

Oracle Application Express: Developing Web Applications

Student Guide - Volume I

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1

Course Overview

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Course Objectives

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

- Create and manage database objects
- Develop and manage application components in a database application
- Utilize and manage shared components
- Manage users, groups, and workspaces
- Secure an application
- Deploy an application
- Develop websheet applications
- Manage the development process



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This course is designed to introduce you to Oracle Application Express, a rapid web application development tool for the Oracle database. In this course, you learn about its features and benefits, and you also learn how to log in and use its various components to build complete and secure web applications.

Agenda: Day 1

1. Course Overview
2. Introducing Oracle Application Express
3. Interacting with the Database by Using SQL Workshop
4. Building a Database Application
5. Creating Reports

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This agenda is a suggested list of lessons to be covered on each day of the five-day course.

Oracle Application Express: Developing Web Applications 1 - 3

Agenda: Day 2

- 6. Creating Forms
- 7. Working with Pages and Regions
- 8. Understanding Session State and Debugging
- 9. Adding Items and Buttons

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Agenda: Day 3

- 10. Including Page Processing
- 11. Using Application and Page Utilities
- 12. Adding Shared Components That Aid Navigation
- 13. Displaying Dynamic Content

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Agenda: Day 4

- 13. Displaying Dynamic Content (continued)
- 14. Working with Themes, Templates, and Files
- 15. Administering Oracle Application Express Workspaces
- 16. Implementing Security

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Agenda: Day 5

- 17. Deploying an Application
- 18. Creating a Websheet Application
- 19. Manipulating and Administering a Websheet Application
- 20. Managing and Maintaining the Application Development

Process

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Order Management Database Application



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In this course, you create an order management database application. You create reports, forms, master-detail forms, charts, lists, and calendars.

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Websheet Application

The screenshot shows the Oracle Websheet Application interface. At the top, there's a navigation bar with 'Create', 'Edit', 'View', 'Administration', and a search bar labeled 'Search Websheet'. Below the navigation is a 'Control Panel' with options like 'New Section', 'Edit Sections', 'New Page', and 'Edit Page'. The main content area has sections for 'Overview' and 'Tasks'. The 'Reports' section is highlighted with a red box and an arrow pointing to it from the left sidebar. The 'Tasks' section contains a table with columns: PROJECT, TASK_NAME, START_DATE, END_DATE, STATUS, ASSIGNED_TO, COST, and BUDGET. The table data is as follows:

PROJECT	TASK_NAME	START_DATE	END_DATE	STATUS	ASSIGNED_TO	COST	BUDGET
Maintain Support Systems	HIR software upgrades	01-JAN-10	27-FEB-10	Closed	Pam King	8000	7000
Maintain Support Systems	Apply Billing System updates	01-JAN-10	28-FEB-10	Closed	Russ Sanders	5000	7000
Maintain Support Systems	Investigate new Virus Protection software	15-FEB-10	23-MAR-10	Open	Pam King	1700	1500
Maintain Support Systems	Arrange for holiday coverage	10-MAR-10	12-MAR-10	Closed	All Blues	300	500
Email Integration	Complete plan	08-FEB-10	14-FEB-10	Closed	Mark Hale	500	750
Email Integration	Check software licenses	17-FEB-10	18-FEB-10	Closed	Mark Hale	200	200
Email Integration	Get RFPs for new server	19-FEB-10	03-MAY-10	Open	Mark Hale	4000	1000
Email Integration	Purchase backup server	12-MAY-10	07-JUL-10	Pending	All Blues	3200	3000

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In this course, you create a websheet application. You create a data grid, a report, and a page with a variety of sections.

Course Environment

Operating system: Linux

Installed products

- Oracle Database 11g R2
- Oracle BI Publisher
- Oracle Application Express 4.1



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Workspace Details

- An Oracle Application Express workspace is assigned to you.
 - Workspace name: ora<n>
 - Username: ora<n>_admin
 - Password: ora<n>
- Log in to your workspace to complete the practice tasks in the Activity Guide.



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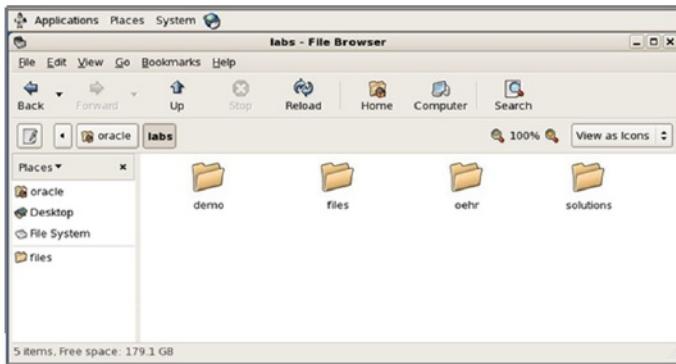
Your instructor assigns a workspace to you. The workspace name, username, and password details are listed in the slide. Replace <n> with the number assigned to you by your instructor, which ranges from 01 to 22. You need to log in to this workspace to complete all the practices in the Activity Guide for this course.

To access the Oracle Application Express development instance, open a web browser and enter the following URL in the address bar:

`http://<hostname>:8080/apex`

hostname is the IP address of the instructor machine.

Accessing the labs Directory



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All the files that are required to complete the practices are available in the `labs` directory. To access the `labs` directory, click the Application Menu and select System Tools > File Browser. From the `oracle` directory, open the `labs` directory. You will see four folders and their contents:

- **demo:** The demos referenced in the lesson notes
- **files:** All the files that you need to complete the practices. You can use this location to save files while performing the practices, if required.
- **solutions:** The solution scripts given in the Activity Guide. This folder also contains catch-up applications that you can import in case you were not able to complete a practice.
- **oepr:** The packaged application that you must import to install the database objects required for the practices

Introducing Oracle Application Express

2



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Objectives

After completing this lesson, you should be able to:

- Describe Oracle Application Express
- Explain Oracle Application Express concepts
- Identify the components of Oracle Application Express
- Run a sample application
- Install a packaged application



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In this lesson, you are introduced to Oracle Application Express. You identify the key features, benefits, and components of Oracle Application Express. You gain an understanding of how Oracle Application Express works by learning about its architecture. You also get started with Oracle Application Express by setting up the users and the environment used in this course.

Lesson Agenda

- Oracle Application Express Overview
 - What Is It?
 - Why Use It?
 - Types of Applications
 - Examples
 - High-Level Architecture
- Application Express Concepts
- Using Application Express



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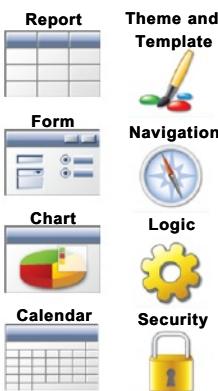
What Is Oracle Application Express?

Oracle Application Express is a web application development, deployment, and maintenance tool.

Oracle Application Express Home Page

The screenshot shows the Oracle Application Express Home Page. At the top, there's a navigation bar with links for Home, Application Builder, SQL Workshop, Team Development, Administration, and a workspace dropdown. Below the navigation is a banner with icons for Application Builder, SQL Workshop, Team Development, and Administration. A main content area displays news items and a 'Top Applications' section with 'Order Management' and 'Ebs Usr' listed. To the right, a sidebar titled 'Feature Development' lists Features, Terms, Measures, Bugs, and Feedback. A red banner at the bottom contains the copyright notice: 'Copyright © 2011, Oracle and/or its affiliates. All rights reserved.' Below the banner is the ORACLE logo.

Key Features



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Oracle Application Express is a web-based development and deployment tool that is available with Oracle database. It enables you to create database-centric web applications that are reliable, scalable, and secure. It has a number of built-in features and wizards that quicken your development process. Some of the key features are listed in the slide.

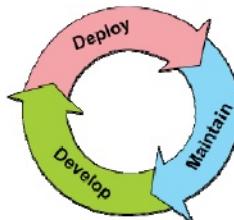
The tool has a user-friendly graphical interface. Using Oracle Application Express requires minimal programming knowledge.

The application definition is stored as metadata in the Oracle database tables. When you run your application, the Oracle Application Express engine assembles the pages from the database and displays them in your browser.

Oracle Application Express was first released in 2004 and was then called HTML DB.

Why Use Oracle Application Express?

- Enables rapid application development
- Creates applications that are reliable, secure, and scalable
- Offers a user-friendly development environment, with a short learning curve
- Provides flexible look-and-feel options by using themes and templates
- Uses declarative programming
- Features a simple, self-contained architecture
- Provides a platform-independent environment



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Using Oracle Application Express, you can develop web-based, database-centric applications that are reliable and fast, as well as secure and scalable. It has a user-friendly interface, which enables you to create and deploy applications in a short span of time. You can use the available themes and templates to provide a consistent look-and-feel across your web pages.

Oracle Application Express uses a declarative framework for web application development. This means that you specify what to do rather than how to do it. No code is generated or compiled. You interact with wizards and property sheets to define your application.

Oracle Application Express enables organizations to capitalize on their existing investment in SQL and PL/SQL skills. Few programming skills are required, and anyone can quickly learn to develop applications. With Oracle Application Express, applications are built faster, with fewer developers.

Oracle Application Express can be installed on a single workstation, or on a server that can support multiple developers. An administrator centrally manages and administers the development environment and creates a shared workspace in a single installation. The definition of an entire application can be easily packaged and exported for deployment and installation into another Oracle Application Express instance.

Types of Applications



Enterprise-wide



Tracking



Websheet



Lookup



Business Intelligence



Text Index/Search



Survey and Feedback

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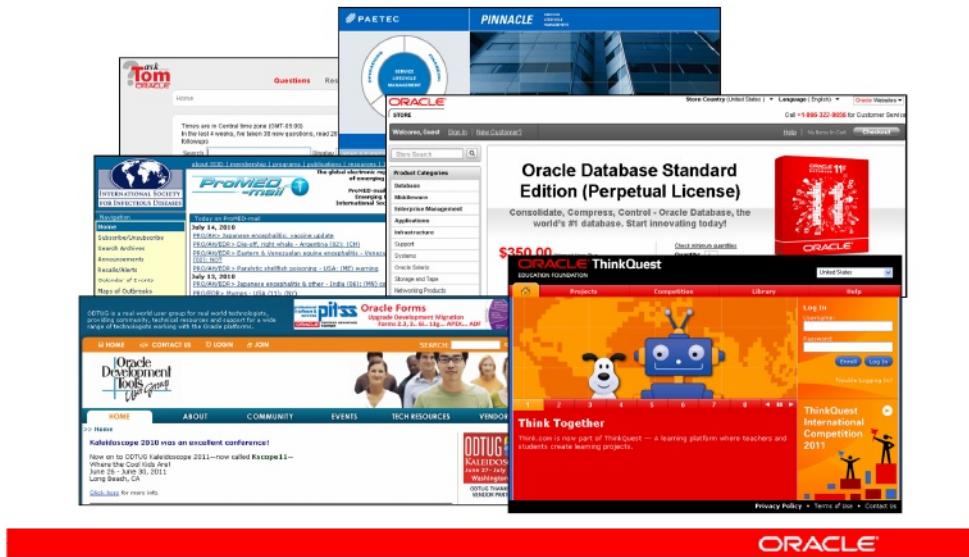
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Examples of the types of applications that are developed by using Oracle Application Express are as follows:

- Enterprise-wide applications
- Web-based applications to track projects, contacts, customers, leads, and assets
- Websheet applications that enable end users to manage structured and unstructured data without developer assistance
- Applications to look up people and catalog items
- Lightweight business intelligence (BI) applications with reports, bar charts, line charts, and pie charts. These applications may be based on summarized data copied from a live database, or operate on live transaction data. The charts and reports enable drilling down and cross-referencing of information.
- Web-based applications that use the text indexing and search capability of the Oracle database
- Applications that must be built in a very short span of time (usually a week)

Applications Developed by Using Oracle Application Express

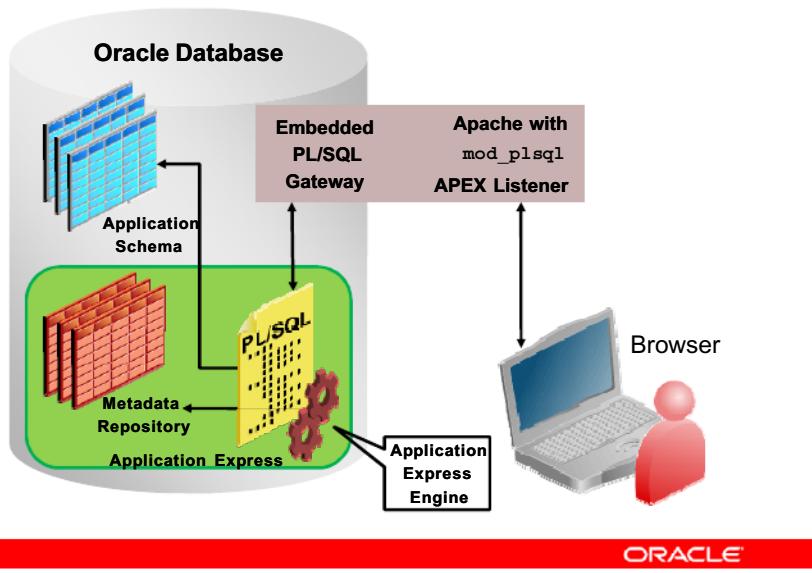


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This slide shows a variety of applications that have been developed by using Oracle Application Express.

Note: Oracle Application Express itself is developed by using Oracle Application Express.

High-Level Architecture



Oracle Application Express resides within your Oracle database. It consists of:

- Metadata stored in database tables
- The Application Express engine, which is written by using PL/SQL code

When you create an application, its definition is stored in the metadata repository. At every stage of application development, metadata is created or modified and stored in the repository tables. The Application Express engine assembles the application pages by accessing the metadata repository.

When you run your application from the browser, calls are made to the Application Express engine. The engine then processes and renders the application components in real time, based on the data in the metadata repository and the schema against which the application is running.

To enable your web browser to interact with the Application Express engine, you need a PL/SQL gateway. A PL/SQL gateway enables you to build PL/SQL-based applications for the web. For Oracle Application Express, you have three options to configure the gateway:

1. Oracle HTTP Server (Apache) with `mod_plsql`
2. Oracle APEX Listener
3. Embedded PL/SQL gateway

The Oracle HTTP Server is an HTTP-compliant web server. `mod_plsql` is an Oracle HTTP Server plug-in that enables the web browser to communicate with the database. It maps browser requests into procedure calls, which are stored in the database, over an Oracle Net Services connection. It is generally indicated by a `/pls` virtual path. When you access a page in the application, the browser sends a URL request to Apache with `mod_plsql`. Apache then translates the URL to the appropriate PL/SQL stored procedure call in the Application Express engine. The engine processes the request and renders the page that you requested.

Oracle Application Express Listener is another option that can be used. Oracle Application Express Listener communicates directly with the Oracle Application Express engine, thus eliminating the need for the `mod_plsql` plug-in.

Starting with Oracle Database 11g Release 1, you can use the embedded PL/SQL gateway. The embedded PL/SQL gateway installs with Oracle Database 11g and does not require the Oracle HTTP Server. It provides the Oracle database with a web server and the necessary infrastructure to create dynamic applications. The embedded PL/SQL gateway runs in the Oracle XML DB HTTP server in the Oracle database. It includes the core features of `mod_plsql`.

The practice environment for this course uses the embedded PL/SQL gateway.

Quiz

Which of the following is responsible for processing and rendering the web application pages?

- a. Oracle database
- b. Metadata repository
- c. Application Express engine
- d. PL/SQL gateway

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Answer: c

Lesson Agenda

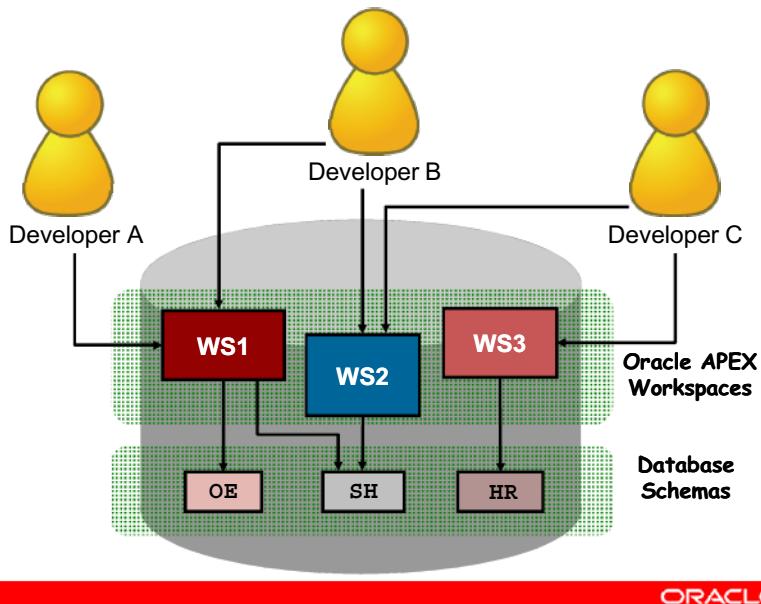
- Oracle Application Express Overview
- Application Express Concepts
 - Workspace
 - Internal Workspace
 - Roles
 - Components
 - Implementing Additional Functionality
- Using Application Express

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What is a Workspace?



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A workspace is an area within Oracle Application Express where you create your applications. To create an application, you must first create or have access to a workspace. Each workspace is associated with one or more schemas. By associating a workspace with a schema, you can:

- Build applications that interact with the database objects in that schema
- Create new database objects in that schema

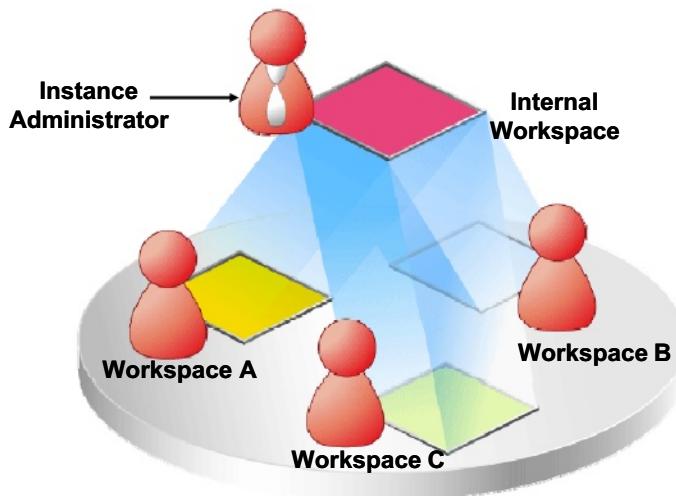
One or more developers or end users can access a workspace.

As shown in the graphic in the slide, a single Oracle database can contain multiple Oracle Application Express workspaces. In this example, you see three developers (A, B, and C) and three different workspaces (WS1, WS2, and WS3). A and B have access to WS1. In addition, B also has access to WS2. C has access to WS2 and WS3. Each workspace has access to one or more database schemas. For example, WS1 has access to OE and SH schemas, WS2 has access to SH, and WS3 has access to HR. Multiple developers can work by using the

same database instance from different workspaces or the same workspace with access to the

same or different schemas. Thus, Oracle Application Express turns a single Oracle database into a shared workgroup database service. This service can be accessed through a browser with no installation required on the desktop for the developer and the end user.

What Is an Internal Workspace?



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An Internal workspace is:

- A special workspace that is created by default when Application Express is installed
- Accessible only to instance administrators
- Used to create and manage workspaces in the Application Express instance

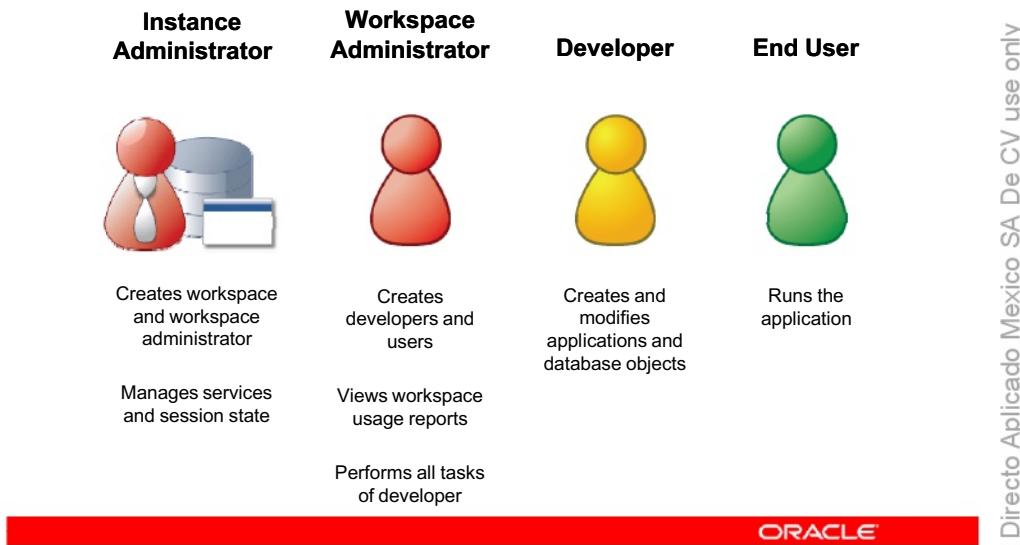
To log in to the Internal workspace, enter the following URL in the address bar:

`http://<hostname>:<port>/apex/apex_admin`

The login page appears. Enter `Admin` for Username, and for Password enter the password that was set during installation.

You can learn more about how to perform administration tasks by using the Internal workspace in the *Oracle Application Express: Administration* course.

Defining Roles



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Four roles are defined in Oracle Application Express.

1. Instance administrator
2. Workspace administrator
3. Developer
4. End user

Instance Administrator

An instance administrator manages the entire Oracle Application Express instance, including service administration and workspace administration. The instance administrator manages the workspaces of all the users, and is also responsible for managing session state and monitoring usage as a whole. The default Oracle Application Express administration privileged user is `admin`.

The instance administrator performs the following tasks:

1. Logs in to Oracle Application Express Administration
2. Creates a workspace and a workspace administrator. Both can be done at the same time by using the Create Workspace Wizard.

Workspace Administrator

When a user is assigned administrative privileges for a workspace, that user becomes the workspace administrator. The workspace administrator can add new users to the workspace, create new user groups, and view usage reports of the workspace.

The workspace administrator performs the following tasks:

1. Logs in to Oracle Application Express by using the workspace that has been assigned by the instance administrator
2. Creates developer users for the workspace so that development can occur
3. Installs sample applications
4. Installs a packaged application with supporting objects

Developer

Multiple users can log in to the same Oracle Application Express instance to develop and edit applications. Each of these users is called a *developer*.

Developers have access to a workspace through which they can access their own database objects. In addition to having private workspaces, users can also share a workspace to develop applications.

End User

The end user is a user without development and administration privileges. This user has only the basic privileges needed to run an application.

Oracle Application Express Components

Oracle Application Express consists of the following components:



Create database applications and websheet applications.



Browse and create database objects.
Execute SQL commands and scripts.



Track new features, bugs, milestones, to-do tasks, and feedback.



Create users.
Request service.
Monitor activity.

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The Oracle Application Express development environment consists of four components:

- **Application builder:** Is used to create the user interface of an application. You can create application pages and use the built-in features to add reports, forms, charts, calendars, and so on to an application. You can specify the database objects that the application should interact with. Using the application builder, you can build database applications and websheet applications. You learn to create a database application in the lesson titled “Building a Database Application,” and how to create a websheet application in the lesson titled “Building a Websheet Application.”
- **SQL Workshop:** Is used to create and manage the database objects of an application. You can browse the objects in your application schema. You can create database objects such as tables, views, sequences, and so on. You can execute SQL commands and run SQL scripts. You learn to use the SQL Workshop in the lesson titled “Interacting with the Database by Using SQL Workshop.”
- **Team Development:** Provides a development management tool that enables you to track new features, bugs, milestones, to-do tasks, and feedbacks
- **Administration:** Is used to manage workspace users and services

Quiz

Which of the following statements are true about Oracle Application Express workspaces? (Choose all that apply.)

- a. It is a private database shipped with Oracle database.
- b. It enables multiple developers to create multiple applications simultaneously.
- c. It can be created by any Application Express user.
- d. It can access more than one database schema.



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Answer: b, d

Lesson Agenda

- Oracle Application Express Overview
- Application Express Concepts
- Using Application Express
 - Types of Installations
 - Logging In to a Workspace
 - Create Users
 - Sample Applications
 - Packaged Applications

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Types of Installations

Oracle Application Express supports two types of installations.

Full Development Environment



Complete access to develop applications

Runtime Environment



Access only to run production applications

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Installing Oracle Application Express

Based on your requirements, you can install Oracle Application Express in one of the following ways:

- **Full development environment:** This installation provides complete access to the Application Builder environment to develop applications.
- **Runtime environment:** This installation is an appropriate choice for production implementations in which you want to run applications that cannot be modified.

An Oracle Application Express runtime environment enables you to run production applications. But it does not provide a web interface for administration. The runtime environment installation option minimizes the installed footprint and privileges. In a runtime instance, developers cannot inadvertently update a production application. Therefore, the runtime environment improves application security.

Logging In to a Workspace

To log in to an Oracle Application Express workspace:

1. Enter the correct URL in your browser address bar.
2. Enter the workspace name.
3. Enter the username and password. Then click Login.



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To log in to Oracle Application Express, you need a workspace name and the username and password created for that workspace. You can log in to Oracle Application Express as a workspace administrator or as a developer. You can access the Oracle Application Express application with the following URL:

`http://<hostname>:<port>/apex`

The login page appears. Enter the workspace name, username, and password. Click Login. You may be prompted to change your workspace password the first time you log in. This option is set when your username and password are created by the Oracle Application Express administrator. You can set your new password to be the same as your old password.

Note

If your setup uses Oracle HTTP Server with mod_plsql, use:

`http://<hostname>:<port>/pls/apex`

If your setup uses embedded PL/SQL gateway, use:

`http://<hostname>:<port>/apex`

Creating a Developer User

To create a developer user, perform the following steps:

1. On the Oracle Application Express home page, click the down arrow on the Administration tab.
2. Select “Manage Users and Groups” from the drop-down menu.
3. Click the Create User button.
4. Enter the username and email address for the user.
5. Review the account privileges for the user.
6. Enter the password for the user.
7. Click the Create User button.



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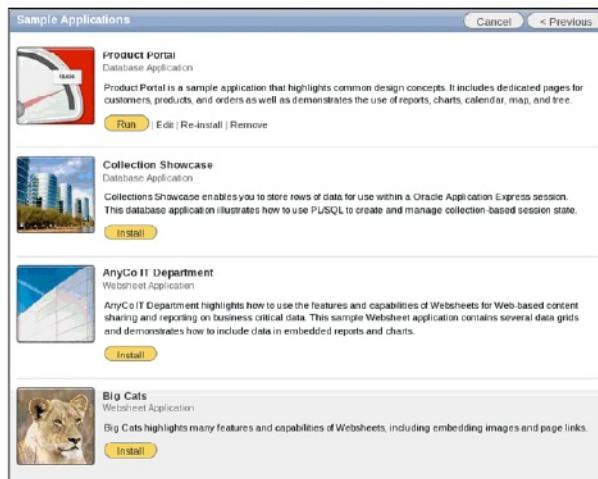
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Workspace administrators create the developer users who build applications. You can access the Create User button by performing one of the following:

- Select “Manage Users and Groups” from the Administration tab drop-down menu.
- Click the “Manage Users and Groups” icon on the Administration page.
- From the Tasks menu on the Administration page, select Create User.

On the Create User page, enter the details for the user. In the Account Privileges section, you can set the default schema for the user. You can restrict access to a specific set of schemas in a workspace or allow access to all schemas. You have an option to give the developer administrator privileges. You can also restrict access to the components of Oracle Application Express. The slide provides an overview of the steps to create a developer user. You can view a demonstration of this task by opening the /home/oracle/labs/demos/les02_create_user.html file.

Available Sample Applications



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When you create a workspace, the following four applications are available by default:

- **Product Portal application:** Highlights common design concepts
- **Collections Showcase application:** Highlights session state concepts
- **AnyCo IT websheet application:** Highlights features and capabilities of websheets
- **Big Cats websheet application:** Highlights features and capabilities of websheets

You can install and run these applications to analyze the building of these applications. This is a good method to get a better understanding of how to use Oracle Application Express to build your own applications. The Product Portal sample database application is already installed in your workspace. You can re-install an installed application to get a fresh copy.

To install a sample application, perform the following steps:

1. Click the **Application Builder** icon.
- Note:** The Sample Database (Product Portal) application is already listed and you can **Run it**.
2. Click **Create >**.
3. Click the **Sample Applications** link. The sample applications are listed.
4. Click the **Install** button for the application that you want to install.

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Running the Sample Database Application



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To run a sample application, perform the following steps:

1. Click the **Sample Database Application** icon on the Application Builder home page.
2. Click the **Run Application** icon.
3. Enter the username and password, if prompted. The Sample Database Application home page is displayed.

You can view a demonstration of this task by opening the
/home/oracle/labs/demos/les02_sample_app.html file.

Sample Database Application

The screenshot shows the Oracle Application Express interface for the Sample Database Application. The top navigation bar includes tabs for Home, Customers, Products, Orders, and Reports, with 'Home' currently selected. Below the navigation bar are several report cards:

- Sales Quota for this Month:** A dial chart showing a value of 2,560.
- Top Customers:** A table listing customers with their total orders and amount.
- Sample Database Application:** A welcome message for the application.
- Top Products:** A table listing products with their quantity and price.
- Top Orders by Date:** A table listing orders by date, amount, and customer.
- Tasks:** A list of actions including Enter a New Order, Add a New Customer, and Add a New Product.

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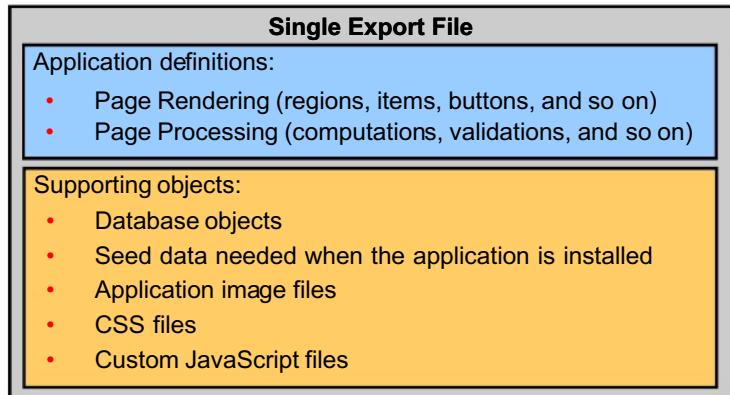
The sample application features an easy-to-use interface for viewing, updating, and searching for order, product, and customer information. You can navigate between the pages by using the Home, Customers, Products, Orders, and Reports tabs.

The sample application demonstrates the following functionality:

- Searching for customers
- Showing examples of ways to display summary information, including a dial chart and summary reports
- Editing customer and product information
- Storing and retrieving product images in a custom table
- Viewing all orders, products, and customers
- Sorting order, product, and customer information by column heading
- Creating new orders, products, and customers
- Viewing pages in a printer-friendly mode

What Is a Packaged Application?

Packaged applications are fully functional applications that you can view, use, and customize.



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Packaged applications are fully functional applications that you can view, use, and customize.
Packaged applications can include the following:

- **Application definitions:** An application definition includes any application or page component. This includes page-rendering components (such as regions, items, or buttons) or page-processing components (such as computations or validations).
- **Supporting objects:** The supporting objects consist of the underlying objects and files that are necessary for the application and would typically include database objects, seed data that is needed when the application is installed, application image files, CSS files, and custom JavaScript files.

A number of packaged applications are available on Oracle Technology Network (OTN) at the following location:

<http://www.oracle.com/technetwork/developer-tools/apex/packaged-apps-090453.html>

Installing a Packaged Application

To install a packaged application, perform the following steps:

1. On the Application Builder page, click Import.
2. Specify the location of the file to import.
3. Confirm that the import was successful and click Next.
4. Click Install.



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You can import and install a packaged application and all of its supporting objects into a target Oracle Application Express instance. The slide provides an overview of the steps to install a packaged application.

You can view a demonstration of this task by opening the /home/oracle/labs/demos/les02_install_pa.html file.

Summary

In this lesson, you should have learned how to:

- Describe Oracle Application Express and its concepts
- Explain the Oracle Application Express architecture
- Identify the components of Oracle Application Express
- Run a sample application provided with Oracle Application Express
- Install a packaged application



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Oracle Application Express is a rapid application development tool that is available in Oracle database. In this lesson, you were introduced to Oracle Application Express, the advantages of using Oracle Application Express to build applications, and the Oracle Application Express features that you use when building your application. You also learned about the architecture and the components of Oracle Application Express, as well as the steps to get started.

Practice 2: Overview

The practices for this lesson cover the following topics:

- Logging in to a workspace
- Creating a developer user
- Running the sample application
- Logging in as a developer
- Installing a packaged application with its supporting objects



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3 **Interacting with the Database by Using SQL Workshop**

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Objectives

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

- List the SQL Workshop components
- Browse, create, and modify database objects by using Object Browser
- Execute SQL commands and SQL scripts
- Build SQL queries and import/export data by using Utilities



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Lesson Agenda

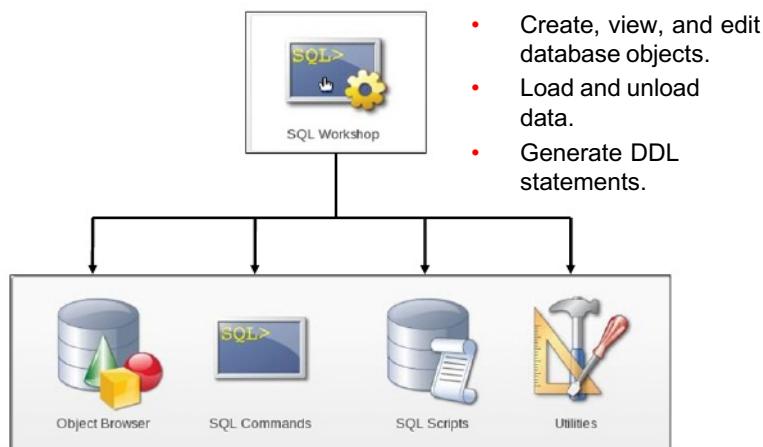
- Using SQL Workshop
 - What Is It?
 - Component Usage
 - Accessing SQL Workshop
- Navigating in SQL Workshop
 - Using Object Browser
- Using SQL Commands and SQL Scripts
- Using Utilities: Query Builder
- Using Utilities: Data Workshop
- Using Utilities: Other Options

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What Is SQL Workshop?



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SQL Workshop is a tool in Application Express that you use to interact with the database objects. You can create, view, and edit database objects. You can also perform tasks such as loading and unloading data to and from database tables, generating data definition language (DDL) statements, and viewing reports.

The four main components of SQL Workshop are displayed in the slide: Object Browser, SQL Commands, SQL Scripts, and Utilities. You learn to use each of these components in this lesson.

Component Usage in SQL Workshop

			
View, create, and modify objects.	Run SQL statements to create, view, and edit objects.	Run SQL scripts to create, view, and edit objects.	Visually create SQL SELECT queries.
	Run PL/SQL code.	Run PL/SQL code.	Load and unload data.
	Save queries.	Upload and save queries to a repository.	Generate DDL statements.
		Transfer scripts to another workspace.	



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Based on the task, you determine the SQL Workshop facility to use.

- **Object Browser:** View, create, and modify objects.
- **SQL Commands:**
 - Run SQL statements to create, view, and edit objects.
 - Run PL/SQL code.
 - Save queries.
- **SQL Scripts:**
 - Run SQL scripts to create, view, and edit objects.
 - Run PL/SQL code.
 - Upload and save queries to a repository.
 - Transfer scripts to another workspace.
- **Utilities:** Create queries, load and unload data, and generate DLL statements.

Accessing SQL Workshop



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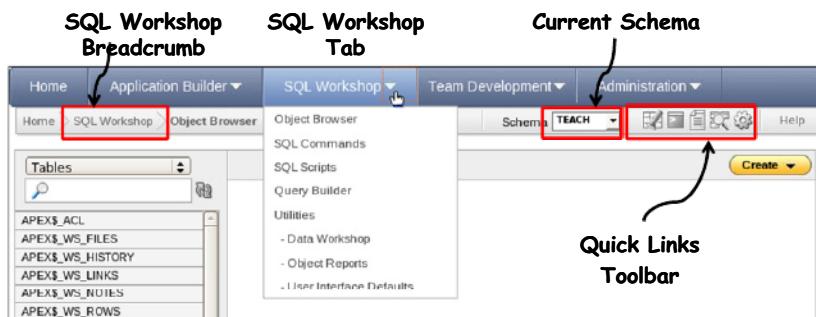
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From the Oracle Application Express home page, you can access the SQL Workshop tool in two ways:

- Click the SQL Workshop icon or the SQL Workshop tab, and then select the component that you want to access.
- Click the down arrow on the SQL Workshop tab, and then select the component that you want to access from the drop-down menu 6

Navigating in SQL Workshop



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From within any SQL Workshop component, if you want to go back to the SQL Workshop page, click the SQL Workshop tab or the SQL Workshop breadcrumb.

To navigate to a different SQL Workshop component, click the down arrow on the SQL Workshop tab and select the component that you want to access. You can also navigate to the component that you want to access by clicking the component's icon from the Quick Links toolbar.

The schemas for your workspace are listed in the Schema drop-down list. You can change the schema for the current component by clicking the drop-down list and selecting a different schema.

Lesson Agenda

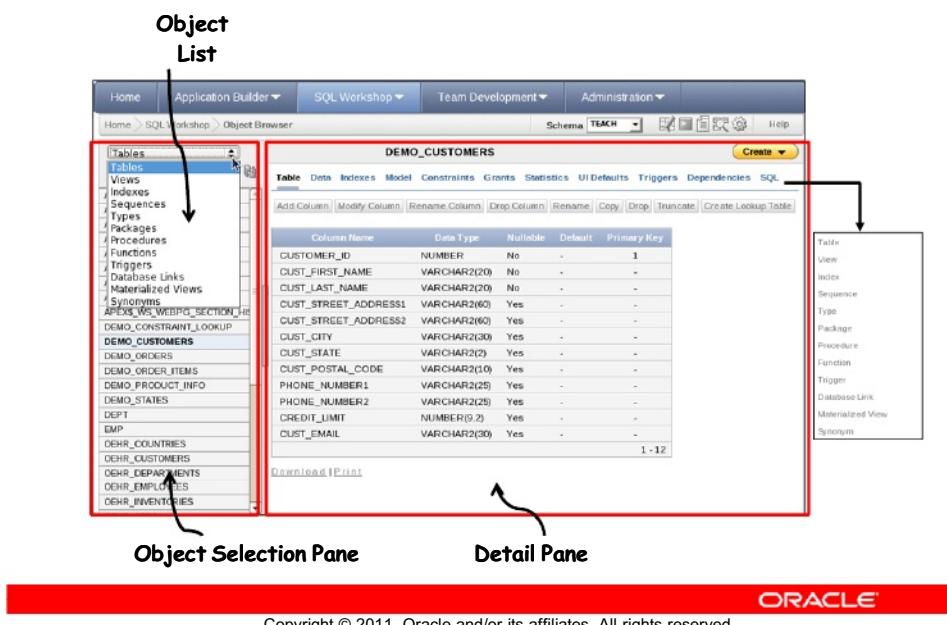
- Using SQL Workshop
- Using Object Browser
 - Object Browser Interface
 - Creating Database Objects
 - Lookup Tables
- Using SQL Commands and SQL Scripts
- Using Utilities: Query Builder
- Using Utilities: Data Workshop
- Using Utilities: Other Options

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Object Browser Interface



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To access Object Browser, click the Object Browser icon on the SQL Workshop page. You can also select Object Browser from the drop-down menu on the SQL Workshop tab.

The Object Browser page consists of two areas:

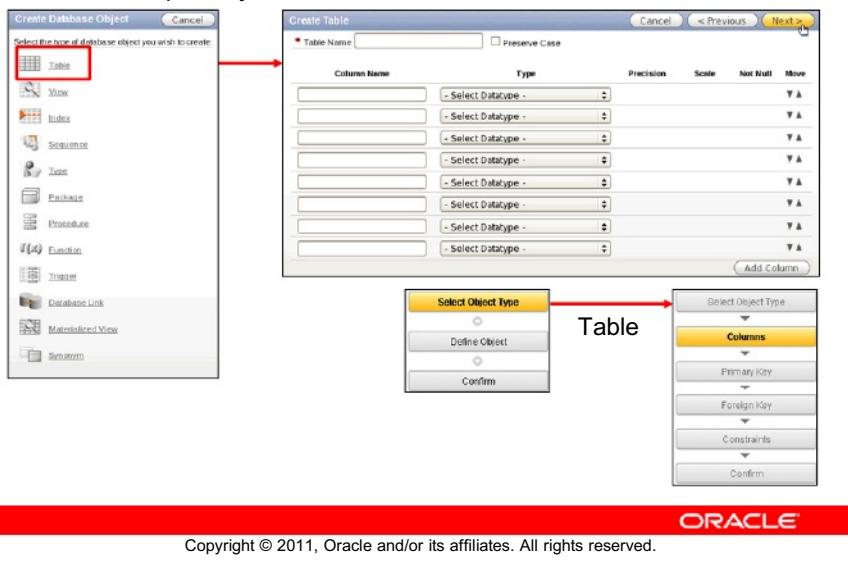
- Object Selection pane:** You use this pane to select the database object that you want to view. The objects are listed by type. You can use the object list to change the type of objects listed. If any object has a red bar next to it in the Object Selection pane, it is invalid.
- Detail pane:** This pane provides additional detailed information about the database object that you selected in the Object Selection pane. You can click the tabs to view information such as data, indexes, and constraints. This pane also contains many manipulation options for the database object. You can click the appropriate button to edit the object.

In addition to viewing database objects, you can create database objects by clicking the

Create button in Object Browser. You can also click the drop-down arrow on the Create

Creating Database Objects

SQL Workshop > Object Browser > Create



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To create a database object, click the Create button on the Object Browser page. A list of objects that you can create is displayed.

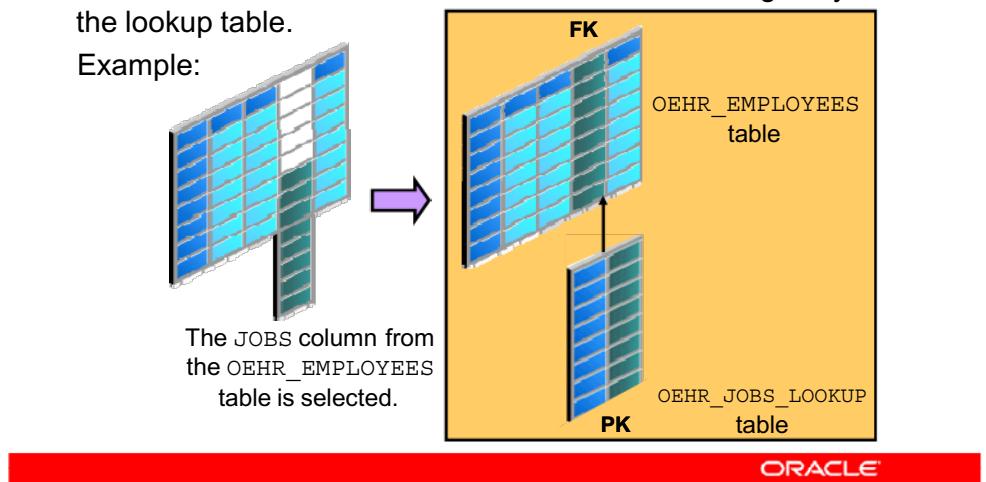
The Create Database Objects wizard has three main steps: selecting the object that you want to create, defining the object, and confirming the details. The steps for defining an object differ based on the object that you are creating. For example, if you want to create a database table, select Table from the Create Database Object list (shown in the slide). The Create Table wizard opens. Defining the table object involves adding the columns, primary key, foreign key, and constraints. Finally, you confirm the details that you entered and create the table.

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What Is a Lookup Table?

A lookup table shows a list of values based on the column value in another table. That column becomes a foreign key to the lookup table.

Example:



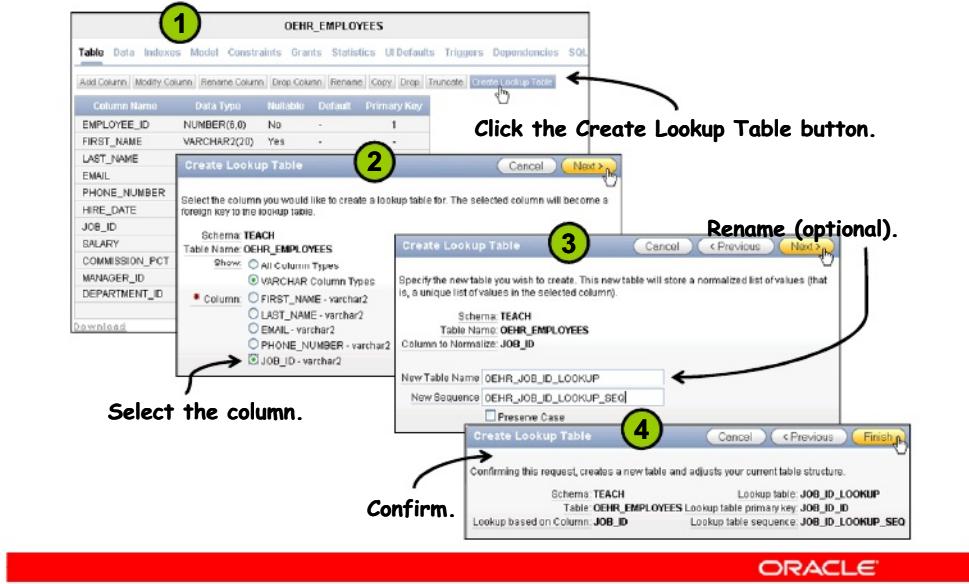
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A lookup table is a new table that is created by extracting a column from an existing table. A new primary key column is created in the new table and a foreign key is created between the source table and the new lookup table.

In the example, the JOBS column is extracted from the OEHR_EMPLOYEES table and a new lookup table is created called OEHR_JOBS_LOOKUP. A primary key column is created in the new OEHR_JOBS_LOOKUP table, and a foreign key to the OEHR_EMPLOYEES table is created. The data in the JOBS column in the OEHR_EMPLOYEES table corresponds to the primary key of the OEHR_JOBS_LOOKUP table.

Creating a Lookup Table



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Navigate to the Objects Browser page. From the object selection pane, select the table for which you want to create a lookup table. The table details are displayed in the detail pane.

To create a lookup table for the selected table, perform the following steps:

1. Click the **Create Lookup Table** button.
2. Select the column that you want to use to create the lookup table. Click **Next**.
3. (Optional) Change the name of the lookup table or sequence. Click **Next**.
4. Click **Finish**.

Viewing the Created Lookup Table

OEHR_JOB_ID_LOOKUP				
Table Data Indexes Model Constraints Grants Statistics UI Defaults Triggers Dependencies SQL				
Add Column Modify Column Rename Column Drop Column Remain Copy Drop Truncate Create Lookup Table				
Column Name	Data Type	Nullable	Default	Primary Key
JOB_ID_ID	NUMBER	No	-	1
JOB_ID	VARCHAR2(4000)	No	-	-
				I - 2

Download

Data in the Lookup Table

EDIT	JOB_ID_ID	JOB_ID
<input checked="" type="checkbox"/>	1	AC_ACCOUNT
<input checked="" type="checkbox"/>	2	AC_MGR
<input checked="" type="checkbox"/>	3	AD_ASST
<input checked="" type="checkbox"/>	4	AD_PRES
<input checked="" type="checkbox"/>	5	AD_VP
<input checked="" type="checkbox"/>	6	FI_ACCOUNT
<input checked="" type="checkbox"/>	7	FI_MGR
<input checked="" type="checkbox"/>	8	HR REP
<input checked="" type="checkbox"/>	9	IT_PROG
<input checked="" type="checkbox"/>	10	MK_MAN
<input checked="" type="checkbox"/>	11	MK REP
<input checked="" type="checkbox"/>	12	PR REP

Data in the Employees Table

EDIT	EMPLOYEE_ID	FIRST_NAME	JOB_ID_ID
<input checked="" type="checkbox"/>	198	Donald	17
<input checked="" type="checkbox"/>	199	Douglas	17
<input checked="" type="checkbox"/>	200	Jennifer	3
<input checked="" type="checkbox"/>	201	Michael	10
<input checked="" type="checkbox"/>	202	Pat	11
<input checked="" type="checkbox"/>	203	Susan	8
<input checked="" type="checkbox"/>	204	Hermann	12
<input checked="" type="checkbox"/>	205	Shelley	2
<input checked="" type="checkbox"/>	206	William	1
<input checked="" type="checkbox"/>	100	Steven	4
<input checked="" type="checkbox"/>	101	Neena	5
<input checked="" type="checkbox"/>	102	Lay	5

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The lookup table that you create contains the column that you selected when you created the table, as well as a new ID column. In this case, you created the JOB_ID_LOOKUP table, and the JOB_ID data from the OEHR_EMPLOYEES table has been moved to the JOB_ID_LOOKUP table. If you review the OEHR_EMPLOYEES table, you notice that the JOB_ID column has been modified to be an ID column, which contains the foreign key reference to the JOB_ID_ID column in the lookup table.

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Quiz

A lookup table:

- a. Contains the primary key of another table
- b. Contains data extracted from a column of an existing table
- c. Stores lookup data of different tables
- d. Enables quicker database search

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Answer: b

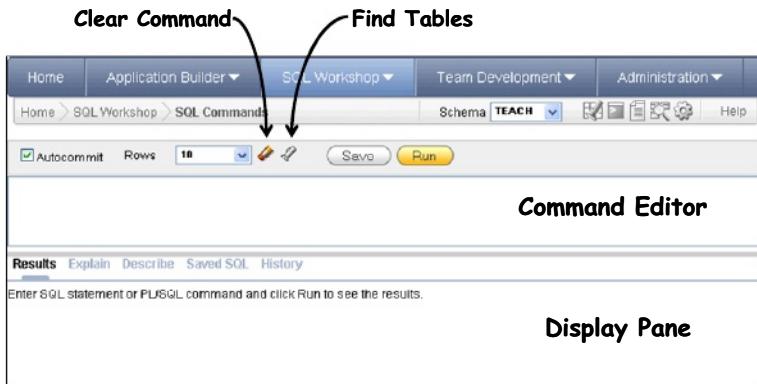
Lesson Agenda

- Using SQL Workshop
- Using Object Browser
- Using SQL Commands and SQL Scripts
 - SQL Commands Interface
 - Running SQL Commands
 - Saving SQL Commands
 - SQL Scripts Interface
 - Creating and Uploading SQL Scripts
 - Importing and Exporting SQL Scripts
- Using Utilities: Query Builder
- Using Utilities: Data Workshop
- Using Utilities: Other Options



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SQL Commands Interface



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To access SQL commands, select SQL Commands from the drop-down menu on the SQL Workshop tab. The SQL Commands page contains a command editor and a display pane.

In the command editor, you can enter and edit SQL commands. SQL commands can be single or multiple SQL statements, or PL/SQL blocks. You can terminate the commands in the editor by using either a semicolon (;) or a slash (/). For example, the following two SQL statements are equivalent:

```
Select * from OEHR_INVENTORIES;  
Select * from OEHR_INVENTORIES  
/
```

If you write a single SQL statement, the terminator is optional.

The other tasks that you can perform in the command editor are the following:

- Enable or disable autocommit on data manipulation language (DML) statements.
- Set the number of output rows.
- Use the Clear Command icon to clear the command editor.
- Use the Find Tables icon to locate and view tables.

In the display pane, the output of the SQL command that you executed is displayed on the Results tab. You can also do the following:

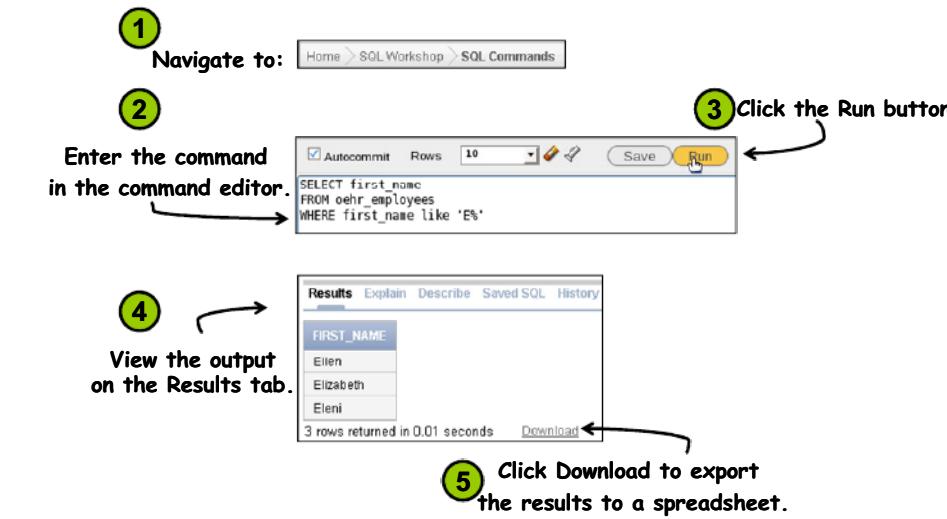
- Click the Explain tab to view the explain plan for the query that you executed.
- Click the Describe tab to view the result of running a Describe command.
- Click the Saved SQL tab to view the saved SQL commands.

Note: The SQL queries that are built and saved by using Query Builder are also listed here.

- Click the History tab to view the SQL commands that are run in the command editor.

You can use SQL Workshop as an alternative to SQL*Plus.

Running SQL Commands



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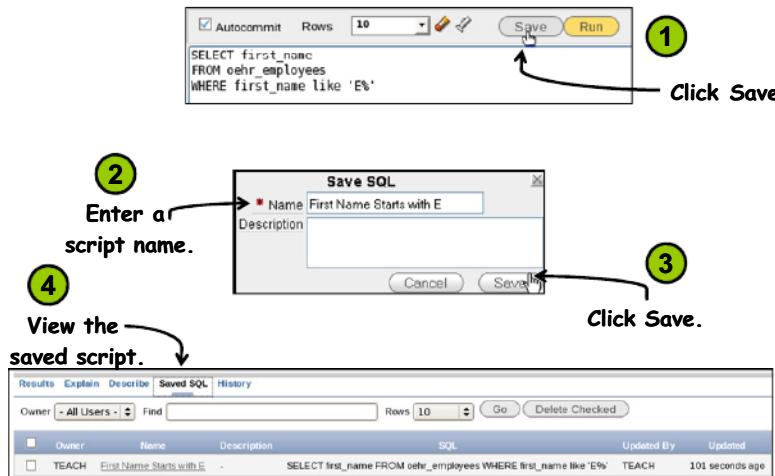
To execute SQL code with SQL commands, perform the following steps:

1. Navigate to the SQL Commands page by selecting **SQL Commands** from the drop-down menu on the SQL Workshop tab.
2. Enter the SQL or PL/SQL statement in the command editor.
3. Click the **Run** button.
4. View the output on the Results tab of the display pane.
5. (Optional) Click the **Download** link to export the results of the query to a spreadsheet in Microsoft Excel.

Note

- If you have multiple commands in the command editor, you can run only one command at a time. Select the command and click Run. Only the command that was selected is executed.
- SQL commands that are created and saved by using Query Builder can be executed from the SQL Commands page.

Saving SQL Commands



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You can save the SQL commands that you entered in the command editor, and then run them any time without having to reenter the command.

To save a command entered in the command editor, perform the following steps:

1. Click the **Save** button.
2. A Save SQL dialog box opens. Enter a name for the SQL command.
3. Click **Save** in the Save SQL window.
4. View the saved SQL command on the Saved SQL tab.

Note

- Saved SQL commands must have unique names within a given workspace.
- The SQL queries that are created and saved by using Query Builder are also listed on the Saved SQL tab. You can execute them from the SQL Commands page.

SQL Scripts Interface



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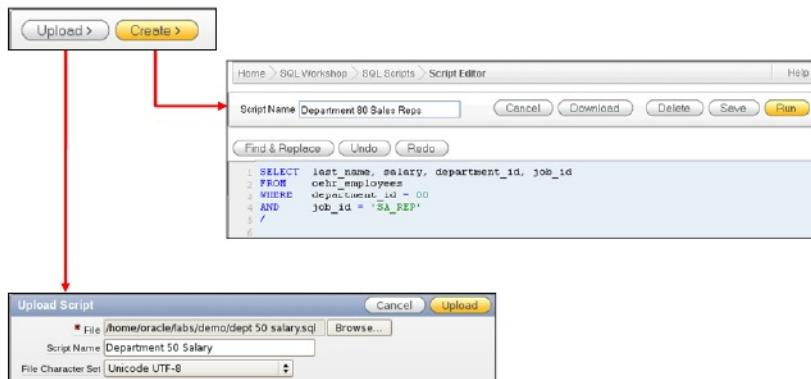
To access SQL scripts, select SQL Scripts from the drop-down menu on the SQL Workshop tab.

It is a good practice to use the SQL command editor to run simple queries, whereas you can use SQL scripts to view, edit, and run script files. Script files are used to store complex commands or frequently used reports that contain SQL or PL/SQL commands.

Using the Upload button, you can upload script files into the SQL scripts repository. Using the Create button, you can create a new script file and save it in the scripts repository. You can use the Export and Import links in the Tasks list to export scripts to or import scripts from a different workspace's scripts repository. The scripts in your workspace's repository are displayed in an interactive report. The slide screenshot shows "No data found" because no scripts are available in the teach workspace's repository.

There is no interaction between the SQL Commands and SQL Scripts tools. The scripts created by using any of these tools are not accessible from the other tool. You can, however, copy and paste the SQL code from one tool and run it in the other tool.

Creating and Uploading SQL Scripts



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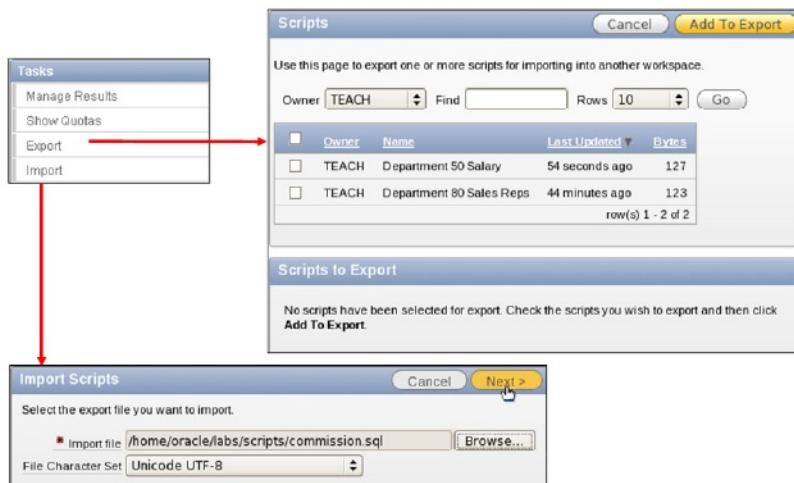
To create a new script file, click the Create button. The Script Editor opens. Enter a name for your script and enter the SQL code in the editor. Use the Run/Save buttons to run or save the script. Click the Download button to save the script to your local system.

To upload a script file from your local file system to the SQL scripts repository, click the Upload button. Browse and locate the file that you want to upload and click the Upload button.

Each script must have a unique name within the scripts repository of your workspace.

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Importing and Exporting SQL Scripts



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The Export and Import tasks enable you to transfer scripts between workspaces.

Using Export, you can export multiple scripts from your current workspace to another workspace. All the scripts that you select to export are encoded into a single script file. You can save this file to your local file system and import it to another workspace.

To export scripts, click the Export link. The scripts available in the script repository are listed in the Scripts pane. Select the scripts that you want to export and click the Add To Export button. The selected scripts are listed in the Scripts to Export pane. You can finalize the scripts that you want to export by removing or adding scripts. To export the scripts, click the Export All button. The scripts are exported as a single export file, which you can save to your local file system.

Using Import, you can import a script file exported from a different workspace into your current workspace. To import a script file, click the Import link. Click the Browse button and locate the file to import from your local file system. Click Next and click Import Scripts to confirm. Only script files exported from the scripts repository can be imported. If you try to import any other script, you get a "script not compatible" error.

Lesson Agenda

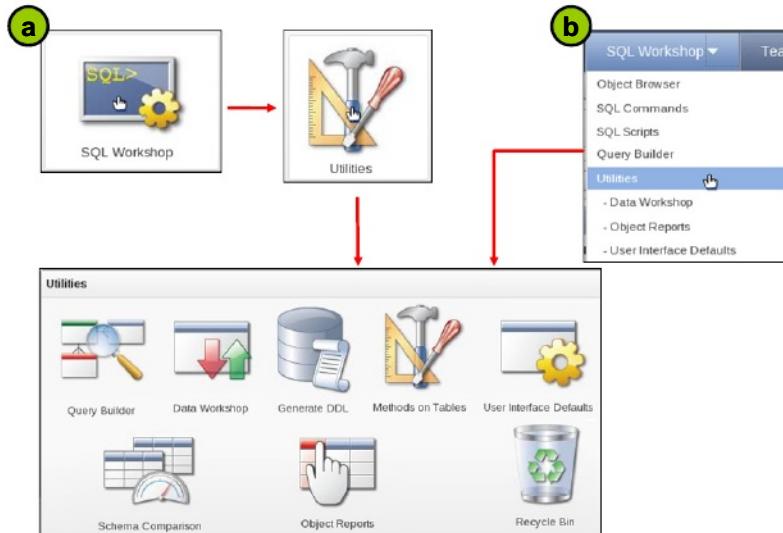
- Using SQL Workshop
- Using Object Browser
- Using SQL Commands and SQL Scripts
- Using Utilities: Query Builder
 - Accessing Utilities
 - Query Builder Interface
 - Building and Running Queries
 - Saving Queries
- Using Utilities: Data Workshop
- Using Utilities: Other Options

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Accessing Utilities



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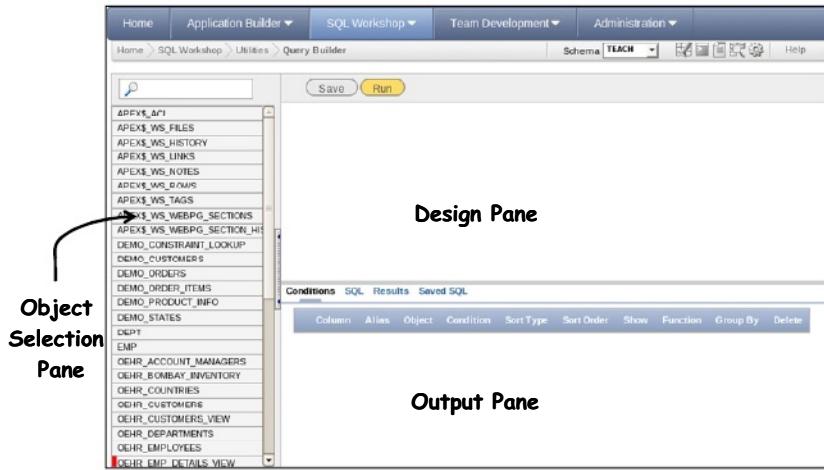
You can access the Utilities page by performing one of the following steps:

- Click the **SQL Workshop** icon on the home page and click **Utilities**.
- Select **Utilities** from the SQL Workshop tab drop-down menu.

Using Utilities in Oracle Application Express, you can perform the following tasks:

- Build SQL queries visually.
- Load and unload data.
- Generate data definition language (DDL) statements from the Oracle data dictionary.
- View reports on the various objects in your database.
- View and purge objects in the Recycle Bin.
- Monitor the functioning of your database.
- Examine views built on the metadata. You can write custom reports of your metadata.
- Compare two schemas in the current workspace.
- View details about your database.

Query Builder Interface



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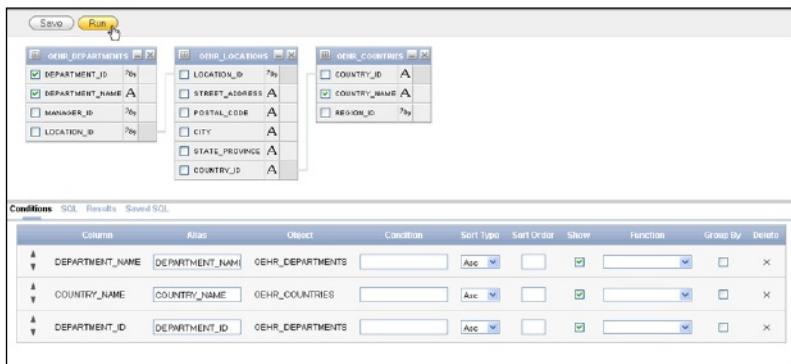
To access Query Builder, select Query Builder from the drop-down menu on the SQL Workshop tab. You can use Query Builder to create SQL SELECT queries visually.

The Query Builder page has three sections:

- **Object Selection pane:** Contains a list of database tables and views, which you can select to build your queries. Only the objects in your current schema are displayed.
- **Design pane:** Displays the objects that you selected from the Object Select pane. You can select the columns that you want to include in your query and specify joins between the objects.
- **Output pane:** Enables you to create conditions. You can also view the generated SQL and other saved queries, and the output of a query.

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Building and Running a Query in Query Builder



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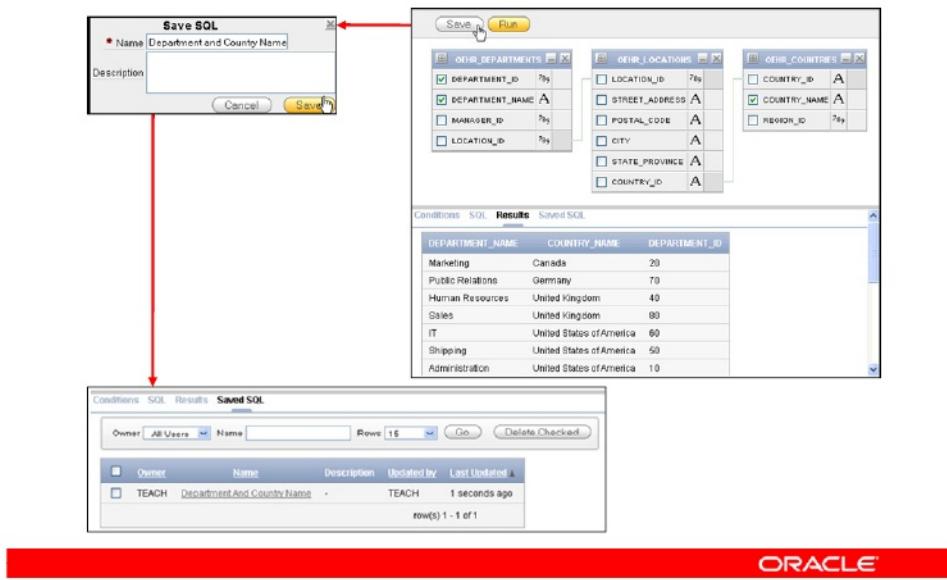
To build a `SELECT` query in Query Builder, perform the following steps:

1. In the Objects Selection pane, select the objects from which you want to display data.
2. To select the columns to include in your query, select the check box for each column. The columns that you select are displayed on the Conditions tab of the Output pane. You can add a condition in the Condition field to generate a `WHERE` clause condition on that column.
3. To create a join between tables, click the join column for the column in the first table, and then click the join column for the column in the second table. For example, click the join column for `location_id` in the `OEHR_Department` table, and then click the join column `location_id` in the `OEHR_Location` table. When the tables are joined, a line connects the two columns. You can view the SQL statement resulting from the join by positioning the cursor over the joining line. (The join column is the column to the right of the data type column.)
4. To view the SQL code generated for your query, click the SQL tab in the Output pane.

It is always advisable to quickly review the SQL generated to ensure that tables are joined correctly. If you are new to SQL, reviewing the resultant SQL teaches you how to write SQL to retrieve data from the database.

5. To execute the query, click the Run button. The results are displayed on the Results tab of the Output pane.

Saving a Query in Query Builder



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You can save a query that you created so that you can run it again at any time and use it in your application. To save a query, click the Save button. A Save SQL dialog box opens. Enter a name for your query and click Save. The saved SQL query is listed on the Saved SQL tab of the Output pane.

Saved queries are also listed in the Saved SQL list. You can view and run them from SQL Commands.

Quiz

From which of the following SQL Workshop components can you access the scripts imported from a different workspace?

- a. Object Browser
- b. SQL Commands
- c. SQL Scripts
- d. Query Builder

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Answer: c

Lesson Agenda

- Using SQL Workshop
- Using Object Browser
- Using SQL Commands and SQL Scripts
- Using Utilities: Query Builder
- Using Utilities: Data Workshop
 - Loading/Unloading Data
 - Loading Text and Spreadsheet Data
 - Unloading to a Text File
 - Unloading to an XML File
- Using Utilities: Other Options

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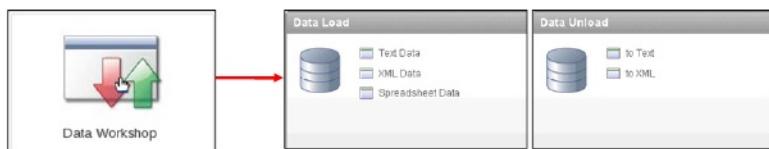


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Loading and Unloading Data

Some points to consider while loading and unloading:

- Tables only
- One at a time
- Own schema
- No filtering
- Data from delimited text files and spreadsheets without complex data types



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Using Data Workshop, you can load data to and unload data from an Oracle database. One of the benefits is its user-friendly graphical interface. However, there are a few limitations to using this tool:

- You can load or unload only tables.
- You can load or unload only one table at a time.
- You can load or unload only tables in your own schema.
- You can load only data that is present in spreadsheets or in tab- or comma-delimited files. The data type should not be complex (for example, objects or multivalue fields).

Apart from the preceding limitations, you are advised to use Data Workshop when you have fewer than 10 tables.

In all other situations, you can load or unload data from an Oracle database by using either SQL*Loader, Export/Import utilities, or Data Pump Export/Import utilities. For more information about these utilities, refer to *Oracle Database Utilities*

(http://download.oracle.com/docs/cd/E11882_01/server.112/e16536/toc.htm).

Loading Text and Spreadsheet Data

To load text data into the Oracle database, perform the following steps:

1. Navigate to the Data Workshop page.
2. Select Text Data/Spreadsheet Data in the Data Load pane.
3. Select the upload type and method.
4. Follow all wizard instructions.



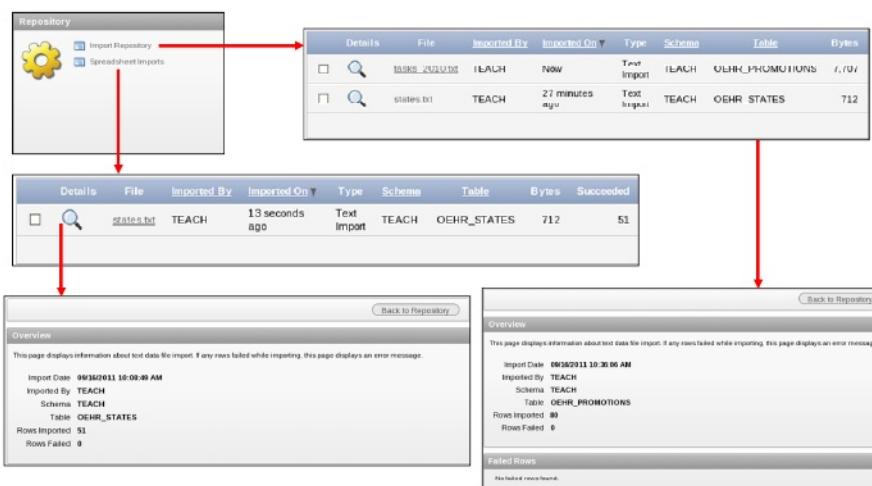
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Using Data Workshop, you can load the data stored in comma-separated or tab-delimited files and spreadsheets into an Oracle database. Access Data Workshop from the SQL Workshop tab menu. Depending on the type of file that you want to load, click Text Data or Spreadsheet Data under Data Load. The Load Data wizard opens. You have the option to load the data into an existing table or a new table. You can upload data from a comma-separated or tab-delimited file, or copy and paste from a spreadsheet.

If you choose to upload to an existing table, the wizard prompts you to select the schema and the table before you specify the data to upload. You then map the new data to the existing data. If you choose to upload to a new table, you must specify the data to upload, name the new table, and specify the primary key to be used. Check the Item Help to learn more about each option.

You can view a demo on these tasks by opening the
`/home/oracle/labs/demos/les02_upl_new.html` and
`/home/oracle/labs/demos/les02_cp_ex.html` files.

Viewing the Loaded Files in the Data Workshop Repository



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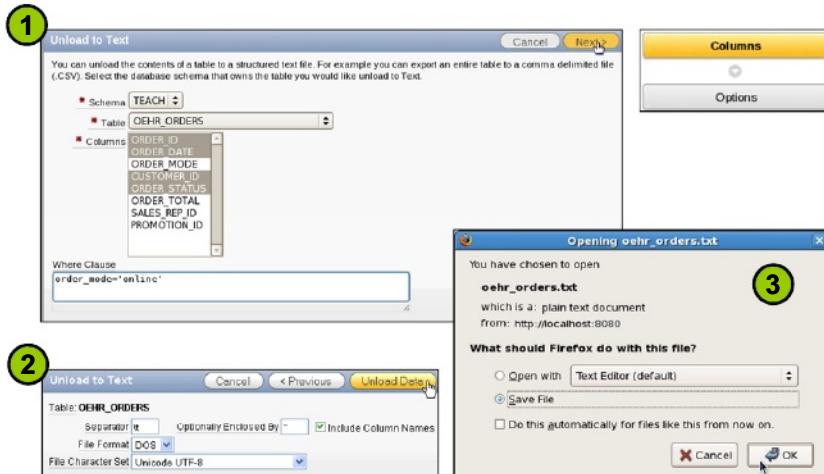
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After you load the data in the database, you can view the details of the uploaded file. Perform the following steps:

1. From the SQL Workshop tab drop-down menu, select Data Workshop.
2. On the Data Workshop page, under Repository, select Import Repository if you uploaded a text file. If you uploaded data from a spreadsheet, click the Spreadsheet Imports link. Information about the import operation (such as schema and table) is displayed.
3. Click the magnifying glass icon for additional details such as error messages for failed operations. In the slide example, data imported into the OEHR_PROMOTIONS and OEHR_STATES tables is shown to be loaded successfully.
4. To remove the imported file, select the check box adjacent to the file and click Delete Checked.

Unloading to a Text File



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Using Data Workshop, you can unload the database table data to a text file. Access Data Workshop from the SQL Workshop tab menu. Click “to Text” under Data Unload. The Unload to Text wizard opens. Perform the following steps:

1. Ensure that the correct Schema is selected and select the Table, which contains the data to export. Select the Columns that you want to export. You can restrict the data to export by specifying a condition in the Where Clause field. Click Next.
2. Specify the separator, format, and so on. See the Item Help for more details. Click Unload Data.
3. Save the file to your local file system.

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Unloading to an XML File



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Using Data Workshop, you can unload the database table data to an XML file. Access Data Workshop from the SQL Workshop tab menu. Click “to XML” under Data Unload. The Unload to XML wizard opens. Perform the following steps:

1. Ensure that the correct Schema is selected and select the Table, which contains the data to export. Select the Columns that you want to export. You can restrict the data to export by specifying a condition in the Where Clause field. Select the Export as File option to save the output directly to a file. Click Unload Data.
2. Save the file to your local file system.

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Lesson Agenda

- Using SQL Workshop
- Using Object Browser
- Using SQL Commands and SQL Scripts
- Using Utilities: Query Builder
- Using Utilities: Data Workshop
- Using Utilities: Other Options
 - Viewing Object Reports
 - Generating DDL Statements
 - Managing User Interface Defaults
 - Restoring Dropped Database Objects
 - Comparing Schemas
 - Monitoring the Database



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Viewing Object Reports

The screenshot displays the Oracle Application Express Object Reports interface. On the left, a sidebar titled 'Object Reports' contains a hand cursor icon pointing at a database icon. A red arrow points from this icon to the 'Table Reports' section in the main content area. The main content area is organized into five sections:

- Table Reports**: Includes options for Table Columns, Table Comments, Table Constraints, Table Statistics, and Table Storage Sizes.
- Exception Reports**: Includes options for Tables without Primary Keys, Tables without Indexes, Unindexed Foreign Keys, and Tables without Triggers.
- Security Reports**: Includes options for Object Grants, Column Privileges, Role Privileges, and System Privileges.
- All Object Reports**: Includes options for All Objects, Invalid Objects, Object Creation Calendar, Object Counts by Type, and Data Dictionary.
- PL/SQL Reports**: Includes options for Program Unit Arguments, Unit Line Counts, and Search PL/SQL Source Code.

At the bottom right of the main content area is the ORACLE logo.

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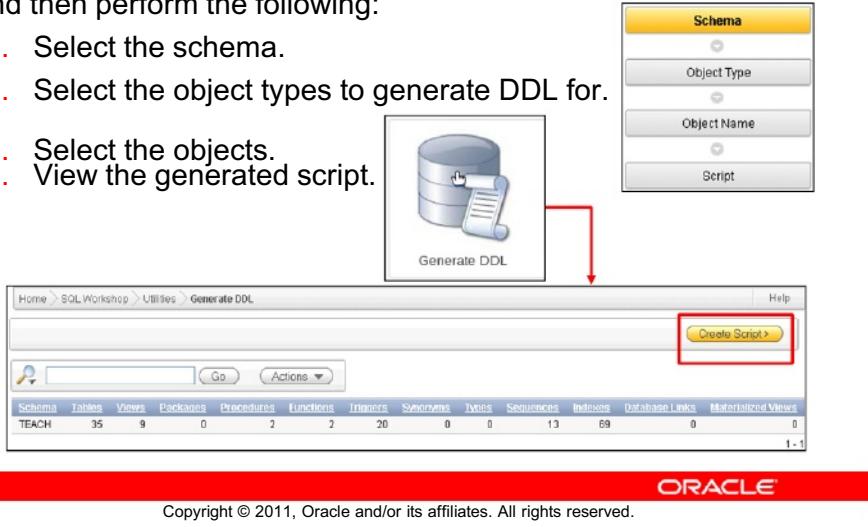
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The Object Reports option helps you manage the objects in your database. The screenshot in the slide shows the various reports that you can view. For example, you can use the Table Reports pane to view details about the tables in your database. To access the data dictionary, click the Data Dictionary link in the All Object Reports pane.

Generating DDL Statements

Click Generate DDL on the Utilities page, click Create Script, and then perform the following:

1. Select the schema.
2. Select the object types to generate DDL for.
3. Select the objects.
4. View the generated script.



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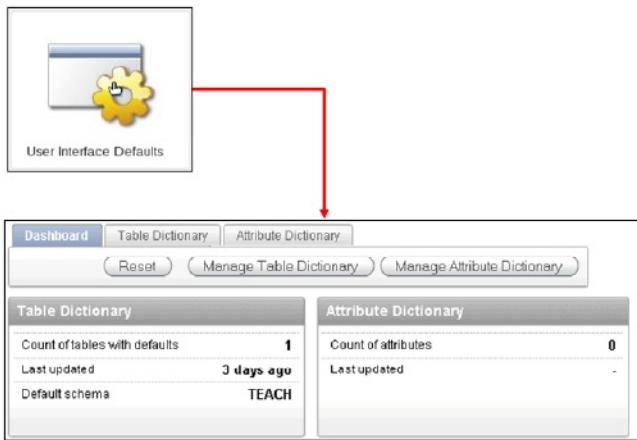
Using the Generate DDL option in Utilities, you can generate data definition language (DDL) statements from the Oracle data dictionary. You can use these scripts to create or re-create database schema objects. The scripts can be generated inline or saved as a script file. You have the option to generate DDL statements for:

- All the objects for a specific schema
- Specific object types
- Specific objects

Access the Generate DDL wizard by navigating to the SQL Workshop Utilities page and selecting Generate DDL. To generate the DDL statements, click Create Script. The Generate DDL wizard opens. The slide provides an overview of the steps to generate DDL.

You can view a demo on this task by opening the /home/oracle/labs/demos/les02_gen_ddl.html file.

Managing User Interface Defaults



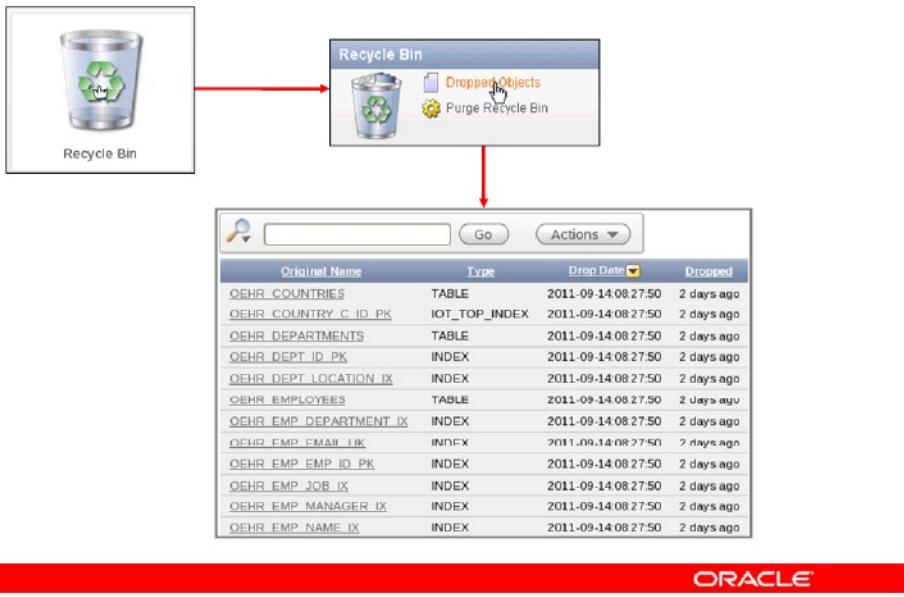
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You use the User Interface Defaults to specify default values for application pages and database tables. You use the Table Dictionary to specify defaults for tables and columns. You use the Attribute Dictionary to specify the defaults that Application Builder should use.

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Restoring Dropped Database Objects

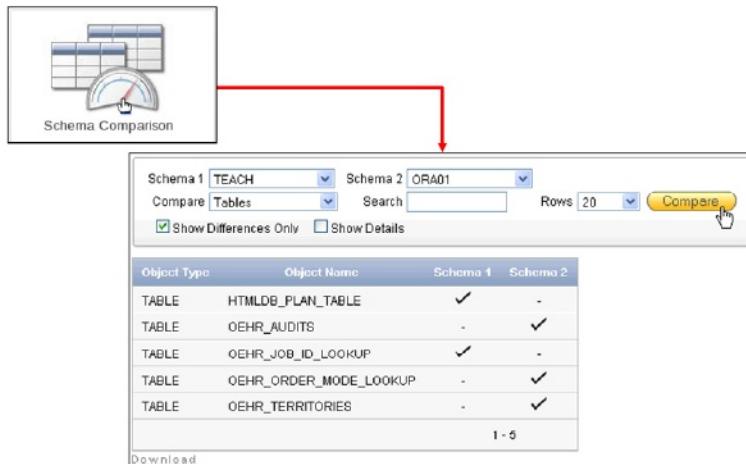


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You can restore previously dropped objects from the recycle bin. The recycle bin can be accessed from the Utilities page. You have an option to view the dropped objects or purge the recycle bin. Clicking the Dropped Objects link displays a list of all dropped objects in the recycle bin. Select an object to either restore or purge it.

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Comparing Schemas



The screenshot shows the Oracle Application Express Schema Comparison interface. At the top, there are dropdown menus for 'Schema 1' (set to 'TEACH') and 'Schema 2' (set to 'ORA01'), a 'Compare' dropdown (set to 'Tables'), a search bar, a 'Rows' dropdown (set to 20), and a large yellow 'Compare' button. Below these are two checkboxes: 'Show Differences Only' (checked) and 'Show Details' (unchecked). The main area displays a table comparing database objects between the two schemas:

Object Type	Object Name	Schema 1	Schema 2
TABLE	HTMLDB_PLAN_TABLE	✓	-
TABLE	OEHR_AUDITS	-	✓
TABLE	OEHR_JOB_ID_LOOKUP	✓	-
TABLE	OEHR_ORDER_MODE_LOOKUP	-	✓
TABLE	OEHR_TERRITORIES	-	✓

At the bottom of the table, it says '1 - 5'. There is also a 'Download' link at the very bottom.

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The Schema Comparison option enables you to run a report that compares database objects in two schemas. You can choose to display the differences between them and show the details of the comparison. You can compare all objects in the schemas or limit your report to specific objects. To compare two schemas, both must be available to your workspace.

Summary

In this lesson, you should have learned how to:

- List the SQL Workshop components
- Browse, create, and modify database objects by using Object Browser
- Execute SQL commands and SQL scripts
- Build SQL queries and import/export data by using Utilities

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In this lesson, you used the SQL Workshop components of Oracle Application Express to create the database objects that are required by your application.

Practice 3: Overview

This practice covers the following topics:

- Using the Object Browser tool
 - Create a table and a lookup table.
 - View the data in the tables and save the data to a spreadsheet.
 - Change the definition of a table.
- Using SQL commands and SQL scripts
 - Enter and run a SQL command.
 - Upload and run a SQL Script.
- Using Utilities
 - Create and save a query.
 - Export data as a text file.
 - Export data as an XML file.
 - Upload data from a file and create a table.
 - Generate DDL statements for a table.



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Building a Database Application

4

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Objectives

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

- Differentiate between a database application and a websheet application
- Identify the components of a database application
 - Create an instant database application
- Create a database application from scratch
- Create a database application from a spreadsheet



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This lesson introduces you to Application Builder. You learn the difference between a database application and a websheet application. In addition, you learn about the different components of a database application and the concepts associated with building a database application from scratch, from a spreadsheet, and instantly.

Lesson Agenda

- Using Application Builder
 - Types of Applications
 - Accessing Application Builder
 - Application Builder Home Page
- Introducing Database Applications
 - Creating a Database Application

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Types of Applications

Websheet application

The screenshot shows a web-based application interface. At the top, there are tabs for 'Home' and 'Reports'. Below the tabs, there are two sections: 'Overview' and 'Tasks'. The 'Overview' section contains a message: 'This page contains some useful reports.' The 'Tasks' section has a search bar and a table with columns: PROJECT, TASK_NAME, START_DATE, END_DATE, STATUS, ASSIGNED_TO, COST, and BUDGET. The table lists several tasks related to maintenance support systems.

PROJECT	TASK_NAME	START_DATE	END_DATE	STATUS	ASSIGNED_TO	COST	BUDGET
Maintain Support Systems	HR software upgrades						
Maintain Support Systems	Apply Billing System updates						
Maintain Support Systems	Investigate new Virus Protection software						
Maintain Support Systems	Arrange for Holiday coverage						
Email Integration	Complete plan						
Email Integration	Check software licenses						
Email Integration	Get RFPs for new server						
Email Integration	Purchase backup server						

The screenshot shows a web-based application interface for a database application. At the top, there are tabs for 'Home', 'Customers', 'Products', 'Orders', 'Charts', and 'Admin'. The main content area displays a table titled 'Sample Application' with columns: Order_ID, Customer_Name, Order_Months, Order_Status, and Sales_Rep. The table lists 19 rows of order data. On the right side, there is a sidebar with sections for 'Sample Application' (welcome message), 'Tasks' (list of tasks: Add a New Order, Enter a New Order, Add a New Customer, Add a New Product), and a footer with the Oracle logo.

Order_ID	Customer_Name	Order_Months	Order_Status	Sales_Rep
12	Dunkin, John	March 2010	\$2,300.00	DEMO
11	Bristley, Esperie	March 2010	\$1,050.00	DEMO
13	Hatsfield, William	March 2010	\$1,540.00	DEMO
14	Loyan, Edward	April 2010	\$1,515.00	DEMO
15	LaVardis, Ferndle	April 2010	\$1,000.00	DEMO
16	Lavardis, Albert	April 2010	\$950.00	DEMO
18	Lagan, Edward	May 2010	\$920.00	DEMO
17	O'Hare, Edward "Bulldy"	April 2010	\$905.00	DEMO
20	Bristley, Esperie	May 2010	\$670.00	DEMO
19	Hatsfield, William	May 2010	\$730.00	DEMO

Database

application

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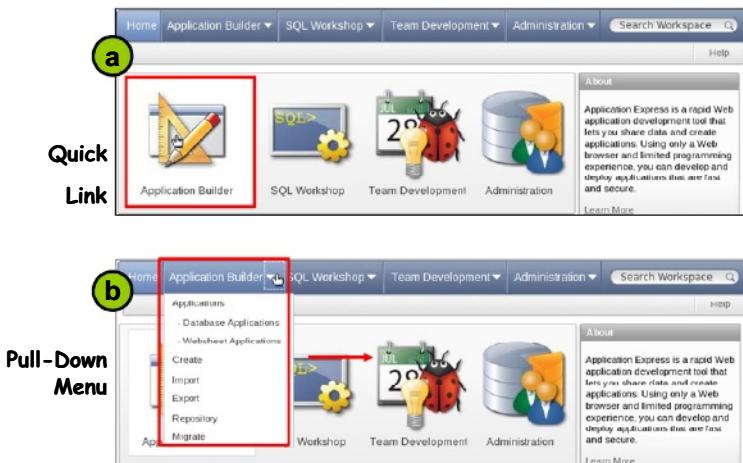
An application is an HTML interface that exists on top of database objects such as tables and procedures. Each application is a collection of pages linked together by using tabs, buttons, or hypertext links. Application Builder enables you to build two different types of applications: a websheet application and a database application.

A websheet application is geared toward the business user and requires no prior development experience. Each websheet application is a collection of pages designed for web-based data entry and reporting. When you create a websheet application, Application Builder automatically handles the creation of tables, triggers, and sequences. Websheets offer an easy, declarative approach to report and form layout, as well as to the creation of lists of values and validations. You examine how to create a websheet application in the lesson titled “Creating a Websheet Application.”

A database application is a collection of pages that share a common session state and authentication. Developers use SQL Workshop to create database objects, and then use a wizard to create an application. Database applications enable developers to manually control all aspects of the development process. You can manually add and customize components (reports, charts, or forms), page controls (buttons, items, or lists of values), and shared components (breadcrumbs, lists, or tabs). The rest of this lesson focuses on how to create a database application. In the following lessons, you learn to build on a database application.

Oracle Application Express: Developing Web Applications 4 - 4

Accessing Application Builder



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When you log in to Oracle Application Express, the Workspace home page appears.

To view the Application Builder home page, you can choose one of the following options:

- a. Click the Application Builder icon to drill down to the Application Builder home page.
- b. Click the down arrow next to Application Builder to view the pull-down menu. You can then select the appropriate menu option.

Application Builder Home Page

From the Application Builder home page, you can:

- Click an application tab
- Search for an application
- Change the page view
- Use the Actions menu
- Reset the application report
- Import or export an application
- Create an application
- View an application

Application Tabs



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The Application Builder home page displays the currently installed applications. From the Application Builder home page, you can:

- **Click an application tab:** To narrow the list of applications displayed, click the applications tab.
- **Search for an application:** To search for a particular application, enter the name of the application in the Search area and click Go. You can also search a particular column by clicking the flashlight icon and selecting a column to search on. If no column is selected, all columns are searched.
- **Change the page view:** You can change the appearance of a page by making a selection from the three View icons next to the Go button. These icons consist of:
 - **View Icons (the default):** Displays each application as an icon and identifies it by the application name
 - **View Report:** Displays a list of the applications in a report
 - **View Details:** Displays each application as a line in a report

- **Use the Actions menu:** The Actions menu enables you to perform different tasks for the data that is displayed. The Actions menu is discussed in more detail in the lesson titled “Creating Reports.”
- **Reset the application report:** This returns to the default display.
- **Import or export an application:** Click Export to export an application file and click Import to import an exported application file.
- **Create an application:** Click Create to create a new application or to install a sample application.
- **View an application:** Click the application icon or application name to view a specific application. This opens the home page of that application.

Lesson Agenda

- Using Application Builder
- Introducing Database Applications
 - Database Application Home Page
 - Components of a Database Application
 - What Is a Page?
 - Different Views of a Page
 - Switching Between Pages and View Types
- Creating a Database Application

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Database Application Home Page

From an application home page, you can:

- Run the application
- Use the Supporting Objects utility
- Create shared components
- Examine application utilities
- Export and import applications
- Edit application properties
- Create a page



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When you click the application icon or application name, the application home page appears. You can see the application ID and the name of the application at the top of the page.

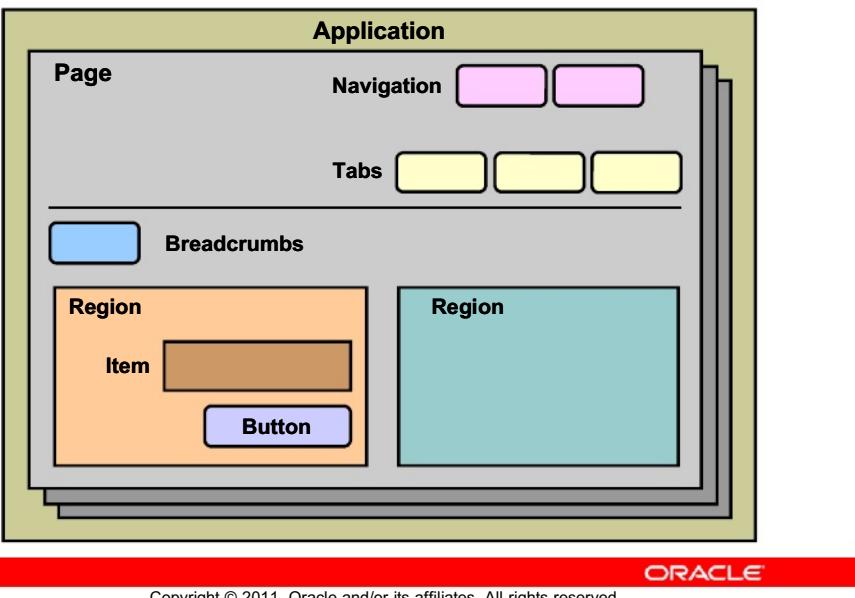
From the application home page, you can:

- **Run the application:** Click the Run Application icon to submit the pages to the Oracle Application Express engine to render a viewable HTML page.
- **Use the Supporting Objects utility:** Click Supporting Objects to access the utility to define the database object definitions, images, and seed data to be included in your application export for your packaged application.
- **Create Shared Components:** Click Shared Components to build shared application components and user interface controls.
- **Examine application utilities:** Click Utilities to monitor developer activity, view dashboards, run the Advisor, and view numerous other reports. This topic is discussed the lesson titled "Using Application and Page Utilities."
- **Export and import application:** Click the Export/Import icon to export or import an entire application or its components, such as cascading style sheets, images, static files, themes, and user interface defaults.

- **Edit application properties:** Click Edit Application Properties to edit the application name and availability, and to define static substitution strings. Additionally, the Edit Application page displays defined build options, the associated theme, template defaults, and component defaults.
- **Create a page:** Click Create Page to add a page to your application.

On the application home page, you also see a list of icons for each page. To open a page, click one of the page icons.

Components of a Database Application



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A database application is a collection of database-driven web pages that are linked by navigational controls such as tabs, buttons, and hypertext links.

A page is the basic element of an application. A page is divided into regions; a region is a section of a page that contains content. The content of the region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static HTML.

A region can also contain the following:

- Items such as a text field, text area, select list, and check box
- Buttons to direct users to a specific page or URL, and also to post and process information
- Breadcrumbs (locator links) to provide hierarchical navigation

Navigation entries are placed outside regions to enable users to navigate between the pages of an application.

What Is a Page?

- A page is the basic building block of an application.
- The Page Definition page is divided into three sections:
 - Page Rendering
 - Page Processing
 - Shared Components

The screenshot shows the Oracle Application Express interface for defining a page. At the top, there's a toolbar with buttons for Page, Go, Run, Utilities, Create, and status indicators (Updated: TEACH 45 hours ago, To do: 0, Feedback: 0, Bugs: 0, Comments: 0). Below the toolbar are three main sections:

- Page Rendering:** Contains sections for Customers, Before Header, After Header, Before Regions, Regions (Body, Alter Regions, Refresh Footer, Alter Footer, Dynamic Actions), and After Regions.
- Page Processing:** Contains sections for Alter Submit, Validating, Processing, and Alter Processing (including UPLOAD DATA and NEW).
- Shared Components:** Contains sections for Parent Tabs, List of Values, Breadcrumbs, Lists, Templates, and Security.

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You build an application by using pages. The Page Definition page is divided into:

- **Page Rendering:** The process of generating a page from the database. You can use the Page Rendering section to modify the controls that impact the rendering of a page, including the page definition, regions, buttons, items, page-rendering computations, and page processes.
- **Page Processing:** The process of submitting a page. A page is typically submitted when a user clicks a button. You can use the Page Processing section of the Page Definition page to specify application logic such as computations, validations, processes, and branches. In general, the Application Express engine runs the logic of specific applications in the order in which they appear on the Page Definition page.
- **Shared Components:** List of the common components that can be displayed or applied on every page within an application. Some of the shared components include tabs, lists of values, breadcrumbs, lists, and navigation bars.

Different Views of a Page

The screenshot displays two views of a page in Oracle Application Express:

- Tree View:** Shows a hierarchical tree structure of components. Nodes include Page Rendering (Customers, Before Header, After Header, Before Regions, Regions, After Regions, Alter Regions, Before Footer, After Footer, Dynamic Actions), Page Processing (After Submit, Validating, Processing, After Processing, AJAX Callbacks), and Shared Components (Presentation Tabs, List of Values, Item Substitutes, Lines, Templates, Security).
- Component View:** Shows a grid-based view of components. It includes sections for Page (Page Name, Title, Template, Header Text, Footer Text, HTML Header, HTML Body, Help Text, Page Group), Computations, Tabs (Tab Set F51), and Validations.

Both views have a top navigation bar with buttons for Page, Go, Run, Utilities, Create, and tabs for Page, Page Processing, and Shared Components. A status bar at the bottom indicates "Updated TEACH 45 hours ago".

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There are two ways to view a page: Tree view and Component view.

The Tree view displays regions, page items, and application logic as nodes in a tree. The tree groups components based on an event sequence or on the way that Oracle Application Express processes them when rendering a page. This organization enables you to better understand when a component is processed. The key features of this view include:

- **Context menus:** Each tree node features a custom context menu. To access a context menu, right-click.
- **Quick access to attributes pages:** To edit attributes, double-click or press Enter. If available, an attribute page appears.
- **Easy reorder of components:** Reorder page items, report columns, processes, validations, branches, or computations by dragging and dropping them to another display, processing point, or region.
- **Tool tips:** Each tree node features a tool tip, which displays basic information about the component, such as item type, condition, and authorization.
- **Identification of conditions, authorizations, and build options:** If a component has a condition, authorization, or build option, the tree node label is displayed in italic.

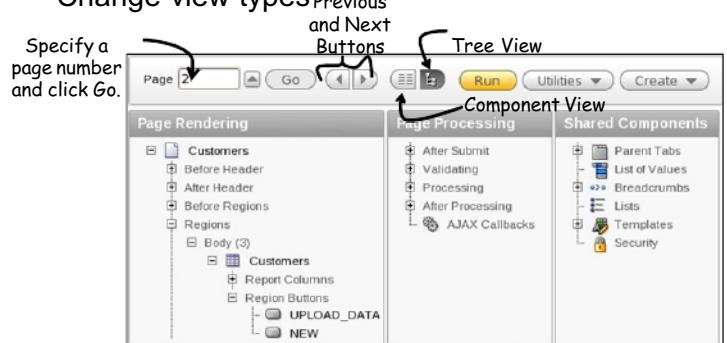
- **Inline Edit:** Tree nodes that have Rename in the context menu can be directly modified within the tree without having to go to the edit page. Pressing F2 enables inline edit. Use Show Names and Show Labels from the Utilities/Switch To menu to show component names or labels.
- **Direct access to default wizards:** Each context menu includes actions that link to default wizards. For example, selecting Create Validation for an item displays the Create Validation wizard.

The Component view groups user interface elements and application logic by component type.

Switching Between Pages and View Types

The navigation bar enables you to:

- Specify a specific page
- Select the previous or next page
- Change view types



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The three ways to switch from one page to another are:

- Enter a page number in the Page field, and then click Go
- Click the up arrow next to the Page field, and then select a page from the list.
- Click the Previous and Next buttons to the right of the Go button

To switch from the Tree view (which is the default) to the Component view, click the Component View icon on the navigation bar. To switch to the Tree view, click the Tree View icon on the navigation bar.

Quiz

Application Builder enables you to create both database and websheet applications.

- a. True
- b. False



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Answer: a

Quiz

Which of the following steps would you perform to navigate from one page to another? (Choose all that apply.)

- a. Click the Component View icon.
- b. Enter a page number in the Page field and click Go.
- c. Use the Previous and Next buttons.
- d. Select the Detail View icon on the application home page.



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Answer: b, c

Lesson Agenda

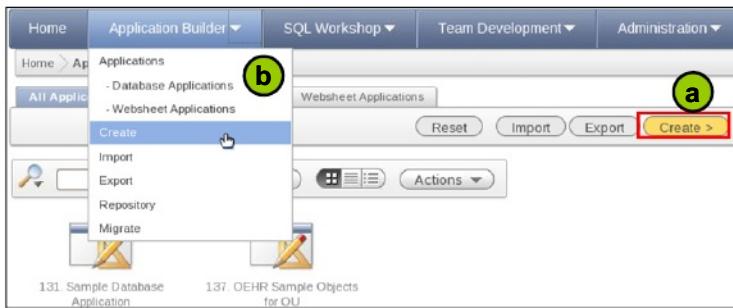
- Using Application Builder
- Introducing Database Applications
- Creating a Database Application
 - Accessing the Create Application Wizard
 - Different ways of Creating an Application
 - Creating an Instant Database Application
 - Creating a Database Application from Scratch
 - Creating a Database Application from a Spreadsheet
 - Running an Application
 - Using the Developer Toolbar

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Accessing the Create Application Wizard



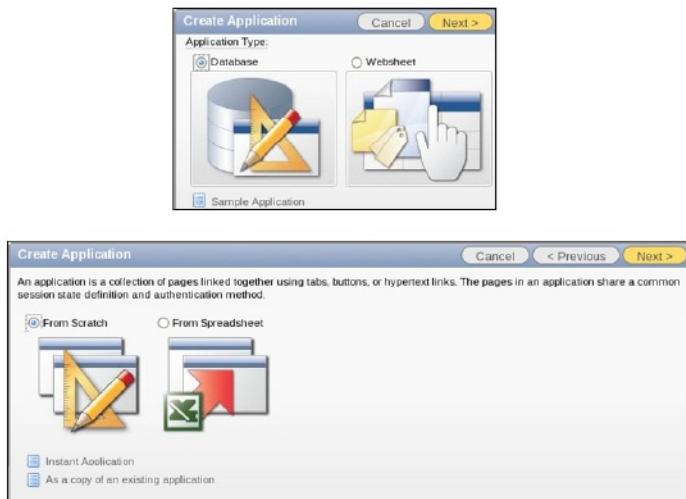
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To access the Create Application wizard, perform either of the following steps:

- a. Navigate to the Application Builder home page and click the Create button.
- b. Select Create from the Application Builder menu.

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Different Ways of Creating a Database Application



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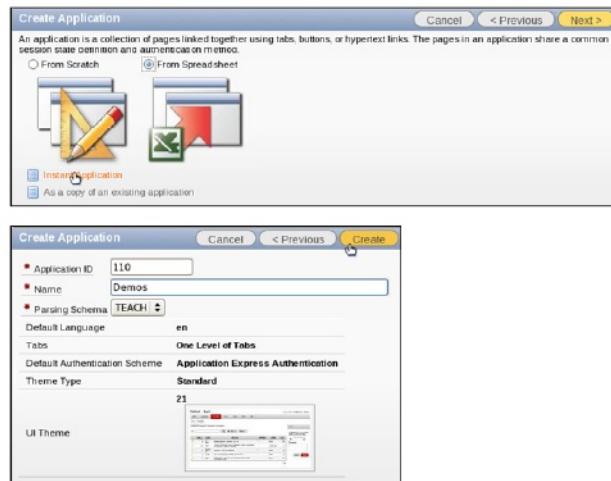
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To create a database application, select Database for the application type, and then click Next. You have three options to create a database application:

- **From Scratch:** You can use the Create Application wizard to assemble an initial set of application pages and (optionally) modify them later. You can create the application by defining:
 - Blank pages
 - Pages that contain reports, forms, tabular forms
 - A report with a linked form, by selecting an authentication scheme and by specifying a visual theme
- **From Spreadsheet:** You can create an application based on spreadsheet data. You first upload or paste the spreadsheet data to create a table. Then you select a default appearance. The resulting application enables end users to query, insert, or update records, or analyze the data.
- **Instant Application:** This link is displayed below the other options. When you use this option, you accept all the defaults for an application. In just one step, you create an instant application that consists of a blank page and a login page.

Creating an Instant Database Application



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You can create an instant application by clicking Instant Application in the Create Application wizard.

An instant application consists of a login page and a blank page. Later, you can manually add pages to the application.

Creating a Database Application from Scratch

In the Create Application wizard, after clicking From Scratch, perform the following steps:

1. Specify an application name.
2. Add your pages.
3. Specify the level tabs that you want.
4. Specify whether you want to copy shared components from another application.
5. Specify the authentication scheme and date format.
6. Select a theme.
7. Confirm that you want to create the application.



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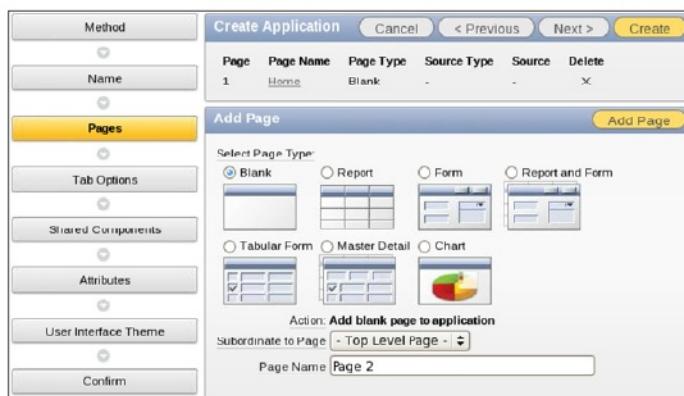
You can create an application from scratch by clicking From Scratch in the Create Application wizard.

The slide provides an overview of the steps to create a database application from scratch.

You can view a demonstration of this task by opening the /home/oracle/labs/demos/les04_scratch.html file.

Creating a Database Application from Scratch: Pages Wizard

Select the type of page that you want to create, specify its name, and click Add Page.



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You can add multiple pages to the application. Select the type of page that you want to create, enter a page name, click the Add Page button, and follow the on-screen instructions:

- Blank:** Creates a page with no built-in functionality. You can select this option to create a page, and later add a form or report to it manually.
- Report:** Creates a page that contains the formatted result of a SQL query. You can choose to build a report based on a selected table, or based on a custom SQL SELECT statement, or based on a PL/SQL function that returns a SQLSELECT statement that you provide.
- Form:** Creates a form to update, insert, and delete a single row in a table
- Report and Form:** Builds a two-page report and form combination. On the first page, users select a row to update. On the second page, users can update the selected table or view.
- Tabular Form:** Creates a form to perform update, insert, and delete operations on multiple rows in a database table

- **Master Detail:** Creates a form that displays a master row and multiple detail rows within a single HTML form. With this form, you can query, insert, update, and delete values from two tables or views.
- **Chart:** Creates a page with a Flash chart to represent the result of a SQL query

Note: When you create new pages, you can now organize them sequentially and hierarchically by using the “Subordinate to Page” drop-down list. This option is available on the second page that you create in your application.

You must have at least one page in your application. After a page is added, you can click Create to use the application defaults and bypass the rest of the Create Application wizard.

Creating a Database Application from a Spreadsheet

In the Create Application wizard, after clicking From Spreadsheet, perform the following steps:

1. Specify how the data will be loaded.
2. Select a file, or copy and paste the data.
3. Specify the table name and column specifications.
4. Specify user interface defaults.
5. Enter the application name.
6. Select a theme.
7. Specify whether you want the data to be summarized, as well as which columns to use.



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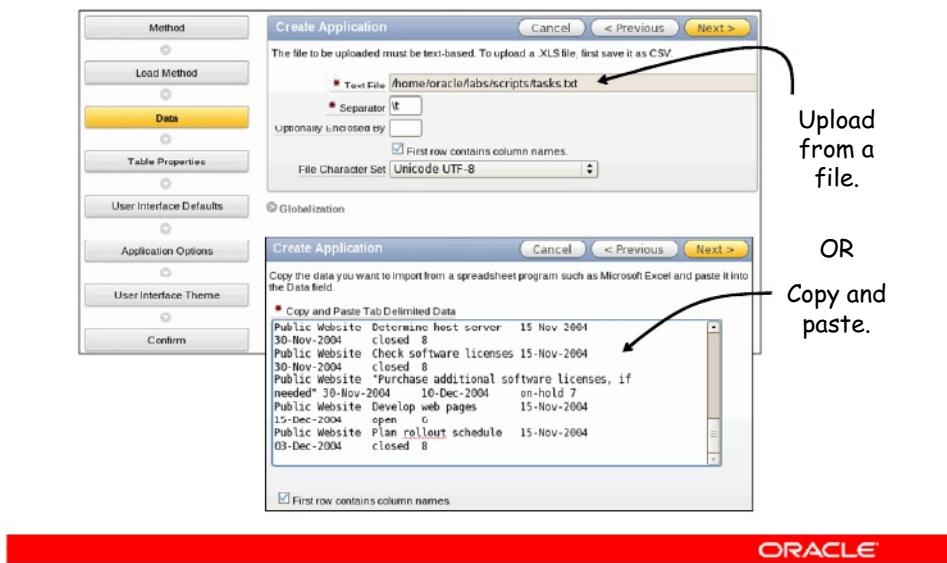
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You can create an application based on a spreadsheet by clicking From Spreadsheet in the Create Application wizard. The slide provides an overview of the steps that are necessary to create a database application from a spreadsheet.

You can view a demonstration of this task by opening the /home/oracle/labs/demos/les04_spreadsheet.html file.

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Creating a Database Application from a Spreadsheet: Data Wizard



Upload
from a
file.

OR
Copy and
paste.

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Depending on the option you choose on the previous wizard page (upload a file, or copy and paste data), you perform the following:

- Upload file, comma-separated (*.csv) or tab-delimited:** If you select the upload file option, specify the name of the file to upload, identify a column-separator character (use \t for tab separators), and enter a delimiter character to delineate the starting and ending boundary of a data value and the character set in which the text file is encoded.
- Copy and paste:** Use this option to copy the data that you want to import and paste it into the data field.

Note: The file to be uploaded must be text-based. To upload an .xls file, first save it as .CSV.

Running an Application



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Regardless of the application that you create, you can run the application by clicking the Run Application icon.

Note: If you have chosen the Application Express authentication scheme, the Login page appears. Enter your workspace username and password, and click Login to log in to your application.

Using the Developer Toolbar

The screenshot shows the home page of the Sample Database Application. It features several report cards: "Sales Quota for this Month" (with a gauge showing 3,118), "Top Customers" (listing Bradley Eugene, Logan L. Lampard, Dulles John, etc.), "Top Products" (listing Jacket, Bag, Trousers, Ladies Shoes, Business Shirt, Skin, Mens Shoes), and "Top Orders by Date" (listing orders from 7/23/2011 to 9/2/2011). On the right, there's a sidebar with a welcome message and a "Tasks" section. At the bottom, a red box highlights the "Developer Toolbar" which includes links for Home, Application <n>, Edit Page <n>, Create, Session, Caching, View Debug, Debug, and Show Edit Links.

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Users who log in to Oracle Application Express with developer privileges have access to the Developer toolbar. The Developer toolbar offers a quick way to accomplish the following:

- Edit the currently running page
- Create a new page, control, or component
- View session state
- Toggle the edit links on and off

The page displayed in this slide is the home page of the Sample Application in Oracle Application Express. The Developer toolbar is displayed at the bottom of every page in a running application, and has the following options:

- **Home:** Opens the Workspace home page
- **Application <n>:** Opens the application home page
- **Edit Page <n>:** Accesses the Page Definition page for the current page
- **Create:** Opens a wizard for creating a new blank page, region, page, control (branch, process, button, or item), or shared component (breadcrumb, list, or tab)
- **Session:** Displays a new window that contains session state information for the current page. You learn more about sessions in the lesson titled “Understanding Session State and Debugging.”

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- **Caching:** Displays reports that offer details about the pages that are cached in the application
- **View Debug:** Displays another window with debug information by session
- **Debug:** Toggles the page between Debug and No Debug mode. To view the debug information after Debug is selected, click View Debug.
- **Show Edit Links:** Toggles between Show Edit Links and Hide Edit Links. Clicking Show Edit Links displays a small orange icon next to each editable object on the page. Each icon is orange and contains a triangle with two rules beneath it. Clicking the link displays another window in which to edit the object.

Summary

In this lesson, you should have learned how to:

- Differentiate between a database application and a websheet application
- Identify the components of a database application
- Create an instant database application
- Create a database application from scratch
- Create a database application from a spreadsheet



This lesson introduced you to Application Builder. You learned about the different types of applications that you can build and the various components of an application. You also learned how to create different types of database applications.

Practice 4: Overview

This practice covers creating the following:

- An instant database application
- A database application from scratch
- A database application by using a spreadsheet

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Creating Reports



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Objectives

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

- Identify the types of reports that you can create in Oracle Application Express
- Manipulate interactive reports.
 - Create and customize interactive reports
- Create classic and wizard reports
- Print reports



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This lesson introduces you to reports in Oracle Application Express. You are introduced to the various built-in wizards that help you create reports. This lesson focuses on interactive reports. You learn how to create and manipulate interactive reports. You also learn how to change the way an interactive report is rendered to users.

Lesson Agenda

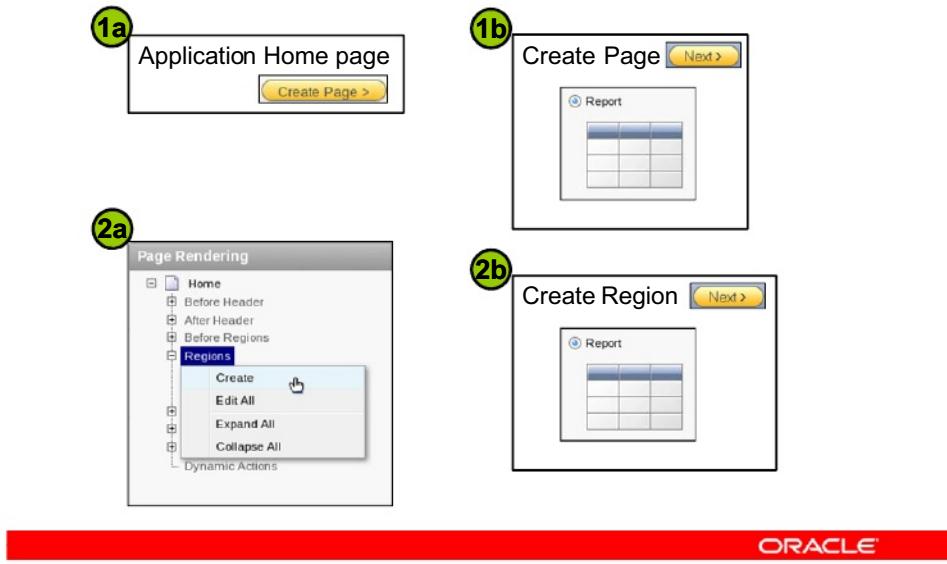
- Overview
 - Accessing the Create Report Wizard
 - Types of Reports
 - Selecting the Appropriate Report Type
- Using Interactive Reports
 - Creating and Customizing an Interactive Report
- Creating Classic Reports
- Printing Reports

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Accessing the Create Report Wizard



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You can access the Create Report wizard in two ways: (1) by creating a new page in the application or (2) by creating a new region on an existing page.

To access the Create Report wizard by creating a new page, perform the following steps:

- 1a. Navigate to the Application home page and click **Create Page**.
- 1b. From the “Select a page type” options provided, select the **Report** option.

To access the Create Report wizard by creating a new region on an existing page, perform the following steps:

- 2a. From the page definition, right-click the **Regions** node and select **Create**. Alternatively, click the **Create** button and select **Region on this page**
- 2b. From the “Select a page type” options provided, select the **Report** option.

Types of Reports



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There are two basic types of reports: an interactive report and a classic (SQL or wizard) report. The interactive report is the default type when you create an application, convert forms, create regions, and create pages.

When you create a report by using the Create Page wizard, you can select different report types:

- **Interactive Report:** Creates an interactive report based on a custom SQL SELECT statement that you provide. End users can customize the layout of their data by selecting the options from the Actions menu.
- **Classic (or SQL) Report:** Creates a report based on a custom SQL SELECT statement or a PL/SQL function that returns a SQL SELECT statement
- **Report on Web Service Result:** Creates a report based on a web service result
- **Wizard Report:** Creates a report without requiring any manual SQL coding. The report is created based on your specifications of the schema owner, table, columns in the table, and the result set display.

Selecting the Appropriate Report Type

Interactive report

The screenshot shows an Oracle Application Express interface. On the left is an interactive report showing employee data with columns: Employee_ID, First_Name, Last_Name, Email, Phone_Number, and Hire_Date. The hire date column is currently sorted in descending order. A context menu is open over the 10th row (Steven King), listing options like 'Select Columns', 'Filter', 'Rows per Page', 'Format', 'Flashback', 'Save Report', 'Reset', and 'Help'. To the right is a classic report showing the same data in a standard tabular format.

Classic report

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The slide examples show the classic and interactive reports. Both these reports are created by the Create Page wizard. The classic report queries the same columns in the OEHR_EMPLOYEES table as the interactive report.

Interactive report: Notice the automatically built-in search bar, column heading menu links, and icons in the first column of each row. These options allow you to drill down to view row details. With interactive reports, you can provide end-user customizations such as searching, filtering, and sorting.

Classic report: The SQL and Wizard report types are considered as classic reports. Notice that there is no search bar, no column heading links, and no drill-down capability. A classic report does not, by default, include any of the interactive report features.

An interactive report has many options available to the user for report customization. Therefore, if you want built-in customization capability, select interactive reports. If your report needs no such controls, a classic report is a better option. You can create only one interactive report on a page. Therefore, if you want multiple reports on a single page, you must create some classic reports.

Quiz

Which of the following report types would be appropriate if you want to include end-user customization?

- a. Report based on a SQL query
- b. Interactive report
- c. Wizard report
- d. End-user report

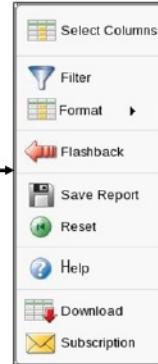


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Answer: b

Lesson Agenda

- Overview
- Using Interactive Reports
 - Interactive Report Interface
 - Searching for Information
 - Using the Actions Menu
 - Manipulating the Report by Using Column Headers
 - Different Views of the Interactive Report
- Creating and Customizing an Interactive Report
- Creating Classic Reports
- Printing Reports



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Interactive Report Components

The screenshot shows an Oracle Application Express interface for managing orders. At the top, there's a navigation bar with links for Home, Customers, Products, Orders (which is highlighted in red), Reports, and a dropdown for Saved Reports. Below the navigation is a search bar with a 'Go' button and a dropdown for selecting a report view ('Primary Report'). To the right of the search bar is an 'Actions' button with a dropdown menu. The main content area displays a table of order data with columns for Order #, Order Date, Customer Name, Sales Rep, and Order Items. The 'Customer Name' column has a small yellow pencil icon next to it, indicating it's a link column. A callout box points to the 'Format' option in the Actions menu's submenu, which includes options like Sort, Control Break, Highlight, Compute, Aggregate, Chart, and Group By.

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In an interactive report, you can customize the layout of the data by selecting the columns that you are interested in, applying filters, highlighting, and sorting. You can also define control breaks, aggregations, and computed columns, and include a chart of the query results. You can create multiple variations of the report and save them as named reports, output to comma-delimited files, and print as PDF documents.

The following components are, by default, included on an interactive report page:

1. **Search bar:** The search bar is at the top of an interactive report and provides features such as the Select Columns icon, Text Area, Go button, and Actions menu button.
2. **Column heading menu:** Click any column heading to see a column heading menu. This menu allows you to change the sort order, hide columns, create break groups on a column, view help text about the column, and create a filter.
3. **Saved Reports:** You can create and save alternative views of a report.
4. **Actions menu:** This menu is used to customize the display of your interactive report.
5. **Link to custom target:** You can link to another page in your application.

In the next few slides, you learn in detail about each of these components.

Searching for Information

Scenario 1

Search Criteria: ed

Filter Applied: Row text contains 'ed'

Order #	Order Date	Customer Name	Sales Rep	Order Items	Order Total
8	9/2/2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00
7	9/2/2011	Logan, Edward	DEMO	7	\$906.00
6	8/20/2011	Logan, Edward	DEMO	4	\$1,515.00

Scenario 2

Filter Applied: Order Items contains 4

Order #	Order Date	Customer Name	Sales Rep	Order Items	Order Total
8	9/2/2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00
6	8/20/2011	Logan, Edward	DEMO	4	\$1,515.00

Remove and enable or disable filter options.

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You can perform a non-case-sensitive search on the entire report or on a specific column.

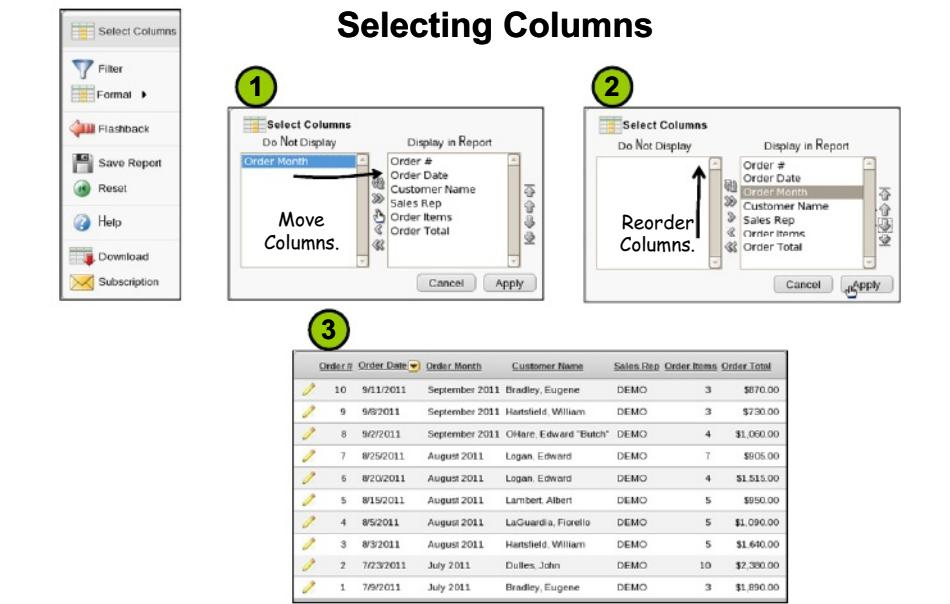
To search in the entire report, enter the search criteria in the text area and click the Go button. A filter is applied on the report and all the rows that contain the search criteria are displayed. (Scenario 1).

To search within a specific column, perform the following steps: (Scenario 2)

1. Click the icon before the text area and select the column to search on.
2. Enter the search criteria and click the Go button.
3. The search is applied and the results are displayed.

You can create multiple filters on a report. For the row to be displayed, the row must satisfy all the filters (an AND condition is implied).

You can remove a filter by clicking the Remove Filter icon (it looks like a filter with a red X over it) next to the filter that you want to remove. Alternatively, you can enable or disable the filter by using the Enable/Disable check box.



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The Actions menu contains many tasks that are useful for manipulating an interactive report. Using the Select Columns option, you can specify which columns to display and in what order. To specify the columns to be displayed in a report, click the Actions menu button and select **Select Columns**. Then, perform the following steps:

1. To show a column in the report display, select a column and click the right arrow (>) to move the column to the Display in Report area. In the slide example, select **Order Month** from the Do Not Display region and click the right arrow (>) to move the column to the Display in Report region.
2. To reorder the columns, select the column and click the up or down arrow. In the slide example, select Order Month and click the up arrow until the column is directly above Customer Name. Click Apply.
3. The report is displayed, showing the changes made.

Adding a Column Filter

Only rows that meet the filter criteria are displayed.

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total
10	9/11/2011	September 2011	Bradley, Eugene	DEMO	3	\$870.00
9	9/8/2011	September 2011	Hartsfield, William	DEMO	3	\$730.00
8	9/2/2011	September 2011	OHare, Edward "Butch"	DEMO	4	\$1,060.00

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As you previously saw, you can create a filter by using the search bar. You can also use the Filter option from the Actions menu to add or modify a filter. There are two types of filters: column or row. A column filter shows the rows that match the criteria from all the filters (an AND condition is implied) applied together. A row filter contains an expression as shown in the next slide. Note that a filter adjusts the WHERE clause on the query. To add a column filter by using the Actions menu, perform the following steps:

1. Click the Actions menu button and select Filter.
2. Select a column (which does not have to be the one that is displayed).
3. Select from a list of standard Oracle operators (=, !=, not in, between).
4. Enter an expression to compare against. The expression is case-sensitive and you can use % as a wildcard (for example, STATE_NAME like A%).
5. Click Apply.

You can have multiple filters for a report. If you decide that you want to disable a particular filter, select the Remove Filter check box.

The example in the slide shows a filter created on the ORDER_DATE column.

Adding a Row Filter

A row filter allows for more than one search criterion, without an implied AND condition.

Filter

Filter Type: Column Row
Name: Orders
Filter Expression: K > '8/30/2011' OR I >= 7

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total
10	9/1/2011	September 2011	Bradley, Eugene	DEMO	3	\$730.00
9	9/9/2011	September 2011	Hartsfield, William	DEMO	3	\$730.00
8	9/2/2011	September 2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00
7	8/25/2011	August 2011	Logan, Edward	DEMO	7	\$905.00
2	7/23/2011	July 2011	Dulles, John	DEMO	10	\$2,380.00

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A row filter allows you to specify multiple column filters, by using an expression. In the example in the slide, the filter selects rows where order date is after August OR where the number of items is greater than or equal to 4. If two column filters were created rather than one row filter, the rows satisfying both the conditions will be displayed. To add a row filter by using the Actions menu, perform the following steps:

1. Click the Actions menu button and select Filter.
2. Select the Row Filter type.
3. Specify the expression by using the Columns and Functions/Operators values, or simply type in the Filter Expression field.
4. Click Apply.

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Sorting Columns

Column 1 shows the sort icon in the report.

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total
10	9/11/2011	September 2011	Bradley, Eugene	DEMO	3	\$870.00
9	9/8/2011	September 2011	Hansfield, William	DEMO	3	\$730.00
1	7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00
8	9/2/2011	September 2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00
6	8/20/2011	August 2011	Logan, Edward	DEMO	4	\$1,515.00
5	8/15/2011	August 2011	Lambert, Albert	DEMO	5	\$950.00
4	8/5/2011	August 2011	LaGuardia, Fiorella	DEMO	5	\$1,090.00
3	8/3/2011	August 2011	Hansfield, William	DEMO	5	\$1,640.00
7	8/23/2011	August 2011	Lugan, EdwarU	DEMO	7	\$925.00
2	7/23/2011	July 2011	Dulles, John	DEMO	10	\$2,380.00

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The sort action is used to specify which columns to sort on and whether to sort in ascending or descending order. You can also specify how to handle nulls (use the default setting, display them first, or display them last). The sort icon is displayed to the right of the column heading in the report for the column specified in the 1 slot. In the example in the slide, Order Items is sorted first, so it has the sort icon.

To sort columns, perform the following steps:

1. Click the Actions menu button and select Format > Sort.
2. Select a column from the Column drop-down list. In the slide example, Order Items is selected.
3. Specify whether to sort the report in Ascending or Descending order.
4. Specify how null values should be displayed in the sort column. If this is set to Default, nulls will default to the value set in the Direction field for this sort entry.
5. Click Apply.

Another way to sort is by using the column header, which is discussed later in this lesson.

Creating Control Breaks

The screenshot shows the Oracle Application Express interface. On the left, a toolbar includes options like 'Select Columns', 'Filter', 'Format' (with 'Control Break' highlighted), 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. The main area displays a report grid with three distinct sections based on 'Order Month': July 2011, August 2011, and September 2011. Each section contains a table with columns: Order #, Order Date, Customer Name, Sales Rep, Order Items, and Order Total. To the right of the report is a 'Control Break' configuration dialog box. It lists six items, each defining a break group with a specific column and an enabled status.

Column	Status
1 Order Month	Enabled
2 - Select Column -	Enabled
3 - Select Column -	Enabled
4 - Select Column -	Enabled
5 - Select Column -	Enabled
6 - Select Column -	Enabled

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You can use the Control Break option to create a break group on one or several columns. This pulls the columns out of the interactive report and displays them as a master record.

To create a break group, perform the following steps:

1. Click the Actions menu button and select Format > Control Break.
2. Select a column from the Column drop-down list.
3. Click Apply.

The example in the slide creates a control break on Order Month. Notice that the Order Month column is extracted from the report and displayed as a master record.

You can also break a particular column from the column header, which is discussed later in the lesson.

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Highlighting a Row or Cell

The screenshot shows the Oracle Application Express interface. On the left, a sidebar menu includes options like 'Select Columns', 'Filter', 'Format > Highlight', 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A secondary context menu is open over a table, showing options such as 'Sort', 'Control Break', 'Highlight', 'Compute', 'Aggregate', 'Chart', and 'Group By'. In the center, a 'Highlight' dialog box is displayed with the following settings:

- Name: Order Items Greater than 5
- Sequence: 10
- Enabled: Yes
- Highlight Type: Row
- Background Color: #99CCFF
- Text Color: #FF7755
- Highlight Condition:

 - Column: Order Items
 - Operator: >
 - Expression: 5

Below the dialog is a table titled 'Order Items Greater than 5'. The rows are highlighted in blue, corresponding to the background color set in the dialog. The table has columns: Order #, Order Date, Order Month, Customer Name, Sales Rep, Order Items (with a downward arrow icon), and Order Total. The last two rows of the table are highlighted in red, indicating they do not meet the specified condition.

These rows are highlighted because the condition is true.

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You can highlight specific rows or cells based on a filter. The rows or cells that meet the condition are highlighted by using the characteristics associated with the highlight.

To highlight a row or cell, perform the following steps:

1. Click the **Actions** menu button and select **Format > Highlight**.
2. Enter a name, and select either a row or cell for Highlight Type. You can select any color from the palette for the background and text.
3. Under Highlight Condition, select a column from the drop-down list. Then select an operator and an expression to be evaluated.
4. Click **Apply**.

The example in the slide shows that the rows are highlighted when Order Items is set to greater than 5.

Adding Computed Columns

The screenshot shows the Oracle Application Express interface. On the left, a sidebar menu includes options like 'Select Columns', 'Filter', 'Format > Compute', 'Aggregate', 'Chart', and 'Group By'. The main area displays a 'Compute' dialog box with the following details:

- Column Heading:** Price with Tax
- Format Mask:** \$5,234.10
- Computation Expression:** D * 1.05

The 'Compute' dialog also features a 'Columns' section listing various order-related columns (Order #, Order Total, Customer Name, etc.) and a 'Keypad' section for entering mathematical operators. Below the dialog is a preview of a report table with a new column 'Price with Tax' added, showing the result of the computation for each row.

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
10 6/15/2011	September 2011	Bradley, Pagina	DEMO		3	\$970.00	\$1,123.50
9 5/8/2011	September 2011	Hartfield, William	DEMO		3	\$730.00	\$766.50
1 7/4/2011	July 2011	Bradley, Eugene	DEMO		9	\$1,860.00	\$1,944.55
8 9/27/2011	September 2011	Ohare, Edward "Buddy"	DEMO		4	\$1,060.00	\$1,113.00
6 8/29/2011	August 2011	Legan, Edward	DEMO		1	\$1,810.00	\$1,890.76
5 8/15/2011	August 2011	Lambert, Albert	DEMO		5	\$950.00	\$997.50
4 8/5/2011	August 2011	LoQuanda, Frerelle	DEMO		5	\$1,090.00	\$1,144.50
3 8/3/2011	August 2011	Hartfield, William	DEMO		5	\$1,640.00	\$1,722.00
7 8/29/2011	August 2011	Lugan, Edward	DEMO		7	\$805.00	\$830.25
2 7/23/2011	July 2011	Dulles, John	DEMO		10	\$2,380.00	\$2,489.00

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Aggregating Columns

The screenshot shows the Oracle Application Express interface. On the left, the Actions menu is open, with the 'Format' option selected. Under 'Format', the 'Aggregate' option is highlighted. To the right, a 'Aggregate' dialog box is displayed. It shows 'New Aggregation -' in the 'Aggregation' dropdown, 'Sum' in the 'Function' dropdown, and 'Price with Tax' in the 'Column' dropdown. At the bottom of the dialog are 'Cancel' and 'Apply' buttons. Below the dialog is a table of order data. The total value '\$13,681.50' is highlighted with a red box at the bottom right of the table.

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
10	9/11/2011	September 2011	Bradley, Eugene	DEMO	3	\$670.00	\$913.50
9	9/8/2011	September 2011	Hartsfield, William	DEMO	3	\$730.00	\$766.50
1	7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,984.50
8	9/2/2011	September 2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00	\$1,113.00
6	8/20/2011	August 2011	Logan, Edward	DEMO	4	\$1,515.00	\$1,560.75
5	8/15/2011	August 2011	Lambert, Albert	DEMO	5	\$950.00	\$997.50
4	8/5/2011	August 2011	LaGuardia, Forelio	DEMO	5	\$1,090.00	\$1,141.50
3	8/3/2011	August 2011	Hartsfield, William	DEMO	5	\$1,640.00	\$1,722.00
7	8/25/2011	August 2011	Logan, Edward	DEMO	7	\$905.00	\$950.25
4	11/27/2011	JULY 2011	Urquiza, John	URQU	10	\$4,394.00	\$4,499.00
							\$13,681.50

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You can use the Aggregate option to perform mathematical computations against a column in your report. Aggregates are displayed after each control break and at the end of the report within the column for which they are defined.

To aggregate columns in your report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Aggregate**.
2. Select a function from the Function drop-down list. The Sum, Average, Count, Minimum, Maximum, and Median functions are available in the Function drop-down list. In the slide example, **Sum** is selected.
3. Select a column from the list of columns. Only base columns can be used in aggregates, and not computed columns. In the slide example, **Price with Tax** is selected.
4. Click **Apply**.

The slide example shows an aggregate that is a sum of "Price with Tax."

Creating a Chart

A new Chart icon is created.

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You can create a chart based on the data contained in the report. You can include only one chart per interactive report. After a chart is defined, you can change the definition of the chart by clicking the Edit Chart link below the search bar. You can return to the detail report by clicking the desired icon on the search bar.

To create a chart, perform the following steps:

1. Click the **Actions** menu button and select **Format > Chart**.
2. Specify the chart type.
3. Select a column for Label.
4. Select a column for Value.
5. Select a function.
6. Select a sort value.
7. Click **Apply**. You can edit the chart or switch back to the report.

The slide example creates a horizontal bar chart that shows the number of orders per month.

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Creating a Group By Report

The image shows three parts of the Oracle Application Express interface:

- Left Sidebar:** Shows the 'Format' menu expanded, with 'Group By' selected.
- Group By Configuration Dialog:** Shows 'Order Month' as the group by column. Functions 1 and 2 are 'Sum' over 'Order Items' and 'Order Total' respectively, labeled 'Total Order'. A third row is partially visible. Sort columns are set to descending direction for all rows.
- Report Result:** Shows a table with 'Order Month' as the header. The first row is 'Edit Group By'. The data rows are September 2011 (10, 2 660), August 2011 (26, 6 100), and July 2011 (13, 4 270). An annotation points to the 'Actions' button in the search bar, which has a 'Group By' icon.

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You can create a Group By report for multiple columns based on multiple functions and sort columns. You can include only one group by report per interactive report. After a Group By report is defined, you can change the definition of the Group By report by clicking the Edit Group By link below the search bar. You can return to the detail report by clicking the desired icon on the search bar.

To create a Group By report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Group By**.
2. Select at least one Group By column.
3. Select at least one function and column to base the function on. Enter a label and format mask.
4. Select a sort column.
5. Click **Apply**. You can edit the Group By report or switch back to the report (by using the icon on the search bar).

The slide example creates a Group By report that shows the total order and the total order price for each month.

Quiz

Which of the following actions would you choose from the Actions menu if you want to pull a column from an interactive report and display it as a master record?

- a. Select Columns
- b. Compute
- c. Control Break
- d. Highlight



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Answer: c

Performing a Flashback Query

The screenshot shows a user interface for performing a flashback query. On the left, a sidebar menu includes 'Select Columns', 'Filter', 'Format', 'Flashback' (which is highlighted), 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A callout points to the 'Flashback' button with the text 'An order is edited.' Above the main area, a modal window titled 'Flashback' contains the text 'A flashback query allows you to view the data as it existed at a previous point in time.' Below this, a field says 'As of [] minutes ago.' Another callout points to this field with the text 'Flash back five minutes to see the order details before the edit.' The main report area displays a table of sales data. The first row, which corresponds to the flashbacked data, has its 'Order Total' value (\$1,320.00) highlighted in red. The table has columns: Order#, Order Date, Order Month, Customer Name, Sales Rep, Order Items, Order Total, and Price with Tax.

Order#	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax	
10	9/1/2011	September 2011	Bradley, Eugene	DEMO	3	\$1,320.00	\$1,386.00	
9	9/8/2011	September 2011	Hartfield, William	DEMO	3	\$730.00	\$798.50	
1	7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,994.50	
8	9/2/2011	September 2011	O'Hare, Edward "Bud"	DEMO	4	\$1,660.00	\$1,113.00	
6	8/20/2011	August 2011	Logan, Edward	DEMO	4	\$1,515.00	\$1,590.75	
5	8/15/2011	August 2011	Lamont, Albert	DEMO	5	\$950.00	\$975.50	
4	8/5/2011	August 2011	LeGuanda, Rosele	DEMO	5	\$1,090.00	\$1,144.50	
3	8/3/2011	August 2011	Hartfield, William	DEMO	5	\$1,640.00	\$1,722.00	
7	8/23/2011	August 2011	Logan, Edward	DEMO	7	\$950.00	\$975.50	
					DEMO	10	\$2,380.00	\$2,469.00
								\$34,154.00

Order#	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax	
10	9/1/2011	September 2011	Bradley, Eugene	DEMO	3	\$870.00	\$913.50	
9	9/8/2011	September 2011	Hartfield, William	DEMO	3	\$730.00	\$798.50	
1	7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,994.50	
8	9/2/2011	September 2011	O'Hare, Edward "Bud"	DEMO	4	\$1,660.00	\$1,113.00	
6	8/20/2011	August 2011	Logan, Edward	DEMO	4	\$1,515.00	\$1,590.75	
5	8/15/2011	August 2011	Lamont, Albert	DEMO	5	\$950.00	\$975.50	
4	8/5/2011	August 2011	LeGuanda, Rosele	DEMO	5	\$1,090.00	\$1,144.50	
3	8/3/2011	August 2011	Hartfield, William	DEMO	5	\$1,640.00	\$1,722.00	
7	8/23/2011	August 2011	Logan, Edward	DEMO	7	\$950.00	\$975.50	
2	7/23/2011	July 2011	Dumas, John	DEMO	10	\$2,380.00	\$2,469.00	
								\$33,681.50

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You can use the Flashback option to perform a flashback query. This allows you to view the data as it existed at a previous point in time. The default amount of time that you can flashback is three hours (or 180 minutes), but the actual amount differs per database. To learn more, review the section titled “Rewinding a Table Using Oracle Flashback Table” of the *Oracle Database 2 Day DBA 11g Release 2 (11.2) Guide*.

To perform a flashback on a report, perform the following steps:

1. Click the **Actions** menu button and select **Flashback**.
2. Enter a value in the “As of” field.
3. Click **Apply**. The flashback query is applied and you view the data as it existed at a previous point in time.

In the example in the slide, an order is edited. After the flashback query is applied, you see the order details before the edit was made.

Saving a Report

The screenshot shows two windows from Oracle Application Express. The top window is a 'Save Report' dialog with the following fields: 'Save' dropdown set to 'As Named Report' (with a note '(Only displayed for developers)'), 'Name' field containing 'Report Broken by Month', and an unchecked 'Public' checkbox. Below these are 'Description' and 'Cancel/Apply' buttons. The bottom window shows the 'Reports' dropdown menu open, listing 'Default' (selected), '1. Primary Report', '2. Monthly Review', and 'Private'. Under 'Private', '1. Report Broken by Month' is selected. Below the menu is a report grid titled 'Order Month : July 2011' with two rows of data.

Order #	Order Date	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
1	7/9/2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,981.50
2	7/23/2011	Dulles, John	DEMO	10	\$2,380.00	\$2,499.00
						\$4,483.50

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You can save a customized report for future use. While navigating between pages in an application, if you select the report from the list in the Reports drop-down list, your changes (filters, control breaks, and so on) will still be available. If you log out, however, your changes will not be saved unless you have saved the report. You can save multiple versions of a report and each will appear as a separate report.

You can save a report as private or public. Private reports are accessible only to the creator. Public reports are available to all authenticated users. There are two types of public reports: a primary and an alternative. The Primary Report is the default view. If a developer wants certain changes to be made to the Primary Report, the developer must save the changes as Default Report Settings. You can have only one primary report but multiple alternative reports. To save a report, perform the following steps:

1. From the **Actions** menu, select **Save Report**
2. In the Save Report dialog box, specify the following:
 - **Save:** Select the **As Named Report** option
 - **Name:** Enter a name for the report. If you do not select the Public check box, the report will be a private report.
 - **Description:** Enter an optional description.
3. Click **Apply**. Your report is added to the list of reports in the drop-down list.

Resetting Reports

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
10 9/1/2011	September 2011	Bradley, Eugene	DEMO	3	\$1,320.00	\$1,386.00	
9 9/8/2011	September 2011	Hansfield, William	DEMO	3	\$730.00	\$766.50	
1 7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,984.50	
8 9/2/2011	September 2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00	\$1,113.00	
6 8/20/2011	August 2011	Logan, Edward	DEMO	4	\$1,515.00	\$1,580.75	
5 8/15/2011	August 2011	Lambert, Albert	DEMO	5	\$950.00	\$997.50	
4 8/5/2011	August 2011	LaGuardia, Fiorello	DEMO	5	\$1,090.00	\$1,144.50	
3 8/3/2011	August 2011	Hartsfield, William	DEMO	5	\$1,640.00	\$1,722.00	
7 8/25/2011	August 2011	Logan, Edward	DEMO	7	\$905.00	\$950.25	
2 7/23/2011	July 2011	Dulles, John	DEMO	10	\$2,380.00	\$2,499.00	
						\$14,154.00	

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You can reset an interactive report back to the default settings and remove any customizations that you have made. To reset the defaults, perform the following steps:

1. Click the **Actions** menu button and select **Reset**.
2. Click **Apply** to confirm that you want the reset to be performed.

Note: Each saved report can be reset to its own default settings.

Downloading Reports

The screenshot shows the Oracle Application Express interface. On the left, a vertical menu titled 'Actions' is open, containing options like 'Select Columns', 'Filter', 'Format', 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. In the center, a report grid displays customer orders. At the top right of the report area, a 'Download' button is visible. A modal dialog box titled 'Download' is displayed, asking 'Choose report download format:' and offering three options: 'CSV' (with a CSV icon), 'HTML' (with an HTML icon), and 'Email' (with an envelope icon). A 'Cancel' button is at the bottom right of the dialog.

HTML Format

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
10	9/1/2011	September 2011	Bradley, Eugene	DEMO	8	\$1,320.00	\$1,388.00
9	9/6/2011	September 2011	Hartsfield, William	DEMO	3	\$730.00	\$765.50
1	7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,981.50
8	9/2/2011	September 2011	O'Hare, Edward "Butch"	DEMO	4	\$1,060.00	\$1,113.00
6	8/20/2011	August 2011	Logan, Edward	DEMO	4	\$1,515.00	\$1,590.75
5	8/15/2011	August 2011	Lambert, Albert	DEMO	5	\$950.00	\$997.50
4	8/5/2011	August 2011	LaGuardia, Fiorello	DEMO	5	\$1,090.00	\$1,144.50
3	8/3/2011	August 2011	Hartsfield, William	DEMO	5	\$1,640.00	\$1,722.00
7	8/25/2011	August 2011	Logan, Edward	DEMO	7	\$905.00	\$950.35
2	7/23/2011	July 2011	Dulles, John	DEMO	10	\$2,380.00	\$2,499.00

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You can use the Download option to download the current result set. The download formats differ depending on your installation and report definition but may include CSV, HTML, XLS, PDF, or RTF. You can also email the HTML file by using the Email option.

Note: To download to a PDF, you must install and configure a print server. To learn more about configuring your print server, review the following document:

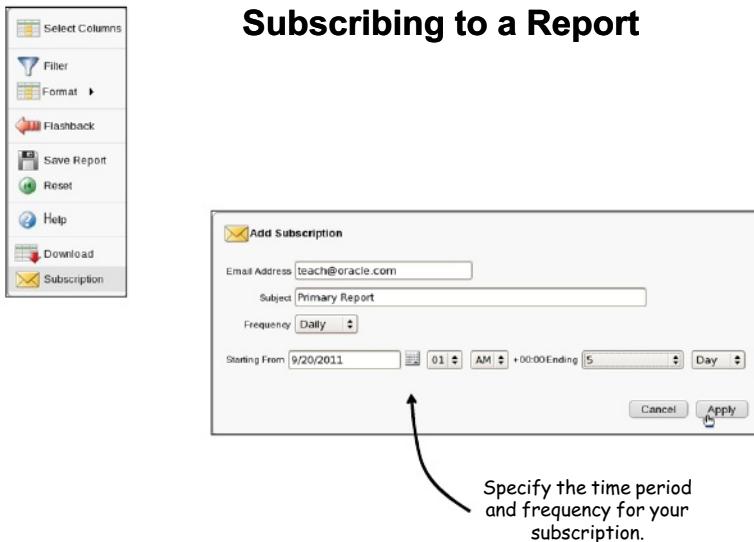
<http://www.oracle.com/technetwork/developer-tools/apex/configure-printing-093060.html>

To download your current result set, perform the following steps:

1. Click the **Actions** menu button and select **Download**.
2. Select a format to download. A file in the specified download format is created.

The slide example shows the HTML format of the report data.

Subscribing to a Report



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You may want to subscribe to a report where the email address that you enter will receive an email of the report for a specified length of time and frequency. Note that you can subscribe to a report only when the report is contained on an authenticated page.

In the slide example, the report will be emailed on a daily basis for five days. The report that is emailed is contained in HTML format.

Manipulating the Interactive Report by Using a Column Header

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
10	9/11/2011		e	DEMO	0	\$1,020.00	\$1,006.00
9	9/8/2011		am	DEMO	3	\$730.00	\$766.50
1	7/9/2011	Last 5 Years	e	DEMO	3	\$1,890.00	\$1,984.50
8	9/2/2011	Last 2 Years	"Butch"	DEMO	4	\$1,060.00	\$1,113.00
6	8/20/2011	Last Year	DEMO	4	\$1,515.00	\$1,590.75	
5	8/18/2011	Last Month	DEMO	5	\$950.00	\$997.50	
4	8/5/2011	Last Week	ello	DEMO	5	\$1,090.00	\$1,144.50
2	8/2/2011	Last 2 Days	am	DEMO	5	\$1,641.00	\$1,729.00
7	8/25/2011	Last Day	DEMO	7	\$905.00	\$950.25	
4	8/25/2011	Last 12 Hours	DEMO	10	\$2,380.00	\$2,499.00	
		Last Hour					\$14,154.00
		Last Minute					

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You can click any column heading to display the Column Heading menu. You can also perform all the functions in the Column Heading menu by using the Actions menu. The Column Heading menu contains the following functions:

- Sorting columns
- Hiding a column
- Creating a control break on a column
- Displaying column information
- Creating a filter

The Column Information icon appears only if there is help text defined for the column. The help text is defined by the developer who created the report.

The slide example shows the Column Header menu on the Order Month column. Notice that the list of values for that column is displayed.

You can break a particular column from the column header. When control break is created,

the column becomes a master record for the report.

When you add some text in the text field, a filter is created on the column.

Quiz

Which of the following functions in the Column Heading menu can also be performed by using the Actions menu?
(Choose all that apply.)

- a. Sorting columns
- b. Creating a control break
- c. Hiding a column
- d. Creating a filter



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Answer: a, b, c, d

Note that you hide a column by using Select Columns.

Lesson Agenda

- Overview
- Using Interactive Reports
- Creating and Customizing an Interactive Report
 - Creating an Interactive Report
 - Accessing the Report Attributes Page
 - Editing Report Attributes
 - Customizing the Search Bar
 - Specifying the Download Formats
 - Specifying Detail View and Icon View
 - Using Link Column
 - Modifying Interactive Report Query
- Creating Classic Reports
- Printing Reports

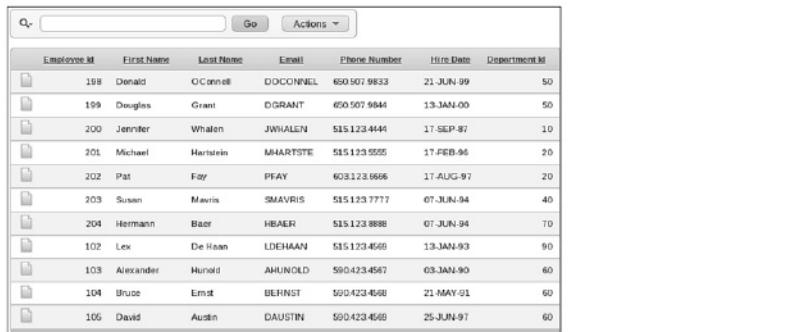
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Creating an Interactive Report

Ways to create an interactive report:

- When creating a new database application
- By creating a new page in an existing database application
- By creating a new region on an existing page



The screenshot shows a web-based application interface for managing employee data. At the top, there is a search bar labeled 'Q-' with a magnifying glass icon, a 'Go' button, and a 'Actions' dropdown menu. Below the header is a table with the following columns: Employee ID, First Name, Last Name, Email, Phone Number, Hire Date, and Department ID. The table contains 10 rows of data, each with a small thumbnail icon on the left. The data is as follows:

Employee ID	First Name	Last Name	Email	Phone Number	Hire Date	Department ID
198	Donald	O'Connell	DDCONNELL	650.507.9833	21-JUN-99	50
199	Douglas	Grant	DRANT	650.507.9844	13-JAN-00	50
200	Jennifer	Whalen	JWHALEN	515.123.4441	17-SEP-87	10
201	Michael	Hartstein	MHARTSTEIN	515.123.5555	17-FEB-96	20
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97	20
203	Susan	Marvin	SMARVIS	515.123.7777	07-JUN-94	40
204	Hermann	Baer	HEBAER	515.123.8888	07-JUN-94	70
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90	60
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91	60
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-97	60

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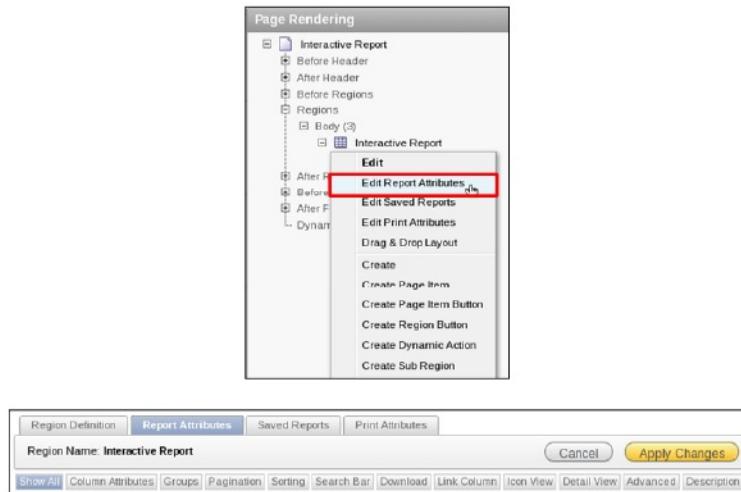
There are numerous ways to create an interactive report. You can create the report when you create the following:

- A new database application
- A new page in an existing database application
- A new region on an existing page in a database application

How to access the Create Report wizard has already been covered in the Overview topic of this lesson. An interactive report is based on a SQL query that can be entered or created by using the Query Builder.

You can view a demonstration of this task by opening the `/home/oracle/labs/demos/les05_create_irr.html` file.

Accessing the Report Attributes Page



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As a developer, you can change the way an interactive report is rendered to users by editing the Report Attributes page.

To access the Report Attributes page, perform the following steps:

1. Access the page definition where the interactive report is created.
2. Under Regions > Body, right-click the interactive report.
3. Select Edit Report attributes. The Report Attributes page is displayed.

There are various tabs on the Report Attributes page where you can edit information to modify the interactive report properties. The next few slides explain the tabs in detail.

Editing Report Attributes

The screenshot shows the Oracle Application Express Report Attributes page. It includes three main tabs: Column Attributes, Pagination, and Sorting.

- Column Attributes:** This tab lists columns from the EMPLOYEES table: Employee_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, HIRE_DATE, JOB_ID, SALARY, COMMISSION_PCT, MANAGER_ID, and DEPARTMENT_ID. Each column has a heading, type (e.g., NUMBER, STRING), and a "Display Text As" dropdown set to "Display as Text (escape special characters)". A note at the top says: "To change the column display order run the report as a developer. Click Select Columns from the Actions menu and move the displayed columns using the arrows. Then select Save Report from the Action menu and save As Default Report Settings." Below this, there's a "Column Groups" section with a note: "Column Groups are used to group columns together on the single row view. No groups defined." An "Add Group" button is available.
- Pagination:** This tab allows setting the pagination type to "Row Ranges X to Y" or "Page Number X of Y" and the display position to "Bottom - Right". It also includes options for handling null values and a maximum raw count of 100000. A note at the top says: "When more than maximum raw data found message: This query returns more than MAX_ROW_COUNT# rows, please filter your data to ensure complete results." Another note at the bottom says: "When No Data Found Message: No data found." A "set defaults" link is present.
- Sorting:** This tab defines ascending and descending image icons (arrow up, arrow down) and their corresponding image attributes (width=13 height=12).

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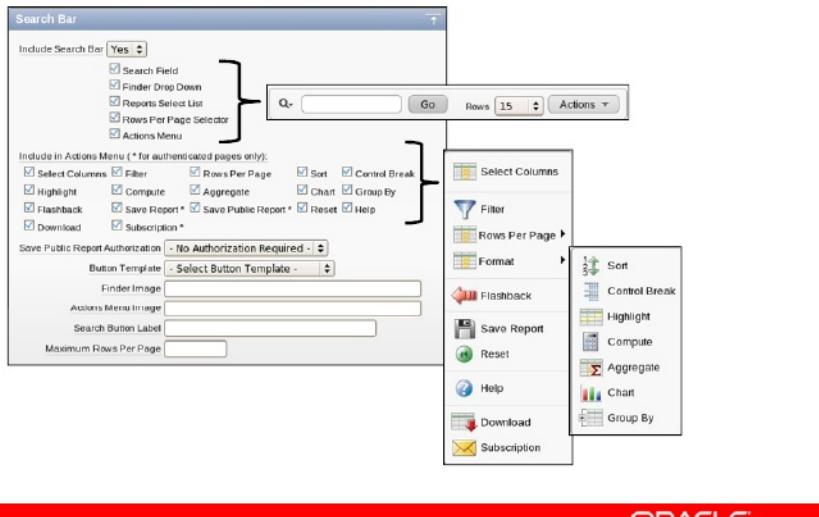
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You can modify various interactive report properties from the tabs on the Report Attributes page as follows:

- **Column Attributes tab:** Edit the properties of individual columns in the report. You can alter column heading text, change column positioning, or hide a column. If you select Hidden in the Display Text As field, the column will no longer appear in the Do Not Display area under Select Columns of the Actions menu. Click the pencil edit icon next to a column name to edit the column properties.
- **Column Groups tab:** Group columns into groups. If you create a single-row view in the report, the grouped columns are displayed together under the group name. To create a group, click the Add Group button. Then, from the Column Attributes tab, you can add columns to the group.
- **Pagination tab:** Specify if you want to use pagination, and where and how it should appear.
- **Sorting tab:** Specify the image to be used next to the column name in the column heading when the sort is applied. Click the **set defaults** link to accept the default images.

Click **Apply Changes** to save the changes that you made to the report attributes.

Customizing the Search Bar



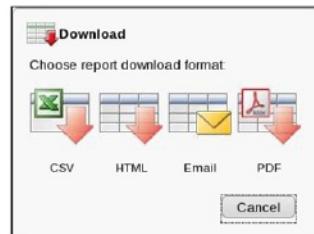
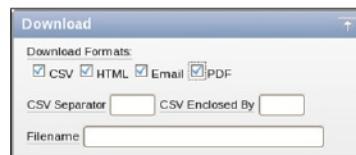
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You can choose whether or not to include a search bar in an interactive report. By default, a search bar is included in an interactive report. If you set Include Search Bar to No, the search bar and all its components are removed from the interactive report. You can specify which components of the search bar should be displayed. You can also control the options that are displayed under the Actions menu. All the actions are selected by default. Deselect the option that you do not want in the Actions menu of the report.

Click **Apply Changes** to save the changes that you made to the report attributes.

Specifying the Download Formats



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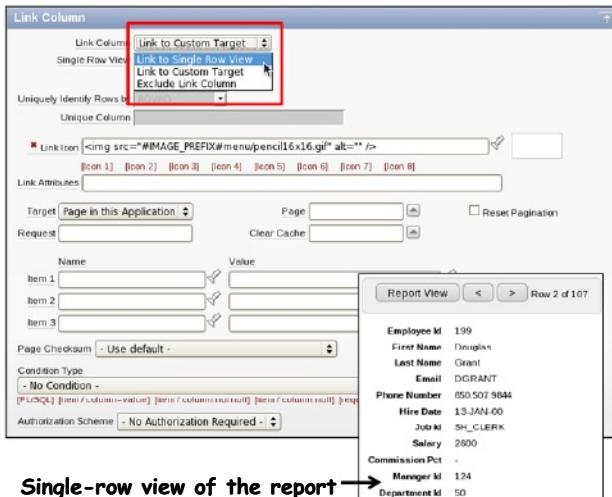
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On the Download tab, you can specify the formats in which users can download the report data. The available formats are CSV, HTML, Email, and PDF.

Click **Apply Changes** to save the changes that you made to the report attributes.

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Using the Link Column



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For an interaction report, you can specify a link column. You can create a column link to a single-row view or to another page in the application.

The single-row view is used by default when you create an interactive report. The single-row view is a display-only view of all the columns in the report. If you have a column in your query but it is hidden in Column Attributes, it will not be displayed in the single-row view. If you have a column that you have hidden in the report by using Select Columns in the Actions menu, it will appear in the single-row view. From the single-row view, you can navigate through all the rows by clicking the Previous and Next buttons. To return to the report, you can click the Review View button.

If you choose to link to a custom page, you can pass item session state values. Linking to a custom page is explained in detail in the lesson titled “Creating Forms.”

You can also completely remove the link column from the report. A link column cannot be sorted, hidden, or moved by an end user.

Click **Apply Changes** to save the changes that you made to the report attributes.

Icon and Detail Views

The screenshot displays two configuration tabs at the top: 'Icon View' and 'Detail View'. The 'Icon View' tab shows settings for enabling icon view, defining link columns, and specifying image source and attributes. The 'Detail View' tab shows settings for enabling detail view, defining rows before and after each detail row, and specifying HTML for each row.

Below the tabs, two reports are shown. The first report, titled 'Products', includes icons for a bag and a belt. The second report, titled 'Bag', shows detailed product information for a bag, including category (Accessories), availability (Yes), last sale date (9/9/2011), description (Unisex bag suitable for carrying laptops with room for many additional items), price (\$125.00), units (16), sales (\$2,000.00), and customers (6). The third report, titled 'Belt', shows similar detailed product information for a belt.

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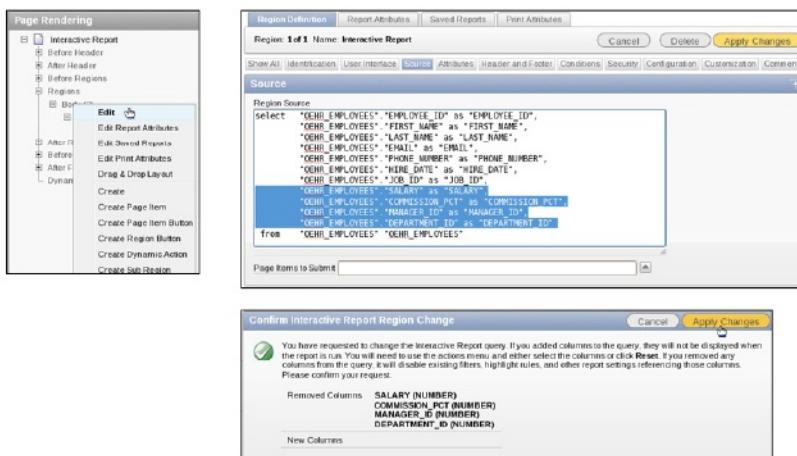
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On the Icon View and Detail View tabs, you can define Icon and Detail Views for an interactive report. When you enable each of these views, an icon is created on the search bar of the interactive report.

Icon View is ideal when you have an image column in your report. Detail View allows you to display the report data by using HTML formatting. Examples of these views (shown in the slide screenshot) are included on the Products tab in the Sample Database application that is installed in each Application Express workspace by default.

Modifying the Interactive Report Query



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You can change the query that is executed when the report is run. To do this, perform the following steps:

1. From the page definition, right-click the interactive report and select **Edit**.
2. Under Region Definition, click **Source**.
3. Modify the report query.
4. Click **Apply Changes**.
5. In the confirmation window, click **Apply Changes**.

If you add columns to the query, they are not displayed when the report is run. In this case, to see the changes in your report, you must reset the report.

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Quiz

When creating an interactive report, which of the following must you define?

- a. A SQL query
- b. A control break
- c. Page and region names
- d. A filter



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Answer: a

Quiz

Which of the following must you do to hide a column so that it is not shown in the report but allows the value to be passed to another page?

- a. Make sure that it is not displayed in Select Columns.
- b. Hide the column in the report and make sure that it is ~~Saved~~.
- c. Hide the column in Column Attributes.
- d. Delete the column from the SQL query.



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Answer: c

Lesson Agenda

- Overview
- Using Interactive Reports
- Creating and Customizing an Interactive Report
- Creating Classic Reports
 - Classic SQL Report
 - Creating a Classic SQL Report
 - Wizard Report
 - Creating a Wizard Report
- Printing Reports
 - Producing Reports
 - Standard Report, Print Enabled

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Classic (SQL) Report

Classic Report					
EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE
198	Donald	OConnell	DOCONNEL	650.507.9833	21-JUN-99
199	Douglas	Grant	DGRANT	650.507.9844	13-JAN-00
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87
201	Michael	Hartstein	MHARTSTEIN	515.123.5555	17-FEB-96
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97
203	Susan	Mavris	SMAVRIS	515.123.7777	07-JUN-94
204	Hermann	Baer	HBAER	515.123.8888	07-JUN-94
205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-94
206	William	Gietz	WGGETZ	515.123.8181	07-JUN-94
100	Steven	King	SKING	515.123.4567	17-JUN-87
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-97

row(s) 1 - 15 of 107 | Next >

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At certain times, an interactive report may not be appropriate, as in the following situations:

- When you want to build the SQL query dynamically by using a PL/SQL function that returns a SQL query
- When you want multiple reports on a page. Currently, you can have only one interactive report on a page.

The two types of classic reports, SQL and wizard, are both based on SQL queries. The screenshot in the slide displays a classic SQL report.

Creating a Classic (SQL) Report

Steps to create a classic (SQL) report:

1. Access the Create Report wizard.
2. Select Classic Report for the report type.
3. Specify the page name and breadcrumb, and choose whether you want tabs.
4. Enter the SQL query for the report, or use Query Builder to create the SQL.
5. Specify the report attributes (such as template, region name, and number of rows).
6. Click Finish.



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The steps to create a classic (SQL) report are provided in the slide. You can view a demonstration of this task by opening the `/home/oracle/labs/demos/les05_create_sql.html` file.

Wizard Reports

Wizard Report						
Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	
198	Donald	O'Connell	DOCNEL	650.507.9833	21-JUN-99	
199	Douglas	Grant	DGRANT	650.507.9844	13-JAN-00	
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87	
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96	
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97	
203	Susan	Mavris	SMAVRIS	515.123.7777	07-JUN-94	
204	Hermann	Baer	HBAER	515.123.8888	07-JUN-94	
205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-94	
206	William	Gietz	WGIETZ	515.123.8181	07-JUN-94	
100	Steven	King	SKING	515.123.4567	17-JUN-87	
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93	
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90	
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91	
105	David	Austin	DAUSTIN	590.423.4569	25-JUN-97	

row(s) 1 - 15 of 107 | [Next](#)



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A wizard report looks the same as a classic (SQL) report except that you cannot modify the query in the source area. Also, instead of specifying the SQL query, you can select the table name and the columns to display in the report.

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Creating a Wizard Report

Steps to create a wizard report:

1. Access the Create Report wizard.
2. Select Wizard Report for the report type.
3. Specify the page and region names as well as the breadcrumbs. Choose whether you want tabs.
4. Select the table and columns that you want to display.
5. Specify the report attributes (such as template and number of rows).
6. Click Finish.



The steps to create a wizard report are provided in the slide. When you create a wizard report, you select the table and columns that you want to be displayed in the report rather than building a SQL query. You can view a demonstration of this task by opening the `/home/oracle/labs/demos/les05_create_wiz.html` file.

Producing Reports

Oracle APEX enables you to:

- Export to PDF, RTF, XLS, and XML formats
- View and print reports that use a prepackaged query and layout
- Create and use customized report queries and layouts

Employee List					
FIRST_NAME	LAST_NAME	EMAIL	HIRE_DATE	JOB_ID	SALAR
Adam	Fripp	AFRIPP	10-APR-1997	ST_MAN	8000
Alana	Walsh	AWALSH	24-APR-1998	SH_CLERK	3100
Alberto	Ettor	AETTOR	10-MAR-1997	SA_MAN	12000
Alexander	Hunold	AHUNOLD	03-JAN-1990	IT_PROG	9000
Alexander	Khosla	AKHOO	18-MAY-1995	PV_CLERK	3100
Alexis	Bull	ABULL	20-FEB-1997	SH_CLERK	4100
Alisa	McEvily	AMCEWLN	01-AUG-1998	SA REP	9000
Alyssa	Hutton	AHUTTON	19-MAR-1997	SA REP	8000
Amil	Banda	ABANDA	21-APR-2000	SA REP	6200
Anthony	Cabrio	ACABRIO	07-FEB-1999	SH_CLERK	3000
Britney	Everett	BEVERETT	03-MAR-1997	SH_CLERK	3900
Bruce	Ernst	BERNST	21-MAY-1991	IT_PROG	6000
Charles	Johnson	CJOHNSON	04-JAN-2000	SA REP	6200
Christopher	Olsen	COLSEN	30-MAR-1998	SA REP	8000
Clara	Vitman	CVITSHNEY	11-NOV-1997	SA REP	10500

Employee List Report					
FIRST_NAME	LAST_NAME	HIRE_DATE	JOB_ID	SALAR	DEPARTMENT_ID
Adam	Fripp	10-APR-1997	ST_MAN	8000	50
Alana	Walsh	24-APR-1998	SH_CLERK	3100	60
Alberto	Ettor	10-MAR-1997	SA_MAN	12000	80
Alexander	Hunold	03-JAN-1990	IT_PROG	6000	60
Alexander	Khosla	18-MAY-1995	PV_CLERK	3100	50
Amil	Banda	20-FEB-1997	SH_CLERK	4100	50
Alisa	McEvily	01-AUG-1998	SA REP	9000	80
Alyssa	Hutton	19-MAR-1997	SA REP	8000	80
Amil	Banda	21-APR-2000	SA REP	6200	50
Anthony	Cabrio	07-FEB-1999	SH_CLERK	3000	50
Britney	Everett	03-MAR-1997	SH_CLERK	3900	50
Bruce	Ernst	21-MAY-1991	IT_PROG	6000	60
Charles	Johnson	04-JAN-2000	SA REP	6200	50

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You can configure a classic report region to print by exporting it to Adobe Portable Document Format (PDF), Microsoft Word rich text format (RTF), Microsoft Excel format (XLS), or Extensible Markup Language (XML). By taking advantage of region report printing, your application users can view and print reports that have a predefined orientation, page size, column headings, and page header and footer. Interactive reports also have the capability to export to PDF, RTF, Microsoft Excel, and comma-separated values (CSV). Note that for interactive reports, it is not possible to define a custom report layout.

When printing to a PDF, the report data is transformed by using an externally defined report server. When the application end user clicks a print link, a request is sent to the Application Express engine. The Application Express engine then generates the report data in XML format, and the report template in the XSL-FO or RTF format. The external reporting engine then transforms the data and the template into a PDF, which displays to the end user by using the conversion servlet that ships with BI Publisher 10.1.3.2. Fortunately, this architectural complexity is transparent to both end users and developers. End users just click a Print link, and developers declaratively set regions to support PDF printing. Output to other formats operates in the same manner by using the necessary conversion servlet.

Note that you must have a valid BI Publisher license to produce your report in Word, Excel, or HTML output formats.

Alternatively, you can configure your print server to use OC4J with Apache FOP, which does not require a BI Publisher license. To learn more about configuring your print server, review the following document:

- <http://www.oracle.com/technetwork/developer-tools/apex/application-express/configure-printing-093060.html>

Standard Report, Print Enabled

1. On the Printing page, select Yes for the Enable Report Printing option.
2. Select the default print format (PDF, Word, Excel, HTML, and XML).
3. Create the report header and footer.
4. Determine which columns to show, as well as their format.

The screenshot shows the Oracle Application Express configuration interface for a report named 'Employee List'. The top navigation bar includes tabs for 'Region Definition', 'Report Attributes', and 'Print Attributes'. The 'Print Attributes' tab is active, showing settings for 'Enable Report Printing' (set to 'Yes'), 'Response Header' (set to 'Report Settings'), 'View File As' (set to 'Attachment'), 'Output Format' (set to 'PDF'), and 'Report Layout' (set to 'Default Report Layout'). Below this is a 'Print Server Overview' section with a URL. The bottom part of the interface is the 'Report Columns' tab, which lists columns with their aliases, headings, show-in-report status, include-in-export status, and column widths. The columns listed are FIRST_NAME, LAST_NAME, EMAIL, HIRE_DATE, JOB_ID, SALARY, and DEPARTMENT_ID.

Alias	Heading	Show in Report	Include in Export	Column Width
FIRST_NAME	FIRST_NAME	Yes	<input checked="" type="checkbox"/>	14
LAST_NAME	LAST_NAME	Yes	<input checked="" type="checkbox"/>	14
EMAIL	EMAIL	Yes	<input type="checkbox"/>	0
HIRE_DATE	HIRE_DATE	Yes	<input checked="" type="checkbox"/>	14
JOB_ID	JOB_ID	Yes	<input checked="" type="checkbox"/>	14
SALARY	SALARY	Yes	<input checked="" type="checkbox"/>	10
DEPARTMENT_ID	DEPARTMENT_ID	Yes	<input checked="" type="checkbox"/>	16

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This type of report is the most basic of all the types and is very easy to produce. You can produce this report in different formats (PDF, Word, Excel, HTML, and XML). You can create a header and footer, and determine which columns show and their format (color, spacing, and so on) on the report. When the Enable Report Printing option is set to Yes, a Print link appears at the bottom of your report. When it is selected, the report is produced in the default format selected.

Summary

In this lesson, you should have learned how to:

- Identify the types of reports that you can create in Oracle Application Express
- Manipulate interactive reports
- Create and customize interactive reports
- Create classic and wizard reports
- Print reports

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Practice 5: Overview

This practice covers the following topics:

- Using an interactive report
- Creating and customizing an interactive report
- Creating a report based on a SQL query
- Creating a customer report by using the report wizard

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6

Creating Forms

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Objectives

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

- Identify the types of forms that you can include in an application
- Create:
 - A form on a table
 - A form with a report
 - A tabular form
 - A master detail form
- Edit forms



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This lesson shows you how to create forms in your application by using the various built-in wizards. You also learn how to edit and modify forms.

Lesson Agenda

- Using Forms
 - Introducing Forms
 - Types of Forms
 - Accessing the Create Form Wizard
- – ROWID Versus Primary Key
- Creating Forms
- Modifying Forms

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Introducing Forms

- What are forms in Oracle APEX?
 - Forms are application components that are used to update database tables and objects.
- How are forms created in Oracle APEX?
 - Manually
 - Declaratively by using wizards
- Where are forms created?
 - On a new page in the application
 - On an existing page of the application



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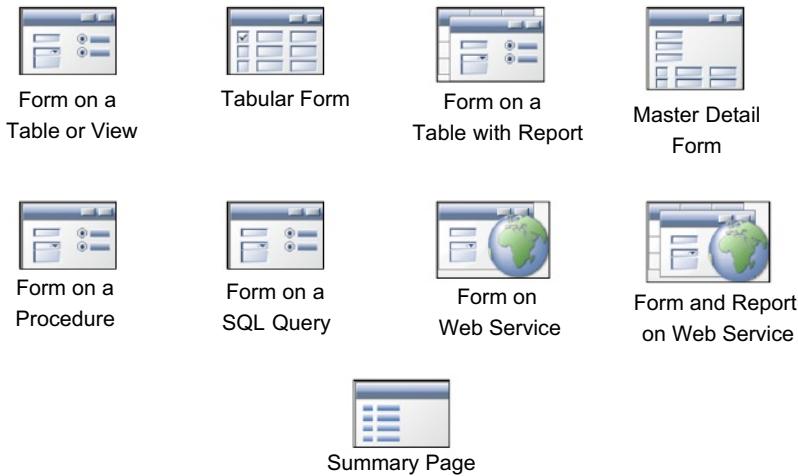
Forms are application components that take input from a user and submit it to a server. A form usually consists of one or more page items (drop-down list, text box, check box, radio buttons, and so on), which enable users to enter information, and a button or link with a submit action.

In Oracle Application Express, you use forms when you must gather input from a user before performing a task on a database table. For example, you can create a form to insert data into a database table.

In Oracle Application Express, you can create forms easily by using wizards. For example, by using the “Form on a Table or View” wizard, you can create one item for each column in a table. The wizard automatically includes the necessary buttons and processes that are required to insert, update, and delete rows from the table.

You can create a form when you create a page in an application. You can also include a form on an existing page by creating a region.

Types of Forms



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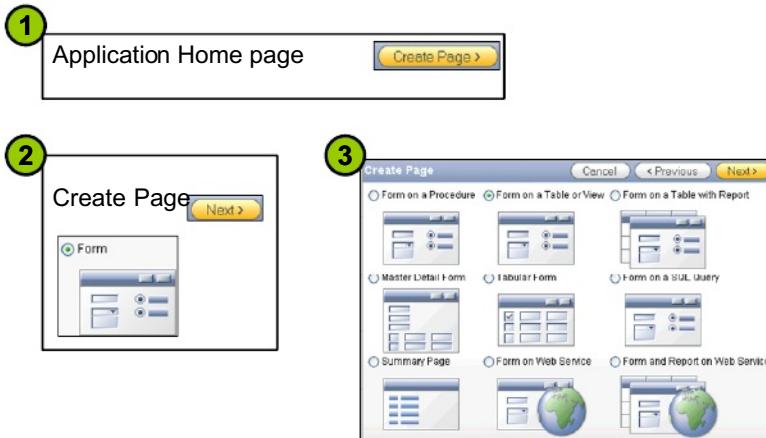
Oracle Application Express provides wizards to create the types of forms listed in the slide.

- **Form on a Table or View wizard:** Create a form to enable users to insert rows into a table.
- **Tabular Form wizard:** Create a form to enable users to edit or delete multiple rows in a table simultaneously. Users will also be able to insert rows into the table.
- **Form on a Table with Report wizard:** Display a report and enable users to edit or delete rows one at a time. Users will also be able to insert rows into the table.
- **Master Detail Form wizard:** Enable users to update data from two tables. You should have a foreign key relation between the two tables.

In this lesson, you learn how to create forms by using these four wizards. Here are descriptions of the other wizards:

- **Form on a Procedure wizard:** Create a form based on stored procedure arguments. Use this approach when you have implemented logic or data manipulation language (DML) in a stored procedure or package.
- **Form on a SQL Query wizard:** Create a form based on the columns returned by a SQL SELECT query.
- **Form on Web Service wizard:** Create a page with items based on a web service definition. This wizard creates a user input form, a process to call the web service, and a Submit button.
- **Form and Report on Web Service wizard:** Create a page with items based on a web service definition. This wizard creates a user input form, a process to call the web service, and a Submit button, and displays the results returned in a report.
- **Summary Page wizard:** Create a read-only version of a form. A typical use case is to provide a confirmation page at the end of a Wizard.

Accessing the Create Form Wizards



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To access the Create Form wizards while creating a new page in your application, perform the following steps:

1. Click Create Page on the home page of the application where you want to create the form.
2. A Create Page wizard opens. Select Form from the available options and click Next.
3. The form wizards are displayed. You can select a wizard based on the type of form that you want to create.

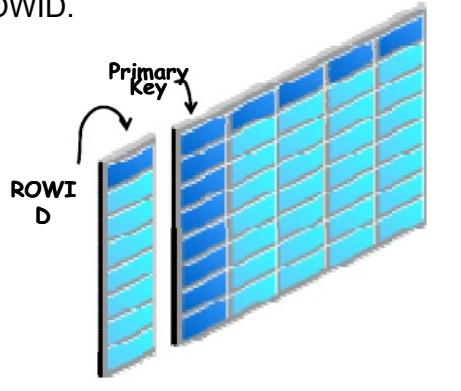
You can also access these wizards while creating a region on a page. You learn more about regions in the lesson titled "Working with Pages and Regions."

The following wizards are also accessible when you create a database application from scratch:

- Form
- Report and Form
- Tabular Form
- Master Detail

ROWID Versus Primary Key

- Oracle Application Express supports up to two primary key columns.
- For tables with no primary key or more than two primary key columns, use ROWID.



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Each row in a database table should be uniquely identifiable so that the DML operations in a form function properly. The most common practice is to specify a primary key for the table. A primary key can be a single column in a table or can be a combination of two or more columns.

In Oracle Application Express, the Create Form wizards allow you to specify up to a maximum of two columns for primary key. If your table does not have a primary key or if it has three or more columns, Oracle Application Express recommends that you use the ROWID feature. ROWID is a pseudocolumn that uniquely identifies a row in a table.

Lesson Agenda

- Using Forms
- Creating Forms
 - Creating a Form on a Table
 - Creating a Form with a Report
 - Creating a Tabular Form
 - Creating a Master Detail Form
- Modifying Forms

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Example: Form on a Table

Each table column
is displayed as a field.

Automatically Created
Region Buttons

The screenshot shows a form titled "OEHR Employees" for creating new employees. The form consists of several input fields: First Name, Last Name, Email, Phone Number, Hire Date, Job ID, Salary, Commission Pct, Manager ID, and Department ID. Each field is preceded by a red asterisk indicating it is required. At the bottom right of the form are two buttons: "Cancel" and "Create". Above the form, there are two annotations: a curved arrow pointing from the text "Each table column is displayed as a field." to the first three input fields (First Name, Last Name, and Email), and two straight arrows pointing from the text "Automatically Created Region Buttons" to the "Cancel" and "Create" buttons.

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The slide shows the form that is created by using the “Form on a Table or View” wizard. The wizard creates a form where users can enter values for the selected columns of an EMPLOYEES table. The wizard displays two buttons on the page: Cancel and Create. To create a new row in the table, enter the details and click the Create button. The data is inserted in the table and you are redirected to the page that you specified while creating the form. Click Cancel to branch to the page that you specified while creating the form.

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Creating a Form on a Table

Access the “Form on a Table or View” wizard, and then perform the following steps:

1. Select the schema and table.
2. Enter the page number and name, region name, and template (filled by default).
3. Select a tab option.
4. Select the primary key columns.
5. Select the source for primary key column.
6. Select the columns to include in the form.
7. Select and name the buttons.
8. Select the pages to branch to.
9. Review the details and create the form.



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The slide provides an overview of the steps to create a form on a table by using the wizard. You must access the “Form on a Table or View” wizard and follow the wizard instructions. You can change the label name of the buttons created on the form page. You can also specify the page that should be displayed after clicking these buttons.

You can view a demonstration of this task by opening the /home/oracle/labs/demos/les06_create_form_table.html file.

Example: Form on a Table with Report

The screenshot shows a grid-based report of employee data from the EMPLOYEES table. A modal dialog box is overlaid on the grid, titled 'OEHR Employees'. This dialog contains fields for creating a new employee record:

First Name	Last Name	Email	Phone Number	Hire Date	Job Id	Salary	Commission Pct	Manager Id	Department Id
Steven	King	SKING@	515.123.4567	17-JUN-87	AD_PRES	24000			90

Below the form, a table lists existing employees with their details.

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The slide shows the pages that are created by using the “Form on a Table with Report” wizard. The first page is an interactive report that lists the details from an EMPLOYEES table. When you click the Create button, a form appears where you can insert new rows in the EMPLOYEES table. When you click the link column in the report, the form is populated with the row details. Then you edit the details and save your changes.

Creating a Form on a Table with a Report

- Type of report
 - Page number and name
 - Region template and name
 - Tabs
 - Columns to display
 - Image for edit link
- 
- Page number and name
 - Region template and name
 - Primary key and trigger
 - Columns to edit
 - Actions to enable (insert, update, and delete)

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The “Form on a Table with Report” wizard combines the steps to create a report and the steps to create a form—and creates two pages. The first page is a report with an edit link (link column) for each row. The report page also includes a Create button to enable users to insert rows into the table. The second page is a form to edit or delete the row selected from the first page (reports page). The slide lists the steps to define the report and the form pages.

You can view a demonstration of this task by opening the
`/home/oracle/labs/demos/les06_create_form_report.html` file.

Example: Tabular Form

<input type="checkbox"/> Employee #	First Name	Last Name	Email	Phone Number	Hire Date	Job Id	Salary	Commission Pct	Manager Id	Department Id
<input type="checkbox"/> 198	Donald	O'Connell	DOCONNEL	650 507 9833	23-JUN-99	SH_CLERK	2600		124	50
<input type="checkbox"/> 199	Douglas	Grant	DGRANT	650 507 9844	13-JAN-00	SH_CLERK	2600		124	50
<input type="checkbox"/> 200	Jennifer	Whalen	JWHALEN	515 123 4444	17-SEP-87	AD_ASST	4400		101	10
<input type="checkbox"/> 201	Michael	Hartstein	MHARTSTE	515 123 5555	17-FEB-96	MK_MAN	13000		100	20
<input type="checkbox"/> 202	Pat	Fay	PFAY	603 223 6666	17-AUG-97	MK_REP	6000		203	20
<input type="checkbox"/> 203	Susan	Mavris	SMAVRIS	515 123 7777	07-JUN-94	HR_REP	6500		103	40
<input type="checkbox"/> 204	Hermann	Baer	HBAER	515 123 8888	07-JUN-94	PR_REP	18000		102	70
<input type="checkbox"/> 205	Shelley	Higgins	SHIGGINS	515 123 8880	07-JUN-94	AC_MGR	12000		103	110
<input type="checkbox"/> 206	William	Gietz	WGGETZ	515 123 8183	07-JUN-94	AC_ACCOUNT	8300		205	110
<input type="checkbox"/> 100	Steven	King	SKING	515 123 4567	17-JUN-87	AD_PRES	24000			90

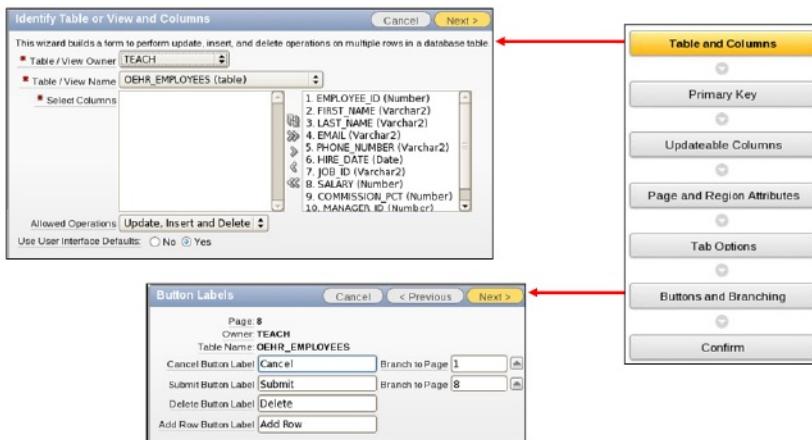
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The slide shows the form that is created by using the Tabular Form wizard. If you allowed all the operations in the wizard, the tabular form presents the user with four action buttons. By default, Cancel, Delete, and Submit are displayed on the upper-right corner and Add Row is displayed at the bottom. Additionally, a check box appears to the left of each row, enabling you to select the rows and delete them. You can also select all the rows simultaneously by selecting the check box to the left of the column headings. You can make changes to the data in any row, and then click the Submit button to save the changes in the database.

Creating a Tabular Form



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The Tabular Form wizard has steps that are similar to the “Form on a Table or View” wizard. While selecting the schema, the wizard prompts you to set the operation that you want to allow users to perform on the form. By default, the “Update, Insert and Delete” option is selected. The wizard enables you to select the columns to be displayed in the form and the columns that can be updatable. Depending on the operations that you allowed the users to perform, the buttons are included on the form page. You can change the label name for the buttons.

You can view a demonstration of this task by opening the [/home/oracle/labs/demos/les06_create_form_tabular.html](#) file.

Example: Master Detail Form

Edit	Order Date	Order Mode	Customer Id	Order Status	Order Total	Sales Rep Id	Promotion Id
	16-AUG-99 02:34:12.234359 PM	direct	101	0	78279.6	153	
	19-NOV-99 03:41:54.896211 PM	direct	102	1	42283.2	154	
	02-OCT-99 04:49:34.079340 PM	direct					
	14-JUL-00 05:18:23.234667 PM	direct					
	06-JAN-00 06:03:12.654218 PM	direct					
	14-MAY-00 07:59:08.843679 PM	direct					
	31-JUL-99 08:53:08.003165 PM	direct					
	06-JAN-98 09:19:44.123456 PM	direct					
	10-FEB-00 10:22:35.564789 PM	direct					
	02-SEP-99 10:23:53.139852 PM	direct					
	20-SEP-99 10:34:11.456788 AM	direct					
	16-MAY-99 03:22:21.234667 AM	direct					
	02-FEB-98 02:34:50.346787 AM	direct					
	24-JUN-99 03:41:54.079340 AM	direct					
	13-SEP-99 04:49:30.647189 AM	direct					

Edit OEHR_ORDERS

Order Date: 02-SEP-99
Order Mode: direct
Customer Id: 144
Order Status: 6
Order Total: 6230.7
Sales Rep Id: 159
Promotion Id: null

OEHR_ORDER_ITEMS Detail

Line Item Id	Product Id	Unit Price	Quantity
3	2311	85.9	8
4	2316	21	10

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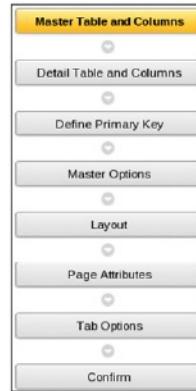
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The slide shows the form that is created by using the Master Detail Form wizard. You can select whether you want the wizard to create a report page on the master table. You can also specify whether you want the master and details information on the same page or on different pages. In the slide example, the reports page is created and the master details information is shown on the same page. On the reports page, you can insert rows into the master table or edit the information in the existing rows. When you click the Edit icon, the master table row and any associated rows in the details table are shown. You can modify the data in the details table, as well as add or delete rows in the details table.

Creating a Master Detail Form

Access the Master Detail Form wizard, and then perform the following steps:

1. Select the schema, table, and columns for the master and detail tables.
2. Select the primary key source for the master and detail tables.
3. Specify master row navigation and the master report (optional).
4. Specify layout, page attributes, and tab options.
5. Review the details and create the form.



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A master detail form reflects a one-to-many relationship between two tables in a database. Typically, a master detail form displays a master row and multiple detail rows within a single HTML form. With this form, users can insert, update, and delete values from two tables or views. When you create the master detail form, you have the option to customize the output. Your decisions result in the creation of one to three pages.

- You can include a master report. This displays the selected master columns and provides links to the master detail page, displaying the selected master record.
- You decide whether to edit the detail records on the same page (that is, you get a tabular form on your master detail page) or to edit the detail records on a separate page (that is, you get only a report in the detail section of your master detail page and the editing is done by using a form on another page).

You can view a demonstration of this task by opening the following file:

`/home/oracle/labs/demos/les06_create_master_table.html`

Quiz

Which type of form would you create if you wanted to show a CUSTOMER and all the ORDERS that the customer has placed for a product?

- a. Form on a table
- b. Tabular form
- c. Master detail form
- d. Form on a table with report



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Quiz

You have a report that displays a list of all employees. You want to create a page to enter details for a new employee. Which of the following wizards should you use?

- a. Form on a Table or View
- b. Tabular Form
- c. Master Detail Form
- d. Form on a Table with Report



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Lesson Agenda

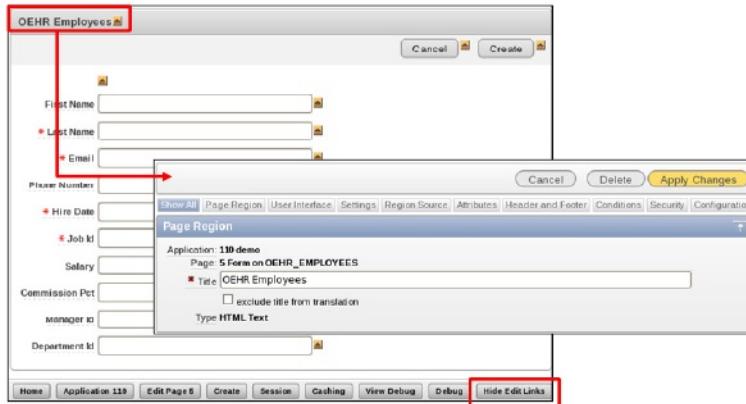
- Using Forms
- Creating Forms
- Modifying Forms
 - Using Show/Hide Edit Links
 - Linking a Report to a Form
 - Reordering Items in the Tree View
 - Editing Items by Using Edit All
 - Changing the Item Display Type
 - Customizing Forms

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Using Show/Hide Edit Links



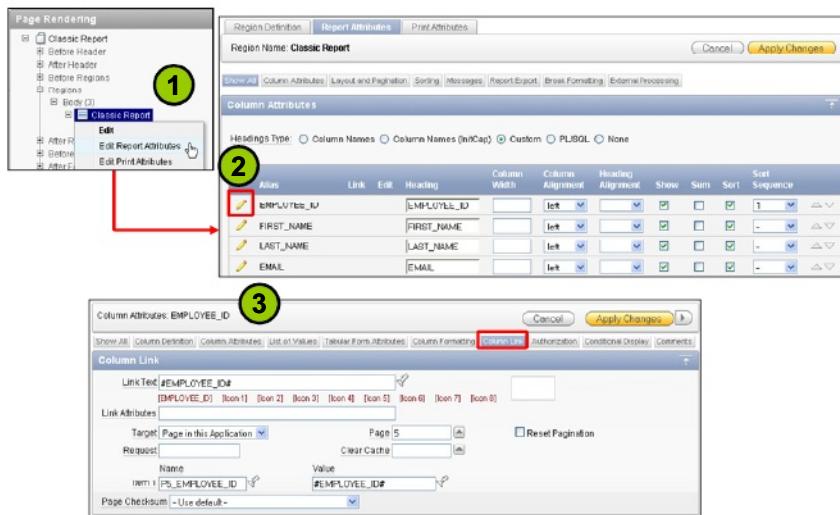
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When you run your form page, you can modify its objects by using the Show Edit Links button on the Developer toolbar. When you click Show Edit Links, an icon appears next to each item in the form. Click the icon to view the details about that item. This is useful, for example, when changing a label or the format of an item.

To disable the edit links, click Hide Edit Links on the Developer toolbar.

Linking a Report to a Form



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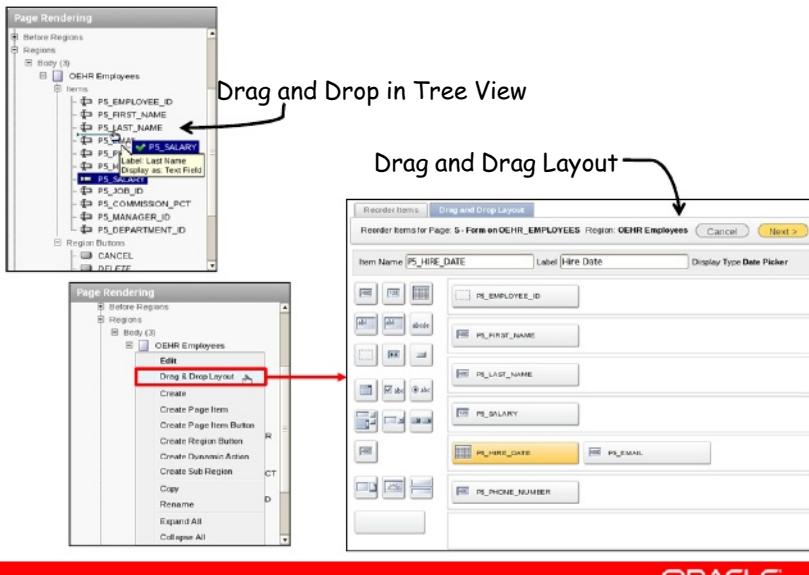
When you create interactive reports, the wizard automatically creates the required forms and links between them. This slide shows how you can link a classic report to a form.

1. From the page definition of the page where you have created the report, right-click the report node and select Edit Report Attributes.
2. Click the Edit icon next to the column that you want to link.
3. Click the Column Link tab and in the Link Text field, enter the HTML text to be shown as the link. Use an image tag to display images, or select one from the list of default images. From the Target drop-down list, select "Page in this Application." In Page, specify the target page ID. To reset the pagination for this page, select Reset Pagination. Use the Name and Value fields to specify the session state for a specific item, and then click Apply Changes.

For example, a column link is created on EMPLOYEE_ID and page 5, which contain a form on the EMPLOYEES table.

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Reordering Items

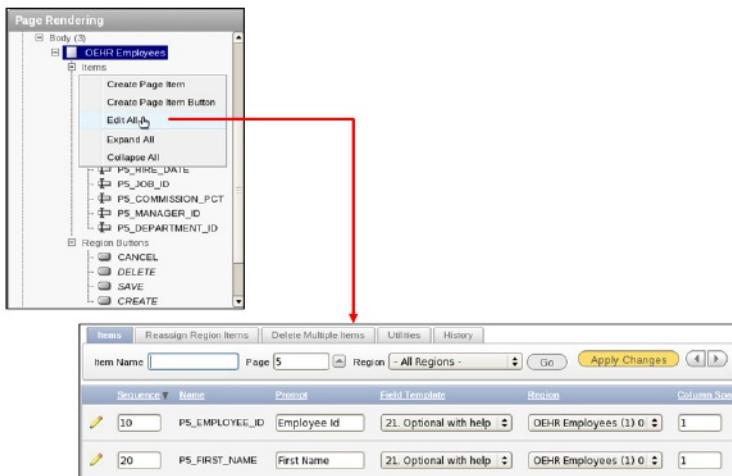


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You can drag an item listed under the Items node to a different location among the items. You can also right-click the region node and select Drag & Drop Layout to reorder items in a Drag and Drop Layout mode. In this mode, you can also change the label for an item.

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Editing Form Items by Using “Edit All”



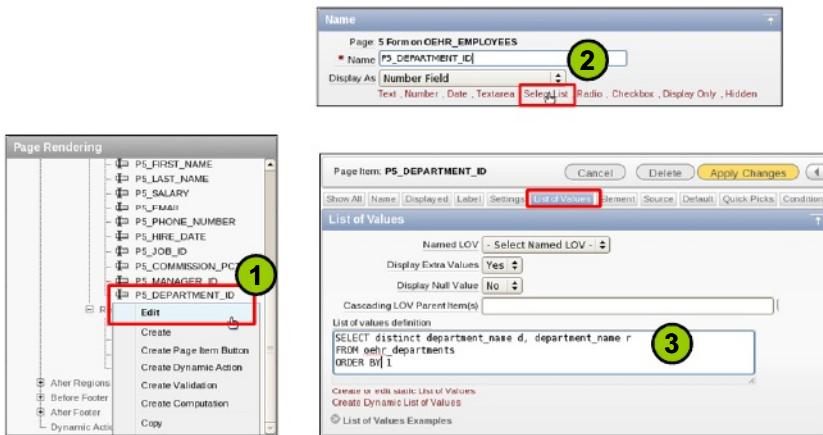
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To modify multiple items simultaneously, you can use the Edit All capability. Right-click the Items node and select Edit All. The Page Items page appears, where all the items on the page are listed on the Items tab. Click the Edit icon to edit the corresponding item. In addition, the following tabs are available:

- Reassign Region Items:** Enables you to assign multiple items to different regions
- Delete Multiple Items:** Enables you to delete multiple items at a time
- Utilities:** Enables you to edit item labels or help text, and view reports across all pages in the selected application
- History:** Enables you to get the history of all the items on this page

Changing Item Display Type



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By default, your varchar/number type columns are displayed as text fields in a form. You can change this default type to other available types, such as drop-down lists, radio buttons, check boxes, and pop-up LOVs.

To change the display type for an item, perform the following steps:

1. Right-click the item for which you want to change the display type and select Edit.
2. For the Display As field (on the Name tab), select the new type from the drop-down list.
3. Click the “List of Values” tab and enter the values for the list. You can view example syntax for writing the list of values by clicking the “List of Values Examples” node below the text area.

You can also create and save a list of values and use it to specify the list values here. You learn how to create a list of values as a sharable component in the lesson titled “Adding Items and Buttons.”

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Customizing Forms

You can include the following in your forms:

- Validations
- Computations
- Processes



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You can customize your forms by creating computations and processes. You can also include validations to verify user inputs. You learn about these topics in detail in the lesson titled “Including Page Processing.”

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Quiz

Which edit facility should you use if you want to change all the item prompts and templates on a page simultaneously?

- a. Show Edit Links
- b. Edit All
- c. Reorder Region Items
- d. Drag and Drop

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Answer: b

Summary

In this lesson, you should have learned how to:

- Identify the types of forms that you can include in an application
- Create:
 - A form on a table
 - A form with a report
 - A tabular form
 - A master detail form
- Edit forms



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This lesson showed you how to create forms, how to use the various built-in wizards that help you create forms, and how to edit the attributes of a form.

Practice 6: Overview

This practice covers creating the following:

- Form on a table
- Master detail form
- Tabular form

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Working with Pages and Regions



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Objectives

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

- View page definitions
- Edit page attributes
- Create a new region
- View region attributes
- Create a sub-region
- Create page zero, page groups, and page comments



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This lesson shows you how to create pages and regions and how to edit their attributes.

Lesson Agenda

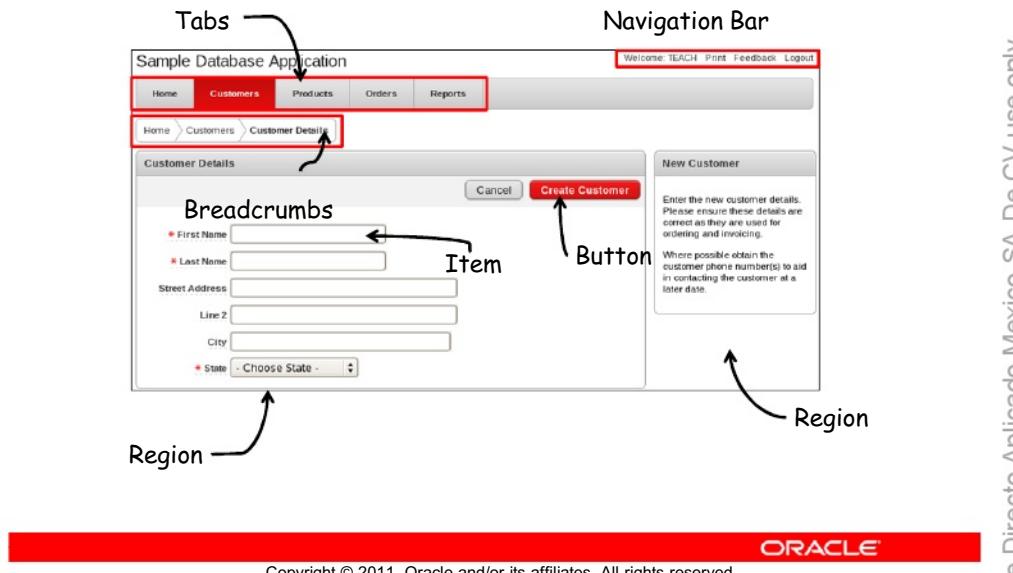
- Introducing Page Definition
 - What Is a Page? (Review)
 - Accessing Page Definition
 - Page Definition Interface
- ~~Editing Page Attributes~~
 - Working with Page Regions
 - Working with Pages

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What Is a Page? (Review)



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In the lesson titled “Building a Database Application,” you learned that a page is the basic building block of any application. The slide presents a recap of the components of a page.

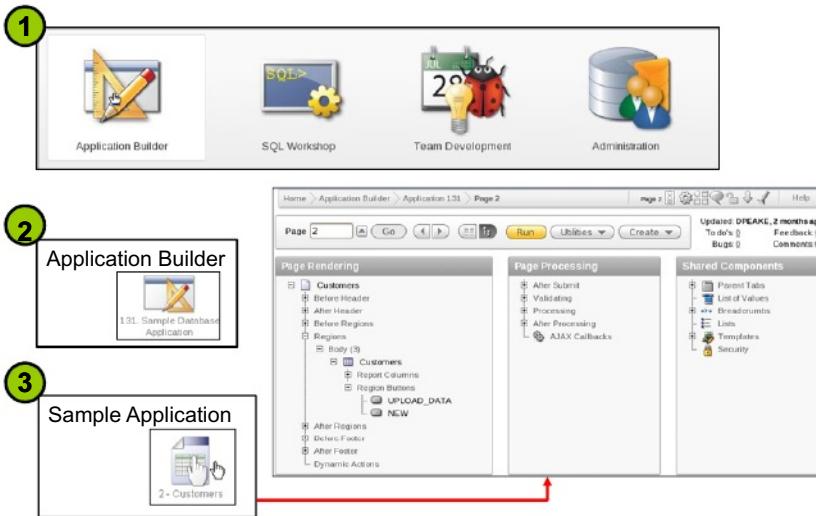
A page contains user interface elements and application logic. A page is divided into regions. A region is a section of a page that contains content. The content of the region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static HTML.

A region can also contain the following:

- Items such as a text field, text area, select list, and check box
- Buttons to direct users to a specific page or URL, and also to post and process information
- Breadcrumbs, tabs, and a navigation bar to enable navigation

Each page in your application has a unique page ID and name. All information about a page and its components is displayed in a *page definition*.

Accessing a Page Definition



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You use the Page Definition page to view, create, and edit the components of a page. To access the page definition for a page, perform the following steps:

1. From the Oracle Application Express home page, click the Application Builder icon.
2. From the Application Builder page, click the application that you want to access.
3. From the selected application page, click a page to view its definition.

The page definition is displayed.

Page Definition Interface

The screenshot shows the Oracle Application Express Page Definition Interface. At the top is a navigation bar with a breadcrumb trail: Home > Application Builder > Application 131 > Page 2. Below the navigation bar are 'View Buttons' for Page, Back, Forward, and List. The main area is divided into three sections: 'Page Rendering', 'Page Processing', and 'Shared Components'. The 'Page Rendering' section contains a tree view of components like Customers, Before Header, After Header, etc. The 'Page Processing' section lists events like Alter Submit, Validating, Processing, and Alter Processing. The 'Shared Components' section lists various reusable components such as Parent Tabs, List of Values, Breadcrumbs, Lists, Templates, and Security.

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A page definition has three sections:

- **Page Rendering:** Lists the page components that are displayed when a user requests for a page. It also lists the processes and computations that are executed when the page is displayed.
- **Page Processing:** Lists the logic that is executed when a page is submitted to the server
- **Shared Components:** Lists the components that can be shared among multiple pages of the application

In this lesson, you will learn to work with the Page Rendering section. The Page Processing and Shared Components sections are discussed in the lessons titled "Including Page Processing" and "Adding Shared Components That Aid Navigation," respectively.

A breadcrumb menu is displayed at the top-left of the page. Each entry indicates your current location and functions as a navigation path. You can instantly navigate by clicking the respective breadcrumb.

The navigation bar allows you to navigate to another page by either entering the page number and clicking the Go button, or clicking the Back or Next buttons.

Tree View

The View buttons allow you to switch between the Tree and Component views of a page definition. The Tree view (shown in the screenshot in the slide) is the default view. Click the Component View button to switch to the Component view. The Component view is discussed in the next slide.

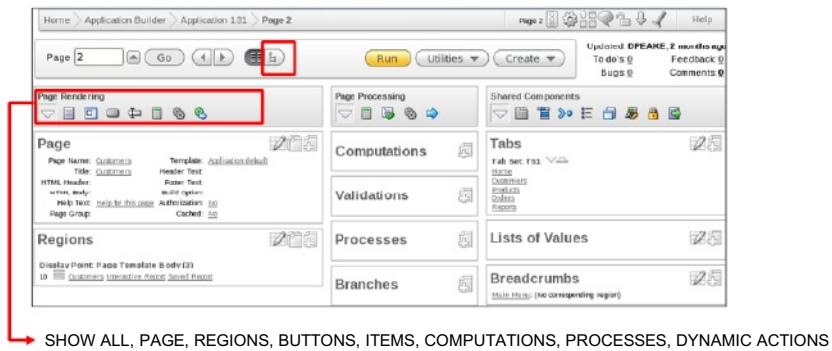
In the Tree view, page details are listed based on event sequence, that is, how Oracle Application Express processes them while rendering a page. Page components, such as regions, page items, and application logic, are represented as nodes in a tree. This organization provides a better understanding of when a component is processed.

Key Features of Tree View

- Each node in the tree has a custom context menu. You can access this menu by right-clicking the node.
- Each context menu includes options that link to default wizards. For example, selecting Create Validation for an item displays the Create Validation wizard.
- You can quickly access the attributes page for a node by double-clicking the node. If available, an attributes page appears.
- You can reorder page items, report columns, processes, validations, branches, or computations by dragging and dropping them to another display, processing point, or region.
- Each tree node has a tool tip, which displays basic information about the component, such as item type, condition, and authorization.
- If a component has a condition, authorization, or build option, the tree node label is displayed in italic.
- Tree nodes with a Rename option in the context menu can be directly modified within the tree without having to go to the edit page. You can press F2 to enable inline edit.

Use Show Names and Show Labels from the Utilities > Switch To menu to show component names or labels.

Page Definition Interface: Component View

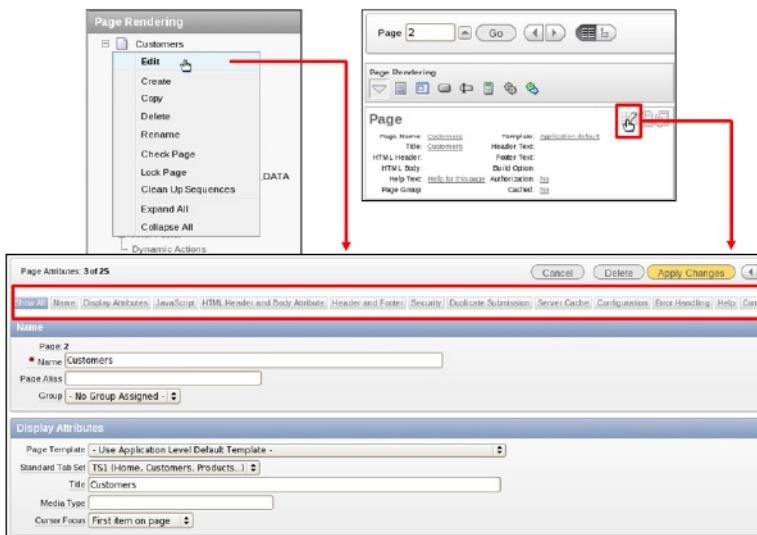


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In the Component view, page components are listed by type. The buttons in each of the sections enable you to focus on one of the components in that section. For example, if you click the Items button, you see only the items in that section. You can move from component to component by clicking the corresponding button. To see all the components again, click the Show All button at the far left.

Editing Page Attributes



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To edit a page's attributes, right-click the page node and select Edit. To edit a page in Component view, click the Edit icon in the Page area. The Edit Page page is displayed. You can modify the following page attributes:

- **Name and Display Attributes:** You can modify the page name, alias, group, standard tabs, and title to be displayed in the browser window. You can also set the cursor focus to be placed on the first item on the page. Select “Do not focus cursor” to bypass this behavior. You can select a page template to define the appearance of this page. This template takes precedence, for this page, over the application template.
- **JavaScript:** You can include JavaScript to be executed when the page loads.
- **HTML Header and Body Attribute:** You can use this attribute to:
 - Specify page-specific inline cascading style classes
 - Add additional style sheets for a specific page

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- **Header and Footer:** You can enter the text that you want to display in the page header or page footer. The page header displays text after the HTML header and before the body section. The footer section displays text after the page template body and before the page template footer.
- **Security:** Select the authorization scheme to be applied to the page from the Authorization Scheme drop-down list. Authorization schemes are defined at the application level and can be applied to many elements within the application. A given authorization scheme is set up to be evaluated once, either for each application session (at session creation) or for each page view. If the selected authorization scheme evaluates to true (subject to other defined conditions), the page is displayed. If it evaluates to false, the page is not displayed and an error message appears.
From the Authentication drop-down list, specify whether this page has been defined as public or requires authentication. If a page is identified as public, the page can be viewed before authentication. This attribute applies only if the application uses authentication.
- **Duplicate Submission:** Use the “Allow duplicate page submissions” drop-down list to specify whether Oracle Application Express allows users to process a page multiple times. This can happen when you click the browser’s Back button, and then submit the page again, or, in some cases, when you click the browser’s Reload button. Setting this attribute to No prevents duplicate page submissions.
- **Server Cache:** You can enable caching for the current page. This improves performance for static pages.
- **Configuration:** Select a Build option for this component. Build options are predefined settings that determine whether or not the components within an application are enabled. Using Build options, you can enable or disable functionality. Most application attributes have a Build option attribute. Do not specify a Build option unless you plan to exclude that object from specific installations. Build options have two possible values: INCLUDE and EXCLUDE. An attribute that is excluded is treated as if it does not exist.
- **Error Handling:** Use this attribute to specify the error text that is displayed in the #NOTIFICATION_MESSAGE# substitution string that is included in the page template.
- **Help:** Use this attribute to enter the help text for the current page.
- **Comments:** Use this attribute to record your comments about the current page.

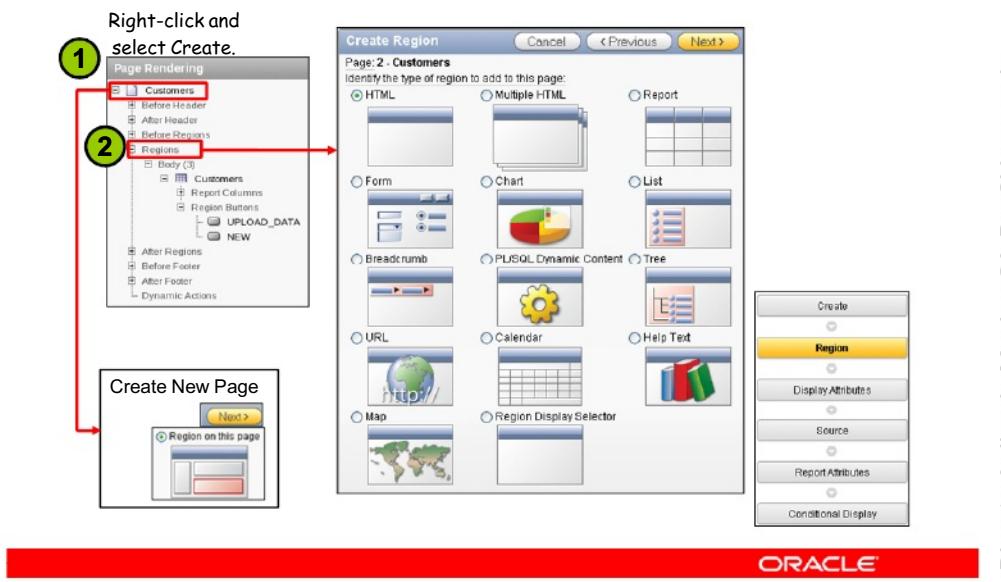
Lesson Agenda

- Introducing Page Definition
- Working with Page Regions
 - Accessing the Create Region Wizard
 - Creating a Region
 - Positioning a Region
 - Conditional Display of Regions
 - Viewing and Editing Region Attributes
 - Specifying Region Header or Footer
 - Creating a Region Display Selector
 - Copying Regions
 - Creating a Sub-Region
- Working with Pages



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Accessing the Create Region Wizards



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To access the Create Region wizards, navigate to the page definition of the page where you want to create a new region. Then perform one of the following steps:

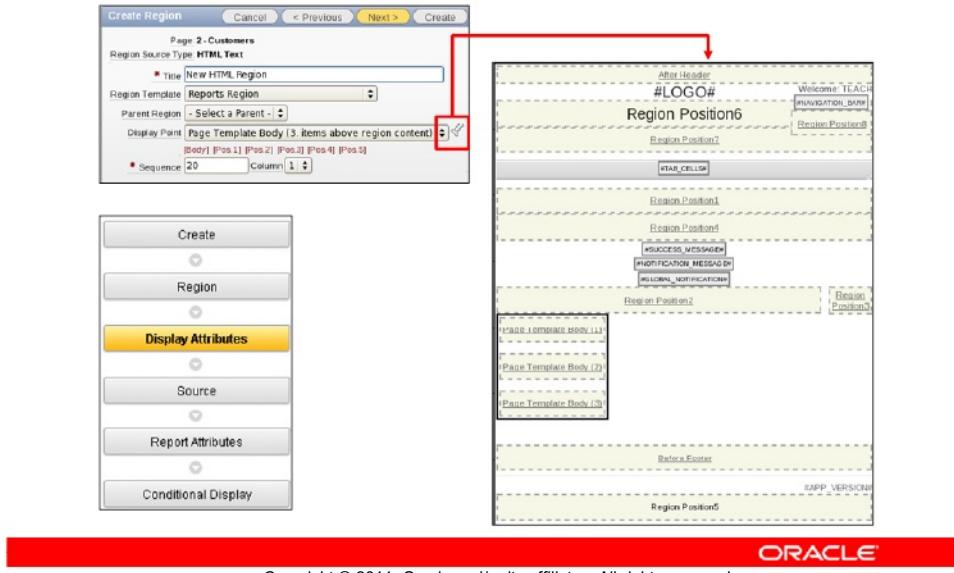
1. Right-click the parent page node and select Create. Select “Region on this page” and click Next.
2. Right-click the Regions node and select Create.

You can also click the down arrow on the Create button and select “Region on this page.”

The various regions that you can create are displayed. Select an option depending on the type of region that you want to create, and click Next to proceed. The List option is displayed only if you have created a list in the application. The Region Display Selector enables you to create a show/hide control for each region on the page for which region display selection is enabled.

Note: To access the Create Region wizard in Component view, click the Create icon in the Regions section.

Positioning the Region



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When you create a region, you must specify its position (Display Point) on the page. You can select either a default position (such as Page Template Body) or a user-defined position in the template (such as Page Template Region Position 4).

You can also specify the sequence of the region to position the region in relation to other regions on the page.

Additionally, you can specify the column in which the region will be placed. Oracle Application Express automatically renders the necessary HTML to produce a multiple-column layout.

You can click the flashlight icon to see a picture of all the templates and where they appear on the page.

Note: The Parent Region field is used to create a sub-region. You learn to create a sub-region later in the lesson.

Conditional Display of Regions



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You can display regions conditionally. A condition is a small unit of logic that enables you to control the display of regions, items, buttons, tabs, and other components. When you apply the condition to a component (for example, a region), the condition is evaluated at run time. The component is displayed only if the condition evaluates to true.

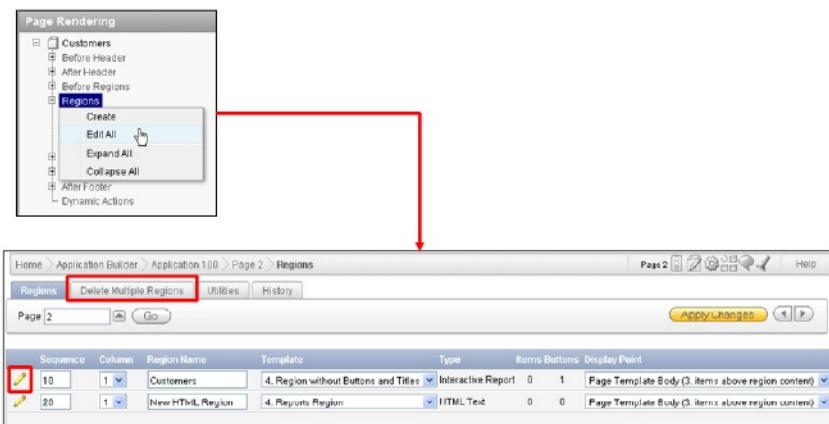
You can set the condition by selecting a condition type when you create the component or by editing the component's conditional display attribute. For example, if you want a particular region to be displayed only when the administrator logs in, you can set an appropriate condition for that region. The condition evaluates to true or false based on the values you enter in the expression fields.

You can click a link below the Condition Type field to select a condition type. The following are some of the predefined condition types:

- Exists
- Not exists
- SQL Expression
- PL/SQL Expression

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Viewing the Regions Page



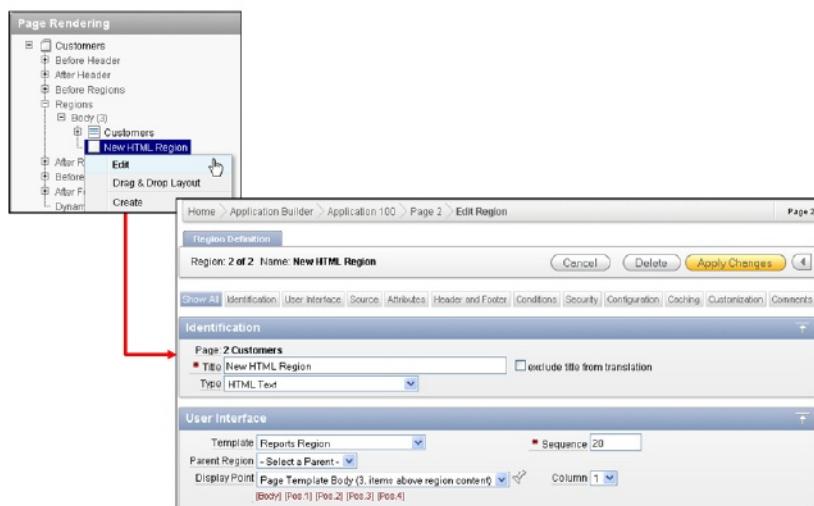
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To view the Regions page, right-click the Regions node and select Edit All. All the regions on the page are listed. You can click the Edit icon to edit the corresponding region. Use the Edit Page Region page to edit the region attributes. Click the Delete Multiple Regions tab to delete multiple regions simultaneously.

Editing a Region



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To edit a region, right-click the region's node and select Edit. Use the Edit Region page to change any region definition, and click Apply Changes to save the changes.

Specifying a Region Header and Footer

You can use substitution strings in region headers and footers.

Displays the time taken to render the region

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You can specify additional HTML to be placed above and below a region, or in its header and footer. Substitution strings can be used in region headers and footers.

In the example shown in the slide, the #ROWS_FETCHED# and #TIMING# substitution strings are used in the region footer. These substitution strings calculate the number of rows fetched in the elapsed time in seconds when rendering a region.

Oracle Application Express: Developing Web Applications 7 - 17

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Enabling Region Display Selection

The screenshot shows two parts of the Oracle Application Express interface. The top part is a 'Region Definition' dialog for a 'Report Region'. It has tabs for 'Region Definition', 'Report Attributes', and 'Print Attributes'. The 'Report Attributes' tab is selected, showing fields for 'Static ID', 'Region Attributes', and 'Region Display Selector' (which is set to 'Yes'). Below this is a 'Attributes' section with fields for 'Region image', 'Image tag attributes', and 'Region HTML table cell attributes'. Buttons at the bottom include 'Cancel', 'Delete', 'Apply Changes', and a help icon. The bottom part shows a preview of the 'Report Region' page. It has a header with 'Show All', 'Report Region', 'Tabular Form', and 'Calendar Region' buttons. The main content area is titled 'Report Region' and displays a table with columns 'FIRST_NAME' and data rows: Alexa, Alberto, Alexander, Alyssa, Alexander, Allan, and Alana. At the bottom of the preview page is the 'ORACLE' logo and a copyright notice: 'Copyright © 2011, Oracle and/or its affiliates. All rights reserved.'

Click to view all regions.

Click to view the region.

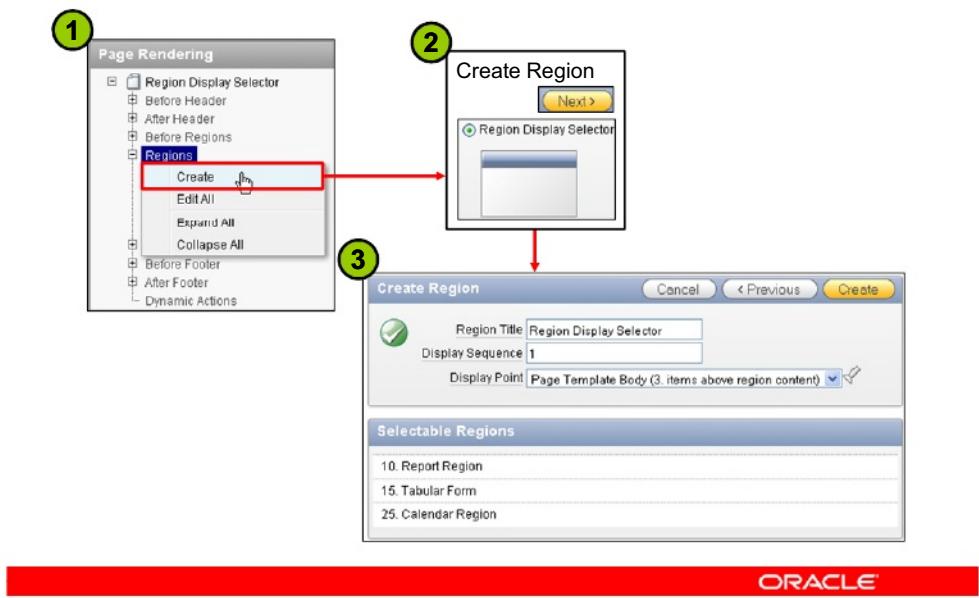
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To enable region display selection, select Yes for Region Display Selector on the Attributes tab. This attribute is used along with the Region Display Selector region.

A Region Display Selector region enables you to hide or show regions on a page. For example, if you have multiple regions on your page, a Region Display Selector allows you to view all the regions at once or only one region at a time.

You learn to create a Region Display Selector in the next slide.

Creating a Region Display Selector



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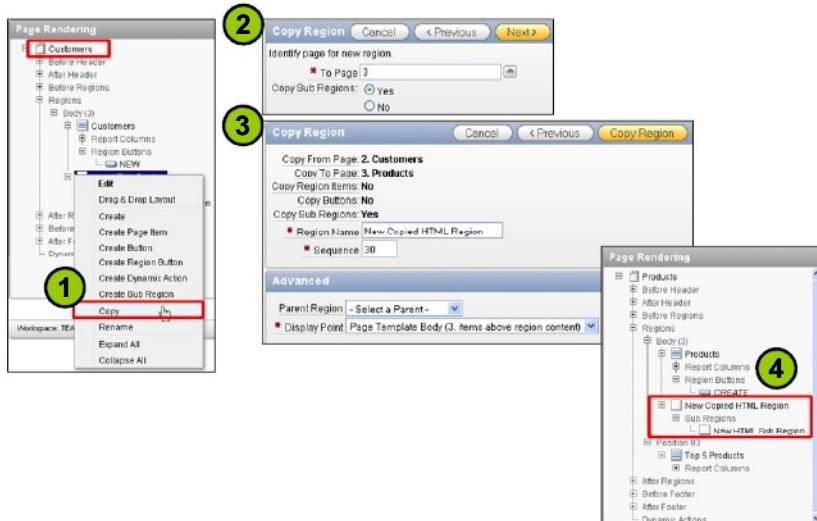
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To create a Region Display Selector on a page, navigate to the page's definition and perform the following steps:

1. Right-click the Regions node and select Create.
2. In the Create Region wizard, select the Display Region Selector option and click Next.
3. The list of selectable regions is displayed. You see only the regions for which you have enabled region display selection. (See previous slide.) Click Create to create the region.

Copying Regions



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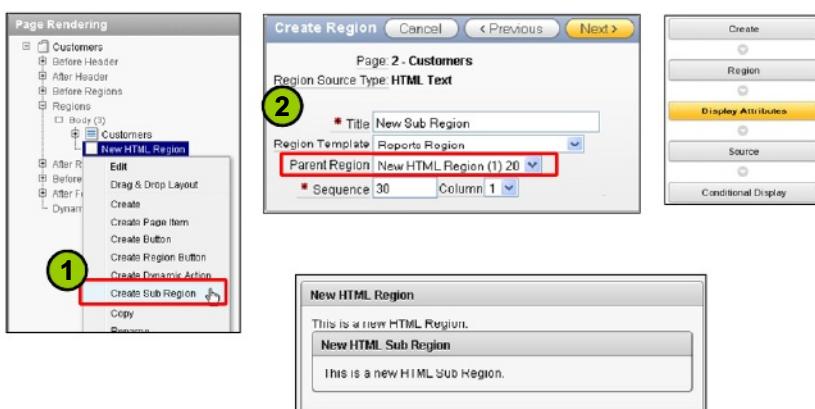
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You can copy regions from one page to another within an application. When copying, you can include the region items and buttons as well. To copy a region, perform the following steps:

1. Right-click the region node and select Copy.
2. Specify the page where you want to copy the region. You also have an option to copy the sub-regions. Click Next.
3. Enter the new region name and click Copy Region.
4. The region is copied to the specified page.

Note: Certain restrictions in Application Express prevent you from copying a region to another page. For example, a page can contain only one interactive report region. You will not be able to copy an interactive report region to a page that already contains an interactive report.

Creating a Sub-Region



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A sub-region is a region within another region. To create a sub-region, you need to specify a parent region while creating the region. Detailed steps are as follows:

1. Right-click the node for the region where you want a sub-region and select Create Sub Region.
2. The Create Region wizard opens. Select the type of region that you want to create.
3. Specify the region attributes. Note that the Parent Region field is automatically set to the region node that you selected in the previous step.
4. Follow the wizard instructions to create the region.

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Lesson Agenda

- Introducing Page Definition
- Working with Page Regions
- Working with Pages
 - What Is Page Zero?
 - Creating Page Zero
 - Creating a Page Group
 - Assigning Pages to a Page Group
 - Viewing a Page Group
 - Locking a Page
 - Copying a Page
 - Adding Comments

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Page Zero

Any item, button, or region on this page is displayed on all the pages in the application.

The screenshot shows two Oracle Application Express pages. The top page is a 'Classic Report' titled 'OEHR Employees' displaying a grid of employee data. The bottom page is a form titled 'OEHR Employees' with fields for First Name, Last Name, Salary, Email, Phone Number, and Department ID. Both pages have a 'Learn More' region in the top right corner, which is highlighted with a red box. A callout arrow points from the text 'Region created on page zero' to this 'Learn More' region on both pages.

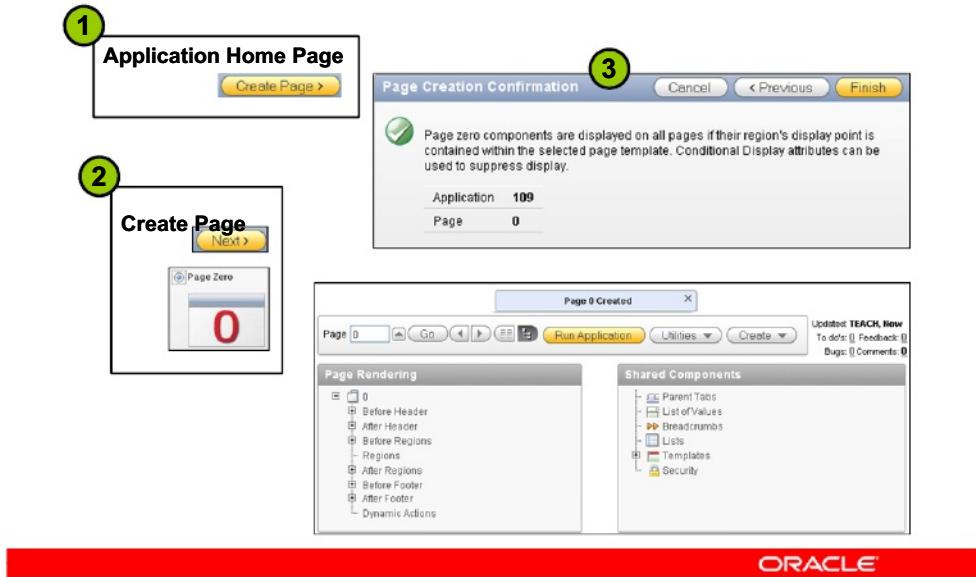
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Page zero is a special page in Oracle Application Express. Any item, button, or region that is created on page zero is displayed on all the pages in your application.

The example in the slide first creates the “Learn More” HTML region type on page zero. By defining the region on page zero, the region is displayed on all pages in the application. You can also restrict the region to appear only on certain pages.

You cannot create processes, computations, or branches on page zero.

Creating Page Zero



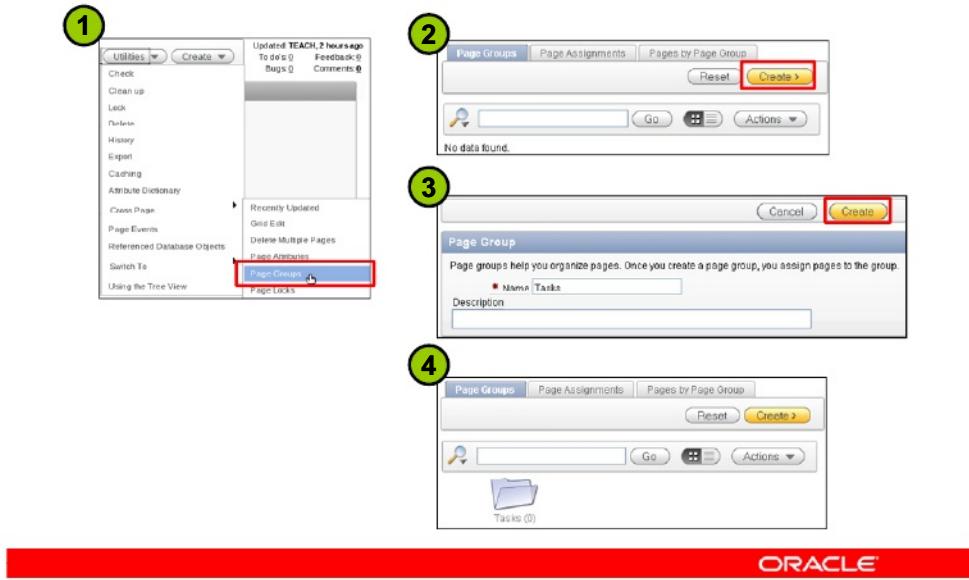
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To create page zero, perform the following steps:

1. Navigate to the Application home page and click Create Page.
2. Select Page Zero as the page type. Click Next.
3. Click Finish.

The page definition for page zero looks different from other pages. You cannot run page zero directly.

Creating a Page Group



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Page groups help you to organize pages. To use page groups, you must create a group, and then assign pages to this group.

To create a group, perform the following steps:

1. From the page definition of any page, click the down arrow on the Utilities button and select Page Groups from the Cross Page submenu.
2. Click the Create button.
3. Enter the name of the page group and click Create.
4. The Page Group is created.

In the next slide, you assign pages to this group.

Assigning Pages to a Page Group

Select the group.

Page	Name	Group	Items	Regions	Developer	Updated
<input checked="" type="checkbox"/>	1 Report Page	Unassigned	0	2	TEACH	74 seconds ago
<input checked="" type="checkbox"/>	2 Insert Form	Unassigned	7	2	TEACH	74 seconds ago
<input checked="" type="checkbox"/>	3 Update Form	Unassigned	10	2	TEACH	74 seconds ago
<input checked="" type="checkbox"/>	4 Success Page	Unassigned	0	2	TEACH	74 seconds ago
<input type="checkbox"/>	5 Form on a Table	Unassigned	11	1	TEACH	46 hours ago

Select the pages.

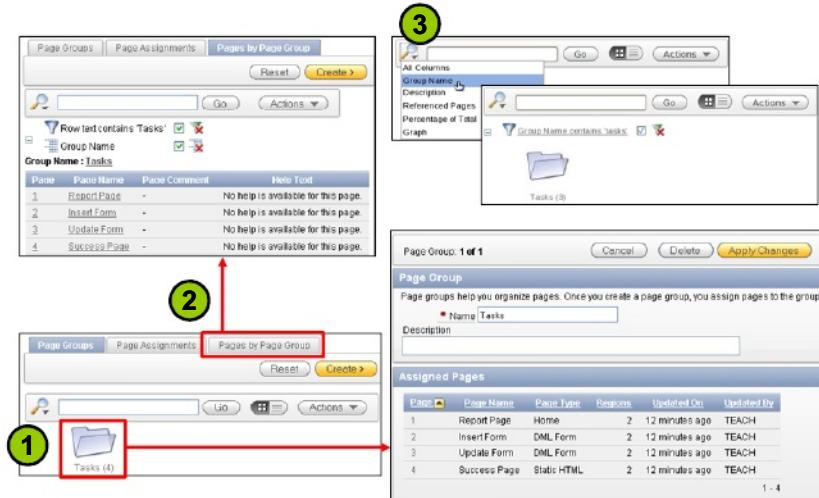
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To assign pages to a group, click the Page Assignments tab. Select the group from the New Group select list. Select the check box next to the pages that you want to assign to the group and click the Assign Checked button.

Viewing a Page Group



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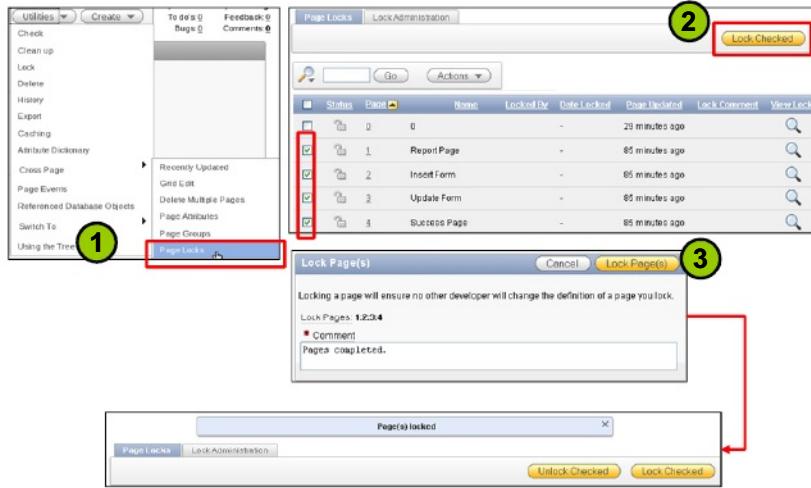
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After you have created page groups and assigned pages to them, you can view the page group by performing any one of the following steps:

1. On the Page Groups tab, click the icon for the page group that you want to view. On the page that opens, you can view the pages assigned to the group, rename the page group, or delete the page group.
2. Click the "Pages by Page Group" tab. All the page groups and the assigned pages in the application are displayed.
3. From the application's home page, select Group for the search option, enter the group name in the text field, and click Go. Only the pages in the specified group are displayed.

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Locking a Page



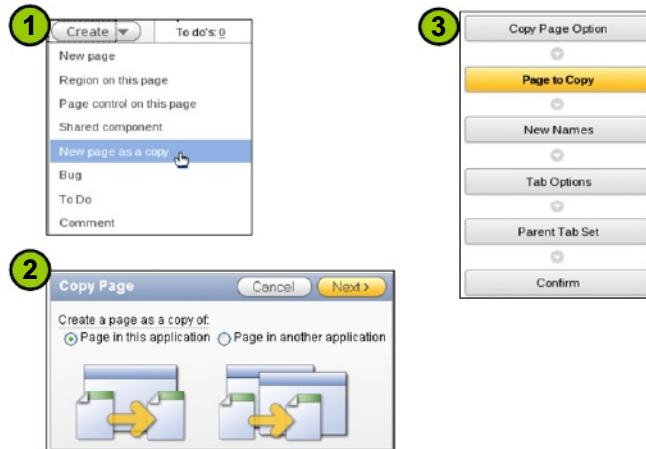
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You can prevent conflicts during application development by locking the pages in your application. By locking a page, you prevent other developers from editing it. To lock a page, perform the following steps:

1. From the page definition of any page, click the down arrow on the Utilities button and select Page Locks from the Cross Page submenu.
2. Select the pages that you want to lock, and click Lock Checked.
3. Enter any comments and click Lock Page(s) to confirm.

Copying a Page



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You can copy pages within an application or from another application. If you are copying a page from another application, that application must reside in the current workspace.

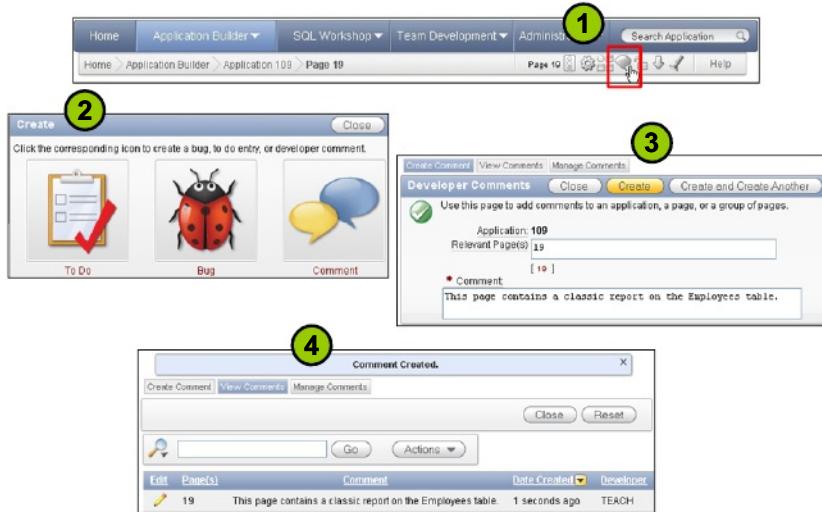
To copy a page from another application, perform the following steps:

1. Click the down arrow on the Create button from the Page Definition of any page. Select "New page as a copy."
2. Select "Page in another application" and click Next.

Follow the wizard instructions. You will be prompted to select the application to copy from, the page to copy, and so on, and whether you want to copy the tabs, templates, and so on from the other page.

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Adding Comments



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Developers can document the changes made to the page. The comments are not shown when the application is run. When you export an application, you decide whether or not to export developer comments. To create a comment, perform the following steps:

1. On the developer action bar, click the “Developer Comment, Bug or To Do” button.
2. Click the Comment icon.
3. Specify the pages and enter your comment.
4. The comment is created successfully.

Quiz

What is page zero used for?

- a. To perform page processing
- b. To identify a different template
- c. To display a set of items or buttons on all the pages in your application
- d. To calculate session values

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Answer: c

Quiz

Which of the following statements are true?

(Choose all that apply.)

- a. Each page can have any number of regions.
- b. You cannot copy a page from another application.
- c. You can add developer comments to an application, a page, or a group of pages.
- d. You can choose to display regions conditionally.

Summary

In this lesson, you should have learned how to:

- View page definition
- Edit page attributes
- Create a new region
- View region attributes
- Create a sub-region
- Create page zero, page groups, and page comments

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In this lesson, you learned about pages and regions. You learned how to create pages and regions, and how to edit their attributes.

Practice 7: Overview

This practice covers the following topics:

- Creating a SQL report region
- Creating a sidebar region
- Editing region attributes, including:
 - Adding a region footer
 - Changing the template
- Creating a hide and show region
- Creating a region on page zero

Understanding Session State and Debugging

8



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Objectives

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

- Define a *session state*
- Explain how Oracle Application Express implements session state
- View session state values
- Reference a session state value
- Clear the session state
- Review the messages in Debug mode



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This lesson shows you how Oracle Application Express manages the session state of an application. You also learn how to debug an application.

Lesson Agenda

- Understanding Session State in Oracle Application Express
 - What Is Session State?
 - What Is a Session ID?
 - What Is Session Timeout?
 - How Does Oracle Application Express Implement Session State
 - Identifying the Parts of an Oracle Application Express URL
- Using Session State in Oracle Application Express
- Using the Debug Option

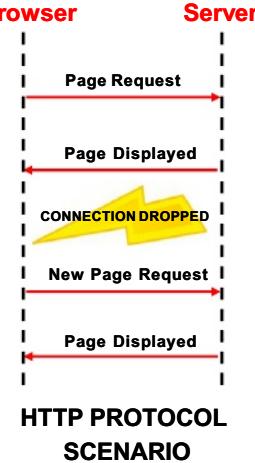
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What Is Session State?

- HTTP protocol
 - Is used to transfer data across the web
 - Is stateless
- A *session* is a series of browser requests and server responses within a specified time.
- The *session state* is the state or value of an item in a session.



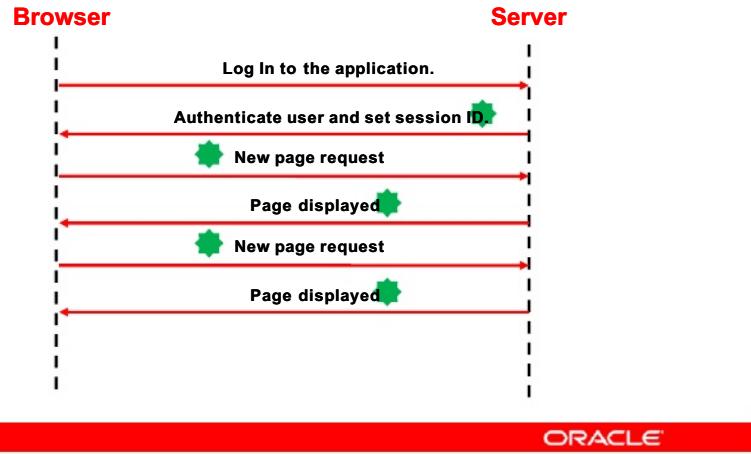
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To understand what a session state is, you must first understand what HTTP is and how it works. HTTP is the protocol that is used to transfer data across the web. HTTP is a stateless protocol. It means that each page request from a browser is treated as an independent request by the server. There is no memory or saved state between the requests.

In a web application scenario, such as an online shopping application, it is essential to maintain application state information. For example, a user fills out a web form for the purpose of ordering products, then adds items to be purchased, and finally submits the form. In this scenario, it is necessary to store the list of items in the shopping cart, and then present this list when required, such as when confirming the order. In addition, the user information must also be retrievable when necessary. To access the values that are entered on one page on a different page, some sort of management is required. A series of requests that originate from the same user by using the same web browser to a web server is called a *session*. The value of the page item during the session length is called the *session state* of the item.

Session ID

A session ID is a unique identifier that is assigned to each new session in an application.



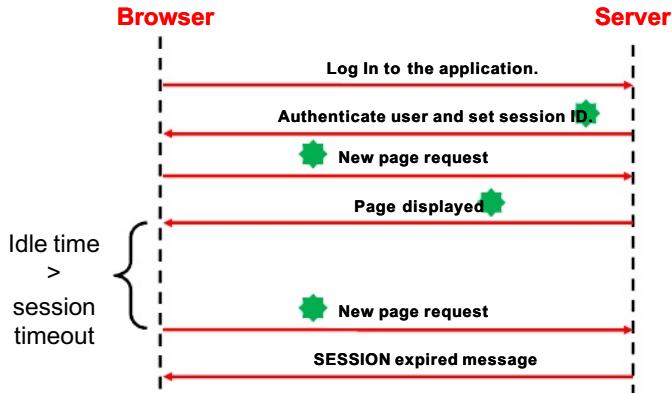
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To manage sessions and to store session state information, each session should be uniquely identifiable by the server and the browser. This is done by using session IDs. A session ID is a unique identifier for each session created in an application. For each new session that is initiated by the browser, the server assigns a session ID. This session ID is associated with subsequent page requests, establishing a session.

In the graphic in the slide, a user logs in to an application. The server authenticates the user and starts a new session. A session ID (depicted by a green symbol) is assigned to the session. Each time the browser makes a request to the server, the session ID is also sent to the server. The server uses this session ID to identify the user and maintain the session state for the user.

Session Timeout

Session timeout is the number of minutes a session can be idle before the server terminates the session.



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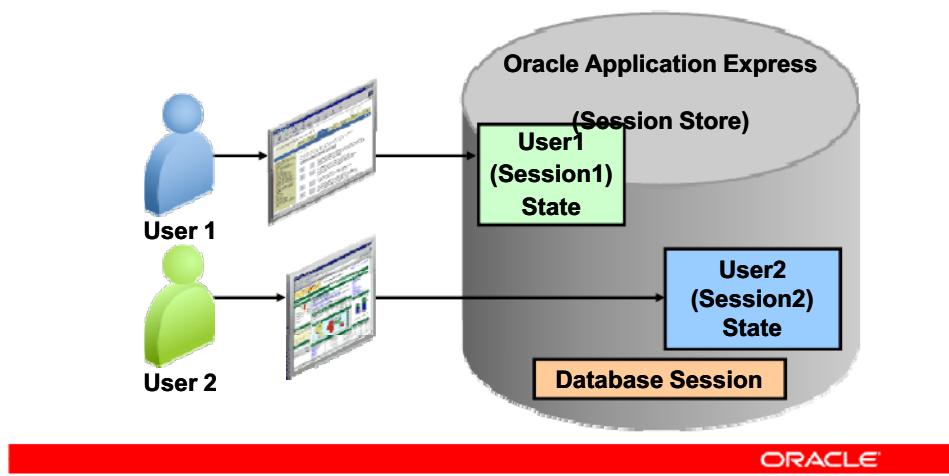
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Session timeout is the time period set for an application session, usually in minutes. If the user does not request a new page or refresh the current page within the time period, the server automatically terminates the session.

How Does Oracle Application Express Implement Session State?

Oracle Application Express maintains session state implicitly.



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In Oracle Application Express, you do not need to write code to manage and maintain sessions or session state. Session state is maintained transparently and you can easily access session state values and manipulate them, if required.

Each time users log in to an application, Oracle Application Express assigns a unique session identifier, which is associated with users until they log out of the application. This session ID is used by the Oracle Application Express engine to store and retrieve the application's working set of data before and after each page view. This is done by comparing the session ID with the session cookie and the session record in the database. The session cookie and the session record safeguard the integrity of the session ID and the authentication status of the user.

You can view the session ID in the URL for a page request. The other visible location is in the page's HTML POST structure or in a session cookie sent by the Oracle Application Express engine during authentication and maintained for the life of the application or the browser session.

Multiple sessions can exist in the database at the same time, because Oracle Application Express treats each session independently. The session information persists in the database until it is purged. Therefore, as long as the client's session has not expired, a user can continue running the application long after having first launched it.

Oracle Application Express uses cookies to store session state. If you turn off cookies in your browser, Application Express applications will not work properly.

The cookies hold information about the application, page, and so on. If developers run multiple instances that use the same browser on one PC when they build applications, the different browser instances interfere with each other. When switching between the two different browser screens, the tool will exhibit strange behavior, including unexpected errors. This can be avoided when you develop applications by using different browsers (such as Internet Explorer and Mozilla Firefox) because each browser tool uses its own cookies.

Oracle Application Express sessions are different from the Oracle database sessions that are used to service page requests. An end user runs an application in a single Oracle Application Express session from login to logout. For each page that is requested during that session, Oracle Application Express engine creates or reuses an Oracle database session to access the database resources. The Oracle Application Express engine uses the session ID to fetch the session state from the database.

Identifying the Parts of an Oracle Application Express URL

Oracle Application Express URL syntax:

1	http://<servername>:<port>/pls/apex/
2	f?p=
3	App:Page:Session:
4	Request:Debug:ClearCache:
5	itemNames:itemValues:
6	PrinterFriendly

Example:

http://localhost:9001/apex/f?p=4000:1:3443878061789777



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The slide shows the syntax of a complete URL for an application developed by using Oracle Application Express.

1. The URL starts with the address of the Oracle Application Express instance. `pls` in the URL indicates that you are using Oracle HTTP Server with `mod_plsql`. If you are using Application Express Listener or Embedded PL/SQL Gateway, `pls` is omitted.
2. `f` is the procedure that is called and `p` is the rest of the URL that is passed as parameters to the procedure.
3. `App` is the application ID or alias of the application that you want to access.
`Page` is the page number or alias of the page that you want to access.
`Session` is the identifier for the session assigned by Oracle Application Express when you log in to an application.

4. Request is set to the request attribute value of a button when it is clicked. For example, if you click a button called CREATE, CREATE is passed as `request` in the URL.
Debug can be set to YES (uppercase) to switch on the debug mode for your application. Every other value turns the debugger off.
ClearCache is used to set the session state values to null. To clear a page, specify the page number. To clear multiple pages, specify a comma-separated list of page numbers. You can also set the following values:
 - RP, to reset pagination
 - APP, to clear cache for all the pages and application-level items in the current application
 - SESSION, to clear cache for the current user session
5. itemNames is a comma-separated list of item names and itemValues is a comma-separated list of item values. Item values cannot include colons, but can contain commas if enclosed with backslashes. To pass a comma in an item value, enclose the characters with backslashes (for example, \123, 45\).
6. PrinterFriendly can be set to YES to render the page by using the printer-friendly page template.

Quiz

What does the number **29** indicate in the following URL?

`http://localhost:9001/apex/f?p=100:29:13402486694618`

`99::NO::P29_ORDER_ID:4`

- a. Application name
- b. Session ID
- c. Page number
- d. Item value

Lesson Agenda

- Understanding Session State in Oracle Application Express
- Using Session State in Oracle Application Express
 - Viewing Session State
 - Methods to Reference Session State
 - Referencing Session State by Using Bind Variables: Example
 - Referencing Session State in Static Text: Example
 - Clearing the Cache
- Using the Debug Option

Viewing Session State

The screenshot shows two windows side-by-side. The left window is titled 'Get Employee Details' and contains a form with fields for Manager (Nancy) and Employee (Daniel). The right window is titled 'Session' and lists session state items for application 104. The 'Session' tab is selected in the top navigation bar of the right window. A red arrow points from the 'Session' button in the toolbar of the left window to the 'Session' tab in the right window.

Application	Page	Item Name	Display	Item Value	Status	Encrypted
104	10	P10_EMPLOYEE	Select List		Null	No
104	10	P10_MANAGER	Select List		Null	No
104	10	P10_GET_DETAILS	BUTTON		Null	No

Application	Page	Item Name	Display	Item Value	Status	Encrypted
104	10	P10_EMPLOYEE	Select List	109	Inserted	No
104	10	P10_MANAGER	Select List	100	Inserted	No
104	10	P10_GET_DETAILS	BUTTON		Null	No

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Each time you request or submit a page, Oracle Application Express automatically saves session state values. To view the session state for a page, click the Session button on the Developer toolbar. The Session State page opens in a new window and provides information about a page, such as:

- Session ID, current user, workspace ID, and the browser language
- The attributes of the page, such as the item name, how the item is displayed, the state or session ID, and the status. The status column indicates the status of the session state. The values include I (Inserted), U (Updated), and R (Reset).
- The application items that do not reside on a page. The application items are session state variables without the associated user interface properties. Application items are not used for display, but used as global variables to the application.

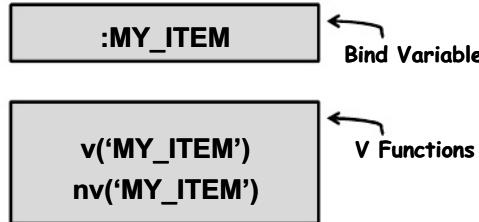
When you view a page for the first time, before making any changes and submitting the page, the state column on the session page displays null. After you click a button and submit the

page, when you view the session page, the state column displays the item values and the state column shows that an insert operation has been performed.

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Methods to Reference Session State

Referencing session state values in SQL and PL/SQL:



Referencing session state values in static text:



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In many situations, you may want to reference session state values of items in regions, computations, processes, validations, and branches. You can reference the session state values by using the following:

- **SQL and PL/SQL**
 - Use the standard bind variable syntax for item names that are not longer than 30 characters. You can use this syntax for references within a SQL or PL/SQL query (for example, `:MY_ITEM`).
 - Use the `v` function to reference the item value [for example, `v ('MY_ITEM')`] if the item name is longer than 30 characters, or when you are coding a stored procedure.
 - Use the `nv` function to reference numeric items [for example, `nv ('MY_NUMERIC_ITEM')`].
- **Static text:** Use `&item name` followed by a period `"."` (for example, `&MY_ITEM.`).

Referencing Session State by Using Bind Variables: Example

```
select * from oehr_employees  
where employee_id = :P10_EMPLOYEE
```

A SQL query used to create a report

A SQL query used to create an LOV

```
select first_name d, employee_id r  
from oehr_employees  
where manager_id = :P10_MANAGER  
order by 1
```

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Referencing Session State in Static Text: Example

The screenshot shows two related pages from Oracle Application Express.

Region Definition: This page is titled "Region: Z of Z, Name: Details for &P10_EMPLOYEE.Employee ID". It has tabs for "Identification", "User Interface", "Source", "Attributes", "Header and Footer", "Conditions", "Security", "Configuration", "Caching", "Customization", and "Comments". The "Identification" tab is selected. It displays "Page: 10 Items and Buttons" and a configuration for the title: "Title: Details for Employee &P10_EMPLOYEE" with an unchecked checkbox "exclude title from translation". The "Type" dropdown is set to "SQL Query".

Details for Employee 112: This page shows the details for employee 112. The table has columns: EMPLOYEE_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, HIRE_DATE, SALARY, COMMISSION_PCT, MANAGER_ID, DEPARTMENT_ID, and JOB_ID. The data row is:

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID	JOB_ID
112	Jose Manuel	Urman	JMURMAN	515.124.4469	07-MAR-98	7800	-	108	100	6

Below the table, it says "1 - 1".

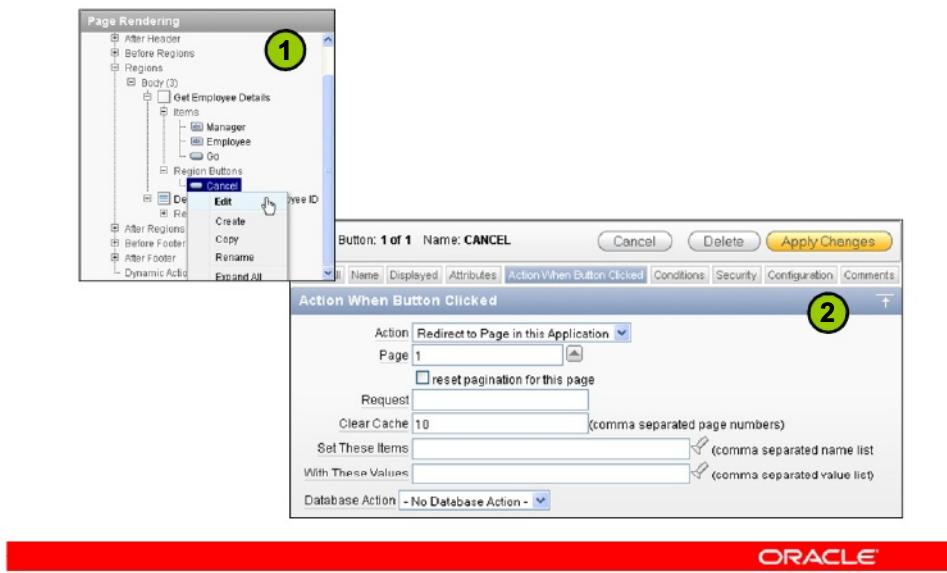
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In this example, you want to display the name of the employee whose details have been retrieved in the region title.

Clearing the Cache



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You can clear the session state information by using a built-in Oracle Application Express process. For example, you want to clear cache for a page when the Cancel button in a form is clicked. To clear cache, perform the following steps:

1. Right-click the button node and select Edit.
2. Click the Action When Button Clicked tab. In the Clear Cache field, enter the page number of the page for which you want to clear the cache. Click Apply Changes.

Note: To clear the cache on multiple pages, you can enter multiple page numbers in the Clear Cache field. For example, if you enter 11, 17, 18, the cache of pages 11, 17, and 18 are cleared.

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Quiz

What does the number **100** indicate in the following URL?

http://localhost:9001/apex/f?p=100:29:1340248669461899::NO

::P29_ORDER_ID:4

- a. Application ID
- b. Session ID
- c. Page number
- d. Item value

Lesson Agenda

- Understanding Session State in Oracle Application Express
- Using Session State in Oracle Application Express
- **Using the Debug Option**
 - What Is the Debug Option?
 - Enabling and Disabling Debug Mode
 - Viewing the Debug Messages

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What Is the Debug Option?

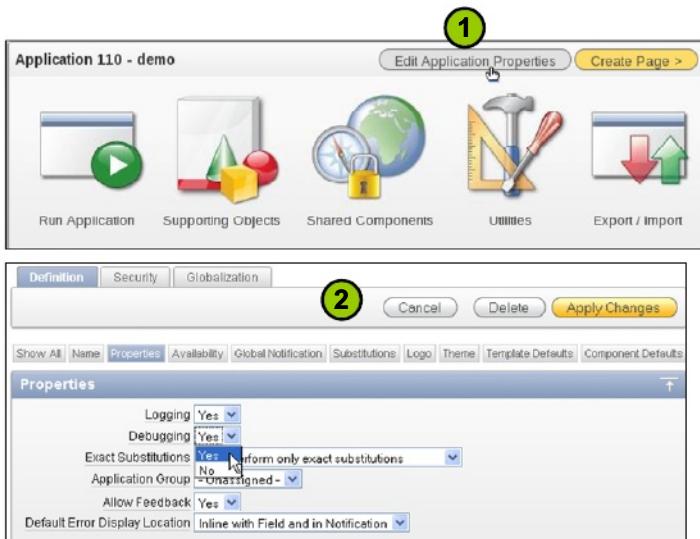
The Debug option is used to:

- View the processing details of a page
- Check the performance of a page



The debug option is used at run time to view the processing of a page. It provides useful information about what is happening in the background. In addition, it can be used to check the performance of a given page so that the performance can be tuned.

Enabling and Disabling Debug Mode



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To use the Debug feature in an application, you must enable debugging for the application. Perform the following steps:

1. From the application's home page, click the Edit Application Properties button.
2. Click the Properties tab, select Yes for Debugging, and click Apply Changes.

You will be able to debug the application at run time only if the Debugging attribute is set to Yes.

To disable the debugging option for an application, perform the same steps and set the debugging field to No.

Debugging an Application

Turning debug mode **ON**



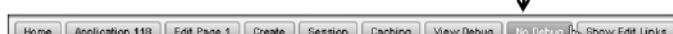
Click Debug.

Set the Debug argument to YES.



<http://localhost:8080/apex/f?p=118:1:3505293171146720::YES::>

Turning debug mode **OFF**



Click No Debug.

Set the Debug argument to NO.



<http://localhost:8080/apex/f?p=118:1:3505293171146720::NO::>

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You can turn on debug mode for an application at run time by using one of the following methods:

- Click the Debug link on the Developer toolbar.
- Set the Debug attribute in the URL to YES.

To turn off debug mode, use one of the following methods:

- Click the No Debug link on the Developer toolbar.
- Set the Debug attribute in the URL to NO.

Viewing the Debug Messages: SHOW Application

The screenshot shows the Oracle Application Express interface. At the top, there is a toolbar with buttons for Home, Application 118, Edit Page 2, Create, Session, Caching, View Debug, No Debug, and Show Edit Links. Below the toolbar is a table titled "View Identifier" with columns: View Identifier, Session, User, Application, Page, Entries, Timestamp, and Seconds. Three rows of data are listed. A red box highlights the first row's "View Identifier" column. A red arrow points from this highlighted cell to the "View Debug" button in the toolbar. Below the table is a "Debug" tab, which is selected. The "Debug" tab has sub-options: Items, Pages, Queries, Tables, PL/SQL, Images, Debug, Session, and Errors. The "Debug" section displays a timeline graph and a list of debug messages. The graph shows activity over time, with a specific point highlighted by a red box. The message list shows several entries with details like timestamp, level, and message text. The Oracle logo is at the bottom right.

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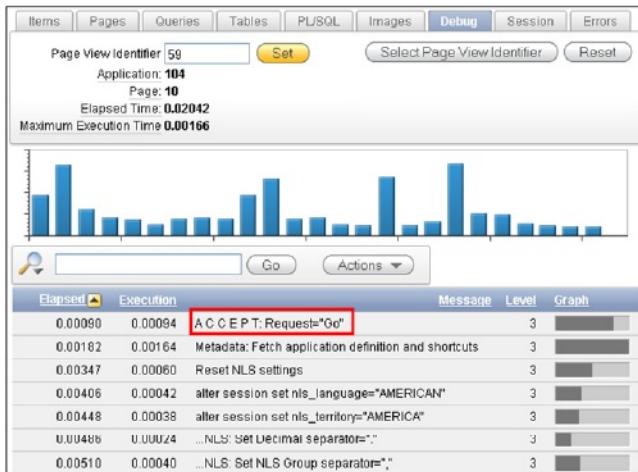
When a page is rendered, a set of messages is displayed under “SHOW application.” The messages displayed include the following (in the order in which they appear):

- NLS Language messages
- Authentication messages
- Session state messages
- BEFORE_HEADER and AFTER_HEADER processing messages for any branching, computations, and processes
- Region
- Item
- BEFORE_FOOTER and AFTER_FOOTER processing messages for any branching, computations, and processes

In addition to the preceding messages, the timing is displayed to make it clear how long each process is taking.

In the slide example, after a page is displayed, you click the View Debug button on the Developer toolbar. The Debug messages are shown. You can place the cursor over the graph to view additional details.

Viewing the Debug Messages: ACCEPT Request



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When values in a form have been changed and submitted, ACCEPT Request messages are displayed before SHOW application. When the debug option is enabled, the following messages appear in the following order:

- NLS Language messages
- Session state messages
- ON_SUBMIT_BEFORE_COMPUTATION process
- BEFORE_COMPUTATION branch
- AFTER_SUBMIT computation
- BEFORE_VALIDATION branch
- BEFORE_PROCESSING branch
- AFTER_SUBMIT process
- AFTER_PROCESSING branch

In the slide example, you click a SUBMIT button and then click the View Debug button on the Developer toolbar. The Debug messages are displayed.

Summary

In this lesson, you should have learned how to:

- Explain what a session state is
- Explain how Oracle Application Express implements session state
- View session state values
- Reference a session state value
- Clear the session state
- Review the messages in Debug mode

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In this lesson, you learned how Oracle Application Express manages the session state of an application. You also learned how to debug an application.

Practice 8: Overview

This practice covers clearing the cache of the Customer Details page.

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Adding Items and Buttons

9



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Objectives

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

- Identify the different types of items
- Create items and edit item attributes
- Create and use lists of values
- Create buttons and edit button attributes



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Lesson Agenda

- Introducing Items
 - Examples
 - What Are Application Items?
 - Accessing the Create Item Wizard
- ~~– Types of Items~~
~~Using Items~~
- Creating List of Value (LOV) Type Items
- Using Buttons



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Examples

The figure displays two Oracle Application Express forms with various UI components labeled:

- Product Details** form:
 - Text Field**: Points to the "Product Name" input field.
 - Select List**: Points to the "Category" dropdown menu.
 - Text Area**: Points to the "Product Description" text area.
 - File Browser**: Points to the "Product Image" file browser input field.
- Identify Customer** pop-up LOV:
 - Radio Group**: Points to the "Create Order for:" radio group.
 - Pop-up LOV**: Points to the "Customer" input field.

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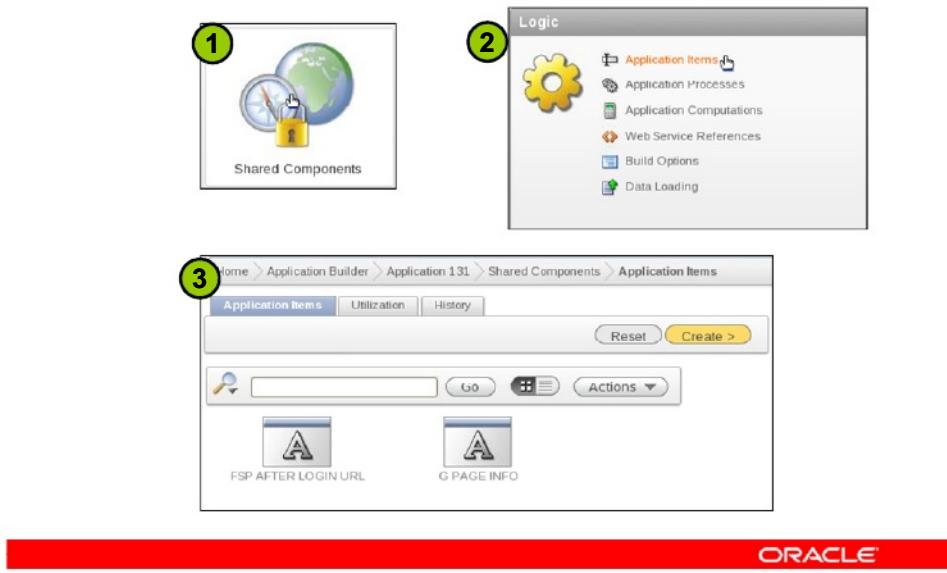
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The slide displays some item examples. An item is part of an HTML form and can be used to store a value in session state so that it can be retrieved at a later time. The examples shown in the slide are page items. Page items are placed on a page and have associated user interface properties, such as Display As, Label, and Label Templates. Another type of item, application items, is discussed in the next slide.

When you create a form by using a wizard, an item is created for each column of the table. The default item type is a text field, number field, or date picker, depending on whether the database table column type is varchar, numeric, or date respectively. You can edit the item properties to change the display type. For example, you can change a text field to a text area or select list.

What Are Application Items?



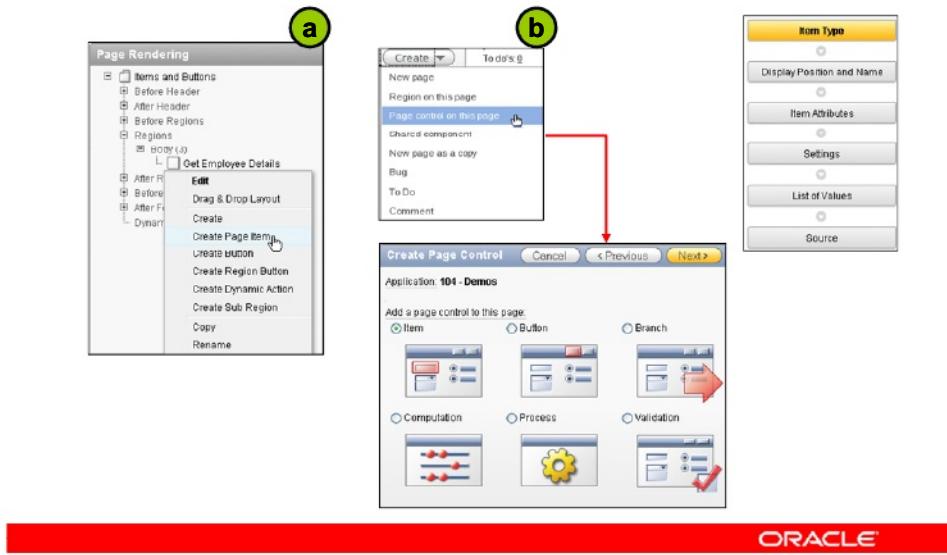
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Application items are not associated with a page and, therefore, have no user interface properties. An application item can be thought of as a global variable. You create an application item from the Application Items page. To access the Application Items page, perform the following steps:

1. Click the Shared Components icon on the application home page.
2. In the Logic pane, click Application Items.
The Application Items page appears.

Application items are typically configured by using processes or computations, or by passing values in a URL. For example, the FSP_AFTER_LOGIN_URL application item is used internally by Oracle Application Express to remember the page that users attempted to visit before they were shown the login page. You can click the item icon to view or edit details.

Accessing the Create Page Item Wizard



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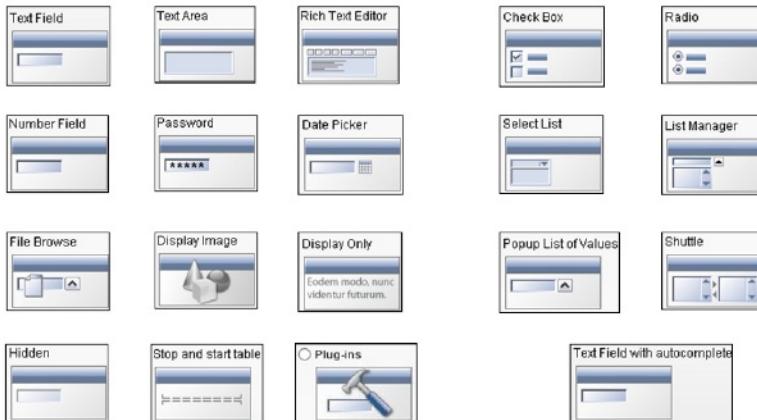
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You can access the Create Page Item wizard in either of the following ways:

- Right-click the region node where you want to create the item and select Create Page Item.
- Click the down arrow on the Create button and select Create Page Control. Then select Items and click Next.

Note: The wizard steps differ depending on the item that you want to create.

Types of Page Items



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Text Field, Text Area, Rich Text Editor: Allow users to enter textual data. The Text Area field is resizable. The Rich Text editor provides various formatting options. You can specify up to 32,767 bytes for a Text Area or Rich Text Editor item.

Number Field: Validates the user input and accepts only numerical data

Password: Creates a text field that displays an asterisk for each character entered

Date Picker: Displays a text field with a calendar icon next to the text field. You can specify a format mask, maximum and minimum date, year range, and so on, while creating the item.

File Browse: Displays a text field with a Browse button. This enables you to locate a file in a local file system and upload it. The files that you upload are stored in a table called `wwv_flow_file_objects$`. Every workspace has access to this table through a view called `APEX_APPLICATION_FILES`.

Display Image, Display Only: The Display Only item displays a read-only version of a display value. The Display Image item displays a specified image.

Hidden: Creates an HTML hidden form element. You can use this item to store session state values.

Start and Stop Table: Forces the close of the current HTML table by using the </table> tag and starts a new HTML table. You can use this item type to reset the column width in the middle of the region.

Check Box: Is based on a list of values. The value corresponding to a check box is returned in a string delimited by a single colon (:).

Radio: Displays an HTML radio group form element based on a list of values

Select List: Displays a list of values. The values in the select list are determined by using a shared list of values or a list of values defined at the item level.

List Manager: Is based on a list of values. It enables you to manage a list of items by selecting from and adding to a list.

Popup LOV: Renders a text field with an icon next to it. A user can click it and select a value from the pop-up window. The list in the pop-up window is driven by a list of values.

Shuttle: Is used to move one or more list elements from left to right

Text Field with Autocomplete: Shows data from a table as you type in text in the field

Note: You can create a maximum of 100 items on a page.

Lesson Agenda

- Introducing Items
- Using Items
 - Creating a Date Picker Item
 - Creating Multiple Items by Using the Tabular Form
 - Creating Multiple Items by Using Drag and Drop
 - Editing an Item
 - Creating Quick Picks
 - Finding Items by Using the Item Finder
- Creating List of Value (LOV) Type Items
- Using Buttons

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Creating a Date Picker Item

The four screenshots illustrate the steps to create a date picker item:

- Step 1:** Item Name is set to P12_DATE, Display As is Date Picker, Sequence is 10, and Region is Get Employee Details (1) 10.
- Step 2:** Item Name is P12_DATE, Display As is Date Picker, Label is Date, Label Alignment is Right, Field Width is 30, Field Alignment is Left center, Label Template is Optional with help, and Begin On New Line is Yes.
- Step 3:** Value Required is No, Format Mask is DD-MON-YYYY, Highlighted Date is blank, Minimum Date is -2, Maximum Date is +2, Show on icon click is checked, Show other Months is No, and Navigation List for is None.
- Step 4:** Item Source is Only when current value in session state is null, Source Type is Static Assignment (value equals source attribute), and Item Source Value is blank. Default is also blank.

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To create a date picker item, select Date Picker in the Create Page Item wizard. Click Next and perform the following steps:

1. Enter a name for the item. As a best practice, use the default format P<n>_<item_name> to name the items. Click Next.
2. Accept the defaults or change the item label and display properties. Select the appropriate label template. If you select an option with “with help,” a help window opens when the item label is clicked. If you select a “required” option, a red asterisk is displayed before the label. Click Next.
3. You can specify whether a value is required for the item. If you select Yes, the item is validated to ensure that it is not null when the page is submitted. The options in this step may differ for each item type. For the date picker item, you can specify a format mask, the date to be highlighted, and so on. Click Next.
4. Specify the source for the item. You can also specify a default value for the item. Click Create Item.

You can run the page to check whether the item was created successfully.

Creating Multiple Items: Using the Tabular Form

The screenshot shows the Oracle Application Express interface. At the top, there is a navigation bar with links like 'Home', 'About', 'Help', and 'Logout'. Below it, a 'Create Page' wizard is open, with the second step 'Create Multiple Items' selected. A red box highlights the 'Create multiple items using tabular form' link. A red arrow points from this link down to the main content area. The main content area is titled 'Define New Items' and contains a table with columns: Sequence, Name, Label, Type, Cache, and LOV. The table has 8 rows, each representing a new item. The 'Type' column for the first few rows shows 'Text Field' selected. A dropdown menu is open over the 'Type' column for the 6th row, showing options: Text Field, Textarea, Checkbox, Radio Group, and Hidden. The 'Cache' and 'LOV' columns also contain dropdown menus. At the bottom of the table, there is a 'Create Multiple Items' button.

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You can create multiple text field, text area, radio, check box, and hidden field items by using a tabular form. Perform the following steps:

1. Navigate to the page where you want to create the items and access the Create Page Item wizard.
2. Click the "Create multiple items using tabular form" link at the bottom of the page.
3. On the Create Multiple Items page, select the region to contain the items and select a template for the item labels.
4. For each item that you want to create, enter the name, label, and type.
5. Click Create Multiple Items.

Run the page to confirm that the items were created successfully.

Creating Multiple Items: Using Drag and Drop Layout

The screenshot illustrates the 'Drag and Drop Layout' feature in Oracle Application Express. It consists of three main components:

- Select Region Dialog:** Shows the option "Create multiple items using Drag and Drop Layout" selected.
- Reorder Items Page:** Displays the 'Reorder Items for Page: 12 - Items and Buttons' section. It shows two items: 'P12_MANAGER' (Label: Manager) and 'P12_EMPLOYEE' (Label: Employee). The 'P12_EMPLOYEE' item is highlighted with a yellow background.
- Reorder Items Confirmation Page:** Shows the final state of the items: 'P12_MANAGER' at row 10 and 'P12_EMPLOYEE' at row 20.

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You can use the “Drag and Drop Layout” page to interactively reorder items within a given region, change select item attributes, create new items, or delete existing items. The “Drag and Drop Layout” page is divided into two sections:

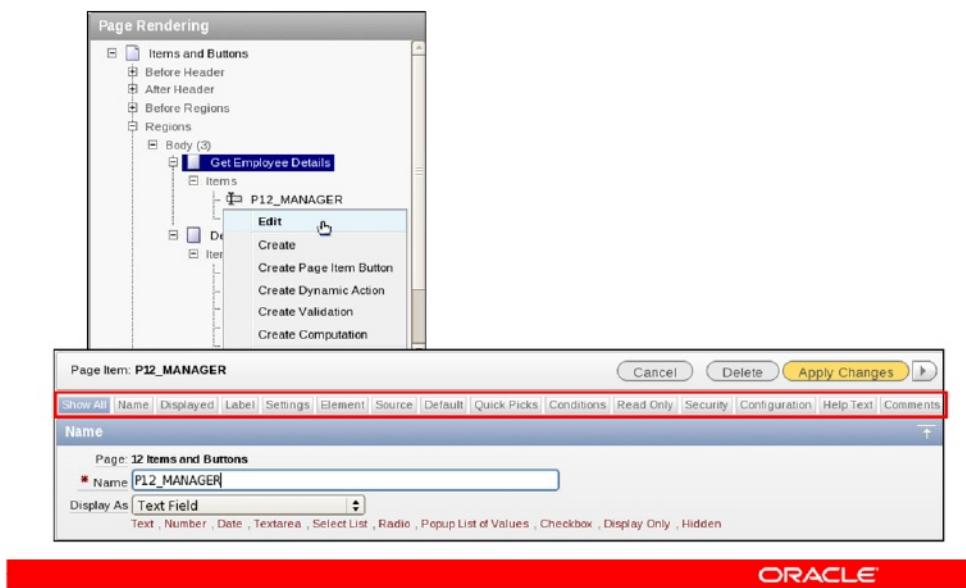
- The Item palette is used to add new items. Click an item type in the palette and drag it to the correct position in the Layout region.
- The Layout region is used to position the items. To move an item vertically, click and drag the Add Row button to insert an empty row. Then drag the item into the empty row.

To create new items on the “Drag and Drop Layout” page, perform the following steps:

1. Click an item type in the Item palette on the left of the page and drag it to the appropriate location in the Layout region.
2. You can reposition the item by selecting the item and dragging it to the appropriate position on the page. You can also insert an existing or new item between two existing rows by clicking the Add Row button and dragging it between the existing rows. This creates an empty row where you can then move an item.
3. Edit the item attributes at the top of the page for each item created and click Next.
4. Review the items and click Apply Changes to create the items.

Run the page to confirm that the items were created successfully.

Editing an Item



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To edit an item, navigate to the Page Definition. Right-click the item node and select Edit. Depending on the type of the item, you can edit the following attributes:

- Name
- Display details
- Label
- Element
- Source
- Default
- List of values
- Security
- Conditions
- Read-only display settings
- Help text
- Configuration
- Comments

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Creating Quick Picks

The screenshot shows two windows. The top window is titled "Get Employee Details" and contains a text input field labeled "Manager" with the value "Neena, Lex, Nancy". An arrow points from this field to the word "Quick Picks" below it. The bottom window is a configuration page for "Page Item: P12_MANAGER". It has tabs for "Show All", "Name", "Displayed", "Label", "Settings", "Element", "Source", "Default", "Quick Picks", "Conditions", "Read Only", "Security", "Configuration", "Help Text", and "Comments". The "Quick Picks" tab is selected. A table lists quick picks: Label 1 (Neena) corresponds to Value 1 (101), Label 2 (Lex) corresponds to Value 2 (102), and Label 3 (Nancy) corresponds to Value 3 (108). There are also empty rows for Labels 4 through 10.

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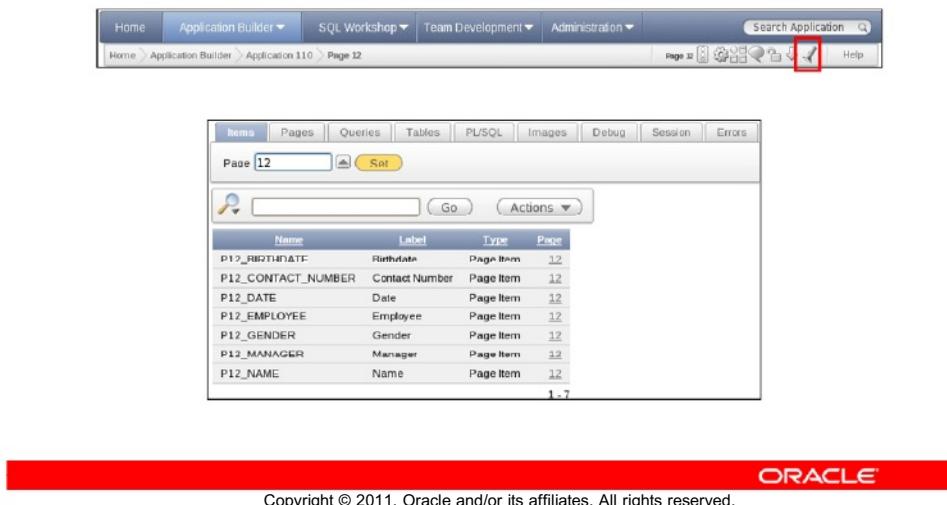
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Quick picks are links that you display below an item. The quick pick links can be clicked to enter a value into the item field. You can create up to 10 selections for items that support quick picks, such as text field, number field, select list, and pop-up LOV.

To create quick picks, right-click the item node and select Edit. Click the Quick Picks tab. Select Yes for Show Quick Picks and enter the label name and value for each quick pick that you want to create. Click Apply Changes and run the page to view the created quick picks. In this example, three quick picks are created for the Manager text field item.

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Finding Items by Using the Item Finder



The screenshot shows the Oracle Application Builder interface. At the top, there's a navigation bar with tabs like Home, Application Builder, SQL Workshop, Team Development, Administration, and a search bar. Below the navigation bar, a breadcrumb trail shows 'Home > Application Builder > Application 110 > Page 12'. On the right side of the toolbar, there's a magnifying glass icon with a red box drawn around it, indicating it's the 'Find' icon. The main content area is titled 'Items' and displays a table of page items for Page 12. The columns are Name, Label, Type, and Page. The data in the table is as follows:

Name	Label	Type	Page
P12_BIRTHDATE	Birthdate	Page Item	12
P12_CONTACT_NUMBER	Contact Number	Page Item	12
P12_DATE	Date	Page Item	12
P12_EMPLOYEE	Employee	Page Item	12
P12_GENDER	Gender	Page Item	12
P12_MANAGER	Manager	Page Item	12
P12_NAME	Name	Page Item	12

At the bottom of the page, there's a red banner with the ORACLE logo and the text 'Copyright © 2011, Oracle and/or its affiliates. All rights reserved.'

To quickly find items on a specific page, perform the following steps:

1. Navigate to the Page Definition page.
2. Click the Find icon at the top-right corner.
3. The items on the selected page are displayed. To find items on another page, enter the page number and click Go. You can also search for a particular string, such as find all items beginning with P2_CUST.
4. Click the page link. The item Edit page is displayed.

Using the other tabs in the Find window, you can also find the following:

- **Pages:** Displays all the pages in the application
- **Queries:** Displays all the queries in the application, along with the respective page number
- **Tables:** Displays all the available tables in your schema
- **PL/SQL:** Displays all PL/SQL expressions, along with the respective page number

- **Images:** Displays all the images in the application
- **Debug:** Displays debugging messages
- **Session:** Displays various information about session state (page and application items, collections, and so on)
- **Errors:** Displays any errors found when running your application

Quiz

Which of the following is not a page item type?

- a. Date Picker
- b. File Browse
- c. HTML
- d. List Manager

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Answer: c

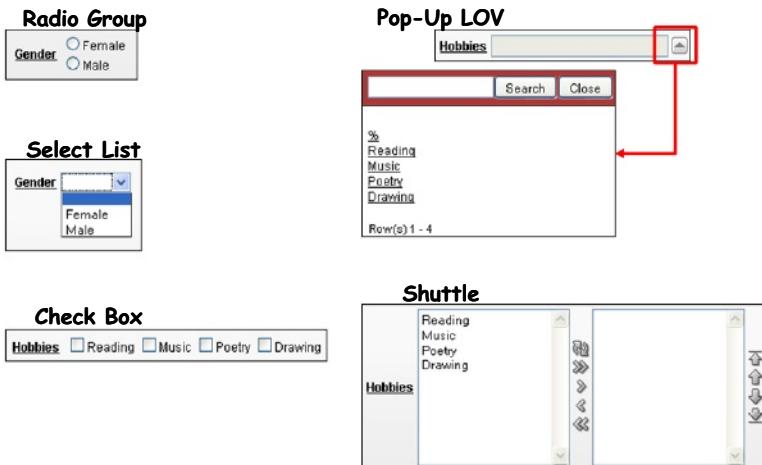
Lesson Agenda

- Introducing Items
- Using Items
- Creating List of Value (LOV) Type Items
 - What Is an LOV?
 - Accessing the Lists of Values Page
 - Creating a Static LOV
 - Creating a Dynamic LOV
 - Associating an LOV with an Item
 - Creating a Select List Item
 - Converting an LOV
 - Creating a Cascading LOV
- Using Buttons



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What Is an LOV?



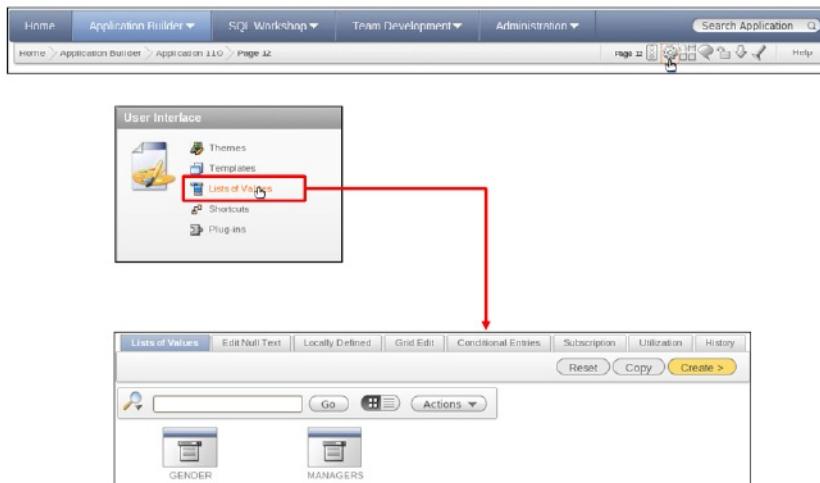
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A list of values (LOV) is used to display values for some specific type of page item, such as a radio group, check box, or select list. You can create an LOV while creating the item or create an LOV as a shared component, and then reference it in one or more items. An LOV can be either of the following:

- **Static:** Based on a set of predefined display and return values
- **Dynamic:** Based on a SQL query that selects values from tables

Accessing the “Lists of Values” Page



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The LOVs that are created as shared components are listed on the “Lists of Values” page. To access the “Lists of Values” page, navigate to the Shared Components page for the application. Under User Interface, click “Lists of Values.” The LOVs that are created for the application are displayed. You can create new LOVs or create a copy of an existing LOV.

Note: Shared component LOVs are also called “named” LOVs.

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Creating a Static LOV

1 **Create List of Values**

A List of Values is a static or dynamic definition used to display a specific type of page item, such as popup lists of values, a select list, a check box, a radio group, or multiple selectlists.

Create List of Values:

- From Scratch
- As a Copy of an Existing List of Values

2 **Create List of Values**

Static lists are based on predefined pairs of display and return values. Dynamic lists are based on a SQL query you write that selects values from a table.

Name: **Gender**
Type: Static
 Dynamic

3 **Create Static List of Values**

Enter static display and return values. Values will display in the order entered. Return Value does not display, but is the value that is returned to the Application Express engine. If you do not specify a Return Value, then it is equal to the Display Value. You can display additional attributes including build option controls and item level conditional display by editing the List of Values.

List of Values Name: **GENDER**

Sequence	Display Value	Return Value
1	Female	F
2	Male	M

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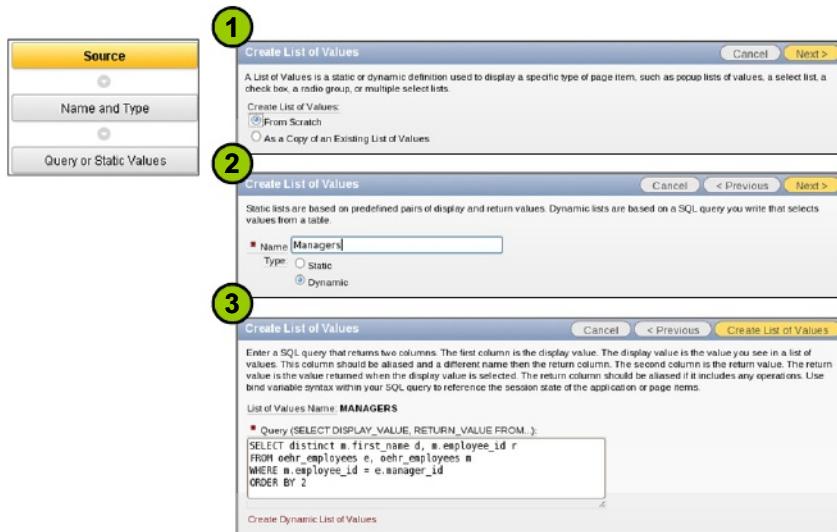
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A static LOV is based on a predefined list of display and return values. To create a static LOV, click the Create button on the "Lists of Values" page and perform the following steps:

1. Select From Scratch and click Next. You can select the second option to create a copy of an LOV from another application in the same workspace.
2. Enter a name for the LOV. Select Static and click Next.
3. Enter the static display and return values. Values are displayed in the order in which they are entered here. The return value is not displayed, and is the value returned to the Oracle Application Express engine. In a case where you do not enter a return value, the display value is also the return value. Click Create List Of Values.

After you add a static LOV to the repository, you can create a check box, radio group, select list, or pop-up list item and reference the LOV there.

Creating a Dynamic LOV



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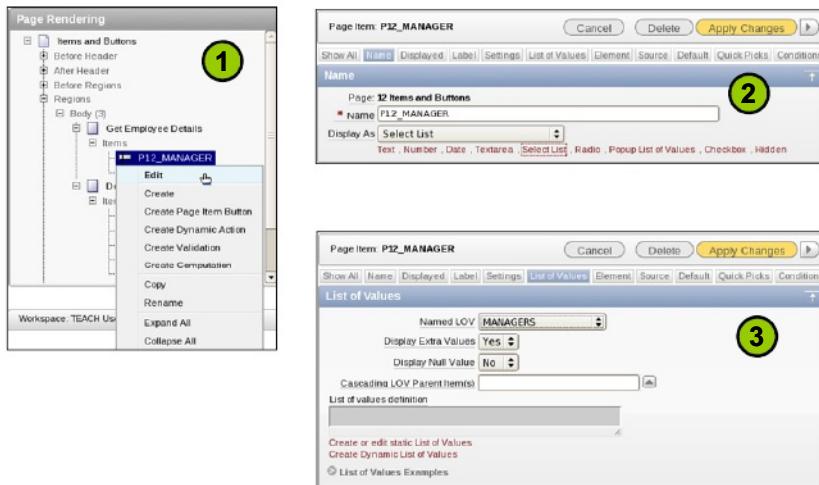
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Dynamic LOVs are based on SQL queries that are executed at run time and select values from tables or views. To create a dynamic LOV, click the Create button on the "Lists of Values" page and perform the following steps:

1. Select From Scratch and click Next.
2. Enter a name for the LOV. Select Dynamic and click Next.
3. Enter a SQL query that returns two columns. The first column returns the values to be displayed in the items list. The second column gives the value that is returned to the Oracle Application Express engine when the display value is selected. You can click the Examples link at the bottom of the page to see sample SQL queries. If the display and return columns are the same, or if a column includes a function or operator, you must use column aliases in the query. Click "Create List of Values."

Associating an LOV with an Item



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You can associate a named LOV with an item that can accept a list of values. To associate an LOV to an item, perform the following steps:

1. Right-click the item node and select Edit.
2. Ensure that the display type is an LOV type item by clicking the Name tab. You can change the display type, if required. In this example, the Manager text field item is changed to a select list item.
3. Click the "List of Values" tab. For Named LOV, select the LOV that you already created. In this example, the Managers LOV is selected. Click Apply Changes.

Run the page to check that the item displays the list of values.

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Creating a Select List Item

The screenshot shows the 'Identify List of Values' page. The application/page is set to 11012, the item name is P12_EMPLOYEE, and it is displayed as a Select List. The 'Display Null Value' field is set to Yes. Below these fields is a text area containing a SQL query:

```
SELECT first_name d, employee_id r
FROM oehr_employees
ORDER BY 1
```

At the bottom of the page, there are links to 'Create or edit static List of Values' and 'Create Dynamic List of Values'.

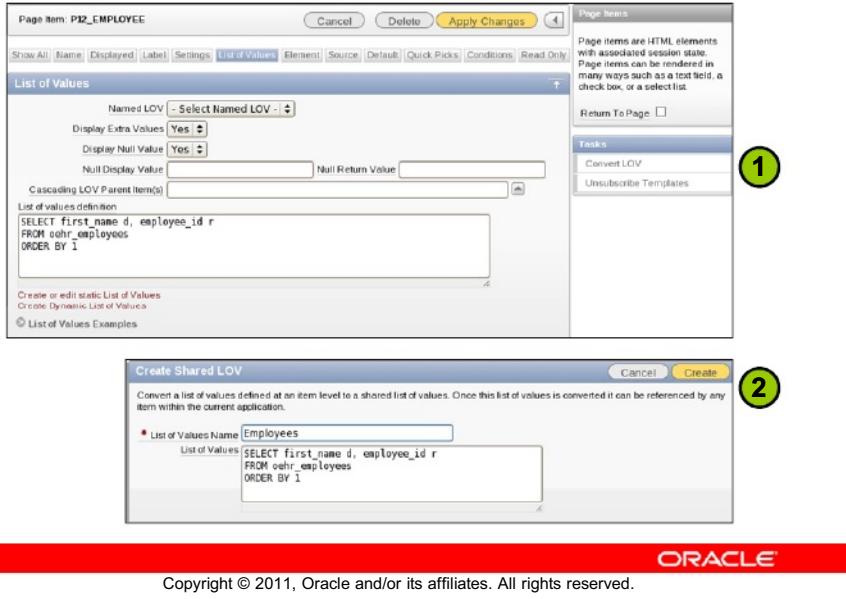
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The steps to create a Select List item are similar to creating a date picker item that was discussed in earlier slides. In addition, you specify the List of Values for the item. You can do this in two ways:

- Create a list of values as a shared component and reference it here.
- Enter the list of values in the text area. You can view syntax examples by clicking the "List of Values Examples" node at the bottom of the page.

In the slide example, the SQL query is entered in the text area. You can click the links below the text area to create a static or dynamic list of values.

Converting an LOV



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The LOVs that are defined while creating an item (as discussed in the previous slide) can be used only for that item. You have an option to convert this LOV to a named LOV so that you can reuse it for other items. Right-click the item that has the LOV defined and select Edit.

Perform the following steps:

1. Click the “List of Values” tab and review the SQL query.
2. Under Tasks, click Convert LOV.
3. Enter a name for the LOV and click Create.

The LOV is converted to a shared component LOV and is listed in the Shared Components region of Page Definition. Shared Components are discussed in greater detail in the lesson titled “Adding Shared Components That Aid Navigation.”

Creating a Cascading LOV

The values displayed in the Employee select list depend on the Manager that is selected.

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A cascading LOV is a dynamic LOV that references another page item for its list of values. For example (shown in slide), you can populate an Employees item with the names of employees who work for the manager entered in the Manager item. You can define a cascading LOV while creating the item or by editing the item. Before creating a cascading LOV, you must first create the item that is referred to. To define a cascading LOV for an existing item, perform the following steps:

1. Navigate to the appropriate page definition. Right-click the item node and select Edit .
2. Click the "List of Values" tab.
3. Click the pop-up icon for the Cascading Parent Item(s) field and select the item that you want to refer in the SQL query.
4. Select the page items to submit.
5. Modify the SQL query to include the referred item in the WHERE clause. If you have selected a named LOV for the item, you must edit the named LOV from the List of

Values page. Click Apply Changes.
Run the page to confirm whether the items are populated as required.

Note: You can define a cascading LOV only for LOV-type items such as select list, check box, and pop-up LOV.

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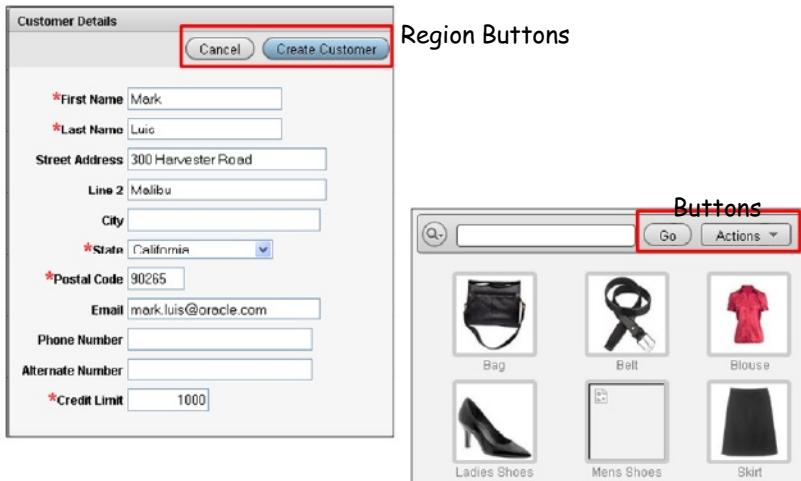
Lesson Agenda

- Introducing Items
- Using Items
- Creating List of Value (LOV) Type Items
- Using Buttons
 - What Is a Button?
 - Creating a Button
 - Creating a Region Button
 - Accessing the Create Multiple Buttons Option
 - Creating Multiple Buttons
 - Editing Button Attributes
 - Modifying a Button to Redirect to a URL
 - Branching with Buttons



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What Is a Button?



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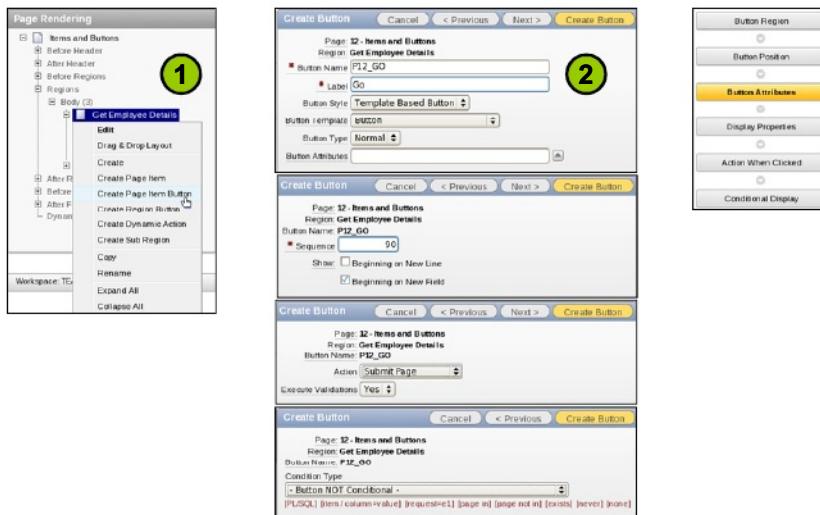
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A button is an interface element that is used to either submit a page or navigate to another page or URL. You can create a button that is placed next to other page items. You can also create region buttons that are placed in predefined region templates.

When you use wizards to create page components such as reports and forms, some buttons (such as Cancel, Save, Create, and Delete) are automatically created.

In this lesson, you learn how to create a region button named CANCEL, which, when clicked, clears the cache for the items on a page and redirect to another page. You also create a button named GO next to an item, which, when clicked, submits the page items and display a report region.

Creating an Item Button



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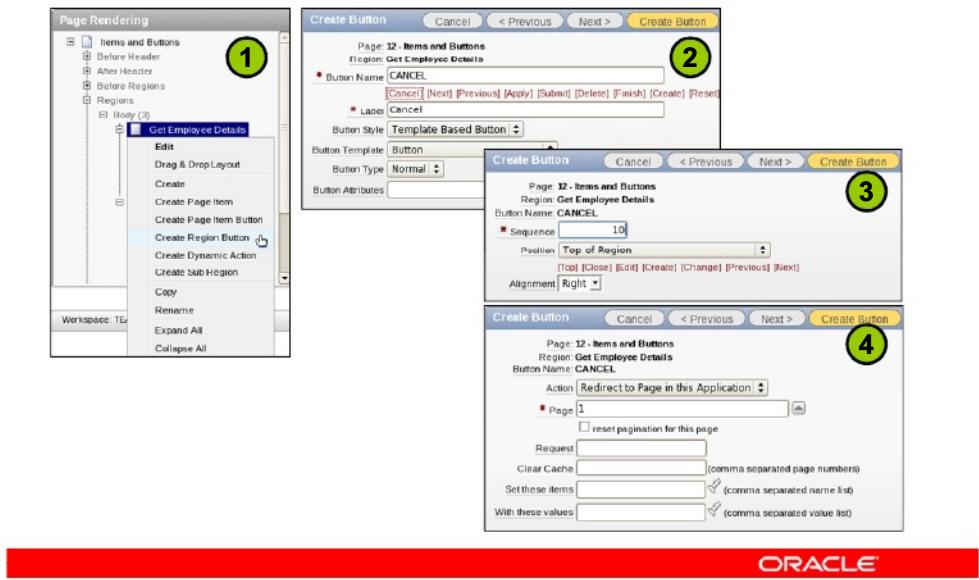
To create a new button, navigate to the Page Definition and perform the following steps:

1. Identify the region to contain the button. Right-click the region node and select Create Button.
2. Fill details in the Create Button wizard and click Create Button.
 - Enter a name for the button.
 - Specify whether the button should display in a separate line or next to the previous item.
 - Enter a label name.
 - Select a style for the button.

The button is created.

If you run the page and click the button, you notice that the page gets submitted. You can now define the actions that are required when the page is submitted.

Creating a Region Button



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To create a region button, navigate to the Page Definition and perform the following steps:

1. Right-click the region where the button should be created and select Create Region Button.
2. Enter a name for the button (you can use the quick pick links that are available) and the label (when you enter a name in the Button Name field, the Label field automatically populates). Specify the button style.
3. Specify where and how the button should be displayed.
4. Select the action that is required when the button is clicked. In this example, you redirect to another page in the application. Click Create Button.

You can click Next if you want to specify a condition for the button to be displayed. You can run the page to verify that the button was created successfully.

Accessing the Create Multiple Buttons Option



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You can create multiple buttons within the same region simultaneously by using the Create Multiple Buttons wizard. To access the wizard, perform the following steps:

1. In the page definition, click the down arrow on the Create button and select “Page control on this page.”
2. Select Button and click Next.
3. Under Tasks, click Create Multiple Buttons.

Creating Multiple Buttons

Sequence	Name	Label	Position	Attributes
10	CANCEL	Cancel	Region Template Position #CLOSE#	
20	PREVIOUS	< Previous	Region Template Position #PREVIOUS#	
30	NEXT	Next >	Region Template Position #NEXT#	
40	SUBMIT	Submit	Region Template Position #CREATE#	
50			Bottom of Region	
60			Bottom of Region	
70			Bottom of Region	
80			Bottom of Region	
90			Bottom of Region	
100			Bottom of Region	
110			Bottom of Region	
120			Bottom of Region	

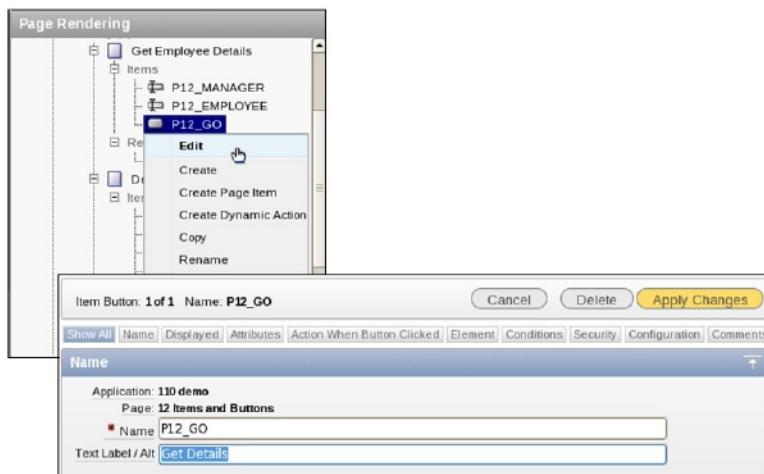
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On the Create Multiple Buttons page, specify the region to contain the buttons and a style for the buttons. For each button that you want to create, enter a name, label, and position. You can use the links under Quick Buttons to create some commonly used buttons.

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Editing Button Attributes



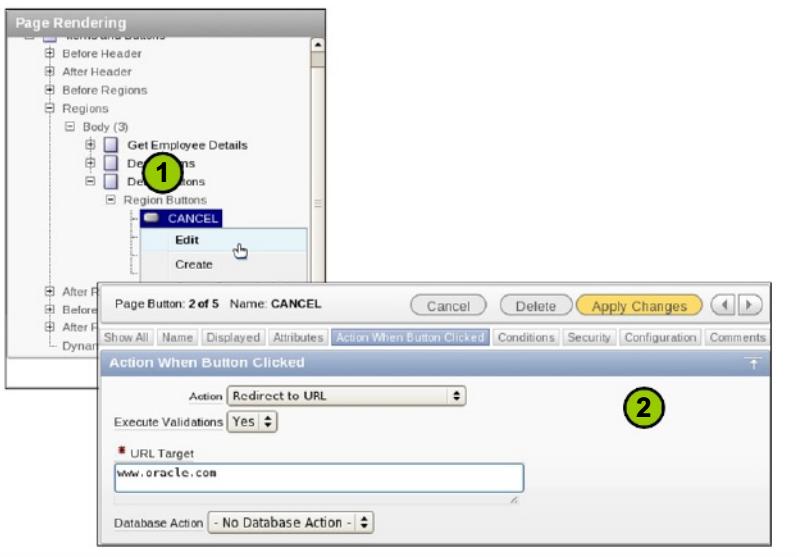
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After you create a button, you can edit its attributes on the Edit Button page. To access the Edit Button page, right-click the button node in the page definition and select Edit. You can modify the button properties and click Apply Changes to save your changes.

Modifying a Region Button to Redirect to a URL



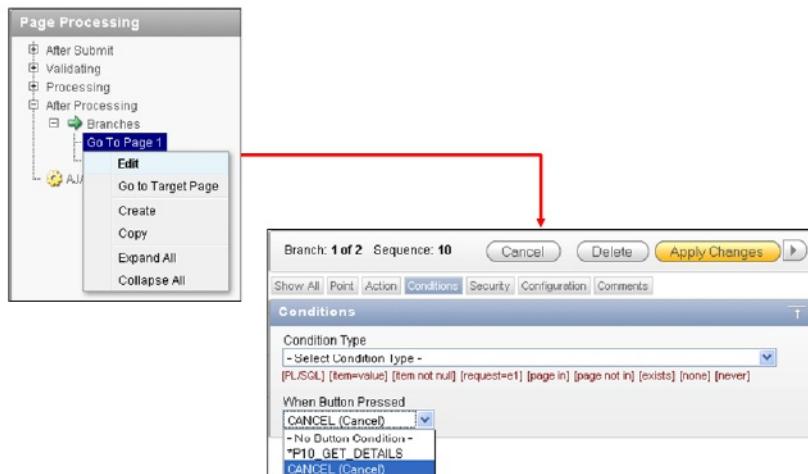
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To edit a region button, navigate to the Page Definition and perform the following steps:

1. Right-click the button name and select Edit. (The button is listed under the Region Buttons node for the region).
2. Click the Action When Button Clicked tab. Select "Redirect to URL for Action" and enter the URL in the text area. In the slide example, the URL that is entered is <http://www.oracle.com>.

Branching with Buttons



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When a branch is associated with a button, it is invoked only if a user clicks the associated button. You can associate a branch with a button on the page while creating the branch or by editing a branch. The slide example shows how to edit a branch. Right-click the branch and select Edit. Click the Conditions tab and select a button from the When Button Pressed select list. Click Apply Changes to save your changes.

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Quiz

Which of the following statements are true about buttons?
(Choose all that apply.)

- a. You can place a button in any position defined in the region template.
- b. A button cannot branch to a URL without submitting the page.
- c. Each page can include any number of branches.
- d. Branching can be conditional.



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Answer: a, c, d

Summary

In this lesson, you should have learned how to:

- Identify the different types of items
- Create items and edit item attributes
- Create and use lists of values
- Create buttons and edit button attributes

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In this lesson, you learned about items and buttons. You learned how to create items and buttons as well as how to edit their attributes.

Practice 9: Overview

This practice covers the following topics:

- Creating a blank page
- Creating and adding items and buttons to pages
 - Date picker
 - Text area
 - Text
 - Select list
 - Oracle Application Express table item
 - Submit and Cancel buttons
- Editing item and button attributes



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10

Creating Page Processes

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Objectives

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

- Explain the difference between page rendering and page processing
- Create computations on application pages
- Create page processes
- Create validations to verify user input
- Create branches within an application



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This lesson explains how the Oracle Application Express engine renders and processes a page. You create computations, validations, and processes that are executed when the page is processed. You create page branches to enable navigation between pages after processing.

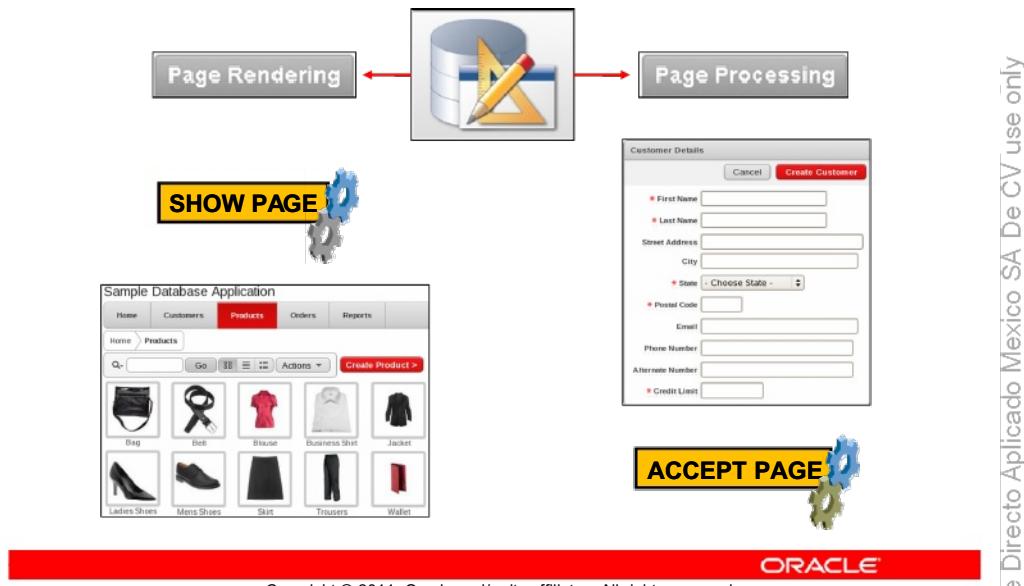
Lesson Agenda

- Introducing Page Processing
 - Page Rendering Versus Page Processing
 - Types of Logic
 - Scenarios
- Including Computations
- Including Processes
- Including Validations
- Including Branches



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Page Rendering Versus Page Processing



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Oracle Application Express performs page rendering and page processing.

Page rendering occurs when the APEX engine assembles a page from the database, using a Show Page process. For example, when you request a page by using a URL, the APEX engine runs Show Page. You use the Page Rendering section of a page definition to modify the controls that impact the rendering of a page, including page attributes, regions, buttons, items, computations, and processes.

Page processing occurs when the APEX engine executes a process by using the data submitted from a page. For page processing, the APEX engine runs an Accept Page process. Typically, a page is submitted when a user clicks a button. You use the Page Processing section of page definition to specify application logic such as computations, validations, processes, and branches.

Types of Logic

	Page Rendering	Page Processing
Computations	✓	✓
Processes	✓	✓
Validations		✓
Branching		✓



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There are four types of logic that you can perform on a page: computations, processes, validations, and branching. The point at which the logic is performed can be specified when the logic is created. If you have more than one process or computation defined at the same point, you can specify a sequence order.

Page rendering computations and processes are performed when the HTML page is assembled and displayed, whereas page-processing computations and processes are performed when the page is submitted to the APEX engine.

Scenario 1: Page Rendering

The screenshot shows two pages from an Oracle Application Express application. The top page is a list of customer records with columns: Customer Name, Address, City, State, and ZIP Code. A red box highlights the 'Create Customer >' button. The bottom page is a 'Customer Details' form with fields for First Name, Last Name, Street Address (Line 1 and Line 2), City, State (a dropdown menu), Postal Code, Email, Phone Number, Alternate Number, and Credit Limit. Red boxes highlight the 'Cancel' and 'Create Customer' buttons. A red arrow points from the 'Create Customer' button on the list page down to the 'Create Customer' button on the form page. Another red arrow points from the 'Cancel' button on the form page back up to the 'Cancel' button on the list page.

Click Create Customer to view empty form page.

On Cancel, another page is rendered.

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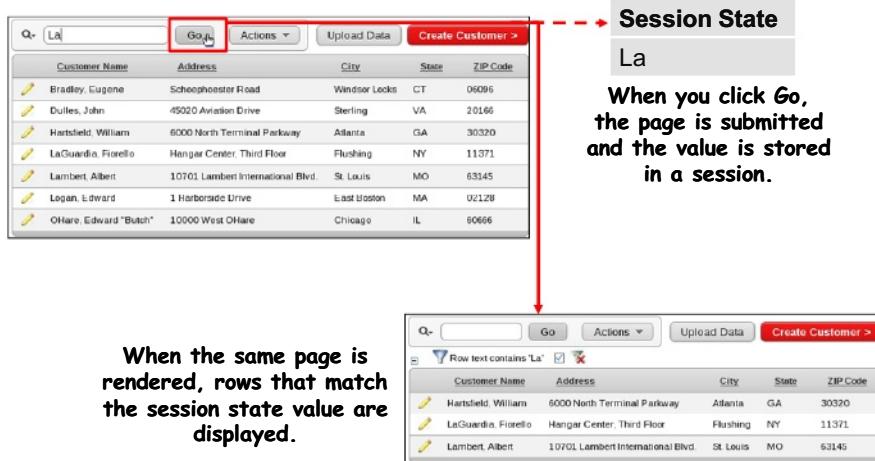
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In the example in the slide, one page redirects to another page. When you click the Create Customer button, the page is submitted and a branch to a form page is invoked.

When you click the Cancel button on the form page, you are redirected to the previous page. Nothing is submitted, so there is no page processing.

Scenario 2: Page Processes



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In the example in the slide, you have a report with a search bar. When you enter a search criterion and click the Go button, the page is submitted. A process stores the search value in a session state and a branch to the same page is invoked. When the page is displayed again, a process runs to display only those rows that match the value stored in the session state.

Scenario 3: Page Processes

The session value is used to fetch the row.

Session State

ID

When you click Edit, the ID value is stored in session state, and the page is redirected.

Customer Details

Customer Name: Bradley, Eugene
Address: Schoephoester Road
City: Windsor Locks
State: CT
ZIP Code: 06096

Customer Name: Dulles, John
Address: 45020 Aviation Drive
City: Sterling
State: VA
ZIP Code: 20166

Customer Name: Hartsfield, William
Address: 6000 North Terminal Parkway
City: Atlanta
State: GA
ZIP Code: 30320

Customer Name: LaGuardia, Fiorello
Address: Hangar Center, Third Floor
City: Flushing

Customer Name: Lambert, Albert
Address: 10701 Lambert International Blvd.
City: St. Louis

Customer Name: Logan, Edward
Address: 1 Harborside Drive
City: East Boston

Customer Name: O'Hare, Edward "Butch"
Address: 10000 West O'Hare
City: Chicago

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This slide explains another scenario to understand page processing. In this example, you have an editable reports page. When you click the Edit icon for a row in the report, the ID value for the row is stored in session state and you are redirected to a forms page. When the form page is displayed, a process runs to fetch the row details by using the ID value stored in the session state.

Scenario 4: Page Validation

Customer Details

Customer Details form fields:

- * First Name: Eugene
- * Last Name: Bradley
- Street Address: Schoephoester Road
- Line 2:
- City: Windsor Locks
- * State: Connecticut
- * Postal Code: 06096
- Email:
- Phone Number: (860) 555-1835
- Alternate Number:
- * Credit Limit: 1000

Customer Record Processed.

Customer Record Processed table:

Customer Name	Address	City	State	ZIP/Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Dulles, John	45020 Aviation Drive	Sterling	VA	20166
Hansfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hanger Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145
Logan, Edward	1 Harborside Drive	East Boston	MA	02128
O'Hare, Edward "Butch"	10000 West O'Hare	Chicago	IL	60656

1 error has occurred

- Credit Limit must not exceed \$5,000. ([Go to error](#))

If you get an error, a message is displayed on the same page, and no processing or computation occurs.

On success, the insert row process is executed and another page is displayed.

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In the example in the slide, you have a forms page. You enter the form details and click the Apply Changes button. The page is submitted and the validations that are created for the page are executed. If you entered data as required by the form and all validations run without error, a success message is displayed. In this example, an insert row process is executed and you are redirected to another page with a success message displayed in the notification area. If any validation fails, an error message is displayed.

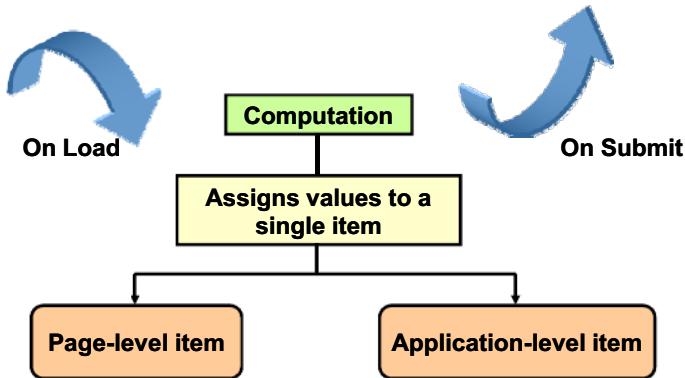
Lesson Agenda

- Introducing Page Processing
- Including Computations
 - What Is a Computation?
 - Computation Use Cases
 - Creating an On Load Computation
 - Creating an On Submit Computation
- Including Processes
- Including Validations
- Including Branches



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What Is a Computation?



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A computation is logic that assigns values to a single item. You can create computations that are executed when a page is rendered or when a page is processed. You can use computations on page items and application-level items. Application-level computations assign a value to an application item when any page in an application is rendered or processed. A typical use of application computation is to store the number of the last page visited. In contrast, page-level computations assign a value to an identified item when a page is displayed or submitted (rendered or processed). The following slides discuss how to create page computations.

Computation Examples

- Page-rendering computations
 - You want to retrieve values (such as total order or existing orders) from the database when a page is displayed.
 - You want to set the value of an item, depending on the existing values in the database or on some conditions.
- Page-processing computations
 - You want to store the values that are entered in two or more fields in a form in a single database column.
 - You want to perform calculations (such as handling fees) based on the values (the order) entered in a form.



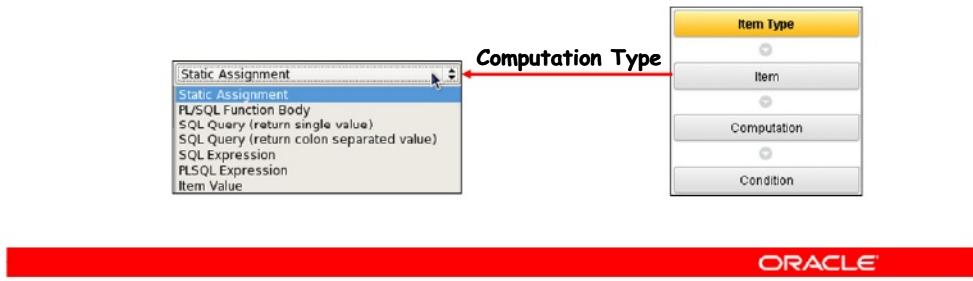
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The slide lists some scenarios when you can create page rendering or page-processing computations.

Creating Computations

Access the Create Computation wizard, and then do the following:

1. Specify the item type.
2. Select the item, computation point, and computation type.
3. Enter the computation.
4. Specify a condition (optional).



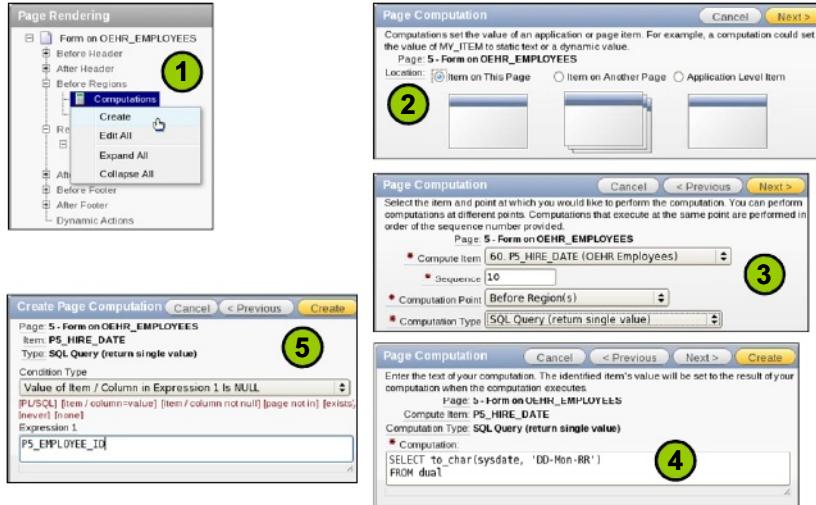
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To access the Create Computation wizard in tree view, identify the node where you want to create the computation. For example, before or after a header, region, or footer in the Page Rendering section or after submit in the Page Processing section. To access the wizard in the Component view, click the create icon in the Computation section of page rendering or page processing.

To create a computation, perform the following steps:

1. Identify whether the item on which you want to create a computation is an item on the current page or a different page, or is an application item. Click Next.
2. Select the item from the list on which you want to create a computation. Specify whether the computation should be executed before or after the header, region, or footer or on submit. Select On New Instance if you want the computation to be executed for each new session. Select the type of computation that you want to create. Click Next.
3. Enter the computation to be executed. The syntax of the computation should correspond to the computation type that you selected in step 2. Click Next.
4. Optionally, add a condition. The computation will be executed only when the condition is met. Click Next.

Creating a Page-Rendering Computation



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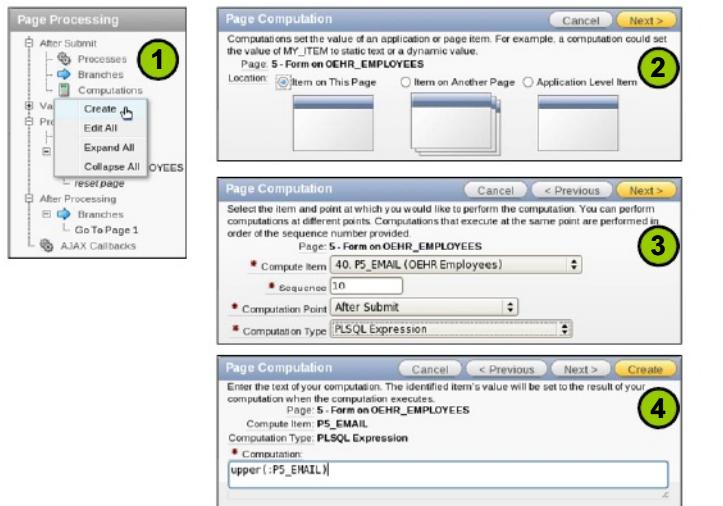
In this example, you create a computation before the regions are rendered to set the value of the hire_date field to the current date. To create this page-rendering computation, perform the following steps:

1. Right-click Computation under the Before Regions node in the Page Rendering section and select Create.
2. Select “Item on This Page.” Click Next.
3. Select P<n>_HIRE_DATE for Compute Item. Select SQL Query for Computation Type. Click Next.
4. In the Computation field, enter TO_CHAR (sysdate, ‘DD-Mon-RR’) and click Create.

The Computation is created and is listed under the Computations node.

When the hire_date item is created by the Create Form wizard, the default value of the item Source Used is “Always, replacing any existing value in the session state.” For this example to work, you need to change this to “Only when current value in session state is null.”

Creating a Page-Processing Computation



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You can define the computations to be performed when the page is submitted from the Computations region of the Page Processing section. This computation is different from the computations of the page-rendering process.

In this example, you want to specify that `P<n>_CUST_EMAIL` that is entered should be stored in the database in uppercase. To create this page-processing computation, perform the following steps:

1. Right-click Computation under the After Submit node in the Page Processing section and click Create.
2. Select “Item on This Page” and click Next.
3. Select `P<n>_EMAIL` for Compute Item, PLSQL Expression for Computation Type, and click Next.
4. In the Computation field, enter `upper (:P<n>EMAIL)`. In this example, you do not want any conditions. Click Create to create the computation. (To specify a condition, click Next).

The Computation is created and is listed under the Computations node.

Quiz

Which of the following computation points would you select to execute the computation before the page is rendered?

- a. On New Instance
- b. Before Header
- c. After Header
- d. After Submit

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Answer: b

Lesson Agenda

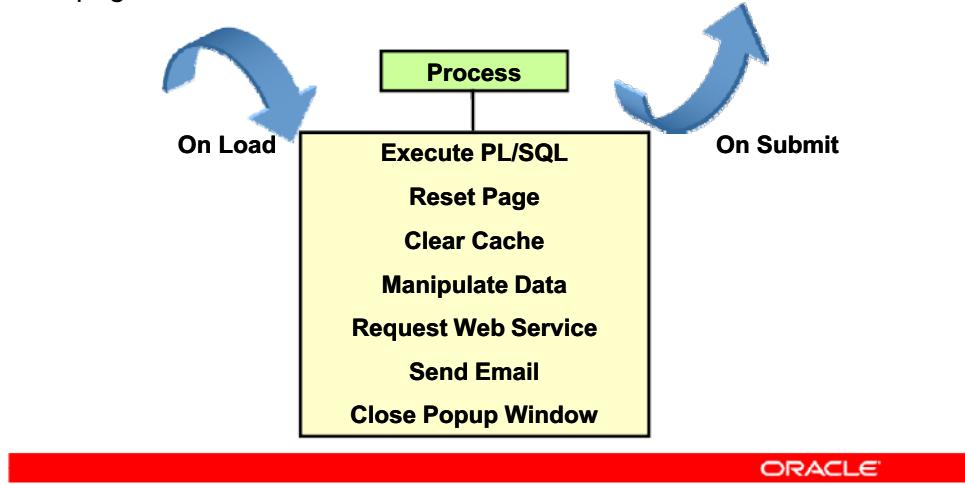
- Introducing Page Processing
- Including Computations
- Including Processes
 - What Is a Page Process?
 - Reviewing Automatically Created Processes
 - Creating an On Load Process
 - Creating an On Submit Process
 - Options to Populate Items in a Form
 - Creating a Tabular Form Process
- Including Validations
- Including Branches



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What Is a Page Process?

A page process is used to perform a specific action when a page is rendered or submitted.



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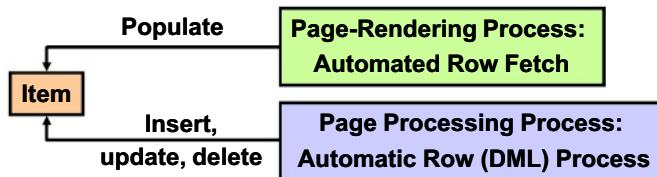
A page process is a specific event that runs when a page is loaded or submitted. You create a page process to execute some code (such as SQL or PL/SQL) or to make a call to the rendering engine. For example, you create a page process to alter data through an `INSERT`, `UPDATE`, or a `DELETE` statement.

When you use wizards, such as Create Report or Create Form, some processes are automatically created. For example, a process to insert, update, or delete a row from the database is created when the user clicks the appropriate button. The next few slides discuss some automatically created processes.

Automatic Processing Processes

Oracle Application Express provides automatic data manipulation language (DML) processing.

- You are not required to provide any SQL code.
 - Just reference a database column.
- The processes automatically perform lost update detection.



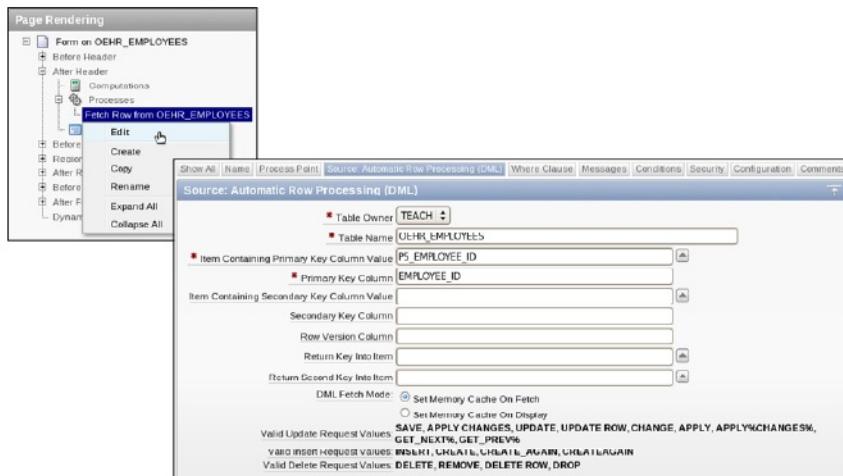
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When you create a form by using the Create Form wizard, the wizard creates two processes:

- The Automated Row Fetch process that is executed when a page is rendered. This process populates the items by fetching data from the database.
- The Automatic Row (DML) process that is executed when a page is submitted. This process updates the database by using INSERT, DELETE, or UPDATE commands.

These processes are automatic in that you must specify only the database column names and not any SQL code. They also perform lost update detection. Lost update detection ensures that data integrity in applications is maintained where data can be accessed concurrently.

Reviewing an Automated Row Fetch Process



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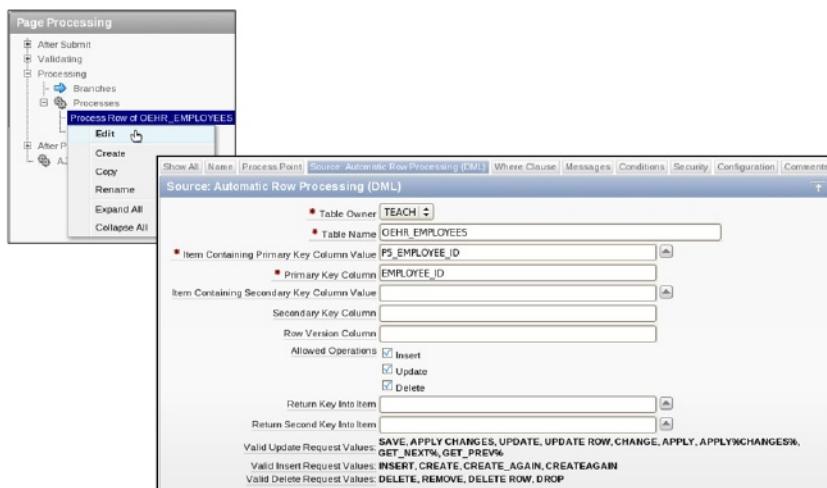
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An Automated Row Fetch process populates the fields in a form by retrieving data from a database table, by using a primary key column value.

To view an Automated Row Fetch process, navigate to the page definition of the page that contains a form created by the Create Form wizard. Perform the following steps:

1. Under the Page Rendering section, right-click "Fetch Row from <table_name>" under the After Header node and select Edit.
2. The Edit Page Process page opens. You can view the process details. Click the Source tab. The table name, item name, and column name are listed.

Reviewing an Automatic Row (DML) Processing Process



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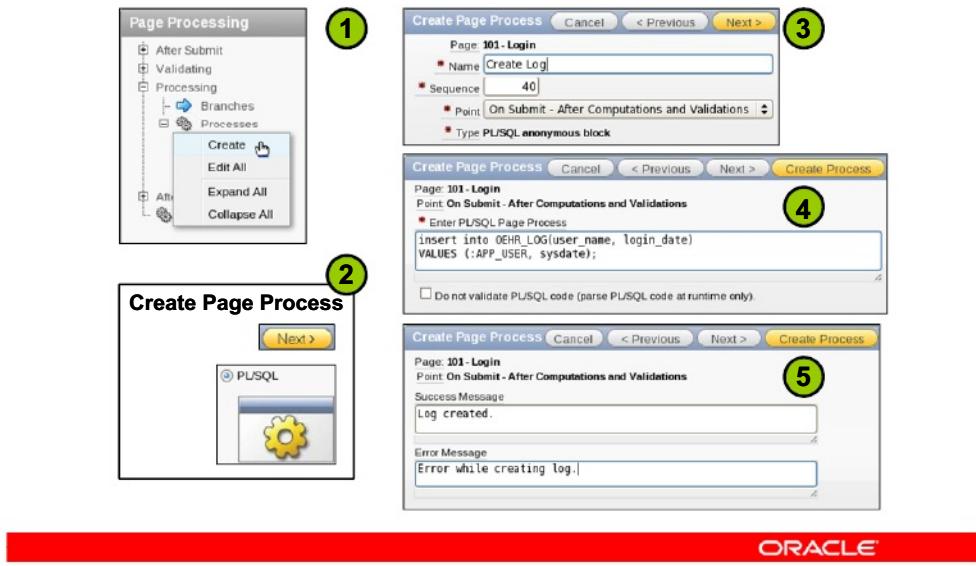
An Automatic Row (DML) Processing process updates the database.

To view an Automated Row (DML) process, navigate to the page definition of the page that contains a form created by the Create Form wizard. Perform the following steps:

1. Under the Page Processing section, right-click “Process row of <table_name>” under the Processing node and select Edit.
2. The Edit Page Process page opens. You can view the process details. Click the Source tab. The table name, item name, column name, and the operations that are allowed on the table are listed.

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Creating an On Submit Process

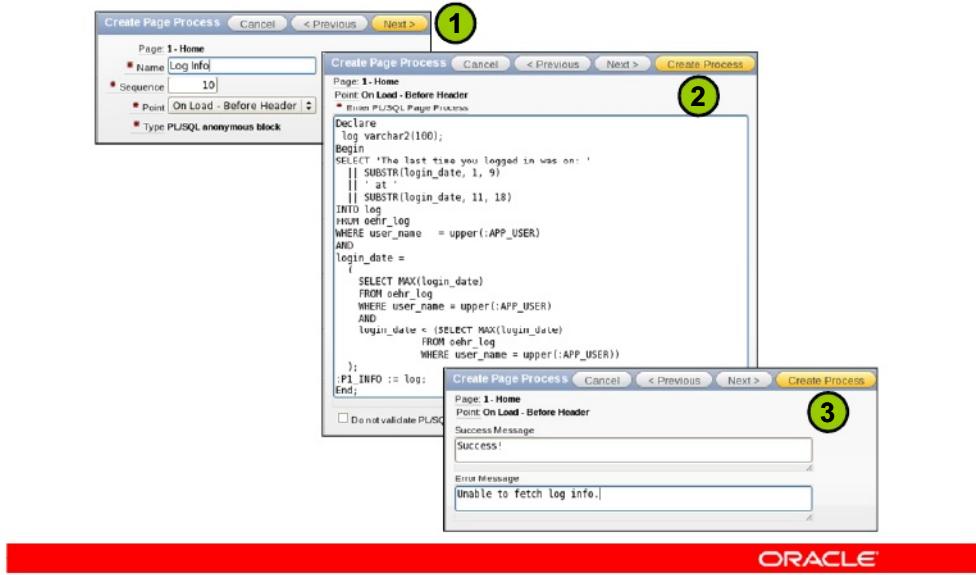


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In this example, you create an On Submit process to perform a logging function. Whenever users log in to the application, you want to store the user's name and the login date and time in a database table. To create the page process, perform the following steps:

1. From the page definition for the Login page, right-click the Processes node under Processing in the Page Processing section and select Create.
2. Select PL/SQL for process type and click Next.
3. Enter a name for your process and accept the other default values. Click Next.
4. Enter the PL/SQL code in the text area. In this example, an `INSERT` command to enter the application user name (`:APP_USER`) and the date/time information (`sysdate`) into an `OEHR_LOG` table is entered.
5. Enter the Success and Failure messages. Click Create Process. Optionally, you can specify a condition for executing the process by clicking Next.

Creating an On Load Process



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In this example, you create an On Load process to retrieve the date and time that a user last logged in to the application. To create the page process, navigate to the page definition for the page where you want to display the details. Right-click the Processes node under Before Regions in the Page Rendering section and select Create. Select PL/SQL for the process type, click Next and then perform the following steps:

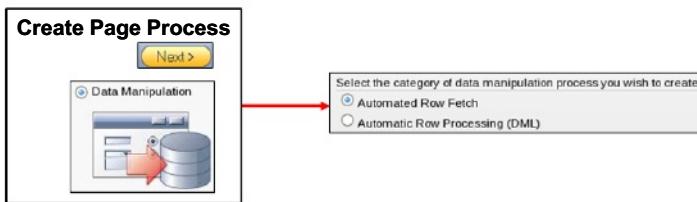
1. Enter a name for your process and accept the other default values. Click Next.
2. Enter the PL/SQL code in the text area. In this example, a `SELECT` query to retrieve the date and time that the user last logged in is entered.
3. Enter the Success and Failure messages. Click Create Process. Optionally, you can specify a condition for executing the process by clicking Next.

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Options to Populate Items in a Form

Items in forms are populated in one of the following ways:

- Create a form by using the wizard, and an Automated Row Fetch process is created automatically.
- Create a page-rendering process manually and define the type as Automated Row Fetch.
- Populate the form manually by referencing an item in a session state.



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In the previous slides, you reviewed the Automated Row Fetch process and also saw how to create a page process. To populate items in a form, you can use the Create Form wizard so that the wizard automatically creates the required processes for you. Using the Create Form wizard was covered in the lesson titled “Creating Forms.”

You can also create your own process. For this, you must select the Data Manipulation process type in the Create Page Process wizard. You can then use the available options to create an automated process.

Alternatively, you can also populate the form manually by referencing an item in a session state.

Creating a Tabular Form Process



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You can create processes on tabular forms. Perform the following steps:

1. Navigate to the page definition where the tabular form is created.
2. Select the Processes node, depending on when you want the process to execute.
3. Right-click the Processes node and select Create.
4. Select the tabular form from the Tabular Form list.
5. Select the type of process that you want to create and follow the wizard instructions.

Lesson Agenda

- Introducing Page Processing
- Including Computations
- Including Processes
- Including Validations
 - What Are Validations?
 - Using the Create Validation Wizard
 - Creating a SQL Validation
 - Creating a PL/SQL Validation
 - Creating an Item String Comparison Validation
 - Creating a Regular Expression Validation
 - Creating a Tabular Form Validation
- Including Branches



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What Are Validations?

The screenshot shows a 'Customer Details' form with the following fields and their values:

- * First Name: Jackson
- * Last Name: (empty)
- * State: Alabama
- * Postal Code: 35291
- Email: (empty)
- * Credit Limit: 6000

Validation messages displayed:

- Last Name must have some value. ([Go to error](#))
- Salary should be less than 5000. ([Go to error](#))

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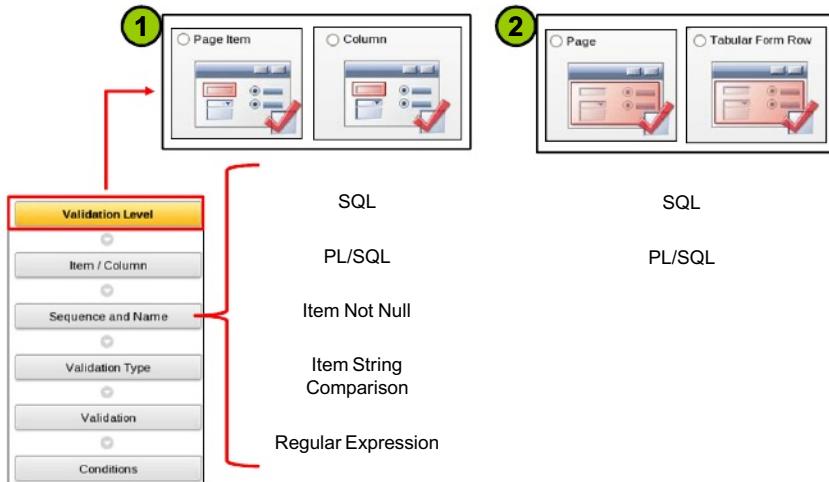
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A validation is a logical control to verify data. You create validations to ensure that an application user enters valid and accurate data. If all the validations created on the page succeed, Oracle Application Express proceeds to the next step of processing; otherwise, Oracle Application Express redraws the page and displays the items along with the validation messages.

When you use the Create Form wizard, some validations are automatically created. For example, a Not Null validation is created for items that refer to a database column that is defined as Not Null. Similarly, if the database column is of type NUMBER, a validation to check that only numeric values are entered is created.

The slide example shows a form created by using the Create Form wizard. The Not Null validations are created automatically by the wizard. The form also displays a red symbol for items that have their columns set as Not Null. A validation for the Credit Limit field is manually created to ensure that a value higher than 5000 is not entered.

Using the Create Validation Wizard



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You can define a validation declaratively by using the Create Validation wizard. To access the Create Validation wizard, navigate to the page definition of the page where you want to create the validation. In the Page Processing section, right-click Validations under the validating node and select Create.

You can create two types of validations, depending on your form type:

- Page Item / Column Validation:** This validation is specific to a single item. If you select this option, the items on the current page are listed and you can choose the item that you want to validate. You can select from five methods, as listed in the slide, to define the validation. In the next few slides, you will see the creation of validations by using four of the methods. How to create a Not Null validation is not discussed. You can actually specify an item to be Not Null in the attributes of the item itself. If your form is a tabular form, you can create a validation on an entire column.
- Page / Tabular Form Row Validation:** This validation does not apply to any single item. It applies to an entire page. Or, in the case of a tabular form, it applies to a row. These validations can be of type SQL or PL/SQL.

The validation that you enter must be consistent with the validation type that you select.

SQL Validation: Example

Create a validation to ensure that the salary entered is not a negative number.

The screenshot shows a form titled "OEHR Employees" with fields for First Name, Last Name, Email, Phone Number, Hire Date, Salary, Commission Pct, Manager Id, Department Id, and Job Id Id. A validation error message is displayed in a red box at the top: "1 error has occurred" followed by "Salary should be greater than zero! (Go to error)". The "Salary" field contains "-250".

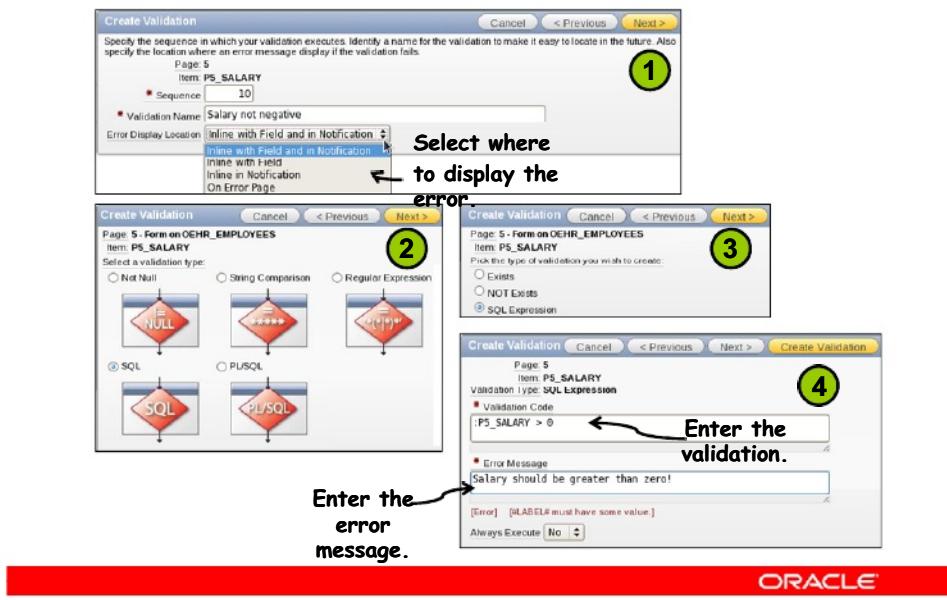
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In this example, you create a validation to ensure that the value entered in the Salary field is not a negative value. You will display the error message in the notification area and next to the Salary item.

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Creating a SQL Validation



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To create a SQL validation, access the Create Validation wizard. Select Page Item Validation and click Next. Select the salary item and click Next. Perform the following steps:

1. Enter a name for the validation and from the Error Display Location drop-down list, select a location to display the error. In this example, “Inline with Field and in Notification” is selected. Click Next.
2. Select SQL and click Next.
3. Select the type of SQL validation that you want to create and click Next. In this example, SQL Expression is selected.
4. Enter the validation and the error message. In this example, the value of the salary item should be greater than zero. Therefore, :P<n>_SALARY > 0 ; is entered. Click Create.

Run the form and fill in the details. In the Salary field, enter a negative number and click Apply Changes. You should get an error message in the notification area and next to the Salary item.

PL/SQL Validation: Example

Create a validation to calculate the maximum salary and to ensure that the salary entered is not more than 10% of the maximum salary.

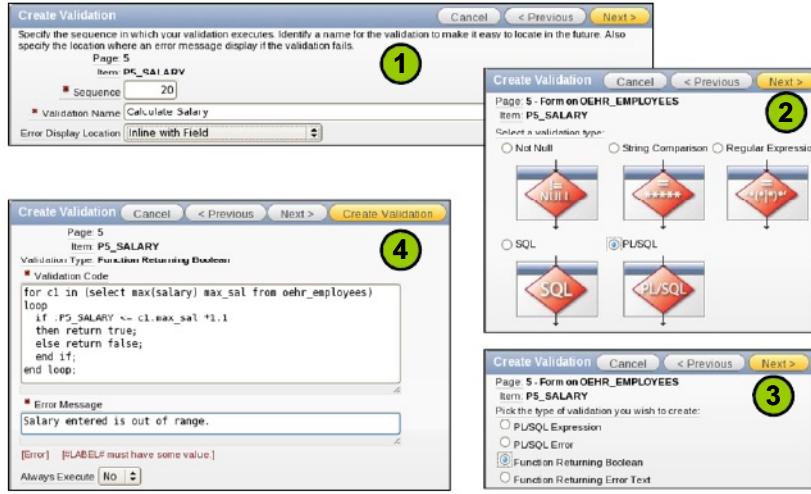
The screenshot shows a modal dialog titled "1 error has occurred" over a form titled "OEHR Employees". The form contains fields for First Name (Jackson), Last Name (Lord), Email (JACKSON.LORD@ORACLE.COM), Phone Number, Hire Date (12-Oct-11), Salary (100000), Commission Pct, Manager Id, Department Id, and Job Id Id (AC_ACCOUNT). A red error message "Salary entered is out of range." is displayed next to the Salary field. The Oracle logo is at the bottom right of the page.

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In this example, you want to make sure that the salary entered is not higher than 10% of the maximum salary. You will display the error message only next to the Salary item.

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Creating a PL/SQL Validation



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To create a PL/SQL validation, access the Create Validation wizard. Select Page Item Validation and click Next. Select the salary item and click Next. Perform the following steps:

1. Enter a name for the validation, and from the Error Display Location drop-down list, select a location to display the error. In this example, “Inline with Field” is selected. Click Next.
2. Select PL/SQL and click Next.
3. Select the type of PL/SQL validation that you want to create and click Next. In this example, Function Returning Boolean is selected.
4. Enter the validation and the error message. In this example, the maximum salary is retrieved. The value entered in the Salary field is compared to a value 10% higher than the maximum salary. If the entered salary is less than the calculated value, true is returned; otherwise, false is returned. Click Create.

Run the form and fill in the details. In the Salary field, enter 100000 and click Apply Changes.

You should get an error message next to the Salary item.

Item String Comparison Validation: Example

Create a validation to ensure that the specified special characters are not entered in the Email field.

The screenshot shows a form titled "OEHR Employees" with various input fields. At the top, a modal dialog box displays the error message: "1 error has occurred" and "You can not specify special characters. (Go to error)". The form fields include:

First Name	jackson
* Last Name	Lord
* Email	ACKSON-LORD@ORACLE.COM
Phone Number	
* Hire Date	12-Oct-11
Salary	2000
Commission Per	
Manager Id	
Department Id	
Job Id Id	AC_ACCOUNT

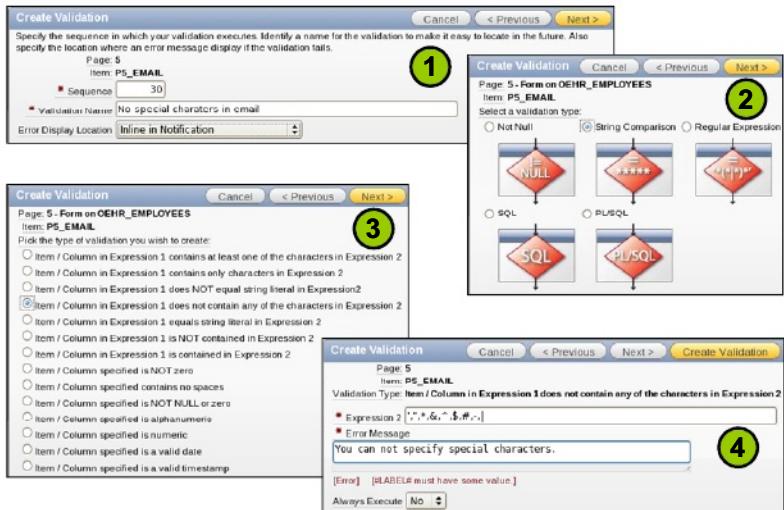
The "Email" field contains the invalid value "ACKSON-LORD@ORACLE.COM".

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In this example, you want to make sure that the Email field does not contain special characters, which are ', ", *, &, ^, \$, #, -, and | . You will display the error message only in the notification area.

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Creating an Item String Comparison Validation



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To create an Item String Comparison validation, access the Create Validation wizard. Select Page Item Validation and click Next. Select the email item and click Next. Perform the following steps:

1. Enter a name for the validation and from the Error Display Location drop-down list, select a location to display the error. In this example, "Inline in Notification" is selected. Click Next.
2. Select String Comparison and click Next.
3. Select the type of comparison that you want to perform and click Next. In this example, "Item in Expression 1 does not contain any of the characters in Expression 2" is selected.
4. Enter the special characters in the Validate String2 field. In this example, (' , " , * , & , ^ , \$, # , - , |) are entered. Enter the error message text. Click Next.

Optionally, specify a condition and click Create. Run the form and fill in the details. In the Email field, enter jackson-lord@aol.com and click Apply Changes. You should get an error message in the notification area.

Regular Expression Validation: Example

Create a validation to ensure that the phone number is entered in a particular format.

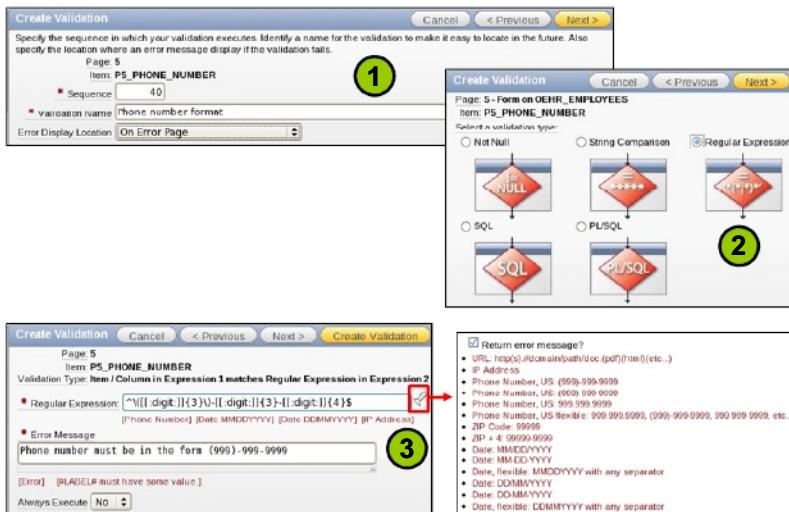
The screenshot shows a form titled 'DEHR Employees'. It contains fields for First Name ('Jackson'), Last Name ('Lord'), Email ('jackson.lord@oracle.com'), Phone Number ('1003505555'), Hire Date ('12-Oct-11'), Salary ('2000'), Commission Pct (''), Manager Id (''), Department Id (''), and Job Id Id ('AC_ACCOUNT'). A validation error message box is displayed, stating 'Phone number must be in the form (999)999.9999' with an OK button.

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In this example, you want the phone number to be entered in this particular format: 999.999.9999. You will display the error message on the Error Page.

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Creating a Regular Expression Validation



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To create a Regular Expression validation, access the Create Validation wizard. Select Item Level Validation and click Next. Select the phone number item and click Next. Perform the following steps:

1. Enter a name for the validation and select a location to display the error. In this example, On Error Page is selected. Click Next.
2. Select Regular Expression and click Next.
3. Select an expression. You can click the search icon next to the Regular Expression field and select an expression from the pop-up window. In this example, Phone Number, US, 999.999.9999 is selected. This specifies the format in which the phone number can be entered in this field. Enter the error message text. Click Create.

Run the form and fill in the details. In the Phone Number field, enter 100305000 or any other invalid format and click Apply Changes. The Error Page should appear and display the error message.

Tabular Form Validation: Example

Create a validation to ensure that the value entered in the Email column has no spaces.

The screenshot shows a tabular form titled "Tabular Form". The columns are Employee Id, First Name, Last Name, Email, Hire Date, Department Id, and Job Id Id. Row 1 contains values: Employee Id 198, First Name Donald, Last Name O'Connell, Email DO CONNEL (highlighted in red), Hire Date 21-JUN-99, Department Id 50, and Job Id Id SH_CLERK. A validation message box at the top says "1 error has occurred" with the message "No spaces allowed in email (Row 1)". Buttons at the bottom include Cancel, Delete, and Submit.

Employee Id	First Name	Last Name	Email	Hire Date	Department Id	Job Id Id
198	Donald	O'Connell	DO CONNEL	21-JUN-99	50	SH_CLERK
199	Douglas	Grant	DGRANT	13-JAN-00	50	SH_CLERK
200	Jennifer	Walen	JWALEN	17-SEP-87	10	AU_ASS_I
201	Michael	Hartstein	MHARTSTE	17-FEB-96	20	MK_MAN
202	Pat	Fay	PFAY	17-AUG-97	20	MK_REP
203	Susan	Mavris	SMAVRIS	07-JUN-94	40	HR_REP

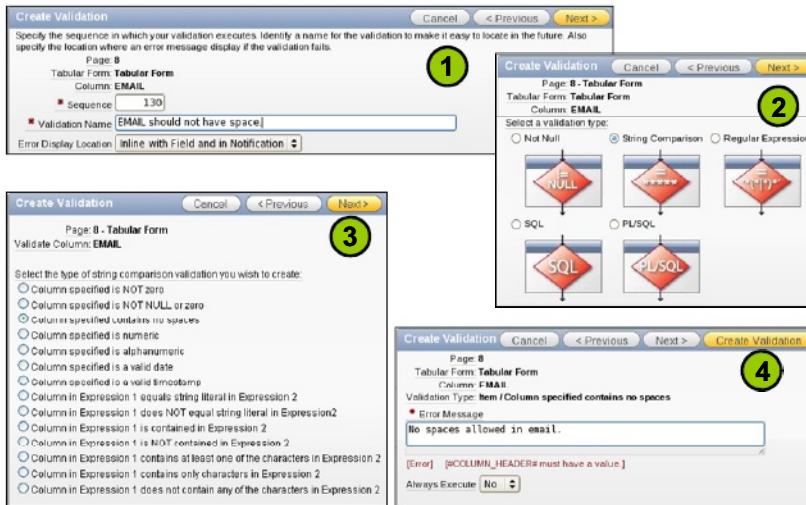
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In this example, you want to ensure that the value entered in the Email column does not have any spaces.

Note: Remember that a Tabular Form Validation can be created only on a page that contains a tabular form. Also, when you create a tabular form by using a wizard, it automatically creates some validations (such as not null, column must be numeric, and valid date), based on the column definition in the database.

Creating a Tabular Form Validation



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To create a Tabular Form validation, access the Create Validation wizard. Select Tabular Form from the list. Select Column type and click Next. Select the email item and click Next. Perform the following steps:

1. Enter the validation name and select the location to display the error message. In this example, “Inline in Notification” is selected. Click Next.
2. Select a validation and click Next. In this example, “String Comparison” is selected.
3. Select the comparison type and click Next. In this example, “Column specified contains no spaces” is selected.
4. Specify the error message and click Next.

Specify a condition if necessary, and click Create. Run the page. In the Email field, for any row, enter a space in the value and click Apply Changes. The error message should be displayed in the notification area.

Quiz

Which of the following is not a validation method?

- a. PL/SQL
- b. Item Level Null
- c. HTML
- d. Regular Expression

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Answer: c

Lesson Agenda

- Introducing Page Processing
- Including Computations
- Including Processes
- Including Validations
- Including Branches
 - What Is Branching?
 - Creating a Branch

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What Is Branching?

The page is submitted and a new page is displayed.

The diagram illustrates the branching process in Oracle Application Express. On the left, a 'Customer Details' form page is shown with fields for First Name (Eugene), Last Name (Bradley), Street Address (Schoephoester Road), City (Windsor Locks), State (Connecticut), Postal Code (06096), Email, Phone Number ((860) 555-1835), Alternate Number, and Credit Limit (1000). Two buttons are highlighted: 'Cancel' and 'Apply Changes'. A red arrow points from the 'Apply Changes' button to the right, where two list pages are shown. The top list page is titled 'Customer Record Processed.' and shows a single record for Eugene Bradley. The bottom list page shows the same record along with other customer entries: Dulles, John; Hartsfield, William; LaGuardia, Fiorello; Lambert, Albert; Legan, Edward; and OHare, Edward. Both list pages have a header with 'Customer Name', 'Address', 'City', 'State', and 'ZIP Code' columns, and a 'Create Customer >' button.

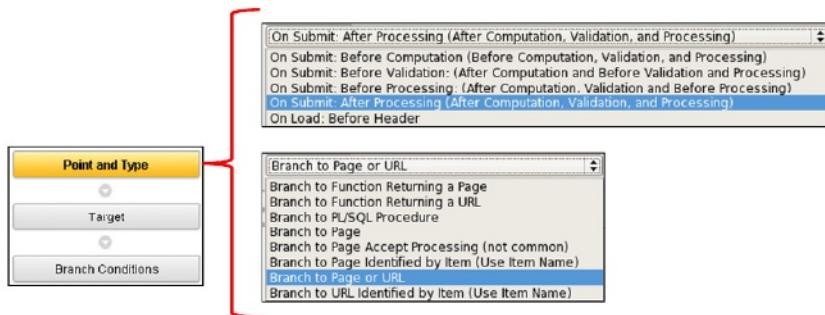
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A branch is an instruction executed in the Oracle Application Express engine to take the user from one page to another page, a URL, or a procedure. For example, you have a form page that accepts values from the user. After the form page is submitted, the Oracle Application Express engine executes the branch that navigates the user to another page. If the Cancel button is clicked, no processing occurs and a redirect to another page is invoked.

Creating a Branch



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You can create a new branch by running the Create Page Branch wizard and specifying the branch point and branch type. The branch points and branch types are shown in the slide. To access the Create Branch wizard, right-click the branch node from the Page Processing section and click Create.

Creating a Branch

1 Create Branch
Page: 5 - Form on OEHR_EMPLOYEES
Branch Point: On Submit: After Processing (After Computation, Validation, and Processing)
Branch Type: Branch to Page
Branch to Page: []
On Submit: After Processing (After Computation, Validation, and Processing)
[1] Before Computations [2] Before Validations [3] Before Processing [4] After Processing
Branch Type: Branch to Page

2 Create Branch
Page: 5 - Form on OEHR_EMPLOYEES
Branch Point: On Submit: After Processing (After Computation, Validation, and Processing)
Branch Type: Branch to Page
Branch to Page: []
(branch to page using redirect)
 include process success message

3 Create Branch
Page: 5 - Form on OEHR_EMPLOYEES
Branch Point: On Submit: After Processing (After Computation, Validation, and Processing)
Branch Type: Branch to Page
Branch Action: ?&APP_ID.:1:&SESSION:::&DEBUG.&success_msg=&SUCCESS_MSG
Sequence: [1]
When Button Pressed: SAVE (Apply Changes)
Condition Type:
- Select Condition type: []
[PLSQL] [item / column-not-null] [item / column-null] [request-equals] [page-in] [page-not-in] [exists] [never] [none]

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In this example, a branch to another page is created on submit, after computations, processes, and validations. To create the branch, access the Create Branch wizard and perform the following steps:

1. Select the branch point and the branch type. Click Next.
2. Enter the page or URL to branch to. Click Next.
3. Specify conditions, if any, and click Create Branch.

Summary

In this lesson, you should have learned to:

- Explain the difference between page rendering and page processing
- Create computations on application pages
- Create page processes
- Create validations to verify user input
- Create branches within an application

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This lesson explained the difference between page rendering and page processing. You should also have learned how to create computations, processes, and validations.

Practice 10: Overview

This practice covers the following topics:

- Creating an On Load computation
- Creating an On Submit computation
- Creating an On Submit process
- Validating Form Items

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Using Application and Page Utilities

11



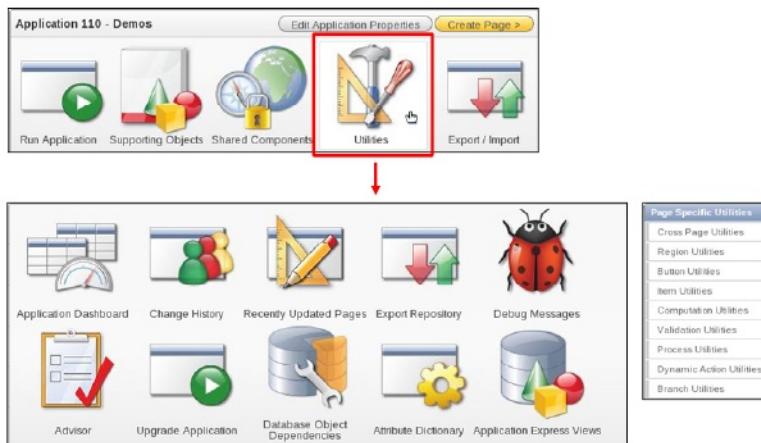
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Objectives

After completing this lesson, you should be able to:

- Identify the available application and page utilities
- Use the Advisor to verify your application
- Identify an application's database object dependencies
- Manage defaults by using the Attribute Dictionary

Accessing the Utilities Page



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To access the Utilities page, click the Utilities icon on the application home page. From the Utilities page, you can access application utilities as well as page-specific utilities. Application utilities summarize information from throughout the application and provide access to useful tools. The Page Specific Utility menu contains links to numerous object utilities, such as regions, buttons, and items. The page-specific utilities are not discussed in detail in this lesson, but you can examine these pages during the practice.

Application Dashboard

Application Overview		Security		Templates	
ID	110	Authentication	PLUGIN	Region	30
Name	Demos	Public Pages	1	List	20
Alias	F110	Non Public	14	Page	15
Parsing Schema	TEACH	Authorization Schemes	0	Report	10
Group				Button	7
Pages	15			Label	5
Theme	Scarlet			LOV	1

Pages by Type		Application Components		Page Components	
Static HTML	3	Lists of Values	4	Classic Report Columns	50
Report	3	Shortcuts	2	Items	37
DML Form	3	Tabs	1	Buttons	22
Interactive Report	2	Application Items	1	Interactive Report Columns	22
Login	1	Plug-ins	0	Regions	21
Page 0	1	Application Computations	0	Validations	23
Home	1	Validations	0	Processes	20
Tabular Form	1	Lists	0	Branches	7
		Application Processes	0	Computations	3

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The Application Dashboard provides information about application components and attributes. The Application Dashboard has the following sections:

- **Application Overview** lists detailed information and statistics about the current application, including the ID, name, alias, parsing schema, associated group, number of pages, and associated theme.
- **Security** lists the current authentication scheme, number of public and non public pages, and the number of authorization schemes used within the current application.
- **Templates** contains links to reports of templates used within the current application.
- **Pages by Type** lists counts of components, including types of reports and forms and dynamic HTML.
- **Application Components** contains links to reports of application-level controls and logic, including lists of values, tabs, lists, application items, application processes, and application computations.
- **Page Components** contains links to reports of page-level controls and logic, including items, buttons, processes, regions, validations, and dynamic actions.

Application Change History

A screenshot of the Oracle Application Express Change History report interface. On the left, there is a small thumbnail icon of three colored circles (green, yellow, red) with a cursor pointing at it. A red arrow points from this icon to the main report area. The main area shows a grid of audit log entries. The columns are labeled: Audit Date, Page, Audit Action, Developer, Component Type, and Component Name. The data in the grid is as follows:

Audit Date	Page	Audit Action	Developer	Component Type	Component Name
13 hours ago	8	Create	TEACH	Page Validations	-
14 hours ago	5	Create	TEACH	Page Validations	-
14 hours ago	5	Create	TEACH	Page Validations	-
15 hours ago	5	Create	TEACH	Page Validations	-
16 hours ago	5	Create	TEACH	Page Validations	-
23 hours ago	1	Create	TEACH	Page Items	-
23 hours ago	1	Create	TEACH	Page Region	Welcome
23 hours ago	101	Change	TEACH	Page Processing	Create Log
23 hours ago	1	Create	TEACH	Page Processing	Log Info
24 hours ago	101	Create	TEACH	Page Processing	Create Log

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The Change History report displays a summary report of edits to the current applications by developer, component type, and page number. This report is a combined list of the changes displayed on the individual page History tabs.

Recently Updated Pages

The screenshot shows a report titled 'Recently Updated Pages'. At the top left is a small icon of a pencil and ruler. Below it is a search bar with a magnifying glass icon and a 'Go' button. To the right is a 'Actions' dropdown menu. Underneath is a table with the following data:

Page	Page Name	Updated	Updated By	Regions	Items	Page Group
8	Tabular Form	13 hours ago	TEACH	1	0	-
5	Form on OEHR_EMPLOYEES	14 hours ago	TEACH	1	11	-
1	Home	23 hours ago	TEACH	2	1	-
101	Login	23 hours ago	TEACH	1	3	-
13	Items and Buttons	37 hours ago	TEACH	3	0	-
12	Demme Session State	37 hours ago	TEACH	3	0	-
9	O	37 hours ago	TEACH	0	0	-
11	Region Display Selector	37 hours ago	TEACH	0	0	-
9	OEHR_ORDERS Report	37 hours ago	TEACH	2	0	-
10	Master Detail Form	37 hours ago	TEACH	3	11	-
6	Report on OEHR_EMPLOYEES	38 hours ago	TEACH	1	0	-
7	Form on OEHR_EMPLOYEES	38 hours ago	TEACH	1	11	-
4	Wizard Report	38 hours ago	TEACH	1	0	-
3	Classic Report	38 hours ago	TEACH	1	0	-
2	Interactive Report	38 hours ago	TEACH	1	0	-

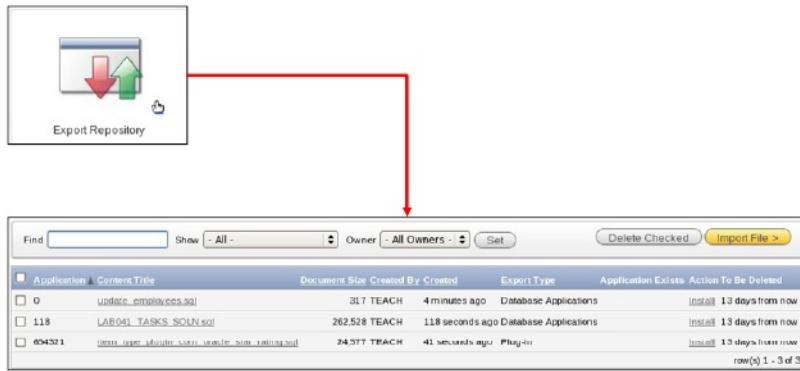
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The Recently Updated Pages report displays a report of pages recently updated by the current user. If you want to view the pages updated by all users, you can remove the filter that is applied by default.

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Export Repository

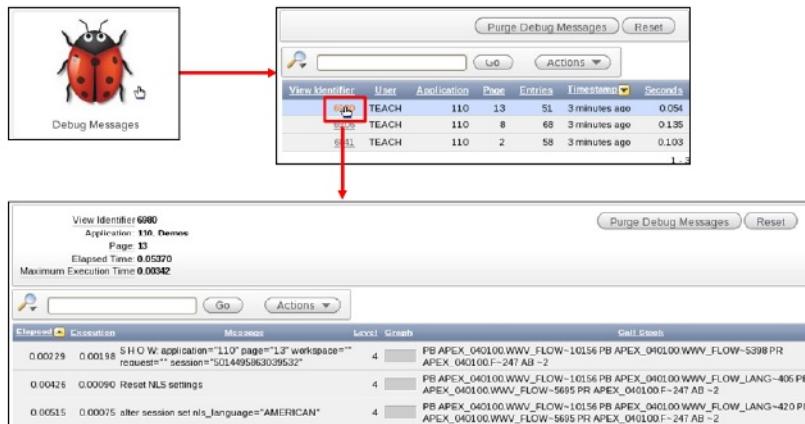


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The Export Repository contains a list of the files that you imported previously. You have the option to install the file again or import a new file. In addition, you see the type of the export file. The export repository consumes space within your workspace. As a good practice, you should remove old files that are no longer needed.

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Debugging Messages



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As discussed in the previous lesson, you can also access the debug messages from the Application Utilities page.

Using the Advisor

The screenshot shows the Oracle Application Express Advisor interface. On the left, the 'Check to Perform' dialog lists various checks such as 'References with Substitution Syntax', 'References with Column Syntax', and 'Unconditional Branch before other Branches'. In the center, the 'Filter Result' dialog displays a list of violations under the 'Quantity Assurance' category, including 'Report does not have a default order'. At the bottom right, a summary icon features a clipboard with a red checkmark and the word 'Advisor'.

A callout bubble points to the 'Check Page(s)' section in the 'Check to Perform' dialog, which contains input fields for selecting pages to check. Another callout bubble points to the 'Value' section in the 'Filter Result' dialog, which shows the SQL query used for the check.

A list of issues is displayed based on your selections.

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The Oracle Application Express Advisor (Advisor) enables you to check the integrity and quality of your Oracle Application Express application. Advisor functions like a compiler or LINT flagging suspicious behavior or errors. (LINT is a utility that examines and analyzes programs for style, usage, and portability issues.) By running the Advisor, you can check the integrity of your application based on the underlying metadata.

The Advisor performs several checks on your application or page(s) in your application, including programming errors, security issues, quality assurance, and other best practices.

Once executed, your previous settings will be recalled for the next use. You can also save the settings without executing by using the "Save as My Preferences" task in the Task menu.

To not perform a check on a particular violation, deselect the check box. When there are no violations, you receive a message indicating that no errors or warnings were found.

In the slide example, you see that errors and quality assurance violations were found. You can click the View link for each violation to go to the page where you can correct the issue and then return to the Advisor to recheck. In the screenshot in the slide, a quality assurance anomaly was detected because there is a report that does not contain a default order.

Note that many of the checks are for informational purposes only and do not need to be resolved before deploying your application (unless you choose to do so).

Resolving Advisor Errors/Warnings

The screenshot shows the 'Report Attributes' tab of the 'Region Definition' dialog. A red box highlights the 'Report Attributes' tab. Below it, the 'Identification' section shows 'Page: 3 Classic Report' and 'Title: Classic Report'. A callout bubble points to the 'Sort Sequence' column in a table below, stating: 'Specify a sort sequence for a column in your report.'

Alias	Link Edit	Heading	Column Width	Column Alignment	Heading Alignment	Show Sum	Sort Sequence
EMPLOYEE_ID	EMPLOYEE_ID			left	center	<input checked="" type="checkbox"/>	-
FIRST_NAME	FIRST_NAME			left	center	<input checked="" type="checkbox"/>	1
LAST_NAME	LAST_NAME			left	center	<input checked="" type="checkbox"/>	-
EMAIL	EMAIL			left	center	<input checked="" type="checkbox"/>	-
PHONE_NUMBER	PHONE_NUMBER			left	center	<input checked="" type="checkbox"/>	-
HIRE_DATE	HIRE_DATE			left	center	<input checked="" type="checkbox"/>	-
SALARY	SALARY			left	center	<input checked="" type="checkbox"/>	-
COMMISSION_PCT	COMMISSION_PCT			left	center	<input checked="" type="checkbox"/>	-
MANAGER_ID	MANAGER_ID			left	center	<input checked="" type="checkbox"/>	-
DEPARTMENT_ID	DEPARTMENT_ID			left	center	<input checked="" type="checkbox"/>	-
JOB_ID_ID	JOB_ID_ID			left	center	<input checked="" type="checkbox"/>	-

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You can click the View link (visible in the screenshot in the previous slide); the Report definition for the page is displayed. To define the sort sequence, click the Report Attributes tab and select the sort sequence for one of the columns (in this case, FIRST_NAME) and click Apply Changes. Rerun the Advisor to see that the violation is no longer in the list.

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Quiz

You must resolve all errors and warnings before deploying your application.

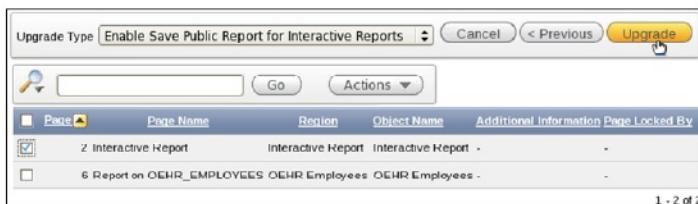
- a. True
- b. False



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Answer: b

Upgrading Application Components

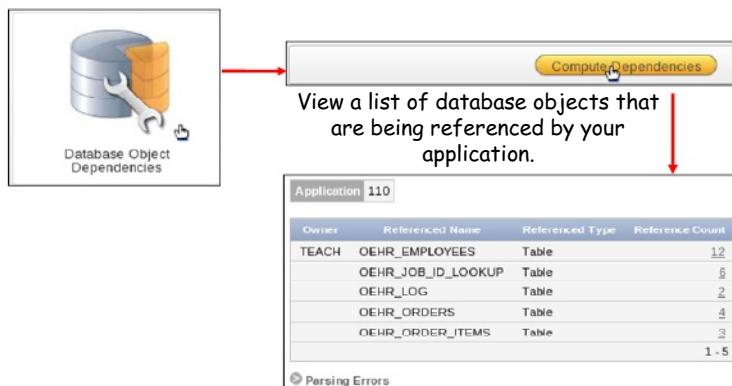


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If your application was created before a new release, the Application Upgrade utility enables you to add the newly available features to your existing application. In the slide's example, you see a list of pages that you can upgrade with new features. For example, you can add (to interactive reports on pages 2 and 6) the ability to save public reports. You simply select the pages that you want to upgrade, and then click Upgrade.

Computing Database Object Dependencies



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The Database Object Dependencies report identifies database objects referenced by the current application. Review this report to determine which objects to move when deploying an application. After clicking Database Object Dependencies from the Application Utilities page, click Compute Dependencies to see the list.

Managing Your Attribute Dictionary

View a list of pages that contain items and report columns.

Page	Name	Page Type	Group Name	Displayed Items	Displayed Report Columns
0	Page 0	Unassigned		0	0
1	Home	Home	Unassigned	1	0
2	Interactive Report	Interactive Report	Unassigned	0	11
3	Classic Report	Report	Unassigned	0	11
4	Wizard Report	Report	Unassigned	0	11
5	Form on OEHR_EMPLOYEES	DML Form	Unassigned	10	0
6	Report on OEHR_EMPLOYEES	Interactive Report	Unassigned	0	11
7	Form on OEHR_EMPLOYEES	DML Form	Unassigned	10	0
8	Tabular Form	Tabular Form	Unassigned	0	11
9	OEHR_ORDERS Report	Report	Unassigned	0	8
10	Master Detail Form	DML Form	Unassigned	8	4
11	Region Display Selector	Static HTML	Unassigned	0	0
12	Demo Session State	Static HTML	Unassigned	0	0
13	Items and Buttons	Static HTML	Unassigned	0	0
101	Login	Login	Unassigned	2	0

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The Attribute Dictionary contains a set of attributes about a column that are used in creating forms and reports. The definitions are matched by column name and a particular definition can be shared by several columns by using synonyms.

You can use Page Item and Report Column definitions to update the Attribute Dictionary. You can also use the Attribute Dictionary to update page items and report columns.

Hidden objects, those in hidden regions, and button items are not counted in the number of candidate items and report columns, because these are not used in the updates.

Select the page that you want to work with. In the slide example, you select the page for your Master Detail Form page. You can also access the Attribute Dictionary for a particular page by navigating to the page definition and selecting Utilities > Attribute Dictionary.

Reviewing Items and Report Columns

Review the list of items or report columns. Determine which attributes to include in the Attribute Dictionary.

Reason	Item	Will Recurse	Label	Editor Mask	UserText	Default	Width	Height	Date Type
<input type="checkbox"/>	OEHREmployees_P5_COMMISION_PCT	COMMISION_PCT	Commission Pct	-	Commission percentage	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_DEPARTMENT_ID	DEPARTMENT_ID	Department Id	-	Department id where	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_EMAIL	EMAIL	Email	-	Email id of the emp	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_FIRST_NAME	FIRST_NAME	First Name	-	First name of the em	30	1		VARCHAR
<input checked="" type="checkbox"/>	OEHREmployees_P5_HIRE_DATE	HIRE_DATE	Hire Date	-	Date when the employ	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_JOB_ID	JOB_ID	Job Id	-	-	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_LAST_NAME	LAST_NAME	Last Name	-	Last name of the emp	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_MANAGER_ID	MANAGER_ID	Manager Id	-	Manager id of the em	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_PHONE_NUMBER	PHONE_NUMBER	Phone Number	-	Phone number of the	30	1		VARCHAR
<input type="checkbox"/>	OEHREmployees_P5_SALARY	SALARY	Salary	-	Monthly salary of th	30	1		VARCHAR

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When you create an item on a page or create a report, you must review and evaluate which attributes you want to update in the dictionary. In the slide example, you want to update the Attribute Dictionary with all the attributes (such as Label and Help text) for the P5_HIRE_DATE item. Select the check box for the appropriate row and click Update Attribute Dictionary. The page number prefix is removed when the Attribute Dictionary enter is created. For example, P5_HIRE_DATE becomes HIRE_DATE.

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Modifying Attributes in the Dictionary

You can modify attributes in the Attribute Dictionary within SQL Workshop Utilities.

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User Interface Defaults enable you to assign default user interface properties for regions and items. The wizard allows you to specify whether you want to use user interface defaults if they exist. When you create a form or report by using a wizard, the wizard uses this information to create default values for region and item properties. Utilizing user interface defaults can save valuable development time and has the added benefit of providing consistency across multiple pages in an application. User interface defaults are divided into two categories, the Table Dictionary and the Attribute Dictionary.

- The Table Dictionary enables you to specify defaults for tables and columns that are initialized from the database definition.
- The Attribute Dictionary enables you to create defaults based on attribute or column names (and thereby usable for all tables). Attribute definitions can also have synonyms, allowing more than one attribute to share a common definition.

The Table Dictionary takes priority over the Attribute Dictionary when user interface defaults are used during creation of pages and regions. If a table-and-column combination exists, that combination is used rather than an attribute definition of the same name.

This can be useful, for example, when you want to have a specific label or help text for the `CREATED_BY` column in the `EMP` table but then use more generic defaults for `CREATED_BY` in another table.

To view a list of the columns in the Attribute Dictionary, select SQL Workshop > User Interface Defaults and select the Attribute Dictionary tab. To make changes to a column, click the Edit icon for the column, make your changes, and click Apply Changes.

Quiz

Nancy wants to apply the same Help text to all her Order Status items on all pages in her application. What must she do to make this happen? (Choose all that apply.)

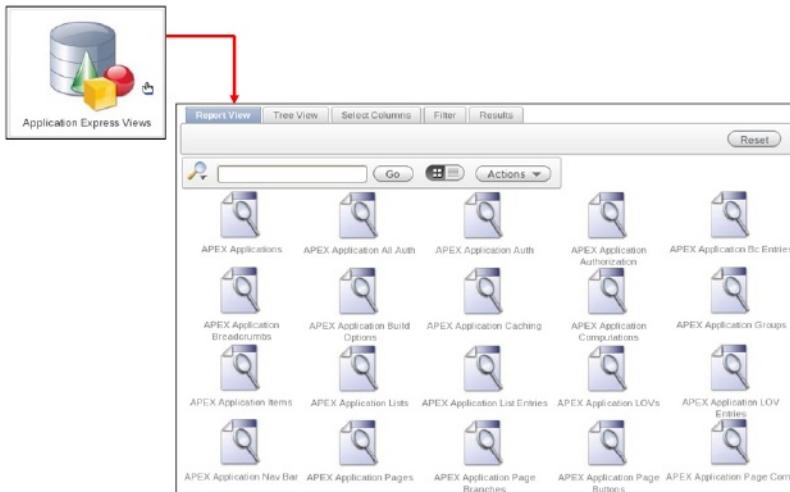
- a. Add an item on a page with the Help text.
- b. Add a table with a new Status column.
c. Review the column and update the directory.
- d. Create a new page with the column already in the dictionary.



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Answer: a, b, d

Application Express Views



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Application Express views are data dictionary views that expose the metadata for the applications within the current workspace. In Application Express Views, you can see a view and its data.

Application Express Views

The screenshot shows the Oracle Application Express interface. At the top, there are tabs for 'Report View', 'Tree View', 'Select Columns', 'Filter', and 'Results'. The 'Selected View' is set to 'APEX_APPLICATIONS'. Below this, the 'Select Columns' tab is active, displaying a list of columns from the APEX_APPLICATIONS view, including OWNER, APPLICATION_GROUP, APPLICATION_GROUP_ID, HOME_LINK, PAGE_TEMPLATE, ERROR_PAGE_TEMPLATE, LANGUAGE_PRIMARY, LANGUAGE_DERIVED_FROM, CSV_ENCODING, DATE_FORMAT, DATETIME_FORMAT, TIMESTAMP_FORMAT, TIMESTAMP_TZ_FORMAT, AUTO_TIME_ZONE, ERROR_HANDLING_FUNCTION, DEFAULT_BROWSER_DISPLAY_LOCATION, IMAGE_PREFIX, AUTHENTICATION_SCHEME_TYPE, AUTHENTICATION_SCHEME, AUTHENTICATION_SCHEME_ID, LOGOUT_URL, LOGOUT_URL_TYPE, and LOGO. The 'Results' tab is also visible. The 'Results' tab is active, showing a table with data for the APEX_APPLICATIONS view. The columns in the table are WORKSPACE, WORKSPACE_DISPLAY_NAME, APPLICATION_ID, APPLICATION_NAME, and ALIAS. The data includes rows for various applications like TASK, Demos, demo old, teach_01, Order Management, OEHM Sample Objects for OU, and Order Management Application.

WORKSPACE	WORKSPACE DISPLAY NAME	APPLICATION ID	APPLICATION NAME	ALIAS
TEACH	TEACH	130	TASK	F190
TEACH	TEACH	110	Demos	F110
TEACH	TEACH	111	demo old	F110111
TEACH	TEACH	100	teach_01	F100
TEACH	TEACH	144	Order Management	F144
TEACH	TEACH	137	OEHM Sample Objects for OU	F412543854
TEACH	TEACH	147	Order Management Application	F147
TEACH	TEACH	131	Sample Database Application	COM_ORACLE_APEX_PRODUCT_PORTAL

Select the columns
that you want to see,
and click the Results
tab to show the data.

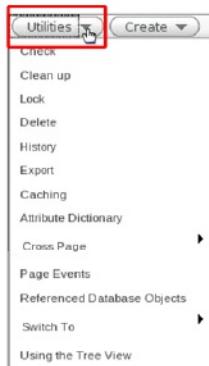
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To view the data within a view, select the columns from the Select Column tab and click the Results tab. On the Results tab, expand the Query region to view the query that was executed. You can copy this query for reuse with SQL Commands or SQL Developer.

Accessing Utilities from Page Definition



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You can also view the Utility options from within a page definition. Click the Utilities button and select the desired utility option. These include:

- **Check** executes the Advisor for the current page.
- **Clean up** resequences your page component sequence numbers by increments of 10.
- **Lock** prevents other developers from modifying the page until unlocked.
- **Delete** deletes the current page.
- **History** shows the change history for the current page.
- **Export** enables you to export the current page.
- **Caching** displays the page cache and any region cache on the page.
- **Attribute Dictionary** opens the Attribute Dictionary dashboard.
- **Cross Page** provides additional utilities to edit or delete pages, define attributes and groups, and lock multiple pages.
- **Page Events** shows the executed events listed in the order they are executed.
- **Referenced Database Objects** lists the database objects referenced on the page.
- **Switch To** changes the names of the page components to either names or labels.
- **Using the Tree View** changes the current view of page (Component versus Tree).

Using Page Utilities



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The Page Specific Utilities region is displayed on the right side of the Utilities page. You can use these utility options to view component reports across pages in an application and by component type (for example, region, button, item, validation, process, dynamic action, or branch).

Summary

In this lesson, you should have learned how to:

- Identify the application and page utilities available
- Use the Advisor to verify your application
- Identify an application's database object dependencies
- Manage defaults by using the Attribute Dictionary

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Practice 11: Overview

This practice covers the following topics:

- Running the Advisor
- Correcting some of the violations
- Making changes to some page items
- Adding the items to the attribute dictionary
- Viewing and changing the columns in the attribute dictionary
- Updating the attribute dictionary with the changes
- Creating a new form page that uses the UI defaults

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In this practice, you run the Advisor and correct some of the violations contained in the list. You also make changes to an item and add the item to the Attribute Dictionary, make some changes to the UI default, and add it back to the Attribute Dictionary.

12 **Adding Shared Components That Aid Navigation**

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Objectives

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

- Explain the use of shared components in an application
- Create and edit the following navigational shared

components in an application:

- Parent and standard tabs
- Navigation bar entries
- Lists
- Breadcrumbs



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Lesson Agenda

- Introducing Shared Components
 - What Are Shared Components?
 - Navigational Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar

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What Are Shared Components?

The image shows two screenshots of the Oracle Application Express interface. On the left, the 'Shared Components Page' is displayed, showing categories like Logic, Navigation, Security, User Interface, Files, Globalization, and Reports. The 'Navigation' section is highlighted with a red box, showing sub-components: Tabs, Units, Breadcrumbs, and Navigation Bar Entries. On the right, the 'Page Definition' is shown, specifically the 'Shared Components' section, which lists Parent Tabs, List of Values, Breadcrumbs, Lists, Themes, Templates, Shortcuts, and Security.

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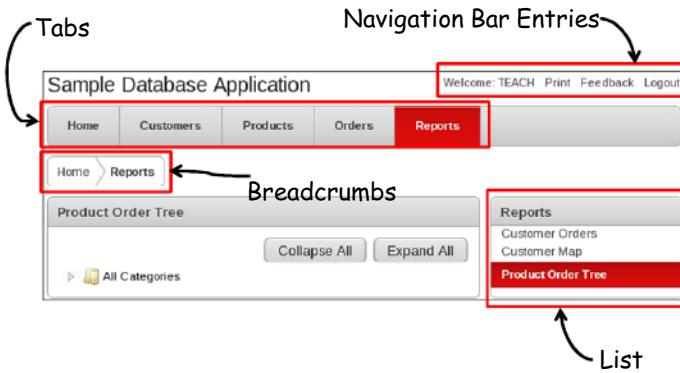
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Shared components are components that can be included on one or more pages of your application. The Shared Component Page screenshot in the slide shows the categories of shared components that you can include in your application.

In the Shared Components section of a page's definition (shown in the Page Definition screenshot in the slide), you can view the shared components that are included on that page.

In this lesson, you learn how to create navigational shared components: tabs, lists, breadcrumbs, and navigation bar entries.

Navigational Shared Components



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An application typically uses a combination of tabs, lists, navigation bars, and breadcrumbs.

- Tabs are used to provide navigation between the major components of an application.
- A list is a collection of links. Each list entry is associated with a page.
- Breadcrumbs are a hierarchical list of links. They show you where you are within the application.
- A navigation bar is used to link text or an image to a page. You need not reference it on every page (as you must do with the other navigational shared components). An application can have only one navigation bar.

The slide shows the Sample Application interface. Home, Customers, Products, Orders, Reports are the tabs. Print, Feedback, Logout links at the top-right of the page are the navigation bar entries. Home > Reports are the breadcrumbs used to go back and forth between the pages within the application's major components. The Tasks section on the right is a list. Thus, you can use a combination of tabs, lists, navigation bars, and breadcrumbs to navigate within an application.

Lesson Agenda

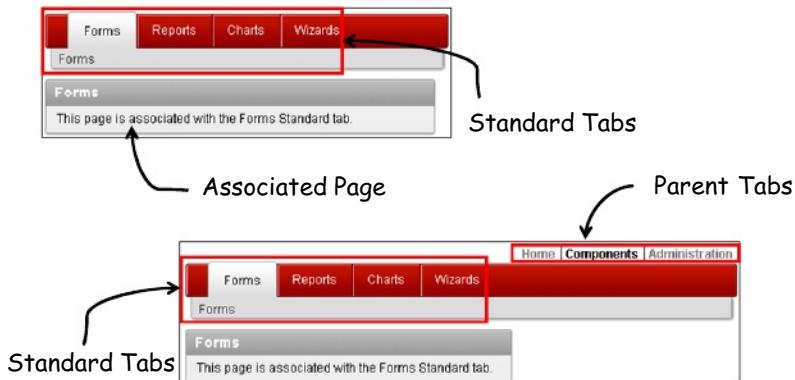
- Using Shared Components
- Creating Tabs
 - Types of Tabs
 - Creating a Tab Set
 - Adding Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar

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Types of Tabs



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You create tabs to provide navigation within the major components of an application. Tabs are positioned at the top section of an application. When you click a tab, it displays the associated page.

In Oracle Application Express, you can create two types of tabs: parent and standard. If you want only one level of tabs in your application, you must create a standard tab set. Each tab is associated with a specific page. If you want two levels of tabs, you must create a parent tab. The parent tab displays a page, which has its own standard tab set.

You must make sure that your application template and page template support the type of tab that you create for an application. For example, if you create a two-level tab set with parent and standard tabs, you must ensure that the application page template has a two-level tabs option selected. Also, you must ensure that the page-level template does not override the application-level template. You learn how to view template properties and edit them in the lesson titled "Working with Themes, Templates, and Files."

Accessing the Tabs Page



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When you create an application or a page, the Create Application and Create Page wizards provide an option to create tabs in an application or on a page. You can view the existing tabs in your application and modify them or create a new tab from the Tabs page. To access the Tabs page, perform the following steps:

1. From the Application home page, click the Shared Components icon.
2. From the Shared Components page, click the Tabs link in the Navigation pane. The Tabs page is displayed.

Alternatively, perform the following steps:

1. From the Application home page, click a page.
2. From the Shared Components section in the page definition, right-click the Tabs node and select Create or Edit All.

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Managing Tabs

Click on a tab name to make a tab current. Once you select a tab you will be able to change that tab's properties.

Selected Pseudo Parent Tab: TS1
Select Standard Tab: Home
Tab Current for Page: 1-Home

TS1 Add

1 Home

Tabs

This page displays a graphical representation of the Tabs defined in your application.

Use Standard Tabs to link users to a specific page. A Parent Tab functions as a container to hold a group of Standard Tabs. Parent Tabs give users another level of navigation as well as a sense of place within the application.

Click **Add** in the upper row to add Parent Tabs. Click **Add** in the lower row to add Standard Tabs.

Parent Tab Tasks

no parent tabs exist

Standard Tab Tasks

Rename Standard Tab Set
Resequence display order
Associate Page(s) with selected Standard Tab
Create New Standard Tab
Create New Standard Tab Set

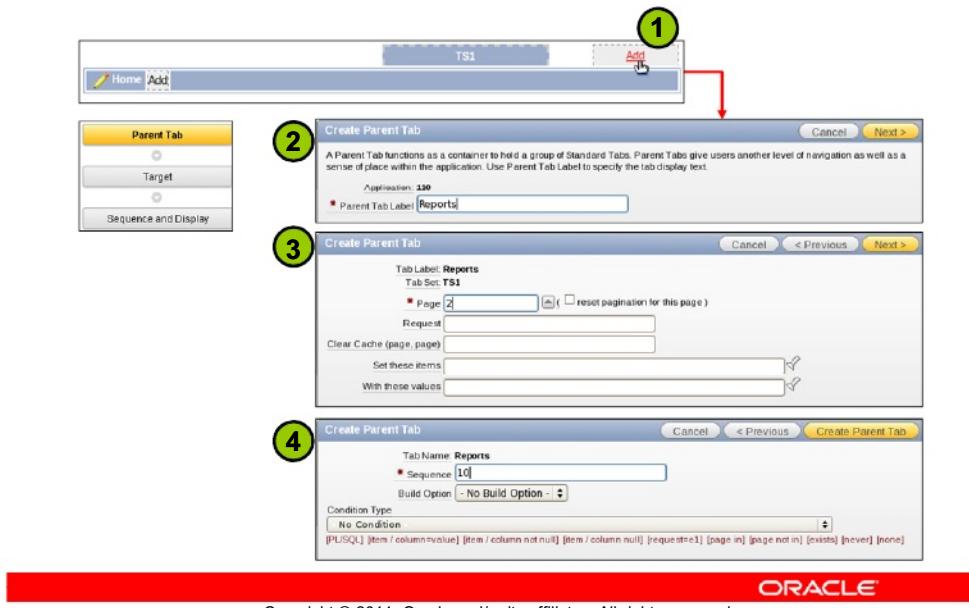
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The Manage Tabs page has a graphical layout of the tabs. You can add a new tab to the parent or standard set. The slide shows the tabs available for the Demo application. Because no parent tab is created, a pseudo-parent tab, TS1, is assigned to hold the standard tabs. Tasks that you can perform are listed in the Parent Tab Tasks and Standard Tab Tasks lists (at the bottom-right of the page).

Creating Parent Tabs



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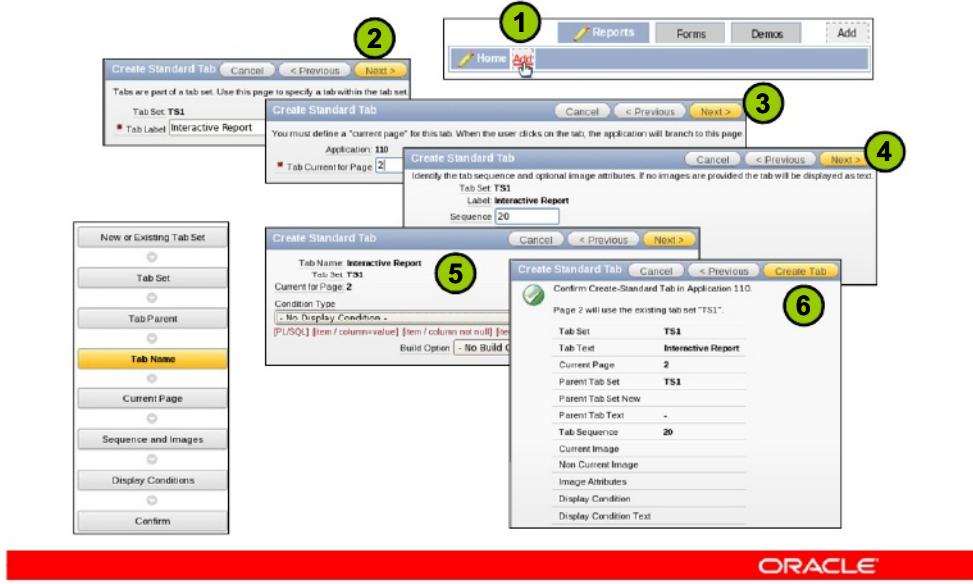
To create a parent tab, perform the following steps:

1. Click the Add link in the parent-level tabs from the Manage Tabs tab. The Create Parent Tab wizard starts.
2. Enter the Parent Tab Label and click Next. In the slide example, Reports is entered.
3. Indicate the target of the tab, and click Next. In this example, page 2 is specified.
4. Accept the default or specify a different sequence and click Create Parent Tab.

In this example, the Reports parent tab is created. Similarly, a Forms parent tab can be created.

Note: To be able to see two-level tabs in your application, ensure that you are using the required templates for your application and pages.

Creating Standard Tabs

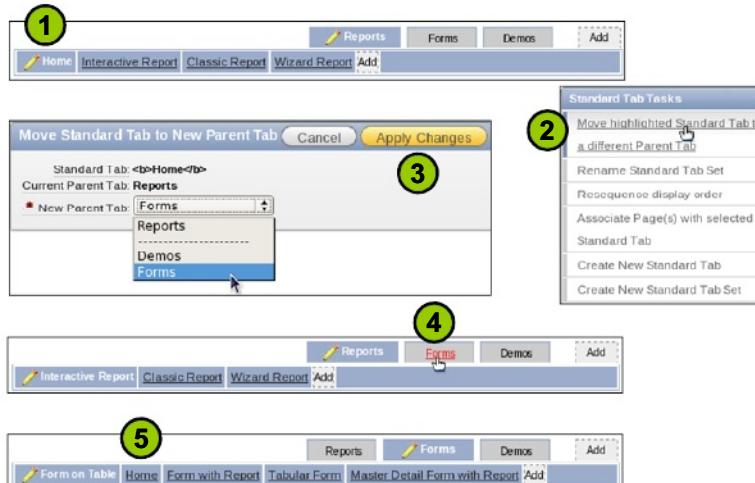


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To create a standard tab, perform the following steps:

1. In the Manage Tabs tab, ensure that the required parent tab is selected and click the Add link in the standard tabs level. The wizard automatically picks up the details for the Tab Set and Tab Parent and starts from the Tab Name step.
2. Enter the Tab Label and click Next. In the slide example, Interactive Report is entered.
3. Indicate the page that is associated with the tab and click Next. In this example, page 2 is specified.
4. Specify a sequence for the tab.
5. (Optional) Specify the conditions under which the tab is displayed.
6. Click Next.
7. Review the details and click Create Tab.

Reassigning a Standard Tab



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You can assign a standard tab associated with a parent tab to another parent tab. Perform the following steps:

1. Ensure that the standard tab that you want to move is selected. In the slide example, the Home tab is selected.
2. Click the "Move highlighted Standard Tab to a different Parent Tab" link in the Standard Tab Tasks list.
3. Select the new parent tab for the standard tab and click Apply Changes. In this example, the Forms tab is selected.
4. Note that the Home tab is no longer listed in the standard tab set for the Reports parent tab.
5. Click the Forms parent tab to confirm that the Home tab is now listed in it.

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Lesson Agenda

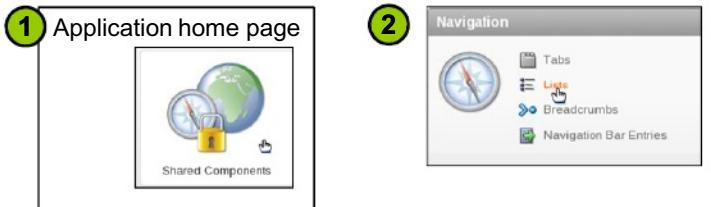
- Using Shared Components
- Creating Tabs
- Creating Lists
 - Accessing the Lists Page
 - Creating a List
 - Creating a List Entry
 - Creating a List Region
 - Using a List on Page Zero
- Creating Breadcrumbs
- Creating a Navigation Bar

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Accessing the Lists Page



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A list is a collection of links. Each link is called a list entry. For each list entry, you must specify the display text, a target URL, and other attributes that control when and how the entries in the list are to be displayed.

To access the Lists page, perform the following steps:

1. From the Application home page, click the Shared Components icon.
2. From the Shared Components page, click the Links link in the Navigation pane.

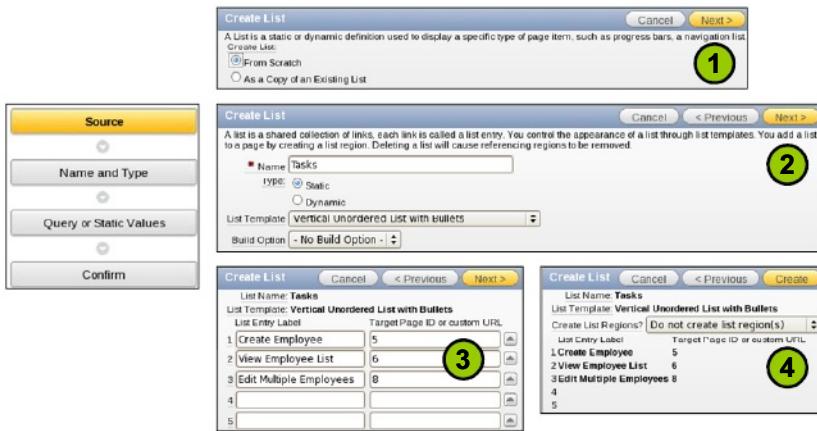
Alternatively, perform the following steps:

1. From the Application home page, click a page.
2. From the Shared Components section in the page definition, right-click the Lists node and select Create or Edit All.

The Lists page is displayed. Existing Lists, if any, are displayed on the Lists tab. You can create a new list or copy a list from another application. (The other application must reside in the same workspace.)

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Creating a Static List



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To create a static list, click the Create button from the Lists page and perform the following steps:

1. Ensure that From Scratch is selected and click Next.
2. Enter a name for the list. Accept the other defaults and click Next.
3. Enter the text for the list entries and specify the page number that you want to link with each entry. Click Next.
4. You can create a list region on the current page. In this example, you accept the defaults and click Create.

The static list is created. You can edit the list to add additional list entries.

Creating List Entries

The screenshot displays the Oracle Application Express interface for creating list entries. At the top, there's a navigation bar with tabs like 'List Details', 'Unused', 'Conditional Entries', 'Utilization', and 'History'. The 'List Template' tab is active. Below this, a sub-menu for 'List Tasks' is open, showing options like 'Create List Entry' (which is highlighted with a red box), 'Edit List', and 'Delete List'. The main content area is titled 'Source: Static List Entries' and shows a list of items: '10 Create Employee', '20 View Employee List', and '30 Edit Multiple Employees'. A modal window titled 'Entry' is open, containing fields for 'Parent List Entry' (set to 'No Parent List Item'), 'Sequence' (set to 40), 'Image' (empty), 'Attributes' (empty), 'List Entry Label' (set to 'List Entry Label'), and 'Create Master Detail Record' (checkbox). The 'Target' tab is selected, showing 'Target type: Page in this Application' and 'Page: 10'. The Oracle logo is visible at the bottom right of the interface.

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After you create a list, you can populate the list. You can also create new list entries in lists that are already populated. To create a list entry, perform the following steps:

1. Click Create List Entry from the Lists page.
2. Enter the text for the link in the List Entry Label field. In the Target tab, enter the page that you want to associate this list entry with. Click Create.

The list entry is created.

Note: On the Entry tab, if you select a list item for the Parent List Entry field, you can create a hierarchical list.

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Creating a Dynamic List



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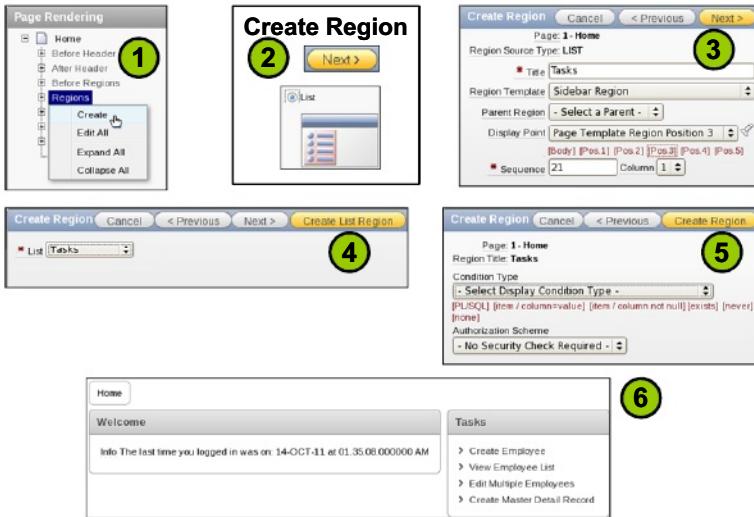
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To create a dynamic list, click the Create button from the Lists page and perform the following steps:

1. Ensure that From Scratch is selected and click Next.
2. Enter a name for the list and select Dynamic for Type and click Next.
3. Enter the SQL Query to create the list and click Next. You can view examples of SQL queries by clicking the Examples link at the bottom.
4. You can create a list region on the current page. In this example, you accept the defaults and click Create.

The dynamic list is created. You can edit the query to modify the list entries.

Creating a List Region



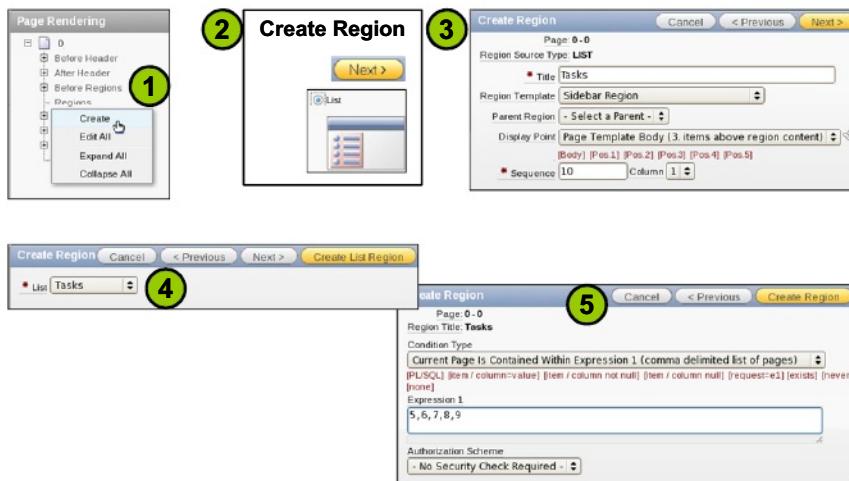
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After you create a list and populate it with values, you can add the list to a page. To add the list to a page, navigate to the page's definition and perform the following steps:

1. Right-click the Regions node and select Create.
2. Select the List option and click Next.
- Note:** You see the list option in the Create Regions wizard only if the application already has a list.
3. Specify the region details and click Next.
4. Select the list from the List drop-down list and click Next.
5. (Optional) Specify any conditions for the display of the region.
6. Click Create Region.

The list region is created on the page.

Creating a List Region on Page Zero



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To display a list on multiple pages of an application, you can create the list region on page zero and specify the pages where the region should be displayed. Navigate to the page definition for page zero and perform the following steps:

1. Right-click the Regions node and select Create.
2. Select List and click Next.
3. Specify the region details and click Next.
4. Select the list from the Lists drop-down list and click Next.
5. Select the [page in] link below the Condition Type field and enter the pages that you want the region to be displayed on in the Expression 1 field. (You can enter multiple page numbers by separating them with a comma.) Click Create Region.

If you run your application, you should see the list region displayed on the pages that you specified.

Lesson Agenda

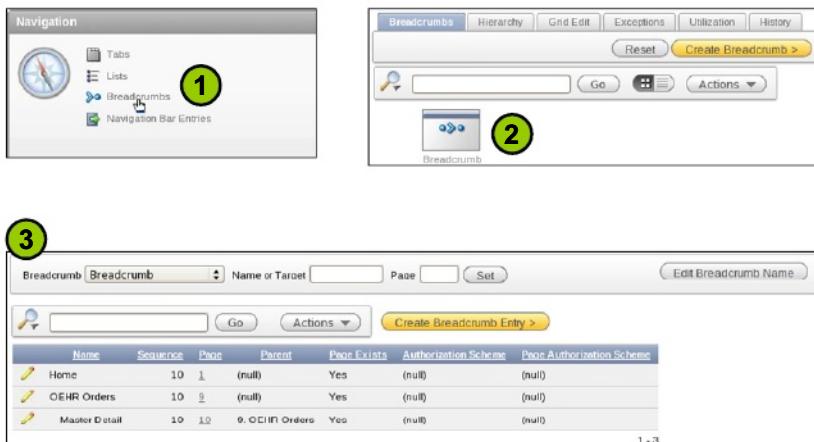
- Using Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
 - Viewing a Breadcrumb
 - Creating Breadcrumb Entries
 - Reparenting Breadcrumbs
 - Creating a Breadcrumb Region
- Creating Navigation Bar

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Viewing a Breadcrumb



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A breadcrumb is a hierarchical list of links. It shows you where you are within the application. You can click a specific page name link to view that page immediately. The breadcrumb path is displayed below the standard tab at the top of each page. You can define the Breadcrumb region in page zero so that it appears on all pages or on each page individually. Conditions can be defined to exclude the breadcrumb region from specific pages where they are not to be displayed, such as popup LOV pages.

By default, each application contains one breadcrumb. The breadcrumb contains multiple breadcrumb entries. The Create Page wizard provides an option to create a breadcrumb entry. To view the breadcrumb for an application, perform the following steps:

1. From the Shared Components page, click the Breadcrumbs link in the Navigation pane.
2. In the Breadcrumbs page, the existing breadcrumb is listed. Click the icon to view the breadcrumb entries for the breadcrumb. To create a new breadcrumb, click the Create Breadcrumb button.
3. The current breadcrumb hierarchy appears. You may navigate to a page by clicking the Create Breadcrumb Entry.

Creating Breadcrumb Entries

The screenshot shows the 'Create Breadcrumb Entry' interface. The 'Breadcrumb' section has a 'Breadcrumb' field with 'Page 2'. The 'Entry' section includes 'Sequence' (10), 'Parent Entry' (Home (Page 1)), and 'Short Name' (Interactive Report). The 'Target' section specifies 'Target is a' as 'Page in this Application', 'Page' as '2', and includes options for 'reset pagination for this page', 'Request', 'Clear Cache', 'Set these items', 'With these values', and 'URL Target'.

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To create a new entry in a breadcrumb, click the breadcrumb icon from the Breadcrumbs page. The Entries page appears. Click the Create Breadcrumb Entry button. A Create / Edit page appears (shown in the slide).

In the Breadcrumb section, ensure that the required breadcrumb is selected for the Breadcrumb field. For the Page field, enter the page on which you want the breadcrumb to appear.

In the Entry section, enter the name for the entry. You can also specify a parent entry for the entry that you are creating.

In the Target section (not shown in slide), specify the page that should appear when the entry is clicked.

You have an option to change the title of the referenced page to the same as the breadcrumb name. To do this, select the check box for "Page Name and Title" in the Synchronize Breadcrumb With section (in the upper-right corner of the page).

Reparenting Breadcrumbs

Screenshot 1: Tasks menu with 'Reparent Entries within this Breadcrumb' highlighted.

Name	Sequence	Page
Home	10	1
Interactive Report	10	2
OEHR Orders	10	9
Master Detail	10	10

row(s) 1 - 4 of 4

Screenshot 2: Reparenting dialog showing the 'Reparent Checked Entries' button.

Name	Sequence	Page
Home	10	1
Interactive Report	10	2
OEHR Orders	10	9
Master Detail	10	10

row(s) 1 - 4 of 4

Screenshot 3: Reparented Breadcrumb Entries dialog showing the updated sequence for 'OEHR Orders'.

Name	Sequence	Page
Home	10	1
Interactive Report	10	2
Master Detail	10	10
OEHR Orders	10	9

row(s) 1 - 4 of 4

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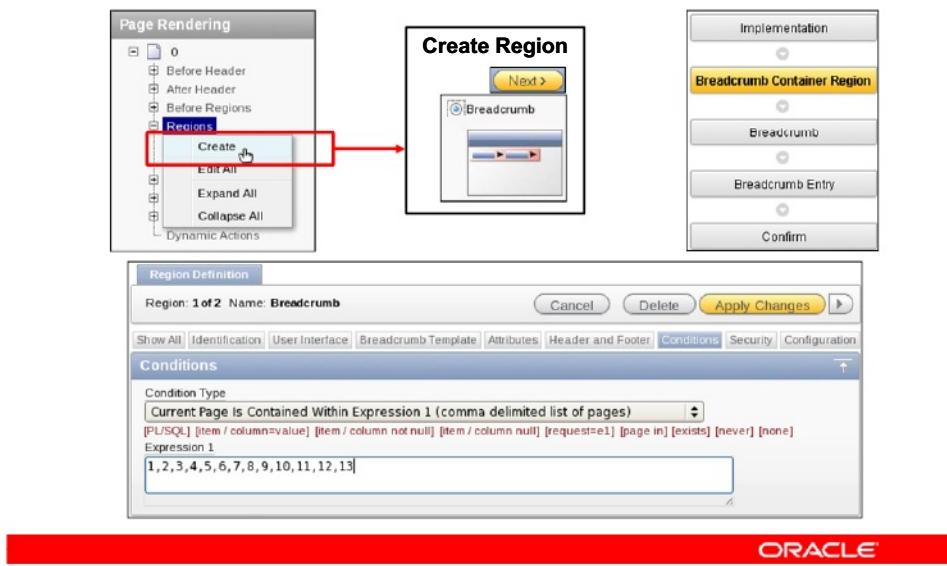
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You can change the parent entry for one or more breadcrumb entries. To reparent the breadcrumb entries, perform the following steps:

1. On the Breadcrumb page, select “Reparent Entries within this Breadcrumb” from the Tasks menu (in the bottom-right corner of page).
2. Select a parent entry for the Reparent To field. Select the check box for each breadcrumb that you want to reparent. Click the Reparent Checked Entries button.
3. The entry is now listed under the new parent.

Creating a Breadcrumb Region



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To display a breadcrumb on a page, you must create a breadcrumb region. You can create the breadcrumb region in page zero and then specify the pages that should display the breadcrumb.

To create a breadcrumb region, from the page definition for page zero, right-click the Regions node and click Create. Select Breadcrumb in the Create Region wizard and click Next. Follow the wizard instructions. The breadcrumb region is created.

To specify the pages on which the breadcrumb region should be displayed, right-click the breadcrumb region node and select Edit. On the Edit Region page, click the Conditions tab. Click the [page in] link for Condition Type and enter the page numbers, separated by a comma, in the Expression 1 field. Click Apply Changes.

If you run the application, you should see the breadcrumb region on the pages that you specified.

Note: On the page that you specified, a breadcrumb entry should have been created.

Lesson Agenda

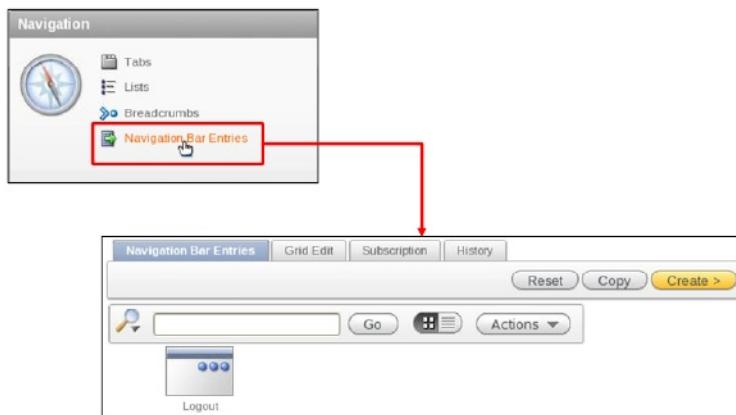
- Using Shared Components
- Creating Tabs
- Creating Lists
- Creating Breadcrumbs
- Creating a Navigation Bar
 - Accessing the Navigation Bar Entries Page
 - Creating a Help Page
 - Creating a Navigation Bar Entry

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Accessing the Navigation Bar Entries Page



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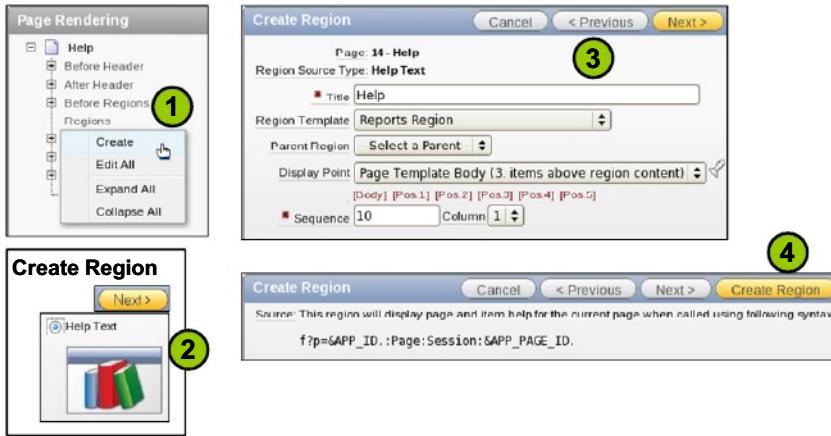
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Each application can have only one navigation bar. The items inside the navigation bar are called navigation bar entries. Some of the typical situations where you use navigation bars are accessing the home page and linking to a Help page. The location of the navigation bar depends on the associated page template. You use text or images when you create a navigation bar icon.

If you click the Navigation Bar Entries link from the application's Shared Components page, you can view the navigation bar entries for the application.

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Creating a Help Page



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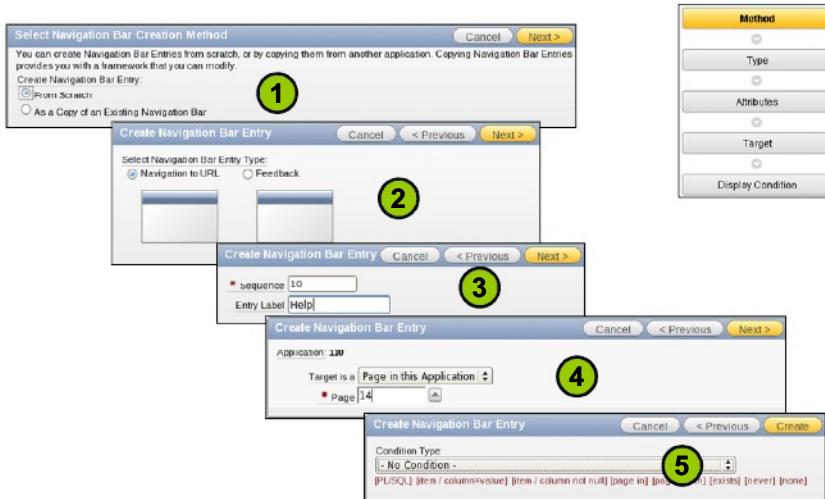
In the next slide, you create a Help navigation bar entry. Before you do that, however, you must create a help page in the application. Create a blank page and follow these steps:

1. From the page definition of the blank page, right-click the Regions node and select Create.
2. Select the Help Text option and click Next.
3. Enter a title for the help region and click Next.
4. Click Create Region.

The Help page with a Help Text region is created. When this page is accessed, the page help and item help (if any) are displayed.

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Creating a Navigation Bar Entry



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Click the Create button in the Navigation Bar Entries page. The Create wizard opens, and you perform the following steps:

1. Select From Scratch and click Next. You can also copy from another application.
2. Select “Navigation to URL” and click Next.
3. Enter the name for the entry and click Next.
4. Specify the target help page to be linked to the entry and click Next.
5. (Optional) Specify a condition. Click Create.

The navigation bar entry is successfully created.

Quiz

Which shared components would you use to create a shared collection of links on a page?

- a. Breadcrumbs
- b. Lists
- c. Navigation bar entries
- d. Tabs

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Answer: b

Summary

In this lesson, you should have learned how to:

- Provide an overview of shared components
- Include the following shared components in your application:
 - Parent and standard tabs
 - Navigation bars
 - Lists
 - Breadcrumbs



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Practice 12: Overview

This practice covers the following topics:

- Creating a list
- Creating and editing standard tabs
- Creating a Help page and adding a navigation bar entry
- Editing navigation bar entries
- Creating a conditional display of a navigation bar

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13

Displaying Dynamic Content

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Objectives

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

- Create and use a dynamic action
- Import and use a plug-in
- Create charts by using a wizard
- Create a calendar
- Create a tree



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This lesson shows you how to start using dynamic actions to define client-side behavior, by building standard and advanced dynamic actions. You learn the difference between the two types of dynamic actions. You also learn how to create charts, calendars, and trees.

Lesson Agenda

- Using Dynamic Actions
 - What Are Dynamic Actions?
 - Creating a Standard Dynamic Action
 - Creating an Advanced Dynamic Action
- ~~Creating a Dynamic Action on a Button~~
- Using Plug-Ins
- Using Charts
- Using Calendars
- Using Trees



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What Is a Dynamic Action?

Example of a standard dynamic action for enable/disable:

Commission Pct is disabled
when Job is not Sales
Representative.

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Dynamic actions provide developers a way to define client-side behavior declaratively without the need to know JavaScript.

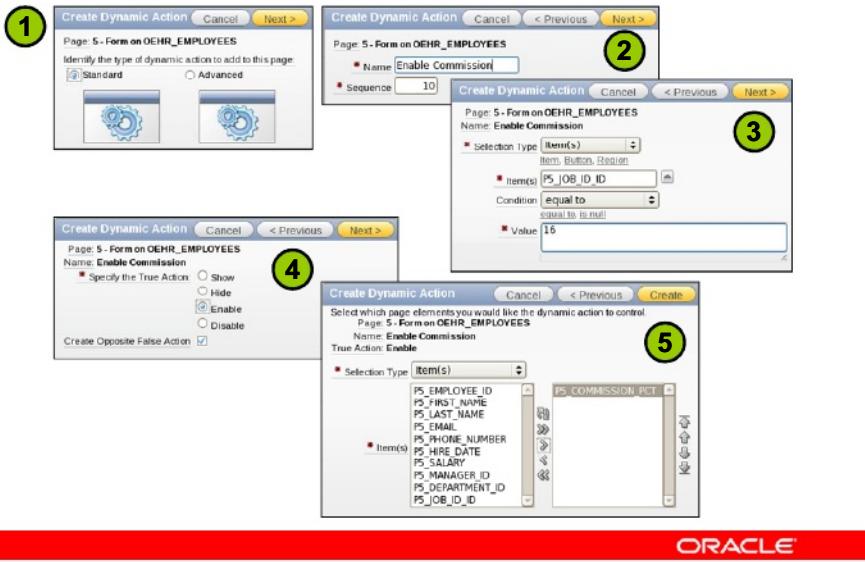
There are two classifications of dynamic actions:

- **Standard** allows you to create dynamic actions that show, hide, enable, or disable page items.
- **Advanced** allows you to create more complex native dynamic actions (such as Add Class or Set Value), specify different event types (such as Click or After Refresh), and also use plug-in dynamic actions (which are installed in your application).

Note that in the standard mode, the triggering event is Change by default, but in the advanced mode, there are many more events to choose from.

An example of a standard dynamic action is shown in the slide. In the slide example, in the left screenshot, the value for Job is Account and the Commission Pct item is disabled. In the screenshot on the right, the value for Job is Sales Representative and the Commission Pct item is enabled. The way in which the items work is controlled by the dynamic action created. Many dynamic actions are available in Application Express. In this course, you examine a few of them. To learn more, review the *Application Express User's Guide*. In addition, an OBE tutorial is available in the Oracle Learning Library. This topic is also discussed in more depth in the Advanced APEX Workshop course.

Creating a Standard Enable/Disable Dynamic Action



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There two ways to create a dynamic action:

- From a specific item
- From the Dynamic Actions node. If you create it from the Dynamic Actions node, you can identify multiple triggering items in the When steps.

An example of a standard dynamic action is to enable and disable an item based on the value of the item. To create this type of dynamic action, navigate to the page that contains the item for which you want to create a dynamic action. In the tree view, right-click the item and select Create Dynamic Action and perform the following steps:

1. Select Standard for Dynamic Action type and click Next.
2. Enter a name for the dynamic action. In this example, the name is Enable Commission.
3. Most of the fields on the next wizard page are prepopulated. In this case, enter a Value of 16, which is the ID of the SA REP value that you want when the dynamic action fires. Select the true action that should be performed when the When condition is met (for example, when P5_JOB_ID is equal to SA REP), and click Next.

4. In this case, Enable is selected. In addition, the false action of Disable will be created if the When condition is not met (for example, when P5_JOB_ID does not equal SA REP).
5. Select the item that you want the enable and disable actions to control, and click Next. In this case, the P5_COMMISSION_PCT item will be enabled or disabled depending on the value of the P5_JOB_ID item. Click Create.

What Is an Advanced Dynamic Action?

Example of an advanced dynamic action for Set Value with a SQL statement:

The location of a department is set when the department changes.

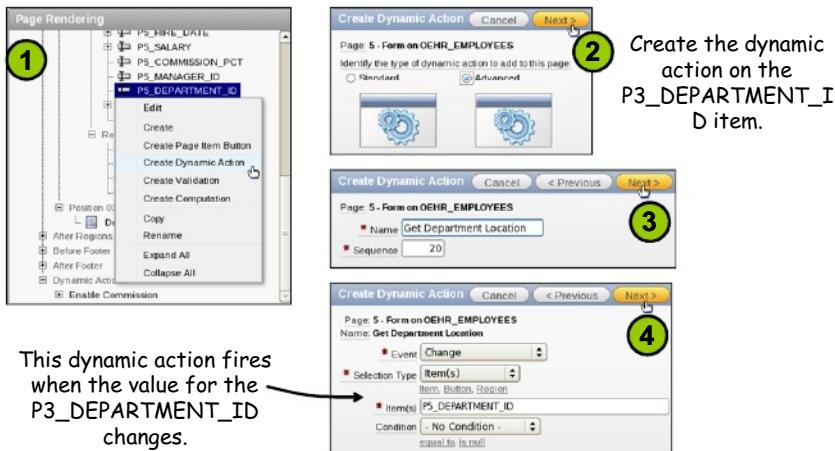
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Advanced dynamic actions enable you to create more complex native dynamic actions (such as Add Class or Set Value), specify different event types (such as Click or After Refresh), and also use plug-in dynamic actions (which are installed in your application). This slide shows an example of an advanced dynamic action. In this example, when the value of an item changes, the value of another item is set based on a SQL statement—in this case, when the Department changes the value of Location changes.

Creating an Advanced Set Value with a SQL Statement Dynamic Action



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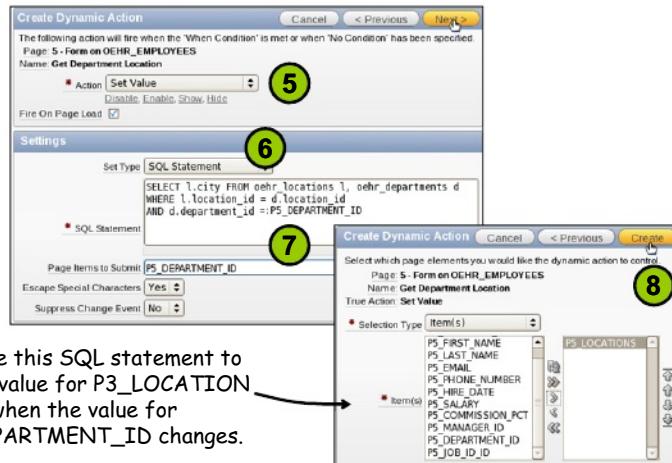
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An example of an advanced dynamic action is to change the value of an item based on the value of another item. To create this type of dynamic action, perform the following steps:

1. Navigate to the page that contains the item you want to create a dynamic action against. In the tree view, right-click the item and select Create Dynamic Action. In the slide example, because you want the dynamic action to be fired when the value for Department changes, right-click P5_DEPARTMENT_ID and select Create Dynamic Action.
2. Select Advanced for Dynamic Action type and click Next.
3. Enter a name for the dynamic action. In this example, the name is GET DEPARTMENT LOCATION.
4. Most of the fields on the next wizard page are prepopulated. In this case, you do not want to base the dynamic action on a particular condition, so you can accept the defaults and click Next.

Creating an Advanced Set Value with a SQL Statement Dynamic Action



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5. Select the action to be performed when the condition is met. In this case, you want to perform a Set Value.
6. Select the type of set value to perform. In this case, you want to set the value by using a SQL statement.
7. Enter the SQL statement that you want to be submitted. Specify the “Page Items to Submit” and click Next. In this case, specify P5_DEPARTMENT_ID because its value has changed and needs to be set in session state in order for the SQL query to be able to bind in the new value and return the appropriate location.
8. Select the item that will be populated when the dynamic action is fired. In this case, P5_LOCATION will be set. Click Create.

Creating a Dynamic Action on a Button

The screenshot shows a form titled "OEHR Employees" with a "Create" button highlighted by a red box. The form contains fields for First Name (Henry), Last Name (Sharp), Email (henry.sharp@oracle.com), Phone Number, Hire Date (13-Nov-11), Salary, Commission Pct, Manager Id, Department Id (Accounting), and Job Id Id (AC_ACCOUNT). The "Create" button is the primary action button.

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You can create a dynamic action to be fired when a button is clicked. Consider a situation when you are submitting a page by clicking a SAVE, Apply Changes, or Create button. It takes a few seconds for the page processing to complete and the resulted page to be displayed. Within these few seconds it is possible for the user to click the button again or make some other changes. This can lead to data integrity issues and also increase the response time if the button is clicked again and again. To avoid this situation, you can click a dynamic action to be fired when a button is clicked, which will gray out the current page so that the user cannot make any changes. The example in the slide shows a Create form. A dynamic action is defined to fire when the Create button is clicked. It displays a grayed out page and also a progress bar. Once the page processing is complete, the resulted page is displayed.

Creating a Dynamic Action on a Button



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To create a dynamic action on a button, perform the following steps:

1. Navigate to the page that contains the button you want to create a dynamic action against. In the tree view, right-click the button and select Create Dynamic Action. In the slide example, because you want the dynamic action to be fired when the Create button is clicked, right-click Create and select Create Dynamic Action.
2. Enter a name for the dynamic action and click Next. In this example, the name is Submit Page.
3. Most of the fields on the next wizard page are prepopulated. In this case, you do not want to base the dynamic action on a particular condition, so you can accept the defaults and click Next.
4. Select an action. In this case, Submit Page is selected. Enter the Request that should be passed in the Request/Button Name field.
5. Click Create.

Quiz

Which of the following would be implemented as a standard dynamic action?

- a. Showing and hiding an item based on the changing of another item's value
- b. Setting an item's value when another element is clicked
- c. Refreshing a report based on an item's value changing
- d. Enabling an item based on the changing of another item's value

Lesson Agenda

- Using Dynamic Actions
- Using Plug-Ins
 - What Is a Plug-In?
 - Importing a Plug-In
 - Installing a Plug-In
 - Adding a Plug-In Item to a Page
- Using Charts
- Using Calendars
- Using Trees

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What Is a Plug-In?

Example of a rating plug-in:

The screenshot shows a form titled "OEHR Employees" with various input fields. At the bottom right, there is a "Star Rating" field containing five yellow stars. A red rectangular box highlights this field, and a mouse cursor is positioned over the fifth star.

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Plug-ins allow developers to declaratively extend the built-in types available with Application Express and to enable developers to share and reuse them.

Application Express supports a set group of item, region, dynamic action, and process types. Plug-ins offer a means of augmenting these built-in types by declaratively creating and using new types in your application. Because plug-ins are designed for reuse, developers can export and import them into other applications in the same or another workspaces and also share them with the Application Express Plug-in community by using the Plug-in Repository.

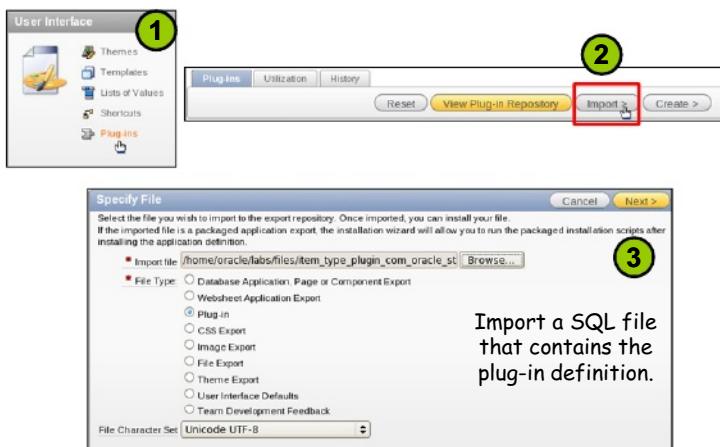
The process of implementing a plug-in involves the following:

- Create or import a plug-in in to your application workspace.
- Edit or create an item, region, process, or dynamic action type to use the plug-in.
- Run your application to test the plug-in.

The slide example shows a Rating plug-in item.

There are a number of plug-ins available in the plug-in repository (accessed from the Plug-in window). To find out more about plug-ins, see the *Application Express User's Guide*.

Importing a Plug-In



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To use a plug-in in your application, you import or create it under Shared Components. To import a plug-in, perform the following steps:

1. Navigate to your application's Shared Components page. Under User Interface, select Plug-ins.
 2. Click Import.
- Note:** You can view the Plug-in Repository for a list of available plug-ins that you can download and then import.
3. Select your plug-in import file and click Next.

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Installing a Plug-In



After you import
the file, you
must install it.

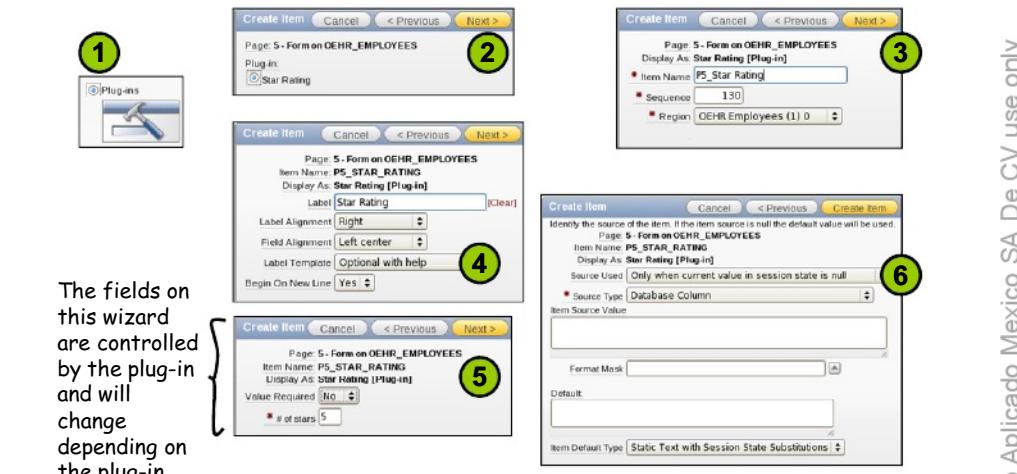
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4. After the file is imported, click Next to install it.
5. Select the application that you want to install the Plug-in into, and click Install Plug-in.

Adding a Plug-In Item to a Page



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After the plug-in is made available to the application, you can use it. From your page definition, right-click Items and select Create Page Item. Perform the following steps to create an item plug-in:

1. Select the Plug-ins item type and click Next.
2. Select the plug-in that you want from the list, and click Next. In this case, you select the Star Rating plug-in.
3. Enter an item name and click Next.
4. Accept the defaults and click Next.
5. Select whether the value for the item is required and the number of stars that you want to show, and click Next.
6. Select Database Column for Source Type and enter the column in the table in which you want the value to be stored.

Note: You may need to create a new column with a data type of number(2) to store the value.

Quiz

Which of the following can be implemented by using a plug-in?

- a. Showing an item that has a particular format
- b. Changing the value of an item based on another item value
- c. Fading in and out an item
- d. Enabling or disabling an item

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Answer: a, c

b and d are dynamic actions.

Lesson Agenda

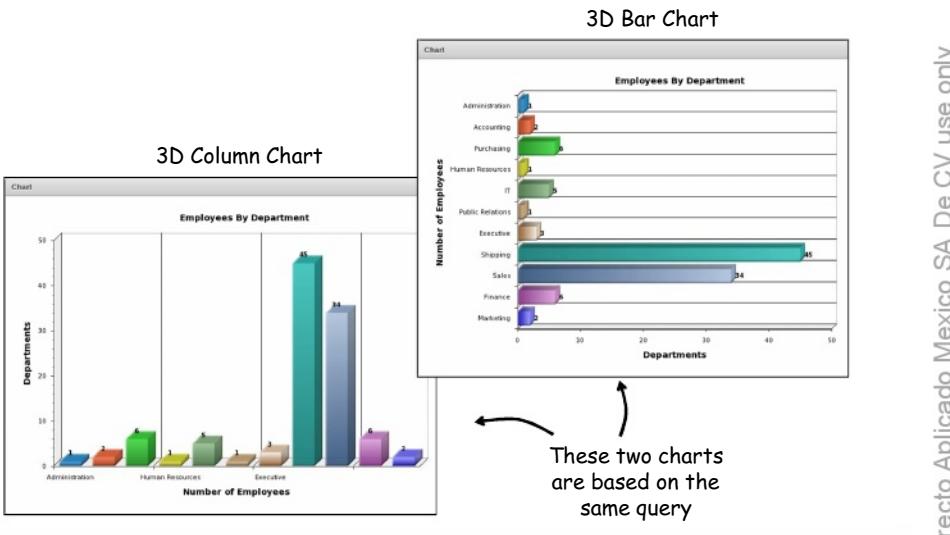
- Using Dynamic Actions
- Using Plug-Ins
- Using Charts
 - Building Charts
 - Creating a Flash Chart
 - Creating an HTML Chart
 - Creating a Map
 - Viewing Chart Attributes
- Using Calendars
- Using Trees

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Building Charts



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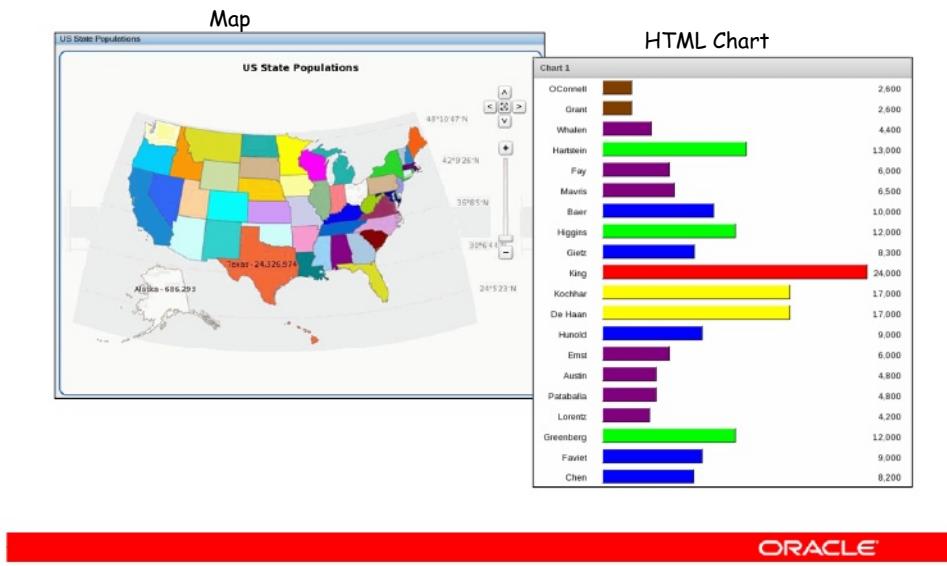
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Oracle Application Express includes built-in wizards for generating two types of charts: HTML and Flash charts.

Flash charts are based on the AnyChart Flash Chart Component. AnyChart is a flexible Macromedia Flash-based solution that enables developers to create animated, compact, and interactive Flash charts. Flash charts are rendered by a browser and require Flash Player 9 or later. For more information about AnyChart, go to <http://www.anychart.com>.

The slide example shows two Flash charts (3D bar and 3D column) that are based on the same query and it shows the number of employees per department.

Building Charts



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Application Builder includes built-in wizards for generating Flash maps. How you create a Flash map depends upon whether you are adding the map to an existing page, or adding a map on a new page. Flash map support in Oracle Application Express is based on the AnyChart AnyMap Interactive Maps Component. AnyMap is a flexible Macromedia Flash-based solution that enables developers to visualize geographical related data. Flash maps are rendered by a browser and require Flash Player 9 or later.

AnyChart stores map data in files with a .amap extension, and supports 300 map files for the United States of America, Europe, Asia, Africa, Oceania, North America, and South America. To render a desired map, you select the map source (for example, Germany) in the wizard, and the map XML automatically references the desired map source .amap file, germany.amap.

HTML charts are simple horizontal and vertical charts.

In the slide example, a map shows the populations of each state. In addition, an HTML chart is displayed that shows Salary by Employee.

Creating a Flash Chart



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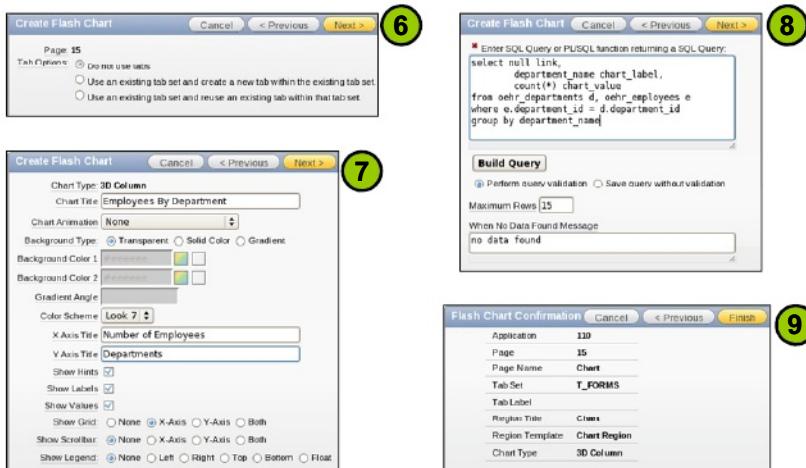
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To create a flash chart, navigate to your application home page and click Create Page. Perform the following steps:

1. Select Chart and click Next.
2. Select Flash Chart and click Next.
3. Select the type of chart that you want to create, and then click Next. **Note:** Numerous Flash charts are available.
4. Depending on what you selected from the previous list, you may receive a set of more detailed charts to select from. Select the chart that you want and click Next.
5. Accept the defaults and click Next.

Creating a Flash Chart



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6. Accept the default tabs and click Next.
7. Enter a Chart Title and specify any of the parameters in this window. In the slide example, a different Color Scheme was selected and X-Axis and Y-Axis titles were specified. Then click Next.
8. Enter a SQL query that this chart will be based on. If you want to see a sample of what one should look like, you can click the Chart Query Example link at the bottom of the window. The query can differ depending on the type of chart that you are creating. Click Next.
9. Click Finish.

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Creating an HTML Chart

Chart SQL:

```
Select null link,
       last_name Label,
       salary value
  from oeht_employees
```

Build Query

(Perform query validation) (Save query without validation)

Font Size: 1

Maximum Rows: 20

Number Mask: 999999999999999

Scale: 400

Axis center: Zero

Chart Type: Horizontal Vertical

Include in summary:

- Number of data points Axis
- Minimum value Maximum value
- Average value Sum of all values
- First value Last value

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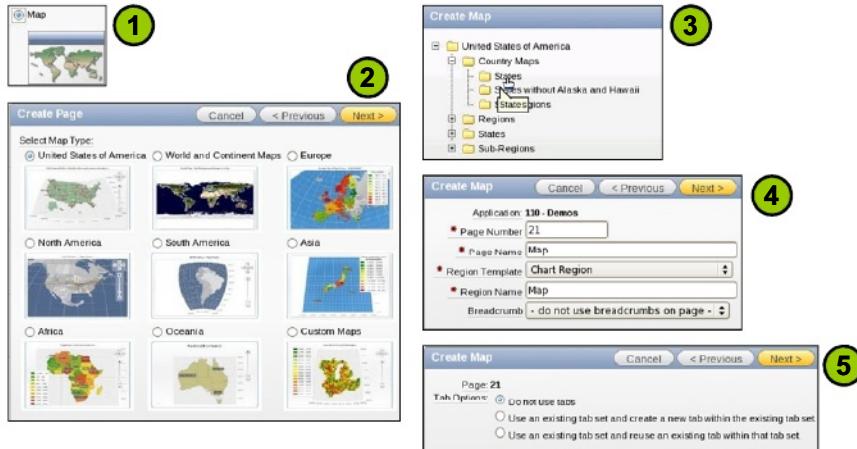
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To create an HTML chart, perform the following steps:

1. Navigate to your application home page.
2. Right-click Regions and select Create.
3. Select Chart and click Next.
4. Click HTML Chart, and then click Next.
5. Enter Page Name and Region Name, and then click Next.
6. Enter the chart SQL manually, or click Build Query. The slide shows the SQL used. If you use the query wizard, you receive the following:
 - a. Select the Table/View Owner, and then click Next.
 - b. Select the Table or View to base the chart on, and then click Next.
 - c. Select a Label (for example, LAST_NAME) and a Value (for example, SALARY) and an Aggregate Function if necessary. Click Next.
 - d. You can link to another page or URL from the label by selecting a Target Type and selecting the page or specifying the URL. Click Next.
 - e. Click Finish.
7. Change any of the attributes of the chart and click Next.
8. Click Finish.

Creating a Map



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To create a Flash Map region in an existing page, navigate to the page where you want to create the map. Right-click Regions, select Create and perform the following steps:

1. Select Map and click Next.
2. Select the type of map that you want and click Next. In the slide example, the United States of America map type is selected.
3. Select the map source file that you want and click Next. In the slide example, you want to show the States Map in the Country Maps category.
4. Enter a Title and click Next.
5. Accept the default for tabs and click Next.

Creating a Map

The screenshot shows two consecutive steps in the Oracle Application Express interface:

Step 6: Create Map

- Map Title: US State Populations
- Map Source: use@country/states.amap
- Map Precision: Orthographic
- Background Color Type: Transparent
- Background Color 1: Gray
- Background Color 2: White
- Gradient Angle: 0
- Defined Region Color Scheme: Look 7
- Undefined Region Color Scheme: Look 1
- Show Hints: checked
- Show Labels: checked
- Show Grid: Longitude
- Show Legend: Left

Step 7: Create Region

- Region Title: US State Populations
- SQL Query:

```
select null link,
       STATE_NAME label,
       POPULATION value
  from POPULATION_INFO
```

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- Enter the Map Title and specify any map parameter changes, and click Next.
- Enter a SQL query that this map will be based on, to associate values with points on the map. If you want to see a sample of what one should look like, you can click the Map Query Example link at the bottom of the window. By default, the value of the LABEL parameter of the query should reference a value contained in the REGION NAME column of AnyChart Map Reference information for the map. If you want to see the AnyChart Map Reference Information associated with the map, you can click the Map Region Information link at the bottom of the window. Click Create Region.

Viewing Chart Attributes

The screenshot displays two separate windows for editing chart attributes:

- Flash Chart:** This window shows settings for a "3D Bar Chart". It includes fields for "Chart Title" (Employees By Department), "Chart Width" (700), "Chart Height" (500), "Color Scheme" (Look 7), "Hatch Pattern" (No), and a "Custom Colors" color palette.
- HTML Chart:** This window shows settings for a "Horizontal" chart. It includes fields for "Font Size" (-1), "Display" (20), "Number Mask" (9999G999G999G990), "Scale" (400), "Axis" (Zero), and "Summary" options (Number of data points, Minimum value, Average value, Maximum value, First value, Sum of all values). It also includes "Pagination" options (Select List, Search Engine, Rows X-Y of Z, No Pagination).

Both windows have tabs for "Region Definition" and "Chart Attributes", and buttons for "Cancel" and "Apply Changes". A red banner at the bottom of the slide contains the text "Copyright © 2011, Oracle and/or its affiliates. All rights reserved." and the Oracle logo.

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After you create a chart, you can edit the attributes of the chart region. To view and edit the attributes:

1. Click the Page icon in the application home page.
2. In Component View, click the chart region and click the Chart Attributes tab. In Tree View, right-click the chart region and select Edit Chart.
3. The attribute categories may be slightly different depending on the chart type. For example, the chart attributes in this slide are for a Flash chart and an HTML chart.

Quiz

Which type of chart would you create if you wanted to show a Gantt chart?

- a. HTML
- b. Map
- c. Flash chart
- d. Resource

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Answer: d

Quiz

In the following SQL query that you provide to define a chart, what does value indicate?

```
SELECT link, label, value FROM table
```

- a. URL
- b. Text that is displayed on the chart axes
- c. Numeric column to use for the data point



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Answer: c

Lesson Agenda

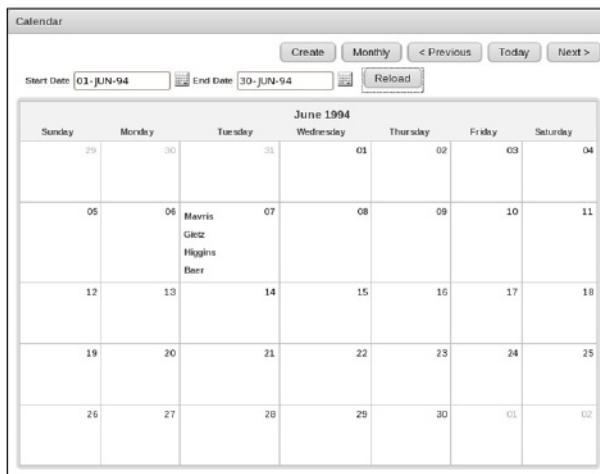
- Using Dynamic Actions
- Using Plug-Ins
- Using Charts
- Using Calendars
 - Creating a Calendar
 - Editing Calendar Attributes
 - Linking to a Form from a Calendar
- Using Trees

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Creating a Calendar



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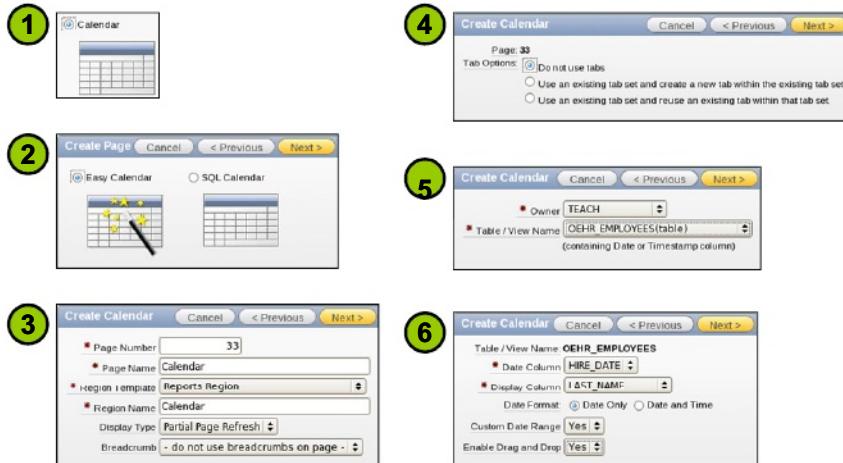
Oracle Application Express supports two calendar types:

- **Easy Calendar:** Creates a calendar based on the schema, table, and columns that you specify. The wizard prompts you to select a date column and a display column.
- **SQL Calendar:** Creates a calendar based on a SQL query that you provide. The SELECT SQL statement that you provide must include at least two columns: a date column and a display column.

The date column determines which days on the calendar will contain entries. The display column defines a specific row that will display a calendar date.

The calendar can be viewed in three different modes: monthly, weekly, and daily.

Creating a Calendar



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To create a calendar on a new page, navigate to your application home page and click Create Page. Perform the following steps:

1. Select Calendar and click Next.
2. Select the type of calendar required and click Next.
3. Specify a Name and click Next.
4. Accept the defaults and click Next.
5. Select the table, which has a date column and click Next.
6. Specify the date column and the column to display. Also specify whether you want to show a custom date range and allow drag and drop in the calendar. Click Next.

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Creating a Calendar

7 Create Calendar Step 7: Link Details. Set Page Number to 34, Link Target to 'Create new edit page', and Region Template to 'Reports Region'. Select columns include LAST_NAME, EMPLID, PHONE_NUMBER, SALARY, COMMISSION_PCT, and others.

8 Create Calendar Step 8: Page 34 Configuration. Set Table / View Name to OEHR_EMPLOYEES, Cancel Button Label to 'Cancel', Show Create Button to 'Yes', Create Button Label to 'Create', Show Save Button to 'Yes', Save Button Label to 'Apply Changes', and Show Delete Button to 'Yes', Delete Button Label to 'Delete'.

9 Create Calendar Step 9: Calendar Confirmation. Summary of settings: Application 130, Page 33, Page Name Calendar, Tab Set T_FORMS, Tab Label Calendar, Region Title Calendar, Region Template Reports Region, Display Type Partial Page Refresh, Table / View Owner TEACH, Table / View Name OEHR_EMPLOYEES, Date Column HIRE_DATE, Label Column LAST_NAME.

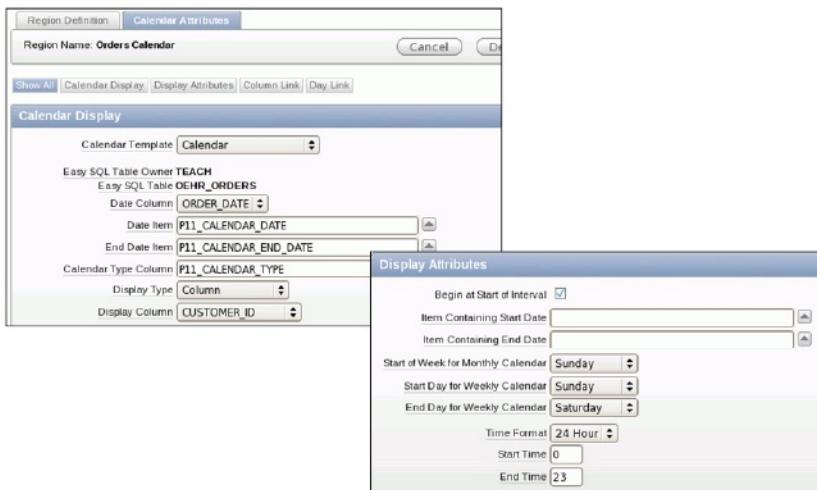
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7. Specify the calendar page attributes and click Next. You can specify how the link column target should be.
8. Accept the defaults and click Next.
9. Click Finish.

Editing Calendar Attributes



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Use Calendar Display attributes to specify a template, date columns, and general calendar formatting. In addition, you can define the interval in which the calendar displays, as well as define links to be placed on a day or a column in the calendar.

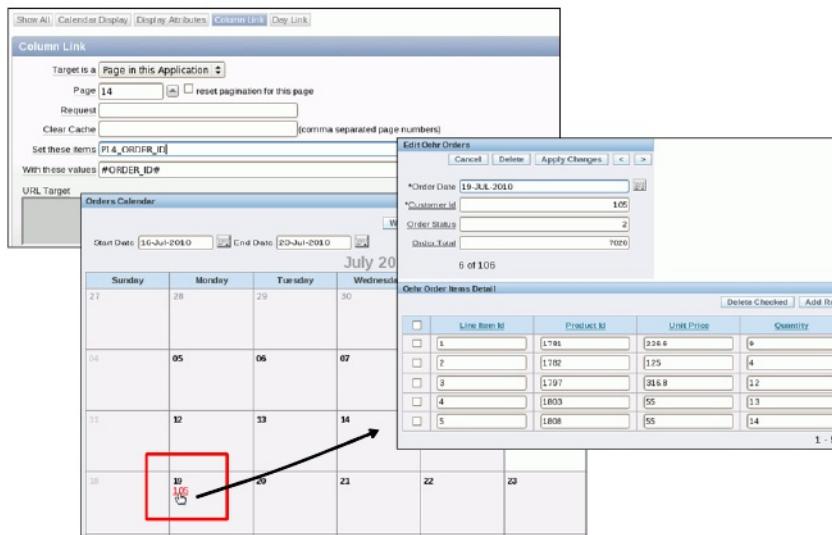
To modify the calendar attributes, perform the following links:

1. Navigate to the page definition where your calendar was created.
2. Under Regions, double-click the Calendar link or right-click and select Edit Calendar.

Warning (on the use of Start Time/End Time) If the date column specified does not have a time component (or if individual records have no time), by default the time is 0:00 hours and will not be displayed if the start time is set to a later time (for example, 8:00 AM).

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Creating a Link from a Calendar to a Form



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From a calendar, you can link to another page in your application. In the slide example, when a user clicks the `customer_id` in the calendar, the master detail page 14 is displayed with the detail about the order.

Lesson Agenda

- Using Dynamic Actions
- Using Plug-Ins
- Using Charts
- Using Calendars
- Using Trees
 - What Is a Tree?
 - Creating a Tree

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What Is a Tree?

The screenshot shows a hierarchical tree structure in Oracle Application Express. The root node is 'King', which has several children: Cambraut, De Haan, Errazuriz, Fripp, Hartstein, Kaufling, Kochhar, and Decker. Decker has a single child, Greenberg, which in turn has four children: Chen, Faviet, Pocci, and Sulara. Sulara has a child, Urman. Urman has three children: Higgins, Marin, and Whalen. Other nodes listed include Mourgos, Partners, Raphaely, Russell, Vollman, Weiss, and Zlotkey.

```
select case when connect_by_isleaf = 1 then 0
when level = 1 then 1
else -1
end as status,
level,
"LAST_NAME" as title,
null as icon,
"EMPLOYEE_ID" as value,
null as tooltip,
null as link
from "TEACH"."OEHR_EMPLOYEES"
start with "MANAGER_ID" is null
connect by prior "EMPLOYEE_ID" = "MANAGER_ID"
order siblings by "LAST_NAME"
```

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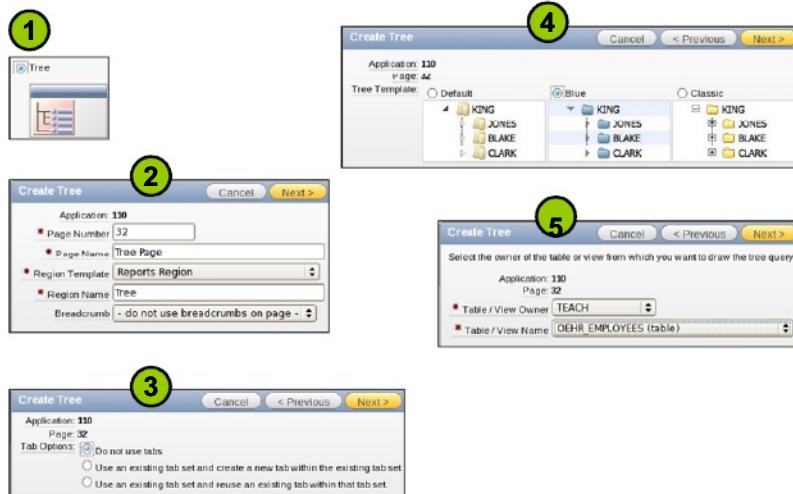
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A tree is a type of region that is suited for representing hierarchical data, such as an organizational chart. It is based on a table or view that contains a hierarchical relationship. You can create a tree in your application to communicate hierarchical or multiple-level data. You can create a tree from a query by identifying an ID and a parent ID in a table or a view. A tree definition contains a starting point and is displayed in a region on a page. The tree can also be referenced by multiple regions.

The slide example shows a tree created from the SQL specified on the right. The tree displays a list of managers and the employees who work for them.

Creating a Tree



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When you create a tree, it can be included on a new page or added to an existing page. To create a tree on a new page, navigate to the application home page and select Create Page. Perform the following tasks:

1. Select Tree and click Next.
2. Enter a Page Name and Region Name, and click Next.
3. Accept the default tab option, and click Next.
4. Select the tree template that you want and click Next.
5. Accept the default schema owner and select the table or view. Click Next.

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Creating a Tree

The screenshot shows four steps of the 'Create Tree' wizard:

- Step 6:** Set up the tree query. Owner: TEACH, Table: OHR_EMPLOYEES. Selected columns: ID (EMPLOYEE_ID), Parent ID (MANAGER_ID), Node Text (LAST_NAME), Start With (MANAGER_ID), Start Tree (Value is NULL).
- Step 7:** Configure tree buttons. Include Buttons: Collapse All (checked), Expand All. Selected Node Page Item: None. Tooltip: None. Link Option: Nothing.
- Step 8:** Define where clause and order by. Where Clause: 'where ename = JONES'. Order Siblings By: LAST_NAME.
- Step 9:** Final settings. Application: 130, Page: 32, Page Name: Tree Page, Tab Set: T_FORMS, Tab Label: Tree, Region Title: Tree, Region Template: Reports Region.

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6. For Query, select the columns for the following to include in the tree and click Next:
 - **ID:** Select the column to base the tree on; in this case, EMPLOYEE_ID.
 - **Parent ID:** Select the column to use as the parent ID; in this case, MANAGER_ID.
 - **Node Text:** Select the text to appear on the tree nodes.
 - **Start With:** Select the column to be used to specify the root of the hierarchical tree query.
 - **Start Tree:** Choose how to start your query; in this case, null.
7. You can specify a Where and an Order By clause and click Next. In addition, you can see the query that was generated by selecting the expand icon for Current Query.
Note that `connect_by_leaf` is a pseudocolumn, and
`connect_by_prior` specifies a condition that identifies the relationship between parent rows and child rows in the hierarchy. The START WITH clause identifies the row or rows to be considered for the starting point of the hierarchy.
8. Specify whether you want to include buttons for Collapse All and Expand All, whether you want to link to an existing item or define a tooltip for the nodes of the tree, and whether the tree state should be saved via the Selected Page Node Item, and click Next.
9. Click Finish.

Quiz

Which of the following components would you use to effectively represent multiple-level data in your application?

- a. Calendars
- b. Lists
- c. Trees
- d. Lists of values



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Answer: c

Summary

In this lesson, you should have learned how to:

- Create and use a simple dynamic action
- Import and use a plug-in
- Create charts by using a wizard
- Create a calendar
- Create a tree

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The lesson showed you how to use dynamic queries to display information based on user input, and how to create charts, calendars, and trees.

Practice 13: Overview

This practice covers the following topics:

- Creating a Show/Hide dynamic action
- Importing and adding the Star Rating plug-in to your page
- Creating and modifying flash charts
- Creating a calendar
- Creating a tree

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Working with Themes, Templates, and Files

14

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Objectives

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

- Define themes and their uses
- Create a new theme from the repository
- Switch to a different theme
- Define templates and their uses
- View existing templates
- Create and edit a template
- Upload and use a cascading style sheet and an image



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This lesson provides an overview of the themes and templates provided by Oracle Application Express.

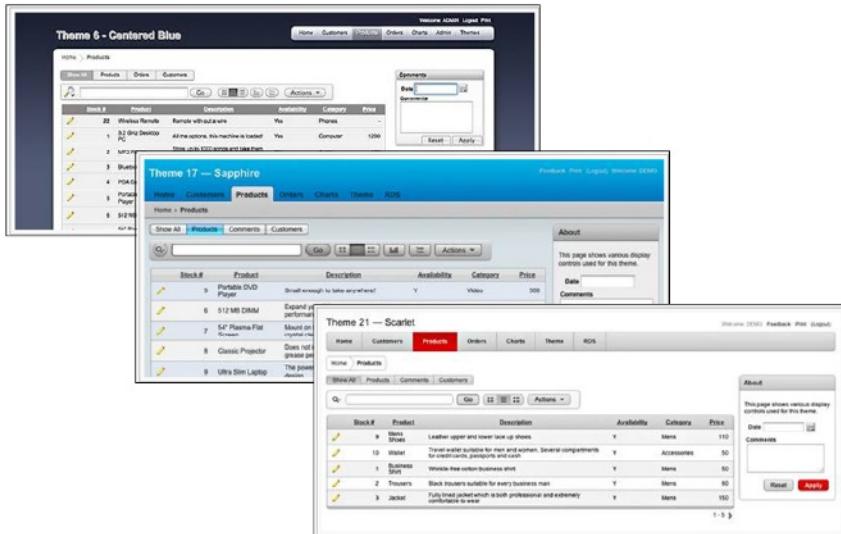
Lesson Agenda

- Using Themes
 - What Is a Theme?
 - Accessing the Themes Page
 - Creating a New Theme from the Repository
 - Switching Between Themes
 - Creating a Copy of an Existing Theme
 - Editing a Theme
- Using Templates
- Using Files



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What Is a Theme?



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A theme is a collection of templates that can be used to define the layout and style of an entire application. The purpose of a theme is to provide a complete set of templates that accommodate every user interface (UI) pattern that may be needed in an application.

Oracle Application Express provides 23 themes from which you can choose to define an application's interface. Each theme comes with one or more templates for application components like reports, forms, charts, and so on. You can also create a new theme from scratch and define templates for an application. In this lesson, you learn how to use the themes and templates provided with Oracle Application Express.

The slide shows some themes provided by Oracle Application Express. Each theme defines an application's user interface, including the tabs, reports, buttons, and other controls.

Accessing the Themes Page

The screenshot shows the Oracle Application Express User Interface. In the top navigation bar, under 'User Interface', there is a link to 'Themes'. The main content area is titled 'Themes' and displays a single theme named 'Simple Red - 1 *'. On the right side, there is a sidebar with a 'Tasks' section containing options like 'Copy Theme', 'Delete Theme', 'Edit Theme', 'Export Theme', 'Import Theme', 'Change Identification Number', and 'View Templates'. A tooltip for 'Themes' defines it as 'A Theme is a named collection of templates used to define the user interface of an application.'

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To access the Themes page for an application, click Shared Components from the applications home page. Under User Interface, click Themes. The Themes page displays the themes available for the application. From the Themes page, you can create a new theme for the application and switch between these themes. You can also edit a theme, copy a theme, import or export a theme, and so on, by selecting the appropriate option from the Tasks section.

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Creating a New Theme from the Repository

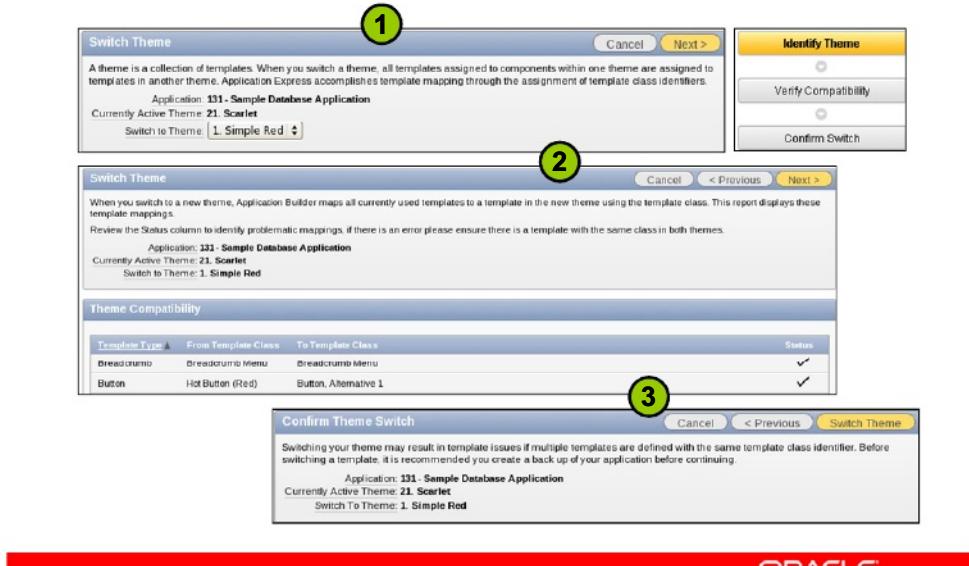


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To create a new theme for your application from the Oracle Application Express repository, click the Create button in the Themes page and perform the following steps:

1. Select "From the Repository" and click Next.
2. Select a theme and click Next.
3. Click Create to create the selected theme for the application.

Switching Between Themes



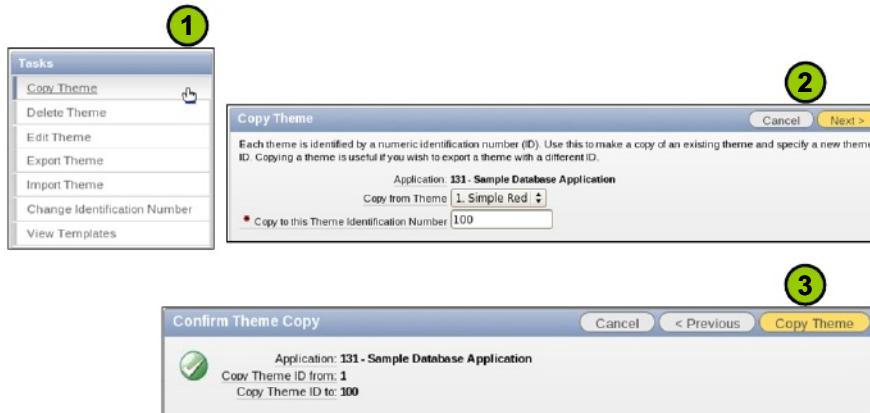
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You can switch between the themes available for an application (that is, those displayed in the Themes page of an application). When you switch to a new theme, all the components that are assigned a template are assigned to a corresponding template in the new theme.

Click the Switch Theme button in the Themes page and perform the following steps:

1. Select the theme to switch to from the select list and click Next.
2. Review the compatibility status report and click Next.
 - A check mark indicates that the mapping was successful.
 - A warning indicates that there is more than one template in the theme you are switching to with the identified class. The warning provides a select list from which to choose the appropriate template.
 - An error indicates that Application Builder was unable to map the class between the themes. Ensure that a class is identified for the templates in both themes.
3. Click Switch Theme.

Creating a Copy of an Existing Theme



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Instead of creating a theme from scratch, you can choose to copy an existing theme and make changes to it. Navigate to the Themes page and perform the following steps.

1. In the Tasks section, click Copy Theme.
2. Select the theme that you want to copy and enter an identification number for the theme. This number must be 100 or greater to indicate that it is a custom theme. Click Next.
3. Click Copy Theme.

The theme is copied successfully and you can make changes to it.

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Editing a Theme

The figure consists of three screenshots illustrating the process of editing a theme in Oracle Application Express:

- Screenshot 1:** Shows the "Tasks" sidebar with the "Edit Theme" option highlighted. A green circle labeled "1" is positioned above the sidebar.
- Screenshot 2:** Shows a list of themes. The theme "Simple Red" (Number 100) is selected, indicated by a checkmark. A green circle labeled "2" is positioned above the list.
- Screenshot 3:** Shows the "Edit Theme" dialog for "Simple Red". The "Name" tab is selected, showing the application number (101), theme number (100), and name ("Simple Red"). Other tabs include "Image", "Component Defaults", "Region Defaults", "Mobile Defaults", and "Calendar Icon Details". A green circle labeled "3" is positioned above the dialog.

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To edit a theme, perform the following steps:

1. From the Tasks section, click Edit Theme.
2. Select the theme that you want to edit.
3. You can change the theme name, component and region defaults, and so on. Click the appropriate tab and make changes. Click Apply Changes to save your modifications.

Quiz

Which of the following statements are true about themes?
(Choose all that apply.)

- a. Workspace themes are available to all developers within the workspace.
- b. You can add a custom theme to the theme repository only at the workspace level.
- c. When you switch to a new theme, all the components that are assigned a template are assigned to a corresponding template in the new theme.
- d. You can copy an existing theme and make changes to the copy.



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Answer: a, c, d

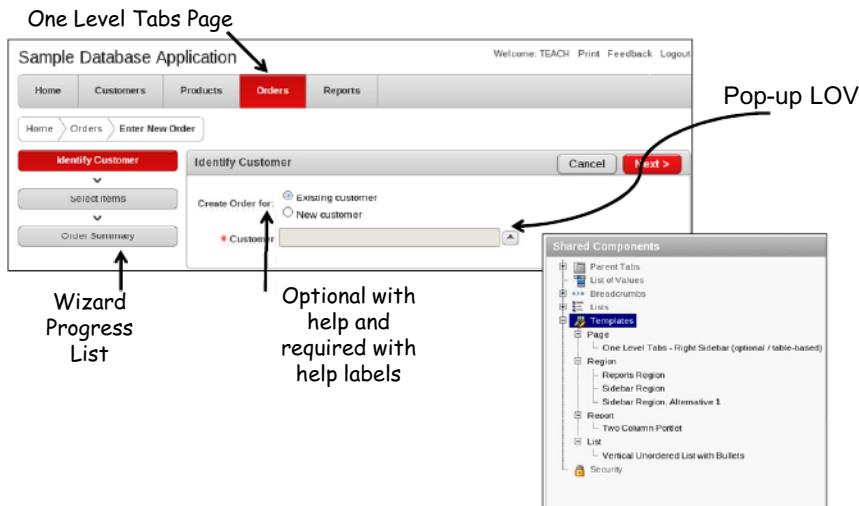
Lesson Agenda

- Using Themes
- Using Templates
 - What Are Templates?
 - Types of Templates
 - Accessing the Templates Page
 - Creating a Copy of an Existing Template
 - Editing a Template
 - Applying a Template
 - Changing the Default Templates for a Theme
 - Overriding Application Defaults at the Page Level
 - Using Substitution Strings in Templates
- Working with Files



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What Are Templates?



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Templates define how the pages or the page components of an application are displayed. You can select templates for your page or page components from the templates available in the applications theme. Alternately, you can customize the look and feel of the application by modifying the existing templates or creating new templates, using HTML and cascading style sheets (CSS).

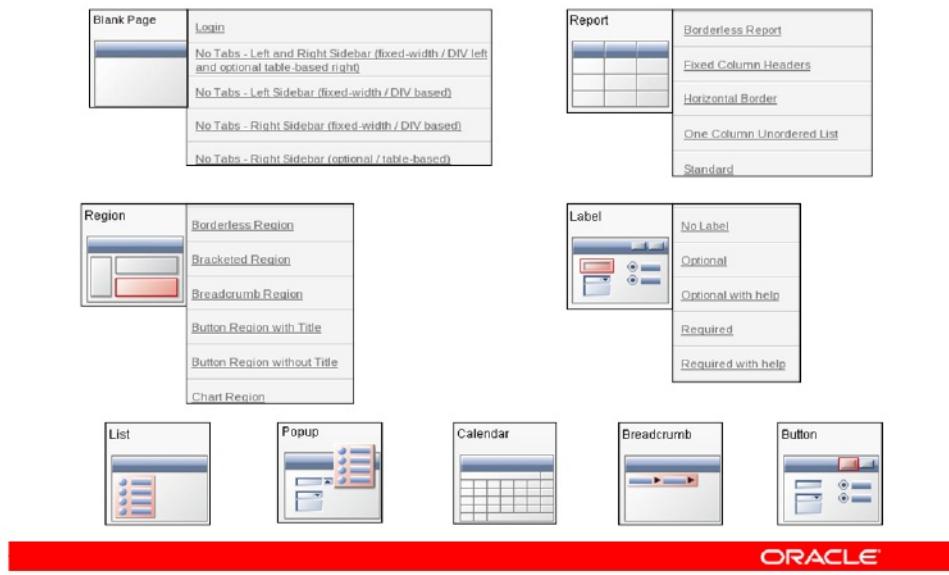
Templates facilitate the separation of business logic from user interface. The developers of your organization can focus on the code for the business logic, whereas the graphic artists can concentrate on the look and feel. The advantages of using templates are as follows:

- Multiple components of your application can use the templates.
- To incorporate any change in the component, a single change to the template is sufficient.

The slide shows an example of a page and the various templates associated with the page and its components. The templates used in a page can be accessed from the Shared

Components region of the page definition.

Types of Templates



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Oracle Application Express offers nine types of templates. Each theme comes with one or more templates for each type. The slide shows some of the templates available for the Page, Report, Region, and Label types. Page templates control the appearance of the navigation bars, the parent tabs, and the standard tabs. Region templates control the display of region titles, buttons, and so on. Report templates control the format of the displayed report. The Label, List, Popup, Calendar, Breadcrumb, and Button templates specify how those respective components should be displayed.

Accessing the Templates Page

The screenshot shows the Oracle Application Express User Interface. In the top-left corner, there's a small icon of a document with a pencil. To its right, the 'User Interface' menu is open, displaying several options: Themes, Templates (which is highlighted with a green circle labeled '1'), Lists of Values, Shortcuts, and Plug-ins. Below the menu, the main content area has a title bar with tabs: Templates, Subscription, Publish, Utilization, and History. The 'Templates' tab is selected, indicated by a green circle labeled '2'. Underneath the tabs, there are search and filter fields for 'Template Name', 'Theme', 'Type', 'References', 'Updated', 'Updated By', 'Subscribed', 'Default', 'Theme', 'Preview', and 'Copy'. A table below lists three template entries: Breadcrumb, Hierarchical Menu, and Button, each with their respective details like name, type, and last update.

Type	Name	References	Updated	Updated By	Subscribed	Default	Theme	Preview	Copy
Breadcrumb	Breadcrumb Menu	0	11 days ago	teach	-	-	1	-	
Hierarchical Menu	Hierarchical Menu	0	11 days ago	teach	-	-	1	-	
Button	Button	0	11 days ago	teach	-	-	1	-	

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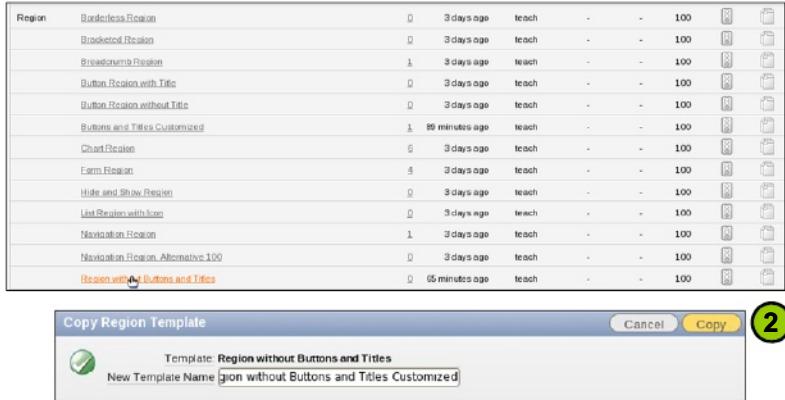
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To view the Templates page, navigate to the Shared Components page of the application. Under User Interface, select Templates. The Templates page appears. You can use the drop-down lists to display templates from a specific theme or type. You can view the default templates and the referenced templates.

Copying a Template

As a best practice, copy a template and edit it rather than modifying templates supplied by Oracle Application Express.



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If you must change one or a few of the templates supplied by Oracle Application Express, it is best to copy the template to another name and then modify the copied template. Then associate the copied template with the desired page. You always copy a template so that you always have the original template to go back to or use in a different application.

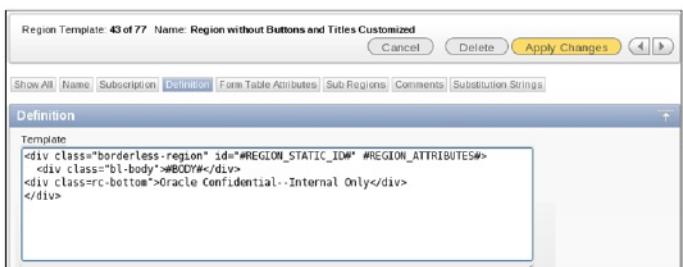
To copy a template, perform the following steps:

1. From the Templates page, click the Copy icon for the template that you want to copy.
2. Enter a name for the template copy and click Copy. In the slide example, you create a copy of the Button Region without Titles template.

Editing a Template



Region	Name	Created	Last Modified	Owner	Size	Actions
	Borderless Region	0	3 days ago	teach	-	
	Navigation Region	1	3 days ago	teach	-	
	Navigation Region Alternative 100	0	3 days ago	teach	-	
	Region without Buttons and Titles	0	65 minutes ago	teach	-	
	Region without Buttons and Titles Customized	1	35 minutes ago	teach	-	



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In situations where you want to add some company-specific text or style, you can edit the template.

To edit a template, do the following:

1. On the Templates page, click the name of the template to modify.
2. Modify the definition of the template and click Apply Changes.
In this example, you add the text Oracle Confidential – Internal Only at the bottom of the page.

Applying a Template

The screenshot shows the Oracle Application Express 'Page Rendering' interface. At the top, there's a tree view under 'Page Rendering' with nodes like 'Customers', 'Before Header', 'After Header', 'Before Regions', 'Regions', 'After Regions', 'Before Footer', 'After Footer', and 'Dynamic Actions'. A context menu is open over the 'Regions' node, with 'Edit All' highlighted. Below this, a list of regions is shown with columns: Sequence, Column, Region Name, Template, and Type. One row is selected for 'Customers' with sequence 10, column 1, template '100. Region without Buttons and Titles Customized', and type 'Interactive Report'. At the bottom right of the page is the ORACLE logo.

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To associate a template with a region, navigate to the page definition and right-click the Regions node. Select Edit All. A list of all regions in the page appears. For the region to which you want to apply a new template, select the appropriate template from the drop-down list and click Apply Changes. Run the page to ensure that the template change takes effect.

Applying a Template: Output

The screenshot displays two versions of an Oracle Application Express page side-by-side. The top part shows the page 'Before' template modification, and the bottom part shows it 'After'. Both pages show a list of customer records with columns for Customer Name, Address, City, State, and ZIP Code. The 'Before' version has a standard grey header and footer. The 'After' version has a red header and footer, indicating a modified template. Arrows labeled 'Before' and 'After' point to their respective sections.

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schaeffhoester Road	Windsor Locks	CT	06096
Dulles, John	45000 Aviation Drive	Sterling	VA	20166
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fiorello	Hanger Center, Third Floor	Flushing	NY	11371
Lambert, Albert	10701 Lambert International Blvd	St Louis	MO	63145
Logan, Edward	1 HarborSide Drive	East Boston	MA	02128
O'Hare, Edward "Butch"	10000 West O'Hare	Chicago	IL	60666

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The screenshots in the slide show how a page looks before and after the modified template is applied.

Using Substitution Strings in Templates

A substitution string:

- Is a defined character string
- Is replaced by an object at run time
- Must be in uppercase
- Begins and ends with a pound (#) symbol

Example: #TITLE# is a substitution string that is replaced with the title text at run time.



The screenshot shows the Oracle Application Express page editor interface. A template code snippet is displayed in a text area. The substitution string '#TITLE#' is highlighted with a red rectangular box. The code includes HTML head elements like <title> and <link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_1/css/theme_4_0.css" type="text/css"/>. It also contains conditional comments for Internet Explorer (IE) versions 6 and 7, showing alternative CSS files: <!--[if IE 6]><link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_1/css/theme_4_0_ie6.css" type="text/css" /><![endif]--> and <!--[if IE 7]><link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_1/css/theme_4_0_ie6.css" type="text/css" /><![endif]-->.

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A substitution string is a defined character string that is replaced by an object at run time. Substitution strings used within a template must be in uppercase and begin and end with a pound (#) symbol. For example, in a region template, the #TITLE# substitution string is replaced with the title of the region, and the #BODY# substitution string is replaced with the region source at run time. The region source can be static HTML, a report, or form fields. At run time, the Oracle Application Express engine replaces these strings with values, other objects, or null values.

If you are familiar with HTML, you can use HTML and, optionally, define some style definitions to customize your reports.

A basic page template must include the following four important substitution strings:

- #HEAD#
- #FORM_OPEN#
- #BOX_BODY#
- #FORM_CLOSE#

Changing Default Templates in a Theme

The screenshot illustrates the steps to change default templates in a theme:

- Step 1:** On the Themes page, under the Tasks section, the "Edit Theme" option is selected (indicated by a green circle with the number 1).
- Step 2:** In the list of themes, the "Simple Red" theme is selected (indicated by a green circle with the number 2).
- Step 3:** The "Component Defaults" tab is selected in the "Component Details" dialog (indicated by a green circle with the number 3). This dialog shows various component types and their corresponding template defaults.

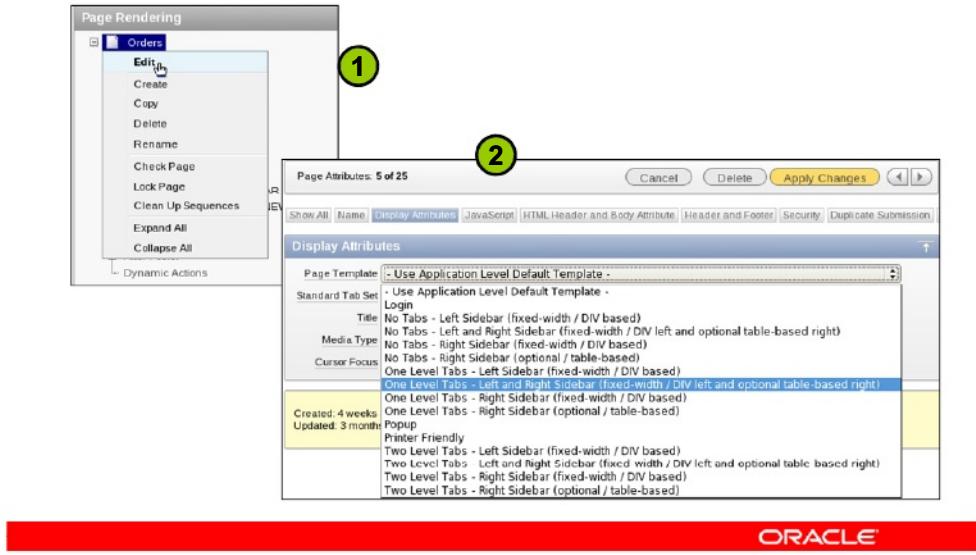
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You can change the default templates for each type of template in a theme. Perform the following steps:

1. From the Tasks section on the Themes page, select Edit Theme.
2. Select the theme to edit.
3. Click the Component Defaults tab and change the template defaults as required. You can also change a region's defaults on the Region Defaults tab.

Overriding Application Defaults at the Page Level



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There may be situations where you have defined an application-level default template, but for a particular page you want to use a different template. For example, you can specify a page template default to be "One Level Tabs – Right Sidebar." But for a specific page, you want to use "One Level Tab – Left and Right Sidebar." To specify the page-level template, perform the following steps:

1. Navigate to the page definition and right-click the page node. Select Edit.
2. Click the Display Attributes tab and select the required template for the Page Template field.

Lesson Agenda

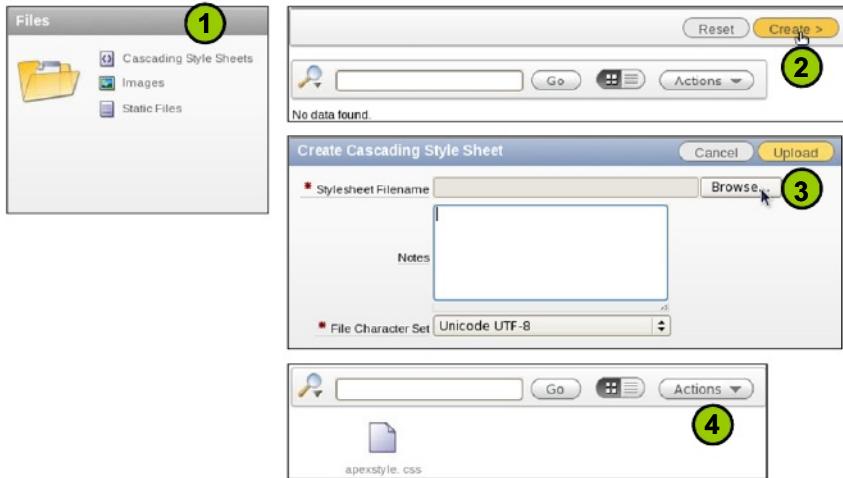
- Using Themes
- Using Templates
- Working with Files
 - Uploading a Cascading Style Sheet
 - Referencing Cascading Style Sheets
 - Uploading an Image
 - Using the Image in a Template

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Uploading a Cascading Style Sheet



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To upload a CSS, navigate to the Shared Components page of the application and perform the following steps:

1. Under Files, click Cascading Style Sheets.
2. The Cascading Style Sheets page appears. Click the Create button.
3. Browse for the .css file and click Upload.
4. The file is uploaded successfully.

Referencing a Cascading Style Sheet

The screenshot illustrates the process of referencing a Cascading Style Sheet (CSS) in Oracle Application Express:

- Definition Tab:** Shows the HTML code for the page template header. A callout points to the `<link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_1/css/theme_4_0.css" type="text/css" />` line, indicating where to include the style sheet.
- Display Attributes Tab:** Shows the page template configuration. A callout points to the "Page Template" dropdown set to "One Level Tabs - Right Sidebar (optional / table-based)" and the "Template" dropdown set to "Sample Database Application".
- Header and Footer:** Shows the region header code: `My sales measures against quota`. A callout points to this code, stating "Reference a style from style sheet."
- Result:** Shows the final rendered page with the text "My sales measures against quota" displayed in a blue font, demonstrating the successful application of the CSS style.

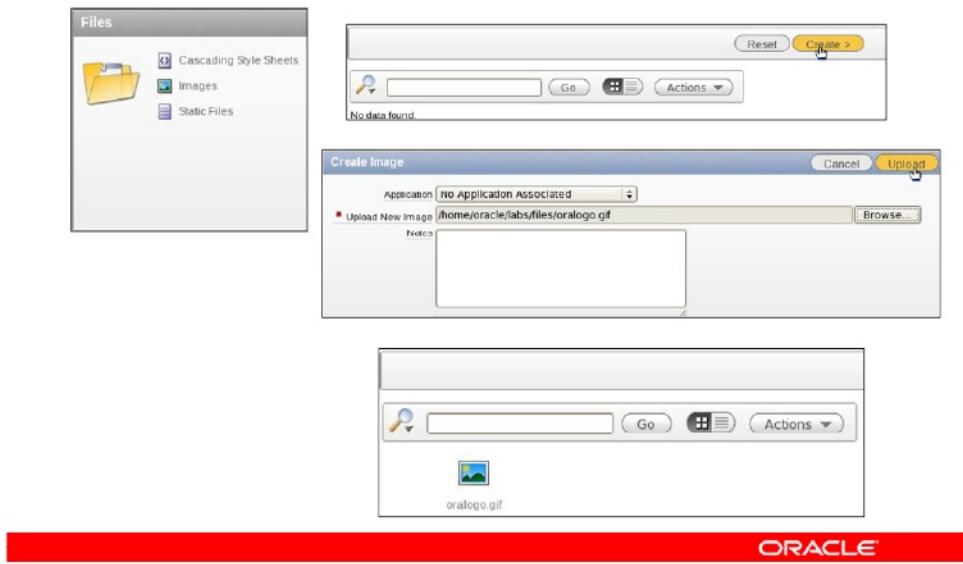
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You can reference an uploaded CSS through the Header section of a page template. You use the Header section to enter the HTML that makes up the `<HEAD>` section of the HTML document. To reference a CSS, perform the following steps:

1. Navigate to the Shared Components page and from the User Interface region, click Templates.
2. Select the page template that you want to edit.
3. Click the Definition tab. Notice that in the header field, the `<link>` tag is used to reference the style sheet. You can include a `<link>` tag to reference your style sheet here. You need to use the `#WORKSPACE_IMAGES#` substitution string to reference files uploaded to the workspace.
4. Click Apply Changes to save the template.
5. Navigate to the page definition of the page where you want to use the style sheet and right-click the page name node. Select Edit and click the Display Attributes tab.
6. From the Page Template drop-down list, select the page template that you modified previously and click Apply Changes.
7. You can now reference the styles in the style sheet in regions in the page. In the slide example, a `bigblue` style is applied to some text and the outcome of the page is also shown.

Uploading an Image



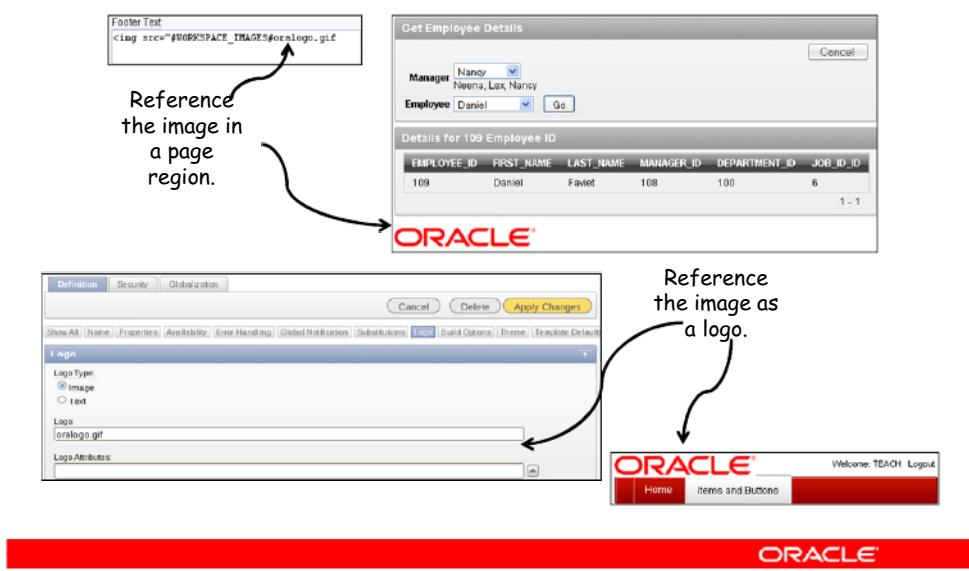
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You can upload images that you want to reference in your application. To upload an image, navigate to the Shared Components page of the application and perform the following steps:

1. Under Files, click Images.
2. The Images page appears. Click the Create button.
3. Browse for the image file and click Upload.
4. The file is uploaded successfully.

Using an Uploaded Image



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You can reference images uploaded to a workspace in application pages or as a logo for the application. To reference an image in application pages, you can use one of the following substitution strings:

- `#APP_IMAGES#` is used when the uploaded image is specific to the given application.
- `#WORKSPACE_IMAGES#` is used when the uploaded image is shared among various applications in the given workspace.
- `#IMAGE_PREFIX#` is used when you want to point to the images directory distributed with Oracle Application Express.

You can also specify the uploaded image as a logo for the application. Click the Edit Application Properties button on the Application home page. Click the Logo tab and specify the image name in the Logo field.

Quiz

Which substitution string would you use to upload a CSS that is associated with a specific workspace?

- a. #IMAGE_PREFIX#
- b. #APP_IMAGES#
- c. #WORKSPACE_IMAGES#

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Answer: c

Summary

In this lesson, you should have learned how to:

- Define themes and their uses
- Create a new theme from the repository
- Switch to a different theme
- Define templates and their uses
- View existing templates
- Create and edit a template
- Upload and use a cascading style sheet and an image



This lesson provided an overview of the themes and the page, region, report, and other templates in Oracle Application Express.

Practice 14: Overview

This practice covers the following topics:

- Working with list templates
- Working with report templates
- Adding a logo to the pages
- Working with cascading style sheets

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15

Administering Oracle Application Express Workspaces

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Objectives

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

- Create a developer and a workspace administrator user
- Request a schema or extra storage
- Monitor the developer activity log
- Monitor workspace activity
- View dashboards



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In this lesson, you learn about the administrative tasks performed in a workspace, such as managing services, managing users, and monitoring workspace activity.

Lesson Agenda

- Using the Administration Page
 - Review
 - Accessing the Administration Page
 - Access to Administrative Tasks
- Creating Users and Groups
- Managing Services
- Monitoring Activity
- Using Dashboards



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Review

Is the following statement true or false?

A workspace is a private database space that is used by a single developer to create Oracle Application Express applications.

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Answer: False

A workspace can be shared by multiple developers to develop web applications.

Review

Match the roles to their correct descriptions:

Descriptions	Roles
1. I create workspaces and workspace administrators.	a) End User 
2. I manage a workspace and create developers and users for the workspace.	b) Developer 
3. I create and modify applications and database objects.	c) Workspace Administrator 
4. I can only run an application.	d) Instance Administrator 

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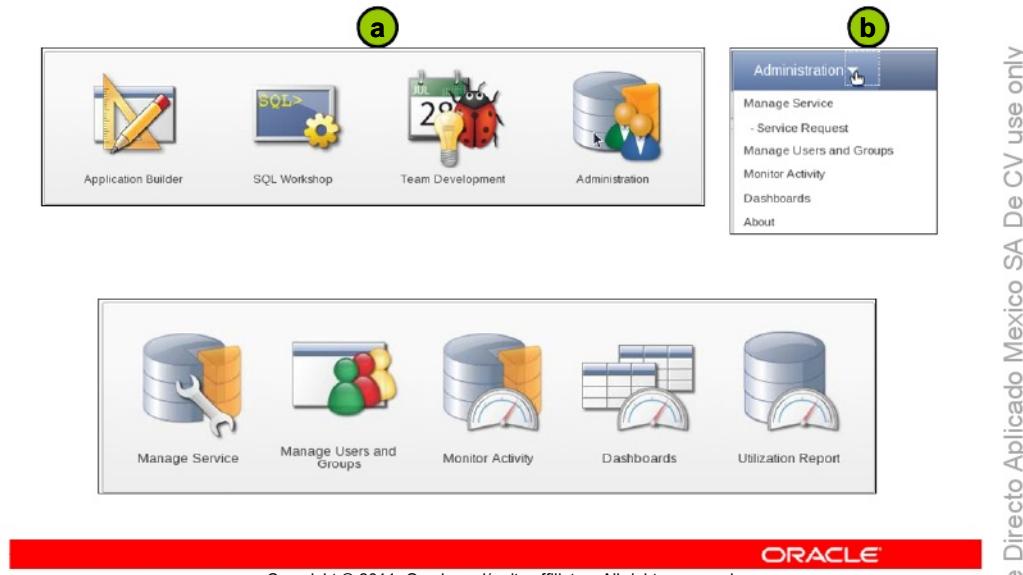
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Answer

- 1 – d
- 2 – c
- 3 – b
- 4 – a

Accessing the Workspace Administration Page



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You can perform administrative tasks from the Administration home page. You can access the Administration home page by doing one of the following:

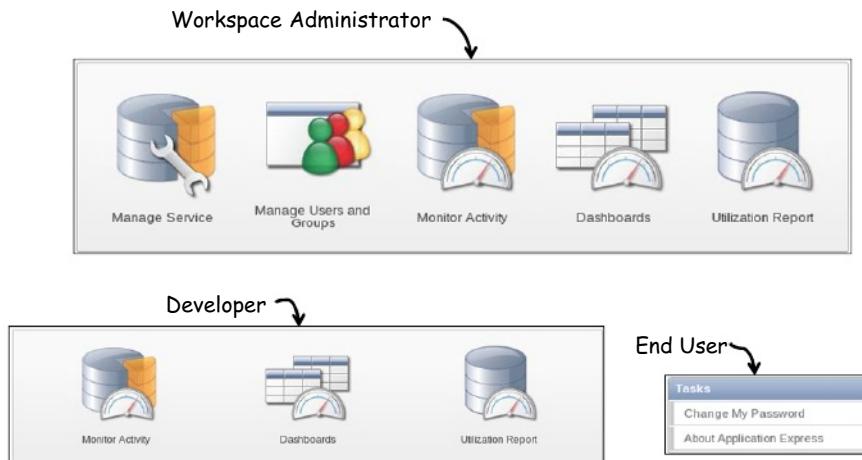
- Clicking the Administration icon from the Oracle Application Express home page
- Clicking the Administration tab

The Administration page provides links to administrative tasks for the specific workspace.

Depending on whether you are an administrator, developer, or end user, you perform one or more of the following:

- Manage services and requests
- Manage Oracle Application Express users and groups
- Monitor workspace activity
- View dashboards
- Report utilization

Access to Administrative Tasks



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Lesson Agenda

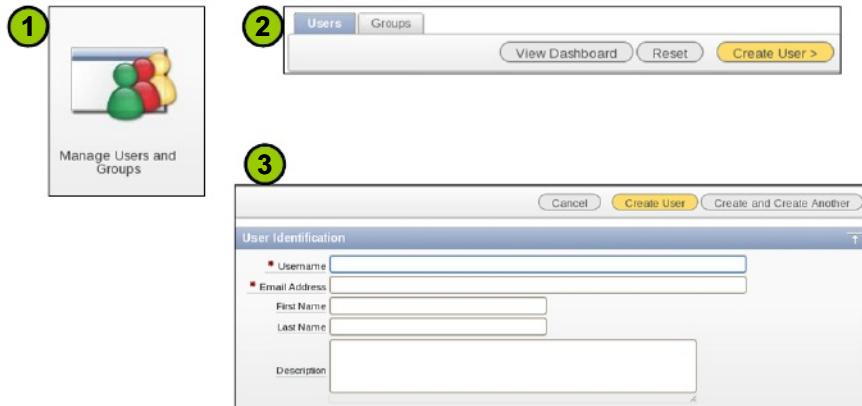
- Using the Administration Page
- Creating Users and Groups
 - Creating Oracle Application Express Users
 - Setting Privileges
 - Creating a User Group
- Managing Services
- Monitoring Activity
- Using Dashboards

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Creating Oracle Application Express Users



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To create Oracle Application Express users, perform the following steps:

1. Click the Manage Users and Groups icon from the Administration page.
2. On the Users page, click the Create User button.
3. Fill in all the details for the user (username, email address, and so on), and click Create User.

The user is successfully created.

The privileges required for the different types of Oracle Application Express users are discussed on the next page.

Note: From the Tasks section on the Administration home page, you can click the Create Multiple Users link to quickly create bulk users.

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Setting User Privileges

Set to No to create a workspace administrator.

Default Schema	TEACH
Accessible Schemas (null for all)	
User is a workspace administrator:	<input type="radio"/> Yes <input checked="" type="radio"/> No
User is a developer:	<input checked="" type="radio"/> Yes <input type="radio"/> No
Application Builder Access	Yes
SQL Workshop Access	Yes
Team Development Access	Yes
Set Account Availability	Unlocked

Set to Yes to create an end user.

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While creating an Oracle Application Express user, you set the account privileges depending on the type of user that you want to create. For each user, you can set the default schema and enter a list of accessible schemas. The slide screenshot shows the setting required to create a Developer user. You also have the option to deny access to a particular component (such as Application Builder or SQL Workshop) to a user.

Creating a User Group



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In addition to creating users, you can also create a user group and add the users as part of this group.

To create a new user group, navigate to the Users page and perform the following steps:

1. Click the Groups tab.
2. Click the Create User Group button.
3. Enter a group name and click Create Group.

Assigning a User to a Group

Edit	User	Email	Account Type	Default Schema	Locked	Password Status	Builder	Last Login	Created
	DEV01	dev01@oracle.com	Developer	TEACH	No	Password Valid	-	16 hours ago	



A large red rectangular box covers several lines of text, likely a password or sensitive information.

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After creating a user group, you can add users to that group. To add a particular user to a group, navigate to the Users page. Click the Edit icon next to the user that you want to add to a group. Scroll to the bottom of the page, where the available groups are listed in the User Groups section. Select the group and click the > button to assign a group to the user. A user can be part of more than one group. Click Apply Changes.

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Lesson Agenda

- Using the Administration Page
- Creating Users and Groups
- Managing Services
 - Overview
 - Creating a Service Request
 - Setting Workspace Preferences
 - Creating Announcements
 - Viewing Workspace Utilization Reports
- Monitoring Activity
- Using Dashboards

Note: These tasks can be performed only by a workspace administrator.



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Overview

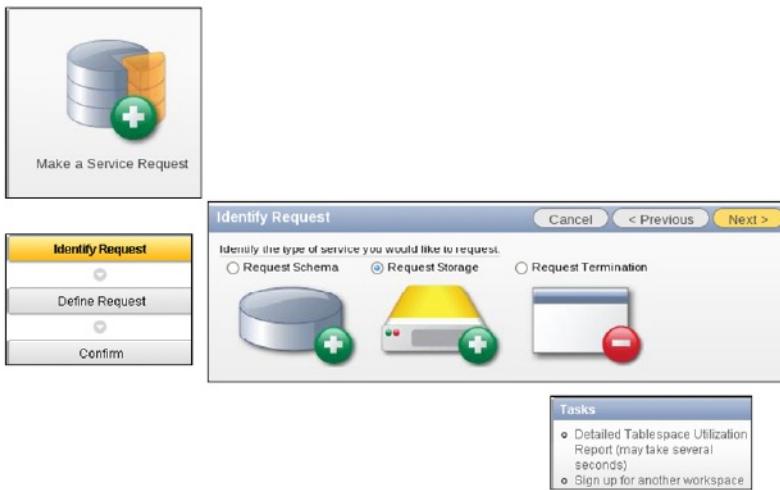
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You can use the Manage Services page to manage your workspace environment. To access the Manage Services page, click the Manage Services icon on the Administration page. From the Manage Services page, you can create service requests, set preferences for the workspace, create and edit workspace announcements, and view various reports on workspace utilization. The Manage Services page also provides links to view the dashboards and perform tasks such as managing session state, application models, and websheet database objects.

Creating a Service Request



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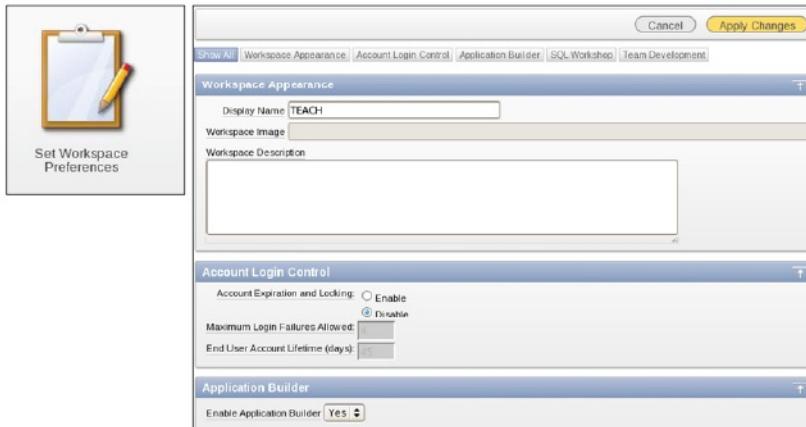
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As a workspace administrator, you can request a new database schema or request more storage for an existing schema. In addition, you can also terminate a service request. To create a service request, click the “Make a Service Request” icon on the Manage Services page. A wizard appears. Select an option depending on the type of service that you want to create and click Next to proceed. Note that the storage capacity list when requesting additional storage is controlled by the Instance Administrator, who can restrict users’ additional storage to less than 50 MB.

Under the Tasks section, you also have links to view a detailed report on workspace utilization and to sign up for a new workspace.

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Setting Workspace Preferences



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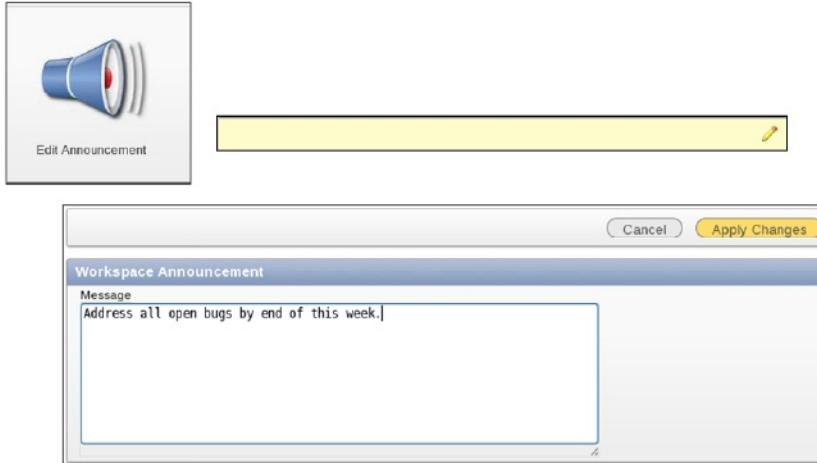
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To set workspace preferences, click the Set Workspace Preferences icon on the Manage Services page. You can set the preferences as described in the following list. Click Apply Changes to save the settings.

- **Account Login Control:** For each workspace, you can enable the following controls:
 - Require end-user account expiration and locking
 - Set up a maximum number of failed login attempts for end-user accounts. If the user exceeds this number, the account is locked. The Workspace Administrator will have to unlock the account.
 - Set the password lifetime for end-user accounts—that is, the number of days an end-user account password can be used before it expires
- **Enable or Disable** the Application Express components
- **PL/SQL Editing:** By default, in SQL Workshop, developers can change and compile PL/SQL source code when browsing database procedures, packages, and functions.

You can select “Do not allow PL/SQL program unit editing” on the Preferences page to disable PL/SQL program unit editing by users.

Creating Announcements



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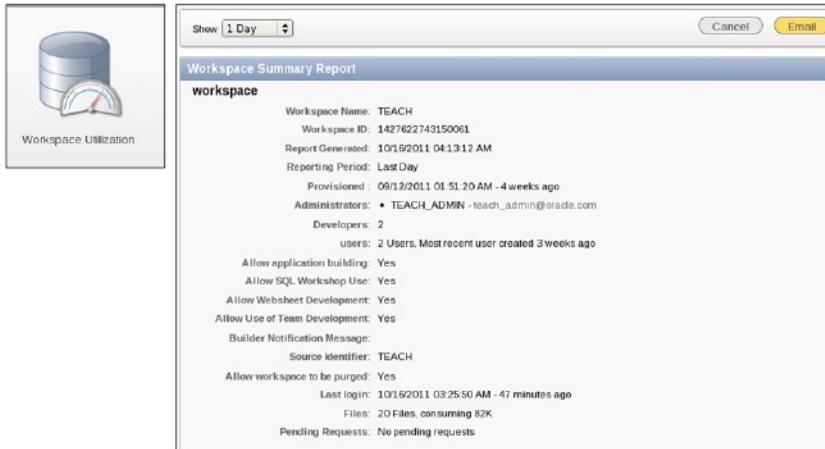
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You can create announcements that can be read by all users in a workspace. To create an announcement, navigate to the Manage Services page and click the Edit Announcement icon. You can also click the Edit icon in the announcement region to create or edit an announcement.

On the Workspace Announcement page, enter the announcement and click Apply Changes. This announcement can now be read by all users when they log in to this workspace.

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Viewing Workspace Utilization Reports



The screenshot shows a workspace utilization report for a workspace named 'TEACH'. The report details the following information:

- Workspace Name: TEACH
- Workspace ID: 1427622743150061
- Report Generated: 10/16/2011 04:13:12 AM
- Reporting Period: Last Day
- Provisioned: 09/12/2011 01:51:20 AM - 4 weeks ago
- Administrators: • TEACH_ADMIN - teach_admin@oracle.com
- Developers: 2
- Users: 2 Users, Most recent user created 3 weeks ago
- Allow application building: Yes
- Allow SQL Workshop Use: Yes
- Allow Worksheet Development: Yes
- Allow Use of Team Development: Yes
- Builder Notification Message: Source identifier: TEACH
- Last login: 10/16/2011 03:25:50 AM - 47 minutes ago
- Files: 20 Files, consuming 82K
- Pending Requests: No pending requests

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If you click the Workspace Utilization icon on the Manage Services page, a workspace summary report is displayed. This report gives a summarized view of all the activity in the workspace and all the contents of the workspace. You can email this report from Oracle Application Express directly by clicking the Email button. On the Email page, enter the recipients' email addresses and a subject for the email. You can also include additional content in the body field. Click Email to send an email with the summary report to the specified recipients.

Lesson Agenda

- Using the Administration Page
- Creating Users and Groups
- Managing Services
- **Monitoring Activity**
- Using Dashboards

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Monitoring Real-Time Activity

The screenshot shows the Oracle Application Express Monitor Activity page. The top navigation bar has tabs for 'Real Time Activity' (selected) and 'Archived Activity'. A 'View Dashboard' button is located in the top right corner. The main content area is organized into several sections:

- Page Views:** Includes options like By View, By User, By Application, By Application and Page, By Day, By Hour, and By Interactive Report.
- Developer Activity:** Includes options like By Developer, By Developer Pie Chart, By Day, By Application, Application Changes detailed, and By Day, Monthly View.
- Page View Analysis:** Includes options like Most Viewed Pages over All Applications, Monthly Calendar of Page Views by Day, Line Chart of Usage by Day, By Weighted Page Performance, and Worksheet Page Views.
- Sessions:** Includes Active Sessions and a Bar Chart of Active sessions by Hour.
- Login Attempts:** Includes Login Attempts, Login Attempts by Authentication Result, and Developer Login Summary.
- Environment:** Includes By User Agent, By Browser, By External Click, and By Operating System.
- Application Errors:** Includes Application Errors.
- Workspace Schema Reports:** Includes Schema Tablespace Utilization, Database Privileges by Schema, Workspace Schemas, and Report Tablespace Utilization (popup).

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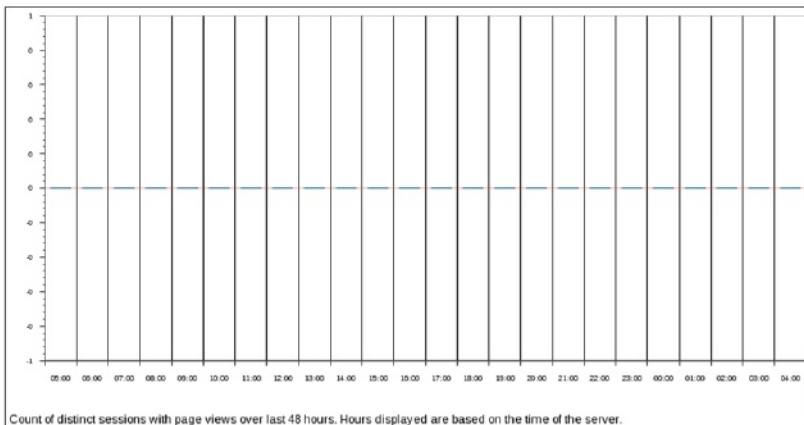
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From the Monitor Activity page, you can view reports on various activities within the workspace. To access the Monitor Activity page, navigate to the Administration page and click the Monitor Activity icon. On the Monitor Activity page, the reports are grouped into real-time activity and archived activity.

The slide shows the reports available for monitoring real-time activity. Using these reports, you can track page views, developer activity, active sessions in the workspace, login attempts, environment details, application errors, and workspace schema reports. Some examples of using these reports are to identify the slowest pages that are accessed the most, the most active developers in the workspace, and the active sessions running in the workspace.

Viewing an Activity Report



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The slide shows the “Bar Chart of Active Session by Hour” report.

Each time you log in to an Oracle Application Express application, the Oracle Application Express engine creates a record in a database table, storing a session ID, user credentials, date created, and other information. An active session is a session that has not yet been purged from the sessions database table.

Monitoring Archived Activity

The screenshot shows the 'Archived Activity' tab selected in the top navigation bar. Below it, the 'Activity Reports' section contains four links: 'By Application by Day' (highlighted with a red box and an arrow), 'By Day', 'By Application', and 'Count of Page Events by Day for last 90 days'. The main content area displays a table of activity data for various log days.

Log Day	Application	Page Events	Worksheet Views	Rows Fetched	Pages	Users	Sessions	Median Render Time	Total Render Time	Content
10/14/2011	131	16	0	55	5	2	2	0.06	1.17	0
10/14/2011	110	35	0	355	6	2	3	0.04	1.22	0
10/14/2011	4000	1	0	0	1	1	1	0.70	0.70	0
10/14/2011	4500	9	0	26	6	1	2	0.38	3.18	0
10/14/2011	4550	1	0	0	1	1	1	0.04	0.04	0
10/14/2011	4000	394	0	3,353	71	1	3	0.12	56.25	0
10/13/2011	131	20	0	73	6	2	2	0.05	1.53	0
10/13/2011	4550	6	0	0	1	1	6	0.09	0.64	0
10/13/2011	110	13	0	389	4	2	1	0.05	0.86	0
10/13/2011	4500	77	0	65	23	1	7	0.11	13.74	0
10/13/2011	4300	20	0	6	8	1	2	0.09	3.19	0
10/13/2011	4000	207	0	1,568	45	1	6	0.15	76.19	0
10/12/2011	4000	457	0	2,836	89	1	5	0.12	81.23	0
10/12/2011	4550	5	0	0	1	1	3	0.08	0.39	0
10/12/2011	4300	84	0	38	8	1	2	0.09	9.55	0

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From the Monitor Activity page, you can also view reports on archived workspace activity. Click the Archived Activity tab to see the list of reports that you can view.

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Quiz

Which of the following tasks can you perform as a workspace administrator? (Choose all that apply.)

- a. Disallow PL/SQL program unit editing.
- b. Enable account expiration and locking.
- c. Set the maximum log-in failures allowed for an end user.

Lesson Agenda

- Using the Administration Page
- Creating Users and Groups
- Managing Services
- Monitoring Activity
- Using Dashboards
 - Viewing the Workspace Dashboard
 - Viewing the Users Dashboard
 - Viewing the Database Dashboard
 - About Other Dashboards

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Viewing the Workspace Dashboard

The screenshot shows the Oracle Application Express Workspace Dashboard for workspace TEACH. The dashboard has three main sections: Service, Available Schemas, and Files.

Service:

Workspace Name	TEACH
Applications	8
Application Pages	77
SQL Scripts	4
Websheets	0
Schemas	1
Open Requests	0

Available Schemas:

TEACH

Files:

Total File Size	82KB
File Count	20
File Types	9

Recent Service Requests:

Workspace Request - APPROVED - MB	4 weeks ago
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A dashboard provides summarized details about the current workspace. To access the Dashboard page, navigate to the Administration page and click the Dashboards icon. The Workspace dashboard, shown in the slide, summarizes the number of applications in the workspace, the total number of application pages, schemas, SQL scripts, space used by files, status of service requests, and so on.

Viewing the Users Dashboard

Your Account

Username	TEACH_ADMIN
Workspace	TEACH
Workspace Administrator	Yes
Application Developer	Yes
Websheet Developer	Yes
eMail	teach_admin@oracle.com
User Created	4 weeks ago

User Groups

Developers	1
------------	---

Recently Created

teach	3 weeks ago
teach_admin	4 weeks ago

Workspace Users

Users	2
Workspace Administrators	1
Application Developers	2
Websheet Developers	0
End Users	0
Created Last 24 Hours	0
Created Last Week	0

User Status

Valid Passwords	0
Expired Passwords	2
Locked Accounts	0
Unlocked Accounts	2
No Email Specified	0

Tasks

- Change My Password
- About Application Express
- Monitor Activity
- Manage Service
- Manage User Groups
- Create User
- Create Multiple Users
- Delete Multiple Users
- Manage Interactive Report
- Settings
- Manage Export Repository
- Websheet Database Objects

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The Users dashboard displays a summary of the account information of the current logged-in user, other users in the workspace, defined user groups, recently created users, and user status.

The page also contains links to various tasks that you can perform. The Tasks list displays various options depending on your role. The slide shows the tasks available for an administrator role.

Viewing the Database Dashboard

The screenshot shows the Oracle Database Dashboard interface. At the top, there is a navigation bar with tabs: Workspace, Users, Activity, Developer Activity, Performance, Websheets, Applications, and Database. The Database tab is selected. Below the navigation bar, there is a schema dropdown set to 'TEACH' and a Refresh button.

Recently Modified Program Units:

BI_OEHR_PROMOTIONS - trigger	3 days ago
T_OEHR_JOB_ID_LOOKUP - trigger	3 weeks ago
bi_TASK - trigger	3 weeks ago
bi_OEHR_STATES - trigger	4 weeks ago
bi_PROJECTS - trigger	4 weeks ago
OEHR_ADD_JOB_HISTORY - procedure	4 weeks ago
OEHR_UI_PK - trigger	4 weeks ago

Object Counts:

INDEX	74
TABLE	37
TRIGGER	24
SEQUENCE	20
VIEW	9
PROCEDURE	1
FUNCTION	1

Recently Created Tables:

OEHR_PROMOTIONS	3 days ago
OEHR_LOG	4 days ago
OEHR_JOB_ID_LOOKUP	3 weeks ago
TASK	3 weeks ago
OEHR_STATES	4 weeks ago
PROJECTS	4 weeks ago
OEHR_LOCATIONS	4 weeks ago

Top Tables by Row Count:

OEHR_INVENTORIES	1112
OEHR_ORDER_ITEMS	665
OEHR_CUSTOMERS	319
OEHR_PRODUCT_INFORMATION	288
OEHR_PRODUCT_DESCRIPTIONS	288
OEHR_EMPLOYEES	107
OEHR_ORDERS	105

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The Database dashboard displays a summary of the database objects used by the workspace. You can select the schema for which you want information from the Schema drop-down list. For the selected schema, a summary of the recently edited PL/SQL code, recently created tables, and number of database objects by type is displayed.

Other Dashboards

Activity	Top Users, Applications, Pages
Developer Activity	Top Developers, Applications, Pages
Performance	The Pages with the Worst Performance
Websheets	Websheet Activity for a Specified Time
Applications	All Applications in the Current Workspace



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Each of the other dashboards provides summarized information about the current workspace.

Activity dashboard: Displays the top users, top applications, and top pages accessed, as well as recent logins and errors in the workspace

Developer Activity dashboard: Displays the top developers, top applications, and top pages used, as well as recent changes and edits in the workspace

Performance dashboard: Displays pages having the worst performance

Websheets dashboard: Displays activity in the websheets created in the workspace over a specified time period

Applications dashboard: Displays a summary of applications in the current workspace

Quiz

You want to see reports that track changes to page views and applications. How do you accomplish this?

- a. From the Administration list, select Manage Application Express Users.
- b. From the Administration list, select Manage Services.
- c. From the Administration list, select Monitor Activity.



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Answer: c

Summary

In this lesson, you should have learned how to:

- Create a developer and a workspace administrator user
- Request a schema or extra storage
- Monitor the developer activity log
- Monitor workspace activity
- View dashboards

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In this lesson, you learned how to administer an Oracle Application Express workspace. You also learned about the administrative tasks performed in a workspace, such as managing services, managing users, and monitoring workspace activity.

Practice 15: Overview

This practice covers the following topics:

- Creating users
- Monitoring a user's activity
- Purging session state information
- Requesting a schema
- Reviewing the workspace summary report

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