

**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.

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

The screenshot shows a web-based application interface for managing employees. At the top, there's a navigation bar with links for Home, Structures, Tables, Procedures, Employees, Help, and Logout. Below the navigation is a search bar and a toolbar with buttons for Reset and Create. The main area displays a table of employee data with columns: First Name, Last Name, Email, Phone Number, Hire Date, Job ID, Salary, Commission %, Manager ID, and Department. The data includes entries for employees like Adam, Alan, Alberto, Alexander, and many others. To the right of the table is a bar chart titled "Employees by Department" showing the number of employees per department. The departments and their counts are: Sales (10), Accounts (3), Purchasing (5), Human Resources (1), IT (3), and Admin (1). The chart has a watermark in the background reading "This student license has a non-transferable".

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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.

Oracle Application Express: Developing Web Applications 1 - 8

Websheet Application

The screenshot shows the Oracle Application Express Websheet Application interface. It consists of two main windows: a larger left window and a smaller right window.

Left Window (Main View):

- Header:** Human Resources Management, Language, Help, Builder, ws_admin, Logout, Search Websheet.
- Toolbar:** Create, Edit, View, Administration.
- Navigation:** Home, Overview, Navigation, Reports (highlighted with a red box).
- Content:** Overview section with a message: "Use this application to view details of all employees across all departments. You can also add new pages and sections as required." Below it is an ORACLE logo.
- Right Panel:** Control Panel with options: New Section, Edit Sections, New Page, New Page (as a Copy), and Edit Page.

Right Window (Report View):

- Header:** Home > Reports, Overview.
- Content:** A table titled "Tasks" showing project tasks. The table has columns: PROJECT, TASK_NAME, START_DATE, END_DATE, STATUS, ASSIGNED_TO, COST, and BUDGET.
- Data:** The table contains the following rows:

PROJECT	TASK_NAME	START_DATE	END_DATE	STATUS	ASSIGNED_TO	COST	BUDGET
Maintain Support Systems	Hire software upgrades	01-JAN-10	27-FEB-10	Closed	Pam King	8000	7000
Maintain Support Systems	Apply Billing System updates	01-JAN-10	29-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 Bins	300	500
Email Integration	Complete plan	08-FEB-10	14-FEB-10	Closed	Mark Hale	500	750
Email Integration	Check software licenses	19-FEB-10	1-AUER-10	Closed	Mark Hale	900	900
Email Integration	Get RTPs for new server	19-FEB-10	09-MAY-10	Open	Mark Hale	4000	1000
Email Integration	Purchase failover server	12-MAY-10	07-JUL-10	Pending	All Bins	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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The classroom setup uses a client/server architecture. The instructor machine is set up with Oracle Database and the required software to run Oracle Application Express. You will log on to the student machine that is assigned to you by using NX client. From the student machine, you access the Oracle Application Express workspace that is assigned to you by using a web browser.

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.
- **oehr:** 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



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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.

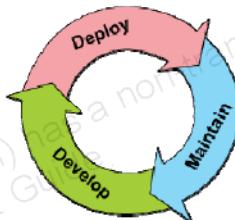
The tool has a user-friendly graphical interface. Using Oracle Application Express requires minimal programming knowledge.

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

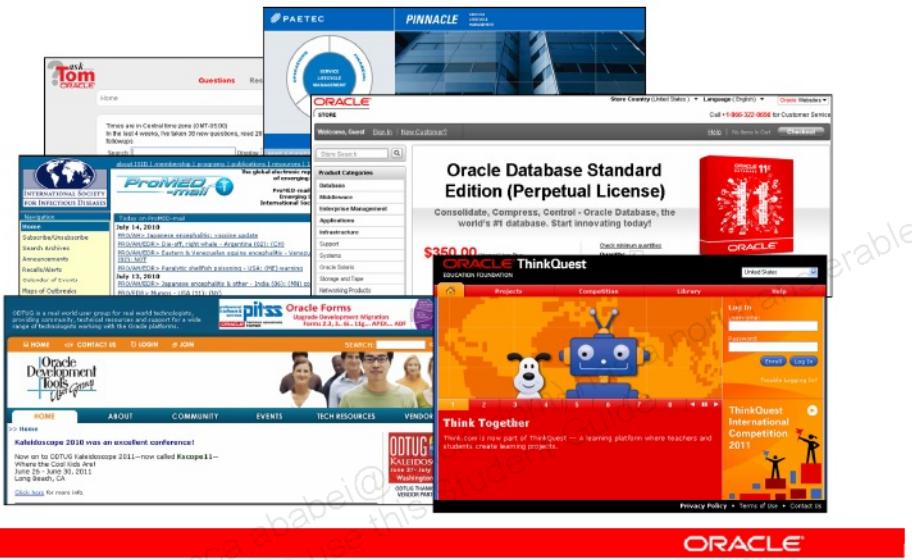
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Examples of the types of applications that are developed by using Oracle Application Express are as follows:

- 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

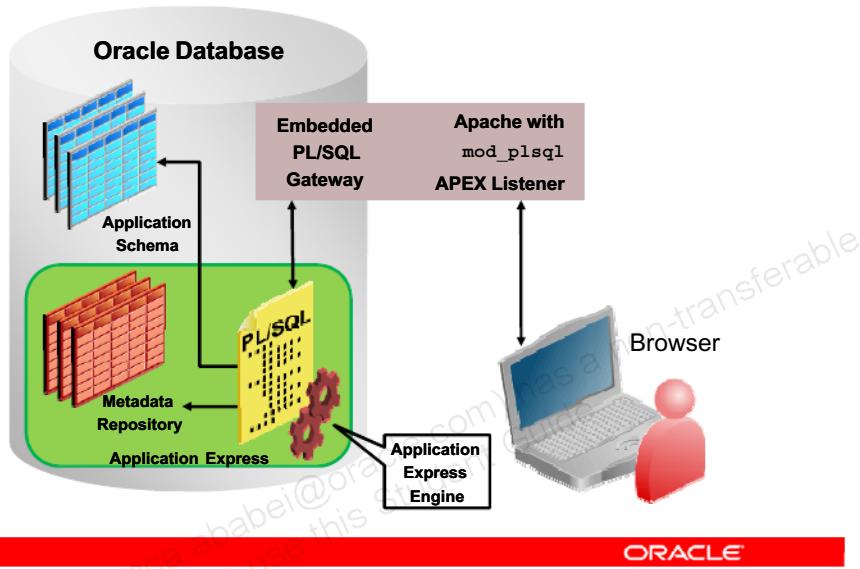


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This slide shows a variety of applications that have been developed by using Oracle Application Express.

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

High-Level Architecture



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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

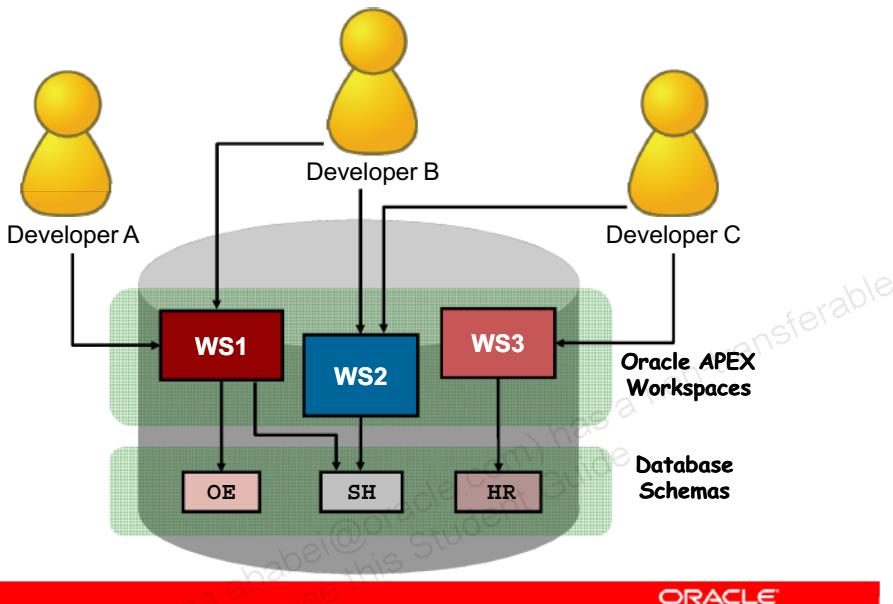
Lesson Agenda

- 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

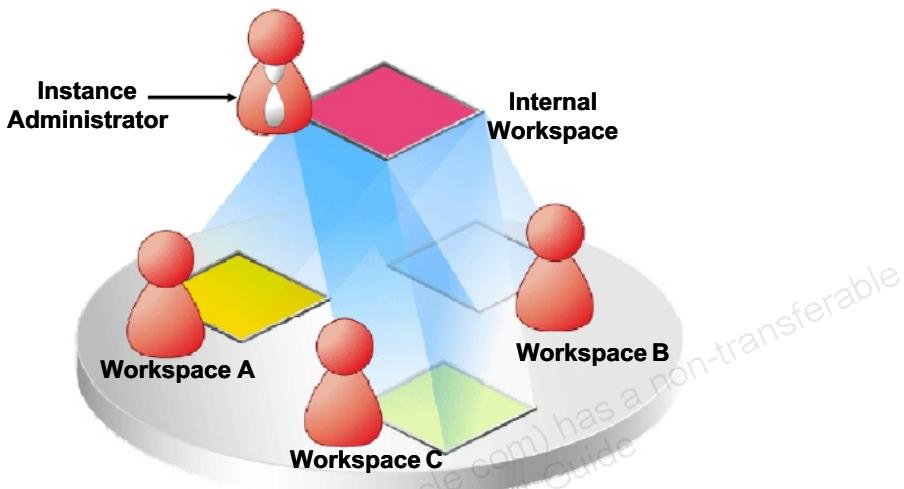
One or more developers or end users can access a workspace.

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

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

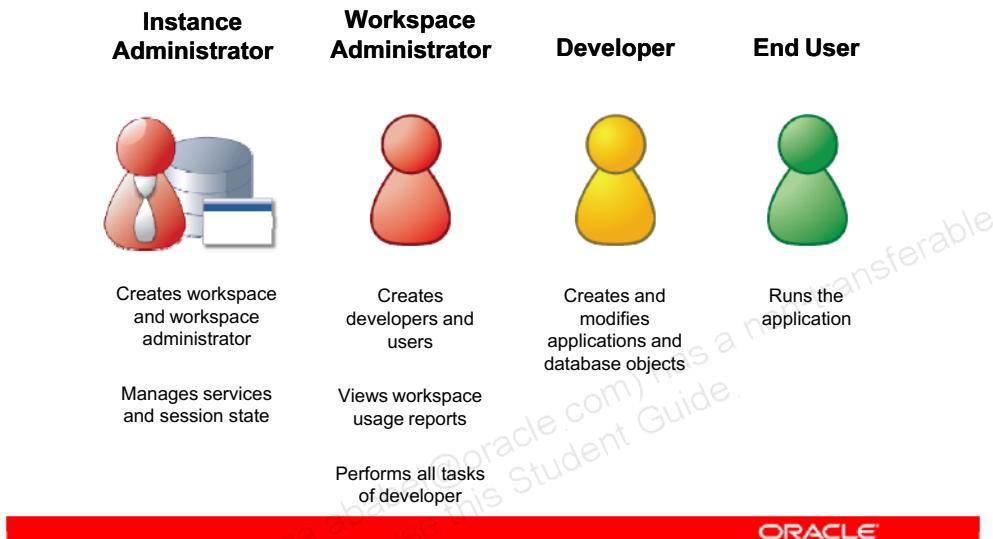
To log in to the Internal workspace, enter the following URL in the address bar:

`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:

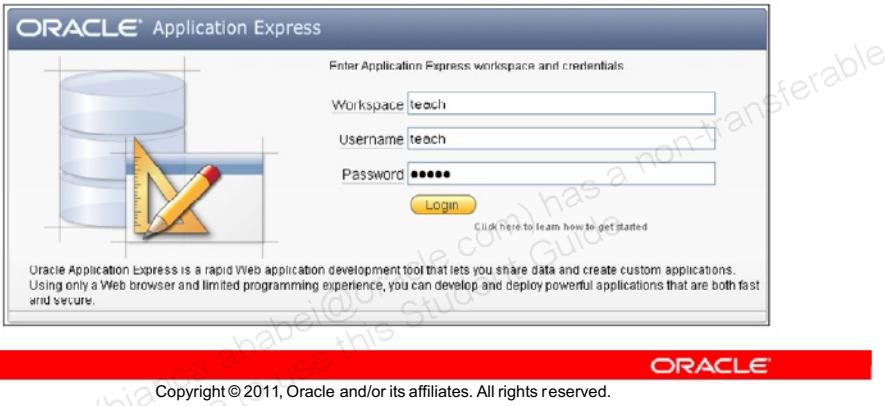
- **Full development environment:** This installation provides complete access to the Application Builder environment to develop applications.
- **Runtime environment:** This installation is an appropriate choice for production implementations in which you want to run applications that cannot be modified.

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.



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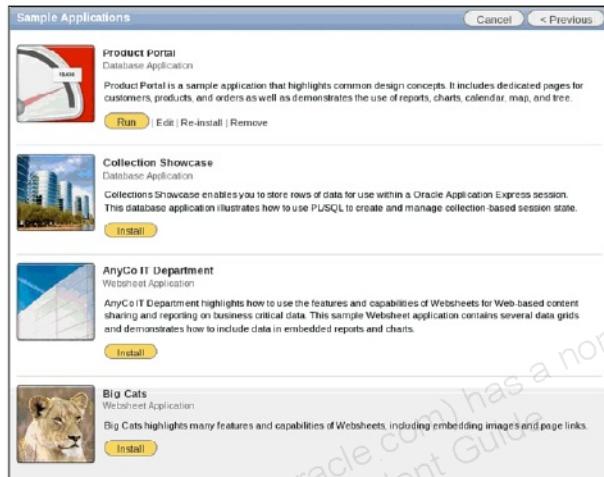
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Workspace administrators create the developer users who build applications. You can access the Create User button by performing one of the following:

- 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.

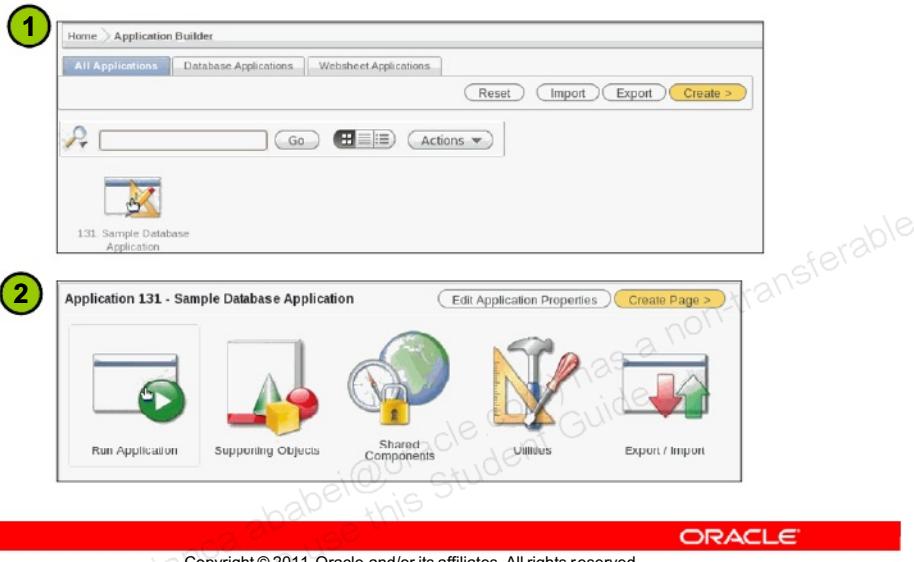
To install a sample application, perform the following steps:

1. Click the **Application Builder** icon.

Note: The Sample Database (Product Portal) application is already listed and you can

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.

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 Home, Customers, Products, Orders, and Reports tabs, with Home selected. The main content area features several reports:

- Sales Quota for this Month:** A dial chart showing progress towards a quota of \$449.
- Top Customers:** A table listing customers with their total orders and amount.
- Top Products:** A table listing products with their quantity and price.
- Top Orders by Date:** A table listing orders by date, amount, and quantity.
- Sample Database Application:** A sidebar with a welcome message and links for Enter a New Order, Add a New Customer, and Add a New Product.
- Tasks:** A sidebar with links for Enter a New Order, Add a New Customer, and Add a New Product.

At the bottom, there are application control buttons: Home, Application 131, Edit Page 1, Create Session, Caching, View Debug, Debug, Show Edit Links, and an ORACLE logo.

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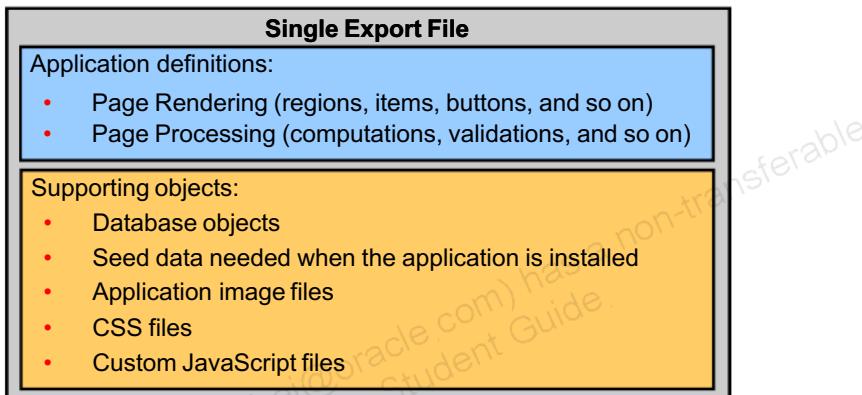
The sample application features an easy-to-use interface for viewing, updating, and searching for order, product, and customer information. You can navigate between the pages by using the Home, Customers, Products, Orders, and Reports tabs.

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.

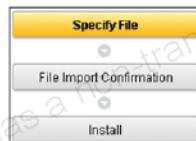
A number of packaged applications are available on Oracle Technology Network (OTN) at the following location:

<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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This lesson has two practices. In these practices, you log in to the Oracle Application Express application and create the users that you need for the rest of the practices in this course. You also run a sample application and install a packaged application. The packaged application creates an application definition and the database objects that you need for the practices.

Interacting with the Database by Using SQL Workshop

3

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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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This lesson explains how to use the SQL Workshop. You learn to use the components of SQL Workshop:

- Object Browser
- SQL Command
- SQL Scripts
- Utilities

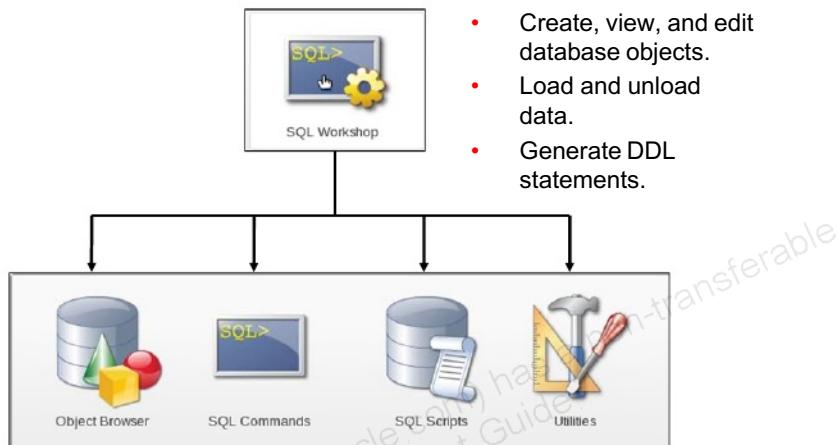
Lesson Agenda

- Using SQL Workshop
 - What Is It?
 - Component Usage
 - Accessing SQL Workshop
- Navigating in SQL Workshop
- 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.	

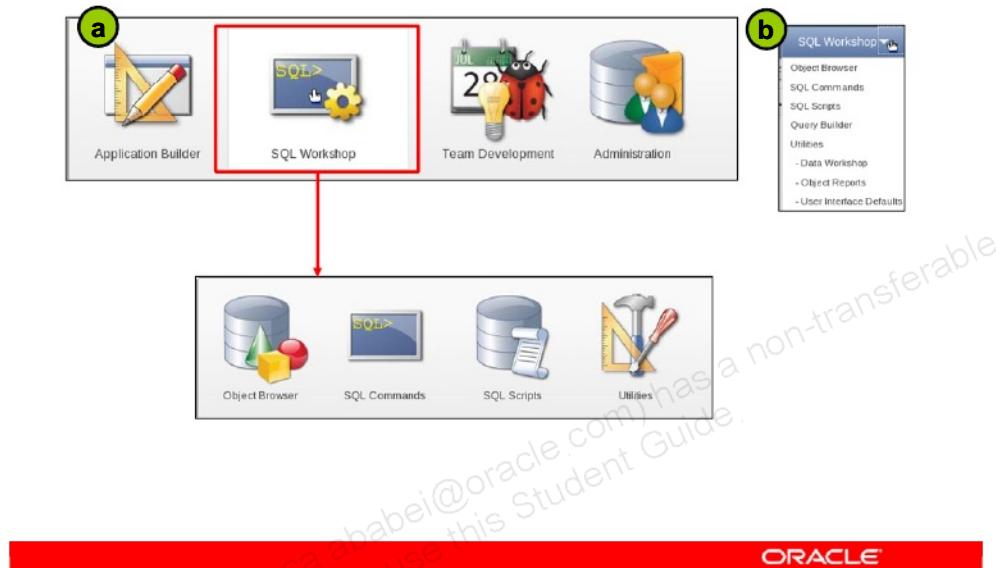


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Based on the task, you determine the SQL Workshop facility to use.

- **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



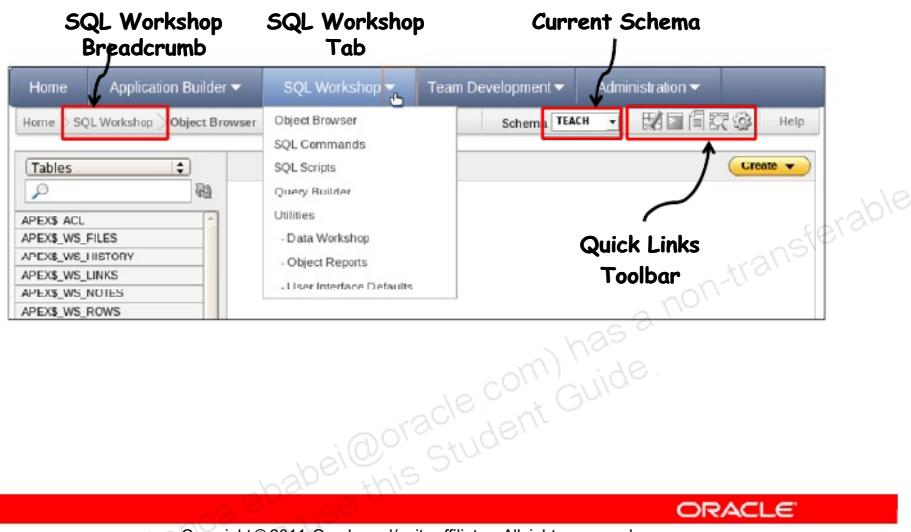
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From the Oracle Application Express home page, you can access the SQL Workshop tool in two ways:

- 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.

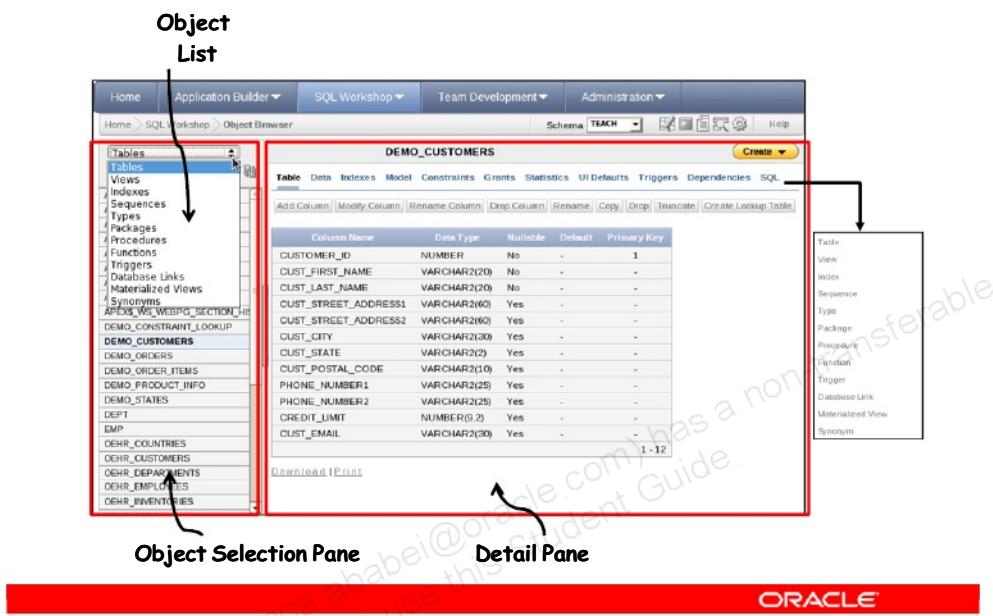
Lesson Agenda

- 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:

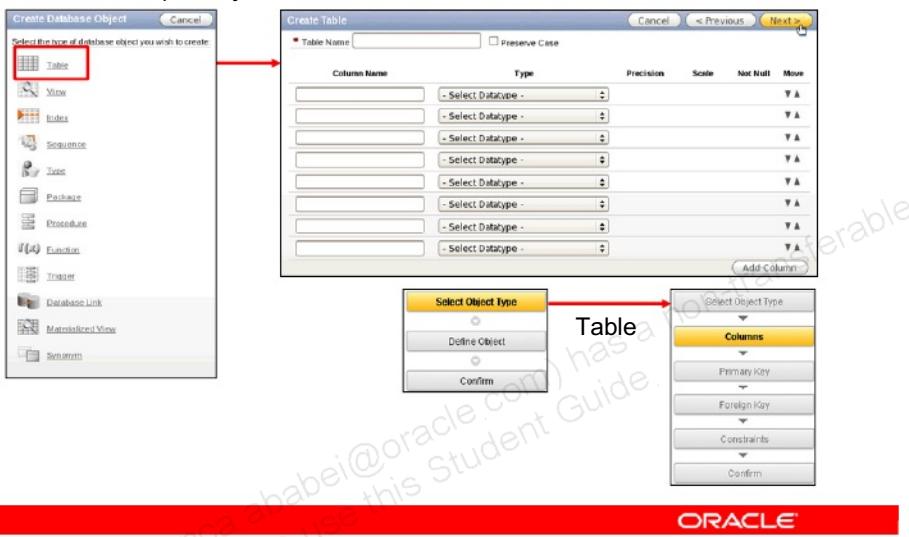
- Object Selection pane:** You use this pane to select the database object that you want to view. The objects are listed by type. You can use the object list to change the type of objects listed. If any object has a red bar next to it in the Object Selection pane, it is invalid.
- Detail pane:** This 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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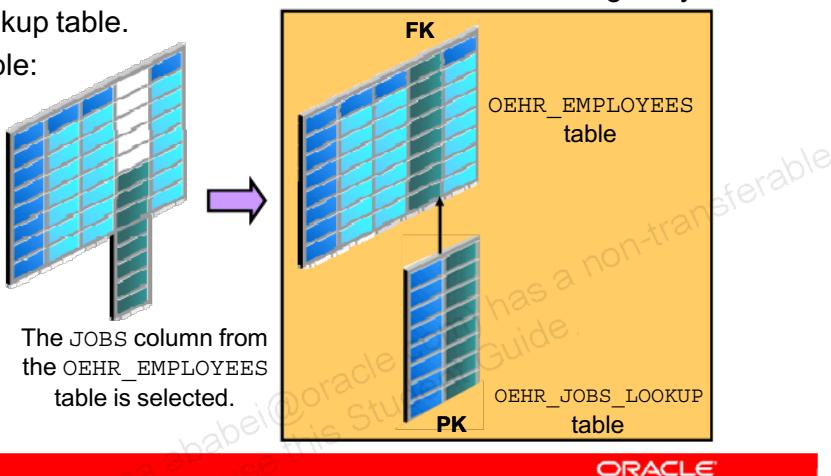
To create a database object, click the Create button on the Object Browser page. A list of objects that you can create is displayed.

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.

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:



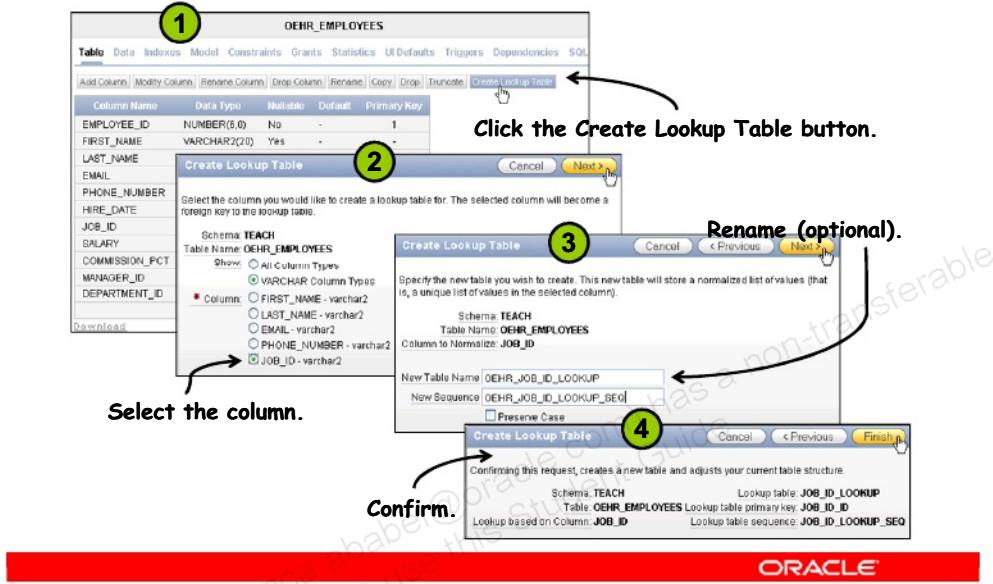
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A lookup table is a new table that is created by extracting a column from an existing table. A new primary key column is created in the new table and a foreign key is created between the source table and the new lookup table.

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 Rename 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

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	MKTREP
<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	
<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"/>	109	Steven	4
<input checked="" type="checkbox"/>	101	Neena	5
<input checked="" type="checkbox"/>	102	Lay	

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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.

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

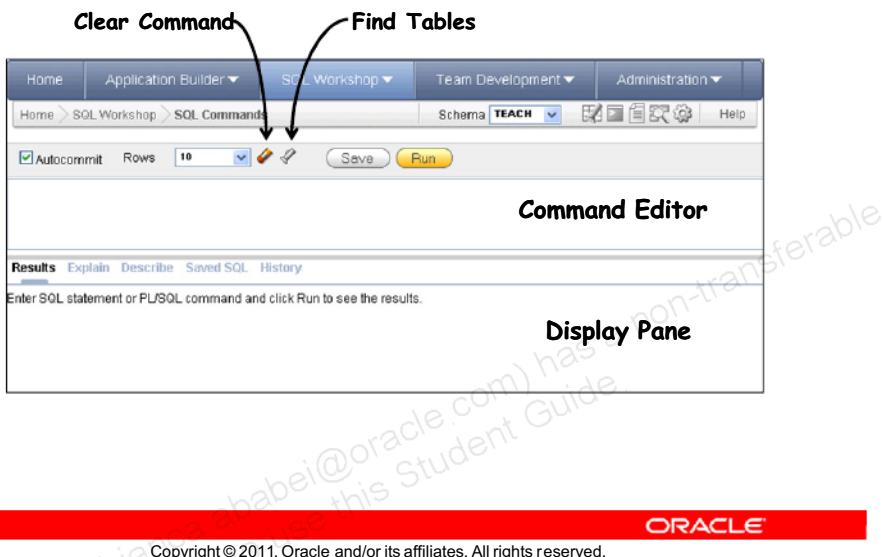
Lesson Agenda

- 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



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:

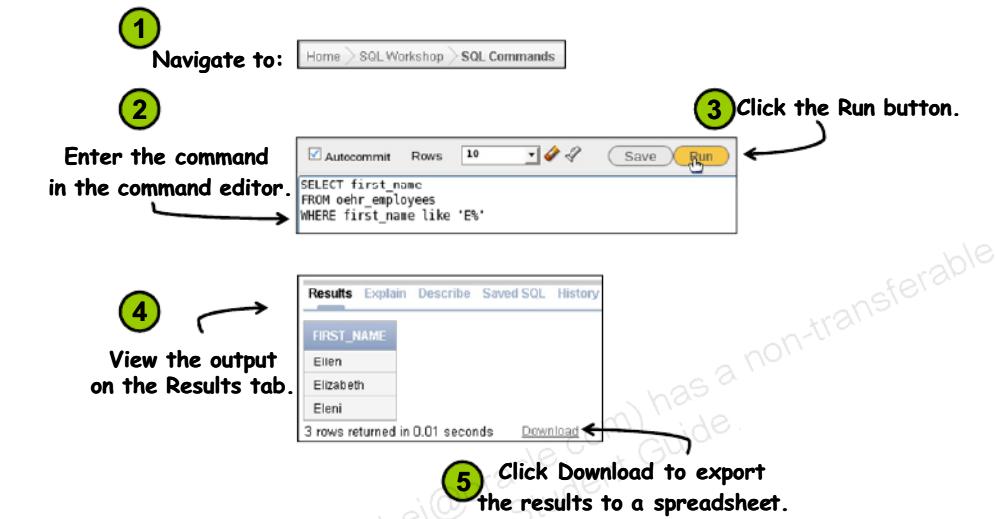
- Click the Explain tab to view the explain plan for the query that you executed.
- Click the Describe tab to view the result of running a Describe command.
- Click the Saved SQL tab to view the saved SQL commands.

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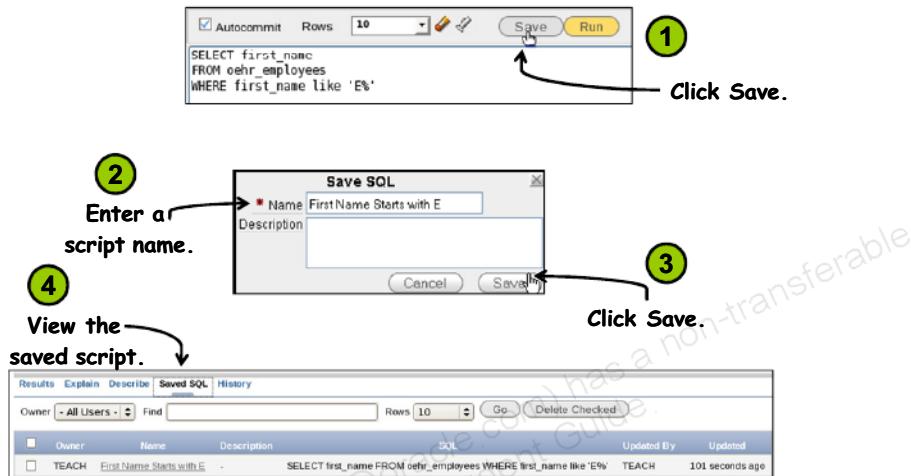
To execute SQL code with SQL commands, perform the following steps:

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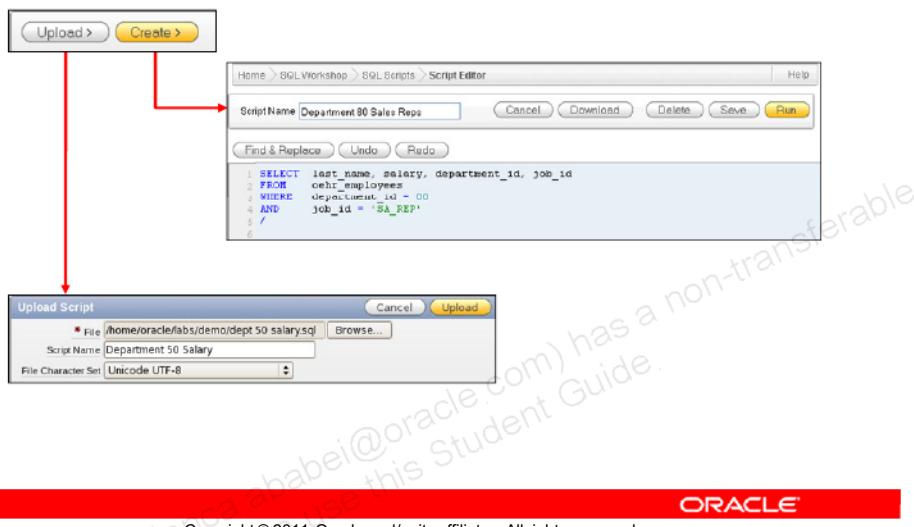
To access SQL scripts, select SQL Scripts from the drop-down menu on the SQL Workshop tab.

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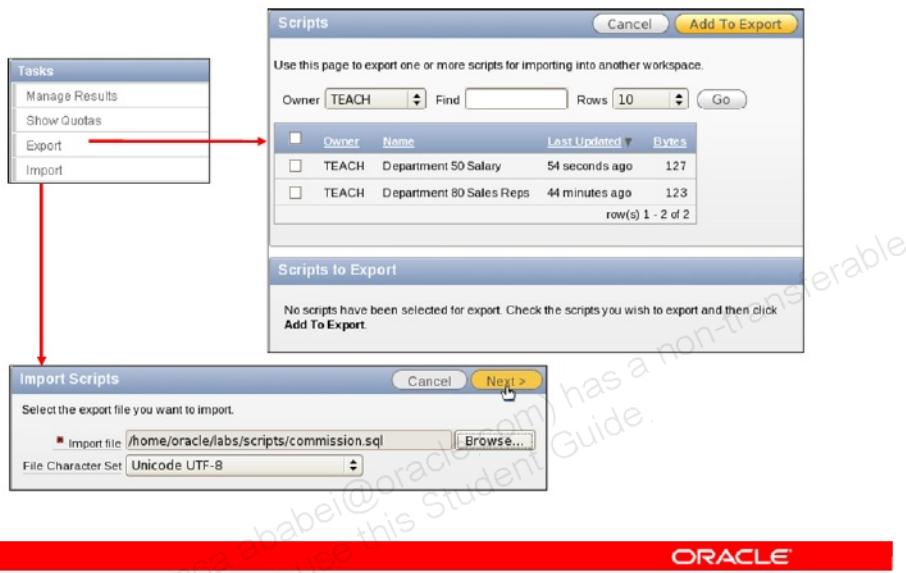
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To create a new script file, click the Create button. The Script Editor opens. Enter a name for your script and enter the SQL code in the editor. Use the Run/Save buttons to run or save the script. Click the Download button to save the script to your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

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.

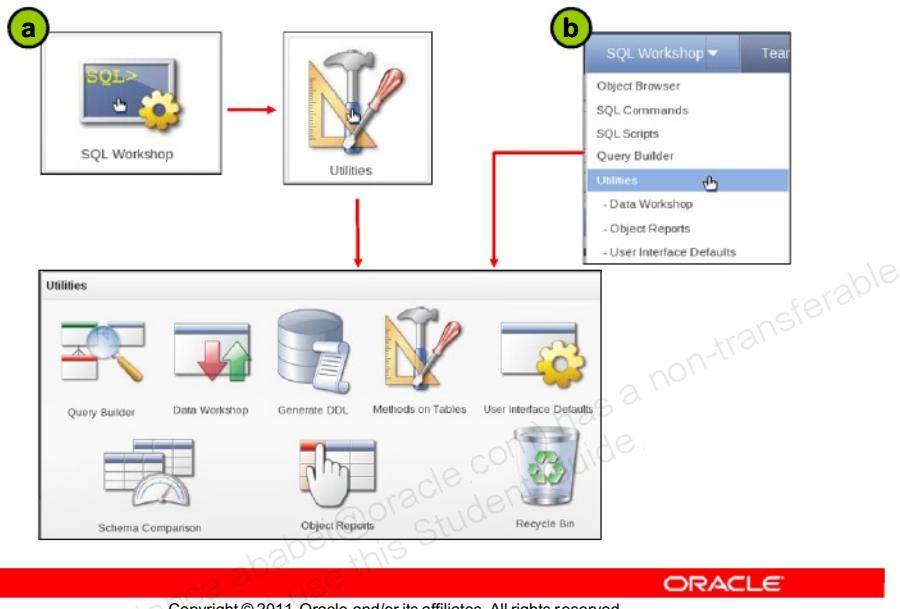
Lesson Agenda

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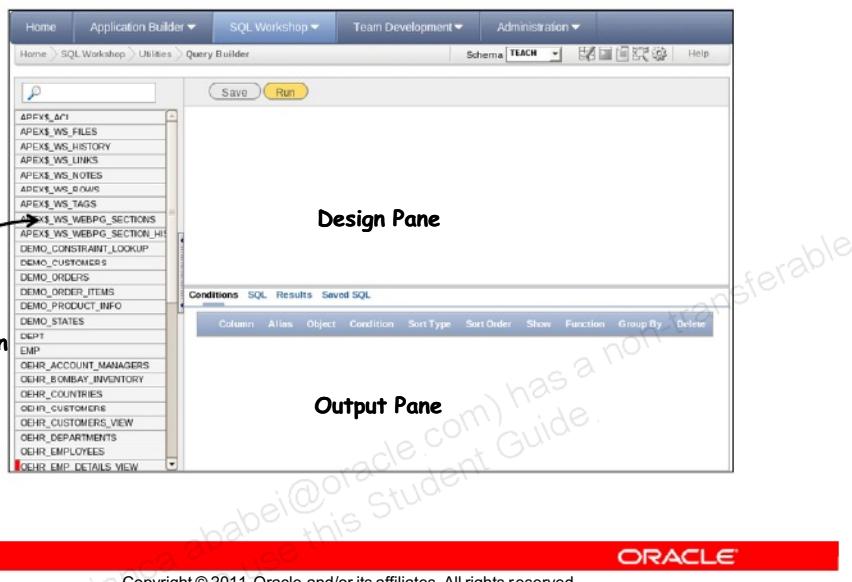
You can access the Utilities page by performing one of the following steps:

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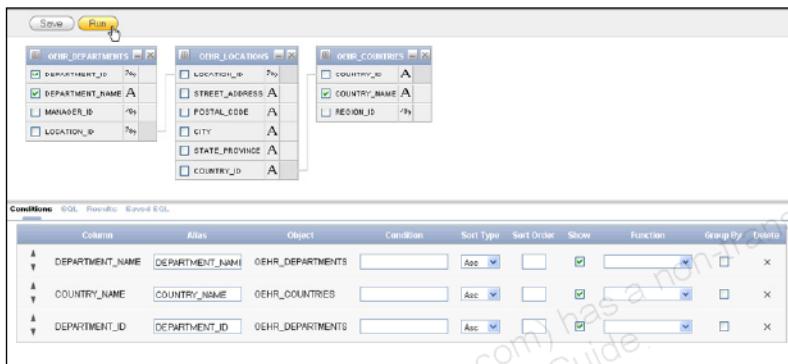
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To access Query Builder, select Query Builder from the drop-down menu on the SQL Workshop tab. You can use Query Builder to create SQL SELECT queries visually.

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.

Building and Running a Query in Query Builder



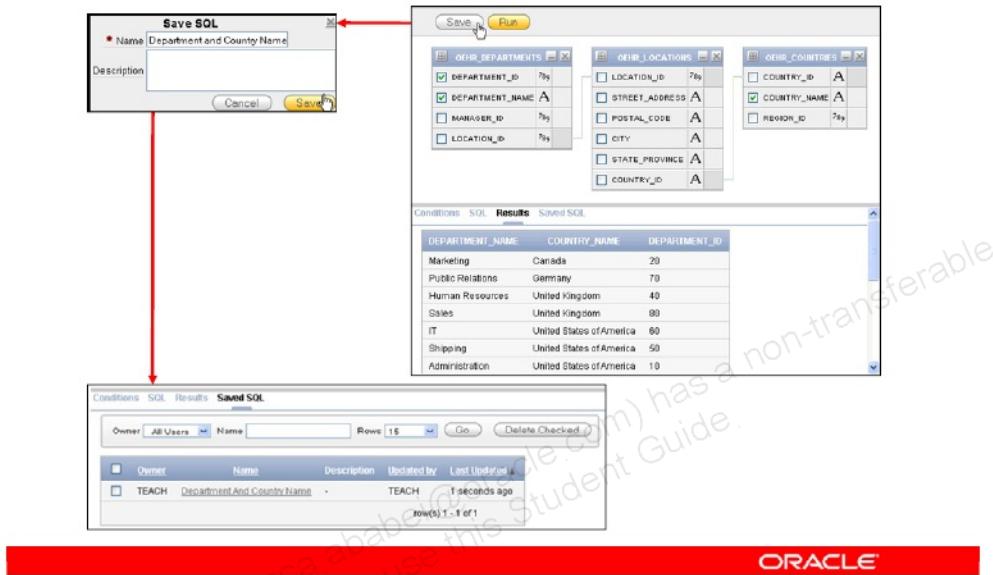
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To build a SELECT query in Query Builder, perform the following steps:

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_Departments table, and then click the join column location_id in the OEHR_Locations 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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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.



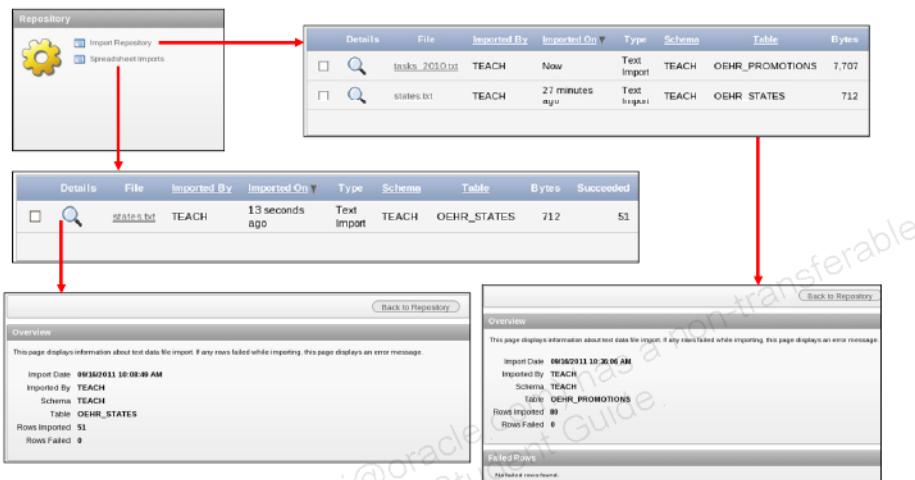
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Using Data Workshop, you can load the data stored in comma-separated or tab-delimited files and spreadsheets into an Oracle database. Access Data Workshop from the SQL Workshop tab menu. Depending on the type of file that you want to load, click Text 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



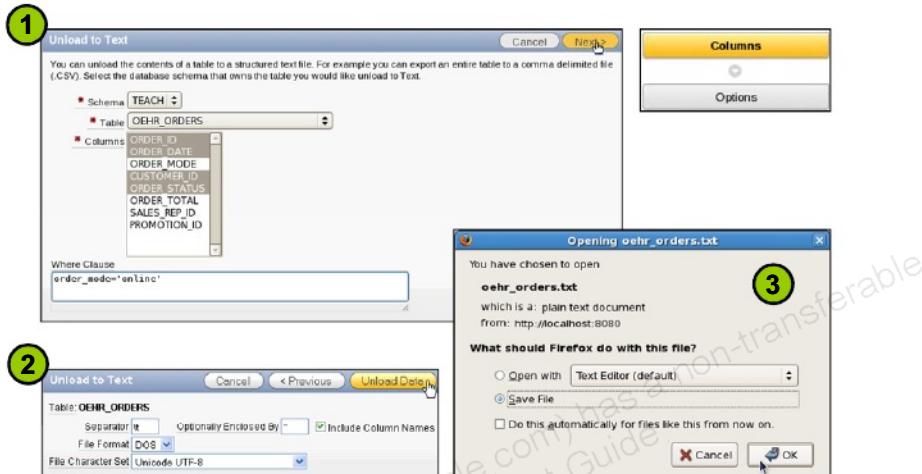
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After you load the data in the database, you can view the details of the uploaded file. Perform the following steps:

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.

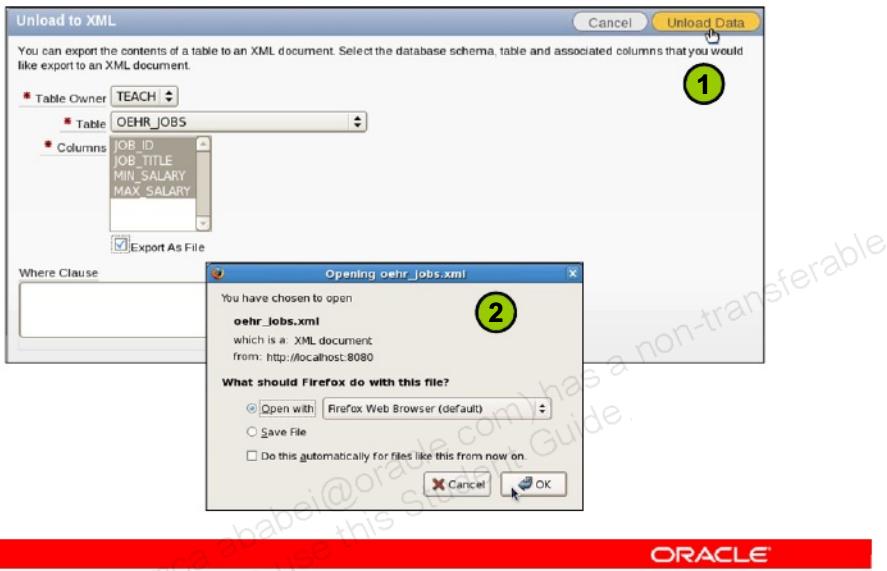
Unloading to a Text File



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.

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.

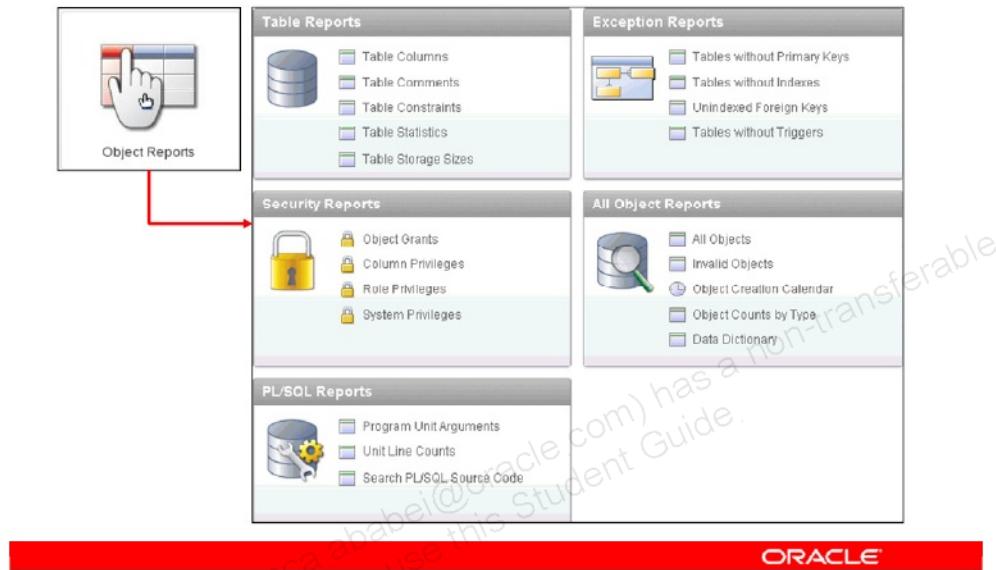
Lesson Agenda

- 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



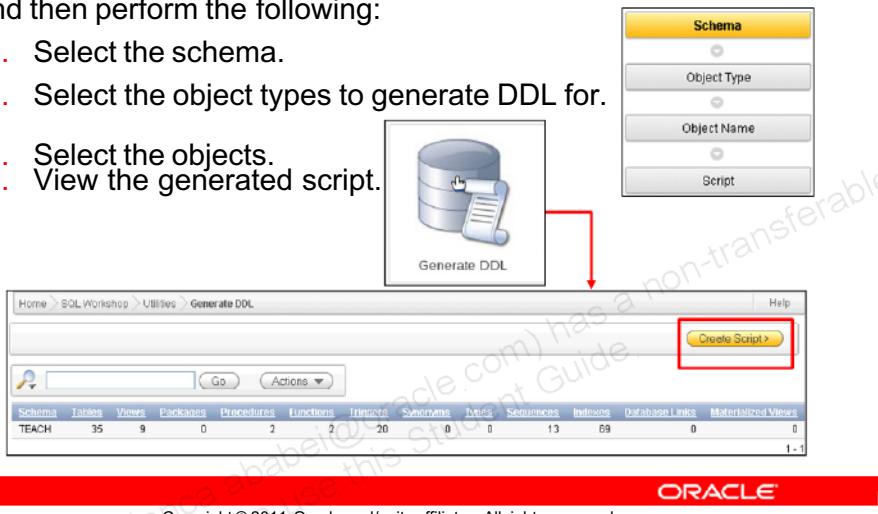
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The Object Reports option helps you manage the objects in your database. The screenshot in the slide shows the various reports that you can view. For example, you can use the Table Reports pane to view details about the tables in your database. To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



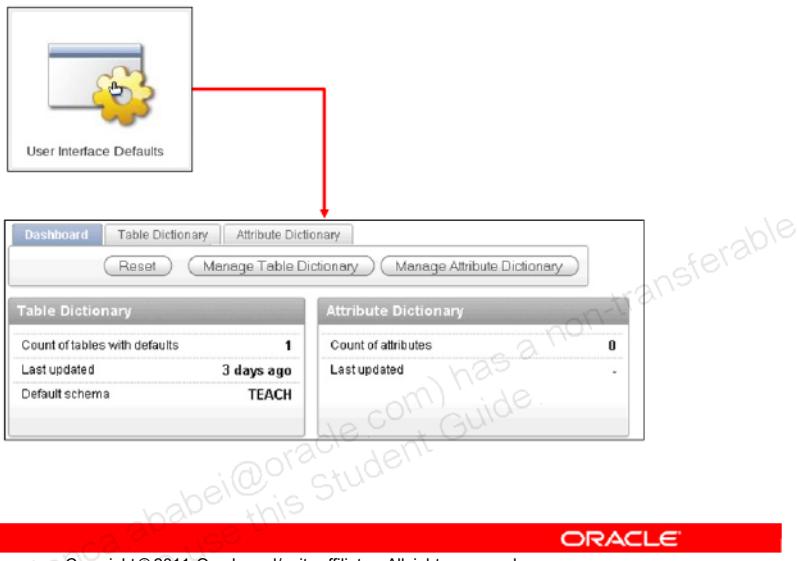
Using the Generate DDL option in Utilities, you can generate data definition language (DDL) statements from the Oracle data dictionary. You can use these scripts to create or re-create database schema objects. The scripts can be generated inline or saved as a script file. You have the option to generate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

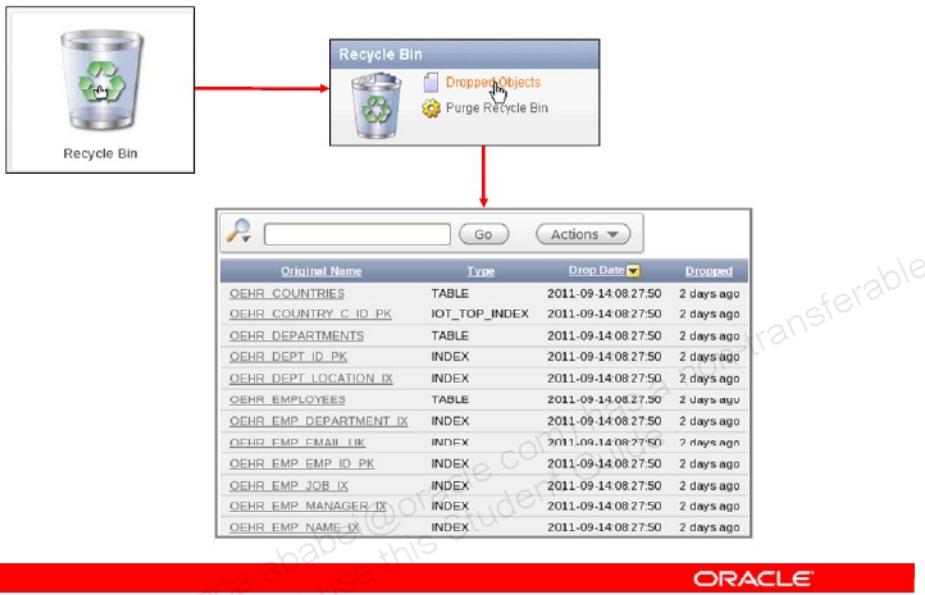
Managing User Interface Defaults



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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.

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.

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'). Below these are buttons for 'Compare Tables' (selected), 'Search', 'Rows 20', and a large yellow 'Compare' button. There are also checkboxes for 'Show Differences Only' (checked) and 'Show Details'. 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'. Below the table is a 'Download' link.

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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

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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's a navigation bar with 'Home' and 'Reports'. Below it, a sidebar has sections for 'Overview' and 'Tasks'. A search bar is at the top right. The main area displays a table with columns: PROJECT, TASK_NAME, START_DATE, END_DATE, STATUS, ASSIGNED_TO, COST, and BUDGET. The data includes tasks like 'Maintain Support Systems - HR software upgrades', 'Apply Billing System updates', and 'Investigate new Virus Protection software'.

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						

Database application

The screenshot shows a database application interface. At the top, there's a navigation bar with 'Home', 'Customers', 'Products', 'Orders', 'Charts', and 'Admin'. Below it, a sidebar has sections for 'Sample Application' and 'Tasks'. A search bar is at the top right. The main area displays a table titled 'Order History' with columns: Order_ID, Customer_Name, Order_Month, Order_Total, and Status. The data includes orders from customers like Dulon, John, Bridley, Esmeralda, and Hayes, with dates ranging from March 2010 to April 2010.

Order_ID	Customer_Name	Order_Month	Order_Total	Status
12	Dulon, John	March 2010	\$2,300.00	DEMO
11	Bridley, Esmeralda	March 2010	\$1,350.00	DEMO
13	Hayes, William	March 2010	\$1,640.00	DEMO
16	Logan, Edward	April 2010	\$1,515.00	DEMO
14	LaVardia, Forrester	April 2010	\$1,100.00	DEMO
15	Lavine, Alvert	April 2010	\$950.00	DEMO
18	Logan, Edward	May 2010	\$920.00	DEMO
17	O'Hare, Edward "Bully"	April 2010	\$900.00	DEMO
20	Bridley, Esmeralda	May 2010	\$670.00	DEMO
19	Hawkins, Velma	Mar 2010	\$700.00	DEMO

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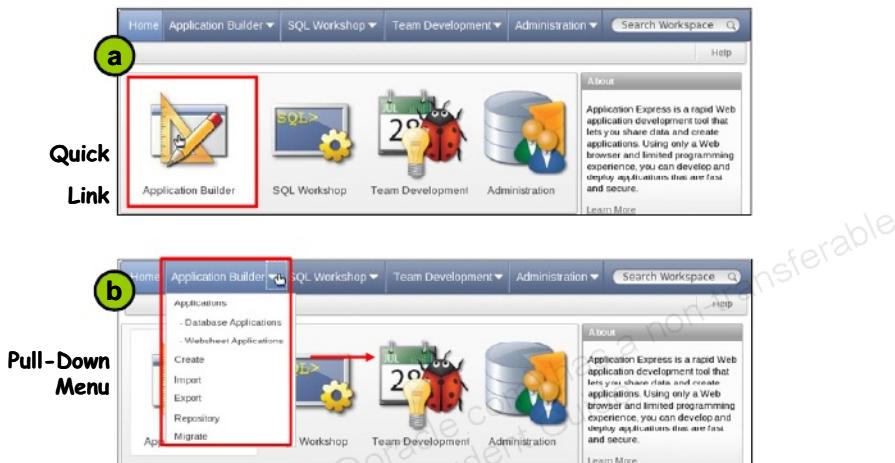
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An application is an HTML interface that exists on top of database objects such as tables and procedures. Each application is a collection of pages linked together by using tabs, buttons, or hypertext links. Application Builder enables you to build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

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



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.

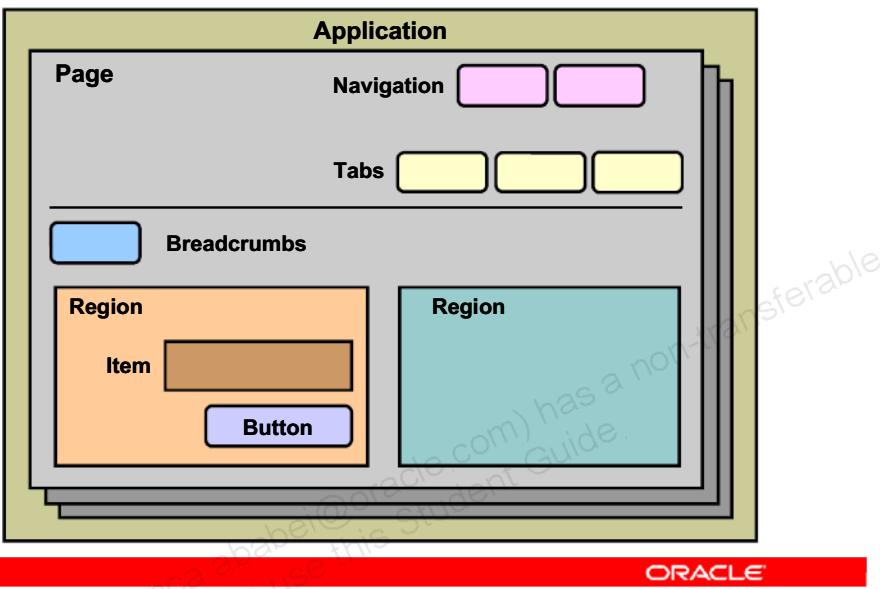
From the application home page, you can:

- **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 (2), Go, Run, Utilities, Create, and status information (Updated: TEACH, 45 hours ago, To do: 0, Feedback: 0, Bugs: 0, Comments: 0). Below the toolbar, the page is divided into three main sections:

- Page Rendering:** Contains sections for Customers (Before Header, After Header, Before Regions, Body (3)), Regions (Alter Regions, Refresh Footer, Alter Footer, Dynamic Actions), and Buttons (Customers, Report Columns, Region Buttons, UPLOAD DATA, NEW).
- Page Processing:** Contains sections for Alter Submit, Validating, Processing, and Alter Processing (AJAX Callbacks).
- Shared Components:** Contains components like 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 shows two views of a page's components:

- Tree View:** This view displays components as a hierarchical tree. It includes sections for Page Rendering (Regions like Customers, Report Columns, Report Buttons), Page Processing (Events like After Submit, Validating, Processing, After Processing, AJAX Callbacks), and Shared Components (like Present Tabs, List of Values, Prerequisites, Lines, Templates, Security).
- Component View:** This view lists components in a grid format. It includes sections for Page (Page Name, Title, Header Text, HTML Header, HTML Body, Help Text, Page Group), Computations (like Tabs, Page Set, FTS), and Validations.

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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.

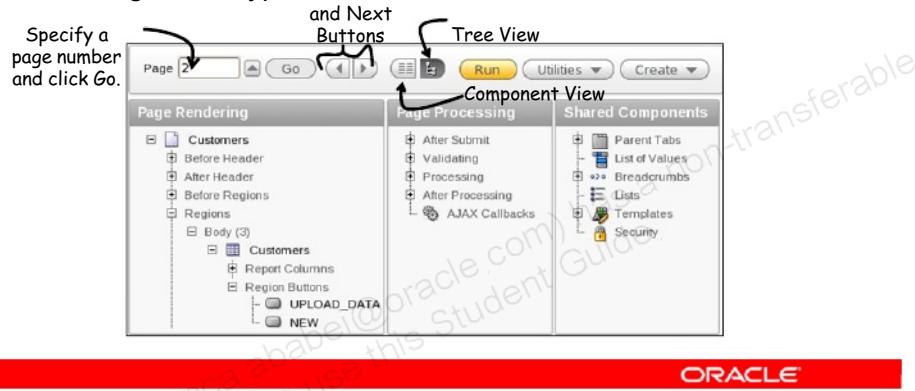
- **Inline Edit:** Tree nodes that have Rename in the context menu can be directly modified within the tree without having to go to the edit page. Pressing F2 enables inline edit. Use Show Names and Show Labels from the Utilities/Switch To menu to show component names or labels.
- **Direct access to 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



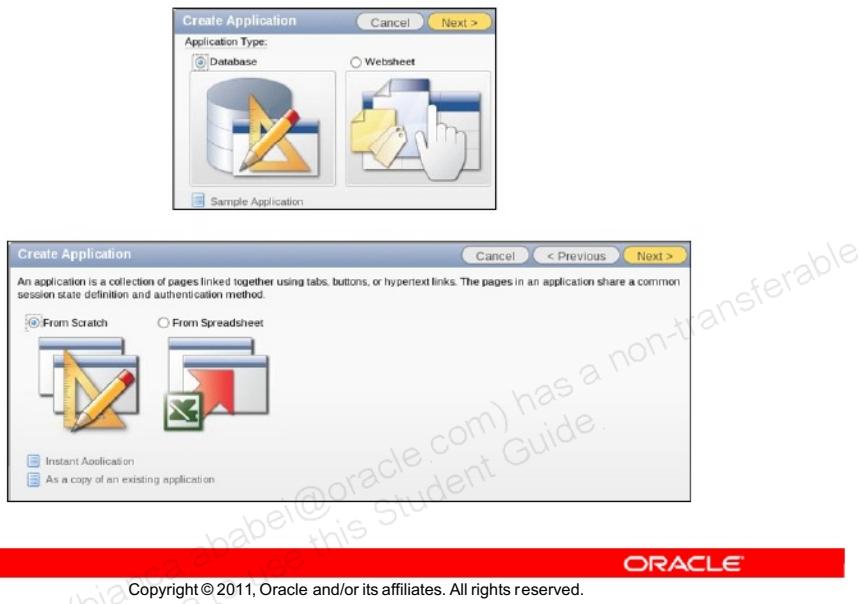
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To access the Create Application wizard, perform either of the following steps:

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

Different Ways of Creating a Database Application



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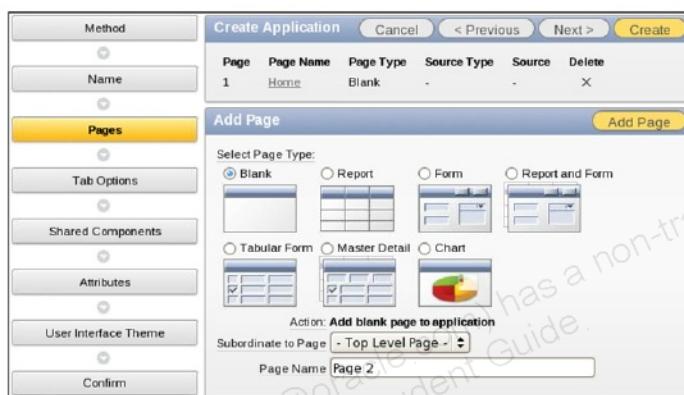
You can create an application from scratch by clicking From Scratch in the Create Application wizard.

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

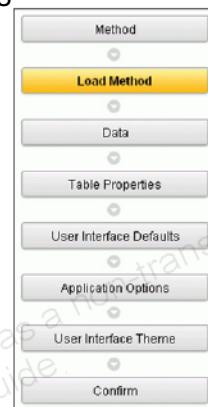
Note: When you create new pages, you can now organize them sequentially and hierarchically by using the “Subordinate to Page” drop-down list. This option is available on the second page that you create in your application.

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.



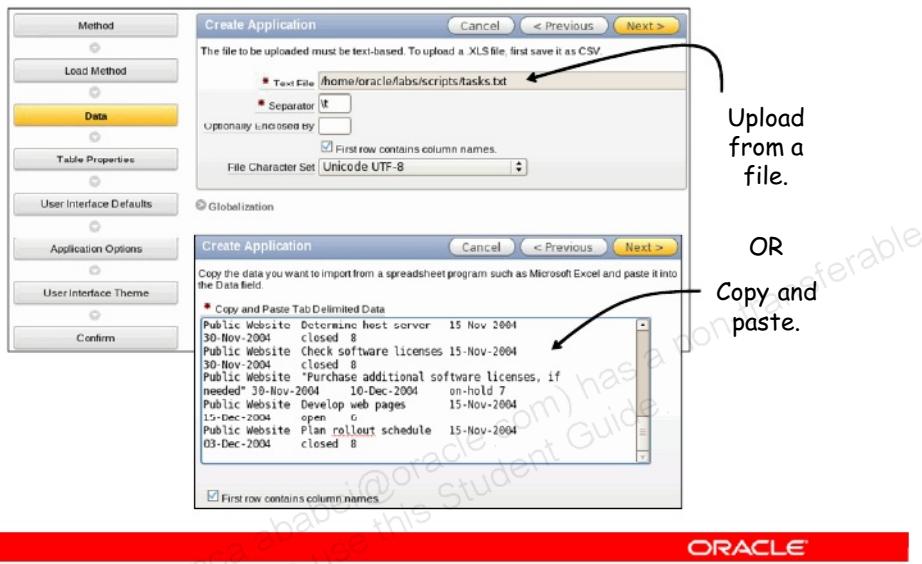
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You can create an application based on a spreadsheet by clicking From Spreadsheet in the Create Application wizard. The slide provides an overview of the steps that are necessary to create a database application from a spreadsheet.

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

Creating a Database Application from a Spreadsheet: Data Wizard



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



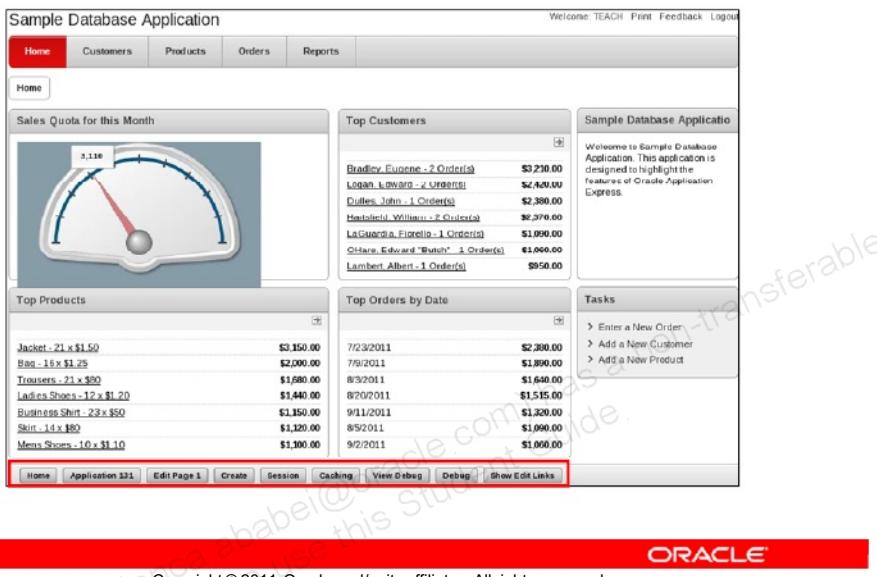
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Regardless of the application that you create, you can run the application by clicking the Run Application icon.

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



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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."

- **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



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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.

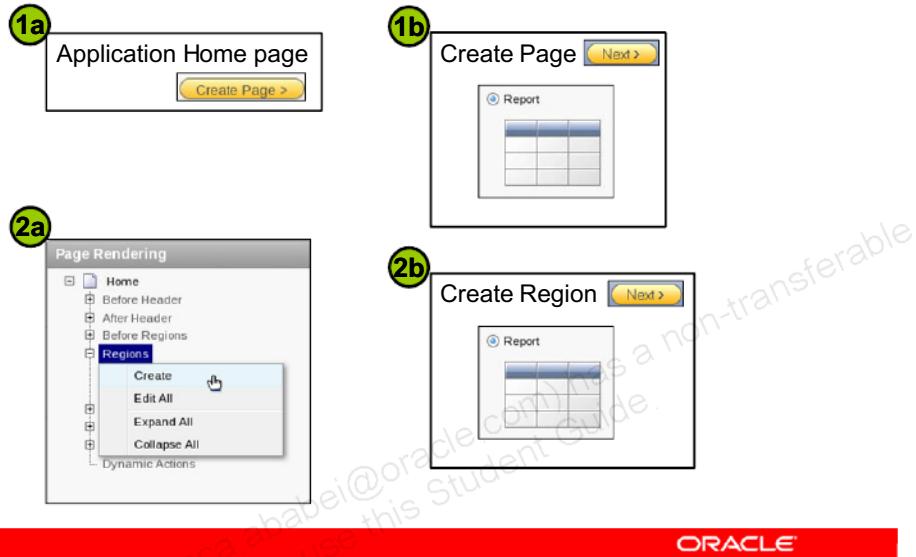
Lesson Agenda

- 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



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.

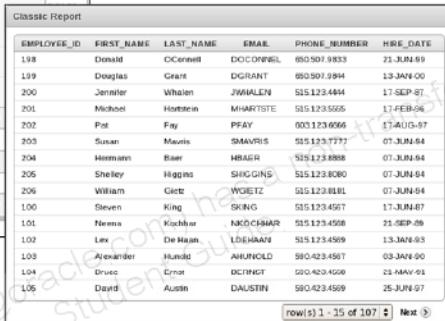
Selecting the Appropriate Report Type

Interactive report



The screenshot shows an interactive report interface. At the top, there is a search bar with placeholder text 'Q...', a 'Go' button, and an 'Actions' dropdown menu. The menu includes options like 'Select Columns', 'Filter', 'Rows Per Page', 'Format', 'Flashback', 'Save Report', 'Reset', 'Help', and 'Download'. Below the menu, the report displays a list of employees with columns: Employee_ID, First Name, Last Name, Email, Phone Number, and Hire Date. The hire date column is currently sorted in descending order. The data includes rows for employees like Donald O'Connell, Douglas Grant, Jennifer Whalen, Michael Hartstein, Pat Fay, Susan Marvin, Hermann Baer, Shelley Higgins, William Gietz, Steven King, Neena Kochhar, Lex De Haan, Alexander Hunold, Bruce Ernst, and David Austin. Each row has a small icon in the first column.

Classic report



The screenshot shows a classic report interface. It features a title 'Classic Report' and a table with the following columns: EMPLOYEE_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, and HIRE_DATE. The data is identical to the interactive report, listing the same 16 employees. At the bottom of the report, there is a navigation bar with links for 'row(s) 1 - 15 of 107' and 'Next'.

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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

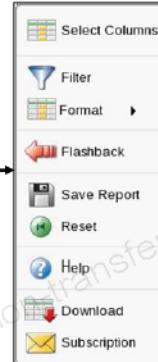
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Answer: b

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



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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

The screenshot illustrates two scenarios for searching information:

Scenario 1: Shows a search criteria of "ed" entered into a general search field. A callout labeled "Search Criteria" points to this field. A callout labeled "Filter Applied" points to the column filter icon (a magnifying glass) in the report header. The report table shows three rows where the customer name contains "ed".

Scenario 2: Shows a search criteria of "ed" entered into a specific column search field ("Order Items"). A callout labeled "Remove and enable or disable filter options." points to the filter configuration area, which includes checkboxes for "Row text contains 'ed'" and "Order Items contains 4". The report table shows the same three rows as Scenario 1.

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

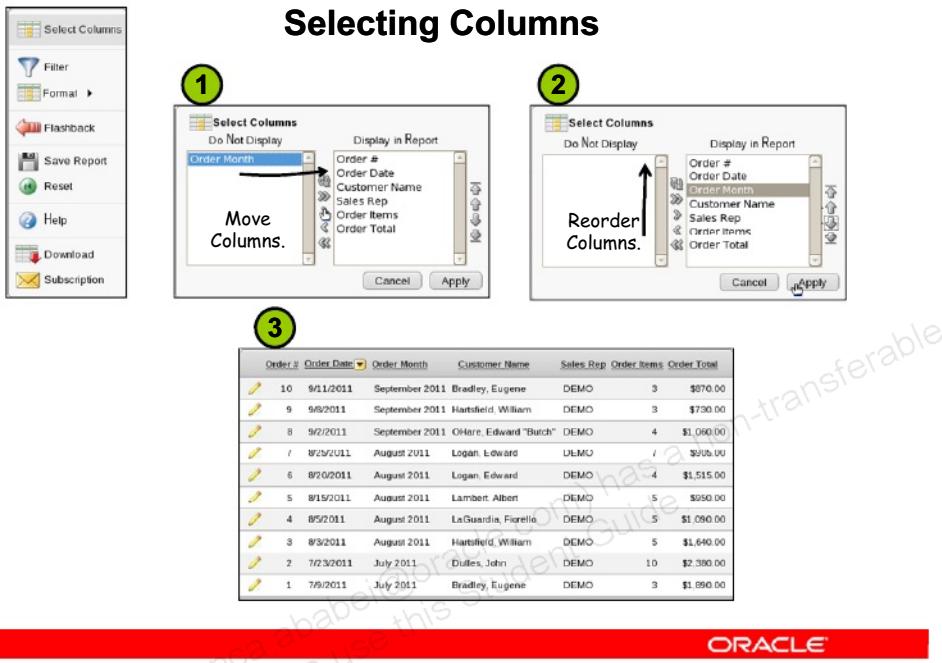
To search in the entire report, enter the search criteria in the text area and click the Go button. A filter is applied on the report and all the rows that contain the search criteria are displayed. (Scenario 1).

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

The screenshot shows the Oracle Application Express interface. On the left, there's a sidebar with various actions: Select Columns, Filter (which is selected), Format, Flashback, Save Report, Reset, Help, Download, and Subscription. A callout points from the 'Filter' button in the sidebar to the 'Filter' dialog window. The 'Filter' dialog has 'Filter Type' set to 'Row'. The 'Name' field contains 'Orders'. The 'Filter Expression' field contains 'K > '8/30/2011' OR I >= 4'. Below these fields are two panels: 'Columns' and 'Functions / Operators'. The 'Columns' panel lists columns C through K. The 'Functions / Operators' panel lists comparison operators like '=', '<', '<=' etc. At the bottom of the dialog are 'Cancel' and 'Apply' buttons, with 'Apply' being highlighted. To the right of the dialog is a results grid titled 'Orders' with columns Order#, Order Date, Order Month, Customer Name, Sales Rep, Order Items, and Order Total. The grid displays five rows of data. At the bottom right of the grid is a page number '1 - 5'.

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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.

Sorting Columns

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total
10	9/1/2011	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, Alberi	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	Logan, Edward	DEMO	7	\$925.00
2	7/23/2011	July 2011	Duffles, 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, the Actions menu is open, with 'Format > Control Break' highlighted. The main area displays a report with three distinct sections based on the 'Order Month' column. Each section contains a table with columns: Order #, Order Date, Customer Name, Sales Rep, Order Items, and Order Total. The first section is for July 2011, the second for August 2011, and the third for September 2011. On the right, a 'Control Break' dialog box is open, showing six steps for defining the break groups. Step 1 is 'Order Month' (Status: Enabled). Steps 2 through 6 are '- Select Column -' (Status: Enabled). At the bottom of the dialog are 'Cancel' and 'Apply' buttons.

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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.

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', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A secondary dropdown menu under 'Format' lists 'Sort', 'Control Break', 'Highlight', 'Compute', 'Aggregate', 'Chart', and 'Group By'. In the center, a 'Highlight' dialog box is open 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' with 10 rows of data. The last two rows are highlighted in blue, indicating they meet the specified condition. An annotation on the right side of the slide points to these rows with the text: 'These rows are highlighted because the condition is true.'

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
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	Hartsfield, William	DEMO	5	\$1,640.00
7	8/25/2011	August 2011	Longfellow, Emily	DEMO	7	\$970.00
2	7/29/2011	July 2011	Carter, Steven	DEMO	10	\$2,380.00

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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:

- Computation:** New Computation
- Column Heading:** PRICE WITH TAX
- Format Mask:** \$ML999G999G999G999G990D00
- Computation Expression:** 0 * 1.05

The dialog also features a 'Columns' section listing columns A through L, a 'Keypad' for entering numbers and symbols, and a 'Function' section listing various Oracle functions like ABS, ADD_MONTHS, CASE, CEIL, CHR, COALESCE, and COS.

Below the dialog is a preview of a report table with the following data:

Order #	Order Date	Order Month	Customer Name	Sales Rep	Order Items	Order Total	Price with Tax
10 6/11/2011	September 2011	Bradley, Eugene	DEMO		3	\$970.00	\$1,017.50
9 5/8/2011	September 2011	Hartfield, William	DEMO		3	\$730.00	\$766.50
1 7/4/2011	July 2011	Bradley, Eugene	DEMO		3	\$1,860.00	\$1,944.50
8 9/27/2011	September 2011	Ohare, Edward "Butch"	DEMO		4	\$1,060.00	\$1,113.00
6 8/29/2011	August 2011	Legan, Edward	DEMO		1	\$1,614.00	\$1,690.76
5 8/10/2011	August 2011	Lambert, Albert	DEMO		5	\$950.00	\$997.50
4 8/5/2011	August 2011	LoQuandre, Freelle	DEMO		5	\$1,050.00	\$1,144.50
3 8/3/2011	August 2011	Hartfield, William	DEMO		5	\$1,640.00	\$1,722.00
7 8/25/2011	August 2011	Logan, Edward	DEMO		7	\$905.00	\$930.25
2 7/23/2011	July 2011	Dulles, John	DEMO		10	\$2,380.00	\$2,469.00

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You can use the Compute option to add computed columns to a report. These can be mathematical computations (for example, NBR_HOURS/24) or standard Oracle functions that are applied to existing columns (some columns have been displayed; other columns, such as TO_DATE, can also be used).

To add a computed column to your report, perform the following steps:

1. Click the **Actions** menu button and select **Format > Compute**.
2. Enter a name for Column Heading. In the slide example, **Price with Tax** is entered.
3. Select a value for Format Mask. In the slide example, **\$5234.10** is selected.
4. Place your cursor in the Computation field and click a column from the list of columns. A column alias appears in the Computations area.
5. Use numbers and symbols from the Keypad. For example, to specify multiplication, click *. If required, use functions displayed in the table. In the slide example, ***1.05** is specified.
6. Click **Apply**. The new computed column now appears in the report.

The slide example shows a computed column that has the calculation Price*1.05. The “Price with Tax” computed column is displayed in the report. Notice that the format mask \$5,234.10 is applied to the report.

Aggregating Columns

The screenshot shows the Oracle Application Express interface. On the left, a sidebar menu includes 'Select Columns', 'Filter', 'Format' (with 'Aggregate' highlighted), 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A secondary menu under 'Format' lists 'Sort', 'Control Break', 'Highlight', 'Compute', 'Aggregate', 'Chart', and 'Group By'. In the center, a modal dialog titled 'Aggregate' is open, showing 'Aggregation - New Aggregation -', 'Function Sum', and 'Column ***Price with Tax***'. Below the dialog is a report table with columns: Order #, Order Date, Order Month, Customer Name, Sales Rep, Order Items, Order Total, and Price with Tax. The last row of the table shows a total of '\$13,681.50' in the Price with Tax column, which is highlighted with a red box. The Oracle logo is at the bottom right.

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	8/8/2011	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	8/2/2011	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, Firelio	DEMO	5	\$1,090.00	\$1,141.50
3	8/3/2011	August 2011	Hartsfield, William	DEMO	5	\$1,660.00	\$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	DEMO	10	\$4,394.00	\$4,499.00
							\$13,681.50

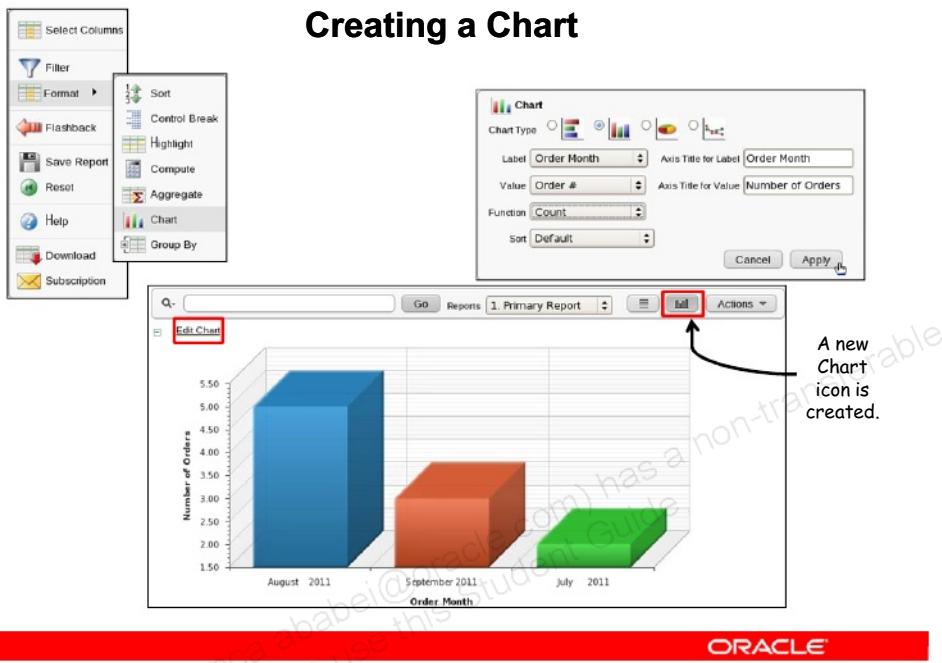
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You can use the Aggregate option to perform mathematical computations against a column in your report. Aggregates are displayed after each control break and at the end of the report within the column for which they are defined.

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."



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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.

Creating a Group By Report

The screenshot shows the Oracle Application Express interface. On the left, a sidebar menu includes options like 'Select Columns', 'Filter', 'Format > Group By' (which is highlighted), 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. The main area displays a 'Group By' configuration dialog. It has sections for 'Group By Column' (with 'Order Month' selected), 'Functions' (with 'Sum' selected for both 'Order Items' and 'Order Total'), 'Column' (with 'Total Order' and 'Total Order Price' respectively), 'Label' (empty), 'Format Mask' (empty), and 'Sum' (checkboxes checked). Below this are 'Sort Column' and 'Direction' settings. At the bottom are 'Cancel' and 'Apply' buttons. An arrow points from the 'Actions' button in the search bar of the main report preview to the 'Group By' icon in the configuration dialog, with the text 'A Group By icon is created.' A watermark 'This Student Guide has a non-transferable license' is visible across the interface.

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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 report interface with a sidebar containing various actions: Select Columns, Filter, Format, Flashback, Save Report, Reset, Help, Download, and Subscription. A callout points to the 'Flashback' button with the text 'An order is edited.' A modal window titled 'Flashback' is open, stating 'A flashback query allows you to view the data as it existed at a previous point in time.' It has a field 'As of [] minutes ago.' with a value of '5'. Below the modal is another report table showing order details. A callout points to this table with the text 'Flash back five minutes to see the order details before the edit.' The main report table shows the same data as the flashback modal, with the difference being the order details from five minutes ago.

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	8/2/2011	September 2011	O'Hare, Edward "Bud"	DEMO	4	\$1,460.00	\$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	LaGuardia, Fiorello	DEMO	5	\$3,090.00	\$3,144.50
3	8/3/2011	August 2011	Hartfield, William	DEMO	5	\$1,640.00	\$1,722.00
				DEMO	7	\$950.00	\$975.50
				DEMO	10	\$2,380.00	\$2,499.00
							\$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	8/2/2011	September 2011	O'Hare, Edward "Bud"	DEMO	4	\$1,460.00	\$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	LaGuardia, Fiorello	DEMO	5	\$3,090.00	\$3,144.50
3	8/3/2011	August 2011	Hartfield, William	DEMO	5	\$1,640.00	\$1,722.00
				DEMO	7	\$950.00	\$975.50
				DEMO	10	\$2,380.00	\$2,499.00
							\$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.



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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

The screenshot shows two states of an interactive report:

- Before reset:** The report displays data for July 2011. A context menu is open on the first row, showing options like "Select Columns", "Filter", "Format", "Flashback", "Save Report", "Reset", "Help", "Download", and "Subscription".
- After reset:** The report displays data for July 2011 after a reset. The context menu is no longer visible. A confirmation dialog box is shown with the message "Restore report to the default settings." and buttons for "Cancel" and "Apply".

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	Hansfeld, William	DEMO	3	\$730.00	\$766.50	
1 7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,984.50	
8 9/8/2011	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	Hansfeld, 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

HTML Format

The screenshot shows a report interface with a sidebar containing various actions like 'Select Columns', 'Filter', 'Format', 'Flashback', 'Save Report', 'Reset', 'Help', 'Download', and 'Subscription'. A modal window titled 'Download' is open, prompting the user to choose a report download format: CSV, HTML, or Email. Below the modal is a table titled 'Report Data' with columns: Order #, Order Date, Order Month, Customer Name, Sales Rep, Order Items, Order Total, and Price with Tax. The table contains 10 rows of sample data.

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	\$1,388.00
9	9/6/2011	September 2011	Hartsfield, William	DEMO	3	\$730.00	\$766.50
1	7/9/2011	July 2011	Bradley, Eugene	DEMO	3	\$1,890.00	\$1,981.50
8	9/2/2011	September 2011	OHare, 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	\$9,05.00	\$950.25
2	7/23/2011	July 2011	Dutes, 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



Specify the time period
and frequency for your
subscription.

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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

The screenshot shows a report grid with columns: Order #, Order Date, Order Month, Customer Name, Sales Rep, Order Items, Order Total, and Price with Tax. The Order Month column has a context menu open, listing options like Last 5 Years, Last 2 Years, Last Year, Last Month, Last Week, Last 2 Days, Last Day, Last 12 Hours, Last 2 Hours, and Last Hour. The menu also includes icons for sorting, hiding, creating a control break, displaying column information, and creating a filter. The report displays several rows of order data with sample values for each column.

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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 data:

Employee ID	First Name	Last Name	Email	Phone Number	Hire Date	Department ID
198	Donald	O'Connell	DOCNEL	650.507.9833	21-JUN-99	50
199	Douglas	Grant	DGRANT	650.507.9844	13-JAN-00	50
200	Jennifer	Whalen	JWHALEN	515.123.4441	17-SEP-87	10
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96	20
202	Pat	Fay	PFAY	608.123.6666	17-AUG-97	20
203	Susan	Mavris	SMAVRIS	515.123.7777	07-JUL-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

At the bottom right of the page is the ORACLE logo.

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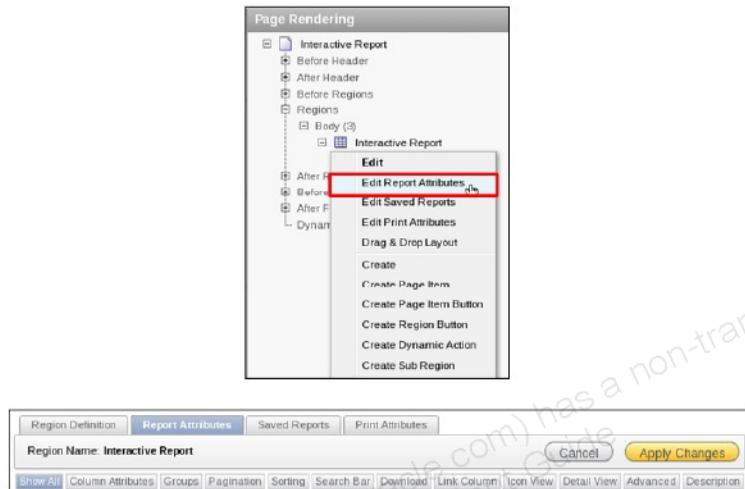
There are numerous ways to create an interactive report. You can create the report when you create the following:

- 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



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

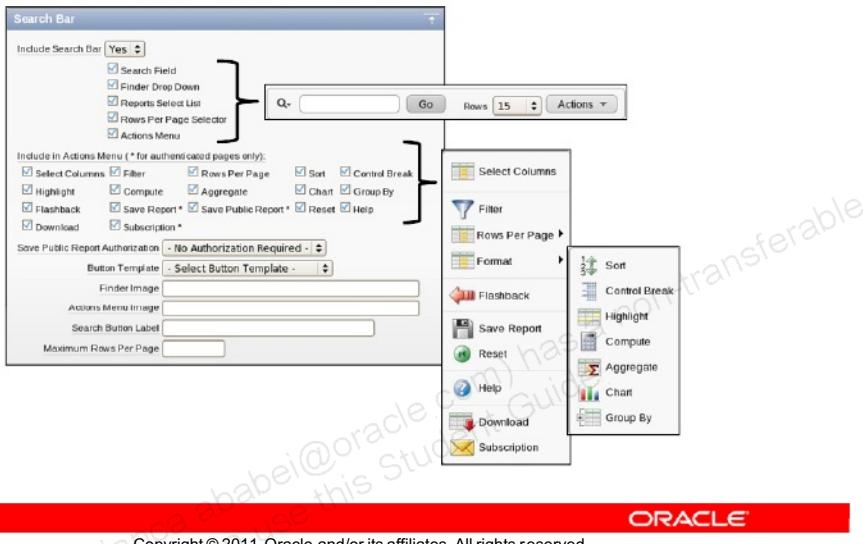
The screenshot shows the Oracle Application Express Report Attributes page. It features four main tabs: Column Attributes, Column Groups, Pagination, and Sorting. The Column Attributes tab displays a list of columns with their properties: Employee ID (Type: NUMBER, Display Text As: Display as Text (escape special characters)), First Name (Type: STRING, Display Text As: Display as Text (escape special characters)), Last Name (Type: STRING, Display Text As: Display as Text (escape special characters)), Email (Type: STRING, Display Text As: Display as Text (escape special characters)), Phone Number (Type: STRING, Display Text As: Display as Text (escape special characters)), Hire Date (Type: DATE, Display Text As: Display as Text (escape special characters)), Job ID (Type: NUMBER, Display Text As: Display as Text (escape special characters)), Salary (Type: NUMBER, Display Text As: Display as Text (escape special characters)), Commission Pct (Type: NUMBER, Display Text As: Display as Text (escape special characters)), Manager ID (Type: NUMBER, Display Text As: Display as Text (escape special characters)), and Department ID (Type: NUMBER, Display Text As: Display as Text (escape special characters)). The Column Groups tab shows no groups defined. The Pagination tab includes settings for Row Ranges X to Y, Pagination Display Position (Bottom - Right), Show Null Values As (empty string), and Maximum Row Count (100000). The Sorting tab lists Ascending Image (arrow_up_gray_light.gif) and Descending Image (arrow_down_gray_light.gif) for both ascending and descending sort directions, with width=13 and height=12 specified for each. A red bar at the bottom contains the ORACLE logo and the copyright notice: Copyright © 2011, Oracle and/or its affiliates. All rights reserved.

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

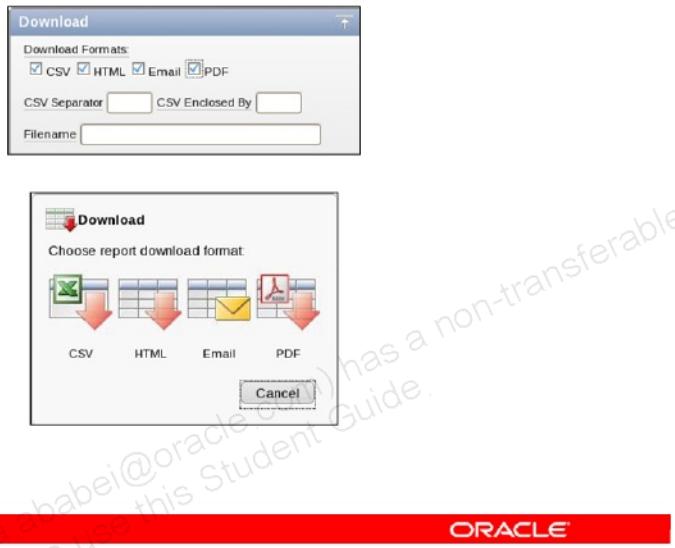


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You can choose whether or not to include a search bar in an interactive report. By default, a search bar is included in an interactive report. If you set Include Search Bar to No, the search bar and all its components are removed from the interactive 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.

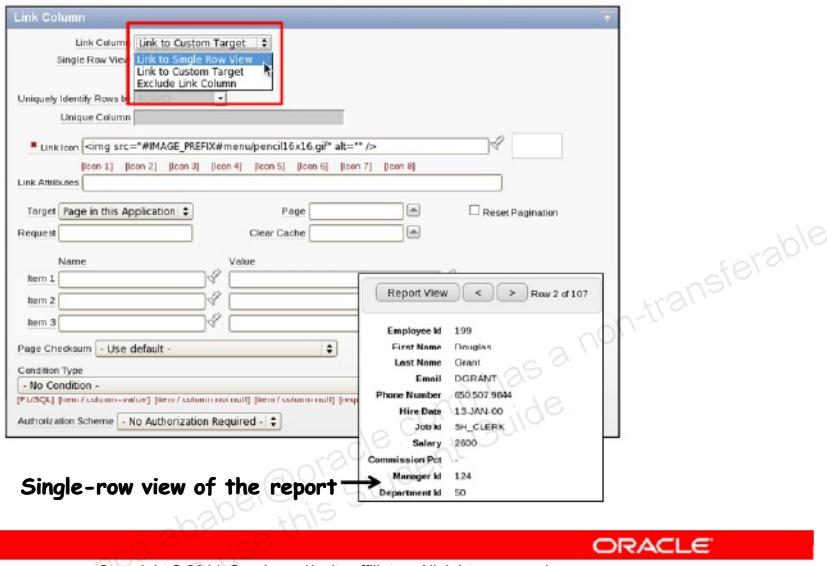
Specifying the Download Formats



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.

Using the Link Column



Single-row view of the report →

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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 illustrates the configuration and execution of Icon and Detail Views in Oracle Application Express. At the top, two tabs are shown: 'Icon View' and 'Detail View'. The 'Icon View' tab contains settings for enabling icon view, defining link columns, and specifying image source columns. The 'Detail View' tab contains settings for enabling detail view, defining before rows, for each row (using #COLUMN_AUASH substitution), and after rows. Below these tabs, two reports are displayed. The first report, titled 'Icon View', shows a grid of icons for products: Bag, Belt, Ladies Shoes, and Mens Shoes. The second report, titled 'Detail View', shows detailed product information for a Bag and a Belt. Both reports include a search bar, a toolbar with 'Actions' and 'Create Product' buttons, and an Oracle logo at the bottom.

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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.

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	WGIEZT	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	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	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	BERNNSI	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.

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.

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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	Ettoriz	AERRAZUR	10-MAR-1997	SA_MAN	12000
Alexander	Husfeld	AHUNOLD	03-JAN-1990	IT_PROG	9000
Alexander	Khos	AKHOO	18-MAY-1995	PV_CLERK	3100
Alexis	Bull	ABULL	20-FEB-1997	SH_CLERK	4100
Alisa	McEvren	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	Vitney	CVISHNEY	11-NOV-1997	SA REP	10500

Employee List Report					
FIRST_NAME	LAST_NAME	HIRE_DATE	JOB_ID	SALARY	DEPARTMENT_ID
Adam	Fripp	10-APR-1997	ST_MAN	8000	50
Alana	Walsh	24-APR-1998	SH_CLERK	3100	60
Alberto	Ettoriz	10-MAR-1992	SA_MAN	12000	90
Alexander	Husfeld	03-JAN-1990	IT_PROG	9000	60
Alexander	Khos	18-MAY-1995	PV_CLERK	3100	60
Alexis	Bull	20-FEB-1997	SH_CLERK	4100	50
Alisa	McEvren	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.

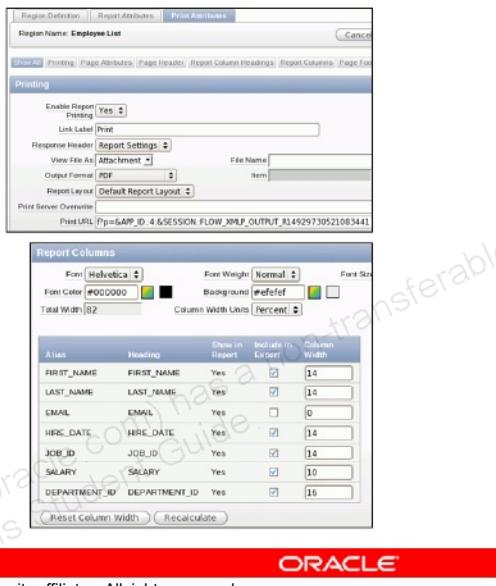
Note that you must have a valid BI Publisher license to produce your report in Word, Excel, or HTML output formats.

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.



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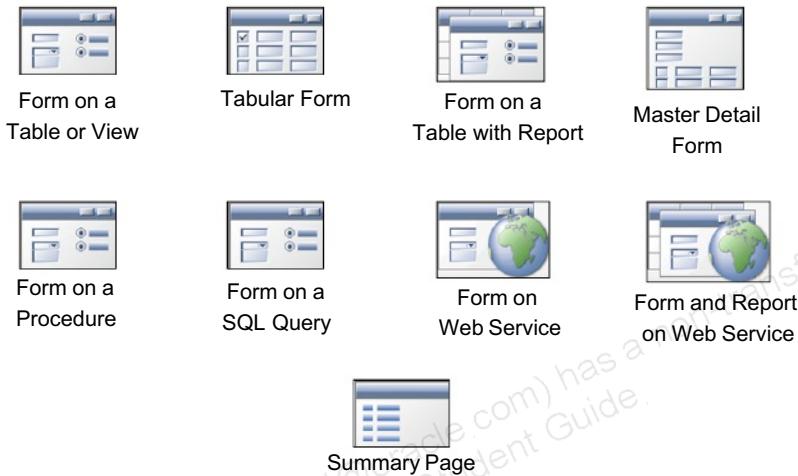
Forms are application components that take input from a user and submit it to a server. A form usually consists of one or more page items (drop-down list, text box, check box, radio buttons, and so on), which enable users to enter information, and a button or link with a submit action.

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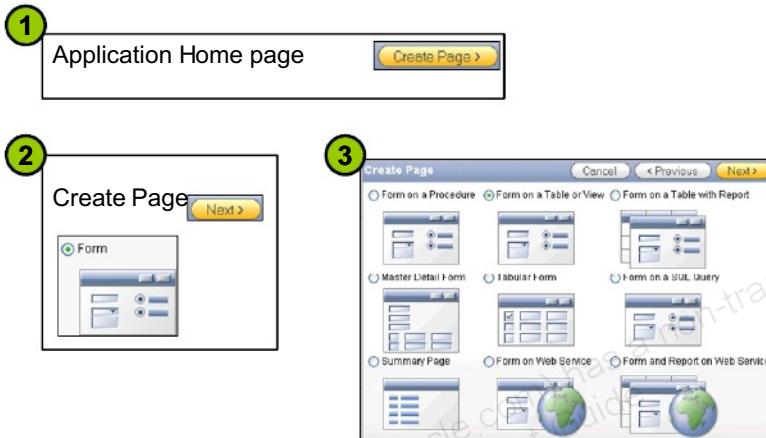
Oracle Application Express provides wizards to create the types of forms listed in the slide.

- **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.

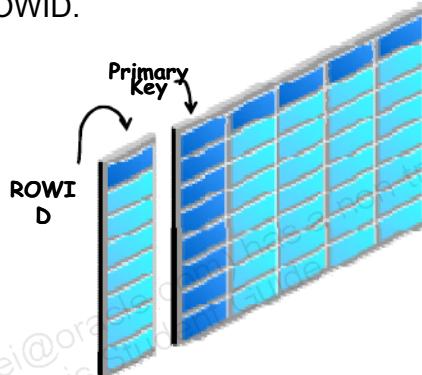
You can also access these wizards while creating a region on a page. You learn more about regions in the lesson titled “Working with Pages and Regions.”

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". It contains ten input fields: First Name, Last Name, Email, Phone Number, Hire Date, Job ID, Salary, Commission Pct, Manager ID, and Department ID. Each field has a red asterisk next to it, indicating it is required. Below the fields are two buttons: "Cancel" and "Create". A curly arrow points from the text "Each table column is displayed as a field." to the first input field. Two arrows point 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.

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
3. name, and template (filled by default).
4. Select a tab option.
5. Select the primary key columns.
6. Select the source for primary key column.
7. Select the columns to include in the form.
8. Select and name the buttons.
9. 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 web-based application interface for managing employees. On the left, there is a table listing employee details such as Employee ID, First Name, Last Name, Email, Phone Number, Hire Date, Job ID, Salary, Commission Pct, Manager ID, and Department ID. The table includes a 'Create' button at the top right. A modal dialog box titled 'OEHR Employees' is open over the table, containing fields for First Name (Steven), Last Name (King), Email (KING), Phone Number (515 123 4567), Hire Date (17-JUN-87), Job ID (AD_PRES), Salary (24000), Commission Pct, Manager ID, and Department ID (90). There are 'Cancel', 'Delete', and 'Apply Changes' buttons at the bottom of the dialog. The background table lists various employees like Donald O'Connell, Douglas Grant, Jennifer Whalen, Michael Hartstein, Pat Fay, Susan Mavris, Hermann Baer, Shelley Higgins, William Gietz, Steven King, Neena Kochhar, Lex De Haan, Alexander Hunold, Bruce Ernst, and David Austin.

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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

Employee Id	First Name	Last Name	Email	Phone Number	Hire Date	Job Id	Salary	Commission Pct	Manager Id	Department Id
198	Donald	O'Connell	DOCONNEL	(650) 507 9833	22-JUN-99	SH_CLERK	2600		124	50
199	Douglas	Grant	DGRANT	(650) 507 9844	13-JAN-00	SH_CLERK	2600		124	50
200	Jennifer	Whalen	JWHALEN	(515) 123 4444	17-SEP-87	AD_ASST	4400		101	10
201	Michael	Hartstein	MHARTSTE	(515) 123 5555	17-FEB-96	MK_MAN	13000		100	20
202	Pat	Fay	PFAY	(603) 223 6666	17-AUG-97	MK_REP	6000		203	20
203	Susan	Mavris	SMAVRIS	(515) 123 7777	07-JUN-94	HR_REP	6500		103	40
204	Hermann	Baer	HBAER	(515) 123 8888	07-JUN-94	PR_REP	120000		102	70
205	Shelley	Higgins	SHIGGINS	(515) 123 8880	07-JUN-94	AC_MGR	120000		103	110
206	William	Gietz	WGRETZ	(515) 123 8181	07-JUN-94	AC_ACCOUNT	8300		205	110
100	Steven	King	SKING	(515) 123 4567	17-JUN-87	AD_PRES	240000			90

Cancel Delete Submit

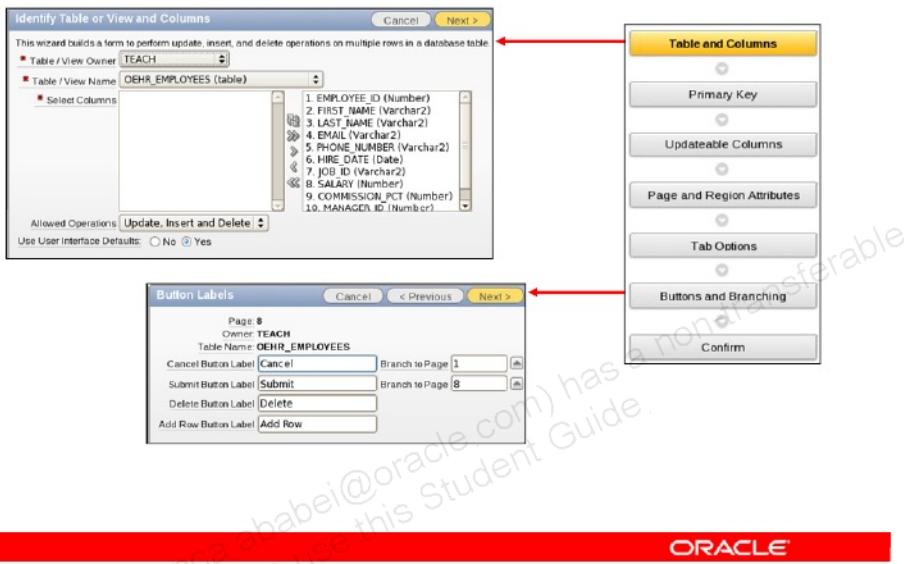
Row(s) 1 - 20 of 107 | New

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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

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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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Answer: c

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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Answer: a

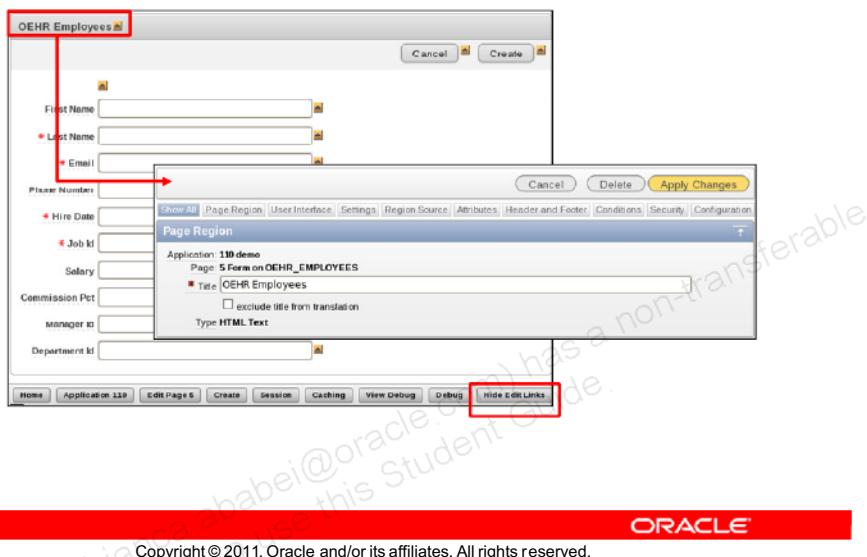
Lesson Agenda

- 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



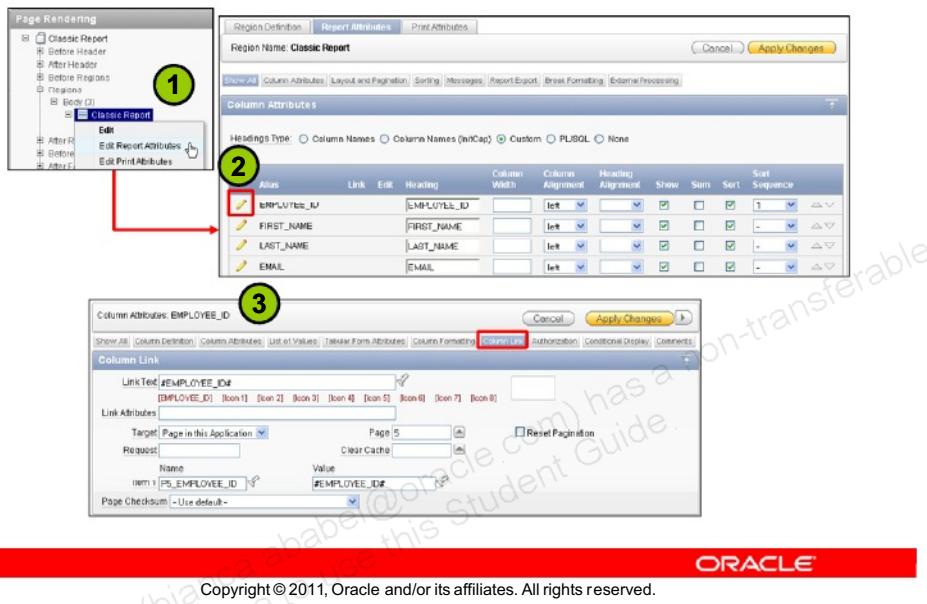
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When you run your form page, you can modify its objects by using the Show Edit Links button on the Developer toolbar. When you click Show Edit Links, an icon appears next to each item in the form. Click the icon to view the details about that item. 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



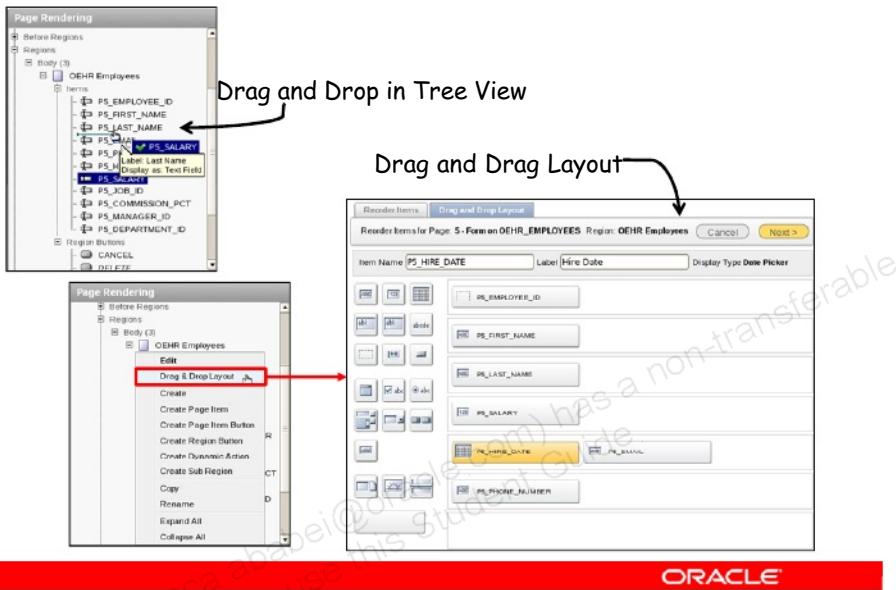
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When you create interactive reports, the wizard automatically creates the required forms and links between them. This slide shows how you can link a classic report to a form.

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.

Reordering Items

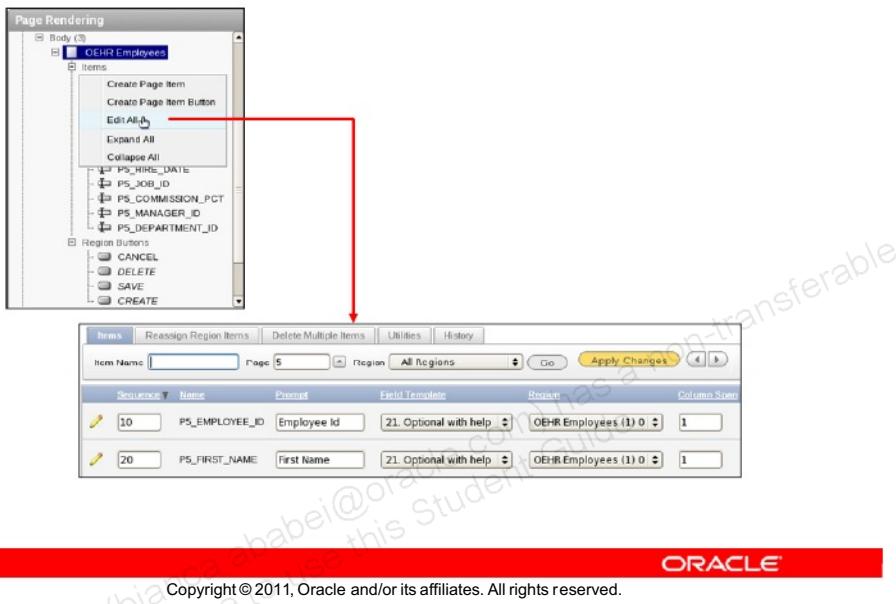


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You can drag an item listed under the Items node to a different location among the items. You can also right-click the region node and select Drag & Drop Layout to reorder items in a Drag and Drop Layout mode. In this mode, you can also change the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

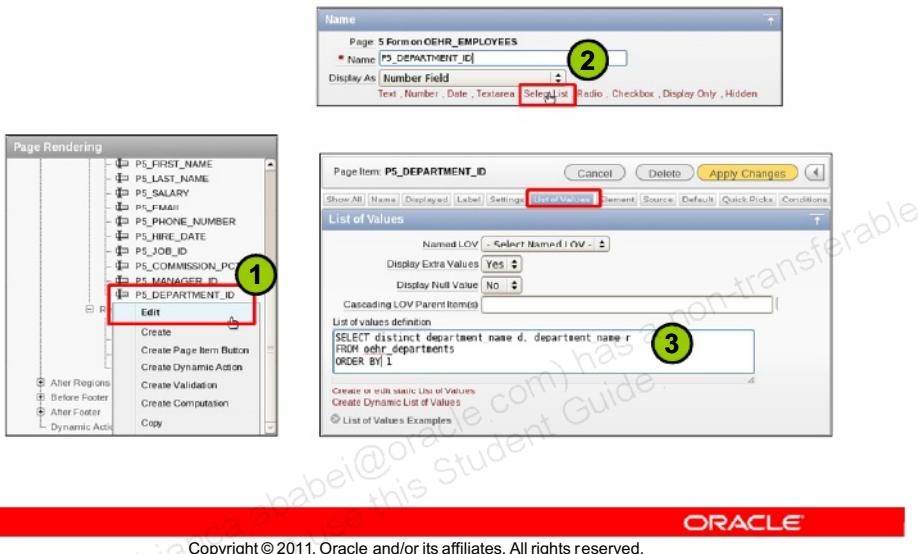
Editing Form Items by Using “Edit All”



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."

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.”

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.

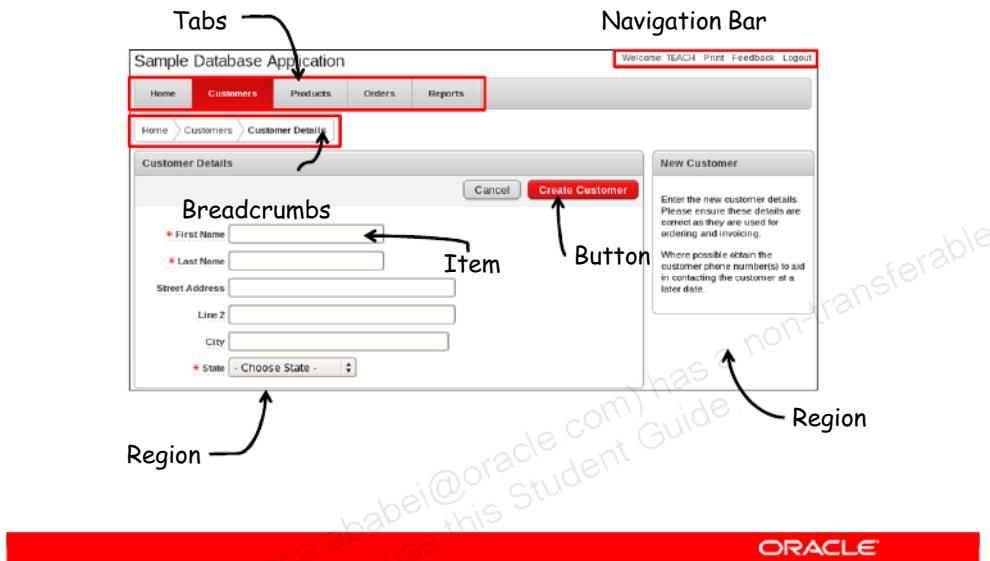
Lesson Agenda

- 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)



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.

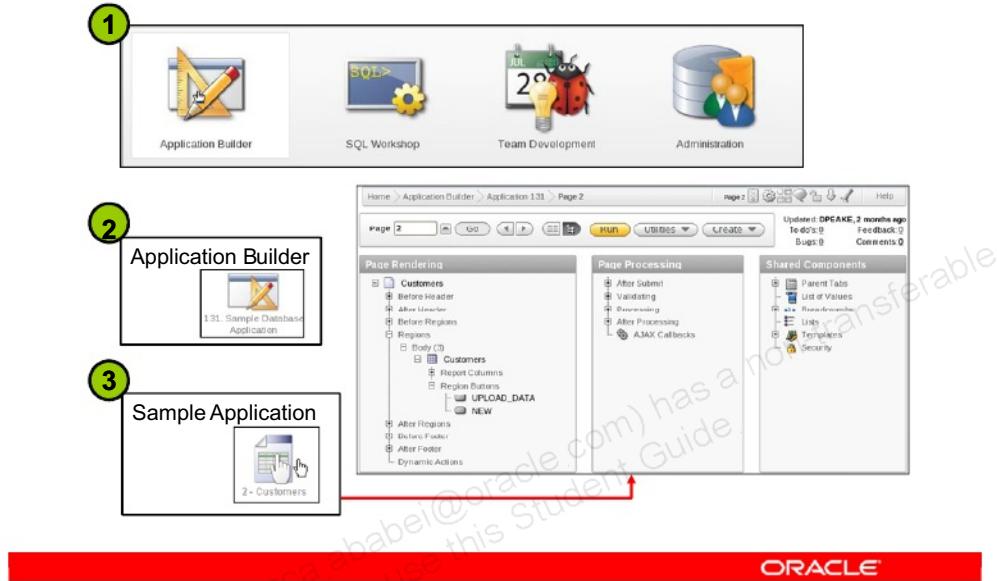
A page contains user interface elements and application logic. A page is divided into regions. A region is a section of a page that contains content. The content of the region is determined by the region source. For example, a region can contain a report based on a SQL query, or it can contain static 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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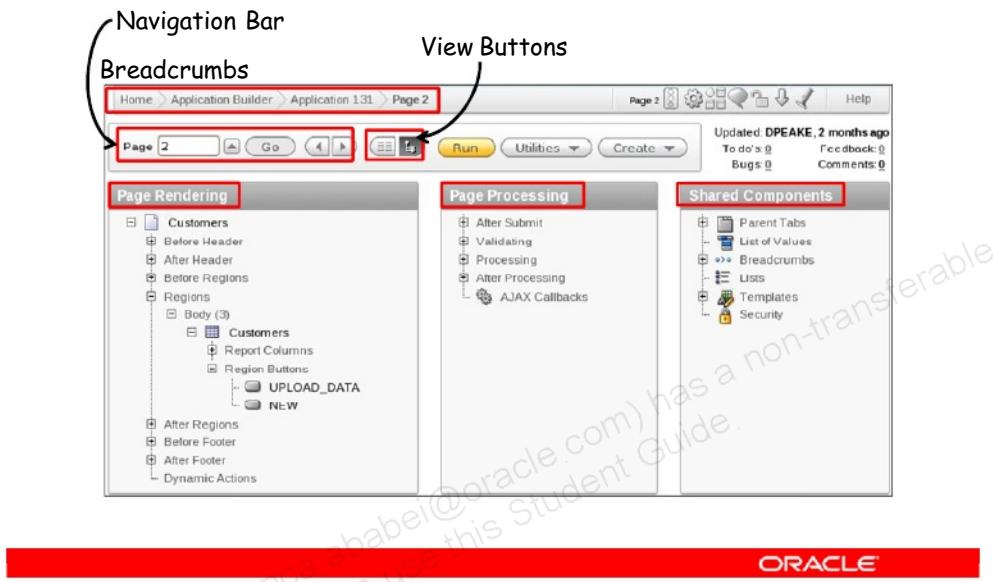
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You use the Page Definition page to view, create, and edit the components of a page. To access the page definition for a page, perform the following steps:

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



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.

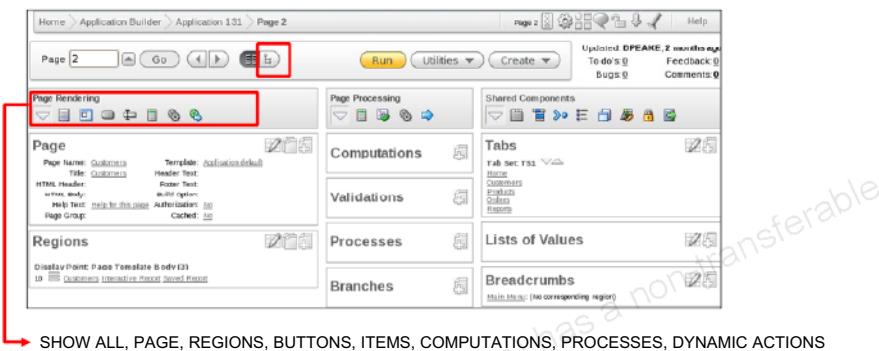
In the Tree view, page details are listed based on event sequence, that is, how Oracle Application Express processes them while rendering a page. Page components, such as regions, page items, and application logic, are represented as nodes in a tree. This organization provides a better understanding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



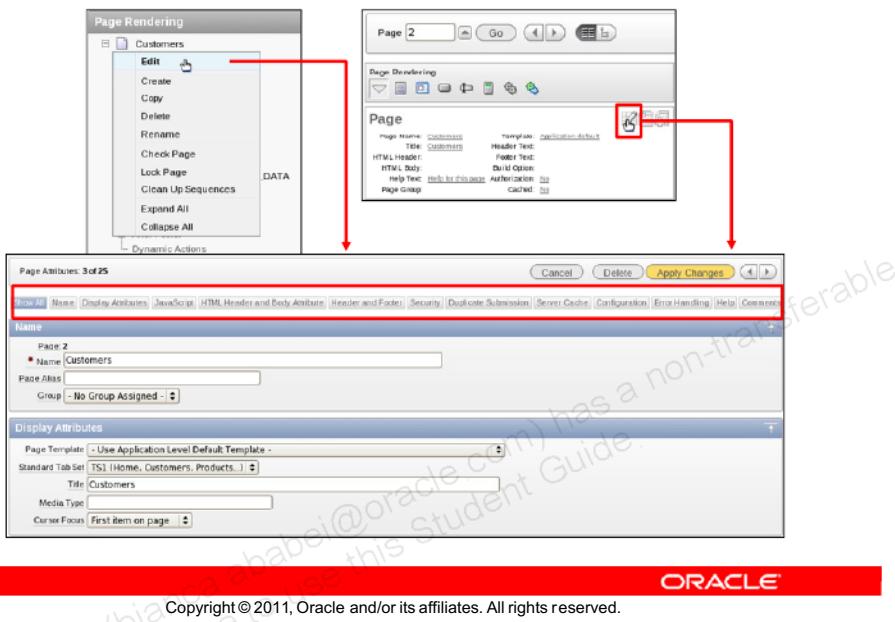
SHOW ALL, PAGE, REGIONS, BUTTONS, ITEMS, COMPUTATIONS, PROCESSES, DYNAMIC ACTIONS

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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

- **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.

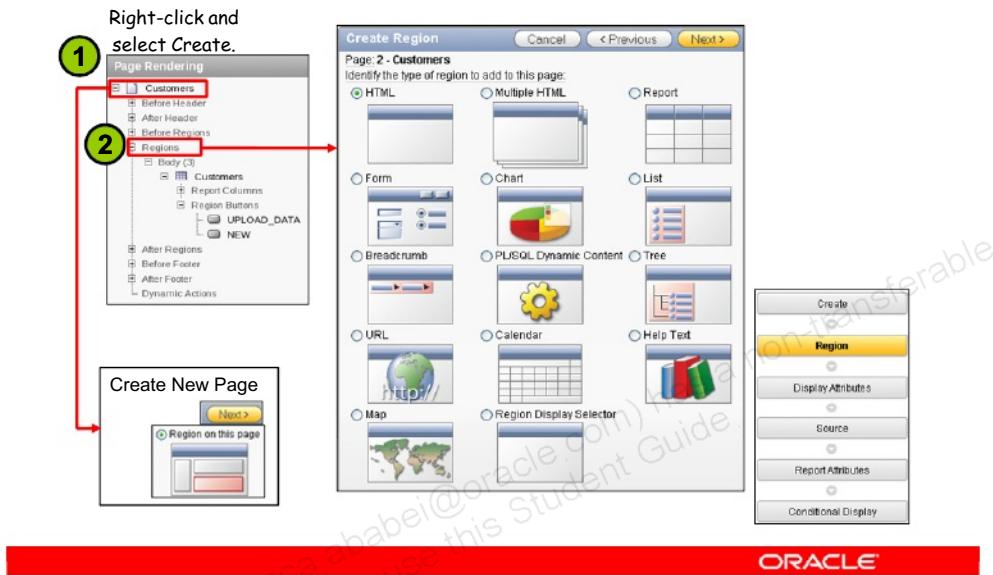
Lesson Agenda

- 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:

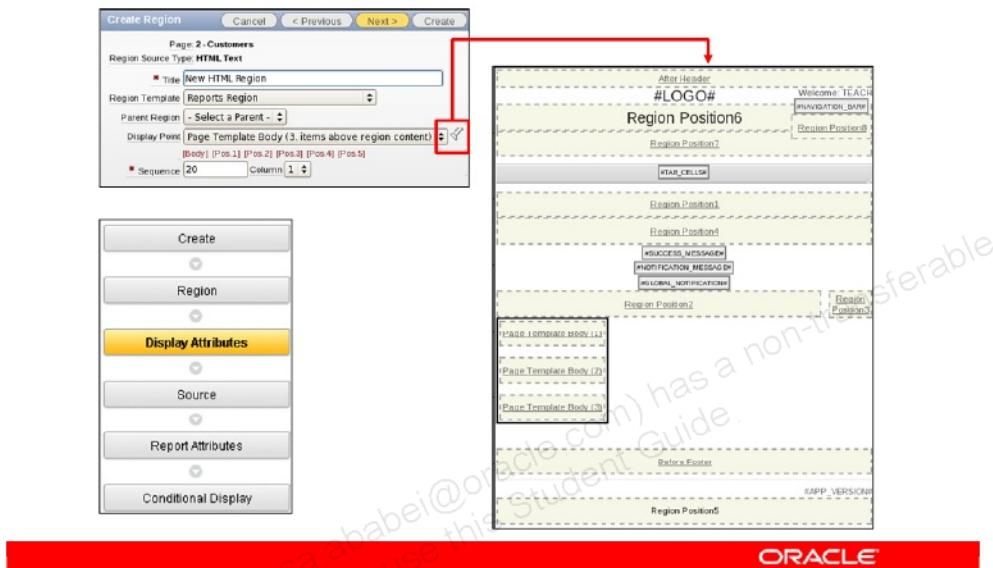
1. Right-click the parent page node and select Create. Select “Region on this page” and click Next.
2. Right-click the Regions node and select Create.

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



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).

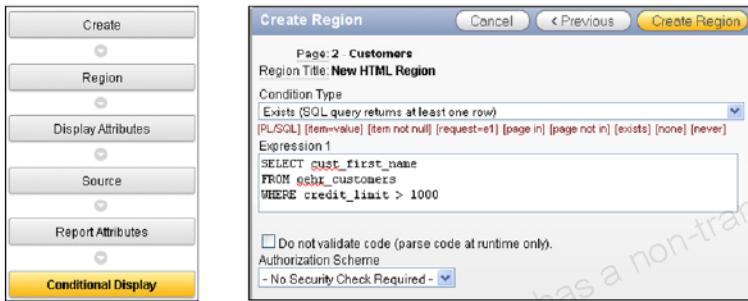
You can also specify the sequence of the region to position the region in relation to other regions on the page.

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:

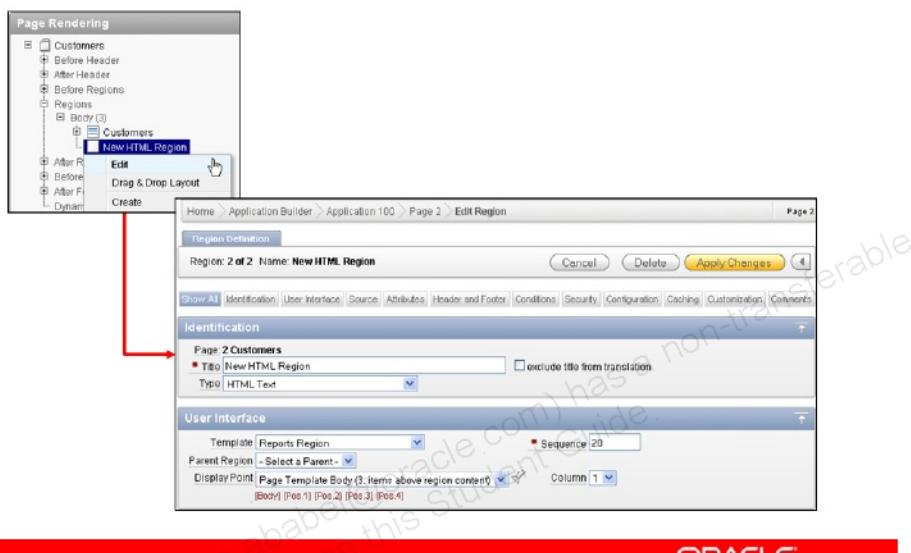
- Exists
- Not exists
- SQL Expression
- PL/SQL Expression

Viewing the Regions Page

The screenshot shows the Oracle Application Builder interface. On the left, a 'Page Rendering' tree view is open, showing nodes like 'Customers', 'Before Header', 'After Header', 'Before Regions', 'Regions' (which is selected and has a context menu), 'After Regions', 'After Footer', and 'Dynamic Actions'. A red box highlights the 'Edit All' option in this context menu. A red arrow points from this menu to the main content area. The main content area is titled 'Regions' and shows a table of regions. The table has columns: Sequence, Column, Region Name, Template, Type, Items, Buttons, and Display Point. Two rows are visible: Row 10 with Region Name 'Customers' and Row 20 with Region Name 'New HTML Region'. The 'Template' column shows values like '4. Region without Buttons and Titles' and '4. Reports Region'. The 'Type' column shows 'Interactive Report' and 'HTML Text'. The 'Display Point' column shows 'Page Template Body (3. items above region content)' and 'Page Template Body (3. items above region content)'. A red box highlights the 'Delete Multiple Regions' tab in the top navigation bar. At the bottom right, there is an 'ORACLE' logo and a copyright notice: 'Copyright © 2011, Oracle and/or its affiliates. All rights reserved.'

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

The screenshot shows the 'Region Definition' page for a report named 'Customers'. The 'Header and Footer' tab is selected. In the 'Header' section, there is a text area containing the substitution string '#ROWS_FETCHED#'. In the 'Footer' section, there is a text area containing the substitution string '#ROWS_FETCHED# rows in #TIMING# seconds.' A note on the left says 'Displays the time taken to render the region'.

You can use substitution strings in region headers and footers.

Customer Name	Address	City	State	ZIP Code
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096
Duties, John	46020 Aviation Drive	Sterling	VA	20166
Horstfeld, William	6000 North Terminal Parkway	Atlanta	GA	30320
LaGuardia, Fierlito	Hangar 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 "Buddy"	10000 West OHare	Chicago	IL	60666

Fetched 7 rows in 0.04 seconds.

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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.

Enabling Region Display Selection

The screenshot shows the 'Region Definition' page for 'Region: 1 of 3 Name: Report Region'. The 'Attributes' tab is selected. A red box highlights the 'Region Display Selector' dropdown, which is set to 'Yes'. Below it are fields for 'Region image', 'Image tag attributes', and 'Region HTML table cell attributes'. At the bottom of the page, there's a preview window titled 'Report Region' showing a list of first names: Alexia, Alberto, Alexander, Alyssa, Alexander, Allan, and Alana. The preview window has tabs at the top: 'Show All', 'Report Region' (which is selected), 'Tabular Form', and 'Calendar Region'. Arrows point from the text 'Click to view all regions.' to the 'Show All' tab and from 'Click to view the region.' to the 'Report Region' tab.

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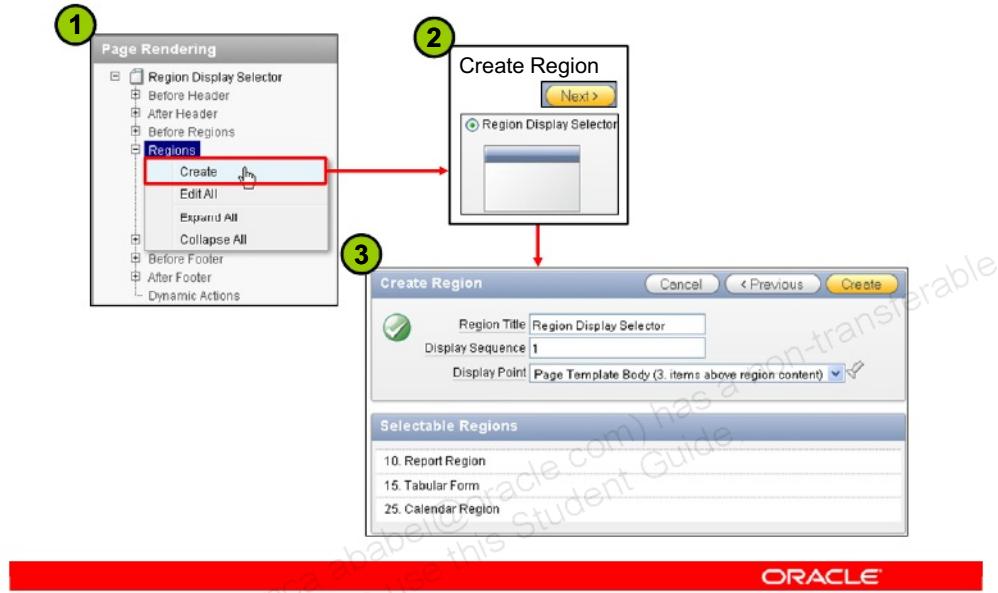
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To enable region display selection, select Yes for Region Display Selector on the Attributes tab. This attribute is used along with the Region Display Selector region.

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



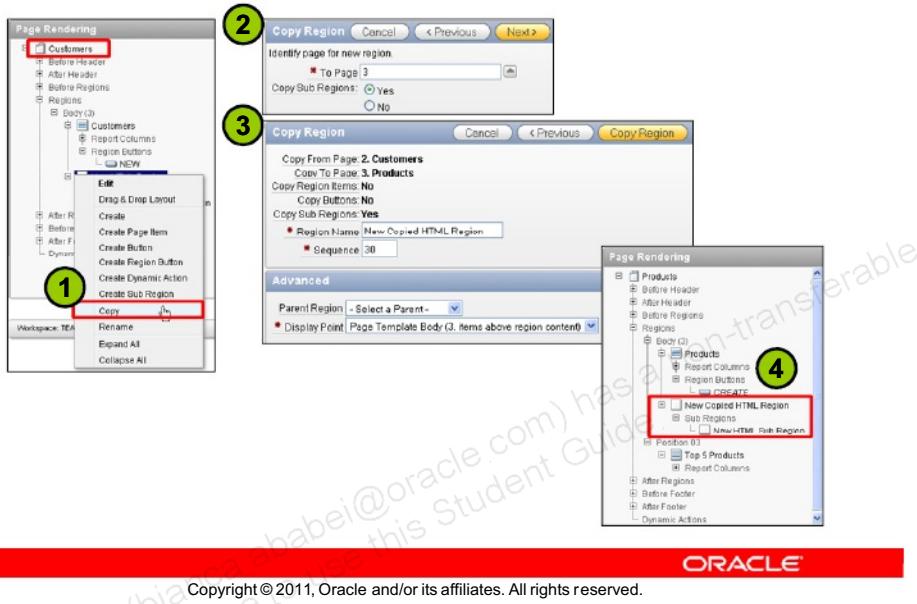
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To create a Region Display Selector on a page, navigate to the page's definition and perform the following steps:

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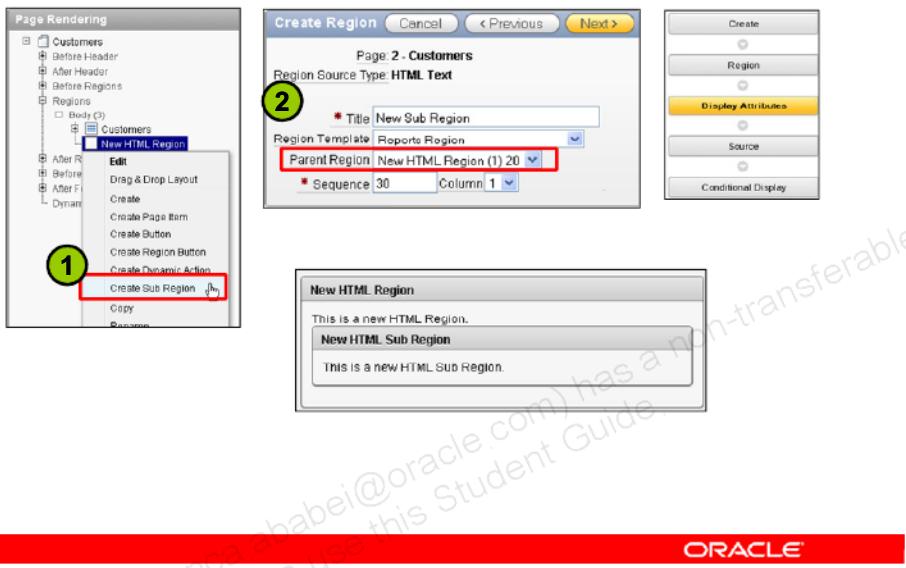
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You can copy regions from one page to another within an application. When copying, you can include the region items and buttons as well. To copy a region, perform the following steps:

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



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.

Lesson Agenda

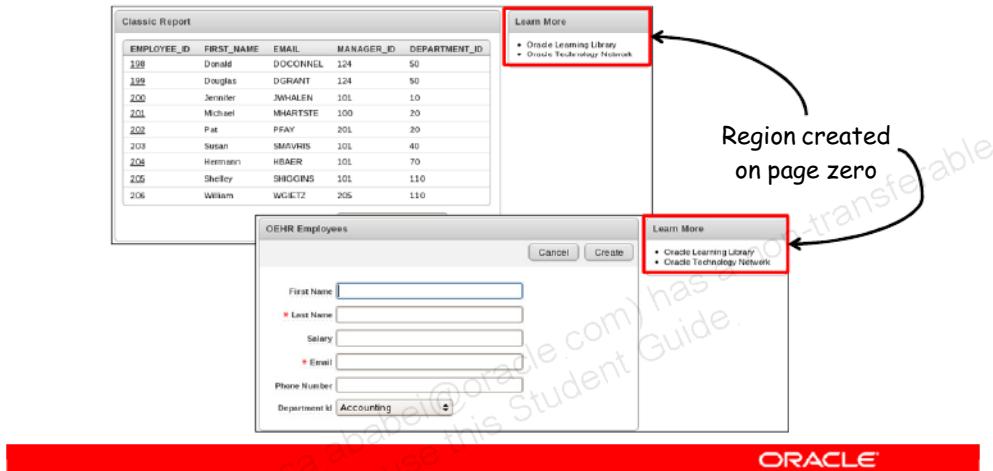
- Introducing Page Definition
- Working with Page Regions
- Working with Pages
 - What Is Page Zero?
 - Creating Page Zero
 - Creating a Page Group
 - Assigning Pages to a Page Group
 - Viewing a Page Group
 - Locking a Page
 - Copying a Page
 - Adding Comments

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Page Zero

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



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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

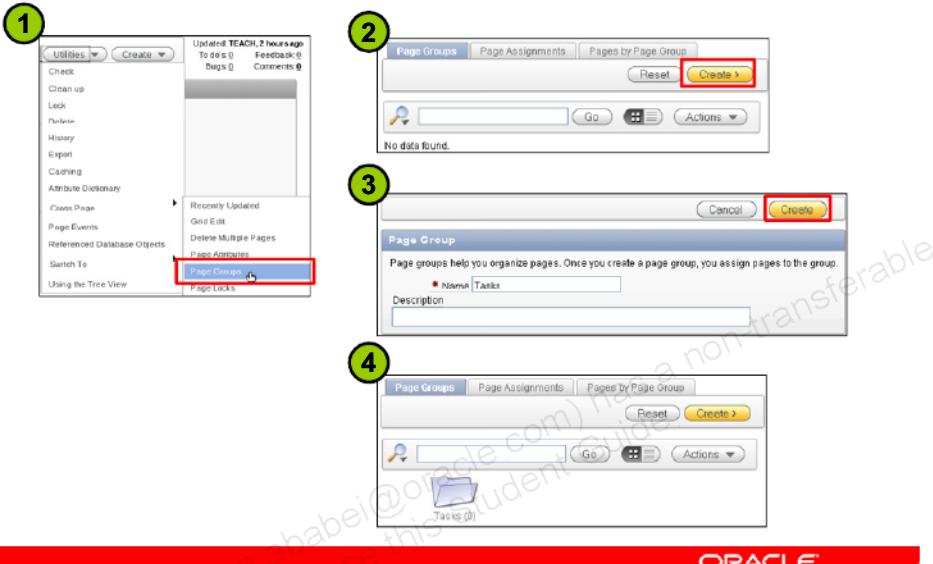


To create page zero, perform the following steps:

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.

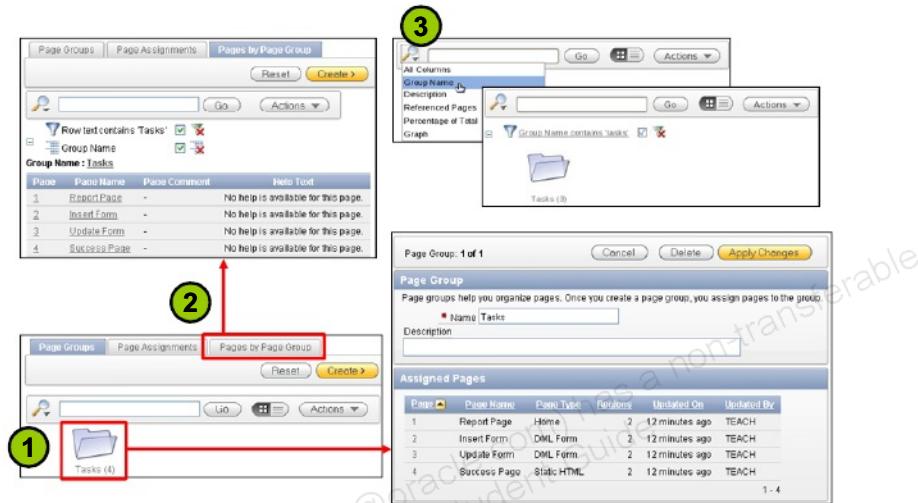
Page	Name	Group	Items	Regions	Developer	Updated
<input checked="" type="checkbox"/>	1 Report Page	Unassigned	0	2	TEACH	74 seconds ago
<input checked="" type="checkbox"/>	2 Insert Form	Unassigned	7	2	TEACH	74 seconds ago
<input checked="" type="checkbox"/>	3 Update Form	Unassigned	10	2	TEACH	74 seconds 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.



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



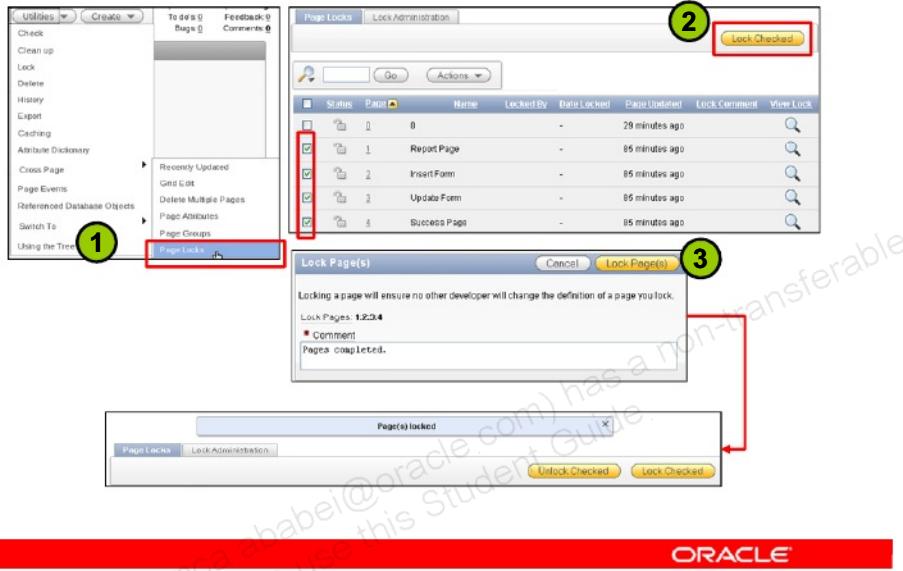
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After you have created page groups and assigned pages to them, you can view the page group by performing any one of the following steps:

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.

Locking a Page



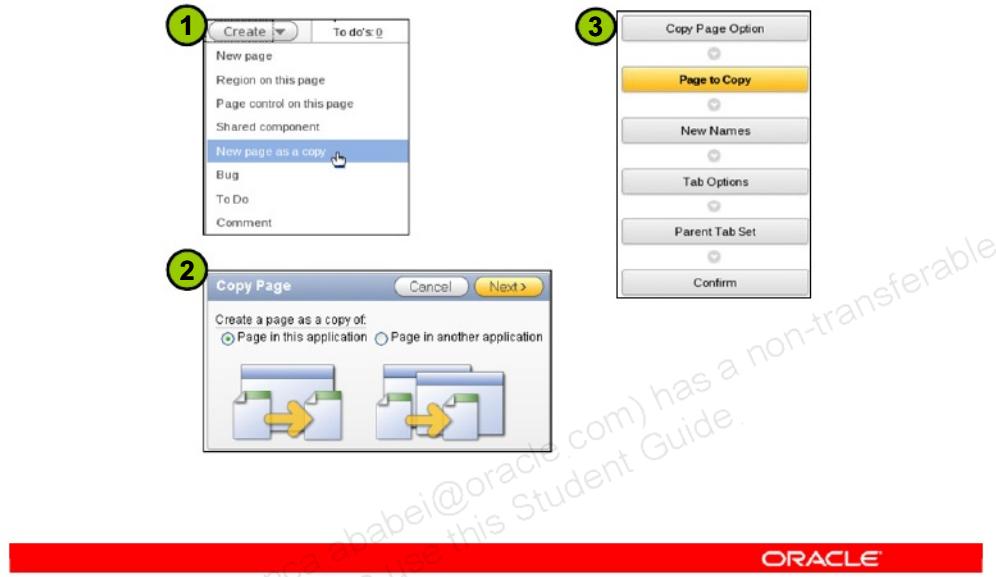
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You can prevent conflicts during application development by locking the pages in your application. By locking a page, you prevent other developers from editing it. To lock a page, perform the following steps:

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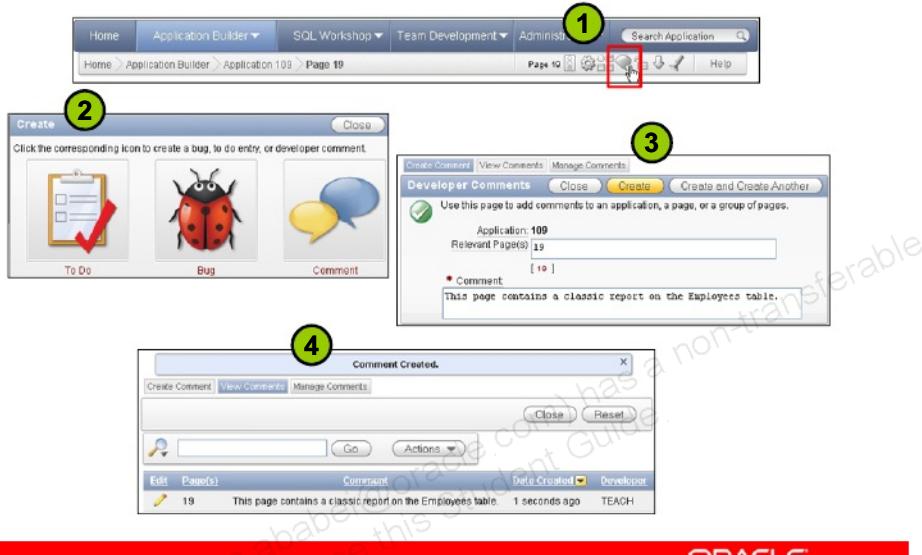
You can copy pages within an application or from another application. If you are copying a page from another application, that application must reside in the current workspace.

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.

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.

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Answer: a, c, d

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



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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

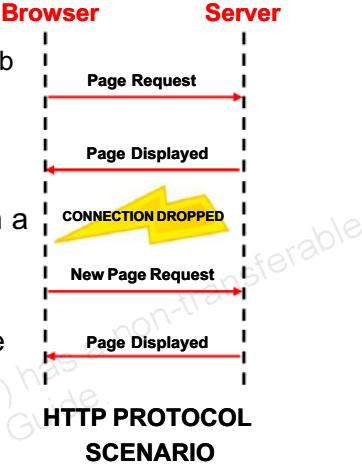
- Understanding Session State in Oracle Application Express
 - What Is Session State?
 - What Is a Session ID?
 - What Is Session Timeout?
 - How Does Oracle Application Express Implement Session State
 - Identifying the Parts of an Oracle Application Express URL
- Using Session State in Oracle Application 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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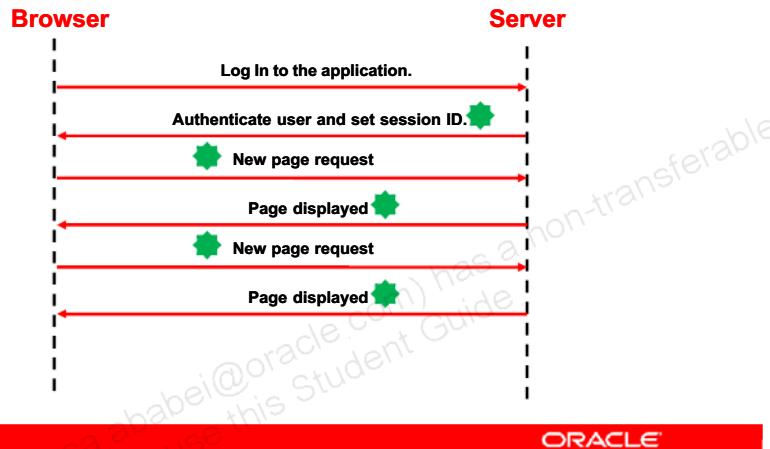
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To understand what a session state is, you must first understand what HTTP is and how it works. HTTP is the protocol that is used to transfer data across the web. HTTP is a stateless protocol. It means that each page request from a browser is treated 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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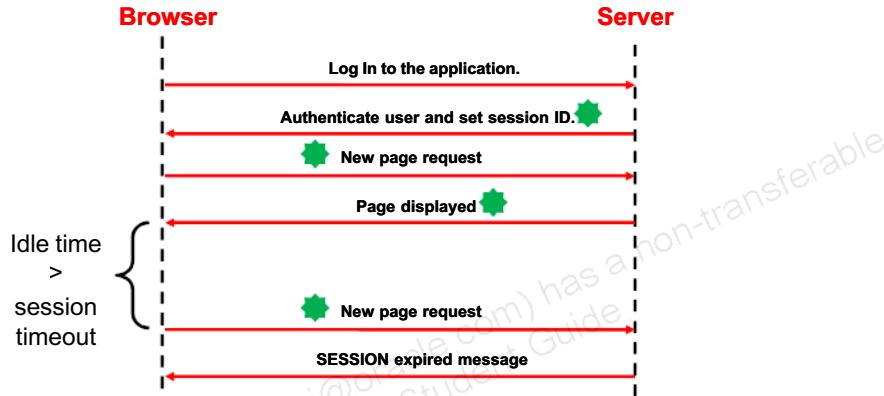
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To manage sessions and to store session state information, each session should be uniquely identifiable by the server and the browser. This is done by using session IDs. A session ID is a unique identifier for each session created in an application. 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.



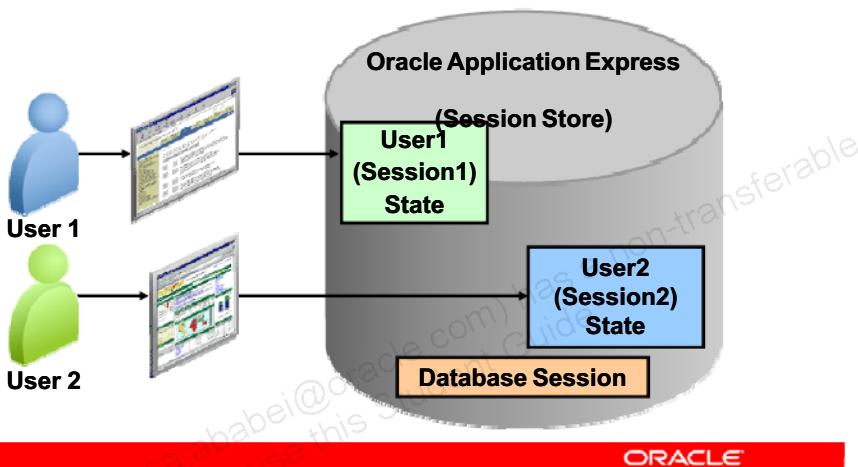
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Session timeout is the time period set for an application session, usually in minutes. If the user does not request a new page or refresh the current page within the time period, the server automatically terminates the session.

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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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

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Answer: c

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

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Viewing Session State

The screenshot shows two windows. The top window is titled 'Get Employee Details' and displays employee information: Manager (Nancy) and Employee (Daniel). The bottom window is the 'Session' page of the developer toolbar, which lists session state items. A red arrow points from the 'Session' button in the top window to the 'Session' tab in the bottom window. The session items table has three rows:

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		No	

Below the table, a note says '1 - 3'.

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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:

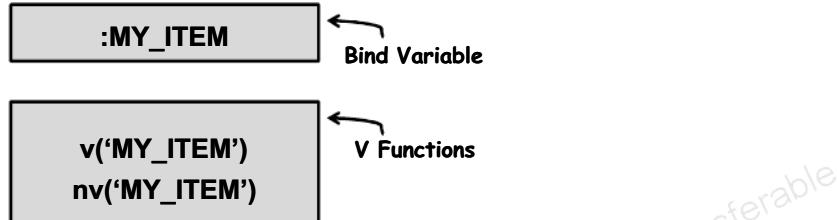
- Session ID, current user, workspace ID, and the browser language
- The attributes of the page, such as the item name, how the item is displayed, the state or session ID, and the status. The status column indicates the status of the session state. The values include I (Inserted), U (Updated), and R (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

Methods to Reference Session State

Referencing session state values in SQL and PL/SQL:



Referencing session state values in static text:

&MY_ITEM.

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In many a situation, 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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There are many scenarios where you can use bind variables to reference the session state value. For example, if you want to display a report and restrict the result based on some item values entered or selected by the user, you can use bind variables to reference the item's session state value in the WHERE clause of the SQL query. Similarly, if you want to display a list of values depending on user input, you can use a bind variable in the SQL query.

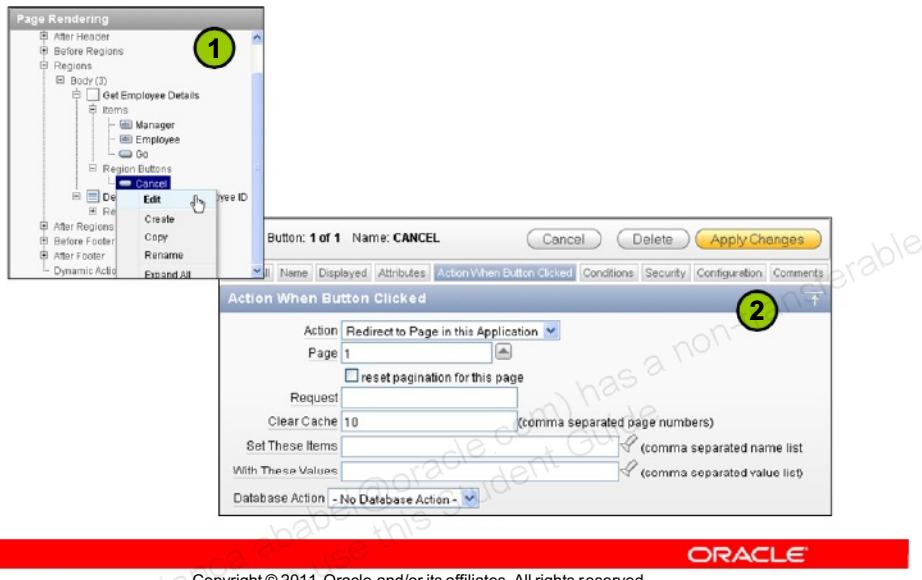
In Oracle Application Express, you can use bind variables to reference the session state in any place where you use SQL or PL/SQL. Other examples of where you can use bind variables are in computations and processes.

Referencing Session State in Static Text: Example

The screenshot shows two parts of the Oracle Application Express interface. The top part is a configuration dialog for a region named 'Details for &P10_EMPLOYEE. Employee ID'. It has tabs for 'Region Definition', 'Report Attributes', and 'Print Attributes'. Under 'Region Definition', there are tabs for 'Identification', 'User Interface', 'Sources', 'Attributes', 'Header and Footer', 'Conditions', 'Security', 'Configuration', 'Caching', 'Customization', and 'Comments'. The 'Identification' tab is selected. It shows 'Page: 10 Items and Buttons' and 'Title: Details for Employee &P10_EMPLOYEE.' with a checked 'exclude title from translation' option. The 'Type' dropdown is set to 'SQL Query'. The bottom part shows the resulting page titled 'Details for Employee 112'. The page contains a table with columns: EMPLOYEE_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, HIRE_DATE, SALARY, COMMISSION_PCT, MANAGER_ID, DEPARTMENT_ID, and JOB_ID_ID. A single row is displayed for employee 112: Jose Manuel Urman, jmurman, 515.124.4469, 07-MAR-98, 7800, -, 108, 100, 6. At the bottom right of the page is the ORACLE logo.

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.

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

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Answer: a

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.



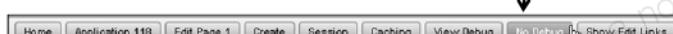
Set the Debug argument to YES.



<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 developer toolbar with several buttons: Home, Application 118, Edit Page 2, Create, Session, Caching, View Debug (highlighted with a red box), 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. The table contains three rows of data:

View Identifier	Session	User	Application	Page	Entries	Timestamp	Seconds
41	6564557079338783	DEMO	118	2	87	12 seconds ago	0.0911
	3505293171149726	DEMO	118	2	86	11 days ago	0.0284
	3505293171149720	DEMO	118	2	87	11 days ago	0.1064

A red arrow points from the "View Identifier" table to the "Debug" tab in the toolbar. Below the table is a detailed debug view for session ID 41. The view includes tabs for Items, Pages, Queries, Tables, PL/SQL, Images, Debug, Session, and Errors. The Debug tab is selected, showing the following information:

- Page ViewIdentifier 41
- Application 118
- Page: 2
- Elapsed Time: 0.09112
- Maximum Execution Time: 0.02287
- Session ID 6564557079338783 can be used.

The main area displays a timeline graph and a list of messages. One message is highlighted with a red box:

0.01282 0.02296 SHOW application='118' page='2' whi... request='6564557079338783' 3

0.03577 0.00108 Application 118, Authentication, CUSTOM2, Page Template 734803562826547 3

0.03603 0.00055 Session ID 6564557079338783 can be used. 3

0.03738 0.00060 Application session: 6564557079338783, user:DEMO 3

0.03768 0.00045 Determine if user 'TEASER' workspace '311070696609025' can develop application '118' in workspace '311070696609025'. 3

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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

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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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In this lesson, you learn how to include items and buttons on application pages. You also learn how to create a list of values (which is a shared component) and associate it with the supported item types.

Lesson Agenda

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

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Examples

The slide displays two examples of Oracle Application Express page items:

- Product Details**: A form for creating a new product. It includes:
 - A **Text Field** for "Product Name".
 - A **Select List** for "Category" with options "Mens" and "Womens".
 - A **Text Area** for "Product Description".
 - A **Text Field** for "List Price".
 - A **File Browser** for "Product Image" with a "Browse..." button.
- Identify Customer**: A pop-up window for identifying a customer. It includes:
 - A **Radio Group** for "Create Order for" with options "Existing customer" (selected) and "New customer".
 - A **Pop-up LOV** for "Customer" with a search input field.

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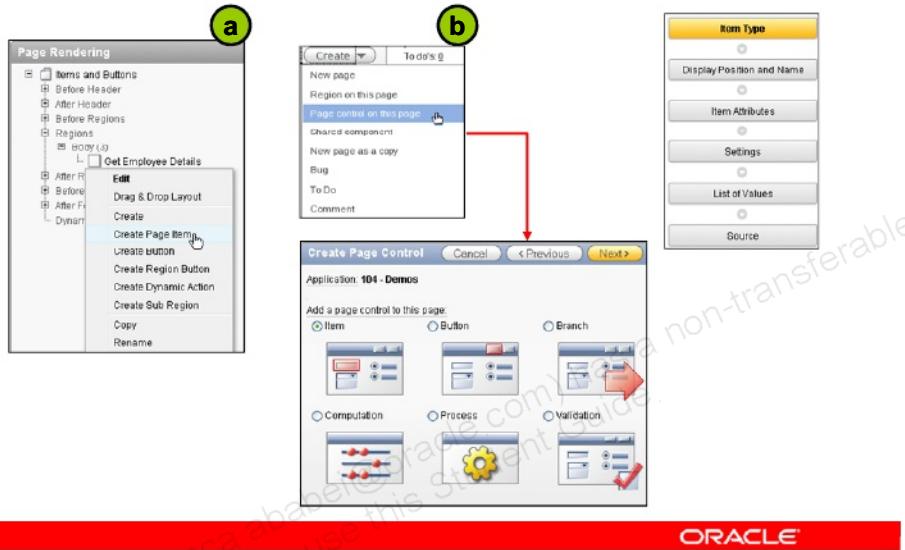
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Application items are not associated with a page and, therefore, have no user interface properties. An application item can be thought of as a global variable. You create an application item from the Application Items page. To access the Application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

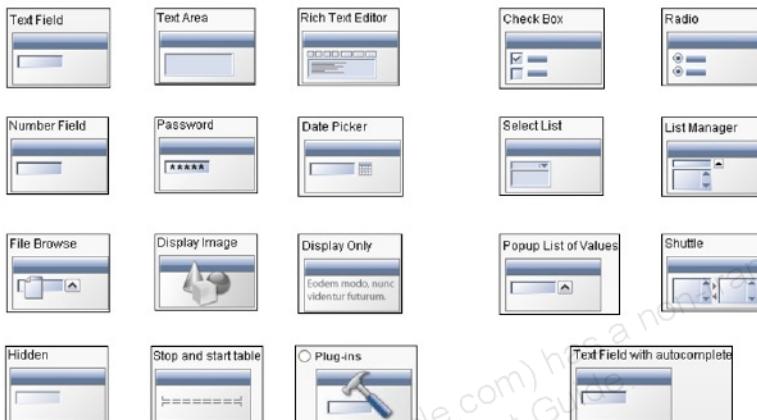


You can access the Create Page Item wizard in either of the following ways:

- 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 `www_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 image consists of four screenshots of the Oracle Application Express 'Create Item' wizard, labeled 1 through 4:

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

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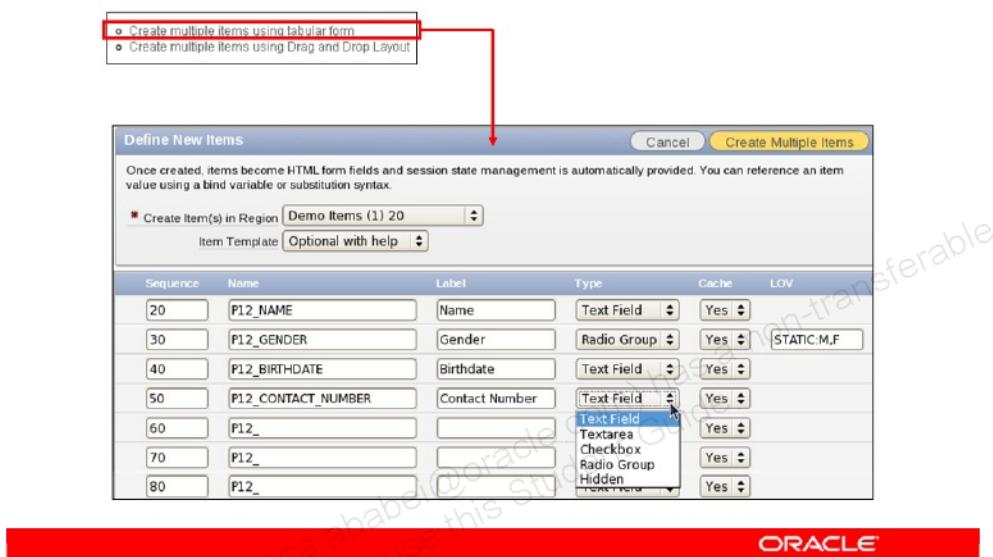
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To create a date picker item, select Date Picker in the Create Page Item wizard. Click Next and perform the following steps:

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

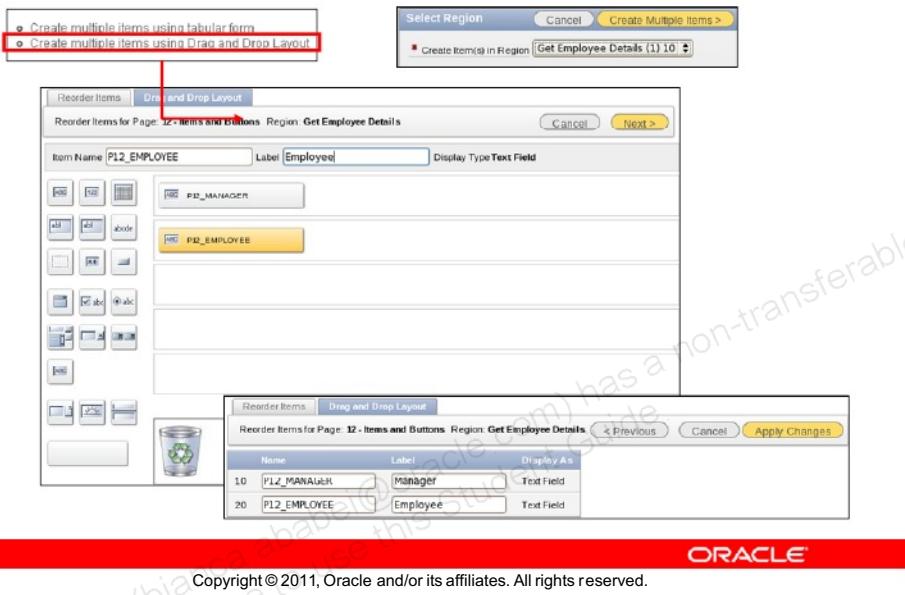


You can create multiple text field, text area, radio, check box, and hidden field items by using a tabular form. Perform the following steps:

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



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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:

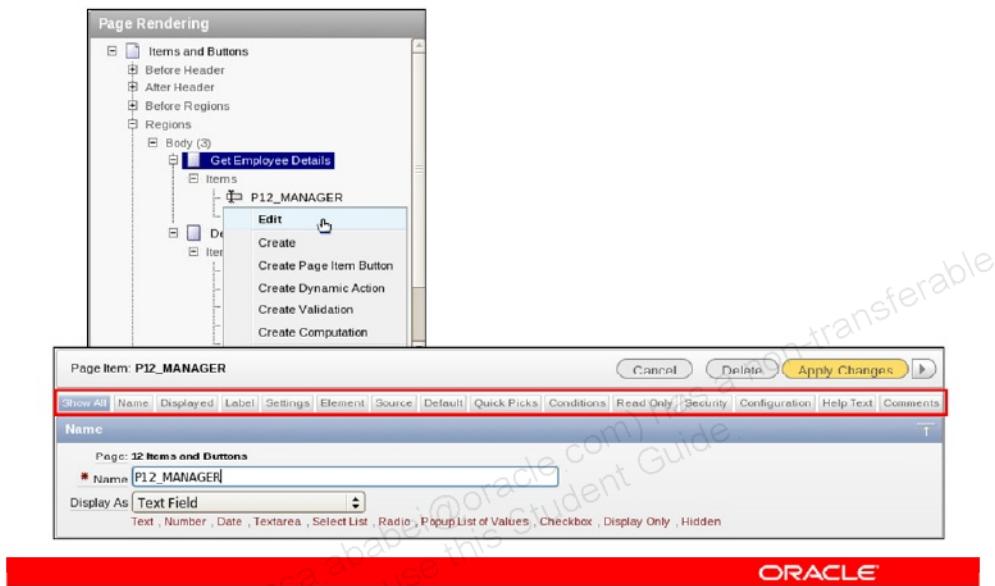
- The Item palette is used to add new items. Click an item type in the palette and drag it to the correct position in the Layout region.
- The Layout region is used to position the items. To move an item vertically, click and drag the Add Row button to insert an empty row. Then drag the item into the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



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

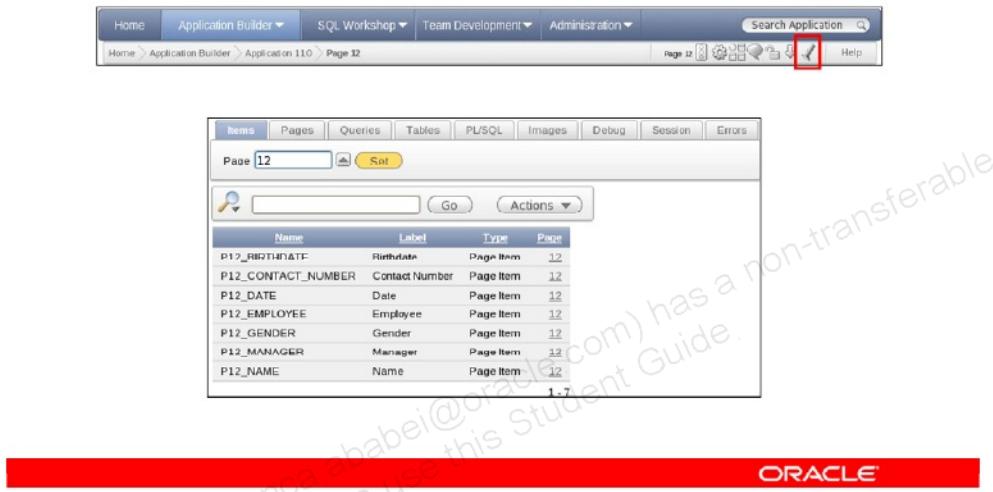
Creating Quick Picks

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 dialog 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 sub-dialog titled 'Quick Picks' is open, showing a list of 10 quick picks. The first three entries are: Label 1: Neena, Value 1: 101; Label 2: Lex, Value 2: 102; Label 3: Nancy, Value 3: 108. The other seven slots are empty. At the bottom of the configuration dialog is an 'Apply Changes' button. Below the configuration dialog is a red footer bar with the text 'Copyright © 2011, Oracle and/or its affiliates. All rights reserved.' and the 'ORACLE' logo.

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.

Finding Items by Using the Item Finder



The screenshot shows the Oracle Application Builder interface with the 'Item Finder' window open. The window has tabs at the top: 'Items', 'Pages', 'Queries', 'Tables', 'PL/SQL', 'Images', 'Debug', 'Session', and 'Errors'. The 'Items' tab is selected. Below the tabs, there is a search bar with the placeholder 'Page 12' and a magnifying glass icon, followed by a 'Go' button and an 'Actions' dropdown menu. The main area displays a table of page items:

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 right of the table, there is a page number indicator '1 - 7'. The background of the application shows a watermark: 'biansababej (bian.sababej@outlook.com) has a non-transferable license to use this Student Guide.'

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

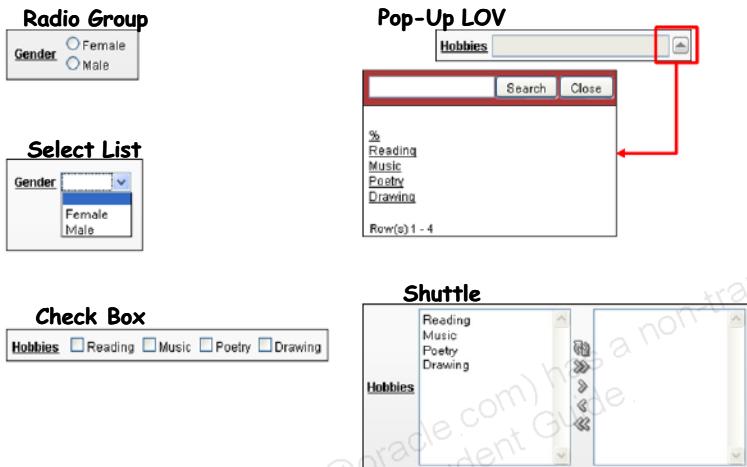
Lesson Agenda

- 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?



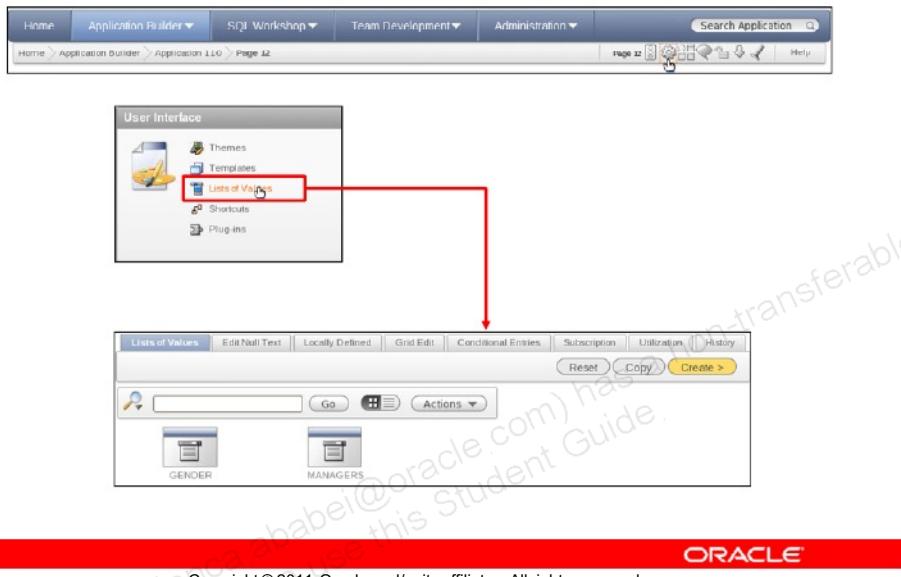
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A list of values (LOV) is used to display values for some specific type of page item, such as a radio group, check box, or select list. You can create an LOV while creating the item or create an LOV as a shared component, and then reference it in one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

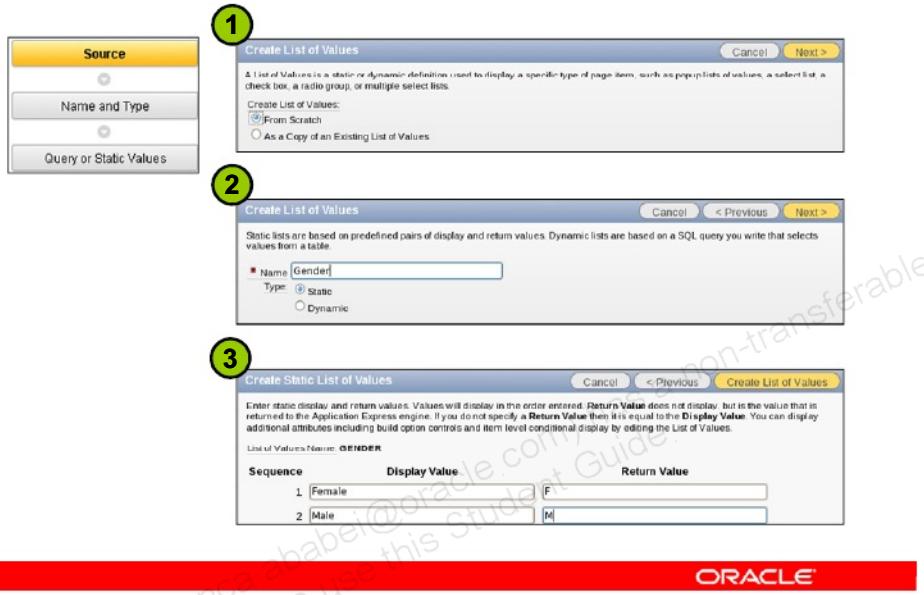
Accessing the “Lists of Values” Page



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.

Creating a Static LOV



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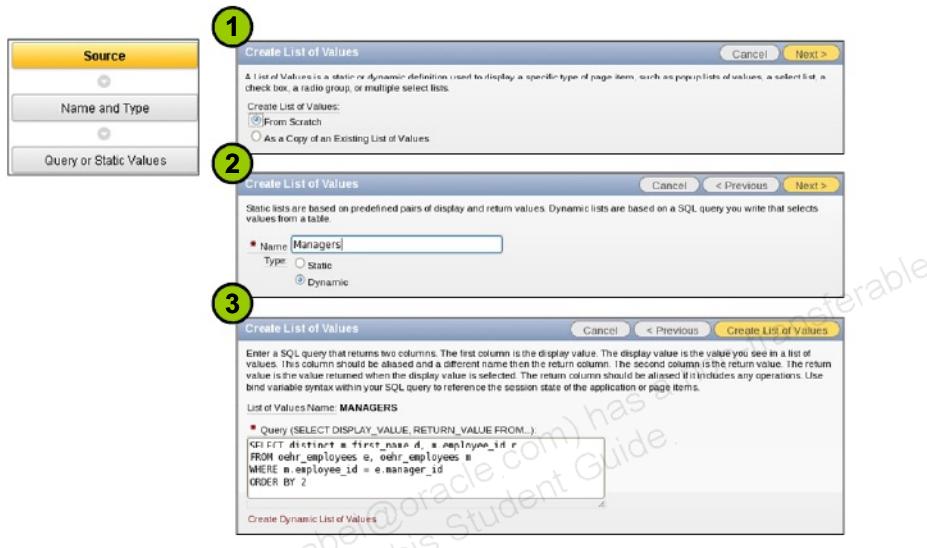
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A static LOV is based on a predefined list of display and return values. To create a static LOV, click the Create button on the "Lists of Values" page and perform the following steps:

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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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.

Creating a Select List Item

Identify List of Values

Use this page to define the list of values. Either construct a SQL statement with the number of columns required by the item type, or use the STATIC syntax. See the List Of Values Examples section for examples.

Application/Page: 11012
Item Name: P12_EMPLOYEE
Display As: Select List
Named LOV:
Display Null Value: Yes
Null Display Value:
Null Return Value:
Cascading LOV Parent Item(s):
List of Values Query:

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

Create or edit static List of Values [Create Static LOV](#)
Create Dynamic List of Values [Create Dynamic LOV](#)

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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.

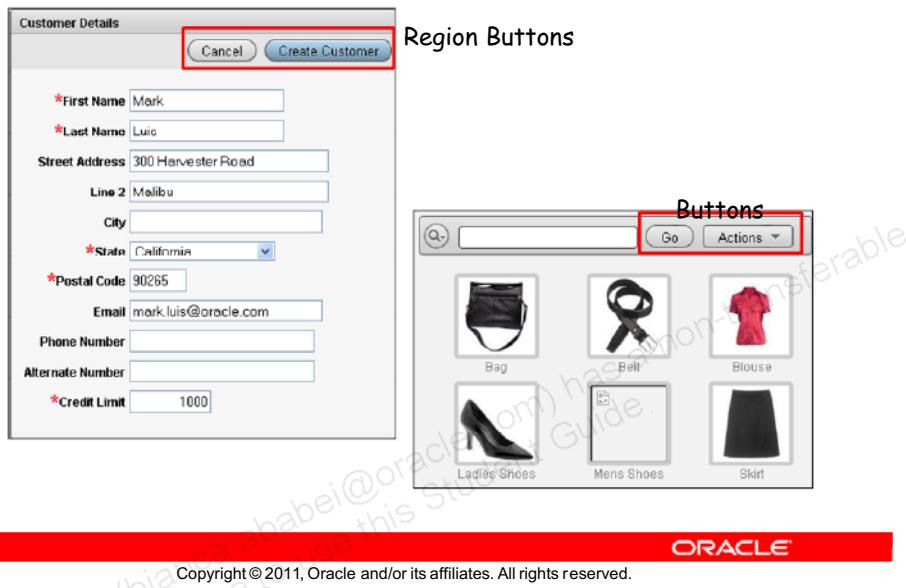
Lesson Agenda

- 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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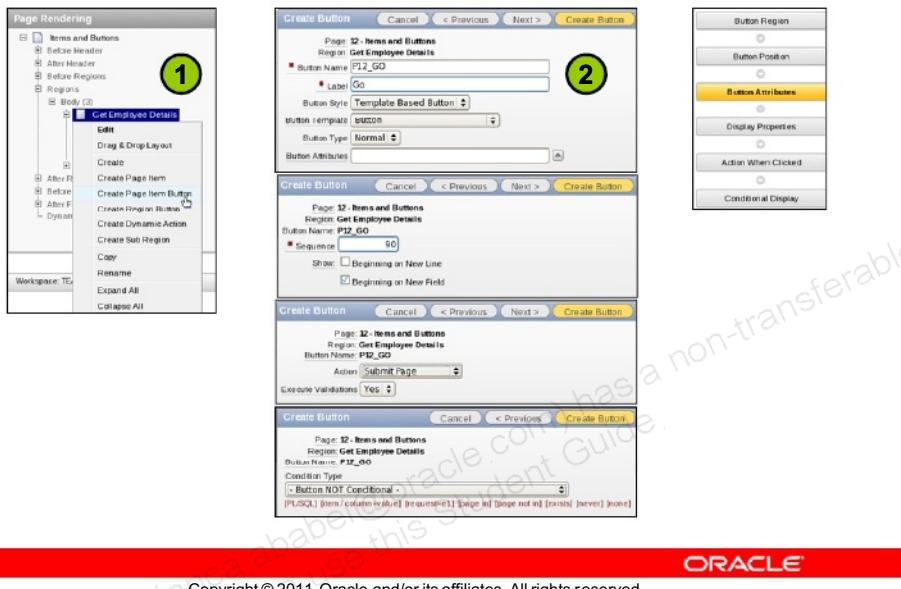
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A button is an interface element that is used to either submit a page or navigate to another page or URL. You can create a button that is placed next to other page items. You can also create region buttons that are placed in predefined region templates.

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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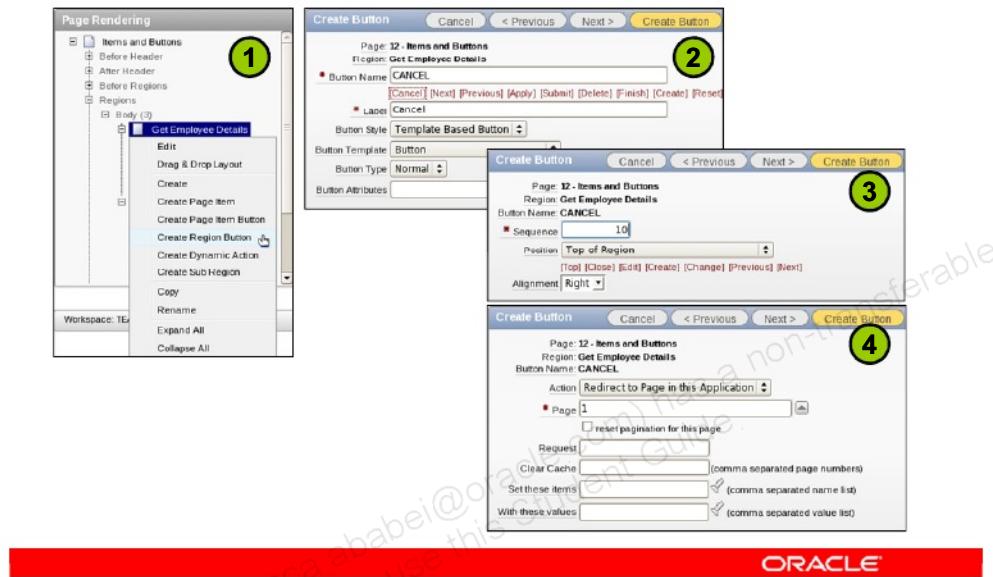
To create a new button, navigate to the Page Definition and perform the following steps:

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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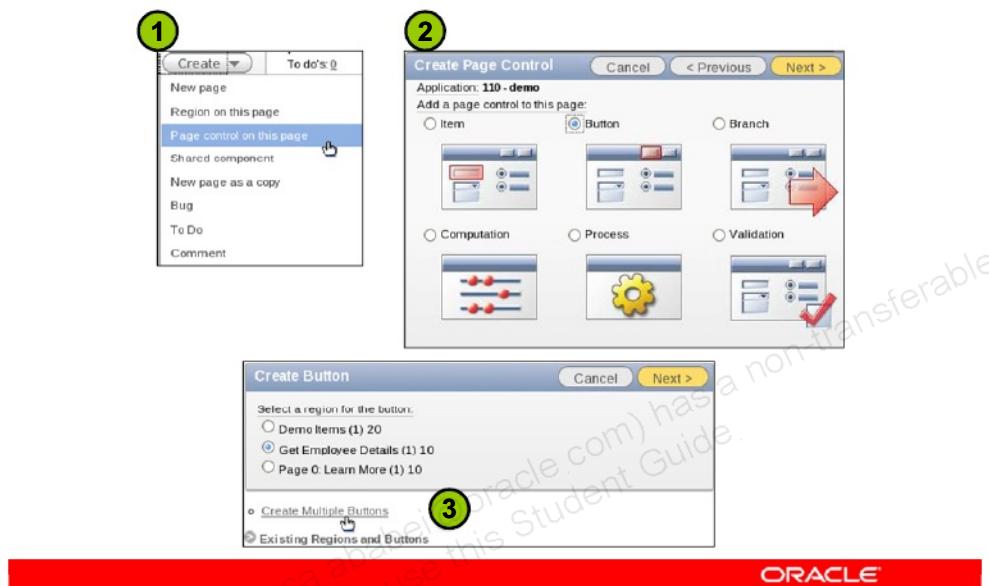
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To create a region button, navigate to the Page Definition and perform the following steps:

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

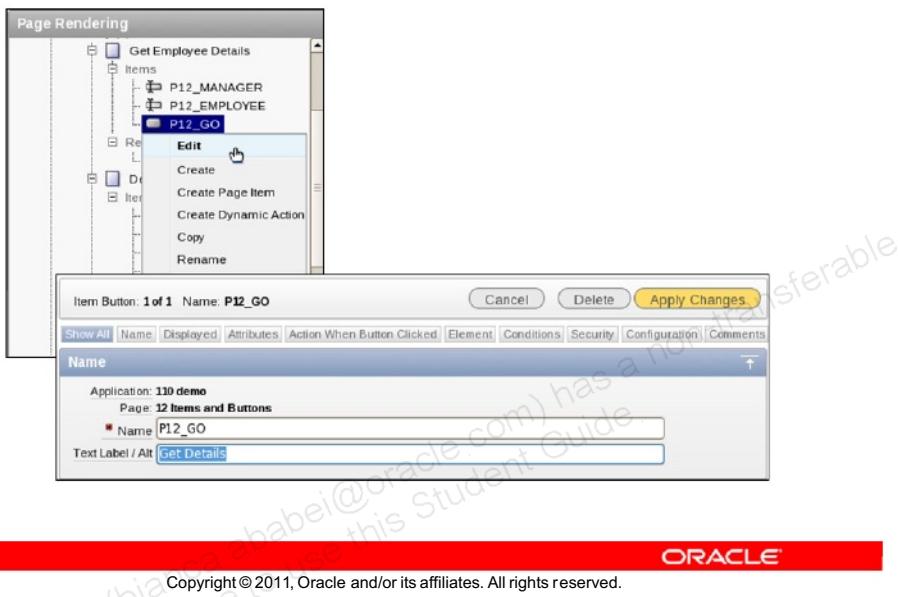
Sequence	Name	Label	Position	Attributes
10	CANCEL	Cancel	Region Template Position #CLOSE#	
20	PREVIOUS	< Previous	Region Template Position #PREVIOUS#	
30	NEXT	Next >	Region Template Position #NEXT#	
40	SUBMIT	Submit	Region Template Position #CREATE#	
50			Bottom of Region	
60			Bottom of Region	
70			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.

Editing Button Attributes



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

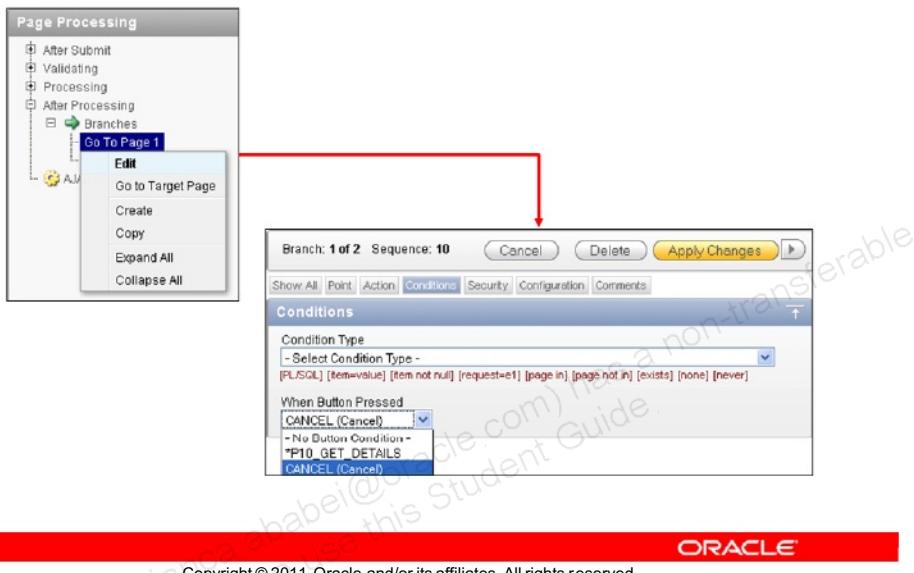


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To edit a region button, navigate to the Page Definition and perform the following steps:

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.

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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