.
- Search for the role for which you want to define vacation rules.
- To define a new rule, click the Create Rule button.
- To update a rule, click the Update icon for that rule.
- To delete a rule, click the Delete icon for that rule.



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Defining Vacation Rules

Navigate to the Vacation Rules page by selecting the Administration tab from the Oracle Workflow administrator home page and selecting Vacation Rules in the horizontal navigation. You must have workflow administrator privileges to define vacation rules for other users in the Vacation Rules page. Workflow administrator privileges are assigned in the Workflow Configuration page.

Summary

Summary

In this lesson, you should have learned how to:

- **Respond to notifications from the Worklist Web pages.**
- **Respond to notifications using e-mail.**
- **Define vacation rules.**

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Worklist Flexfields

Chapter 9

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Worklist Flexfields

Worklist Flexfields

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

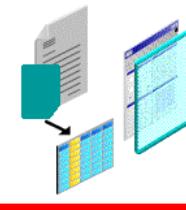
- **Define worklist flexfields rules.**
- **Understand how to secure access to a specialized worklist view.**
- **Create a specialized worklist view using worklist flexfields.**

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Worklist Flexfields

Worklist Flexfields

- Use worklist flexfields to define specialized worklist views that display information specific to particular types of notifications.
- Worklist flexfields are columns in the notification table, WF_NOTIFICATIONS, in which you can store information from different message attributes for different notifications.
- Storing information in the notification table lets you display that information in a Personal Worklist view.



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Worklist Flexfields

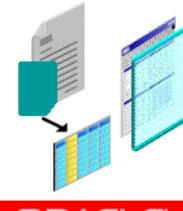
Note: Worklist flexfields are separate from the key flexfields and descriptive flexfields used in Oracle E-Business Suite. For information about key and descriptive flexfields, see the *Oracle Applications Flexfields Guide*.

Benefits of Worklist Flexfields

Benefits of Worklist Flexfields

If you define a specialized worklist view for a particular type of notifications, your users can:

- Quickly review important details about several notifications at once, without navigating to the Notification Details page for each notification.
- Sort the worklist by the displayed message attributes specific to that type of notification.



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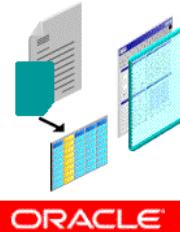
Benefits of Worklist Flexfields

For example, if an expense notification includes message attributes for the expense total and purpose, you can map these message attributes to worklist flexfields. You can then define a worklist view that includes only expense notifications and that displays the expense total and purpose for each notification alongside the standard notification properties, such as the subject line and sent date.

Defining a Specialized Worklist View Using Worklist Flexfields

Defining a Specialized Worklist View Using Worklist Flexfields

- 1. Define a worklist flexfields rule that maps message attributes from one or more workflow item types to worklist flexfields columns.**
- 2. Optionally define a securing function to secure access to your new worklist view.**
- 3. Create a Personal Worklist view that displays the columns mapped by a worklist flexfields rule and that includes only notifications from the corresponding item types.**
- 4. If you secured access to the view with a securing function, restart Oracle HTTP Server.**



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Defining a Specialized Worklist View Using Worklist Flexfields

Users must have access to the Personal Worklist to take advantage of a specialized worklist view. Ensure that you have added the Personal Worklist to a responsibility and assigned that responsibility to any users who need to access the specialized worklist view.

Message Attributes in Worklist Flexfields Rules

Message Attributes in Worklist Flexfields Rules

- You can map both send and respond message attributes in a worklist flexfields rule.
- You can map message attributes with the following data types:
 - Text
 - Number
 - Form
 - URL
 - Date



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Message Attributes in Worklist Flexfields Rules

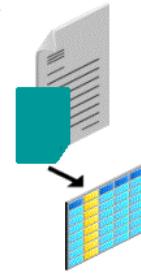
- If a respond message attribute has a default value, the corresponding worklist flexfield displays that value while the notification is open.
- When displayed in a Personal Worklist view, a form attribute appears as a form icon that drills down to the specified Oracle E-Business Suite form or Oracle Self-Service Web Applications page. Users must use a responsibility with the appropriate security to open a linked form or Oracle Application Framework page.
- When displayed in a Personal Worklist view, a URL attribute appears as a URL icon that links to the specified URL.
- A message attribute of type date must have the following format to be used in a worklist flexfields rule: dd-mon-yyyy hh24:mi:ss

The Personal Worklist requires date attributes to be stored in this format to display them properly according to each user's preference.

How Worklist Flexfields Rules Operate

How Worklist Flexfields Rules Operate

- **Worklist flexfields rules make message attributes available for display in the Personal Worklist.**
- **A worklist flexfields rule operates in combination with other rules that cover the same item type.**
- **The phase numbers and customization levels of the rules determine how their effects combine to produce a net set of available message attributes.**



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Phase Numbers

Phase Numbers

- The phase numbers for worklist flexfields rules control the order in which rules for the same item type take effect.
 - If two rules for the same item type map message attributes to the same worklist flexfield column, then the rule with the higher phase number overrides the rule with lower phase number in that column.
 - Other column mappings from the lower-phase rule may still take effect if they do not conflict with any column mappings from higher-phase rules.
- Rules seeded by Oracle E-Business Suite use phase numbers from 1 to 99.
- You can assign your rules phase numbers of 100 or higher.

100

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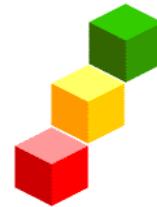
Phase Numbers

Do not assign the same phase number to more than one rule for the same item type. To ensure that the rules you want take effect, assign a different phase number to each rule for an item type.

Customization Levels

Customization Levels

- The customization level for a rule determines which worklist flexfields columns the rule can map and whether you can update the rule definition.
- Oracle Workflow uses the customization level to protect Oracle E-Business Suite seed data and to preserve your customizations in an upgrade.
- Rules seeded by Oracle E-Business Suite can have a customization level of Core or Limit.
- For rules that you define, Oracle Workflow automatically sets the customization level to User.

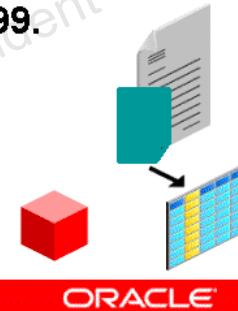


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Core Rules

Core Rules

- Core rules represent key Oracle E-Business Suite features.
- You cannot make any changes to core rule definitions.
- Core rules use a different set of worklist flexfields columns than limit and user rules.
- Consequently, core rules cannot override or be overridden by limit and user rules.
- Core rules use phase numbers from 1 to 99.



Core Rules

Although core rules cannot override or be overridden by limit and user rules, it is possible for a core rule with a higher phase number to override a core rule for the same item type with a lower phase number.

Core rules can map the following worklist flexfields columns.

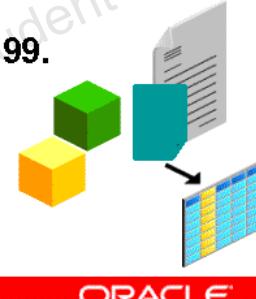
- Data type: Text
 - PROTECTED_TEXT_ATTRIBUTE1
 - PROTECTED_TEXT_ATTRIBUTE2
 - PROTECTED_TEXT_ATTRIBUTE3
 - PROTECTED_TEXT_ATTRIBUTE4
 - PROTECTED_TEXT_ATTRIBUTE5
 - PROTECTED_TEXT_ATTRIBUTE6
 - PROTECTED_TEXT_ATTRIBUTE7
 - PROTECTED_TEXT_ATTRIBUTE8
 - PROTECTED_TEXT_ATTRIBUTE9

- PROTECTED_TEXT_ATTRIBUTE10
- Data type: Number
 - PROTECTED_NUMBER_ATTRIBUTE1
 - PROTECTED_NUMBER_ATTRIBUTE2
 - PROTECTED_NUMBER_ATTRIBUTE3
 - PROTECTED_NUMBER_ATTRIBUTE4
 - PROTECTED_NUMBER_ATTRIBUTE5
- Data type: Form
 - PROTECTED_FORM_ATTRIBUTE1
 - PROTECTED_FORM_ATTRIBUTE2
 - PROTECTED_FORM_ATTRIBUTE3
 - PROTECTED_FORM_ATTRIBUTE4
 - PROTECTED_FORM_ATTRIBUTE5
- Data type: URL
 - PROTECTED_URL_ATTRIBUTE1
 - PROTECTED_URL_ATTRIBUTE2
 - PROTECTED_URL_ATTRIBUTE3
 - PROTECTED_URL_ATTRIBUTE4
 - PROTECTED_URL_ATTRIBUTE5
- Data type: Date
 - PROTECTED_DATE_ATTRIBUTE1
 - PROTECTED_DATE_ATTRIBUTE2
 - PROTECTED_DATE_ATTRIBUTE3
 - PROTECTED_DATE_ATTRIBUTE4
 - PROTECTED_DATE_ATTRIBUTE5

Limit and User Rules

Limit and User Rules

- Limit rules represent optional Oracle E-Business Suite features. You can update the status of limit rules to Enabled or Disabled, but you cannot make any other changes to the rule definitions.
- User rules are the custom rules that you define. You can update any property in the rule definitions.
- Limit rules and user rules share the same set of worklist flexfields columns.
 - Limit rules use phase numbers from 1 to 99.
 - User rules use phase numbers of 100 or higher.



Limit and User Rules

Limit rules and user rules can map the following worklist flexfields columns.

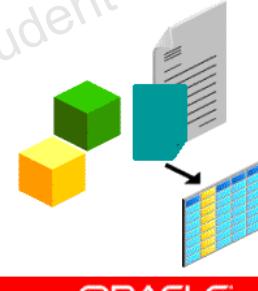
- Data type: Text
 - TEXT_ATTRIBUTE1
 - TEXT_ATTRIBUTE2
 - TEXT_ATTRIBUTE3
 - TEXT_ATTRIBUTE4
 - TEXT_ATTRIBUTE5
 - TEXT_ATTRIBUTE6
 - TEXT_ATTRIBUTE7
 - TEXT_ATTRIBUTE8
 - TEXT_ATTRIBUTE9
 - TEXT_ATTRIBUTE10
- Data type: Number
 - NUMBER_ATTRIBUTE1

- NUMBER_ATTRIBUTE2
- NUMBER_ATTRIBUTE3
- NUMBER_ATTRIBUTE4
- NUMBER_ATTRIBUTE5
- Data type: Form
 - FORM_ATTRIBUTE1
 - FORM_ATTRIBUTE2
 - FORM_ATTRIBUTE3
 - FORM_ATTRIBUTE4
 - FORM_ATTRIBUTE5
- Data type: URL
 - URL_ATTRIBUTE1
 - URL_ATTRIBUTE2
 - URL_ATTRIBUTE3
 - URL_ATTRIBUTE4
 - URL_ATTRIBUTE5
- Data type: Date
 - DATE_ATTRIBUTE1
 - DATE_ATTRIBUTE2
 - DATE_ATTRIBUTE3
 - DATE_ATTRIBUTE4
 - DATE_ATTRIBUTE5

Limit and User Rules

Limit and User Rules

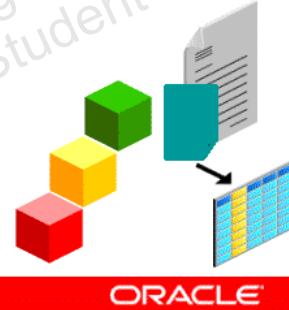
- A limit rule can be overridden by:
 - Another limit rule for the same item type with a higher phase number
 - A user rule for the same item type
- A user rule can only be overridden by another user rule for the same item type with a higher phase number.
- A limit rule cannot override a user rule.



Combining Core, Limit, and User Rules

Combining Core, Limit, and User Rules

- **Message attributes that are mapped by core and limit rules usually appear in a seeded worklist view within a particular application.**
- **You can also include message attributes mapped by core and limit rules in your own worklist views.**
- **Define your own user rules for any message attributes you want that are not made available by default through core or limit rules.**



Combining Core, Limit, and User Rules

- If a core rule does not meet your requirements, you can choose not to include its message attributes in your views. However, Oracle Workflow still stores the message attributes in the mapped columns.
- If a limit rule does not meet your requirements and you want to override some of its mappings while allowing others to take effect, define a user rule that maps the attributes you want to the relevant columns in place of the attributes you do not need. If you no longer want any mappings from a limit rule to take effect, disable that rule.
- While defining a user rule, you can check whether its column mappings conflict with any existing rules for the same item type, and whether the new rule will override or be overridden by the conflicting rules. Review each conflict to decide whether to accept the current overrides or update the rule definitions to make a different rule take effect.

Worklist Flexfields Rules Example

Worklist Flexfields Rules Example

Column	Message Attribute	Effective Rule
PROTECTED_TEXT_ATTRIBUTE1	Requisition Number	EXC01
NUMBER_ATTRIBUTE1	Requisition Amount	EXL02
TEXT_ATTRIBUTE1	Note	EXU03
URL_ATTRIBUTE1	Monitor URL	EXU03

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Worklist Flexfields Rules Example

This example uses the sample Requisition item type. For more details about this sample item type, see: The Requisition Item Type, Oracle Workflow Developer's Guide.

Suppose a core rule named EXC01 is seeded for the Requisition item type with a phase of 50 and the following column mapping:

- PROTECTED_TEXT_ATTRIBUTE1 column : Requisition Number attribute

Also, suppose a limit rule named EXL02 is seeded for the Requisition item type with a phase of 60 and the following column mappings:

- TEXT_ATTRIBUTE1 column : Requisition Description attribute
- NUMBER_ATTRIBUTE1 column : Requisition Amount attribute

You prefer to display the Note attribute instead of the Requisition Description attribute, and you also want to display the Monitor URL attribute. To do so, you define a user rule named EXU03 for the Requisition item type with a phase of 110 and the following column mappings:

- TEXT_ATTRIBUTE1 column : Note attribute
- URL_ATTRIBUTE1 column : Monitor URL attribute

These rules combine to produce a net set of four message attributes that you can display in a Personal Worklist view for the Requisition item type.

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Defining a Worklist Flexfields Rule: Entering General Properties

Defining a Worklist Flexfields Rule: Entering General Properties

- **Navigate to the Worklist Flexfields Rules page.**
- **Click the Create Rule button.**
- **Enter the internal name and display name for the rule.**
- **Select Enabled or Disabled as the rule status.**
- **Enter the phase number.**
- **Enter an optional description.**
- **Enter the name and ID of the application that owns the rule as the owner name and owner tag.**
- **Click Next.**



Defining a Worklist Flexfields Rule: Entering General Properties

Use a Web browser to navigate to the Worklist Flexfields Rules page, using a responsibility and navigation path specified by your system administrator. Some possible navigation paths in the seeded Workflow responsibilities are:

- Workflow Administrator Web Applications: Worklist Flexfields Rules
- Workflow Administrator Web (New): Worklist Flexfields Rules

Entering General Properties

Review the customization level for the rule.

- Core: You cannot make any changes to the rule definition. This level is used only for rules seeded by Oracle E-Business Suite.
- Limit: You can update the rule status to Enabled or Disabled, but you cannot make any other changes to the rule definition. This level is used only for rules seeded by Oracle E-Business Suite.
- User: You can update any property in the rule definition. This level is automatically set for rules that you define.

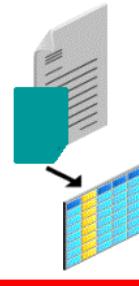
The phase number you enter for the rule specifies the order in which rules for the same workflow item type take effect. Rules with a higher phase number override rules with a lower phase number. Rules seeded by Oracle E-Business Suite use phase numbers from 1 to 99. You can assign your rules phase numbers of 100 or higher.

Note: Do not assign the same phase number to more than one rule for the same item type. To ensure that the rules you want take effect, assign a different phase number to each rule for an item type.

Defining a Worklist Flexfields Rule: Selecting Filter Criteria

Defining a Worklist Flexfields Rule: Selecting Filter Criteria

- **Search for the workflow item types that contain the notifications to which the rule should apply.**
- **Select the item types you want in the Available Filter Criteria list and move them to the Selected Filter Criteria list.**
- **Click Next.**



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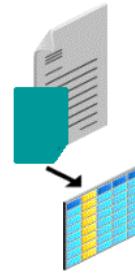
Defining a Worklist Flexfields Rule: Selecting Filter Criteria

- You can enter a partial value in the Workflow Type field to search for item types whose display names begin with that value. This field is case-sensitive.
- Select an item type in either list to view its description.
- If you perform a new search to show different item types in the Available Filter Criteria list, Oracle Workflow still preserves the item types that you already added to the Selected Filter Criteria list.

Defining a Worklist Flexfields Rule: Selecting Message Attributes

Defining a Worklist Flexfields Rule: Selecting Message Attributes

- **Optionally, specify the data type of the message attributes to display in the Available list.**
- **Select the message attributes to map in the Available list and move them to the Selected list.**
- **Click Next.**



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Defining a Worklist Flexfields Rule: Selecting Message Attributes

- If you no longer want a previously selected workflow item type in the filter criteria for the rule, click the remove icon for that item type in the Selected Filter Criteria list. When you remove an item type, Oracle Workflow removes any message attributes belonging to that item type from the Available list and the Selected list.
- You can add to the Selected list a maximum of ten text attributes, five number attributes, five form attributes, five URL attributes, and five date attributes.
- The Available and Selected lists show the display name and data type for each message attribute. Select a message attribute in either list to view in the Description field the display name and internal name of the message to which the attribute belongs.
 - If multiple messages in the selected workflow item types have a message attribute with the same internal name, display name, and data type, that message attribute appears only once in the lists. In this case the Description field indicates that the message attribute occurs in multiple messages
 - Oracle Workflow treats all message attributes with the same internal name and data type as the same attribute for purposes of worklist flexfields column mapping. Although attributes with different display names appear separately in the Available

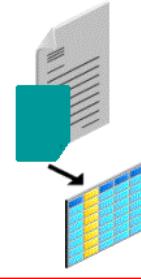
and Selected lists, if you select at least one attribute with a particular internal name and data type, all attributes that share that internal name and data type will be included in the column mapping.

- If you display message attributes of a different data type in the Available list, Oracle Workflow still preserves the message attributes that you already added to the Selected list.

Defining a Worklist Flexfields Rule: Mapping Attributes to Columns

Defining a Worklist Flexfields Rule: Mapping Attributes to Columns

- For each message attribute, select the worklist flexfields column in which to store the attribute value.
- To review any conflicts with other rules' column mappings, click the Find Conflicts button.
- Click Finish.



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Defining a Worklist Flexfields Rule: Mapping Attributes to Columns

- The Mapped Column field for each attribute displays only columns that match the attribute data type.
- You can use each column only once in a rule.
- If multiple messages in the selected workflow item types have a message attribute with the same internal name and data type, that message attribute appears only once. However, if any of the repeated message attributes have different display names, the list shows all the display names.
- To remove a message attribute from the column mappings for the rule, click the remove icon for that attribute.
- On the Find Worklist Flexfields Rule Map Conflicts page, review the columns that other rules map to different attributes for the same workflow item types. The Conflict field indicates whether the current rule overrides or is overridden by the other rule, based on the rule phase numbers.
 - To return to your rule definition, click the Return to Pending Rule link.

- If you need to resolve any conflicts, you can return to the previous pages to update the definition of this rule before finishing it, or you can update other rule definitions after finishing this rule.

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Resolving Conflicts Between Worklist Flexfields Rules

Resolving Conflicts Between Worklist Flexfields Rules

- If you want to be able to display the mapped attributes from all rules simultaneously, change the column mappings for one of the rules to use separate columns for the different attributes.
- If you no longer want any column mappings from a particular rule to take effect, disable that rule.
- If you want to override some column mappings from a particular rule while allowing others to take effect, either decrease the phase number for that rule or increase the phase number for the overriding rule.
- If the appropriate rules already override any others, accept the existing rule definitions.



Maintaining Worklist Flexfields Rules

Maintaining Worklist Flexfields Rules

Use the Worklist Flexfields Rules page to locate a specific rule and to maintain rules.

- Search for the rules you want to display.
- To update a rule, click the update icon for that rule.
- If you no longer want a rule to take effect, click the update icon and disable the rule.



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Maintaining Worklist Flexfields Rules

Searching for Rules

You can search by the internal rule name, display name, phase, status, level, workflow item type, message attribute, or worklist flexfields column name.

- You can enter partial values in the Rule Name and Display Name fields. These fields are case-sensitive.
- If you specify a workflow type to search by, you can only select a message attribute belonging to that workflow type. Otherwise, you can select a message attribute belonging to any workflow type

You must enter at least one of the following criteria when you search to limit the size of the results list.

- Rule Name
- Display Name
- Level
- Workflow Type

If you search only by the Level option or the Workflow Type option, you must select a specific value for that option. You cannot use one of these criteria with the Any value as your only search option.

The Workflow Type, Message Attribute, and Column Name search options only list values for which a rule exists.

Storing Message Attribute Values in Worklist Flexfields Columns

- ### Storing Message Attribute Values in Worklist Flexfields Columns
- When you finish creating or updating a worklist flexfields rule:
 - The Denormalize Worklist Flexfields concurrent program runs once for each workflow item type in the rule.
 - The program stores the message attribute values for any existing open notifications in the mapped columns.
 - When notifications are sent from item types covered by existing worklist flexfields rules:
 - The Notification System stores the message attribute values for the new notifications in the mapped columns.

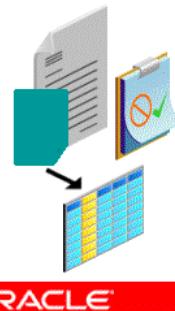


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Performing a Worklist Flexfields Rule Simulation

Performing a Worklist Flexfields Rule Simulation

- A worklist flexfields rules simulation lets you review the net effect of the enabled rules:
 - For a particular item type
 - For a particular message within an item type
- The simulation shows which message attributes are available in which worklist flexfields columns after all relevant rules are applied.
- Use the simulation results to choose the columns to include when you create a Personal Worklist view.



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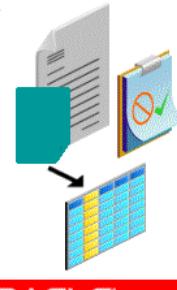
Performing a Worklist Flexfields Rule Simulation

- Perform a Core Rules simulation to learn which message attributes are already available in worklist flexfields columns by default. Although you cannot change these rules, you can use the simulation results to avoid duplicating the mapped attributes in user rules.
- Perform a Limit and User Rules simulation to verify that any other message attributes you require are available in worklist flexfields columns. If necessary, you can adjust the rules' effect by enabling or disabling limit rules and creating, updating, enabling, or disabling user rules.
- After performing a simulation, update your rules with any changes you want to make and then repeat the simulation, until you are satisfied with the net set of message attributes available for the item type.

Performing a Worklist Flexfields Rule Simulation

Performing a Worklist Flexfields Rule Simulation

- **Navigate to the Worklist Flexfields Rules Simulation page.**
- **Specify the criteria for the simulation.**
 - **Select a workflow item type.**
 - **Optionally, select a message within that item type.**
 - **Select the customization level to review, either core rules or limit and user rules together.**
- **Click Go.**
- **Review the list of mapped attributes and columns.**



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Performing a Worklist Flexfields Rule Simulation

Use a Web browser to navigate to the Worklist Flexfields Rules Simulation page, using a responsibility and navigation path specified by your system administrator. Some possible navigation paths in the seeded Workflow responsibilities are:

- Workflow Administrator Web Applications: Worklist Flexfields Rules Simulation
- Workflow Administrator Web (New): Worklist Flexfields Rules Simulation

Reviewing Simulation Results

The list of mapped attributes and columns shows the net effect of the enabled rules for the selected item type and customization level. If you specified a message, the list shows only mapped attributes belonging to that message.

The list displays only the rule that takes effect for each column. To view any overridden rules that also map to that column, choose the overridden rules icon.

- On the Find Worklist Flexfields Rule Conflicts page, review the columns that overridden rules map to different attributes than the effective rule. The Conflict field indicates that the effective rule overrides the other rules, based on the rule phase numbers.

- Check that no two rules for the same item type have the same phase number. To ensure that the rules you want take effect, each rule for an item type must have a different phase number.
- To return to the simulation results, click the Return to Worklist Flexfields Rule Simulation link.

If necessary, you can take action to resolve any conflicts.

- To update a rule, click the update icon for that rule.
- To create a new rule, click the Create Rule button.

Defining a Securing Function

Defining a Securing Function

- If you want to secure access to your specialized worklist view, use the Form Functions window to define a securing function that you will associate with the view.
 - Type: Subfunction
 - Context Dependence: Responsibility
- Add both your new securing function and the Personal Worklist function (WF_WORKLIST_CUSTOM) to a menu.
- Assign the responsibility associated with that menu to your users.



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Defining a Securing Function

The navigation path to the Form Functions window in the seeded System Administrator responsibility is:

- System Administrator: Application > Function

If you follow these steps to secure your specialized worklist view, then it will appear in the list of views only when users access the Personal Worklist from the responsibility on whose menu you added your securing function.

If you do not secure your specialized worklist view, it will appear in the list of views whenever any user accesses the Personal Worklist from any responsibility.

For more information about defining functions, menus, and responsibilities, see the *Oracle Applications System Administrator's Guide* and *Oracle Applications Developer's Guide*.

Creating a Personalized View for the Personal Worklist

Creating a Personalized View for the Personal Worklist

- Use Oracle Application Framework Personalization to create a Personal Worklist view that displays the worklist flexfields to which you mapped message attributes.
- To make the view available to your users, create it as an administrator-seeded user-level personalization
- Worklist flexfields rules are connected to a Personal Worklist view through the item types they both reference.



Creating a Personalized View for the Personal Worklist

You do not need to associate worklist flexfields rules directly with a Personal Worklist view. Rather, to display meaningful information in a view, limit the view to include only related item types that are covered by worklist flexfields rules, and add only worklist flexfields columns that are mapped by those rules.

Note: If you do not limit the item types included in the view, then the view may display notifications from other item types with blank values or unrelated values in the worklist flexfields columns.

For more information about creating personalizations, see the *Oracle Application Framework Personalization Guide*.

Creating a Personalized View for the Personal Worklist

Creating a Personalized View for the Personal Worklist

- Set the Personalize Self-Service Defn profile option to Yes for the user you are logged in as.
- In the Personal Worklist, click the Personalize Page global link or the Personalize region link for the "Customizable and searchable worklist" region.
- On the Page Hierarchy Personalization page, click the Seeded User Views icon for the "Table: Customizable and ..." item.
- On the Personalize Views page, click the Create View button.
- On the Create View page, define the properties of your view.



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Creating a Personalized View for the Personal Worklist

Defining View Properties

- If you defined a securing function for the view, specify the function in the view's general properties.
- Select the columns to display in the view, including the worklist flexfields columns that are mapped to message attributes. Rename the columns as appropriate to identify the attributes stored in them.
- Specify the columns by which to sort the view, including worklist flexfields columns if appropriate.
- To display only notifications from the relevant item types, add the Type parameter or the Type Internal Name parameter to the search query for the view, and specify the item type display name or internal name, respectively. You can add multiple instances of these parameters to include multiple item types in the view. In this case, select the "Search results where each may contain any value entered" option.

Restarting Oracle HTTP Server

Restarting Oracle HTTP Server

- If you associated a securing function with the view, you must stop and restart Oracle HTTP Server after completing the menu updates and saving the view, to make the changes take effect.
- Users should access the Personal Worklist through a responsibility that includes the securing function.
- The specialized view will then appear in their list of available views.



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Summary

Summary

In this lesson, you should have learned how to:

- **Define worklist flexfields rules.**
- **Understand how to secure access to a specialized worklist view.**
- **Create a specialized worklist view using worklist flexfields.**

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Oracle Workflow Directory Service

Chapter 10

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Oracle Workflow Directory Service

Oracle Workflow Directory Service

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Describe how Oracle Workflow accesses user and role information.**
- **Map the Oracle Workflow directory service to your directory repository.**
- **Load roles into Oracle Workflow Builder.**

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Oracle Workflow Directory Service

Oracle Workflow Directory Service

- A role is a grouping of one or more users who share a common responsibility.
- Oracle Workflow assigns ownership of work items and sends notifications to roles.
- The Oracle Workflow directory service consists of views that map to a designated directory repository.
- The directory repository consists of a set of database tables that contain user and role information.



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Oracle Workflow Directory Service

A role can contain only individual users as its members. It cannot contain another role. However, roles can be related to each other in a hierarchy so that users assigned to one role automatically inherit membership in its superior roles as well.

Predefined Directory Service

Predefined Directory Service

Predefined directory service views for users and roles from the unified Oracle E-Business Suite environment are automatically implemented for you during installation.



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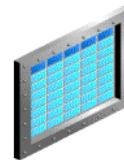
Predefined Directory Service

If the predefined directory service provided by Oracle Workflow does not meet your needs, you can create your own directory service by defining custom views with the required columns. However, note that only the Oracle Workflow predefined directory services are supported by Oracle.

Directory Service Views

Directory Service Views

- The Oracle Workflow directory service includes the following views:
 - WF_USERS
 - WF_ROLES
 - WF_USER_ROLES
 - WF_USER_ROLE_ASSIGNMENTS_V
- Each view contains columns that Oracle Workflow needs to reference to get information about a user or a role.



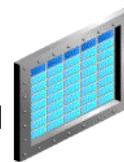
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WF_USERS View

WF_USERS View

WF_USERS contains the following columns:

- **Name:** Internal name of the user
- **Display Name:** Display name of the user
- **Description:** Description of the user
- **Notification Preference:** A value of MAILTEXT, MAILATTH, MAILHTML, MAILHTML2, QUERY, SUMMARY, or SUMHTML to indicate how the user prefers to receive notifications
- **Language:** NLS_LANGUAGE initialization parameter that specifies the default language-dependent behavior
- **Territory:** NLS_TERRITORY initialization parameter that specifies the default territory-dependent date and numeric formatting used

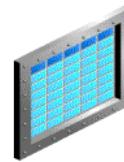


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WF_USERS View

WF_USERS View

- **Email_Address:** Valid e-mail address for the user or a mail distribution list
- **Fax:** Fax number for the user
- **Orig_System:** Name identifying the directory repository on which this view is based
- **Orig_System_ID:** Primary key that identifies the user in the base repository
- **Parent_Orig_System:** Optional code for the originating system of an entity you want to mark as being related to this user
- **Parent_Orig_System_ID:** Primary key that identifies the parent entity in the parent originating system

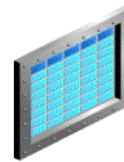


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WF_USERS View

WF_USERS View

- **Start Date:** Date at which the user becomes valid in the directory service
- **Status:** Availability of the user to participate in a workflow process; either ACTIVE, EXTLEAVE, INACTIVE, or TMPLAVE
- **Expiration_Date:** Date at which the user is no longer valid in the directory service
- **Owner_Tag:** Code to identify the program or application that owns the information for this user

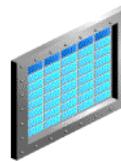


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WF_ROLES View

WF_ROLES View

- Workflow roles can be roles, positions, or responsibilities referenced in the directory repository.
- Every user must also be defined as a role.
- The columns in WF_ROLES are similar to those in WF_USERS:
 - Name
 - Display Name
 - Description
 - Notification Preference
 - Language
 - Territory

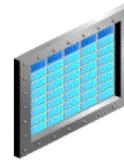


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WF_ROLES View

WF_ROLES View

- **Email_Address**
- **Fax**
- **Orig_System**
- **Orig_System_ID**
- **Parent_Orig_System**
- **Parent_Orig_System_ID**
- **Start_Date**
- **Status**
- **Expiration_Date**
- **Owner_Tag**



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WF_ROLES View

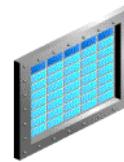
If the e-mail address is null for a given role, notification mailers send an individual e-mail to each user within the role.

WF_USER_ROLES View

WF_USER_ROLES View

WF_USER_ROLES is an intersection of the users and roles in **WF_USERS** and **WF_ROLES**.

- **User_Name:** Internal name of the user as listed in **WF_USERS**
- **Role_Name:** Internal name of the role as listed in **WF_ROLES**
- **User_Orig_System:** Name identifying the directory repository on which **WF_USERS** is based
- **User_Orig_System_ID:** Primary key that identifies the user in the base user directory repository
- **Role_Orig_System:** Name identifying the directory repository on which **WF_ROLES** is based

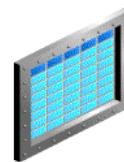


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WF_USER_ROLES View

WF_USER_ROLES View

- **Role_Orig_System_ID:** Primary key that identifies the role in the base role directory repository
- **Start_Date:** Date at which the association of this user with this role becomes valid in the directory service
- **Expiration_Date:** Date at which the association of this user with this role is no longer valid in the directory service
- **Assignment_Type:** A code indicating how the user was assigned to membership in this role



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WF_USER_ROLES View

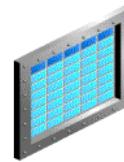
The Assignment_Type column indicates how a user was assigned to membership in a role:

- D: The user was directly assigned to this role.
- I: The user inherited this role through membership in another role.
- B: The user has both direct and inherited assignments to this role.

WF_USER_ROLES View

WF_USER_ROLES View

- **Parent_Orig_System:** Optional code for the originating system of an entity you want to mark as being related to this user/role association
- **Parent_Orig_System_ID:** Primary key that identifies the parent entity in the parent originating system



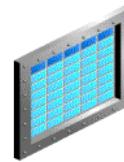
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WF_USER_ROLE_ASSIGNMENTS_V View

WF_USER_ROLE_ASSIGNMENTS_V View

WF_USER_ROLE_ASSIGNMENTS_V tracks assignments of users to roles, both direct and inherited through role hierarchy relationships.

- **User_Name:** Internal name of the user as listed in **WF_USERS**
- **Role_Name:** Internal name of the role as listed in **WF_ROLES**
- **Assigning_Role:** The role from which the user is inheriting assignment to this role

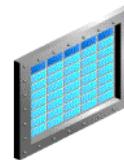


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WF_USER_ROLE_ASSIGNMENTS_V View

WF_USER_ROLE_ASSIGNMENTS_V View

- **Start_Date:** Date at which the assignment of this user to this role becomes valid in the directory service
- **End_Date:** Date at which the assignment of this user to this role is no longer valid in the directory service
- **Assignment_Type:** The way in which the user was assigned to membership in this role
 - **DIRECT**
 - **INHERITED**



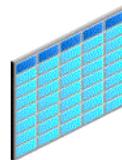
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Local Directory Service Tables

Local Directory Service Tables

Oracle Workflow provides the following local directory service tables:

- **WF_LOCAL_ROLES** stores role information, including a user flag to mark those roles that also represent individual users. This table contains columns similar to those in the **WF_USERS** and **WF_ROLES** views.
- **WF_LOCAL_USER_ROLES** stores information about the associations of users with roles. This table contains columns similar to those in the **WF_USER_ROLES** view.



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Local Directory Service Tables

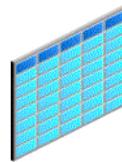
Oracle Workflow also includes the following directory service tables:

- **WF_LOCAL_ROLES_TL** stores translated data for MLS support in the **WF_USERS** and **WF_ROLES** views.
- **WF_ROLE_HIERARCHIES** stores information about hierarchical relationships between roles.
- **WF_USER_ROLE_ASSIGNMENTS** stores information about how assignments of users to roles are inherited through role hierarchy relationships.

Local Directory Service Tables

Local Directory Service Tables

- The Workflow local tables store denormalized user and role information originating from various other Oracle E-Business Suite modules, so that the directory service views can access this information with good performance.
- You should maintain synchronization between the user and role information stored in application tables by the source modules and the information stored in the Workflow local tables.
- You can also use the Workflow local tables to store ad hoc users and roles.



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Local Directory Service Tables

In the Workflow local tables:

- Only the following Oracle E-Business Suite entities are stored as users: Oracle E-Business Suite users, which may or may not be linked to Oracle Human Resources employees; Trading Community Architecture (TCA) person parties; and TCA contacts (relationship parties).
- Several types of Oracle E-Business Suite entities are stored as roles, including: Oracle E-Business Suite responsibilities, Oracle Human Resources positions, MarketView approvals and channels, Engineering approval lists, TCA groups, Federal HR group boxes, Position Control roles, and User Management roles.

For more information about entities owned by various Oracle E-Business Suite products, refer to the documentation for those products.

You should periodically purge ad hoc users and roles from the Workflow local tables after they have expired in order to improve performance. Run the Purge Obsolete Workflow Runtime Data concurrent program through the Oracle Workflow Manager component of Oracle Applications Manager to perform this purging.

Ad Hoc Users and Roles

Ad Hoc Users and Roles

- You can create and manage new users and roles at run time in a workflow process. These are called ad hoc users and roles.
- Oracle Workflow provides PL/SQL APIs that you can use to dynamically create ad hoc user and role definitions in the directory service. These APIs store the information in the WF_LOCAL_* tables.
- You can set an expiration date after which an ad hoc user or role is no longer valid. The WF_USERS and WF_ROLES views use the expiration date.



Ad Hoc Users/Roles

The WF_DIRECTORY package contains the APIs supporting ad hoc users and roles, including:

- CreateAdHocUser()
- CreateAdHocRole()
- CreateAdHocRole2()
- AddUsersToAddHocRole()
- AddUsersToAddHocRole2()
- RemoveUsersFromAdHocRole()
- SetAdHocUserStatus()
- SetAdHocRoleStatus()
- SetAdHocUserExpiration()
- SetAdHocRoleExpiration()
- SetAdHocUserAttr()
- SetAdHocRoleAttr()

Validating a Directory Service Data Model

Validating a Directory Service Data Model

- You can run a script named `wfdirchk.sql` to validate your directory service data model.
- The `wfdirchk.sql` script is located on your server in the `$FND_TOP/sql` directory.



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Validating a Directory Service Data Model

Customizations to the predefined directory service provided by Oracle Workflow are not supported. However, if you do choose to create your own directory service or customize the predefined directory service, you should run `wfdirchk.sql` afterwards to validate the directory service data model.

Setting Workflow Preferences

Setting Workflow Preferences

- Control your users' interaction with Oracle Workflow by globally setting the default notification preference for the entire enterprise.
- Only the workflow administrator has access to set a global default preference.
- Individual users can override a global default preference at any time by changing the value of their own personal user preference.



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Setting Workflow Preferences

Set the global default notification preferences in the Workflow Configuration page and individual user preferences in the General Preferences page in Oracle E-Business Suite. The General Preferences page also allows users to set their individual language and territory preferences.

Note: The language, territory, and notification preference settings in the Workflow Configuration and General Preferences pages are effective for Oracle Workflow only if your directory service views map these columns to the Oracle Workflow preferences table.

Loading Roles

Loading Roles

- If you want to reference specific roles in a workflow process definition, you must first load the roles stored in your Oracle Workflow directory service into Oracle Workflow Builder.
- The property pages for workflow objects that reference role information contain role fields whose lists of values are populated by the roles you loaded from the database.
- For example, you can set an attribute of type role or the recipient of a notification to a role that you have loaded.



Loading Roles

To load roles:

1. In Oracle Workflow Builder, select Open from the File menu to connect to your database and open the item type you want.
2. From the File menu, select Load Roles from Database.
3. Specify search criteria in the Find Roles field of the Role selection window and then click Find.
4. Select the roles you want to load in the Query Results list, and click Add to add them to the Loaded Roles list.
5. Click OK to load the roles and make them available to the objects in your open item type.

After you load roles from the database, you can expand the Directory Service branch in the navigator tree to view information about the roles.

Summary

Summary

In this lesson, you should have learned how to:

- **Describe how Oracle Workflow accesses user and role information.**
- **Map the Oracle Workflow directory service to your directory repository.**
- **Load roles into Oracle Workflow Builder.**

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Defining Function Activities

Chapter 11

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Defining Function Activities

Defining Function Activities

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

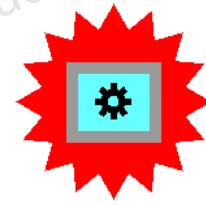
- **Define function activities.**
- **Explain the standard API for PL/SQL procedures for function activities.**
- **Define activity details.**
- **Define activity attributes.**

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Function Activities

Function Activities

- A function activity is a step in a workflow process used to perform an automated unit of work.
- A function activity is usually defined by a PL/SQL stored procedure.

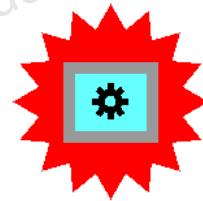


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Defining a Function Activity

Defining a Function Activity

Function activities must be associated with an item type and are created in the navigator tree beneath the Functions branch of the item type.



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Defining a Function Activity

To define a function activity:

1. In Oracle Workflow Builder, select the item type that you want in the navigator tree. Then select New Function from the Edit menu.
2. On the Activity property page, enter an internal name for the activity. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the activity.
4. Enter a description of the activity.
5. Choose an icon that identifies the activity.
6. Enter a function name and function type for the activity.
 - PL/SQL: Enter the name of the PL/SQL stored procedure that you want the Workflow Engine to execute for this function activity. Use the following format:
`<package_name>.<procedure_name>`
 - External: Enter the name of the external program you want the Workflow Engine to enqueue on the Outbound queue. You must provide an external agent to dequeue and consume the entry on the Outbound queue. The external agent can similarly

enqueue an entry onto the Inbound queue for a Workflow background engine to consume and process to complete the function activity.

7. Specify the result type that contains the possible results that the function can return.
8. Optionally, specify a relative cost, in seconds, that represents how long the procedure takes to run. If the cost exceeds the Workflow Engine threshold, the activity will be deferred for later processing by a background engine.
9. Click Apply to save your changes.
10. Optionally, select the Details tab to display and modify additional activity details.
11. Optionally, select the Access tab to set the access levels allowed to modify this activity.

External Function Activities

External Function Activities

- **External function activities enable you to incorporate programs or processes other than PL/SQL procedures as automated units of work within a workflow process.**
- **For greater control and flexibility, use the Business Event System to incorporate external processing within a workflow process.**



External Function Activities

The most flexible and powerful way to integrate external processing into a workflow process is by using business events and subscriptions. However, Oracle Workflow also supports processing external to the database through external function activities. This capability facilitates integration with external products and legacy systems.

The Workflow Engine leverages Oracle Advanced Queuing to support the execution of external function activities.

- An ‘Outbound’ queue and an ‘Inbound’ queue are established in Oracle Workflow. When the Workflow Engine encounters an external function activity, a message is written to the Outbound queue. The payload of the message includes any activity attribute name and value pairs.
- A message on the workflow outbound queue is read by an external agent. An external execution agent can be any application that is external to the database. The external system consumes and processes the message.
- The external agent enqueues a message in the workflow inbound queue for Oracle Workflow to consume and process. The workflow inbound queue message can be considered as the “reply” to the original workflow outbound queue message. The inbound

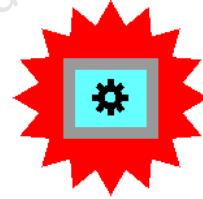
queue message payload can include activity attribute name and value pairs with updated values. The Workflow background engine consumes and processes the inbound message and completes the original function activity.

Note: The ‘Outbound’ and ‘Inbound’ queues used for external function activities are separate from the queues used for the Business Event System. Also, a message in this context is different from the messages associated with notification activities.

Assigning a Cost to a Function Activity

Assigning a Cost to a Function Activity

- **Cost is entered in seconds and converted to hundredths of a second when stored in the database.**
- **Assign a high cost to function activities that require a large amount of processing to complete.**
- **If the cost of an activity exceeds the threshold cost of the Workflow Engine, the activity is deferred by the Workflow Engine.**
- **A background engine set up to poll for deferred activities can execute the deferred activity at a later time.**



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Assigning a Cost to a Function Activity

Activity costs are entered in the Workflow Builder in seconds and stored in the database in hundredths of a second. For example, a function with an execution cost of 10 milliseconds would be entered in the function properties Cost field as 0.01 and stored in the cost database column as 1.

The default Workflow Engine threshold is 500 milliseconds. This value is equivalent to 0.5 when compared with function activity costs entered in the function properties in the Workflow Builder and 50 when compared to function activity costs stored in the database.

The Workflow Engine executes one activity at a time. If possible, you should avoid placing costly activities along the critical path of a process. Instead, place costly activities on parallel branches in a process, where they can be deferred for a background engine to process later.

PL/SQL Procedures for Function Activities

PL/SQL Procedures for Function Activities

- The PL/SQL procedure associated with a function activity defines the automated processing that the activity performs within the workflow process.
- A PL/SQL procedure for a function activity must follow a standard API.



PL/SQL Procedures for Function Activities

Note: This functionality is most typically used by developers.

Standard API for PL/SQL Procedures Called by Function Activities

Standard API for PL/SQL Procedures Called by Function Activities

All PL/SQL stored procedures called by function activities in a workflow process must follow the standard API format so that the Workflow Engine can properly execute the activity.

```
procedure <procedure name>
  (itemtype  in  varchar2,
   itemkey    in  varchar2,
   actid      in  number,
   funcmode   in  varchar2,
   resultout  out  varchar2);
```

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Standard API for PL/SQL Procedures Called by Function Activities

```
procedure <procedure name> (
  itemtype  in varchar2,
  itemkey    in varchar2,
  actid      in number,
  funcmode   in varchar2,
  resultout  out varchar2) is
<local declarations>

begin
if (funcmode='RUN') then
  <your RUN executable statements>
  resultout:='COMPLETE:<result>';
  return;
endif;
```

```
if (funcmode='CANCEL') then
    <your CANCEL executable statements>
    resultout:='COMPLETE';
    return;
endif;
if (funcmode='SKIP') then
    <your SKIP executable statements>
    resultout:='COMPLETE:<result>';
    return;
endif;
if (funcmode='RETRY') then
    <your RETRY executable statements>
    resultout:='COMPLETE:<result>';
    return;
endif;
...
exception
when others then
    WF_CORE.CONTEXT(''<package name>'', '<procedure name>',
                    <itemtype>, <itemkey>,
                    to_char(<actid>), <funcmode>);
    raise;
end <procedure name>;
```

Standard API Parameters

Standard API Parameters

- **itemtype:** The internal name for the item type.
- **itemkey:** A string that represents a primary key generated by the workflow-enabled application. The item key uniquely identifies the item within an item type.
- **actid:** The ID number of the activity from which this procedure is called.
- **funcmode:** The execution mode of the function activity: RUN, CANCEL, SKIP, or RETRY.
- **resultout:** A result that is returned depending on the result type specified for the activity.



Function Activity Execution Modes

Function Activity Execution Modes

- **RUN**
 - Executed when activities are executed for the first time
 - Executed following CANCEL mode when a loop is revisited with On Revisit set to Reset
- **CANCEL**
 - Executed for activities revisited in a loop with On Revisit set to Reset
 - Executed for activities that are part of a process that has been canceled by a call to WF_ENGINE.AbortProcess()



Function Activity Execution Modes

Looping occurs when the completion of an activity causes a transition to another activity that has already been completed. The activity property called On Revisit determines how the Workflow Engine handles this activity when it transitions to the activity more than once.

- Ignore: Ignores the activity after the activity has been executed once.
- Reset: Resets completed activities in a loop by executing activities in CANCEL mode before re-executing them in RUN mode.
- Loop: Re-executes activities in the loop without resetting them; in this case no CANCEL logic is executed.

Function Activity Execution Modes

Function Activity Execution Modes

- **SKIP**
 - Executed when activities are skipped within the Status Monitor
 - Executed when activities are skipped by a call to `WF_ENGINE.HandleError()`
- **RETRY**
 - Executed when activities are retried within the Status Monitor
 - Executed when activities are retried by a call to `WF_ENGINE.HandleError()`



Function Activity Execution Modes

Oracle Workflow records audit trail data for skip and retry operations.

Standard API Resultout Parameter

Standard API Resultout Parameter

- If a result type is specified in the property page of the activity in the Workflow Builder, this parameter represents the expected result returned when the procedure completes.
- Possible resultout values are:
 - COMPLETE:<result_code>
 - WAITING
 - DEFERRED:<date>
 - NOTIFIED:<notification_id>:<assigned_user>
 - ERROR:<error_code>



Standard API Resultout Parameter

- **COMPLETE:<result_code>** The activity completes with the specified result code. The result code must match one of the result codes defined in the result type of the activity.
- **WAITING** The activity is pending, waiting for another activity to complete before it completes. An example is the Standard 'AND' activity.
- **DEFERRED:<date>** The activity is deferred to a background engine for execution until a given date. <date> must be of the format:
`to_char(<date_string>, wf_engine.date_format)`
- **NOTIFIED:<notification_id>:<assigned_user>** An external entity has been notified that an action must be performed. A notification ID and an assigned user can optionally be returned with this result. Note that the external entity must call CompleteActivity() to inform the Workflow Engine when the action completes.
- **ERROR:<error_code>** The activity encounters an error and returns the indicated error code.

Exception Handling

Exception Handling

- Use WF_CORE APIs to raise and catch errors in your PL/SQL procedures.
- The Workflow Engine sets the status of the function activity to “ERROR” if:
 - The PL/SQL procedure raises an unhandled exception
 - The PL/SQL procedure returns a result beginning with “ERROR:”



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Exception Handling

If an activity encounters an error, information about the error is stored in the following columns in the WF_ITEM_ACTIVITY_STATUSES table, which are viewable from the Status Monitor.

- ERROR_NAME
- ERROR_MESSAGE
- ERROR_STACK

Exception Handling Example

Exception Handling Example

```
...
exception
when others then
  WF_CORE.CONTEXT ('<package name>',
    '<procedure name>', <itemtype>,
    <itemkey>, to_char(<actid>),
    <funcmode>;
  raise;
end <procedure name>
```

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Exception Handling Example

- WF_CORE.CONTEXT adds an entry to the error stack to provide context information that helps locate the source of an error.
- Use this example exception handler construct in your PL/SQL procedures to facilitate debugging workflow function activities.
- If a call to ‘procedure name’ fails with an unhandled exception, the column ERROR_STACK in the WF_ITEM_ACTIVITY_STATUSES table records the call to ‘procedure name’ and its arguments.

Defining Activity Details

Defining Activity Details

- Every activity has a Details property page.
- The activity details for process, notification, event, and function activities are similar.



Defining Activity Details

To define activity details:

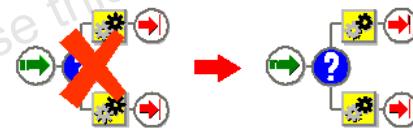
1. Open the property pages for the activity you want in the Oracle Workflow Builder and select the Details tab.
2. Specify the internal name of the item type that owns the error process that you want to execute if an error occurs in the current activity.
3. Specify the internal name of the error process.
4. Specify the On Revisit value to determine how the Workflow Engine handles this activity when it transitions to the activity more than once.
 - Ignore: Ignores the activity after the activity has been executed once; used for OR-type operations where the rest of the branch is ignored.
 - Reset: Resets completed activities in a loop by executing activities in CANCEL mode before re-executing them in RUN mode.
 - Loop: Re-executes activities in the loop without resetting them.
5. Click Apply to save your changes.

Note: The Details tab also displays the effective date and version of the activity. You set the effective date when you save your changes using the Save As option in the File menu. All your activity modifications share the same effective date when you save. The version number of the activity is maintained by Oracle Workflow.

Error Handling

Error Handling

- **Avoid relying on an error process to handle exceptions in the PL/SQL procedure of a function activity. Instead, try to model your process to handle any known errors that could occur.**
- **Specify an error process in the activity details to handle any unexpected errors encountered during execution of a workflow process.**



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Error Handling

Oracle Workflow provides an item type called System: Error which contains processes that you can use for generic error handling.

- Default Error Process
- Retry-only Process

Looping

Looping

- **Looping occurs when the completion of an activity causes a transition to another activity that has already been completed.**
- **The first activity detected as a revisited activity is also called a loop point or pivot activity.**
- **The Workflow Engine can handle a revisited activity in one of three ways:**
 - **Ignore**
 - **Reset**
 - **Loop**



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Looping

To handle a revisited activity, the Workflow Engine can:

- Ignore the activity and stop further processing of the thread, so that in effect, the activity can only run once.
- Reset the loop to the loop point before re-executing by first running cancel logic to undo the activities within the loop.
- Loop through the activities to the loop point, re-executing each one without running cancel logic to undo any previous logic. The Loop option results in faster performance than Reset, so the Loop option is recommended if the activities within the loop can be re-executed without first having their status reset by cancel logic.

Defining an Activity Attribute

Defining an Activity Attribute

- You can define parameters for certain activities as activity attributes:
 - If the PL/SQL procedure or external program for a function activity contains external parameters
 - If an event to be raised requires additional parameters
- Activity attributes apply only to the current activity and, unlike item type attributes, are not global to a process.
- Activity attributes are created in the navigator tree beneath the activity with which they are associated.



Defining an Activity Attribute

- Activity attributes can only be associated with function activities or Raise event activities.
- You can change the definition of an activity attribute at any time in Oracle Workflow Builder.

To define an activity attribute:

1. In the Oracle Workflow Builder, select the activity you want in the navigator tree. Then select New Attribute from the Edit menu.
2. On the Attribute property page, enter an internal name for the attribute. The internal name must be all uppercase without any colons or leading or trailing spaces.
3. Enter a display name for the attribute.
4. Enter a description of the attribute.
5. In the Type field, select the data type for the attribute.
6. Depending on the data type, enter format information and a default value, if applicable.
7. Click Apply to save your changes.

Setting Activity Attribute Values

Setting Activity Attribute Values

- Because an activity can be reused throughout a process, the value of an activity attribute can vary from node to node.
- Specify the values for the attributes in the Node Attributes property page for a node.



Setting Activity Attribute Values

To set activity attribute values:

1. In the Oracle Workflow Builder, display the property pages of an activity node, and select the Node Attributes tab.
2. Select an attribute.
3. Enter a value for the attribute. The value can be either constant or dynamic.
 - For a constant value, select Constant and enter a value.
 - For a dynamic value, select Item Attribute and then select the name of an item type attribute that returns a value of the appropriate data type during runtime.
4. Click Apply to save your changes.

You can use the WF_ENGINE.GetActivityAttribute APIs to retrieve the value of an activity attribute within a PL/SQL function. The following example shows a variable being set to the value of an activity attribute of type text:

```
aname := wf_engine.GetActivityAttrText(itemtype, itemkey,  
actid, 'VALUE1');
```

Summary

Summary

In this lesson, you should have learned how to:

- **Define function activities.**
- **Explain the standard API for PL/SQL procedures for function activities.**
- **Define activity details.**
- **Define activity attributes.**

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Post-Notification Functions

Chapter 12

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Post-Notification Functions

Post-Notification Functions

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Define PL/SQL procedures for post-notification functions.**
- **Explain how to use context variables in post-notification functions.**

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PL/SQL Procedures for Notification Activities

- You can use a post-notification function to couple processing logic to a notification activity.
- Post-notification functions for notification activities must follow the same standard API as PL/SQL procedures for function activities.
- Notification activities use different execution modes than function activities.



Standard API for PL/SQL Procedures Called by Notification Activities

Standard API for PL/SQL Procedures Called by Notification Activities

All PL/SQL-stored procedures referenced by notification activities as post-notification functions must follow the standard API format so that the Workflow Engine can properly execute the activity.

```
procedure <procedure name>
  (itemtype    in    varchar2,
   itemkey     in    varchar2,
   actid       in    number,
   funcmode    in    varchar2,
   resultout   out   varchar2);
```

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Standard API for PL/SQL Procedures Called by Notification Activities

```
procedure <procedure name> (
  itemtype    in    varchar2,
  itemkey     in    varchar2,
  actid       in    number,
  funcmode    in    varchar2,
  resultout   out   varchar2) is
<local declarations>

begin
if (funcmode='VALIDATE') then
  <your VALIDATE executable statements>
  resultout:='COMPLETE';
  return;
endif;
```

```

if (funcmode='RESPOND') then
    <your RESPOND executable statements>
    resultout:='COMPLETE';
    return;
endif;
if (funcmode='FORWARD') then
    <your FORWARD executable statements>
    resultout:='COMPLETE';
    return;
endif;
if (funcmode='TRANSFER') then
    <your TRANSFER executable statements>
    resultout:='COMPLETE';
    return;
endif;
if (funcmode='QUESTION') then
    <your QUESTION executable statements>
    resultout:='COMPLETE';
    return;
endif;
if (funcmode='ANSWER') then
    <your ANSWER executable statements>
    resultout:='COMPLETE';
    return;
endif;
if (funcmode='RUN') then
    <your RUN executable statements>
    resultout:='COMPLETE:<result>';
    return;
endif;
if (funcmode='TIMEOUT') then
    <your TIMEOUT executable statements>
    if (<condition_ok_to_proceed>) then
        resultout:='COMPLETE';
    else
        resultout := wf_engine.eng_timedout;
    end if;
    return;
endif;
...
exception
    when others then
        WF_CORE.CONTEXT(''<package name>'', '<procedure name>',
        <itemtype>,
                    <itemkey>, to_char(<actid>), <funcmode>);

```

```
    raise;  
end <procedure name>;
```

Post-Notification Function Execution Modes

Post-Notification Function Execution Modes

- **VALIDATE**
- **RESPOND**
- **FORWARD**
- **TRANSFER**
- **QUESTION**
- **ANSWER**
- **RUN**
- **TIMEOUT**



Post-Notification Function Modes

- **VALIDATE:** Called when a performer submits a response before RESPOND mode. The post-notification function can validate the response values before accepting and recording the response. For example, if the notification requires an electronic signature, the post-notification function can run in VALIDATE mode to verify the response values and inform the user of any errors before requiring the user to enter a signature.
- **RESPOND:** The performer responded to the notification. The post-notification function can interpret the result and perform post-response processing. The function can reject the response with an error.
- **FORWARD:** The performer delegates the notification to another user. The function can audit or reject the delegation request with an error. This state corresponds to the Delegate Authority option on the Reassign Notifications page.
- **TRANSFER:** The performer transfers the notification to another user. The function can audit or reject the transfer request with an error. This state corresponds to the Transfer Ownership option on the Reassign Notifications page.

- **QUESTION:** The performer submitted a request for more information about the notification from another user. The function can verify that the request is directed to a role that has appropriate authority to view the notification, for example.
- **ANSWER:** The performer responded to a request with answering information. The function can interpret the answer and validate or reject it.
- **RUN:** Called after RESPOND mode. The post-notification function in RUN mode can perform additional processing associated with the notification.
- **TIMEOUT:** If a notification activity does not complete within a certain period of time, then Oracle Workflow marks that activity as timed out and then cancels any notification associated with the timed-out activity. The post-notification function in TIMEOUT mode can perform processing to determine an alternative result for the notification. For example, if the notification is a vote, and some responses are received before the timeout event, the post-notification function can determine whether there are enough votes received to determine the vote result.

Standard API Resultout Parameter for a Post-Notification Function

Standard API Resultout Parameter for a Post-Notification Function

- Oracle Workflow ignores the resultout parameter for the VALIDATE, RESPOND, FORWARD, TRANSFER, QUESTION, and ANSWER execution modes, unless the parameter value is in the form **ERROR%**.
- If you want to fail the corresponding operations after the post-notification function has been executed, you can:
 - Return **resultout = ERROR:<errcode>**.
 - Raise an exception in your procedure.



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Standard API Resultout Parameter for a Post-Notification Function

If, based on the results of your post-notification function, you do not want the Validate, Respond, Forward, Transfer, Question, or Answer operation to occur, you can do one of two things:

- Return **ERROR:<errcode>** in the resultout parameter. In this case, Oracle Workflow converts the result to a generic exception and includes the specified error code in the generic error message that appears to the user.
- Raise an exception directly in your procedure with a more informative error message to appear to the user.

Post-Notification Function Context Information

Post-Notification Function Context Information

You can reference the following global WF_ENGINE variables in your post-notification function:

- WF_ENGINE.context_nid
- WF_ENGINE.context_user
- WF_ENGINE.context_user_comment
- WF_ENGINE.context_recipient_role
- WF_ENGINE.context_original_recipient
- WF_ENGINE.context_from_role
- WF_ENGINE.context_new_role
- WF_ENGINE.context_more_info_role
- WF_ENGINE.context_user_key
- WF_ENGINE.context_proxy



Post-Notification Function Context Information

In some cases, the values of the context variables depends on the function mode in which the post-notification function is being executed and on the notification interface that the recipient uses to respond.

For more information, see Post-Notification Functions, *Oracle Workflow API Reference*.

Exception Handling

Exception Handling

Use WF_CORE APIs to raise and catch errors in PL/SQL post-notification functions, just as in PL/SQL procedures called by function activities.



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Summary

Summary

In this lesson, you should have learned how to:

- **Define PL/SQL procedures for post-notification functions.**
- **Explain how to use context variables in post-notification functions.**

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Workflow Engine

Chapter 13

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Workflow Engine

Workflow Engine

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Objectives

Objectives

After completing this lesson, you should be able to do the following:

- **Describe how the Workflow Engine manages a process.**
- **Describe the processing performed by the background engine.**
- **Apply Workflow Engine APIs.**

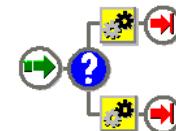
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Overview of the Workflow Engine

Overview of the Workflow Engine

The Oracle Workflow Engine:

- Is implemented in server-side PL/SQL.
- Is activated whenever a call to one of its PL/SQL procedures or functions is made.
- Manages the state of activities for each process instance.
- Determines the next activity once a prerequisite activity completes.
- Executes function activities automatically.
- Interacts with the Business Event System to receive, raise, and send event messages.
- Calls the Notification System to send notification messages.



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Overview of the Workflow Engine

The Notification System is also implemented in server-side PL/SQL and can interface with the Workflow Web agent or the Java-based notification mailer program to deliver notifications to end users.

The Workflow Engine and the Business Event System can function independently of each other. However, you can now achieve the most powerful and flexible processing by using the Workflow Engine and the Business Event System together to execute cross-system processes for e-business integration.

Oracle Workflow additionally provides Java wrappers for many Workflow Engine APIs to let you call the Workflow Engine from Java code.

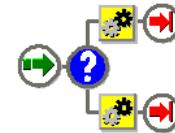
For more information, see: Workflow Engine APIs, *Oracle Workflow API Reference*.

Overview of the Workflow Engine

Overview of the Workflow Engine

The Oracle Workflow Engine:

- Supports results-based branches, parallel branches, rendezvous, loops, and subprocesses.
- Can execute activities from non-savepoint environments such as database triggers and distributed transactions. It automatically traps savepoint-not-allowed errors.
- Can defer activities too costly to execute in real time to background engines for processing.
- Maintains a history of completed activities.
- Detects error conditions and executes error processes.



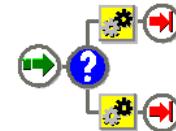
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Initiating a Workflow Process

Initiating a Workflow Process

To initiate a workflow process, your application can:

- Raise an event that triggers a subscription to send the event to the process
 - Call the **WF_EVENT.Raise API** or a Java raise API
 - or
 - Execute a **Raise event activity** in another workflow process
- Execute a procedure that calls the following Workflow Engine APIs:
 - **WF_ENGINE.CreateProcess** and **WF_ENGINE.StartProcess**
 - or
 - **WF_ENGINE.LaunchProcess**



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Initiating a Workflow Process

- If you use an event to initiate a workflow process, you must define a subscription that sends the event message to the workflow process when the event is raised. You can also define a subscription to send an event to start a workflow process when the event message is received from an external source. In both cases, the process must begin with a Receive event activity that is marked as a Start activity node to receive the event.
- If you call the Workflow Engine APIs to initiate a workflow process, use the CreateProcess and StartProcess APIs if you want to perform additional tasks, such as setting item attributes, after creating and before starting the process. If you do not need to perform any additional tasks, you can use the LaunchProcess API, which is a wrapper combining the CreateProcess and StartProcess APIs.
- The procedure that executes the Workflow Engine APIs to initiate a process must identify the item type and item key of the process for these APIs. The item type and item key passed to these APIs uniquely identify an item and must be passed to subsequent API calls for each specific process. The process must begin with the standard Start activity or with another function, notification, or process activity, marked as a Start activity node.

- You can also use the Workflow Engine bulk APIs to initiate several instances of the same workflow process at once. Call WF_ENGINE_BULK.CreateProcess and WF_ENGINE_BULK.StartProcess if you want to set item attributes after creating and before starting the processes, or call WF_ENGINE_BULK.FastForward to create multiple new processes and begin executing them at a specified activity stage.
- Oracle Workflow also includes the Developer Studio to let you manually initiate a workflow process. The Developer Studio is intended for use by a workflow developer or administrator to test workflow processes in a development environment.

Example

The following example shows how to initiate a process using the CreateProcess, SetItemUserKey, SetItemAttribute, SetItemOwner, and StartProcess APIs.

```
wf_engine.CreateProcess( ItemType => ItemType,
                        ItemKey   => ItemKey,
                        process   => WorkflowProcess );

-- 

wf_engine.SetItemUserKey ( ItemType => ItemType,
                          ItemKey   => ItemKey,
                          UserKey   => ItemUserKey);

-- 

wf_engine.SetItemOwner ( itemtype => itemtype,
                        itemkey   => itemkey,
                        owner     => ProcessOwner );

-- 

-- Initialize workflow item attributes

-- 

wf_engine.SetItemAttrText ( itemtype => itemtype,
                            itemkey   => itemkey,
                            fname     => 'REQUISITION_NUMBER',
                            avalue    => RequisitionNumber);

-- 

wf_engine.SetItemAttrNumber ( itemtype => itemtype,
                             itemkey   => itemkey,
                             fname     => 'REQUISITION_AMOUNT',
                             avalue    => RequisitionAmount);

-- 

...

-- 

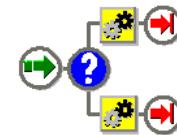
wf_engine.StartProcess( itemtype => itemtype,
                        itemkey   => itemkey );
```

Workflow Engine Processing

Workflow Engine Processing

Upon starting a process, the Workflow Engine:

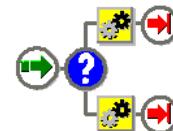
- Identifies and executes the Start activity node
 - Stores the event message in an item attribute if the Start node is a Receive event activity
 - Executes the Start node if it is a function, notification, or process activity
- Determines the next activity to transition to after completing the prerequisite activity or activities



Workflow Engine Processing

Workflow Engine Processing

- **Drives through the process**
 - Automatically executes function activities and Send or Raise event activities
 - Pauses when it encounters a notification activity, blocking activity, or Receive event activity
 - Calls the Notification System to notify a performer
 - Transitions to the next activity after the performer completes the notification, the blocking activity is completed, or the event message is received
- **Stops when it encounters an End activity**



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Workflow Engine Processing

The Workflow Engine sets a savepoint for each completed function activity, and saves all consecutively completed function activities as part of one commit cycle. If an error occurs during a commit, the database can roll back to an appropriate savepoint.

The Workflow Engine never issues a commit, as it is the responsibility of the calling application to commit. When the Workflow Engine encounters a blocking activity such as a response-required notification, it sets the activity to the appropriate status, such as NOTIFIED, and returns control to the calling application. That application can then issue a commit. Similarly, when the Workflow Engine reaches the end of a process, it returns control to the calling application, which can then issue a commit.

Note:

- A notification activity that sends an FYI notification message will be automatically completed by the Workflow Engine. Only notifications that prompt for a response will cause the Workflow Engine to pause and wait for a response from the notification recipient.

- If a background engine resumes the processing for a process that was deferred or timed out, the background engine issues a commit after completing its processing. In this case, the background engine is acting on behalf of the calling application.

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Activity Statuses

Activity Statuses

After the Workflow Engine executes an activity, it updates the state of the activity to one of the following statuses:

- **Active**
- **Complete**
- **Waiting**
- **Notified**
- **Deferred**
- **Error**
- **Suspend**



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Activity Statuses

- Active: The activity is currently being executed. The topmost process will be active until the entire process completes.
- Complete: The activity executed successfully.
- Waiting: The activity is waiting for dependencies to complete. An example is the AND activity, where one incoming transition is complete but the activity is still waiting for another required incoming transition to complete before it can be marked as complete.
- Notified: The activity is waiting for a response from a notification, for an event message, or for an external program to complete and call the Workflow Engine.
- Deferred: The activity is deferred to a background engine for execution.
- Error: The activity has encountered an error during execution.
- Suspend: The activity is suspended from further execution.

Calling the Workflow Engine

Calling the Workflow Engine

The Workflow Engine must be informed when an activity completes.

- **Process, notification, function, and event activities automatically call WF_ENGINE.CompleteActivity() when they complete.**
- **If a notification activity requires some action to be taken in a form or Web page, then that form or Web page must call WF_ENGINE.CompleteActivity() when the user completes the transaction.**
- **If a function activity calls an external program, then you must code that external program to call WF_ENGINE.CompleteActivity() when it completes.**

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Calling the Workflow Engine

You can add a standard Block activity after any function activity that calls an external program. The Block activity will pause the process until the external program completes and makes a call to WF_ENGINE.CompleteActivity().

Background Engines

Background Engines

A background engine is a PL/SQL procedure that handles stuck processes and deferred and timed out activities.

- The background engine checks for and executes any activities that satisfy the arguments of the procedure at the time the procedure is invoked.
- Before ending, the procedure checks one more time for any new activities to execute, if new processes become stuck or new activities are deferred or timed out after the procedure is initiated.
- The procedure ends once all matching activities are executed.



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Background Engines

Use the Workflow Manager component in Oracle Applications Manager to run background engines by submitting the Workflow Background Process concurrent program.

Stuck Processes

Stuck Processes

- A process is identified as stuck when it has a status of ACTIVE, but cannot progress any further.
- The background engine sets the status of a stuck process to ERROR:#STUCK and executes the error process defined for it.



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Stuck Processes

For example, a process could become stuck when:

- A thread within a process leads to an activity that is not defined as an End activity but has no other activity modeled after it, and no other activity is active.
- A process with only one thread loops back, but the pivot activity of the loop has the On Revisit property set to Ignore.
- An activity returns a result for which no eligible transition exists. For instance, if the function for a function activity returns an unexpected result value, and no default transition is modeled after that activity, the process cannot continue.

Generally, you should run a separate background engine to check for stuck processes at less frequent intervals than the background engine that you run for deferred or timed out activities, normally not more often than once a day. Run the background engine to check for stuck processes when the load on the system is low.

Timed Out Activities

Timed Out Activities

- The background engine configured for timed out activities checks for activities that are waiting for a response and determines whether these activities have timeout values that have been exceeded.
 - Notification activities marked as NOTIFIED by the Workflow Engine after it calls the Notification System to deliver notifications
 - Receive event activities marked as NOTIFIED by the Workflow Engine after it transitions to these activities
 - Subprocesses with a status of ACTIVE
- If the timeout value is exceeded, the background engine marks the activity as timed out and calls the Workflow Engine to follow the <Timeout> transition.



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Timed Out Activities

You can fix the due date of an activity at design time by setting the timeout value to a relative time in days, hours, and minutes. You can also set the timeout value to an item attribute and specify it when you initiate an instance of the process.

If you are using an item attribute to set the timeout value, then the item attribute must be set to type number or type date. If the item attribute is of type number, the value entered must be in the unit of minutes. If the item attribute is of type date, the value entered must be a date in the format DD-MON-RR HH24:MI:SS.

Note: If a timed out activity does not have a <Timeout> transition modeled, the Workflow Engine will try to find an error process to execute.

Deferred Processing

Deferred Processing

- A function activity is deferred if its cost exceeds the Workflow Engine threshold cost.
- The default threshold cost is set to 50.
- To change the threshold, add this command to a form or PL/SQL procedure :

```
WF_ENGINE.THRESHOLD := n;
```

- Lower the threshold to defer more activities.
- Raise the threshold to defer fewer activities.
- Set the threshold to -1 to defer all activities.



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Deferred Processing

The Workflow Engine integrates with Oracle Advanced Queuing to carry out deferred processing. When the Workflow Engine encounters an activity for deferred processing, a message is written to a separate “deferred” queue. The Background Engine consumes and processes the deferred queue messages, executing and completing the deferred activity.

The Workflow Engine threshold is an externalized constant. You can force a process to be deferred as soon as it is launched by lowering the Workflow Engine threshold level. For example, if you want to launch a workflow process using the Workflow Engine APIs from a database trigger, you must defer the process immediately in order to avoid issuing savepoints, which are not allowed in a database trigger.

The following example shows how to defer a process immediately upon launching it.

```
-- Set engine to defer everything to the background engine for this session  
-- This provides faster user response time, at the expense of  
-- delaying workflow progress until the background engine runs.  
save_threshold := wf_engine.threshold;  
wf_engine.threshold := -1;
```

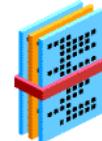
```
-- Launch the process  
wf_engine.CreateProcess(...);  
wf_engine.SetItemAttr...(...);  
wf_engine.StartProcess(...);  
  
-- Reset the threshold  
wf_engine.threshold:=save_threshold;  
  
exception  
    -- Ensure threshold is reset  
    wf_engine.threshold := save_threshold;
```

Oracle Workflow APIs

Oracle Workflow APIs

Oracle Workflow APIs are grouped as follows:

- **Engine APIs**
 - Starting and running a process
 - Communicating attribute information
 - Communicating state changes
 - Handling multiple work items in bulk
- **Core APIs: Raising and catching errors**
- **Purge APIs: Purging obsolete run-time data**
- **Directory APIs: Communicating directory service user and role information**

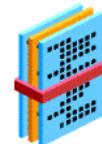


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Oracle Workflow APIs

Oracle Workflow APIs

- **Monitor APIs: Generating Workflow Monitor URLs**
- **Notification APIs: Managing notifications**
- **Preference API: Retrieving user preference information**
- **Business Event System APIs: Managing business events**
- **Views: Accessing workflow data**



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Oracle Workflow APIs

The public views are installed in the APPS account.

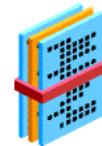
For more information, refer to the *Oracle Workflow API Reference*.

Workflow Engine APIs

Workflow Engine APIs

Use the following APIs to start or run a workflow process:

- **WF_ENGINE.CreateProcess**
- **WF_ENGINE.StartProcess**
- **WF_ENGINE.LaunchProcess**
- **WF_ENGINE.SetItemOwner**
- **WF_ENGINE.SetItemUserKey**
- **WF_ENGINE.GetItemUserKey**
- **WF_ENGINE.SetItemParent**
- **WF_ENGINE.Event**
- **WF_ENGINE.Background**
- **WF_ENGINE.CreateForkProcess**
- **WF_ENGINE.StartForkProcess**



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Workflow Engine APIs

- WF_ENGINE.CreateProcess creates a new run-time process for a work item.
- WF_ENGINE.StartProcess begins execution of the specified process.
- WF_ENGINE.LaunchProcess launches a specified process by creating the new run-time process and beginning its execution.
- WF_ENGINE.SetItemOwner sets the owner of an existing item.
- WF_ENGINE.SetItemUserKey sets a user-friendly identifier for an item.
- WF_ENGINE.GetItemUserKey returns the user-friendly identifier assigned to an item.
- WF_ENGINE.SetItemParent defines the parent/child relationship for master/detail processes.
- WF_ENGINE.Event receives an event from the Business Event System into a workflow process.
- WF_ENGINE.Background runs a background engine to process deferred and timed out activities and stuck processes.
- WF_ENGINE.CreateForkProcess forks a run-time process by creating a new process that is a copy of the original.

- WF_ENGINE.StartForkProcess begins execution of the specified new forked process.

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Workflow Engine APIs

Workflow Engine APIs

Use the following APIs to communicate attribute information to the Workflow Engine:

- **WF_ENGINE.SetItemAttribute**
- **WF_ENGINE.SetItemAttrDocument**
- **WF_ENGINE.SetItemAttributeArray**
- **WF_ENGINE.GetItemAttribute**
- **WF_ENGINE.GetItemAttrDocument**
- **WF_ENGINE.GetItemAttrClob**
- **WF_ENGINE.GetItemAttrInfo**



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Workflow Engine APIs

- WF_ENGINE.SetItemAttrText, WF_ENGINE.SetItemAttrNumber, WF_ENGINE.SetItemAttrDate, and WF_ENGINE.SetItemAttrEvent set the value of an item type attribute in a process.
- WF_ENGINE.SetItemAttrDocument sets the value of an item attribute of type document to a document identifier.
- WF_ENGINE.SetItemAttrTextArray, WF_ENGINE.SetItemAttrNumberArray, and WF_ENGINE.SetItemAttrDateArray set the values of an array of item type attributes in a process.
- WF_ENGINE.GetItemAttrText, WF_ENGINE.GetItemAttrNumber, WF_ENGINE.GetItemAttrDate, and WF_ENGINE.GetItemAttrEvent return the value of an item type attribute in a process.
- WF_ENGINE.GetItemAttrDocument returns the document identifier of an item attribute of type document.
- WF_ENGINE.GetItemAttrClob returns the value of an item type attribute in a process as a character large object (CLOB).

- WF_ENGINE.GetItemAttrInfo returns information about an item attribute, such as its type and format.

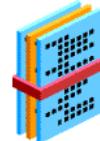
Example

- If an event subscription sends a business event to a workflow process, the subscription's globally unique identifier (GUID) is set as a dynamic item attribute of type text named SUB_GUID so that the workflow process can reference other information in the subscription definition. You can call the WF_ENGINE.GetItemAttrText() API to retrieve the subscription GUID value from the SUB_GUID item attribute, and then use the GUID to select other values from the WF_EVENT_SUBSCRIPTIONS table.

Workflow Engine APIs

Workflow Engine APIs

- **WF_ENGINE.AddItemAttr**
- **WF_ENGINE.AddItemAttributeArray**
- **WF_ENGINE.GetActivityAttribute**
- **WF_ENGINE.GetActivityAttrClob**
- **WF_ENGINE.GetActivityAttrInfo**



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Workflow Engine APIs

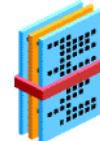
- WF_ENGINE.AddItemAttr adds a new item attribute to the run-time process.
- WF_ENGINE.AddItemAttrTextArray, WF_ENGINE.AddItemAttrNumberArray, and WF_ENGINE.AddItemAttrDateArray add an array of new item type attributes to the run-time process.
- WF_ENGINE.GetActivityAttrText, WF_ENGINE.GetActivityAttrNumber, WF_ENGINE.GetActivityAttrDate, and WF_ENGINE.GetActivityAttrEvent return the value of an activity attribute in a process.
- WF_ENGINE.GetActivityAttrClob returns the value of an activity attribute in a process as a character large object (CLOB).
- WF_ENGINE.GetActivityAttrInfo returns information about an activity attribute, such as its type and format.

Workflow Engine APIs

Workflow Engine APIs

Use the following APIs to communicate state changes to the Workflow Engine:

- **WF_ENGINE.CompleteActivity**
- **WF_ENGINE.CompleteActivityInternalName**
- **WF_ENGINE.BeginActivity**
- **WF_ENGINE.AssignActivity**
- **WF_ENGINE.GetActivityLabel**
- **WF_ENGINE.AbortProcess**
- **WF_ENGINE.SuspendProcess**



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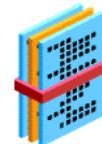
Workflow Engine APIs

- WF_ENGINE.CompleteActivity notifies the engine that the specified activity has been completed for the item, identifying the activity by the activity node label name.
- WF_ENGINE.CompleteActivityInternalName notifies the engine that the specified activity has been completed for the item, identifying the activity by its internal name.
- WF_ENGINE.BeginActivity determines if the specified activity can currently be performed and raises an exception if it cannot.
- WF_ENGINE.AssignActivity assigns an activity to another performer.
- WF_ENGINE.GetActivityLabel returns the instance label of an activity, given the internal activity instance identification.
- WF_ENGINE.AbortProcess aborts process execution and cancels outstanding notifications.
- WF_ENGINE.SuspendProcess suspends process execution so that users cannot transition items to new activities.

Workflow Engine APIs

Workflow Engine APIs

- **WF_ENGINE.ResumeProcess**
- **WF_ENGINE.HandleError**
- **WF_ENGINE.ItemStatus**



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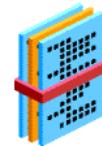
Workflow Engine APIs

- WF_ENGINE.ResumeProcess returns a suspended process to normal execution status.
- WF_ENGINE.HandleError handles any activity that has encountered an error. This API can also be called for any arbitrary activity in a process to roll back part of the process to that activity.
- WF_ENGINE.ItemStatus returns the status and results for the root process of the specified item instance.

Workflow Engine Bulk APIs

Workflow Engine Bulk APIs

- **WF_ENGINE_BULK.CreateProcess**
- **WF_ENGINE_BULK.StartProcess**
- **WF_ENGINE_BULK.FastForward**
- **WF_ENGINE_BULK.SetItemAttrText**
- **WF_ENGINE_BULK.SetItemAttrNumber**
- **WF_ENGINE_BULK.SetItemAttrDate**



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Workflow Engine Bulk APIs

- WF_ENGINE_BULK.CreateProcess creates multiple new run-time process instances of the specified item type at once, based on the specified array of workflow item keys.
- WF_ENGINE_BULK.StartProcess begins execution of multiple new run-time process instances at once, identified by the specified item type and array of workflow item keys.
- WF_ENGINE_BULK.FastForward creates multiple new run-time process instances of the specified item type at once, based on the specified array of workflow item keys, and begins execution of the new work items at the specified activity.
- WF_ENGINE_BULK.SetItemAttrText, WF_ENGINE_BULK.SetItemAttrNumber, and WF_ENGINE_BULK.SetItemAttrDate set the values of an array of item type attributes in multiple work items, identified by the specified item type and array of item keys.

Summary

Summary

In this lesson, you should have learned how to:

- **Describe how the Workflow Engine manages a process.**
- **Describe the processing performed by the background engine.**
- **Apply Workflow Engine APIs.**

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