

Oracle® Database

2 Day + Application Express Developer's Guide

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Preface

Oracle 2 Day + Application Express Developer's Guide introduces you to application development using Oracle Application Express. This guide shows you how to set up development environment or access a hosted demonstration environment to use with this guide. It then walks you through building an initial application, modifying it, and previewing it.

Through a series of exercises, you become familiar with the Oracle Application Express user interface, basic product functionality, and some underlying concepts that enable you to develop professional, fast, and secure applications.

This preface contains these topics:

- [Topic Overview](#)
- [Audience](#)
- [Documentation Accessibility](#)
- [Related Documents](#)
- [Conventions](#)

Topic Overview

This document contains the following sections:

Title	Description
Introducing Oracle Application Express	Describes Oracle Application Express, its architecture and the environment for using the product. It also introduces you to some concepts and terms used in this guide.
Accessing Your Development Environment	Leads you through the steps to access a development environment for your use.
Getting Started with Oracle Application Express	Introduces you to areas of the user interface. It also leads you through installing the sample objects to use with this guide.
Building Your Application	Leads you through the steps for building an application, modifying it, and previewing it at different points during the development process.
About Deploying Your Application	Describes some basic information about deploying your application. It also leads you through the steps to create end users and to determine the URL of your application.

Title	Description
About Globalization	Describes some basic information about globalization. It also leads you through the steps to specify how the application determines global identification.
Next Steps	Describes additional resources to expand your knowledge of Oracle Application Express and boost your productivity.

Audience

Oracle 2 Day + Application Express Developer's Guide is intended for:

- *Workspace administrators* who want to set up the Oracle Application Express development environment
- *Application developers* who want to learn how to build database-centric Web applications using Oracle Application Express

To use this guide, you must have a general understanding of relational database concepts and the operating system environment under which Oracle Application Express is running.

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Screen readers may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, some screen readers may not always read a line of text that consists solely of a bracket or brace.

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TTY Access to Oracle Support Services

To reach AT&T Customer Assistants, dial 711 or 1.800.855.2880. An AT&T Customer Assistant will relay information between the customer and Oracle Support Services at 1.800.223.1711. Complete instructions for using the AT&T relay services are available at <http://www.consumer.att.com/relay/tty/standard2.html>. After the AT&T Customer Assistant contacts Oracle Support Services, an Oracle Support Services engineer will handle technical issues and provide customer support according to the Oracle service request process.

Related Documents

For more information, see these Oracle resources:

- *Oracle Application Express Installation Guide*
- *Oracle Application Express Release Notes*
- *Oracle Application Express Application Builder User's Guide*
- *Oracle Application Express Advanced Tutorials*
- *Oracle Application Express SQL Workshop and Utilities Guide*
- *Oracle Application Express API Reference*
- *Oracle Application Express Migration Guide*
- *Oracle Application Express Administration Guide*
- *Oracle Database Concepts*
- *Oracle Database Advanced Application Developer's Guide*
- *Oracle Database Administrator's Guide*
- *Oracle Database SQL Language Reference*
- *SQL*Plus User's Guide and Reference*

For additional documentation available on Oracle's Technology Network, visit the Oracle Application Express Web site located at

http://www.oracle.com/technology/products/database/application_express/

For additional application examples, visit the Oracle by Examples (OBEs) Application Express page, located on Oracle's Technology Network. The OBEs provide step-by-step examples on how to perform various tasks within Application Express.

http://www.oracle.com/technology/products/database/application_express/html/obes.html

For information about Oracle error messages, see *Oracle Database Error Messages*. Oracle error message documentation is available only in HTML. If you have access to the Oracle Database Documentation Library, you can browse the error messages by range. Once you find the specific range, use your browser's "Find in Page" feature to locate the specific message. When connected to the Internet, you can search for a specific error message using the error message search feature of the Oracle online documentation.

Many books in the documentation set use the sample schemas of the seed database, which is installed by default when you install Oracle. See *Oracle Database Sample Schemas* for information about how these schemas were created, and how you can use them yourself.

Printed documentation is available for sale in the Oracle Store at

<http://oraclestore.oracle.com/>

To download free release notes, installation documentation, white papers, or other collateral, visit the Oracle Technology Network (OTN). You must register online before using OTN; registration is free and can be done at

<http://www.oracle.com/technology/membership/>

If you have a user name and password for OTN, then you can go directly to the documentation section of the OTN Web site at

<http://www.oracle.com/technology/documentation/>

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Introducing Oracle Application Express

This section describes Oracle Application Express, its architecture, and the environment for using the product. It also introduces you to concepts and terms used in this guide when discussing Oracle Application Express.

This section contains the following topics:

- [About Oracle Application Express](#)
- [Understanding Oracle Application Express Architecture](#)
- [About the Oracle Application Express Environment](#)
- [About Oracle Application Express User Roles](#)
- [Overview of the Application You Build](#)

About Oracle Application Express

Oracle Application Express is a rapid Web application development tool for the Oracle database. Using only a Web browser and limited programming experience, you can develop professional applications that are both fast and secure. Thanks to built-in features such as user interface themes, navigational controls, form handlers, and flexible reports, Oracle Application Express accelerates the application development process.

From the end user's perspective, the deployed applications require only a browser and access to an Oracle database running Application Express.

Note: This guide describes only a subset of Application Express functionality. For a complete list of features, see "What is Application Express?" in *Oracle Application Express Application Builder User's Guide*.

Understanding Oracle Application Express Architecture

Oracle Application Express installs with your Oracle database and is comprised of data in tables and PL/SQL code.

Whether you run the Oracle Application Express development environment or an application you built using Oracle Application Express, the process is the same. Your browser sends a URL request that is translated into the appropriate Oracle Application Express PL/SQL call. After the database processes the PL/SQL, the results are relayed back to your browser as HTML. This cycle happens each time you request or submit a page.

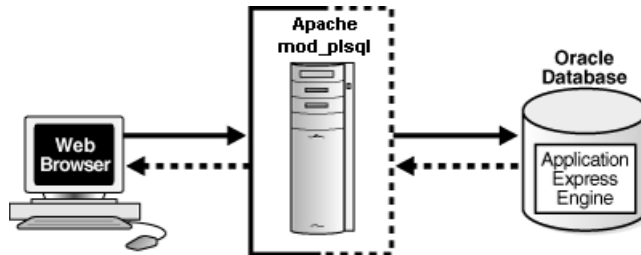
The application session state is managed in the database tables within Oracle Application Express. It does not use a dedicated database connection. Instead, each

request is made through a separate database session, consuming minimal CPU resources.

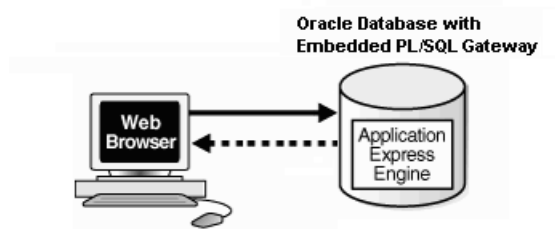
About Oracle HTTP Server (Apache) and the Embedded PL/SQL Gateway

The version of Oracle Database you use determines how the URL is translated:

- Versions before Oracle Database 11.1 require Oracle HTTP Server (Apache) with `mod_plsql`. The following illustration shows that architecture.



- With Oracle Database 11.1 or later or Oracle Database 10g Express Edition, you can remove Oracle HTTP Server (Apache) from the architecture and replace it with the embedded PL/SQL gateway. The following illustration shows the architecture using the embedded PL/SQL gateway.



The embedded PL/SQL gateway provides Oracle Database with a Web server and also the necessary infrastructure to create dynamic applications. The embedded PL/SQL gateway runs in the XML DB HTTP server in the Oracle database and includes the core features of `mod_plsql`, but does not require the Oracle HTTP Server powered by Apache. Inclusion of the embedded PL/SQL gateway simplifies the architecture and eliminates the middle tier.

About the Application Express Engine

The Application Express engine renders and processes pages. It also performs these tasks:

- Session state management
- Authentication services
- Authorization services
- Page flow control
- Validations processing

About the Oracle Application Express Environment

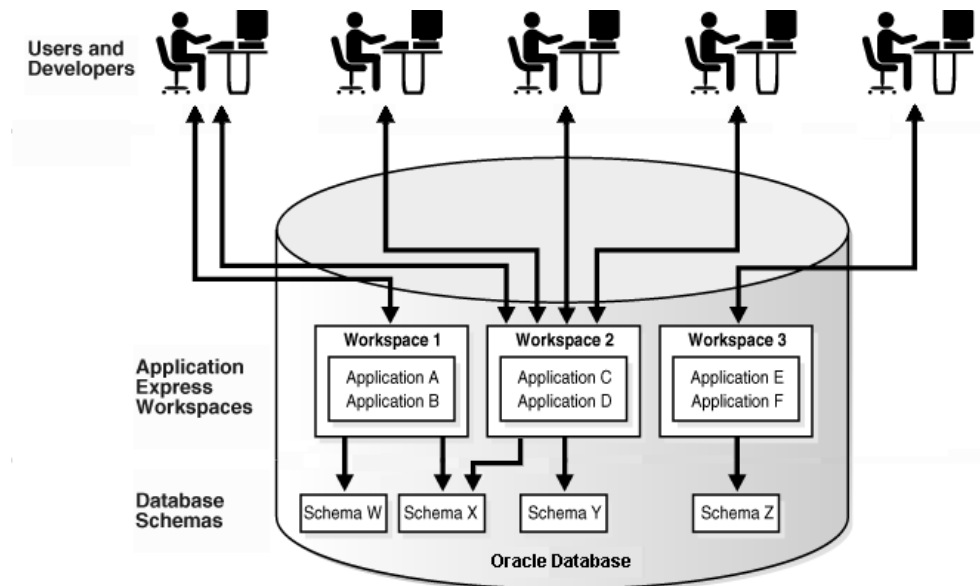
Oracle Application Express enables a single Oracle database to become a shared workgroup database service. Multiple users can access it using a Web browser without installing additional software.

About Workspaces

The area where you develop applications is called a workspace. A **workspace** is a virtual private database that enables multiple users to work within the same Oracle Application Express installation while keeping their objects, data, and applications private.

In a typical development environment, you might create a single workspace for all your developers to share. However, you can also create dedicated workspaces for specific developers or projects. Creating a dedicated workspace limits access to the workspace objects to only those users associated with the workspace.

The following illustration shows the relationship among users and developers, workspaces, and database schemas.



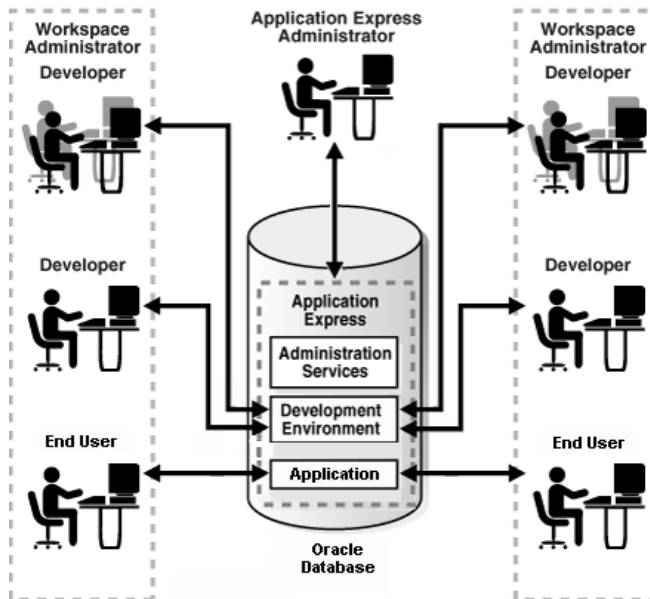
When you create a workspace, you associate it with a new or existing schema. A **schema** is a logical container for database objects such as tables, views, and stored procedures. A single schema can be associated with one or more workspaces.

About Oracle Application Express User Roles

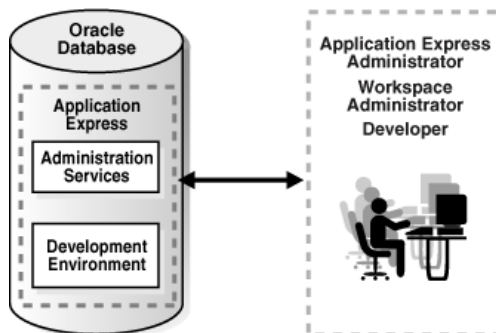
When setting up Application Express users at a large organization, you assign roles and privileges to specific users. The roles within Oracle Application Express include the following:

- **Workspace administrators** are users who perform administrator tasks specific to a workspace such as managing user accounts, monitoring workspace activity, and viewing log files. For this guide, you are acting as the workspace administrator when setting up the development environment.
- **Developers** are users who create and edit applications. Developers can have their own workspace or share a workspace.
- **End users** have no development privileges. You define end users so that they can access applications that do not use an external authentication scheme.
- **Oracle Application Express administrators** are superusers that manage an entire hosted instance using the Application Express Administration Services application.

The following illustration shows multiple users with various roles accessing the Oracle Application Express development environment, Application Express Administration Services, and the published applications.



For this guide, you must have the privileges usually associated with three roles: Application Express Administrator, Workspace Administrator, and Developer. The following illustration shows an Oracle Application Express instance with a single user.



Overview of the Application You Build

In "[Building Your Application](#)" on page 4-1, you create a simple Human Resources (HR) application for a fictitious company called *AnyCo Corp*. The application manages departmental and employee information stored in the department and employees tables that you create. The tutorial shows you how to build the application, modify it, and then preview it.

Accessing Your Development Environment

This section guides you through the steps to access an Oracle Application Express development environment for your use. Then, you and other developers can begin building applications within Oracle Application Express.

This section contains the following topics:

- [Before You Begin](#)
- [Accessing the Hosted Demo Environment](#)
- [Setting Up Your Own Local Environment](#)
- [Creating Additional User Accounts](#)

Before You Begin

Before you begin this section, do the following:

- Determine which environment you want to use:
 - Oracle provides a hosted demonstration (demo) environment where you can try out Oracle Application Express.

Using the demo environment is the fastest way to access a development environment. You request a workspace from an Oracle Application Express Web site and provide some basic user information. Shortly after you submit your request, you receive your login credentials in an email. This option does not require installing any software.

For instructions on getting started with the demo environment, see "[Accessing the Hosted Demo Environment](#)" on page 2-2.

Note: Do not use the hosted demonstration environment for your production work.

- Set up your own local instance of Oracle Application Express. To do that, you install the product and then follow the steps in "[Setting Up Your Own Local Environment](#)" on page 2-3.

For instructions on installing Oracle Application Express, review the installation guide for your operating environment. See "[Related Documents](#)" on page -ix.

- Read "[Introducing Oracle Application Express](#)" on page 1-1.

- To view or develop Oracle Application Express applications, use a Web browser that supports JavaScript and the HTML 4.0 and Cascading Style Sheet (CSS) 1.0 standards. The following browsers meet this requirement:
 - Microsoft Internet Explorer 6.0 or later
 - Firefox 1.0 or later
- Enable cookies for your Web browser.

Accessing the Hosted Demo Environment

To try out Oracle Application Express without installing the product locally, go to the hosted demo environment and sign up for a workspace.

To access the hosted demo environment:

1. In a Web browser, go to:

<http://apex.oracle.com>

2. Under the Login button, click **Sign up for an account**.

The Registration Wizard appears. Note the steps included in the wizard appear in a flowchart on the left side of the page. The highlighted block indicates the step you are performing.

3. On the Welcome page, review the information and click **Next**.

4. For Identify Administrator, enter valid information and click **Next**.

The system generates an email with your login credentials and sends it to the email address you enter.

5. For Workspace, enter a name for your workspace.

Workspace names must be unique. Requesting a duplicate name might delay your request. In general, enter a name that is significant to you. For example, enter your own name, your company name, or the name of the project or department to which your applications pertain.

To use the same name for your workspace and your schema (defined in the next step) use alphabetic characters when naming your workspace. Schema names are restricted to alphabetic characters.

6. For New or Existing Schema, select **Request a new schema** and click **Next**.

7. For Database Schema, do the following:

- a. New schema to create - Enter a name containing only alphabetic characters.
- b. Initial Space Allocation - Select at least 10 MB to accommodate the space needed for creating the objects required for this guide.
- c. Click **Next**.

8. For Service Description, enter the requested information and click **Next**.

9. For Confirmation:

- a. Enter the displayed numeric and alphabetic characters in the Verification Code field. Be sure to use the correct capitalization because the verification code is case-sensitive.



- b. Review the information and click **Submit Request**.

An initial email containing a link is sent to you. Click the link to complete the workspace provisioning process. This step verifies that your email address is valid before approving a workspace. After that, an email with your login credentials is sent to you. Use those credentials to log in to the hosted demo environment and begin using Oracle Application Express.

Logging In to the Hosted Demo Environment

Using the login credentials you received in an email, log in to your dedicated workspace on the hosted demo environment.

To log in to the hosted demo environment:

1. In a Web browser, go to:
<http://apex.oracle.com>
2. On the Login page, enter your login credentials.
3. Click **Login**.

The Workspace home page appears. You might be prompted to change your password. If not, you can change it manually by clicking the **Change Password** link on the right side of the Workspace home page. Then, enter in the information requested on the page that appears.

To continue with the tutorials, skip the rest of this section and go to "[Getting Started with Oracle Application Express](#)" on page 3-1.

Setting Up Your Own Local Environment

Instead of using the hosted demo environment, you can install Oracle Application Express locally. If you do a local installation, you must set up your development environment. The general steps you must perform include:

1. Log in to Application Express Administration Services, as described in "[Logging In to Administration Services](#)" on page 2-4.
2. Create a workspace, as described in "[Creating a Workspace](#)" on page 2-5.
3. (Optional) Create additional users with developer or administrator privileges, as described in "[Creating Additional User Accounts](#)" on page 2-8.

Note: This tutorial explains a simplified method for setting up your development environment so that you can begin using Oracle Application Express. However, when you want to set up your development environment to accommodate your real-life development needs, review "Oracle Application Express Hosted Instance Administration" in *Oracle Application Express Administration Guide*.

Logging In to Administration Services

To set up your local development environment, you first must log in to Oracle Application Express Administration Services. This is a separate application for managing an entire Oracle Application Express instance.

To log in to the Oracle Application Express Administration Services:

1. In a Web browser, go to the Oracle Application Express Administration Services application. Depending on which setup you are using, Oracle Application Express is installed to one of these locations:

- If your setup uses the embedded PL/SQL gateway, go to:

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

Where:

- `hostname` is the name of the system where Oracle XML DB HTTP Server is installed.
- `port` is the port number assigned to Oracle XML DB HTTP Server. In a default installation, this number is 8080.
- `apex` is the database access descriptor (DAD) defined in the configuration file.

For users who have upgraded from earlier versions, or who have a custom configuration, this value may be `htmldb` or something else. Verify your DAD with your Oracle Application Express administrator.

See Also: "Verifying the Oracle XML DB HTTP Server Port" in *Oracle Application Express Application Builder User's Guide*

- If your setup uses the Oracle HTTP Server (Apache) with `mod_plsql`, go to:

`http://hostname:port/pls/apex/apex_admin`

Where:

- `hostname` is the name of the system where Oracle HTTP Server is installed.
- `port` is the port number assigned to Oracle HTTP Server. In a default installation, this number is 7777. You can find information about your Oracle HTTP Server installation's port number from either of the following files:

`ORACLE_BASE\ORACLE_HOME\install\portlist.ini`

`ORACLE_BASE\ORACLE_HTTPSERVER_HOME\Apache\Apache\conf\httpd.conf`

Be aware that if you change a port number, it is not updated in the `portlist.ini` file. You can only rely on this file immediately after installation.

- `pls` is the indicator to use the `mod_plsql` cartridge.
- `apex` is the database access descriptor (DAD) defined in the `mod_plsql` configuration file.

For users who have upgraded from earlier versions, or who have a custom configuration, this value may be `htmldb` or something else. Verify the DAD with your Oracle Application Express administrator.

See Also: "Managing Oracle Database Port Numbers" in *Oracle Application Express Installation Guide* and `ORACLE_BASE\ORACLE_HTTPSERVER_HOME\Apache\modplsql\conf\dads.readme` for more information on database access descriptors

The Login page appears.

2. In Username, enter the username you specified when you installed Oracle Application Express.
3. In Password, enter the Oracle Application Express administrator account password you specified when you installed Oracle Application Express.
4. Click **Login**.

Oracle Application Express Administration Services appears.

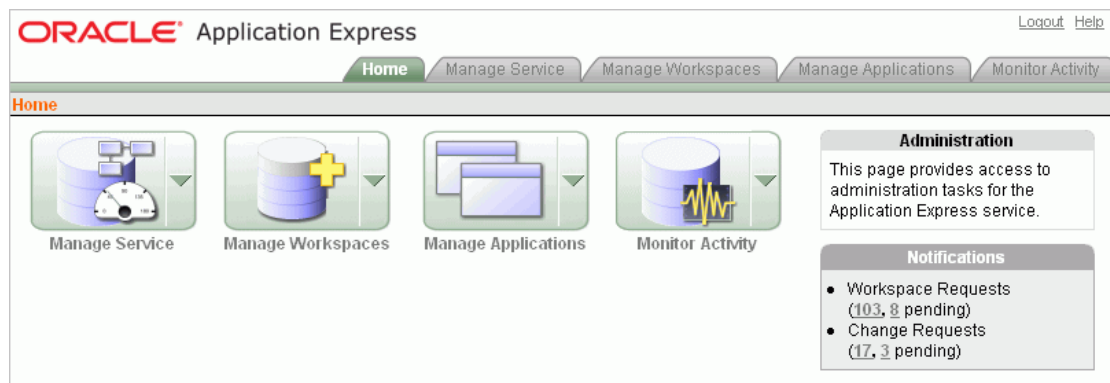
Creating a Workspace

From Administration Services, create a workspace. A **workspace** is a shared work area within the Oracle Application Express development environment that has a unique ID and name. All users in the workspace can access all its applications and scripts. For more information about workspaces, see "[About Workspaces](#)" on page 1-3.

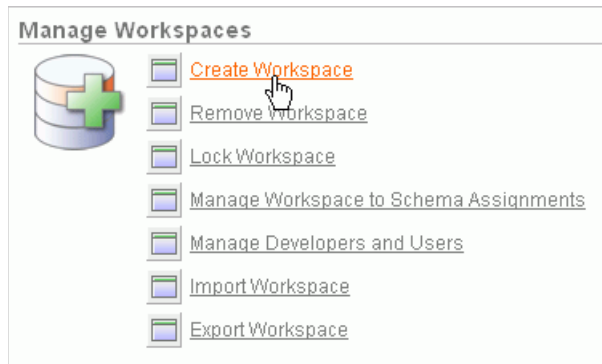
To create a workspace:

1. Log in to Oracle Application Express Administration Services.

The Home page appears for Administration Services.



2. Click **Manage Workspaces**.
3. Under Manage Workspaces, click **Create Workspace**.



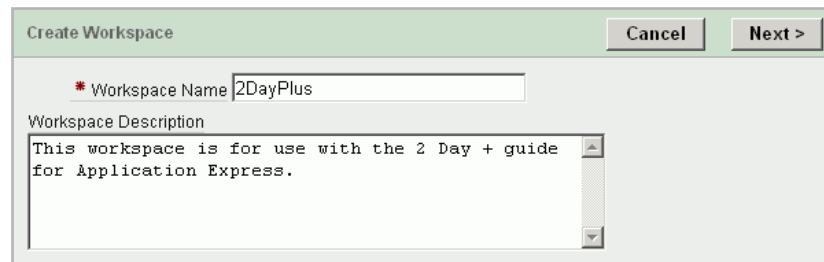
The Create Workspace Wizard appears.

4. For Identify Workspace, enter the following information:
 - a. Workspace Name - Enter a unique workspace name. This guide uses **2DayPlus** for the workspace name.

In general, you want to enter a workspace name that is significant to you. For example, you might enter your own name, your company name, or the name of the project or department to which your application pertains.

If you want to use the same name for both your workspace and schema, enter a workspace name that contains only alphabetic characters. Schema names are restricted to alphabetic characters.

- b. Description - Enter a workspace description.
 - c. Click **Next**.



5. For Identify Schema, enter the following information:
 - a. Re-use existing schema - Select **No** if you are creating your first workspace.

A **schema** is a logical container for database objects. In this step, you are creating the container for database objects you add later in this tutorial.
 - b. Schema Name - Enter a schema name. This guide uses **TWODAYPLUS** for the schema name.

You must use only alphabetic characters in your schema name.
 - c. Schema Password - Enter a case-sensitive password.
 - d. Space Quota (MB) - Select at least 10 MB to accommodate the necessary space for creating the objects required for this guide.
 - e. Click **Next**.

6. For Identify Administrator, enter the following information:
 - a. Administrator Username - Accept the default, **ADMIN**, or enter another user name to be used in Oracle Application Express.
 You are creating an account for only one user, yourself as an administrator. To see instructions for creating additional users, see "[Creating Additional User Accounts](#)" on page 2-8.
 - b. Administrator Password - Enter a case-sensitive password.
 - c. Enter the remaining information, including your valid email address, and click **Next**.

The login credentials for accessing Oracle Application Express are sent to the email address you enter here, if you have configured the email settings for your Oracle Application Express environment.

7. Confirm your selections and click **Create**.

Logging In to Your Local Instance

To log in to your local instance of Oracle Application Express, you must have this information:

- URL where you can access Oracle Application Express
- Workspace name you use to develop applications
- Username set up for you for this workspace within Oracle Application Express
- Password set up for you for this workspace within Oracle Application Express

If you set up your development environment, you have your login credentials. Otherwise, contact the person who created your user account to supply the information.

To log in to Oracle Application Express:

1. In a Web browser, go to the Oracle Application Express Login page. Depending on your setup, Oracle Application Express installs to one of these locations:

- If your setup uses the embedded PL/SQL gateway:

`http://hostname:port/apex`

- If your setup uses the Oracle HTTP Server (Apache) with `mod_plsql`:

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

For an explanation of the URLs, see ["Logging In to Administration Services"](#) on page 2-4.

The Login page appears.

2. Under Login, enter your login credentials.

3. Click **Login**.

Creating Additional User Accounts

As an administrator, you inherit all the privileges associated with the developer role. If you want to start developing the application shown in this guide, skip this section and go to ["Logging In to Your Local Instance"](#) on page 2-7.

However, you might want to create user accounts for other developers who share this workspace. Associating users with the workspace grants them access to all applications and scripts within that workspace. You can also create additional user accounts for workspace administrators.

To create user accounts:

1. Log in to the Workspace where you want to add users. See ["Logging In to the Hosted Demo Environment"](#) on page 2-3 or ["Logging In to Your Local Instance"](#) on page 2-7.

The Workspace home page appears.

2. From the Administration links list on the right, click **Manage Application Express Users**.
3. Under the Tasks list on the right, click either the **Create Developer** or **Create Workspace Administrator** link.

The Create User page appears.

The screenshot shows a user creation form with three main sections:

- User Identification:** Contains four required fields: * User Name, * Password, * Confirm Password, and * Email Address.
- Developer Privileges:** Contains a text field for Accessible Schemas (null for all), a dropdown for Default Schema (set to TWODAYPLUS), and two radio button options: "User is a developer" (set to No) and "User is a workspace administrator" (set to No).
- Account Control:** Contains two dropdown menus: "Set Account Availability" (set to Unlocked) and "Require Change Of Password On First Use" (set to Yes).

Buttons at the top include "Cancel", "Create User", and "Create and Create Another".

4. Under Account Control:
 - Set Account Availability - Select **Unlocked**.
 - Require Change of Password On First Use - Select **No** if you do not want to force this user to change his or her password at first log in.
5. Under User Identification, enter the appropriate information:
 - a. User Name - Enter a user name for this end user.
 - b. Password and Confirm Password - Enter a case-sensitive password for this account.
 - c. Email Address - Enter the valid email address for this end user.
This email address must be valid so that users can receive the login credentials to log in to the application.
6. Under Developer Privileges:
 - a. Accessible Schemas (null for all) - Leave this blank to allow the end user to access all applications in the workspace, or enter a colon-delimited list of schemas to restrict the end user's access.
If a user does not have access to the schema that an application is built on, the user cannot access the application.
 - b. Default Schema - Accept the default, the schema you set up for this guide.
 - c. User is a developer - Accept the default.
 - d. User is a workspace administrator - Accept the default.
7. Under User Groups, you can select a user group.
You can use groups to restrict access to parts of an application. Groups are primarily useful when using Application Express Authentication.
8. Under Additional Attributes, you can enter additional user information.
9. Click **Create User** or **Create and Create Another**.

See also: "Managing Application Express Users" in *Oracle Application Express Administration Guide*

Getting Started with Oracle Application Express

This section introduces you to areas of the Oracle Application Express user interface. It also shows you how to install the sample objects to use with this guide.

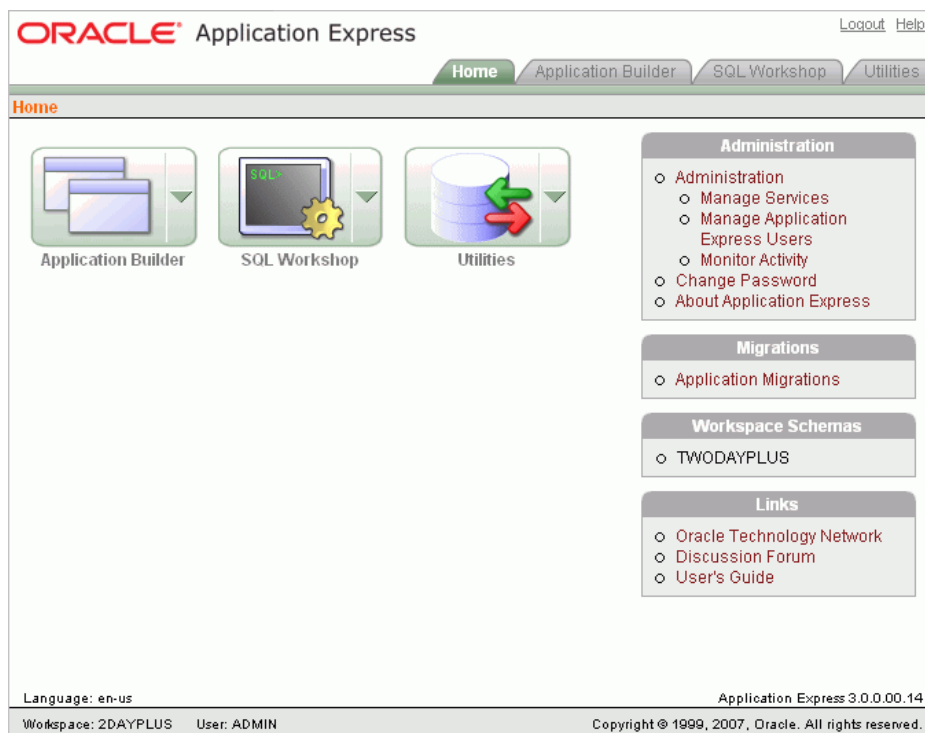
Before you begin, log in to either the host demo environment or your local instance of Oracle Application Express. For instructions, see "[Accessing Your Development Environment](#)" on page 2-1.

This section contains the following topics:

- [About the Workspace Home Page](#)
- [What Is Application Builder?](#)
- [Installing the Sample Objects](#)

About the Workspace Home Page

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



Take a few minutes to explore the product. The following three large icons appear in the center of the page:

- **Application Builder.** Use Application Builder to assemble an HTML interface (or application) on top of database objects such as tables and procedures. Most exercises in this guide use Application Builder.
- **SQL Workshop.** Use the SQL Workshop to access tools to view and manage database objects. Click **SQL Workshop** to access the following database tools:
 - **Object Browser.** View, create, modify, browse, and drop database objects. Use the PL/SQL editor to edit and compile packages, procedures, functions, and triggers while taking advantage of error reporting.
 - **SQL Commands.** Run SQL commands and anonymous PL/SQL, scripts, and saved queries.
 - **SQL Scripts.** Create, edit, view, run, and delete script files. You can also upload and download scripts from your local file system.
 - **Query Builder.** Search and filter database objects, select objects and columns, create relationships between objects, view formatted query results, and save queries with little or no SQL knowledge, using Query Builder's graphical user interface.
- **Utilities.** Import and export data from the database, generate DDL, view object reports, restore dropped database objects, and perform other tasks.

Note that your workspace and username appear in the lower left corner.

About the Administration List

An Administration list appears on the right side of the Workspace home page. Use the links to administer your application development environment.

If you have administrator or developer privileges, these links appear:

- **Administration.** Click this link to view a list of administrative tasks. If you are a developer, you have limited access to these features.
 - **Manage Services.** Click this link to manage session state, log files, preferences, and application models.
 - **Manage Application Express Users.** Click this link to manage Application Express user accounts and user groups.
 - **Monitor Activity.** Click this link to monitor page view and application changes.
- **Change Password.** Click this link to open a popup window where you can change your workspace password.
- **About Application Express.** Click this link to see version and configuration information for both Oracle Application Express and your database.

About the Migrations Link

Use the Migrations link to migrate a Microsoft Access application and generate an Oracle Application Express application from the retrieved objects.

About the Workspace Schemas List

The Workspace Schemas list displays the database schemas that are associated with, and therefore accessible to, this workspace.

About the Links List

The Links list contains links to resources to expand your knowledge of Oracle Application Express.



- **Oracle Technology Network** opens the Oracle Application Express section of Oracle Technology Network. Use this page to access additional information and resources about using Oracle Application Express.

Tip: Use this link to check for newer versions of Oracle Application Express, to download packaged applications you can use with Oracle Application Express, and to take advantage of sample code to accelerate your development process. For more information, see "[Next Steps](#)" on page 7-1.

- **Discussion Forum** opens the Oracle Application Express Discussion Forum. This is an excellent resource for research and finding answers to questions or answering questions from other users.
- **User's Guide** opens an HTML-based online Help system. You can also access online Help by clicking the **Help** link in the upper right corner of any page in Oracle Application Express.

What Is Application Builder?

You use the Application Builder component of Oracle Application Express to build your application. Through wizards or your direct input, you can assemble an HTML interface (or application) on top of database objects such as tables and procedures. Each application is a collection of linked pages using tabs, buttons, or hypertext links.

A **page** is the basic building block of an application. Pages also contain user interface elements such as tabs, lists, buttons, items, and regions. To see the definition of each page belonging to your application, you use the Page Definition page.

The screenshot displays the Oracle APEX Page Designer interface in the Page Definition view. At the top, there is a search bar for 'Page 1', navigation buttons, and a 'View' dropdown set to 'Definition'. Action buttons for 'Run', 'Copy', 'Delete', and 'Create >' are visible. The right side shows 'Last Updated: 2 hours ago' and 'Page Comments: 0'. The main workspace is divided into three columns:

- Page Rendering:** Contains metadata for the page, including Page Name (Sample Application), Title (Oracle Sample Application), HTML Header, HTML Body, Help Text, Page Group, Template (Application default), Header Text, Footer Text, Build Option, Authorization (No), and Cached (No).
- Page Processing:** Lists logic controls such as Computations, Validations, Processes, and Branches.
- Shared Components:** Lists reusable components like Tabs (Tab Set: TS1 with Home, Customers, Products, Orders, Charts, Admin), Lists of Values, Breadcrumbs (Main Menu: (No corresponding region)), Lists (Tasks), Templates (Page: One Level Tabs, Region: Reports Region, Region: Sidebar Region, Report: Standard, Alternating Row Colors, List: Vertical Unordered List with Bullets), and Theme.

Below the Page Rendering section, there are sections for Regions, Buttons, and Items. The Regions section shows two display points: 'Page Template Body (2)' with items 'My Top Orders' and 'Report (Column 2)', and 'Region Position 03' with items 'Sample Application HTML' and 'Tasks List'. The Items section shows items for the 'My Quota' region, including 'P1 QUOTA' and 'P1 TOTAL SALES', both marked as 'Hidden'.

The Page Definition contains three main areas:

- **Page Rendering** lists user interface controls and logic that are executed when a page is rendered. Page rendering is the process of generating a page from the database.
- **Page Processing** lists logic controls (such as computations and processes) that are evaluated and executed when the page is processed.
- **Shared Components** lists components used by the current page that can also be referenced by other pages within your application.

Installing the Sample Objects

In Oracle Application Express, users log in to a workspace. You can think of each workspace as a shared work area that separates your objects, data, and applications into a virtual private database.

Before performing any tasks in this guide, you must create the appropriate sample objects within your workspace. These sample objects are copies of the objects that are typically installed in two schemas:

- Human Resources (HR)

The HR schema contains information about the employees and the facilities where they work. Each employee has an identification number, email address, job identification code, salary, and manager. Employees are assigned to a department, and each department is associated with one location that has a full address, including the street name, postal code, city, state or province, and country code.

- Order Entry (OE)

The OE schema tracks product inventories and sales of a company's products, including the product identification number, the product name, the associated associates product category, product descriptions, the weight group (for shipping

purposes), the warranty periods, the suppliers, the availability status, and a minimum price.

To create the objects locally in your workspace, import the *OEHR Sample Objects* application.

This section contains the following topics:

- [Downloading OEHR Sample Objects](#)
- [Importing the OEHR Sample Objects](#)
- [Viewing Your Database Objects](#)

Tip: In order to successfully import the objects associated with the *OEHR Sample Objects* application, your Oracle database must include Oracle Spatial. If your database instance does not include Oracle Spatial, you can install it using Database Configuration Assistant. To learn more, see the *Oracle Application Express Installation Guide* for your operating environment.

Downloading OEHR Sample Objects

To import the *OEHR Sample Objects* application, you must download it from the Oracle Technology Network (OTN).

To download the *OEHR Sample Objects* application from OTN:

1. In your Web browser, go to:

http://www.oracle.com/technology/products/database/application_express/

2. Click **Packaged Applications**.
3. Click **OEHR Sample Objects**.
4. Download and save the `oehr_sample_objects.zip` file to your computer.
5. Unzip and extract the `oehr_sample_objects_installer.sql` file:
 - Microsoft Windows - Double-click the `oehr_sample_objects.zip` file
 - UNIX or Linux - Enter the following command:

```
$ unzip oehr_sample_objects.zip
```

Importing the OEHR Sample Objects

After you download and unzip the *OEHR Sample Objects* application, import it into Oracle Application Express. During the import process, specify installation of both the application and the supporting objects. Installing the application creates the objects and sample data needed to complete the exercises in this guide.

To import and install the *OEHR Sample Objects* application:

1. Log in to Oracle Application Express.

For instructions, see "[Logging In to the Hosted Demo Environment](#)" on page 2-3 or "[Logging In to Your Local Instance](#)" on page 2-7.

2. On the Workspace home page, click **Application Builder**.

The Application Builder home page appears.

3. Click the **Import** button.

4. For Specify File, specify the following:
 - a. Import file - Click **Browse** and navigate to the `oehr_sample_objects_installer.sql` file.
 - b. File Type - Select **Application, Page, or Component Export**.
 - c. File Character Set - Select the correct character set.
 - d. Click **Next**.Next, you must install the imported file.
5. To install an imported file, click **Next**.
The Install Application Wizard appears.
6. In the Install Application Wizard, specify the following:
 - a. Parsing Schema - Select the schema you created when you set up your development environment.
 - b. Build Status - Select **Run and Build Application**.
 - c. Install As Application - Select **Auto Assign New Application ID**.
 - d. Click **Install**.
7. For Install Supporting Objects, select **Yes** and click **Next**.
8. Confirm your selections by clicking **Install**.
9. After the installation is completed, click the **Home** breadcrumb link at the top of the page.
The Application Builder home page appears.

Checking Your Workspace Storage Space

If you experience problems installing the *OEHR Sample Objects* application, verify the available space in your workspace. If you do not have enough space, request additional storage space.

If you are a workspace administrator, you can:

- Determine if you have enough storage space. See "Viewing the Workspace Overview Report" in *Oracle Application Express Administration Guide*.
- Request additional storage space. See "Requesting Additional Storage" in *Oracle Application Express Administration Guide*.

Deleting the OEHR Sample Objects Application

Deleting the *OEHR Sample Objects* application and deinstalling the supporting objects completely removes all associated objects and sample data.

To delete the *OEHR Sample Objects* application:

1. Log in to Oracle Application Express.
2. On the Workspace home page, click **Application Builder**.
The Application Builder home page appears.
3. Click the **OEHR Sample Objects** icon.
4. On the Tasks list, click **Delete this Application**.
The Deinstall page appears.

5. To remove all associated objects and sample data, select **Remove Application Definition and Deinstall Supporting Objects**.
6. Click **Deinstall**.

Using HR Schema Instead of OEHR Sample Objects

If you are using a locally installed instance of Oracle Application Express release 2.2.1.1 or later (not a hosted demo environment such as <http://apex.oracle.com>) and have the HR schema installed, you can perform the exercises in this guide directly against the HR schema.

To do so, you must associate the HR schema with your workspace instead of performing the steps described in "Importing the OEHR Sample Objects" on page 3-5.

Note: The table names in the HR schema do not include the OEHR prefix (EMPLOYEES versus OEHR_EMPLOYEES). Because this guide outlines all the steps using the OEHR schema, you must adjust your selections and code accordingly.

Also, note that other users may be using the HR schema. Therefore, the objects or data within the objects may differ from that shown in this guide.

Viewing Your Database Objects

Review the objects you just created by going to Object Browser. Object Browser enables you to browse, create, and edit objects in your database.

To view the objects:

1. On the Workspace home page, click **SQL Workshop**.
2. Click **Object Browser**.

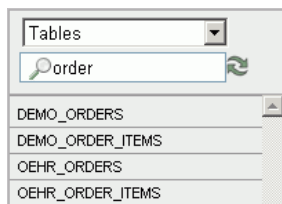
Object Browser appears.

The screenshot shows the Oracle SQL Workshop Object Browser interface. On the left, a tree view lists database objects, with 'OEHR_EMPLOYEES' selected. The main area displays the table structure for 'OEHR_EMPLOYEES' with columns: EMPLOYEE_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NUMBER, HIRE_DATE, JOB_ID, SALARY, COMMISSION_PCT, MANAGER_ID, and DEPARTMENT_ID. The table has a primary key on EMPLOYEE_ID.

Column Name	Data Type	Nullable	Default	Primary Key
EMPLOYEE_ID	NUMBER(6,0)	No	-	1
FIRST_NAME	VARCHAR2(20)	Yes	-	-
LAST_NAME	VARCHAR2(25)	No	-	-
EMAIL	VARCHAR2(25)	No	-	-
PHONE_NUMBER	VARCHAR2(20)	Yes	-	-
HIRE_DATE	DATE	No	-	-
JOB_ID	VARCHAR2(10)	No	-	-
SALARY	NUMBER(8,2)	Yes	-	-
COMMISSION_PCT	NUMBER(2,2)	Yes	-	-
MANAGER_ID	NUMBER(6,0)	Yes	-	-
DEPARTMENT_ID	NUMBER(4,0)	Yes	-	-

Object Browser is divided into two sections:

- Object Selection pane displays on the left side of the Object Browser page and lists database objects of a selected type within the current schema.
 - Detail pane displays to the right of the page and displays detailed information about a selected object.
3. From the list in the Object Selection pane on the left, select **Tables**.
The Detail pane lists the tables in your current schema.
 4. In the Object Selection pane, click **OEHR_EMPLOYEES** from the list.
The Detail pane shows details about the table.
 5. Click the **Data** tab at the top of the Details pane.
The data in the OEHR_EMPLOYEES table appears. Note that other tabs show additional details about the object you select.
 6. To search for an object name, enter a case-insensitive term in the Search field.



7. To view all objects, leave the Search field blank.

See also: "Managing Database Objects with Object Browser" in *Oracle Application Express SQL Workshop and Utilities Guide*

Building Your Application

In this tutorial, you create a Human Resources (HR) application for a fictitious company called *AnyCo Corp*. This section shows you how to build the application, modify it, and preview it at different points during the development process.

Before you begin this section:

- Read "[Getting Started with Oracle Application Express](#)" on page 3-1.
- Ensure you have installed the database objects as described in "[Installing the Sample Objects](#)" on page 3-4. This applies to both the hosted demo environment and local instance.

This section contains the following topics:

- [About the Application You Build in This Tutorial](#)
- [Creating the Initial Application](#)
- [Using an Interactive Report](#)
- [Modifying the Departments Report](#)
- [Adding an Employees Report and Form](#)
- [Editing the Employees Report](#)
- [Adding a Link on the Home Page to the Employees Report](#)
- [Adding a Department Column to the Employees Reports](#)
- [Linking a Column Value to Another Page](#)
- [Adding a Conditional Department Details Report](#)
- [Adding Your Company Name](#)
- [Switching Themes to Change the User Interface](#)

About the Application You Build in This Tutorial

This tutorial guides you through the development of a Human Resources (HR) application for a fictitious company called *AnyCo Corp*. The application enables users to view and modify employee information stored in the OEHR_DEPARTMENTS and OEHR_EMPLOYEES tables.

When building the application, you perform these tasks:

1. "[Creating the Initial Application](#)": Create an application that includes a Home page and a basic Departments report.
2. "[Using an Interactive Report](#)": Run and use the Interactive Report.

3. ["Modifying the Departments Report"](#): Expand the report to pull in data from other tables.
4. ["Adding an Employees Report and Form"](#): Build an Employee form and report based on the OEHR_EMPLOYEES table.
5. ["Editing the Employees Report"](#): Add calculated fields to the Employees report.
6. ["Adding a Link on the Home Page to the Employees Report"](#): Add a link on the Home page.
7. ["Adding a Department Column to the Employees Reports"](#): Modify the Employees report to enable the user to select a department.
8. ["Linking a Column Value to Another Page"](#): Add a link on the Departments report that navigates the user to the Employees report.
9. ["Adding a Conditional Department Details Report"](#): Add a report as a region that displays department details.
10. ["Adding Your Company Name"](#): Add your company name so that it appears on all pages in your application.
11. ["Switching Themes to Change the User Interface"](#): Switch the theme for your application.

Creating the Initial Application

This first exercise guides you through creating your initial application. Using the Create Application Wizard, you create two pages and specify basic application functionality.

The pages created in this section include:

- Home - This page is the first page displayed when the application is run. This page contains a link to the Departments report.
- Departments - This page is an interactive report of all departments.

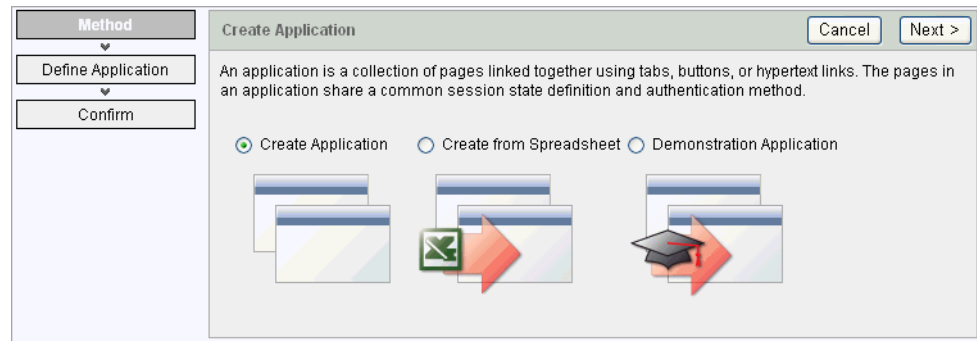
There are two types of reports, interactive and classic. Interactive is the default when creating applications, converting forms and creating report regions. Interactive reports should be selected when you want to provide user customizations such as filters, sorting, compilation and so on. If you have limited need for this functionality, you are best served by using a classic report.

See also: For more information on the difference between these two report types, see Chapter 3. *How to Create a Parameterize Report in the Oracle Application Express Advanced Tutorials.*

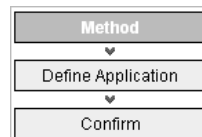
To create your initial application:

1. Log in to Oracle Application Express.
For instructions, see ["Logging In to the Hosted Demo Environment"](#) on page 2-3 or ["Logging In to Your Local Instance"](#) on page 2-7.
2. On the Workspace home page, click **Application Builder**.
3. Click the **Create** button.

The Create Application Wizard appears.



Note that each page within a wizard displays the title of the wizard (for example, *Create Application*). Each wizard page also displays a series of blocks on the left, representing the sequence of steps. The highlighted block indicates the step you are performing.



To orient you, each step in these exercises generally begins with the block label. For example, the first step in the Create Application Wizard highlights the word *Method*. Therefore, the next step orients you by beginning with the words *For Method*.

4. For Method, accept the default, **Create Application**, and click **Next**.
5. For Name:
 - a. Name - Enter AnyCo Corp.
 - b. Application - accept the default ID. The system provides a unique ID for each application you create in this workspace.
 - c. Create Application - Accept the default, **From scratch**.
 - d. Schema - Select the schema that contains the objects for this tutorial (for example, **TWODAYPLUS**).
 - e. Click **Next**.

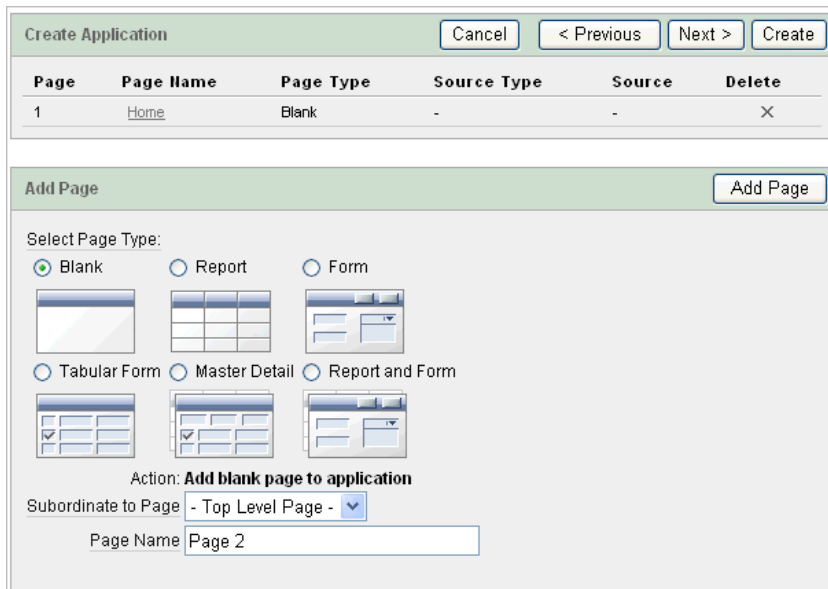
Next, add a page to your application.

6. For Pages, specify the following in the Add Page section:
 - a. Select Page Type - Accept the default, **Blank**.

Tip: Explanatory information for each option appears on the right side of the page. This page-level help appears throughout the application.

- b. Page Name - Enter Home.
 - c. Click **Add Page**.

The Home page is now listed in the top area. Also, note that the Add Page area appears so you can continue adding pages to your initial application.



Next, add a report page on the OEHR_DEPARTMENTS table.

7. In the Add Page section, specify the following:
 - a. Select Page Type - Select **Report**.
 - b. Subordinate to Page - Select **Home (1)**.
This sets up the hierarchy among the pages in your application.
 - c. Page Source - Accept the default, **Table**.
 - d. Table Name - Select **OEHR_DEPARTMENTS**.
The list shows all tables and views in the schema associated with the application.
 - e. Implementation - Accept the default **Interactive**.
 - f. Click **Add Page**.
Notice that the pages listed in the Create Application section reflect the hierarchy of the pages in your application.
Next, change the default page name, OEHR_DEPARTMENTS, to Departments.
8. Click the **Oehr_Departments** link.
9. Under Page Definition, change the Page Name to `Departments` and click **Apply Changes**.
10. In the Create Application section, click **Next**.
After adding your initial pages, define some application-level settings.
11. For Tabs, select **No Tabs** and click **Next**.
12. For Shared Components, accept the default, **No**, and click **Next**.
13. For Attributes, make these changes:
 - a. Authentication Scheme - Accept the default, **Application Express**.

Note that Application Express is the default Authentication Scheme. The authentication scheme option enables you to control users' access to the application using Application Express authentication or another type of authentication.

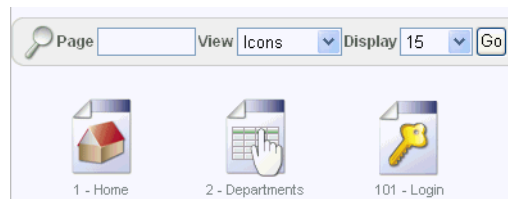
- b. Language - Accept the default, **English (United States) (en-us)**
 - c. User Language Preference Derived From - Accept the default, **Use Application Primary Language**.
 - d. Date Format - Select the up arrow to select the **12-JAN-04** format from the list of Date formats.
 - e. Click **Next**.
14. For User Interface, select **Theme 18** and click **Next**.
 15. For Confirm, verify the information and click **Create**.

The two pages you created, Home and Departments, appear as icons by default.

Note: To view the pages in a list instead of as icons, from the View list select **Details** and click **Go**. Your view setting is retained from session to session.

Because these steps use the default setting, switch back to Icons view before continuing.

Notice that Oracle Application Express adds a Login page automatically to your application.



Congratulations! You created your first application using Oracle Application Express. Next, preview the application to see the application the way it would appear to end users.

Previewing Your Application

You preview your application by running it. Running the application displays the rendered version of the application as end users would see it.

As you create pages, you can view them by running the page individually or by running the entire application. When you run a page or application, the Application Express engine dynamically renders it into viewable HTML based on data stored in the database.

- To run the application, click the **Run Application** icon.



- To run the page, click the **Run Page** icon.



To preview your application:

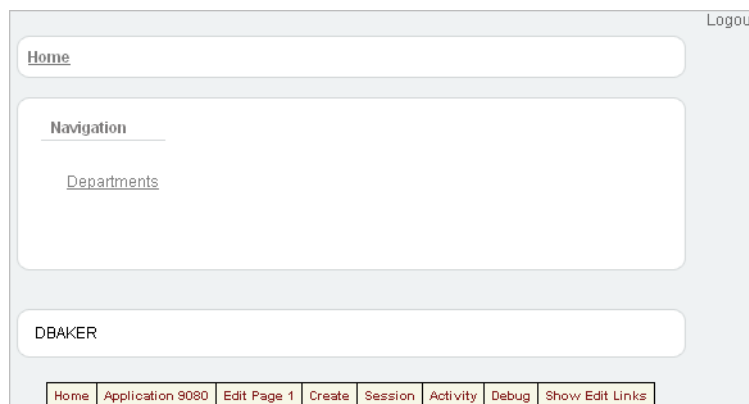
1. On the Application home page, click **Run Application**.

The first time you run an application you are prompted to enter a user name and password. To continue, simply enter your workspace user name and password and then click Login.

2. The first time you run an application you are prompted to enter a user name and password. To continue, simply enter your workspace user name and password and then click **Login**.

You can run the application using your Application Express login credentials because you chose Application Express Authentication when creating the application. For more information, see "Establishing User Identity Through Authentication" in *Oracle Application Express Application Builder User's Guide*.

The Home page of your application appears.



Notice that a link to the Departments page appears on the Home page because you set up that hierarchy.

Also notice the Developer toolbar at the bottom of the page. These links appear when you run an application within the development environment. The Developer toolbar offers a quick way to edit the current page, create a page, region, or page control, view session state, or toggle in and out of Debug mode.

3. Click the **Departments** link.

The Departments report appears.

Home > Departments

Rows 15 Go

Department Id	Department Name	Manager Id	Location Id
10	Administration	200	1700
20	Marketing	201	1800
30	Purchasing	114	1700
40	Human Resources	203	2400
50	Shipping	121	1500
60	IT	103	1400
70	Public Relations	204	2700
80	Sales	145	2500
90	Executive	100	1700
100	Finance	108	1700
110	Accounting	205	1700
120	Treasury	-	1700
130	Corporate Tax	-	1700
140	Control And Credit	-	1700
150	Shareholder Services	-	1700

1 - 15

Modifying the Departments Report

When you run the Create Application Wizard, the wizard creates forms and reports based on the selections you make. Behind the scenes, Application Express writes a query for you to extract the appropriate data from the database.

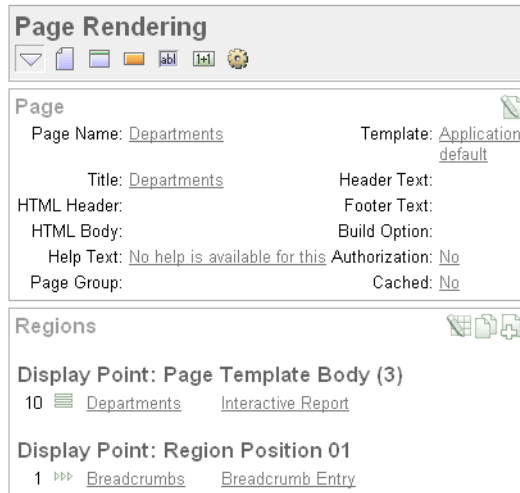
In this exercise, you modify the query for the Departments report to include information from the OEHR_EMPLOYEES table. Three columns from the OEHR_EMPLOYEES table, Number of Employees, Manager Name and Location, are added to the Departments report. The Manager Name column replaces the Manager Id column and the Location column replaces the Location Id column.

To modify the Departments report:

1. Click the **Edit Page 2** link on the Developer toolbar (at the bottom of the page).

The Page Definition for Page 2 appears. A **page** is the basic building block of an application. Pages contain user interface elements such as tabs, lists, buttons, items, and regions. To see the definition of each page belonging to your application, you use the Page Definition page. For more information, see "[What Is Application Builder?](#)" on page 3-3.

2. Under Page Rendering, locate the Regions section.



3. Click **Departments**.
4. Scroll down to Source, and replace the default Region Source script with the following:

```
SELECT d.DEPARTMENT_ID,
       d.DEPARTMENT_NAME,
       (select count(*) from oehr_employees where department_id = d.department_id)
"Number of Employees",
       substr(e.first_name,1,1) || '.' || e.last_name "Manager Name",
       c.COUNTRY_NAME "Location"
FROM OEHR_DEPARTMENTS d,
     OEHR_EMPLOYEES e,
     OEHR_LOCATIONS l,
     OEHR_COUNTRIES c
WHERE d.LOCATION_ID=l.LOCATION_ID
      AND l.COUNTRY_ID=c.COUNTRY_ID
      AND d.DEPARTMENT_ID=e.department_id
      AND d.manager_id=e.employee_id
      AND instr(upper(d.department_name), upper(nvl(:P2_REPORT_
SEARCH,d.department_name)))>0
```

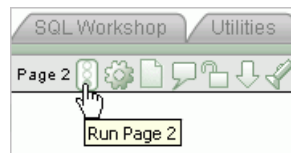
5. Click **Apply Changes**.
6. Click **Apply Changes** to confirm.
7. Under the Regions section, click the **Interactive Report** link.
8. Click **Edit** icon next to Number of Employees.
9. Under Column Definition, select **center** for Column Alignment.
10. Click **Apply Changes**.

Run the Report to View Added Columns

To see how the page looks to end users, run the page. When you run a page, the Application Express engine dynamically renders and processes the page to display viewable HTML.

To run the page:

1. Click the Run Page icon in the upper right corner.

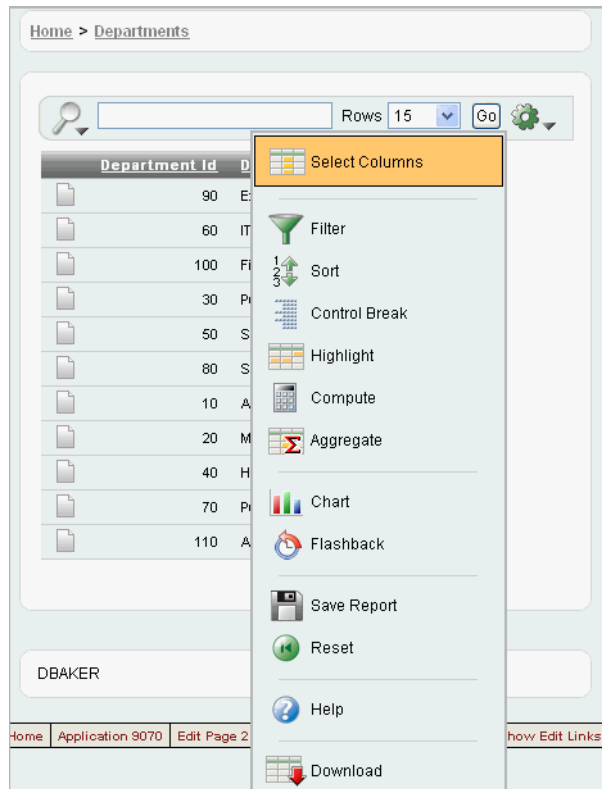


The revised Departments report appears.

A screenshot of a web application showing a report titled 'Home > Departments'. The report has a search bar and a 'Rows' dropdown set to '15'. Below the search bar is a table with two columns: 'Department Id' and 'Department Name'. The table contains 11 rows of data. At the bottom right of the table, it says '1 - 11'.

Department Id	Department Name
90	Executive
60	IT
100	Finance
30	Purchasing
50	Shipping
80	Sales
10	Administration
20	Marketing
40	Human Resources
70	Public Relations
110	Accounting

2. To add the new columns, click the **Actions** menu. The list of Action options appears.



Note that the Manager Id and Location Id columns are no longer available. Also note that the three new columns are not displayed on the revised report: Number of Employees, Manager Name, and Location. The following steps are required to add these columns to the display and reorder them.

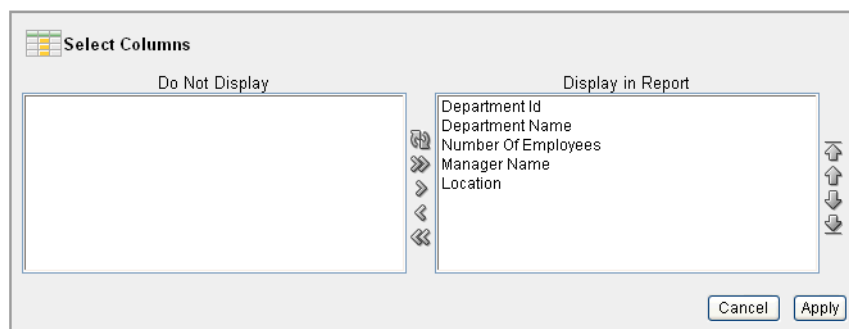
3. Select **Select Columns**.

The columns that were added by the new SQL, Location and Manager Name, are in the **Do Not Display** box.

4. Click the **Move All** icon to add these three columns to the **Display in Report** box. The Move All icon looks like the following figure.



5. Use the up and down arrows to the right of the Display in Report to put the columns in this order:



6. Click **Apply**.

The Departments page appears and includes the new columns.

Department Id	Department Name	Number Of Employees	Manager Name	Location
90	Executive	3	S.King	United States of America
60	IT	5	A.Hunold	United States of America
100	Finance	6	N.Greenberg	United States of America
30	Purchasing	6	D.Raphaely	United States of America
50	Shipping	45	A.Fripp	United States of America
80	Sales	34	J.Russell	United Kingdom
10	Administration	1	J.Whalen	United States of America
20	Marketing	2	M.Hartstein	Canada
40	Human Resources	1	S.Mavris	United Kingdom
70	Public Relations	1	H.Baer	Germany
110	Accounting	2	S.Higgins	United States of America

Using an Interactive Report

This exercise guides you through some commonly used report options available to users when they run interactive reports. These options allow the user to perform certain tasks quickly.

See Also: For an overview of all Interactive Report components see *How to Create a Parameterized Report in the Oracle Application Express Advanced Tutorials*.

Topics included in this section:

- [Save Report Settings as the Default](#)
- [Create a Filter](#)
- [Change the Sort Order](#)
- [Add a Controlled break](#)
- [Reset Report Settings](#)

You already used the Select Column option from the Actions menu to add columns to the report display. In this section, you run the application and use some of the various search, sort, highlight and reset features to manipulate the Departments interactive report.

This tutorial only touches on some of the most prominent functionality available with interactive reports. For complete details refer to the *Oracle Application Express Advanced Tutorials* and *Oracle Application Express Application Builder User's Guide*.

Save Report Settings as the Default

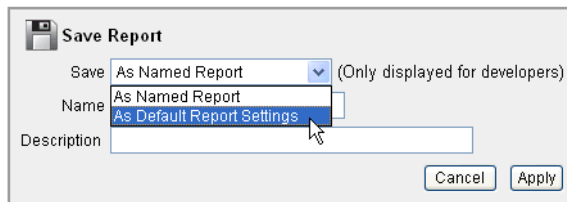
If the report settings are not saved as the default, the columns added to the display in the previous steps are not displayed when the application is restarted or when the report is reset.

To save current report settings as the default:

1. Select the **Actions** menu.
2. Select **Save Report**.

The Save Report settings appear.

3. Select **As Default Report Settings** from the **Save** drop down.



4. Click **Apply**.

The report will show all columns when the user selects the Reset option from the Actions menu or when the page is reset by a Reset Interactive Report command, RIR.

See Also: For a description of how to save as a report as a Named Report see *How to Create a Parameterized Report in the Oracle Application Express Advanced Tutorials*.

Create a Filter

This exercise shows you how a user can add a filter to the Departments report. This example creates a filter to show all departments with the exception of departments with an Id of 60.

There is more than one way a user can create a filter. The user can add a filter from the:

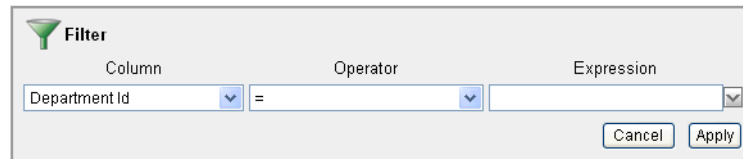
- Search Bar
- Actions Menu
- Column Heading

The Actions menu offers more options than the others. For a quick filter using the equals operator, the Search Bar or column heading are the quickest methods. For anything else, use the Filter option from the Actions menu.

To create a filter for all departments not equal to 60:

1. Select the **Actions** menu.
2. Select **Filter**.

The filter settings display. Note the user can also click the column heading link to create a filter for that column. Creating a filter from the column heading menu, however, is limited to the equal operator.



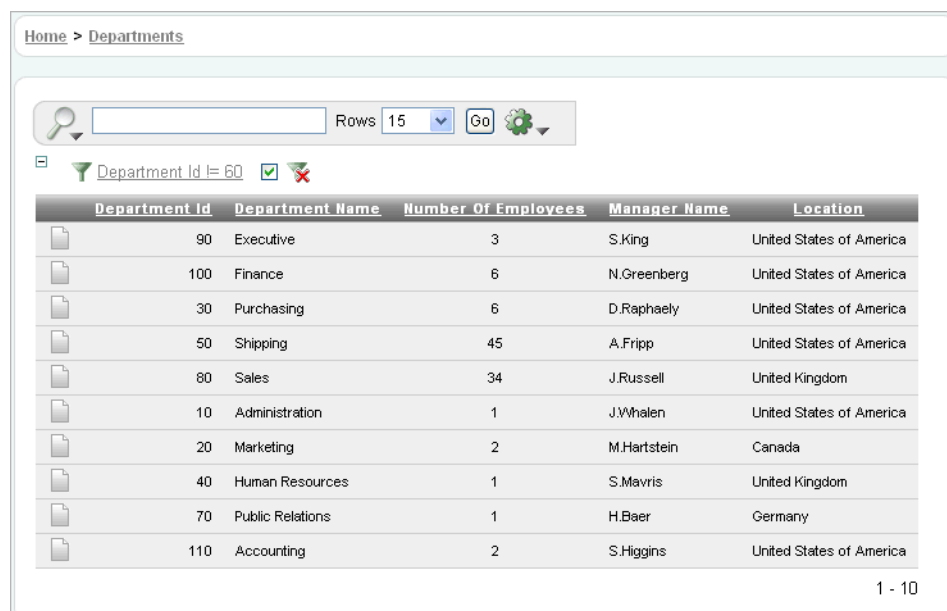
The Filter dialog box has three main sections: Column, Operator, and Expression. The Column dropdown is set to 'Department Id', the Operator dropdown is set to '=', and the Expression dropdown is empty. There are 'Cancel' and 'Apply' buttons at the bottom right.

- From the Operator drop down, select the not equals operator:

!=

- Select 60 from the Expression drop down.
- Click **Apply**.

The Departments report is displayed with the Department_Id!=60 filter applied. All departments, accept for the IT department with a Department Id of 60, are included in the report.



The screenshot shows the 'Home > Departments' report. At the top, there is a search bar and a 'Rows' dropdown set to 15. Below that, a filter is applied: 'Department Id != 60'. The filter is shown with a green checkmark and a red X icon. The report table displays the following data:

Department Id	Department Name	Number Of Employees	Manager Name	Location
90	Executive	3	S.King	United States of America
100	Finance	6	N.Greenberg	United States of America
30	Purchasing	6	D.Raphaely	United States of America
50	Shipping	45	A.Fripp	United States of America
80	Sales	34	J.Russell	United Kingdom
10	Administration	1	J.Whalen	United States of America
20	Marketing	2	M.Hartstein	Canada
40	Human Resources	1	S.Mavris	United Kingdom
70	Public Relations	1	H.Baer	Germany
110	Accounting	2	S.Higgins	United States of America

1 - 10

Notice the filter is shown at the top of the report. You can edit, disable, or delete this filter. To edit, click on the filter name. To disable, uncheck the check box. To delete, click on the Delete icon that looks like an X over the filter icon.

- Uncheck the check box next to the Department Id!=60 filter to disable it. The report shows data for all Department Ids.

Change the Sort Order

In this exercise, you learn how the user can reorder the data for each column.

To change the sort order:

- Select the **Actions** menu.
- Select **Sort**.

The sort settings are displayed. Note this option is also available for each column by clicking the column heading. The Actions menu is quicker when changing the sort order for multiple columns.

3. Select **Department Name** for the first column entry.

Column	Direction	Null Sorting
1 Department Name	Ascending	Default
2 - Select Column -	Ascending	Default
3 - Select Column -	Ascending	Default
4 - Select Column -	Ascending	Default
5 - Select Column -	Ascending	Default
6 - Select Column -	Ascending	Default

4. Click **Apply**.

The report shows the Department Name column in ascending alphabetical order.

Department Id	Department Name	Number Of Employees	Manager Name	Location
110	Accounting	2	S.Higgins	United States of America
10	Administration	1	J.Whalen	United States of America
90	Executive	3	S.King	United States of America
100	Finance	6	N.Greenberg	United States of America
40	Human Resources	1	S.Mavris	United Kingdom
60	IT	5	A.Hunold	United States of America
20	Marketing	2	M.Hartstein	Canada
70	Public Relations	1	H.Baer	Germany
30	Purchasing	6	D.Raphaely	United States of America
80	Sales	34	J.Russell	United Kingdom
50	Shipping	45	A.Fripp	United States of America

Notice the up arrow icon after the Department Name that indicates the column has been sorted in ascending order. You can click on this arrow to resort the column.

Add a Controlled break

Another Actions menu option the user can select to reformat the report, is the controlled break. This allows the user to delineate data into clearly visible groups.

To add a controlled break:

1. Click the **Location** column heading.
The column heading menu appears.
2. Click the **Control Break** icon as shown below.

Note this same option is also available from the Actions menu.



The report is reformatted to show a break after each group of rows that share the same location.

Department Id	Department Name	Number Of Employees	Manager Name
Location : Canada			
20	Marketing	2	M.Hartson
Location : Germany			
70	Public Relations	1	H.Baer
Location : United Kingdom			
40	Human Resources	1	S.Mewis
80	Sales	14	J.Pussell
Location : United States of America			
110	Accounting	2	S.Piggins
10	Administration	1	J.PWhalen
90	Executive	3	S.King
100	Finance	6	N.Greenberg
60	IT	5	A.Hunold
30	Purchasing	6	D.Raphaely
50	Shipping	15	A.Frippe

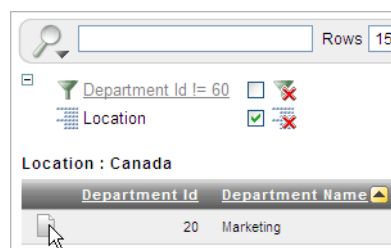
Note the Location control break report setting has been added under the Department Id!=60 filter.

Display the Single Row View

The user can display details for a row by selecting the Single Row icon.

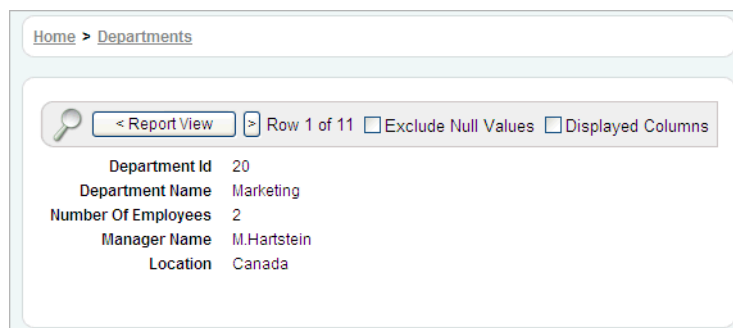
To display the single row view:

1. Locate the **Single Row View** icon for the first row.



2. Select the **Single Row View** icon for the first row.

The details page for the first row appears.



Reset Report Settings

The user can revert the report settings back to the saved default settings.

When an interactive report is reset, the default settings are applied to the report. An interactive report can be reset by the user and by the developer under the following conditions:

- A user can reset an interactive report if the Reset option is available from the Actions menu. This option is enabled or disabled by the developer. For further details see "Editing Interactive Reports" in the *Oracle Application Express Application Builder User's Guide*.
- A developer can specify that an interactive report be reset when it is called from another page. The Reset Interactive Report command, RIR, is used for this purpose. For further details see "Editing Interactive Reports" in the *Oracle Application Express Application Builder User's Guide*.

To return to the default settings:

1. Select the **Departments** breadcrumb.
2. Select the **Actions** menu.
3. Select **Reset**.
4. Click **Apply**.

The report goes back to the default report settings saved in the previous section.

Adding an Employees Report and Form

In this exercise, you add a report to display employee information and a form to create, update, and delete employee information.

To add an employee report and form:

1. Click the **Application ID** link on the Developer toolbar (at the bottom of the page).
The Application home page appears.
2. Click **Create Page**.
3. For Page:
 - a. Select **Form** and click **Next**.
 - b. Select **Form on a Table with Report**.

This option creates two pages, a report and form, based on a single table or view.

- c. Click **Next**.
4. For Table/View Owner, accept the default and click **Next**. This specifies the schema owner.
5. For Table/View Name, select **OEHR_EMPLOYEES** and click **Next**.
6. For Define Report Page, make these changes:
 - a. Implementation - Select **Interactive**.
 - b. Page Name - Change to *Employees*.
 - c. Region Title - Change to *Employees*.
 - d. Breadcrumb - Select **Breadcrumb**.
The Create Breadcrumb Entry section appears.
 - e. For Select Parent Entry, click the **Home** link.
Home appears in the Parent Entry field.
 - f. Click **Next**.
7. For Define Report Page, accept the default, **Do not use tabs**, and click **Next**.
8. For Define Report Page, press the **Ctrl** key, select the following columns, and click **Next**:
 - EMPLOYEE_ID
 - FIRST_NAME
 - LAST_NAME
 - HIRE_DATE
 - SALARY
 - COMMISSION_PCT

The columns you selected appear on the Report page when the page is run.
9. For Define Report Page, accept the defaults and click **Next**.
Note that the default Edit Link image resembles a small piece of paper and pencil.
Next, define the page and region information for the form.
10. For Define Form Page, edit the following:
 - a. Page Name - Enter *Create/Edit Employee*.
 - b. Region Title - Enter *Create/Edit Employee*.
 - c. Entry Name - Enter *Create/Edit Employee*.
 - d. Click **Next**.
11. In Primary Key, accept the defaults and click **Next**.
12. In Define the source for the primary key columns, accept the default, **Existing trigger**, and click **Next**.
Your table, *OEHR_EMPLOYEES*, already has a trigger that populates the primary key.
13. In Select Column(s), select all columns and click **Next**.

These columns appear in the Create/Edit Employee form when the page is run.

14. In Identify Process Options, accept the defaults and click **Next**.

These selections enable users to add, update, and create employee records.

15. For Confirm, verify the information and click **Finish**.

Previewing the Pages

To preview the two pages you just created, run the current page. From the Employees report, you can then preview the form.

To preview the pages:

1. Click the **Run Page** icon.



The Employees report appears.

Home > Employees

Search: Rows: 15 Go

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct
100	Steven	King	17-JUN-87	24000	-
101	Neena	Kochhar	21-SEP-89	17000	-
102	Lex	De Haan	13-JAN-93	17000	-
103	Alexander	Hunold	03-JAN-90	9000	-
104	Bruce	Ernst	21-MAY-91	6000	-
105	David	Austin	25-JUN-97	4800	-
106	Valli	Pataballa	05-FEB-98	4800	-
107	Diana	Lorentz	07-FEB-99	4200	-
108	Nancy	Greenberg	17-AUG-94	12000	-
109	Daniel	Faviet	16-AUG-94	9000	-
110	John	Chen	28-SEP-97	8200	-
111	Ismael	Sciarra	30-SEP-97	7700	-
112	Jose Manuel	Urman	07-MAR-98	7800	-
113	Luis	Popp	07-DEC-99	6900	-
114	Den	Raphaely	07-DEC-94	11000	-

1 - 15

Note the following about the Employees report:

- The Search Bar with the Actions menu appears at the top. For more information see [Using an Interactive Report](#) on page 4-11.
- The column headings are links that allow the user to quickly perform various sorting, filtering and reformatting operations. For more information see [Using an Interactive Report](#) on page 4-11.

- The Edit icon you selected appears in each row. You can click the Edit icon to update the employee record. Since you created a form based on a table with a report, the wizard automatically linked the report to the form. If you create just a report, as is done in the previous [Creating the Initial Application](#) section, the wizard automatically links the report to the single row view.
- The Create button appears in the upper right corner. You can click the Create button to add an employee to the underlying table.
- The Employees report includes the five columns you specified. When you selected the columns and applied the changes, Oracle Application Express created the appropriate SQL code in the background to produce this result.

Your data might appear in a different order. If so, ignore this difference and continue with these steps.

2. To review the form you also created, click the **Edit** icon in an Employee row. The Create/Edit Employee form appears.

Note the following about the Create/Edit Employee form:

- The form includes Cancel, Delete, and Apply Changes buttons.
- The Hire Date field displays a calendar, which is included because the data type of the underlying column is `DATE`.
- Fields labeled in red require entries.

Editing the Employees Report

In this exercise, you create a new column titled Remuneration to display employees' salaries in the Employees report.

Topics in this section include:

- [Create a Function](#)
- [Add a Column](#)
- [Previewing the Page](#)
- [Changing the Column Format](#)

Create a Function

First, create a function to calculate employees' salaries.

To create a function:

1. Click the **Home** link on the Developer toolbar.
2. Click **SQL Workshop** and then **SQL Commands**.
SQL Commands provides a window where you can run PL/SQL against the database.
3. In the SQL editor, enter the following script:

```
CREATE OR REPLACE FUNCTION calc_remuneration(
    salary IN number, commission_pct IN number)
RETURN NUMBER IS
BEGIN
    RETURN ((salary*12) + (salary * 12 * nvl(commission_pct,0)));
END;
```

When copying and pasting this SQL, make sure there is not an empty line before the first statement, CREATE OR REPLACE FUNCTION.

4. Click **Run**.
The Results section displays this message:

Function created.

Add a Column

Next, add a column to display the results of the employees' salary calculations.

To add a column:

1. Navigate to the Page Definition for page 3:
 - a. Click the **Application Builder** tab.
 - b. Select the **AnyCo Corp** application.
 - c. Click **3 - Employees**.
The Page Definition for page 3, Employees, appears.
2. Under Regions, click the **Employees** link (next to Interactive Report).



The Region Definition appears.

3. Scroll down to Source, and replace the existing code with the following:

```
SELECT "EMPLOYEE_ID",
       "FIRST_NAME",
       "LAST_NAME",
       "HIRE_DATE",
       "SALARY",
```

```
"COMMISSION_PCT",
  calc_remuneration(salary, commission_pct) REMUNERATION
FROM "#OWNER#"."OEHR_EMPLOYEES"
```

4. Click **Apply Changes**.
5. Click **Apply Changes** to confirm.

Previewing the Page

To preview the page, click the **Run Page** icon in the upper right corner. Notice the Remuneration column does not appear. You must add the column by using the Select Column action.

Home > Employees

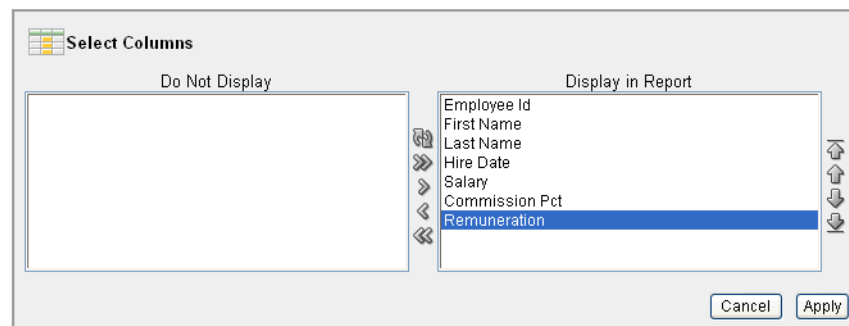
Search: [] Rows: 15 Go [] [Create]

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct
100	Steven	King	17-JUN-87	24000	-
101	Neena	Kochhar	21-SEP-89	17000	-
102	Lex	De Haan	13-JAN-93	17000	-
103	Alexander	Hunold	03-JAN-90	9000	-
104	Bruce	Ernst	21-MAY-91	6000	-
105	David	Austin	25-JUN-97	4800	-
106	Valli	Pataballa	05-FEB-98	4800	-
107	Diana	Lorentz	07-FEB-99	4200	-
108	Nancy	Greenberg	17-AUG-94	12000	-
109	Daniel	Faviet	16-AUG-94	9000	-
110	John	Chen	28-SEP-97	8200	-
111	Ismael	Sciarra	30-SEP-97	7700	-
112	Jose Manuel	Urman	07-MAR-98	7800	-
113	Luis	Popp	07-DEC-99	6900	-
114	Den	Raphaely	07-DEC-94	11000	-

1 - 15

To display the Remuneration column:

1. Select the **Actions** menu.
2. Select the **Select Columns** action.
3. Move the **Remuneration** column from the Do Not Display box to the Display in Report box.



4. Click **Apply**.

The Employees Report is displayed and includes the Remuneration column.

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration
100	Steven	King	17-JUN-87	24000	-	288000
101	Neena	Kochhar	21-SEP-89	17000	-	204000
102	Lex	De Haan	13-JAN-93	17000	-	204000
103	Alexander	Hunold	03-JAN-90	9000	-	108000
104	Bruce	Ernst	21-MAY-91	6000	-	72000
105	David	Austin	25-JUN-97	4800	-	57600
106	Valli	Pataballa	05-FEB-98	4800	-	57600
107	Diana	Lorentz	07-FEB-99	4200	-	50400
108	Nancy	Greenberg	17-AUG-94	12000	-	144000
109	Daniel	Faviet	16-AUG-94	9000	-	108000
110	John	Chen	28-SEP-97	8200	-	98400
111	Ismael	Sciarra	30-SEP-97	7700	-	92400
112	Jose Manuel	Urman	07-MAR-98	7800	-	93600
113	Luis	Popp	07-DEC-99	6900	-	82800
114	Den	Raphaely	07-DEC-94	11000	-	132000

Changing the Column Format

Next, change the format of the columns that contain numeric values.

To change the column format:

1. Click **Edit Page 3** on the Developer toolbar (at the bottom of the page).
The Page Definition appears.
2. Under Regions, click **Interactive Report**.
The Interactive Report Attributes page appears.
3. Locate the Column Attributes section.
Next, change the format of the value in the Salary and Remuneration columns.
4. To edit the Salary format:
 - a. Click the **Edit** icon next to SALARY.
 - b. For Number/Date Format, select **\$5,234.10** from the list.
Notice that the appropriate format mask appears in the field.
 - c. Click **Apply Changes**.
5. Repeat the previous step for REMUNERATION.
6. Click the **Run Page 3** icon in the upper right corner to preview the page.
Notice that the numbers in the Salary and Remuneration columns now appear with the dollar sign, include commas and decimals, and are correctly aligned.

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration
100	Steven	King	17-JUN-87	\$24,000.00	-	\$288,000.00
101	Neena	Kochhar	21-SEP-89	\$17,000.00	-	\$204,000.00
102	Lex	De Haan	13-JAN-93	\$17,000.00	-	\$204,000.00
103	Alexander	Hunold	03-JAN-90	\$9,000.00	-	\$108,000.00
104	Bruce	Ernst	21-MAY-91	\$6,000.00	-	\$72,000.00
105	David	Austin	25-JUN-97	\$4,800.00	-	\$57,600.00
106	Valli	Pataballa	05-FEB-98	\$4,800.00	-	\$57,600.00
107	Diana	Lorentz	07-FEB-99	\$4,200.00	-	\$50,400.00
108	Nancy	Greenberg	17-AUG-94	\$12,000.00	-	\$144,000.00
109	Daniel	Faviet	16-AUG-94	\$9,000.00	-	\$108,000.00
110	John	Chen	28-SEP-97	\$8,200.00	-	\$98,400.00
111	Ismael	Sciarra	30-SEP-97	\$7,700.00	-	\$92,400.00
112	Jose Manuel	Urman	07-MAR-98	\$7,800.00	-	\$93,600.00
113	Luis	Popp	07-DEC-99	\$6,900.00	-	\$82,800.00
114	Den	Raphaely	07-DEC-94	\$11,000.00	-	\$132,000.00

Adding a Link on the Home Page to the Employees Report

In this exercise, you add a link on the Home page to take users to the Employees report. This link appears in the Navigation region on the left side of the Home page.

To add a link on the Home page to the Employees report:

1. Navigate to the Page Definition for the Home page, page 1:
 - a. Click **Application** in the Developer toolbar (at the bottom of the page).
 - b. On the Application home page, click **Home**.
2. Under Regions, click the **List** link (next to Navigation).
3. On the List Entries page, click the **Create List Entry** button on the right side of the page.
4. On the Create/Edit List Entry page, edit the following:
 - a. Sequence - Change to 20.
 - b. List Entry Label - Enter `Employees`.
 - c. Page - Enter 3.
5. Click **Create**.
6. Run the page.



Notice that your Home page now includes a link to Employees.

7. Click **Employees** to test the link. The Employees report appears.

Adding a Department Column to the Employees Reports

In this exercise, you link the Employees and Departments reports. When you complete this section, the Employees report will have a Departments column showing which department each employee belongs to.

To perform this task, you create a column on the Employees page to enable the user to select a department. You then run the Employees report and add the Departments column to the report display. The report settings are saved as the default.

Topics in this section include:

- [Add a Column](#)
- [Display Column in the Report](#)
- [Save Report Settings as the Default](#)

Add a Column

In order to filter the Employees report by department, add a Department column to the report.

To add a column:

1. Click on **Edit Page 3** in the Developer toolbar.
2. Under Regions, click **Employees** and scroll down to Source.
3. Replace Region Source with the following SQL:

```
SELECT e.EMPLOYEE_ID,
       e.FIRST_NAME,
       e.LAST_NAME,
       e.HIRE_DATE,
       e.SALARY,
       e.COMMISSION_PCT,
       calc_remuneration(salary, commission_pct) REMUNERATION,
       e.DEPARTMENT_ID,
       d.DEPARTMENT_NAME
FROM OEHR_EMPLOYEES e,
     OEHR_DEPARTMENTS d
WHERE e.DEPARTMENT_ID=d.DEPARTMENT_ID
```

4. Click **Apply Changes**.
5. Click **Apply Changes** to confirm.

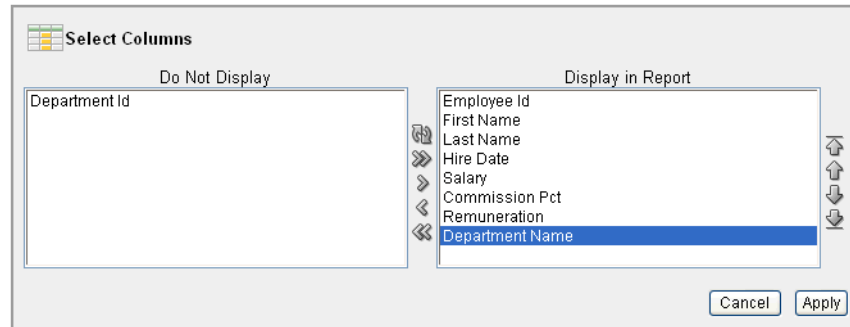
The next section explains how to add the column to the report display and how to use this column to filter employee reports.

Display Column in the Report

When you first run this report, use the Select Columns action to add the Department Name column to the display. Once this column is visible on the report, make this report the default and filter by department.

To add the Department Name column to the report:

1. Click **Run Page 3** icon.
2. Select the **Actions** menu and select **Select Columns** from the list.
3. Move the Department Name from the Do Not Display box to the last entry in the Display in Report box.



4. Click **Apply**.

The Employees Report is displayed and includes the Department Name column.

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration	Department Name
200	Jennifer	Wheeler	17-SEP-97	\$4,400.00	-	\$32,800.00	Administration
201	Michael	Hartstein	17-FEB-96	\$13,000.00	-	\$156,000.00	Marketing
202	Pat	Fay	17-AUG-97	\$6,000.00	-	\$72,000.00	Marketing
114	Den	Debnagy	07-DEC-94	\$11,000.00	-	\$132,000.00	Purchasing
115	Alexander	Koo	18-MAY-95	\$3,100.00	-	\$37,200.00	Purchasing
116	Shelley	Stees	24-DEC-97	\$2,800.00	-	\$34,800.00	Purchasing
117	Sigal	Tobias	24-JUL-97	\$2,800.00	-	\$33,600.00	Purchasing
118	Ouy	Hirao	15-NOV-98	\$2,800.00	-	\$37,200.00	Purchasing
119	Karen	Coheners	10-AUG-99	\$2,500.00	-	\$30,000.00	Purchasing
203	Susan	Mavris	07-JAN-94	\$6,500.00	-	\$78,000.00	Human Resources
120	Matthew	West	18-JUL-95	\$9,000.00	-	\$108,000.00	Shipping
121	Adam	Fripp	10-APR-97	\$9,200.00	-	\$110,400.00	Shipping
122	Fayen	Kouling	01-MAY-95	\$7,900.00	-	\$94,800.00	Shipping
123	Shelia	Ullman	10-OCT-97	\$6,500.00	-	\$78,000.00	Shipping
124	Kevin	Mourgos	16-NOV-99	\$9,000.00	-	\$108,000.00	Shipping

Next, make these report settings the default.

Save Report Settings as the Default

This section describes how to save the current report settings as the default. Report settings are any setting made through the Actions menu including: selected columns, filters, sorting, control breaks, highlights, computed columns, aggregate columns, charts, flashback.

In this example, the default settings include the display of all columns with no additional Actions menu settings such as filters, sorting, highlights and so on in the report. Once the default settings are saved, these columns are the default display in this report:

- Employee Id
- First Name
- Last Name
- Hire Date
- Salary
- Commission Pct
- Remuneration
- Department Name

To save the current report settings as the default:

1. Run the Employees report page.
The current report default does not include the Department Name column when the report is displayed.
2. Click the **Actions** menu.
3. Select **Save Report** from the list.
4. For Save, select **As Default Report Settings** from the list.
5. Click **Apply**.

Note: If a reset is performed on this page, these default report settings are used. The Department Name column is displayed by default.

Linking a Column Value to Another Page

In this exercise, you add a link to the Number of Employees column on the Departments report that navigates the user to the Employees report. It also sets the focus to the selected department. The column link includes a Clear Interactive Report command, CIR, to clear the Employees report, when shown, of any filters, control breaks, highlights, aggregates, computed columns, chart settings and flashback settings.

Topics included in this section:

- [Change Column Value to a Link](#)
- [Run the Departments Report](#)
- [Create a Highlight to Test Clear Interactive Report Command](#)

Change Column Value to a Link

To make this change, you edit the report attributes on the Departments report to change the value for the Number of Employees column to a link.

To change the column value to a link:

1. Navigate to the Page Definition for the Departments page, page 2.
2. Under Regions, click **Interactive Report**.
The Interactive Report Attributes page appears.
3. Locate the Column Attributes section.
4. In the Column Attributes section, click the **Edit** icon next to Number of Employees.
5. Scroll down to the Column Link section.
6. Under Column Link, make these changes:
 - a. Link Text - Select **[Number of Employees]**
 - b. Page - Enter 3.
 - c. Select the **Reset Pagination** check box.
 - d. Clear Cache - Enter 3 , CIR

The 3 means the cache for page 3 is cleared and the string CIR clears the Employees interactive report of any filters, control breaks, highlights, aggregates, computed columns, chart settings or flashback settings when the report is displayed.

Note: If you want to reset the interactive report to the default report settings instead of clear the report, replace CIR with RIR. The last saved default report settings are applied to the interactive report.

e. Item 1, Name - Enter **IR_DEPARTMENT_ID**.

By prefixing the item name with IR_, the URL item will be associated with an interactive report column rather than an item on the page.

f. Item 1, Value - Select **#Department ID#**.

The Column Link section shows all the options you selected.

In summary, these options enable the following behavior when the end user clicks the link:

- The end user is navigated to page 3, the Employees report.
- On the Employees report, the selected department is in focus.
- The Employees report is cleared. This means any filters, control breaks, highlights, aggregates, computed columns, chart settings or flashback settings are removed.
- The user is returned to the first set of employee records when the user selects another department.

g. Click **Apply Changes**.

Note that in the Column Attributes section, the Number of Employees row contains a check mark in the Link column, reflecting the change you just made.

Run the Departments Report

Now it's time to run the report and test the Number of Employees column link from the Departments report. The Employees report is displayed showing all employees that belong to the selected department.

1. Click the **Run Page 2** icon.

The Departments report is displayed. Note that end users can now drill down on the data in the Number of Employees column.

Number Of Employees
3
5
6
6
45
34
1
2
1
1
2

2. In the Number of Employees column, click the 3 for the Executive row.

All employees that belong to the Executive department appear in the Employees report.

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration	Department Name
100	Steven	King	17-JUN-87	\$24,000.00	-	\$200,000.00	Executive
101	Neena	Kochhar	21-SEP-89	\$17,000.00	-	\$204,000.00	Executive
102	Lex	De Haan	13-JAN-93	\$17,000.00	-	\$204,000.00	Executive

The Department Id filter is displayed because this report is filtered by the Department Id value for the Executive department, 90, passed to this report from the Departments report. Notice the Clear Interactive Report command is included at the end of the URL in your browser, as shown in this example:

```
f?p=9257:3:3672543193352902::NO:RP,3,CIR:IR_DEPARTMENT_ID:90
```

Create a Highlight to Test Clear Interactive Report Command

This exercise demonstrates how to use the CIR command to clear a highlight before displaying the Employees report. To show this, you highlight any rows containing the first name of Neena, then display the Employees report from the Number of Employees column on the Departments report.

To highlight rows in the Employees report:

1. Click the **Actions** menu and select **Highlight**.
The Highlight options appear.
2. For Highlight options make these changes:
 - a. Name - Enter Neena
 - b. Background Color - Select **[yellow]**
 - c. Text Color - Select **[blue]**
 - d. Column - Select **First Name**
 - e. Operator - Select =

- f. Expression - Select **Neena**
- g. Click **Apply**.

The Employees report appears with the row for Neena highlighted.



Employee ID	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration	Department Name
100	Steven	King	17-JUN-07	\$24,000.00	-	\$24,000.00	Executive
102	Neena	Kochhar	21-SEP-05	\$17,000.00	-	\$17,000.00	Executive
102	Lev	De Haan	13-JAN-03	\$17,000.00	-	\$17,000.00	Executive

3. Click the **Home** breadcrumb.
4. Click **Departments** link.
5. Click **Number of Employees** in the Executive row.

The Employees report is displayed with the highlighting cleared, due to the `CIR` command specified in the column link.

Adding a Conditional Department Details Report

In this exercise, you add a report as a region that displays department details. You also create a condition so that the report displays department information only if you select a department. If you select **No Department Assigned**, the Department Details report does not appear.

Topics in this section include:

- [Creating the Report and Condition](#)
- [Add a List of Values](#)
- [Add an Item to Display List of Values](#)
- [Add a Branch](#)
- [Change Employees Report Query](#)
- [Change Column Link on Department Report](#)
- [Turning Off Pagination](#)

Creating the Report and Condition

First, create the report and set it to conditionally display.

To create the report and condition:

1. Navigate to the Page Definition for page 3, Employees.
2. Under Regions, click the **Create** icon.
3. For Region, make these changes:
 - a. Identify the type of region to add to this page - Select **Report** and click **Next**.
 - b. Report Implementation - Accept the default, **SQL Report**, and click **Next**.
4. For Display Attributes, make these changes:
 - a. Title - Enter `Department Details`.
 - b. Region Template - Select **No Template**.
 - c. Sequence - Enter 7.

- d. Accept the remaining defaults and click **Next**.
5. For Source, make this change:
 - a. Enter the following query:


```
SELECT count(e2.employee_id) "Number of Employees:",
       substr(e.first_name,1,1)||'. '|| e.last_name "Manager Name:",
       c.country_name "Location:"
FROM   oehr_departments d, oehr_employees e,
       oehr_locations l, oehr_countries c,
       oehr_employees e2
WHERE  d.manager_id    = e.employee_id
AND    d.location_id   = l.location_id
AND    d.department_id = e2.department_id
AND    l.country_id    = c.country_id
AND    nvl(d.department_id, '-1') = nvl(:P3_DEPARTMENT_ID, '-1')
GROUP BY substr(e.first_name,1,1)||'. '||e.last_name, c.country_name
```
 - b. Click **Next**.
 Next, you create a condition that does not display department details when the user selects the **No Department Assigned** option.
6. For Report Attributes, make these changes:
 - a. Report Template - Select **default: vertical report, look 1 (include null columns)**.
 This selection displays the list vertically.
 - b. Accept the remaining defaults and click **Next**.
7. For Conditional Display, make these changes:
 - a. Condition Type - Select **Value of Item in Expression 1 != Expression 2**.
 Note the exclamation point (!) included after Expression 1 in the option to select.
 - b. Expression 1 - Enter:
 P3_DEPARTMENT_ID
 - c. Expression 2 - Enter:
 -1
 The -1 indicates no Department has been assigned.
 - d. Click **Create Region**.
8. Under Regions, click **Create** icon.
9. Select **HTML** and click **Next**.
10. Select **HTML** and click **Next**.
11. For Create Region, make these changes:
 - a. Title - Enter Department
 - b. Region Template - Select **No Template**
 - c. Sequence - Enter 5
 - d. Click **Create**.

Add a List of Values

In this section, you create a list of values that is used to select which department details to view. This is a dynamic list that queries the OEHR_DEPARTMENTS table for a list of all the department names.

To create a list of values:

1. Click **Shared Components** icon at the top right next to the Run Page 3 icon.
2. Under User Interface, select **Lists of Values**.
3. Click the **Create** button.
4. Accept the default, From Scratch, and click **Next**.
5. For Name, enter DEPARTMENTS and select **Dynamic**.
6. Click **Next**.
7. For the Query, enter the following SQL:

```
SELECT department_name d, department_id v
FROM oehr_departments
ORDER BY d
```

8. Click **Create List of Values**.

Add an Item to Display List of Values

Now, you create an item in the Department Details region to display the list of departments.

To add an item:

1. Navigate to the Page Definition for page 3, Employees.
2. Under Items, click the **Create** icon.
3. Select **Select List** and click **Next**.
4. Select **Select List with Submit** and click **Next**.
5. For Create Item, make these changes:
 - a. Item Name - Enter P3_DEPARTMENT_ID
 - b. Sequence - Enter 10
 - c. Region - Select **Department (1) 5**
 - d. Click **Next**.
6. For Identify List of Values, make these changes:
 - a. Named LOV - Select **DEPARTMENTS**
 - b. Display Null Option - Select **Yes**
 - c. Null Text - Enter - No Department Assigned -
 - d. Null Value - Enter -1
 - e. Click **Next**.
7. For Label, enter Department and click **Next**.
8. For Item Source Value, enter -1
9. Click **Create Item**.

Add a Branch

You need to add a branch that returns to the Employees page 3 when the user chooses a department from the Department list of values.

1. Under Branches, click the **Create** icon.
2. Accept defaults and click **Next**.
3. For Page, enter 3.
4. Select **reset pagination for this page** and click **Next**.
5. Accept defaults and click **Create Branch**.

Change Employees Report Query

Now, you change the Employees report query to display employees that belong to the selected department.

To change the query:

1. Under Regions, click the **Employees** link.
2. Enter the following SQL for Region Source:

```
SELECT  e.EMPLOYEE_ID,
        e.FIRST_NAME,
        e.LAST_NAME,
        e.HIRE_DATE,
        e.SALARY,
        e.COMMISSION_PCT,
        calc_remuneration(salary, commission_pct) REMUNERATION,
        e.DEPARTMENT_ID,
        d.DEPARTMENT_NAME
FROM    OEHR_EMPLOYEES e,
        OEHR_DEPARTMENTS d
WHERE   e.DEPARTMENT_ID = d.DEPARTMENT_ID(+) AND
        (e.DEPARTMENT_ID = :P3_DEPARTMENT_ID or
         (e.DEPARTMENT_ID is null and nvl(:P3_DEPARTMENT_ID, '-1') = '-1'))
```

3. Click **Apply Changes**.

Change Column Link on Department Report

Because the Employees query has changed, the Number of Employees column link needs to initialize the P3_DEPARTMENT_ID item to the value of DEPARTMENT_ID.

To change the column link for Number of Employees:

1. Click the **Application ID** breadcrumb.
2. Click **2 - Departments**.
3. Under Regions, click the **Interactive Report** link.
4. Click the **Edit** icon for Number of Employees.
5. Under Column Link, enter P3_DEPARTMENT_ID for Item 1.
6. Click **Apply Changes**.

Turning Off Pagination

Next, turn off pagination for the Department Details report, because only one record (the department details report) displays at a time. If pagination is on, the region that displays the department details includes the information *row 1 - 1*.

To turn off pagination:

1. Click the **Application ID** breadcrumb.
2. Click **3 - Employees**.
3. Under Regions, click **Report** (next to Department Details).
4. Scroll down to Layout and Pagination.
5. For Pagination Scheme, select **- No Pagination Selected -**.
6. Click **Apply Changes**.
7. Run the page.
8. To remove the Department id = 90 filter, select the **Remove Filter** icon next to the filter.
9. From the Department list, select **No Department Assigned**.

Home > Employees

Department: - No Department Assigned -

Search: Rows: 15 Go

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct
178	Kimberely	Grant	24-MAY-1999	7000	.15

1 - 1

Employee Kimberly Grant appears. This employee is not currently assigned to a department. Therefore, no department details appear. The *1 - 1* you see on this form is part of the Employees report, not part of the Department Details region you just edited.

10. From the Department list, select **Marketing**.

Department: Marketing

Number of Employees: 2

Manager Name: **M. Hartstein**

Location: **Canada**

Note the details under Department.

Adding Your Company Name

You can add a graphical logo or text to your application so that it displays on each page. Your page template determines the display location.

In this exercise, you add your company name to your application.

To add your company name to your application:

1. Navigate to the Application home page. Click the **Application** link on the Developer toolbar (at the bottom of the page).
2. Click **Shared Components**.
3. Under Application, click **Definition**.
The Edit Application Definition page appears.
4. Under Logo:
 - a. Logo Type - Select **Text**.
 - b. Logo - Enter **AnyCo Corp**.
 - c. Logo Attributes - Select **Black Text** from the pop up list.
5. Click **Apply Changes**.
6. Click **Application** link on Developer toolbar.
7. Click **Run Application** icon.



The company name now appears on each page in your application.

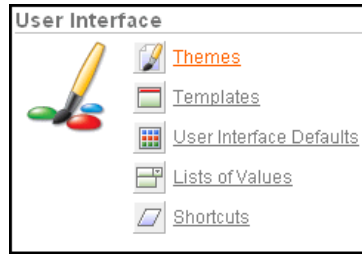
Switching Themes to Change the User Interface

In this exercise, you switch the current theme to another one for your application. A **theme** is a collection of templates that defines the application user interface. Each theme contains templates for every type of application component and page control, including individual pages, regions, reports, lists, labels, menus, buttons, and list of values.

Oracle Application Express separates presentation (or user interface themes) from the application logic. You can design your application in one theme, change to another supplied theme, or create and use your own custom theme. By separating the application logic (such as queries, processes, and branches) from the HTML rendering, your application can take advantage of the latest designs and other technological advances without an application rewrite. Each theme provides a complete set of templates that accommodate every user interface pattern that may be needed in an application.

To switch the theme:

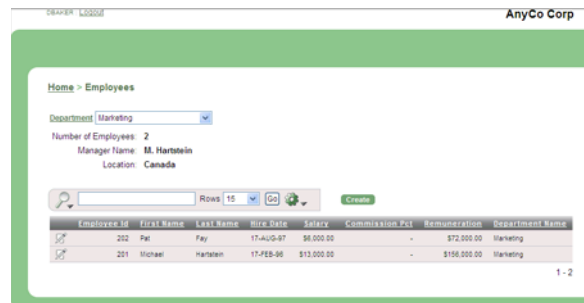
1. Click the **Application** link on the Developer toolbar (at the bottom of the page).
2. On the Application home page, click **Shared Components**.
3. Under User Interface, click **Themes**.



4. On the Themes page, click **Create**.
The Create Theme Wizard appears.
5. For Method, accept the default, **From the Repository**, and click **Next**.
6. For Identify Theme, select **Theme 11** and click **Next**.
7. For Confirm, click **Create**.
8. Click **Switch Theme**.
9. For Identify Theme, accept the default, **11. Round Green**, and click **Next**.
10. For Verify Compatibility, review the information, accept the defaults, and click **Next**.

The wizard verifies that corresponding templates exist in the selected theme for all templates used in your current application. If a template is missing, it warns you with a message in the Status column. For this tutorial, you can ignore this message because Oracle Application Express maps missing region templates to existing ones.

11. For Confirm Switch, click **Switch Theme**.
12. Run the page.



The color scheme and display layouts are changed in all your pages.

About Deploying Your Application

This section describes basic information about deploying your Oracle Application Express application. It also shows you how to create end users and to determine the URL of your application.

This section contains the following topics:

- [Overview of Deploying Your Application](#)
- [Creating End Users](#)
- [About Publishing the Application URL](#)

Overview of Deploying Your Application

After building your application in your development environment, you need deploy it so that end users can begin using it. Deploying involves the following steps:

1. Collect your supporting object definitions (CREATE object statements, sample data, images, files, and so on). Review the Database Dependencies report to determine which supporting objects to move. See "Viewing Application Reports" in *Oracle Application Express Application Builder User's Guide*.
2. Define your supporting objects. This includes the object definitions you collected in the previous step and other supporting objects, such as messages and prerequisites.
3. Export the application with its supporting objects.
4. Import and install the exported files.

Using Oracle Application Express greatly simplifies the deployment process. It enables you to migrate the application definition, associated files, and all supporting objects in just a few steps.

See also: "Deploying an Application" in *Oracle Application Express Application Builder User's Guide*.

Creating End Users

After moving your application to a production environment, you must now create user accounts within Oracle Application Express for all your end users.

To create end user accounts:

1. Navigate to the Workspace home page.

2. From the Administration links list on the right, click **Manage Application Express Users**.
3. Under the Tasks list on the right, click the **Create End User** link.

The Create User page appears.

4. Under Account Control:
 - Set Account Availability - Select **Unlocked**.
 - Require Change of Password On First Use - Select **No** if you do not want to force this user to change his or her password at first log in.
5. Under User Identification, enter the appropriate information:
 - a. User Name - Enter a user name for this end user.
 - b. Password and Confirm Password - Enter a case-sensitive password for this account.
 - c. Email Address - Enter the valid email address for this end user.
6. Under Developer Privileges:
 - a. Accessible Schemas (null for all) - Leave this blank to allow the end user to access all applications in the workspace, or enter a colon-delimited list of schemas to restrict the end user's access.

If a user does not have access to the schema that an application is built on, the user cannot access the application.
 - b. Default Schema - Accept the default value, that is, the schema you set up for this guide.
 - c. User is a developer - Accept the default, **No**.
 - d. User is a workspace administrator - Accept the default, **No**.

Selecting No limits the user to only accessing and using the application, not modifying the application itself.
7. Under User Groups, you can select a user group.

You can use groups to restrict access to various parts of an application. Groups are primarily useful when using Application Express Authentication.

8. Under Additional Attributes, you can enter additional user information.
9. Click **Create User** or **Create and Create Another**.

See also: "Managing Application Express Users" in *Oracle Application Express Administration Guide*

About Publishing the Application URL

After deploying your application, you must now publish its URL so end users know how to access it.

To determine the URL:

1. Log in to Oracle Application Express on the production environment.
2. Select the application.
3. On the Application home page, position the mouse over the **Run Application** icon.
4. Note the URL that displays in the status bar at the bottom of the page.

For example:

```
http://apex.oracle.com/pls/apex/f?p=11563:1:3397731373043366363
```

Where:

- `apex.oracle.com` is the URL of the server.
- `pls` is the indicator to use the `mod_plsql`.
- `apex` is the database access descriptor (DAD) name. The DAD describes how Oracle HTTP Server connects to the database server so that it can fulfill an HTTP request. The default value is `apex`.
- `f?p=` is a prefix used by Oracle Application Express.
- `11563` is the application being called.
- `1` is the page within the application to be displayed.
- `3397731373043366363` is the session number, which is unique for every user's access to the application. Do not include session numbers as a part of the URL communicated to end users.

To run this example application, you would go to this URL:

```
http://apex.oracle.com/pls/apex/f?p=11563:1
```

See also: "Deploying an Application" in *Oracle Application Express Application Builder User's Guide*

About Globalization

This section describes some basic information about globalization. It also leads you through the steps to specify how the application determines global identification.

This section contains the following topics:

- [About Language Identification and Rendering](#)
- [Specifying the Method for Global Identification](#)

About Language Identification and Rendering

You can develop applications in Application Builder that run concurrently in different languages. This feature enables different users to view the application in their own language and data in the appropriate formats.

When rendering a page in the application, Oracle Application Express first determines the language for an application based on the method you specified. Then, the Application Express engine alters the session language and territory settings for a specific page request. It then looks for a translated application in the appropriate language. If the Application Express engine finds that language, it renders the application using that definition. Otherwise, it renders the application in the base (or primary) application language.

Even if your application is not translated, the language display determines the format for displaying data so that end users view numbers, dates, and currency in the appropriate formats.

Specifying the Method for Global Identification

As part of the application definition settings, you can specify how the application determines which language and formats to display. You can base it on the user's browser language preference or restrict it to the language you specify.

To specify the method for determining global identification:

1. Click **Application Builder** and then select the application.
2. Click **Shared Components**.
3. Under Globalization, click **Edit Attributes**.
4. Under Globalization, specify the following:
 - a. **Application Primary Language** - Select the language you used when developing the application.

- b. Application Language Derived From - Select **Browser (use browser language preference)**.

This option enables users to view the application in the language specified in their browsers.

- c. Automatic CSV Encoding - Select **Yes** or **No**.

Automatic CSV Encoding controls the encoding of all comma-delimited (CSV) report output in an application. If Automatic CSV Encoding is set to Yes, CSV report output is properly converted to a character set compatible with localized desktop applications. The character set for the CSV encoding is determined by the Application Language Derived From setting.

For example, the end user whose browser setting is German (de) sees these changes on the Employees page of AnyCo Corp:

- The euro currency symbol appears for the amounts in the Salary and Remuneration columns.
- The amounts reflect the formatting used in Germany (commas and decimals).
- The Hire Date reflects the date format used in Germany.

Employees						
Edit	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration
	Matthew	Weiss	18.07.96	€8.000,00		€96.000,00
	Adam	Fripp	10.04.97	€8.200,00		€98.400,00
	Payam	Kaufling	01.05.95	€7.900,00		€94.800,00
	Shanta	Vollman	10.10.97	€6.500,00		€78.000,00

Note that the application fields are not yet translated. For instructions on translating your application, see "Managing Application Globalization" in *Oracle Application Express Application Builder User's Guide*.

Next Steps

Now that you have completed this guide, you are ready to take advantage of other resources to expand your knowledge of Oracle Application Express and boost your productivity. This section describes those resources.

This section contains the following topics:

- [Downloading Public Packaged Applications and Sample Code](#)
- [Additional Resources](#)

Downloading Public Packaged Applications and Sample Code

If you are using Oracle Application Express 2.2 or later, you can download packaged applications and sample code from the Oracle Application Express Web site. Packaged applications are fully functional applications that you can view, use, and customize. Sample code is provided as packaged applications that contain code examples to explain a solution.

To download public packaged applications and sample code:

1. In a Web browser, go to the following Web sites:

http://www.oracle.com/technology/products/database/application_express/packaged_apps/packaged_apps.html

2. Scroll down to review the available applications or code.
3. Click the link for the file you want to download, and save the file to your computer.
4. Unzip the file.
5. Log in to the workspace in Oracle Application Express where you want to use the packaged application or code.
6. Import and install the application.

Follow the same steps you performed when installing the sample objects for this guide. See "[Importing the OEHR Sample Objects](#)" on page 3-5.

Additional Resources

To continue learning about Oracle Application Express, review these additional resources designed for Application Express users.

Advanced Tutorials

This guide provides exercises to expand your understanding of Oracle Application Express. See *Oracle Application Express Advanced Tutorials*.

Training Courses

You can attend training courses for Oracle Application Express.

To review the training courses:

1. In a Web browser, go to the Oracle Application Express Web site:
http://www.oracle.com/technology/products/database/application_express/index.html
2. Under More Information, click the **Oracle University Training** link.

Oracle Technology Network

Oracle Technology Network (OTN) is a central Web site for Oracle Application Express resources and information. In addition to downloading the latest product version, sample code, and packaged applications, the OTN site includes:

- Discussion forum, where you can post questions and search for solutions
- How-to documents, which are technical notes written by subject matter experts
- Quick tour of the product
- Oracle by Example provides step-by-step tutorials which demonstrate common tasks
- News and magazine articles related to Oracle Application Express

To access OTN for Oracle Application Express:

1. Log in to Oracle Application Express.
2. On the Workspace home page, click **Oracle Technology Network** or **Discussion Forum** in the Links section on the right side of the page.

Note: If you are not currently using Oracle Application Express, you can go directly to this OTN Web site:
http://www.oracle.com/technology/products/database/application_express/index.html

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