

Oracle® Database

2 Day + Application Express Developer's Guide

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Oracle Database 2 Day + Application Express Developer's Guide, Release 4.2

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Preface

Oracle Database 2 Day + Application Express Developer's Guide introduces you to application development using Oracle Application Express. This guide shows you how to set up a development environment, or access a hosted demonstration environment. 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.

Topics:

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

Topic Overview

This document contains the following sections:

Title	Description
Changes in This Release	Describes changes in this document for Oracle Application Express, release 4.2.
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.

Title	Description
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.
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 Database 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.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Related Documents

For more information, see these Oracle resources:

- *Oracle Application Express Installation Guide*
- *Oracle Application Express Release Notes*
- *Oracle Application Express End User's Guide*
- *Oracle Application Express Application Builder User's Guide*
- *Oracle Application Express SQL Workshop 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*
- *Oracle Database PL/SQL Language Reference*

For additional documentation available on Oracle Technology Network (OTN), visit the Oracle Application Express website located at:

<http://www.oracle.com/technetwork/developer-tools/apex/overview/index.html>

For additional application examples, go to the Learning Library. Search for free online training content, including Oracle by Example (OBE), demos, and tutorials. To access the Oracle Learning Library, go to:

<http://www.oracle.com/technetwork/tutorials/index.html>

Printed documentation is available for sale in the Oracle Store at:

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

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

<http://www.oracle.com/technetwork/indexes/documentation/index.html>

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.

Changes in This Release

This preface contains:

- [Changes in Oracle Application Express Release 4.2](#)

Changes in Oracle Application Express Release 4.2

The following are changes in *Oracle Database 2 Day + Application Express Developer's Guide* for Oracle Application Express release 4.2.

- All content has been updated to reflect new functionality
- Screen captures and graphics have been added and updated to reflect Oracle Application Express release 4.2 user interface enhancements

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.

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.

Tip: To learn more about Oracle Application Express features, click **Learn more...** on the Workspace home page.

Understanding Oracle Application Express Architecture

Oracle Application Express installs with your Oracle database and is composed 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.

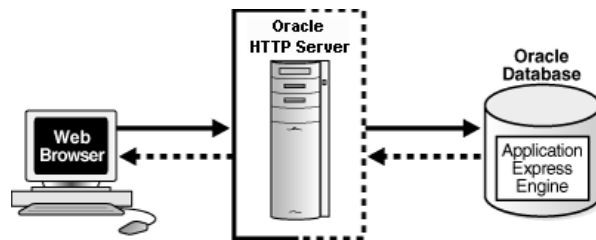
Understanding Web Listener Options

In order to run, Oracle Application Express must have access to Oracle Application Express Listener, Oracle HTTP Server and `mod_plsql`, or the embedded PL/SQL gateway.

About Oracle HTTP Server (Apache) and Oracle Application Express Listener

Oracle HTTP Server uses the `mod_plsql` plug-in to communicate with the Oracle Application Express engine within the Oracle database. Oracle Application Express Listener communicates directly with the Oracle Application Express engine, thus eliminating the need for the `mod_plsql` plug-in.

Both Oracle HTTP Server and the Oracle Application Express Listener function as communication brokers between the web server and the Oracle Application Express objects in the Oracle database. More specifically, they map browser requests into database stored procedure calls over an Oracle Net Services connection. The following graphic illustrates the Oracle Application Express architecture using Oracle HTTP Server and `mod_plsql`.



This three-tier architecture has the following components:

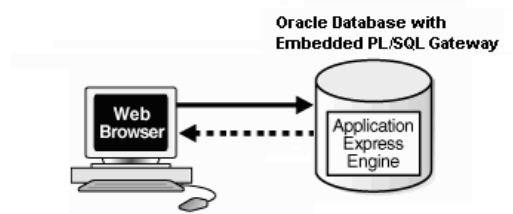
- A web browser
- Oracle HTTP Server (Apache) with `mod_plsql` or Oracle Application Express Listener
- An Oracle database containing Oracle Application Express

Advantages of either Oracle HTTP Server (Apache) with `mod_plsql` or Oracle Application Express Listener include:

- Separation of database tier from mid-tier
- Appropriate for Oracle Real Application Clusters (Oracle RAC) environments
- Versions before Oracle Database 11g Release 1 require Oracle Application Express Listener or Oracle HTTP Server (Apache) with `mod_plsql`

About the Embedded PL/SQL Gateway

The embedded PL/SQL gateway installs with the Oracle database. It provides the Oracle database with both a web server and the necessary infrastructure to create dynamic applications. The embedded PL/SQL gateway runs in the Oracle XML DB HTTP server in the Oracle database and includes the core features of `mod_plsql`. The following graphic illustrates the Oracle Application Express architecture using the embedded PL/SQL gateway.



This two-tier architecture has the following components:

- A web browser
- An Oracle database containing the embedded PL/SQL gateway and Oracle Application Express

Advantages of the embedded PL/SQL gateway:

- Ease of configuration
- Included in the database
- No separate server installation

See Also: "Security Considerations When Using the Embedded PL/SQL Gateway" in *Oracle Application Express Application Builder User's Guide*

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

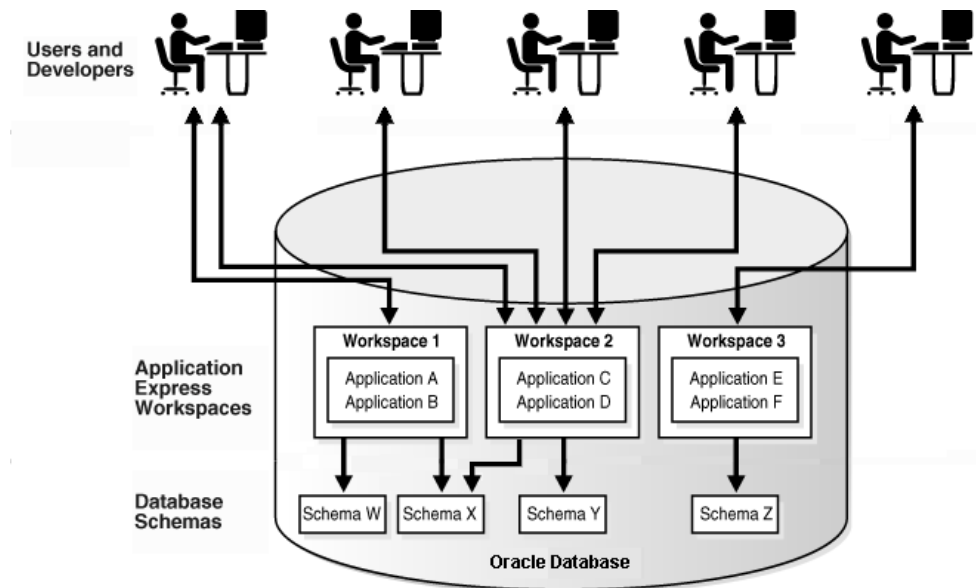
Oracle Application Express enables a single Oracle database to become a shared workgroup database service. Multiple users can access it using a web browser without installing additional software.

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 graphic shows the relationships between users and developers, workspaces, and database schemas.



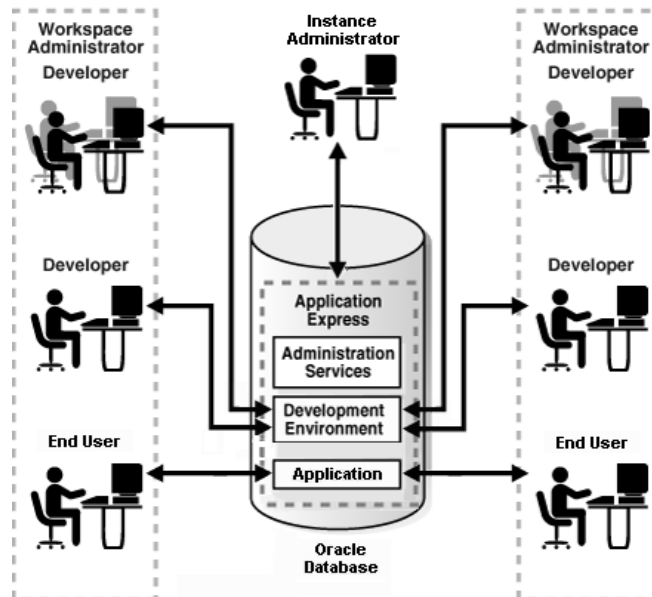
When you create a workspace, you associate it with a new or existing schema. A **schema** is a logical container for database objects such as tables, views, and stored procedures. A single schema can be associated with one or more workspaces.

About Oracle Application Express User Roles

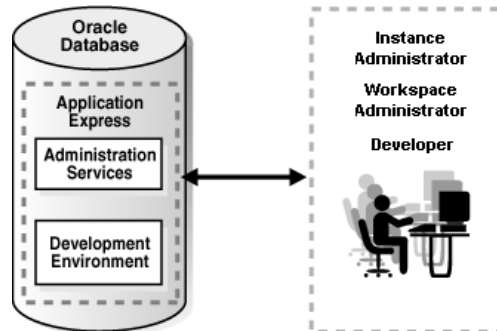
When setting up Application Express users at a large organization, you assign roles and privileges to specific users. The roles within Oracle Application Express include the following:

- **End users** are application users without any access to development or administrative capabilities.
- **Developers** are users who create and edit applications and modify database objects. Developers can have their own workspaces or share a workspace.
- **Workspace administrators** are developers who perform administrator tasks specific to a workspace such as managing user accounts, monitoring workspace activity, and viewing log files.
- **Instance administrators** are superusers who manage an entire hosted instance using the Application Express Administration Services application.

The following graphic 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: Instance Administrator, Workspace Administrator, and Developer. The following graphic 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 departments 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.

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:

- Install Oracle Application Express as described in *Oracle Application Express Installation Guide*.
- Read "[Introducing Oracle Application Express](#)" on page 1-1.
- Confirm that your web browser supports JavaScript and the HTML 4.0 and Cascading Style Sheet (CSS) 1.0 standards. The following browsers meet this requirement:
 - Microsoft Internet Explorer 7.0 or later version
 - Mozilla Firefox 14 or later version
 - Google Chrome 21 or later version
 - Apple Safari 5.0 or later version
- Enable cookies for your web browser.
- 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 website 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 using 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. Install Oracle Application Express and then follow the steps in "[Setting Up Your Own Local Environment](#)" on page 2-3.

Accessing the Hosted Demo Environment

To use 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. Click **Sign Up**.
3. Click **Get Started**.
4. On Welcome, review the information and click **Next**.
5. Identify the administrator for the service. Enter a first name, last name, and valid email address and click **Next**.

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

6. For Workspace, enter a workspace name.

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.

7. Specify a schema. Options include:
 - 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.

Click **Next**.

A survey appears.

8. Answer the survey questions and click **Next**.
9. Indicate why you are requesting this service and click **Next**.
A license agreement appears.
10. Review the agreement, select **I accept the terms**, and click **Next**.
11. Click **Submit Request**.

An initial email containing a link is sent to you. Click the link within the email 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 may 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 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 steps you must perform include:

1. Install Oracle Application Express as described in *Oracle Application Express Installation Guide*.
2. Log in to Application Express Administration Services, as described in "[Logging In To Administration Services](#)" on page 2-3.
3. Create a workspace, as described in "[Creating a Workspace](#)" on page 2-5.
4. (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 in one of these locations:

- If your setup uses the Oracle Application Express Listener, go to:

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

Where:

- *hostname* is the name of the system where Oracle Application Express Listener is installed.
- *port* is the port number assigned to Oracle Application Express Listener. In a default installation, this number is 8080. These defaults are correct at the time of the writing of this document. To learn more, see *Oracle Application Listener Installation and Developer Guide*.
- *apex* is the service name defined when configuring the Oracle Application Express Listener.

See Also: *Oracle Application Express Listener* documentation

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

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

Where:

- *hostname* is the name of the system where Oracle XML DB Protocol Server is installed.
- *port* is the port number assigned to HTTP on the Oracle XML DB Protocol 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 releases, or who have a custom configuration, this value may be `htmlb` or something else. Verify your DAD with your Instance administrator.

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

`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.

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 to Administration**.

Oracle Application Express Administration Services appears.

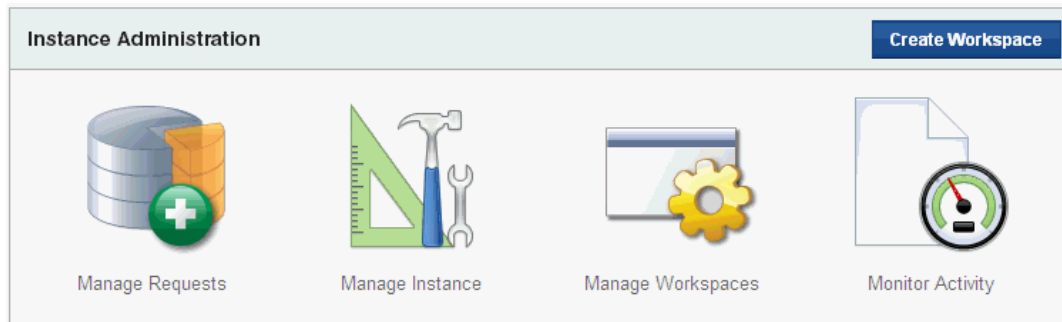
Creating a Workspace

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.

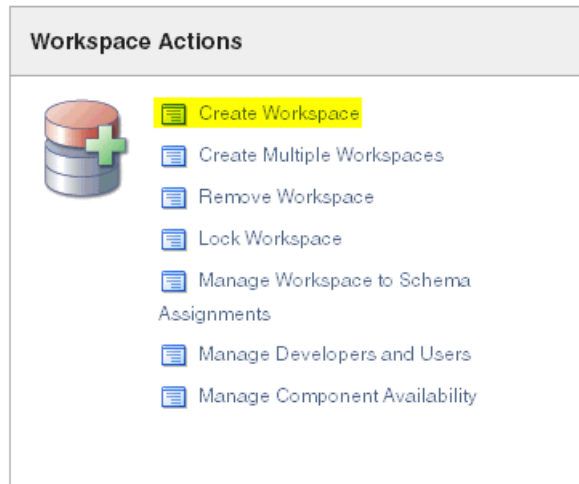
To create a workspace:

1. Log in to Oracle Application Express Administration Services.

The Instance Administration Home page appears.



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



The Create Workspace Wizard appears.

4. For Identify Workspace:

- 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. Workspace ID - Leave Workspace ID blank to have the new Workspace ID automatically generated. A Workspace ID must be a positive integer greater than 100000.
- c. Workspace Description - Enter a workspace description.
- d. Click **Next**.

5. For Identify Schema:

- 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 allocate the necessary space for creating the objects required for this guide.
- e. Click **Next**.

Select whether or not the schema already exists. If the schema exists, select the size of the associated tablespace to be created.

Re-use existing schema?

* Schema Name

* Schema Password

* Space Quota (MB)

6. For Identify Administrator:

- 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.

* Administrator Username

* Administrator Password

First Name

Last Name

* Email

7. Click **Next**.
8. Confirm your selections and click **Create Workspace**.
9. Click **Done**.

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 or the Oracle Application Express Listener:

`http://hostname:port/apex`

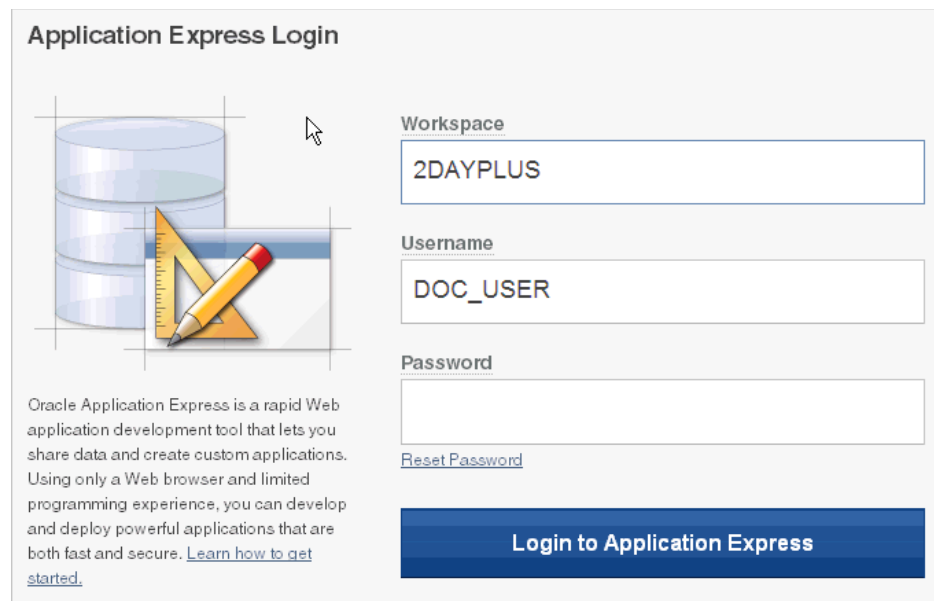
- If your setup uses the Oracle HTTP Server (Apache) with mod_plsql:

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

For an explanation of the URLs, see ["Logging In To Administration Services"](#) on page 2-3.

The Login page appears.

2. On the Login page, enter your login credentials.



Application Express Login

Workspace
2DAYPLUS

Username
DOC_USER

Password

[Reset Password](#)

[Login to Application Express](#)

Oracle Application Express is a rapid Web application development tool that lets you share data and create custom applications. Using only a Web browser and limited programming experience, you can develop and deploy powerful applications that are both fast and secure. [Learn how to get started.](#)

3. Click **Login to Application Express**.

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 a user account:

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. Click **Administration**.
3. Click **Manage Users and Groups**.
4. Click **Create User**.

The Create User page appears.

The screenshot shows the 'Create User' form. The top section, 'User Identification', contains fields for Username (required), Email Address (required), First Name, Last Name, Description, and Default Date Format. The bottom section, 'Account Privileges', contains fields for Default Schema (set to TWODAYPLUS), Accessible Schemas (null for all), User is a workspace administrator (radio buttons for Yes/No, with No selected), User is a developer (radio buttons for Yes/No, with Yes selected), Application Builder Access (Yes), SQL Workshop Access (Yes), Team Development Access (Yes), and Set Account Availability (Unlocked).

5. Under User Identification:
 - a. Username - Enter the username used to log in to the system. Restrictions include:
 - Maximum length of 100 characters
 - No spaces
 - Only these special characters are permitted: ampersand (@) and period (.)
 - b. Email Address - Enter the valid email address for this user.
 - c. First Name - Enter the first or given name to further identify the user (optional).
 - d. Last Name - Enter the last or family name to further identify the user (optional).
 - e. Description - Enter comments about this user (optional).
 - f. Default Date Format - Specify the default Oracle date format for the user. This specification controls the default date format within SQL Workshop.

6. Under Account Privileges:

- a. Default Schema - Specify the default schema used for data browsing, application creation, and SQL script execution.

When using workspaces that have multiple schemas available, this schema is the default. This setting does not control security, only the user's preference.

- b. Accessible Schemas (null for all) - Leave this blank to enable the end user to access all applications in the workspace, or enter a colon-delimited list of schemas for which this user has permissions when using the SQL Workshop.
- c. User is a workspace administrator - Specify if this user should have workspace administrator privileges.

Administrators are given access to all components. Additionally, they can manage user accounts, groups, and development services. Components may not be available if they are switched off by Instance Administrators.
- d. User is a developer - Specify if this user should have developer privileges.

Developers must have access to either Application Builder, SQL Workshop, or both. Components may not be available if they are switched off by Instance Administrators.
- e. Application Builder Access - Determines whether a developer has access to the Application Builder.
- f. SQL Workshop Access - Determines whether a developer has access to the SQL Workshop.
- g. Team Development Access - Determines whether a developer has access to the Team Development.
- h. Set Account Availability - Select **Locked** to prevent the account from being used. Select **Unlocked** to allow the account to be used.

7. Under Password:

- Password - Enter a case-sensitive password.
- Confirm Password - Enter the password again.
- Require Change of Password On First Use:
 - To require the user to change the password immediately after logging in the first time, select **Yes**.
 - To keep user from having to change the password immediately after logging in the first time, select **No**.

8. Under User Groups, optionally select a user group.

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.

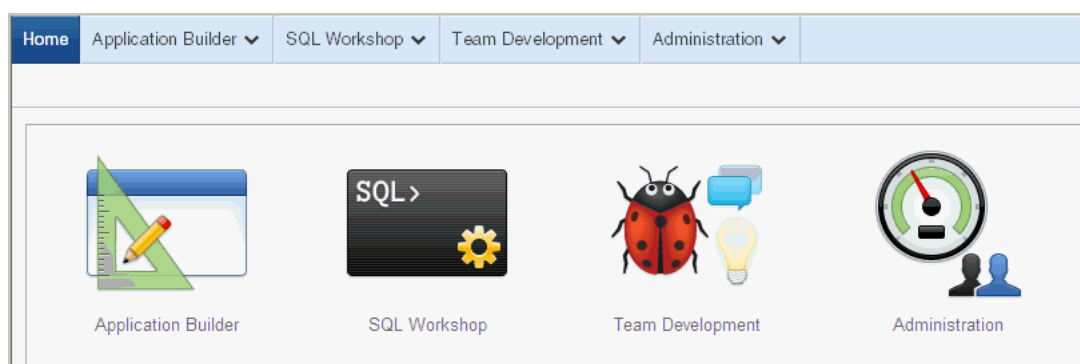
Before you begin, log in to Oracle Application Express. For instructions, see "[Accessing Your Development Environment](#)" on page 2-1.

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. The Workspace Home Page has the following large icons:

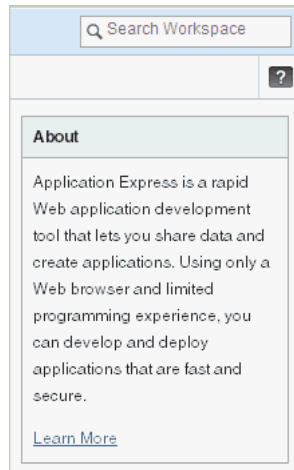


- **Application Builder.** Use Application Builder to assemble an HTML interface (or application) on top of database objects such as tables and procedures.
- **SQL Workshop.** Use the SQL Workshop to access tools for viewing and managing database objects.
- **Team Development.** Use Team Development to track new features, nonfeature to-do tasks, bugs, and milestones. Users can also provide real-time feedback which then can be categorized into features, to-do tasks, or bugs.
- **Administration** links to the Workspace Administration page.

Take a few minutes to explore the product.

About the Learn More Link

To the right of the Workspace Home Page icons is:



Click the **Learn More** link in the About box to view an informative introduction to Oracle Application Express. Topics covered include architecture, self service, security, Websheets, application development, SQL Workshop, Team Development, administration, and managing development.

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 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.

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/technetwork/testcontent/oehr-sample-objects-131098.zip>

The File Download window appears.

2. In the File Download window, click **Save**.

The Save As window appears.

3. Save the `oehr-sample-objects-131098.zip` file to your computer.
4. Unzip and extract the `oehr_sample_objects_installer.sql` file:
 - Microsoft Windows - Open the `oehr-sample-objects-131098.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 the 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 **Import**.
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 **Database Application, Page, or Component Export**.
 - c. File Character Set - Select the correct character set.
 - d. Click **Next**.

Next, you install the imported file.

5. To install an imported file, click **Next**.
The Install Database Application Wizard appears.
6. For Install Application, 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 Application**.

After you install the application, you must install the supporting objects.

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.

Note: The *OEHR Sample Objects* application that you just installed functions solely as a way to install the sample objects needed to complete the exercises in this document. You will not directly use this application.

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 "About the Workspace Utilization Report" in *Oracle Application Express Administration Guide*.
- Request additional storage space. See "Requesting a New Schema, More Storage, or Terminating Service" 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**.

This message appears: "Deinstall successful. Application definition deleted."

Viewing Your Database Objects

Review the objects you 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. It has two panes:
 - **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:

Tables

DEMO_STATES

DEMO_TAGS

DEMO_TAGS_SUM

DEMO_TAGS_TYPE_SUM

DEPT

EMP

OEHR_CATEGORIES_TAB

OEHR_COUNTRIES

OEHR_DEPARTMENTS

OEHR_EMPLOYEES

OEHR_INVENTORIES

OEHR_JOBS

OEHR_JOB_HISTORY

OEHR_LOCATIONS

OEHR_ORDERS

OEHR_ORDER_ITEMS

OEHR_PRODUCT_DESCRIPTIONS

OEHR_PRODUCT_INFORMATION

OEHR_PROD_REF_LIST_NTAB

OEHR_PROMOTIONS

OEHR_REGIONS

OEHR_SUBCAT_REF_LIST_NTAB

OEHR_EMPLOYEES

TableDataIndexesModelConstraintsGrantsStatisticsUI DefaultsTriggersDependencies

Add ColumnModify ColumnRename ColumnDrop ColumnRenameCopyDropTruncateCreate Lookup

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	-	-

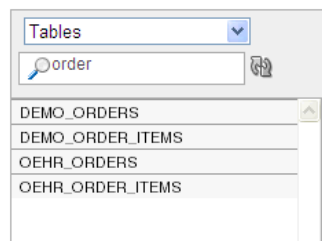
To see more rows of the table, use the scroll bar on the right side of the Detail Pane (not shown in preceding figure).

- Click the **Data** tab at the top of the Detail pane.

The data in the OEHR_EMPLOYEES table appears. Other tabs show additional details about the object you select.

- To search for an object name, enter a case-insensitive term in the Search field.

For example, search for "order":



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

See also: "Managing Database Objects with Object Browser" in *Oracle Application Express SQL Workshop 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 that you have installed the database objects as described in ["Installing the Sample Objects"](#) on page 3-2.

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 Report](#)
- [Linking a Column Value to Another Page](#)
- [Adding a List of Values to the Employees 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. [Modifying the Departments Report](#): Expand the report to pull in data from other tables.
3. [Using an Interactive Report](#): Run and use the Interactive Report.
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 Report](#): 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 List of Values to the Employees 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 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:

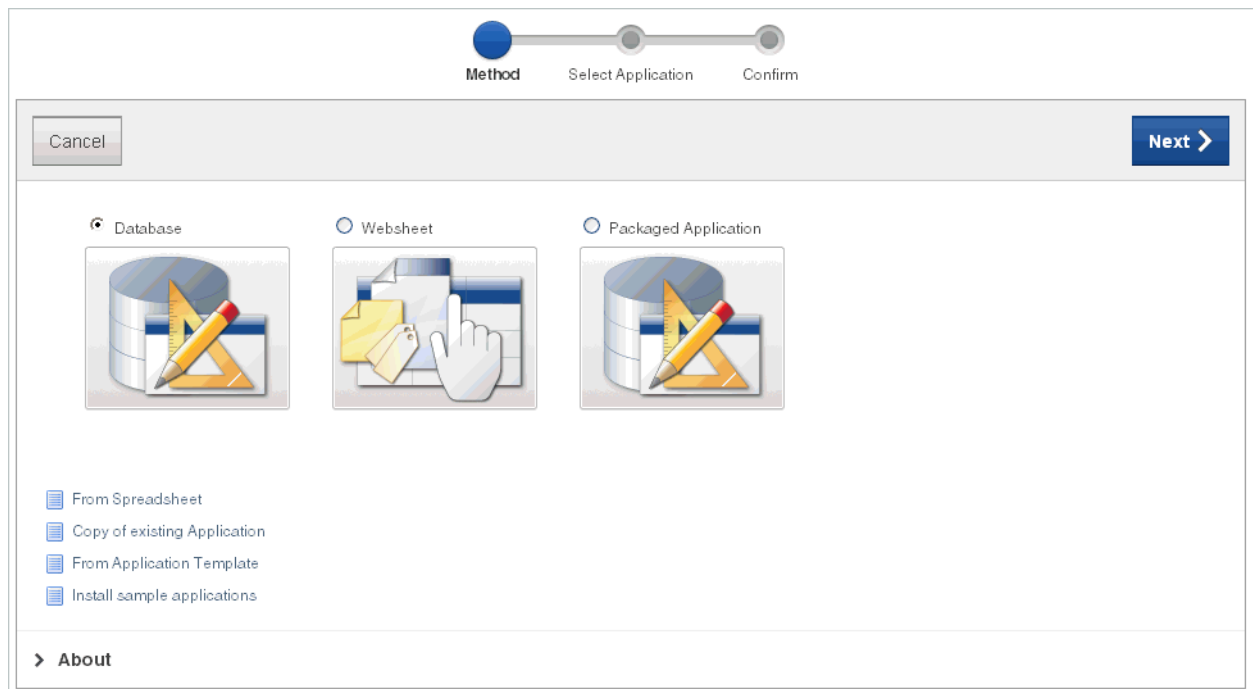
- Home - This page is the first page displayed when the application is run. This page contains a link to the Departments report.
- Departments - This page is an interactive report of all departments.

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

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 **Create**.

The Create Application Wizard appears.



Each page within a wizard displays the title of the wizard (for example, *Create Application*). Each wizard page also displays a line at the top, representing the sequence of steps. The highlighted circle 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. In the Create Application Wizard, select **Database** and click **Next**.

The Create Wizard shows that you are on the Name step.

5. For Name:
 - a. Application - Accept the default ID. The system provides a unique ID for each application you create in this workspace.
 - b. Name - Enter AnyCo Corp
 - c. Schema - Select the schema that contains the objects for this tutorial (for example, TWODAYPLUS).
 - d. Create Options - Select **Include Home Page**.
 - e. User Interface - Accept the default, **Desktop**.

Tip: When you move your cursor over an item that has Help, the mouse changes to a question mark. Clicking the item then displays Help in another window.

- f. Click **Next**.

The Create Wizard shows that you are on the Pages step.

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

Page	Page Name	Page Type	Source Type	Source	Delete
1	Home	Blank	-	-	X

Add Page

Select Page Type:

☒ Blank
 ☐ Report
 ☐ Report and Form
 ☐ Form

☐ Tabular Form
 ☐ Master Detail
 ☐ Chart

Action: Add blank page to application

Subordinate to Page: Home (1)

Page Name: Page 2

Next, add a report page on the OEHR_DEPARTMENTS table.

6. 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**.

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.

7. Click the link **Oehr Departments**.

The New Page Definition window appears.

8. Under Page Definition, change the Page Name to `Departments` and click **Apply Changes**.

The New Page Definition window closes.

You might have to refresh the page to see that the page name has changed to Departments.

9. On the Create Application page, click **Next**.

Next, define some application-level settings.

10. For Shared Components, accept the default, **No**, and click **Next**.

11. For Attributes, make these changes:

a. Authentication Scheme - Accept the default, **Application Express**.

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. Tabs - Select **No Tabs**.

c. Language - Accept the default, **English (en)**.

d. User Language Preference Derived From - Accept the default, **Application Primary Language**.

e. Date Format - Click the up arrow and select **12-JAN-04**.

f. Date Time Format - Click the up arrow and select **12-JAN-2004 1430**.

g. Timestamp Format - Click the up arrow and select **12-JAN-2004 1430**.

h. Timestamp Time Zone Format - Click the up arrow and select **12-JAN-2004 1430**.

i. Click **Next**.

The Create Wizard shows that you are on the User Interface Theme step.

12. For Show, select **All Themes**.

13. For Select a theme, select **Blue Builder (Theme 2)** and click **Next**.

The Create Wizard shows that you are on the Confirm step.










14. Verify the information and click **Create Application**.

This message appears: "Application Created Successfully."

A report at the bottom of the page displays the two pages you created, Home and Departments and a Login page that Oracle Application Express adds automatically to your application.

Note: To view the pages in Icon view, click the **View Icons** icon. Your view setting is retained from session to session.

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

Q		Go	  			Actions		
Page	Name	Updated	Updated By	Page Type	User Interface	Group	Lock	Run
1	Home	6 minutes ago	-	Home	Desktop	Unassigned		
2	Departments	6 minutes ago	-	Interactive Report	Desktop	Unassigned		
101	Login	6 minutes ago	-	Login	Desktop	Unassigned		

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.

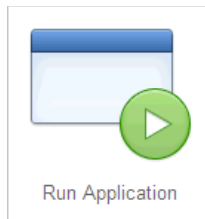
Previewing Your Application

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.

You can run an application in the following ways:

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



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



To preview your application:

1. On the Application home page, click **Run Application**.
2. The first time you run an application you are prompted to enter a user name and password. To continue, enter your workspace user name and password and 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.



The Home page has a link to the Departments page because you set up that hierarchy.

The Home page has the Developer toolbar at the bottom because you ran the application in the development environment. The Developer toolbar offers a quick way to edit the current page, create a page, region or page control, view the session state, or toggle in and out of Debug mode.

3. Click the link **Departments**.

The Departments report appears.

	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.

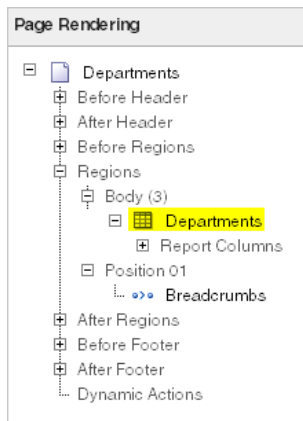
To modify the Departments report:

1. On the Developer toolbar (at the bottom of the page), click **Edit Page 2**.

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 3-2.

2. Under Page Rendering, locate **Regions**.
3. Expand **Regions** and locate **Departments**.



4. Right-click **Departments** and select **Edit**.

Tip: You can also double-click **Departments**.

The Region Definition appears.

5. 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

```

6. Click **Apply Changes**.

7. To confirm, click **Apply Changes**.

This message appears: "Interactive Report query changed successfully."

8. Right-click **Departments** and select **Edit Report Attributes**.

9. Next to Number of Employees, click the icon **Edit**.

10. Under Column Definition, for Column Alignment, select **center**.

This message appears: "Actions Processed."

11. Click **Apply Changes**.

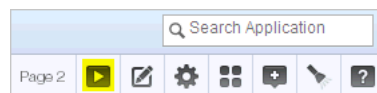
This message appears: "Actions Processed."

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. In the upper right corner, click the icon **Run Page**.



The revised Departments report appears.

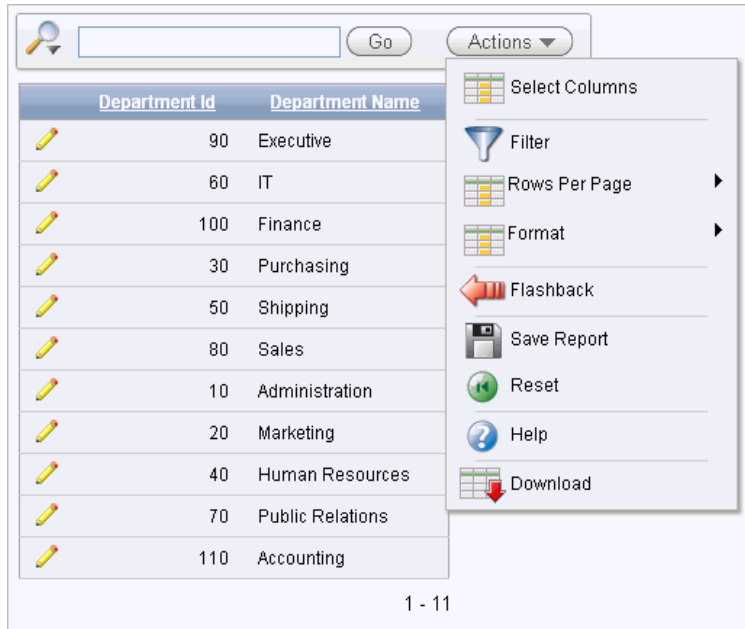
Department Id Department Name		
	90	Executive
	60	IT
	100	Finance
	30	Purchasing
	50	Shipping
	80	Sales
	10	Administration
	20	Marketing
	40	Human Resources
	70	Public Relations
	110	Accounting

1 - 11

The Manager Id and Location Id columns are not available. Also, the three new columns do not display on the revised report: Number of Employees, Manager Name, and Location.

2. To add the new columns, click the menu **Actions**.

The list of Action options appears.



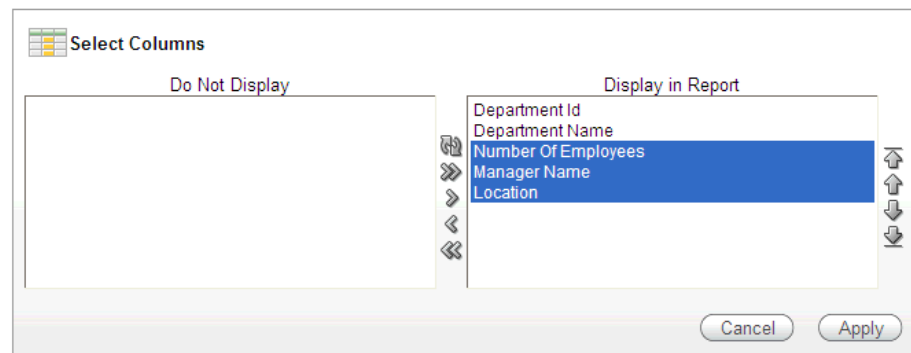
3. From the Actions menu, select **Select Columns**.

The columns that were added by the new SQL query are in the Do Not Display box.

4. To add these three columns to the Display in Report box, click the icon **Move All**, which resembles two forward arrows.



5. Verify that the columns are in the following order. If they are not, click up and down arrows to the right of the Display in Report list to change the order:
 - Department Id
 - Department Name
 - Number Of Employees
 - Manager Name
 - Location



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

1 - 11

Using an Interactive Report

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

Topics:

- [Save Report Settings as the Default](#)
- [Create a Filter](#)
- [Change the Sort Order](#)
- [Add a Controlled Break](#)
- [Display the Single Row View](#)
- [Reset Report Settings](#)

You 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 search, sort, highlight, and reset features to manipulate the Departments interactive report.

This tutorial only shows the most prominent functionality available with interactive reports. For complete details, see "Customizing Interactive Reports" in *Oracle Application Express Application Builder User's Guide*.

Save Report Settings as the Default

Both developers and end users can save an interactive report. However, only a developer can save the Primary Default report that initially displays.

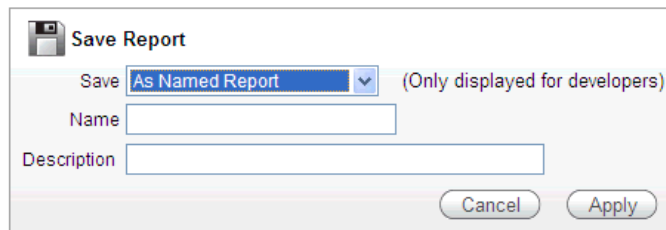
There are four types of interactive reports:

- **Primary Default** (Developer Only). The Primary Default is the report that initially displays. Primary Default reports cannot be renamed or deleted.
- **Alternative Report** (Developer Only). Enables developers to create multiple report layouts. Only developers can save, rename, or delete an Alternative Report.
- **Public Report** (End user). Can be saved, renamed, or deleted by the end user who created it. Other users can view and save the layout as another report.
- **Private Report** (End user). Only the end user that created the report can view, save, rename, or delete the report.

To save current report settings as the default:

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

The Save Report settings appear.



3. For Save, select **As Default Report Settings**.

The Default Report Type settings appear.

4. Select **Primary** and click **Apply**.

The report shows all columns when the user selects the Reset option from the menu Actions or when the page is reset by the command Reset Interactive Report (RIR).

See Also: For a description of how to save a report as a Named Report see "Customizing Interactive Reports" in the *Oracle Application Express Application Builder User's Guide*.

Create a Filter

This exercise shows you how to add a filter to the Departments report. This example creates a filter to show all departments except the department with Id 60.

There are multiple ways that a user can create a filter. The user can add a filter from the:

- Search Bar

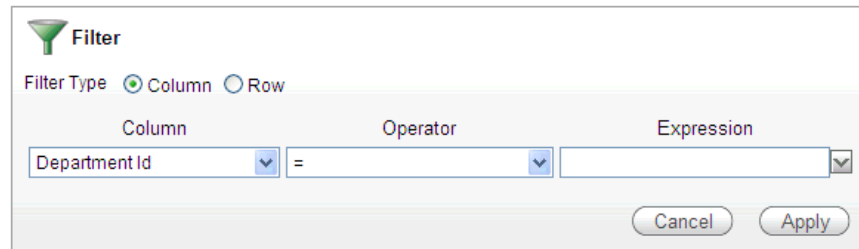
- Actions Menu
- Column Heading

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

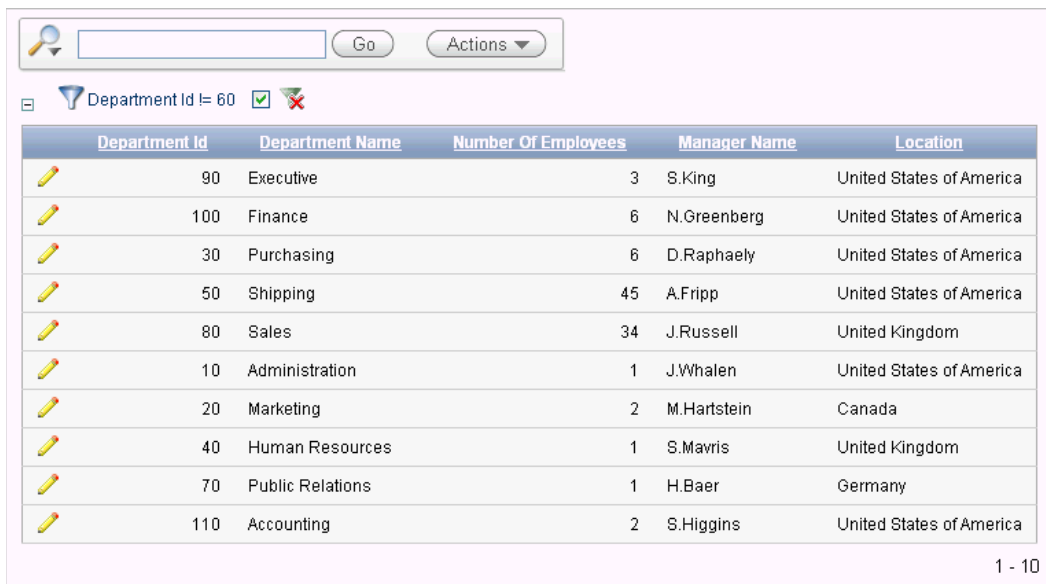
The filter settings display. You can also click the column heading link to create a filter for that column. Creating a filter from the column heading menu, however, is limited to the equal operator.



The image shows a 'Filter' dialog box. At the top, there is a green funnel icon and the word 'Filter'. Below this, 'Filter Type' has two radio buttons: 'Column' (selected) and 'Row'. Under 'Column', there are three fields: 'Column', 'Operator', and 'Expression'. The 'Column' field has a dropdown menu with 'Department Id' selected. The 'Operator' field has a dropdown menu with '=' selected. The 'Expression' field has a dropdown menu. At the bottom right, there are 'Cancel' and 'Apply' buttons.

3. From Operator, select the not equals operator (!=).
4. From Expression, select 60.
5. Click **Apply**.

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



The image shows a report interface. At the top, there is a search bar with a magnifying glass icon, a 'Go' button, and an 'Actions' dropdown menu. Below this, there is a filter bar showing 'Department Id != 60' with a checkmark icon and a delete icon (X over a filter icon). Below the filter bar is a table with 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

At the bottom right of the report, it says '1 - 10'.

The filter displays at the top of the report. You can edit, disable, or delete this filter. To edit, click the filter name. To disable, deselect the check box. To delete, click the Delete icon that looks like an X over the filter icon.

6. Deselect 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

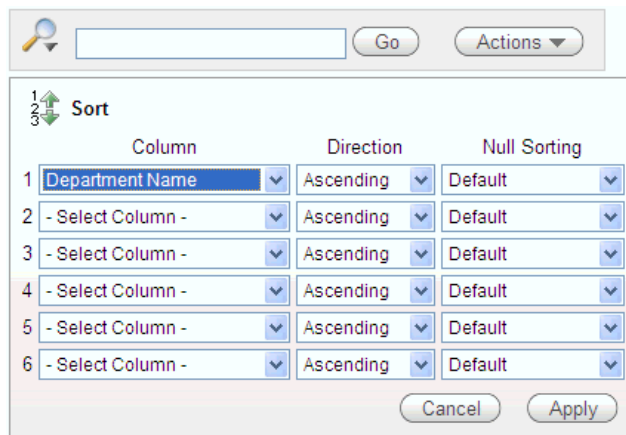
In this exercise, you learn how to reorder the data for each column.

To change the sort order:

1. Click the menu **Actions**.
2. Select **Format** and then **Sort**.

The sort settings are displayed. 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.

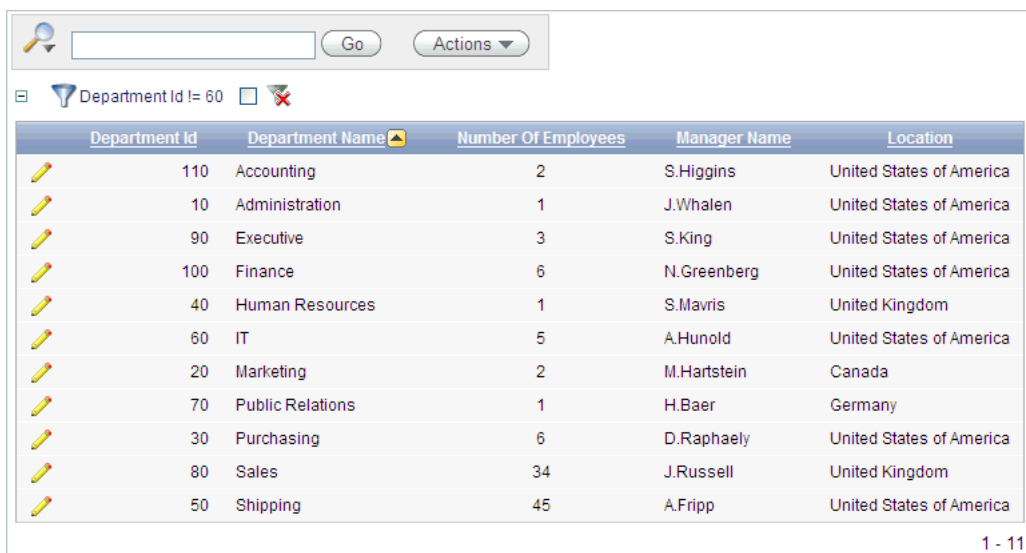
3. For the first column entry, select **Department Name**.



	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

The Up Arrow icon after the Department Name indicates that the column has been sorted in ascending order. You can click this arrow to re-sort the column.

Add a Controlled Break

Another way to reformat a report is to create a controlled break. A controlled break enables the user to delineate data into clearly visible groups.

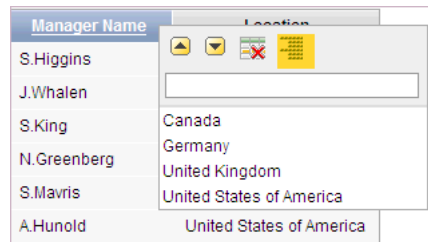
To add a controlled break:

1. Click the column heading **Location**.

The column heading menu appears.

2. Click the icon **Control Break** (shown below).

This option is also available from the menu Actions, Format.



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

Department Id	Department Name	Number Of Employees	Manager Name
Location : Canada			
20	Marketing	2	M.Hartstein
Location : Germany			
70	Public Relations	1	H.Baer
Location : United Kingdom			
40	Human Resources	1	S.Mavris
80	Sales	34	J.Russell

The Location control break report setting displays under the Search bar.

Display the Single Row View

You can also display details for a row by selecting the Edit icon.

To display a single row view:

1. In the first row, locate the **Edit** icon .

Department Id = 60

Location

Location : Canada

Department Id	Department Name	Number Of Employees	Manager Name
20	Marketing	2	M.Hartstein
70	Public Relations	1	H.Baer

Location : Germany

- In the first row, select the **Edit** icon.

The details page for the first row appears.

Home > Departments

< Report View > Row 1 of 11 ☐ Exclude Null Values ☐ Displayed Columns

Department Id	20
Department Name	Marketing
Number Of Employees	2
Manager Name	M.Hartstein
Location	Canada

Reset Report Settings

You can revert the report settings 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 "Customizing 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 "Customizing Interactive Reports as a Developer" in the *Oracle Application Express Application Builder User's Guide*.

To return to the default settings:

- Click **Report View**.
- Click the **Actions** menu and select **Reset**.
- When prompted to restore the default settings, 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. On the Developer toolbar (at the bottom of the page), click the link **Application ID**.
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 Report Page, make these changes:
 - a. Page Name - Change to `Employees`.
 - b. Region Title - Change to `Employees`.
 - c. Region Template - Select **Reports Region**.
 - d. Breadcrumb - Select **Breadcrumb**.
The Create Breadcrumb Entry section appears.
 - e. For Select Parent Entry, click the link **Home**.
Home appears in the Parent Entry field.
 - f. Click **Next**.
5. For Data Source page:
 - a. Table/View Owner - Accept the default, **TWODAYPLUS**.
 - b. Table/View Name - Select **OEHR_EMPLOYEES (table)**.
 - c. Click **Next**.
6. For Tabs Page, accept the default, Do not use tabs, and click **Next**.
7. For Report Columns page:
 - a. Adjust the selected columns so that these columns display in the right box:
 - `EMPLOYEE_ID`
 - `FIRST_NAME`
 - `LAST_NAME`
 - `HIRE_DATE`
 - `SALARY`
 - `COMMISSION_PCT`
 - b. Click **Next**.
You are still on the Report Columns step.
8. Accept the defaults for the link image and click **Next**.
Next, define the page and region information for the form.
9. For Form Page, make these changes:
 - a. Page Name - Enter `Create/Edit Employee`

- b.** Region Title - Enter Create/Edit Employee
 - c.** Click **Next**.
- 10.** For Primary Key Type, accept the default, **Managed by Database (ROWID)**, and click **Next**.
- 11.** In Select Column(s), move all columns from the left box to the right box and click **Next**.

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

- 12.** For Identify Process Options, accept the defaults and click **Next**.

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

- 13.** For Confirm, verify the information and click **Create**.

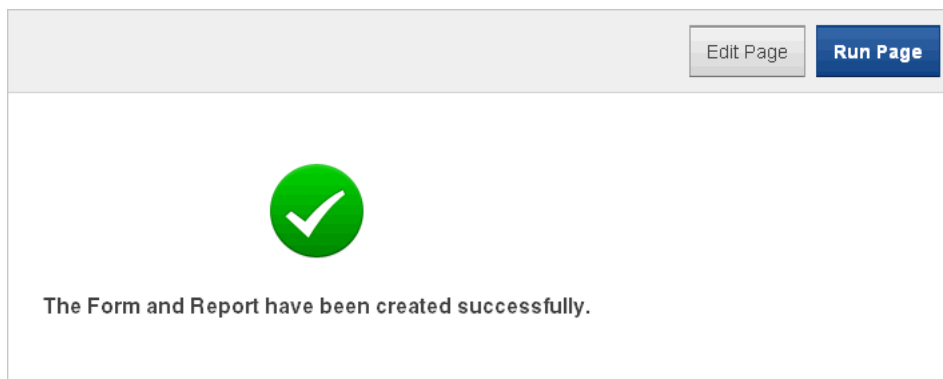
This message appears: "The Form and Report have been created successfully."

Previewing the Pages

















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

To preview the pages:

- 1.** Click **Run Page**.



The Employees report appears.

Home > Employees						
 <input type="text"/> <input type="button" value="Go"/> <input type="button" value="Actions"/> <input type="button" value="Create"/>						
Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	
 206	William	Gietz	07-JUN-94	8300	-	
 205	Shelley	Higgins	07-JUN-94	12000	-	
 200	Jennifer	Whalen	17-SEP-87	4400	-	
 100	Steven	King	17-JUN-87	24000	-	
 101	Neena	Kochhar	21-SEP-89	17000	-	
 102	Lex	De Haan	13-JAN-93	17000	-	
 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	-	
 108	Nancy	Greenberg	17-AUG-94	12000	-	
 203	Susan	Mavris	07-JUN-94	6500	-	
 103	Alexander	Hunold	03-JAN-90	9000	-	
 104	Bruce	Ernst	21-MAY-91	6000	-	

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 enable 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. Because you created a form based on a table with a report, the wizard automatically linked the report to the form. If you create only a report, as described in the previous section, ["Creating the Initial Application"](#), 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 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.

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

The Create/Edit Employee form appears. For example, if you click the Edit icon for the employee Steven King:

Home > Employees > Create/Edit Employee

Create/Edit Employee Cancel Delete Apply Changes

*Employee Id 100

First Name Steven

*Last Name King

*Email SKING

Phone Number 515.123.4567

*Hire Date 17-JUN-87

*Job Id AD_PRES

Salary 24000

Commission Pct

Manager Id

Department Id 90

Note the following about the Create/Edit Employee form:

- The Hire Date field displays a calendar, which is included because the data type of the underlying column is DATE.
- Fields with red asterisks are mandatory and cannot be blank or null.

Editing the Employees Report

In this exercise, you create a new column entitled Remuneration to display employee salaries in the Employees report.

Topics:

- [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. On the Developer toolbar, click **Home**.
2. Click **SQL Workshop** and then **SQL Commands**.

SQL Commands provides a window where you can run SQL commands (including those that create PL/SQL subprograms).

3. In the window (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

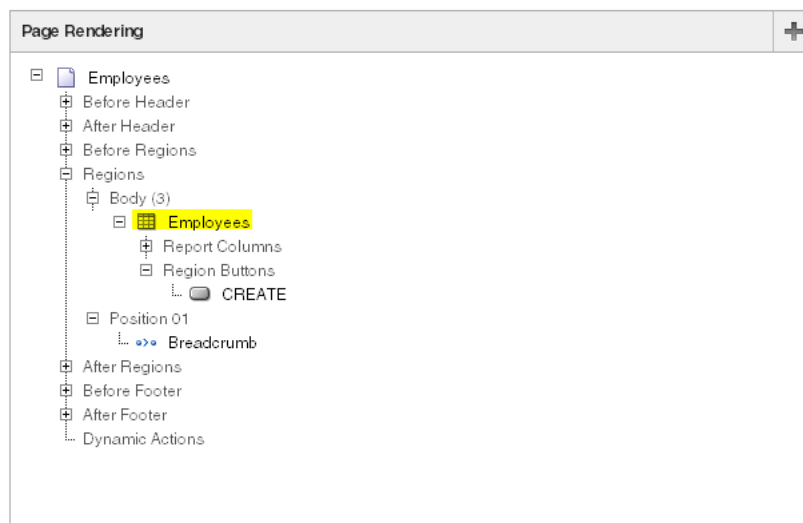
Next, add a column to display the results of the employees' salary calculations.

To add a column:

1. Navigate to the Page Definition for the Employees page:
 - a. Click the tab **Application Builder**.
 - b. Select the application **AnyCo Corp**.
 - c. Click the **Employees** page.

The Page Definition for the Employees page appears.

2. Under Regions, locate **Employees**.



3. Right-click **Employees** and select **Edit**.

The Region Definition appears.

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

```
SELECT "ROWID",
       "EMPLOYEE_ID",
       "FIRST_NAME",
       "LAST_NAME",
       "HIRE_DATE",
       "SALARY",
       "COMMISSION_PCT",
       calc_remuneration(salary, commission_pct) REMUNERATION
FROM "#OWNER#"."OEHR_EMPLOYEES"
```

5. Click **Apply Changes**.
6. To confirm, click **Apply Changes**.

This message appears: "Interactive report query changed successfully."

Previewing the Page

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

Home > Employees

Go Actions Create

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct
206	William	Gietz	07-JUN-94	8300	-
205	Shelley	Higgins	07-JUN-94	12000	-
200	Jennifer	Whalen	17-SEP-87	4400	-
100	Steven	King	17-JUN-87	24000	-
101	Neena	Kochhar	21-SEP-89	17000	-
102	Lex	De Haan	13-JAN-93	17000	-
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	-
108	Nancy	Greenberg	17-AUG-94	12000	-
203	Susan	Mavris	07-JUN-94	6500	-
103	Alexander	Hunold	03-JAN-90	9000	-
104	Bruce	Ernst	21-MAY-91	6000	-

1 - 15

To display the Remuneration column:

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

Select Columns

Do Not Display

Display in Report

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

Cancel Apply

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

Changing the Column Format

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

To change the column format:

1. On the Developer toolbar (at the bottom of the page), click **Edit Page 3**.
The Page Definition appears.
2. Under Regions, right-click **Employees** and select **Edit Report Attributes**.
The Interactive Report Attributes page appears.
3. Locate the section **Column Attributes**.

Next, change the format of the value in the Salary and Remuneration columns.

4. To edit the Salary format:
 - a. Next to SALARY, click the icon **Edit**.
 - b. For Number/Date Format, from the context menu, select **\$5,234.10**.
The appropriate format mask appears in the field.
 - c. Click **Apply Changes**.

This message appears: "Action Processed."

5. Repeat the previous step for REMUNERATION.
6. To preview the page, in the upper right corner, click the **Run Page** icon.

The numbers in the Salary and Remuneration columns now appear with the dollar sign and include commas and decimals.

<

Adding a Link on the Home Page to the Employees Report

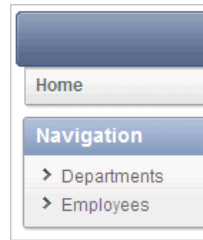
In this exercise, you add a link on the Home page to take users to the Employees report. This link appears in the Navigation region on the left side of the Home page.

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

- Navigate to the Page Definition for the Home page:
 - On the Developer toolbar (at the bottom of the page), click the link **Application ID**.
 - On the Application home page, click **Home**.
- Under Regions, right-click **Navigation** and select **Edit List**.
- On the List Details page, click **Create List Entry**.
- On the Create/Edit page, make the following changes:
 - List Entry Label - Enter **Employees**
 - Page - From the context menu, select **Employees**.
- Click **Create List Entry**.

This message appears: "Action Processed."

- Run the page.



Your Home page now includes a link to Employees.

7. To test the link, click **Employees**.

The Employees report appears.

Adding a Department Column to the Employees Report

In this exercise, you link the Employees and Departments reports. When you complete this section, the Employees report has 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. The report settings are saved as the default.

Topics:

- [Add a Column](#)
- [Display the Department Name 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. In the Developer toolbar, click **Edit Page 3**.
2. Under Regions, right-click **Employees** and select **Edit**.

The Region Definition appears.

3. Scroll down to **Source**.
4. Replace Region Source with the following SQL:

```
SELECT e.ROWID,
       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
```

5. Click **Apply Changes**.
6. To confirm, click **Apply Changes**.

This message appears: "Interactive Report query changed successfully."

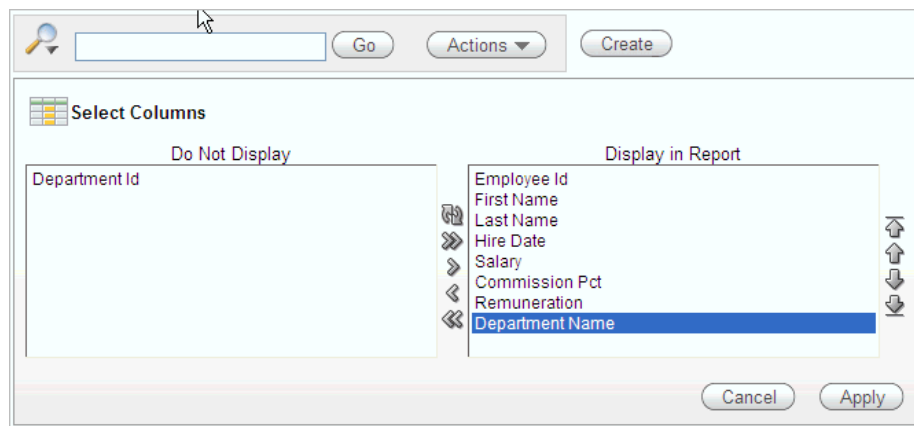
The next section explains how to add the column to the report display and how to use this column to filter employee reports.

Display the Department Name Column in the Report

When you first run this report, use the Select Columns action to add the Department Name column to the display. After 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 the icon **Run Page**.
2. Click the **Actions** menu and select **Select Columns**.
3. Move **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	Whalen	17-SEP-87	\$4,400.00	-	\$52,800.00	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	Raphaely	07-DEC-94	\$11,000.00	-	\$132,000.00	Purchasing
119	Karen	Colmenares	10-AUG-99	\$2,500.00	-	\$30,000.00	Purchasing
115	Alexander	Khoo	18-MAY-95	\$3,100.00	-	\$37,200.00	Purchasing
116	Shelli	Baida	24-DEC-97	\$2,900.00	-	\$34,800.00	Purchasing
117	Sigal	Tobias	24-JUL-97	\$2,800.00	-	\$33,600.00	Purchasing
118	Guy	Himuro	15-NOV-98	\$2,600.00	-	\$31,200.00	Purchasing
203	Susan	Mavris	07-JUN-94	\$6,500.00	-	\$78,000.00	Human Resources
198	Donald	OConnell	21-JUN-99	\$2,600.00	-	\$31,200.00	Shipping
199	Douglas	Grant	13-JAN-00	\$2,600.00	-	\$31,200.00	Shipping
120	Matthew	Weiss	18-JUL-96	\$8,000.00	-	\$96,000.00	Shipping
121	Adam	Fripp	10-APR-97	\$8,200.00	-	\$98,400.00	Shipping
122	Payam	Kaufling	01-MAY-95	\$7,900.00	-	\$94,800.00	Shipping

1 - 15

Next, make these report settings the default.

Save Report Settings as the Default

This section explains how to save the current report settings as the Primary Default report. Both developers and end users can save interactive reports. However, only a developer can save the report that initially displays, called the Primary Default report.

To save the current report settings as the default:

1. Run the report page **Employees**.
2. Click the **Actions** menu and select **Save Report**.
3. For Save, select **As Default Report Settings**.
4. Accept the Default Report Type setting, **Primary**, and 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:

- [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. On the Developer toolbar, click **Application ID**.
2. Click **Departments**.
3. Under Regions, right-click **Departments** and select **Edit Report Attributes**.
The Report Attributes page appears.
4. Locate the section **Column Attributes**.
5. In the Column Attributes section, next to Number of Employees, click the **Edit** icon.
6. Scroll down to the section **Column Link**.
7. Under Column Link, make these changes:

- a. Link Text - Select **#Number of Employees#**.
- b. Page - From the context menu, select **Employees**.

In the Page field, the number of the Employees page, 3, appears.

- c. Select **Reset Pagination**.
- 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.

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

The prefix `IR_` associates the URL item with an interactive report column rather than an item on the page.

- f. Item 1, Value - From the context menu, select **#DEPARTMENT_ID#**.

The Column Link section shows the options you selected.

Column Link

Link Text:

[Number of Employees] [Icon 1] [Icon 2] [Icon 3] [Icon 4] [Icon 5] [Icon 6] [Icon 7] [Icon 8]

Link Attributes:

Target: Page: ☒ Reset Pagination

Request: Clear Cache:

	Name	Value
Item 1	<input type="text" value="IR_DEPARTMENT_ID"/>	<input type="text" value="#DEPARTMENT_ID#"/>
Item 2	<input type="text"/>	<input type="text"/>
Item 3	<input type="text"/>	<input type="text"/>

Page Checksum:

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

- The end user is navigated to page 3 of the Employees report.
- On the Employees report, the selected department is in focus.
- The Employees report is cleared—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.

This message appears: "Action Processed."

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

Run the Departments Report

Now, 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 icon Run Page.

The Departments report is displayed. End users can now drill down on the data in the Number of Employees column by clicking the numbers in that column.

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

- In the Executive row, in the Number of Employees column, click 3.

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration	Department Name
100	Steven	King	17-JUN-87	\$24,000.00	-	\$288,000.00	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. The Clear Interactive Report command is included at the end of the URL in your browser, as shown in this example:

```
f?p=100625:3:13870074215647::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. 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:

- Click the **Actions** menu and select **Format** and then **Highlight**.

The Highlight options appear.

- For Highlight options:
 - Name - Enter Neena
 - Background Color - Select [yellow]
 - Text Color - Select [red]
 - Column - Select **First Name**
 - 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-87	\$24,000.00	-	\$288,000.00	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

3. Next, reset the report.

a. Click the breadcrumb **Home**.

b. Click link **Departments**.

c. In the Executive row, click **Number of Employees**.

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

4. To the right of **DepartmentID = 90**, click the icon **Remove Filter**.

5. On the Developer toolbar, click **Application ID**.

Adding a List of Values to the Employees Report

In this exercise, you add a list of values to the Employees page to display employees by department. You also change the Employees report query, edit the column link on the Department report, and turn off pagination.

Topics:

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

Add a List of Values

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

To create a list of values:

1. Click **Shared Components**.
2. Under User Interface, select **Lists of Values**.
3. Click **Create**.

4. Accept the default, **From Scratch**, and click **Next**.
5. For Name and Type:
 - a. Name - Enter `DEPARTMENTS`
 - b. Type - Select **Dynamic**.
 - c. Click **Next**.
6. For the Query, enter:


```
SELECT department_name d, department_id v
FROM oehr_departments
ORDER BY d
```
7. Click **Create List of Values**.
This message appears: "Dynamic list of values created."

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 the Employees page.
2. Under Region, right-click **Employees** and select **Create Page Item**.
3. Select **Select List** and click **Next**.
4. For Display Position and Name:
 - a. Item Name - Enter `P3_DEPARTMENT_ID`
 - b. Sequence - Enter 10
 - c. Region - Select **Employee (10)**
 - d. Click **Next**.
5. For Item Attributes:
 - a. Label - Enter `Department`
 - b. Accept the remaining defaults and click **Next**.
6. For Settings:
 - a. Value Required - Select **No**.
 - b. Page Action when Value Changed - Select **Redirect and Set Value**.
 - c. Click **Next**.
7. For List of Values, make these changes:
 - a. Named LOV - Select **DEPARTMENTS**
 - b. Display Null Value - Select **Yes**
 - c. Null Display Value - Enter:

- No Department Assigned -
 - d. Null Return Value - Enter:

-1

e. Click **Next**.

8. Click **Create Item**.

This message appears: "Item P3_DEPARTMENT_ID created."

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, right-click **Employees** and click **Edit**.

2. For Region Source, enter:

```
SELECT e.ROWID,
       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**.

This message appears: "Region Updated."

Change Column Link on Department Report

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

To change the column link for Number of Employees:

1. Click the breadcrumb **Application ID**.

2. Click **Departments**.

3. Under Regions, right-click **Departments** and select **Edit Report Attributes**.

4. For Number of Employees, click the icon **Edit**.

5. Scroll down to **Column Link**.

6. For Item 1 Name, select **P3_DEPARTMENT_ID**.

7. Click **Apply Changes**.

This message appears: "Action Processed."

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 breadcrumb **Application ID**.
2. Click **Employees**.
3. Under Regions, right-click **Employees** and select **Edit Report Attributes**.
4. Scroll down to **Pagination**.
5. For Pagination Type, select **- No Pagination Selected -**.
6. Click **Apply Changes**.
This message appears: "Action Processed."
7. Click the **Run Page** icon.
8. From the Department list, select **No Department Assigned**.

Employee Id	First Name	Last Name	Hire Date	Salary	Commission Pct	Remuneration	Department Name
178	Kimberely	Grant	24-MAY-99	\$7,000.00	.15	\$96,600.00	-

The row for employee Kimberly Grant appears. This employee is not currently assigned to a department.

Tip: If no records initially display, reload the page and try again.

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.

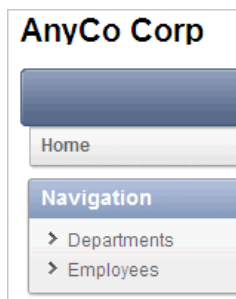
To add your company name to your application:

1. Navigate to the Application home page: On the Developer toolbar (at the bottom of the page), click **Application ID**.
2. In the upper right corner, click **Edit Application Properties**.
The Edit Application Definition page appears.
3. Click **User Interface**.
4. Under Logo:
 - a. Logo Type - Select **Text**.
 - b. Logo - Enter AnyCo Corp

c. Logo Attributes - Select **Black Text**.

This message appears: "Application *id_number* processed."

5. Click **Apply Changes**.
6. Click **Home**.
7. Click the **Run Page** icon.



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

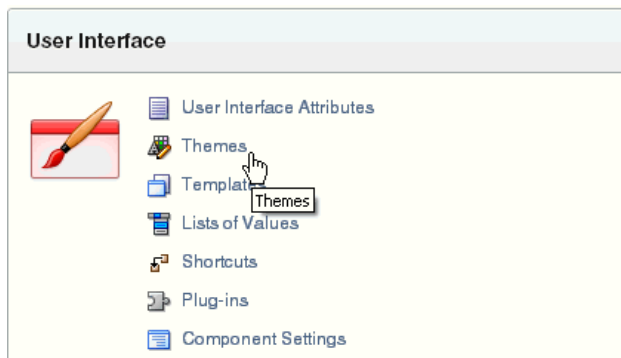
Switching Themes to Change the User Interface

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



4. On the Themes page, click **Create**.

The Create Wizard appears.

5. For Method, accept the default, **From the Repository**, and click **Next**.
6. For User Interface, accept the default, **Desktop**, and click **Next**.
7. For Identify Theme, select **Cloudy (Theme 24)** and click **Next**.
8. Click **Create**.

This message appears: "Theme created."

9. Click **Switch Theme**.

10. For Identify Theme:

- For Currently Active Theme, select **2. Builder Blue**.
- For Switch to Theme, select **24. Cloudy**.

Click **Next**.

11. 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.

12. For Confirm Switch, click **Switch Theme**.

13. Click the icon **Run Page**.



The design and layout are changed in all your pages.

About Deploying Your Application

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

Topics:

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

Overview of Deploying Your Application

After building your application in your development environment, you must 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 Object Dependencies report to determine which supporting objects to move. See "Viewing Application Utilities and 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 only a few steps.

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

Creating Users

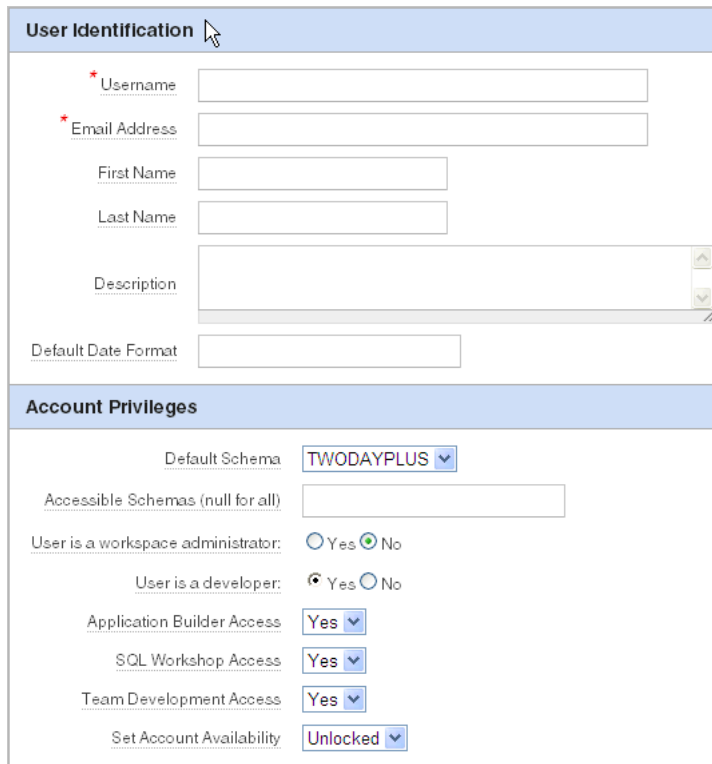
After moving your application to a production environment, you must create user accounts within Oracle Application Express for your end users.

Note: For the following procedure, you need workspace administrator privileges.

To create user accounts:

1. Navigate to the Workspace home page.
2. Click **Administration**.
3. Click **Manage Users and Groups**.
(This icon appears only if you have workspace administrator privileges.)
4. Click **Create User**.

The Create User page appears.



The screenshot shows the 'Create User' page with two main sections: 'User Identification' and 'Account Privileges'.

User Identification:

- * Username:** A text input field.
- * Email Address:** A text input field.
- First Name:** A text input field.
- Last Name:** A text input field.
- Description:** A text area with a scroll bar.
- Default Date Format:** A text input field.

Account Privileges:

- Default Schema:** A dropdown menu set to 'TWO DAY PLUS'.
- Accessible Schemas (null for all):** A text input field.
- User is a workspace administrator:** Radio buttons for 'Yes' and 'No'.
- User is a developer:** Radio buttons for 'Yes' and 'No'.
- Application Builder Access:** A dropdown menu set to 'Yes'.
- SQL Workshop Access:** A dropdown menu set to 'Yes'.
- Team Development Access:** A dropdown menu set to 'Yes'.
- Set Account Availability:** A dropdown menu set to 'Unlocked'.

5. Under User Identification:
 - a. Username - Enter the username used to log in to the system. Restrictions are:
 - Maximum length of 100 characters
 - No spaces
 - Only these special characters are permitted: ampersand (@) and period (.)
 - b. Email Address - Enter the email address for this user.
 - c. First Name - (Optional) Enter the first or given name to further identify the user.
 - d. Last Name - (Optional) Enter the last or family name to further identify the user.
 - e. Description - (Optional) Enter comments about this user.
 - f. Default Date Format - Specify the default Oracle date format for the user. This specification controls the default date format within SQL Workshop.
6. Under Account Privileges:

- a. Default Schema - Specify the default schema used for data browsing, application creation, and SQL script execution.

When using workspaces that has multiple schemas available, this schema is the default. This setting does not control security, only the user's preference.

- b. Accessible Schemas (null for all) - Leave this blank to enable the end user to access all schemas associated with the workspace.
- c. User is a workspace administrator - Specify if this user should have workspace administrator privileges.

Administrators have access to all components. Additionally, they can manage user accounts, groups, and development services. Components may not be available if they are switched off by Instance Administrators.

- d. User is a developer - Specify if this user should have developer privileges.

Developers must have access to either Application Builder, SQL Workshop, or both. Components may not be available if they are switched off by Instance Administrators.

- e. Application Builder Access - Determines whether a developer has access to the Application Builder.
- f. SQL Workshop Access - Determines whether a developer has access to the SQL Workshop.
- g. Team Development Access - Determines whether a developer has access to the Team Development.
- h. Set Account Availability - Select **Locked** to prevent the account from being used. Select **Unlocked** to allow the account to be used.

7. Under Password:

- Password - Enter a case sensitive password.
- Confirm Password - Enter the password again.
- Require Change of Password On First Use:
 - To require the user to change the password immediately after logging in the first time, select **Yes**.
 - To keep user from having to change the password immediately after logging in the first time, select **No**.

8. Under User Groups, optionally select a user group.

9. Click **Create User** or **Create and Create Another**.

This message appears: "User created."

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

About Publishing the Application URL

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

To determine the URL:

1. Log in to Oracle Application Express in the production environment.

2. Select **Application Builder**.
3. Select the application.
4. On the Application home page, position the mouse over **Run Application**.
5. 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 a session number in the URL that you give 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 provides some basic information about globalization. It also leads you through the steps to specify how the application determines global identification.

Topics:

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

See also: "Managing Application Globalization" in *Oracle Application Express Application Builder User's Guide*

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**.
2. Select the application.
3. Click **Shared Components**.
4. Under Globalization, click **Globalization Attributes**.

5. 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. Application Date Format - Specify the date format to be used in the application.
 - d. Application Date Time Format - Specify the date time format to be used in the application.
 - e. Application Timestamp Format - Specify the timestamp format to be used in the application.
 - f. Application Timestamp Time Zone Format - Specify the timestamp with time zone format to be used in the application.
 - g. Character Value Comparison - Determines the collating sequence for character value comparison in various SQL operations and clauses, for example, ORDER BY, LIKE, MIN/MAX. To learn more, see item Help.
 - h. Character Value Comparison Behavior - Determines the collation behavior of SQL operations, for example, LIKE, MIN/MAX. To learn more, see item Help.
 - i. Automatic Time Zone - Controls the setting of the database session time zone. When set to Yes, the client time zone is derived from the client's web browser and set for the duration of the Application Express session.
 - j. 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.

Definition Security **Globalization** User Interface

Application 100515

Show All Globalization

Globalization

Application Primary Language English (en) ▼

Application Language Derived From Browser (use browser language preference) ▼

Application Date Format DD-MON-RR ▲

Application Date Time Format DD-MON-YYYY HH24:MI ▲

Application Timestamp Format DD-MON-YYYY HH24:MI ▲

Application Timestamp Time Zone Format DD-MON-YYYY HH24:MI ▲

Character Value Comparison

Character Value Comparison Behavior Database session NLS setting (default) ▼

Automatic Time Zone No ▼

Automatic CSV Encoding Yes ▼

No translations found.

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).

Department Executive ▼

Q Go Actions ▼ Create

	Employee Id	First Name	Last Name	Hire Date	Salary	Remuneration	Department Name
	102	Lex	De Haan	13-JAN-93	€17.000,00	€204.000,00	Executive
	101	Neena	Kochhar	21-SEP-89	€17.000,00	€204.000,00	Executive
	100	Steven	King	17-JUN-87	€24.000,00	€288.000,00	Executive

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.

Note: Consider deleting the sample objects required to complete this tutorial to free up space in your workspace. For instructions, see ["Deleting the OEHR Sample Objects Application"](#) on page 3-5.

Additional Resources

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

Oracle Learning Library

Search for free online training content, including Oracle by Example (OBE), demos, and tutorials. To access the Oracle Learning Library, go to:

<http://www.oracle.com/technetwork/tutorials/index.html>

Training Courses

You can attend training courses for Oracle Application Express. To review these courses, go to the following website and enter Application Express in the search criteria field:

<http://education.oracle.com>

Oracle Technology Network

Oracle Technology Network (OTN) is a central website 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
- News and magazine articles related to Oracle Application Express

To access the Oracle Application Express page on OTN, go to the following website:

<http://www.oracle.com/technetwork/developer-tools/apex/overview/index.html>

A

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