Oracle® HTML DB

2 Day Developer

Release 2.0

B16376-01

July 2005

Oracle HTML DB 2 Day Developer, Release 2.0

B16376-01

Primary Author: Terri Winters

Contributors: Carl Backstrom, Sharon Kennedy, Sergio Leunissen, Raj Mattamal, and Simon Watt

Contents

4 How to Control Form Layout

5 How to Work with Check Boxes

6 How to Implement a Web Service

10 How to Build and Deploy an Issue Tracking Application

Send Us Your Comments

Oracle HTML DB 2 Day Developer, Release 2.0

B16376-01

Oracle welcomes your comments and suggestions on the quality and usefulness of this publication. Your input is an important part of the information used for revision.

- Did you find any errors?
- Is the information clearly presented?
- Do you need more information? If so, where?
- Are the examples correct? Do you need more examples?
- What features did you like most about this manual?

If you find any errors or have any other suggestions for improvement, please indicate the title and part number of the documentation and the chapter, section, and page number (if available). You can send comments to us in the following ways:

- Electronic mail: infodev_us@oracle.com
- FAX: (650) 506-7227 Attn: Server Technologies Documentation Manager
- Postal service:

  Oracle Corporation
  Oracle Server Technologies Documentation
  500 Oracle Parkway, Mailstop 4op11
  Redwood Shores, CA 94065
  U.S.A.

If you would like a reply, please give your name, address, telephone number, and electronic mail address (optional).

If you have problems with the software, please contact your local Oracle Support Services.

Preface

Oracle HTML DB 2 Day Developer contains tutorials with step-by-step instructions that explain how to create a variety application components and complete applications using the Oracle HTML DB development environment.

This preface contains these topics:

- Audience
- Documentation Accessibility
- Related Documents
- Conventions

Audience

Oracle HTML DB 2 Day Developer is intended for application developers who are building database-centric Web applications using Oracle HTML DB, release 1.6. To use this guide, you need to have a general understanding of Oracle HTML DB release 1.6, relational database concepts, and the operating system environment under which you are running Oracle HTML DB.

Documentation Accessibility

Our goal is to make Oracle products, services, and supporting documentation accessible, with good usability, to the disabled community. To that end, our documentation includes features that make information available to users of assistive technology. This documentation is available in HTML format, and contains markup to facilitate access by the disabled community. Accessibility standards will continue to evolve over time, and Oracle is actively engaged with other market-leading technology vendors to address technical obstacles so that our documentation can be accessible to all of our customers. For more information, visit the Oracle Accessibility Program Web site at

`http://www.oracle.com/accessibility/`

Accessibility of Code Examples in Documentation

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

Accessibility of Links to External Web Sites in Documentation

This documentation may contain links to Web sites of other companies or organizations that Oracle does not own or control. Oracle neither evaluates nor makes any representations regarding the accessibility of these Web sites.

TTY Access to Oracle Support Services

Oracle provides dedicated Text Telephone (TTY) access to Oracle Support Services within the United States of America 24 hours a day, seven days a week. For TTY support, call 800.446.2398.

Related Documents

For more information, see the following documents in the Oracle Database 10*g* Release 2 (10.2) and Oracle HTML DB Release 2.0 documentation set:

- *Oracle HTML DB User's Guide*
- *Oracle Database Concepts*
- *Oracle Database Application Developer's Guide - Fundamentals*
- *Oracle Database Administrator's Guide*
- *Oracle Database SQL Reference*

For information about Oracle error messages, see *Oracle Database Error Messages*. Oracle error message documentation is available only in HTML. If you only have access to the Oracle Database 10*g* Release 2 (10.2) Online Documentation Library, you can browse the error messages by range. Once you find the specific range, use your browser's "find in page" feature to locate the specific message. When connected to the Internet, you can search for a specific error message using the error message search feature of the Oracle online documentation.

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

Printed documentation is available for sale in the Oracle Store at

`http://oraclestore.oracle.com/`

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

`http://otn.oracle.com/membership/`

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

`http://otn.oracle.com/documentation/`

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	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.

1

How to Create a Tabular Form

A tabular form enables users to update multiple rows in a table at once using a single page. You can use the Tabular Form Wizard to create a tabular form that contains a built-in multiple row update process. This built-in process performs optimistic locking behind the scenes to maintain the data integrity.

This tutorial explains how to create a tabular form within an existing application and then how to change one of the updatable columns from a text field to a select list.

This section contains the following topics:

- About Sample Application
- Creating a Tabular Form Using a Wizard
- Changing Updatable Column Display Type

About Sample Application

Oracle HTML DB installs with a number of demonstration applications. In this exercise you will create a tabular form within the demonstration application, *Sample Application*.

To see if *Sample Application* is installed:

1. Log in to Oracle HTML DB.
2. Click the down arrow on the right side of the **Application Builder** icon.
3. From the menu, select **Demonstrations**.

   The Demonstration Applications page appears, displaying links to the following applications:

   - *Sample Application* offers a working demonstration that highlights basic design concepts
   - *Collection Showcase* demonstrates shopping cart concepts
   - *Web Services* serves an example of how you can use Web Services
   - *Presidential Inaugural Addresses* demonstrates Oracle Text
4. Locate Sample Application and check the Status column:

   a. If the Status column displays **Installed**, return to the Workspace home page.

   b. If the Status column displays **Not Installed**, select **Install** in the Action column.

   c. Follow the on-screen instructions.

Creating a Tabular Form Using a Wizard

The Tabular Form Wizard creates a form to perform update, insert, and delete operations on multiple rows in a database table. Additionally, the wizard creates a multiple row update process that checks for MD5 checksum values before doing the update in order to prevent lost updates. The following exercise creates a tabular form on the `EMP` table.

To create a tabular form using the Tabular Form Wizard:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select **Sample Application**.
4. Click **Create Page**.
5. For the page type, select **Form** and click **Next**.
6. Select **Tabular Form** and click **Next**.
7. On Identify Table/View Owner:
   a. From Table/View Owner, select the owner of the `EMP` table.
   b. From Allowed Operations, accept the default.
   c. Click **Next**.
8. For Table/View Name, select **EMP** and click **Next**.
9. On Identify Columns to Display:
   a. For Use User Interface Defaults, accept the default.
   b. For Select Columns, press **CTRL** and select the following columns:

   ```
   ENAME, JOB, HIREDATE, SAL, COMM
   ```

   Note: This exercise limits the number of columns to optimize the display on-screen. For a real form, you would probably want to include additional columns.

   ---

   c. Click **Next**.
10. For Primary Key Column 1, accept the default **EMPNO** and click **Next**.
11. For Source Type, accept the default, **Existing trigger**, and click **Next**.
12. For Updatable Columns, press **CTRL** and select the following columns and click **Next**:

    ```
    JOB, HIREDATE, SAL, COMM
    ```

13. On Identify Page and Region Attributes:
    a. For Page, enter `800`.
    b. For Page Name, enter `Tabular Form on EMP`.
    c. For Region Title, enter `Tabular Form on EMP`.
    d. Click **Next**.
14. On Identify Tab, accept the default, **Do not use tabs,** and click **Next**.

15. On Button Labels:
    a. Accept the defaults for the Cancel, Delete, and Add Row buttons.
    b. For the Submit button, enter `Apply Changes`.
    c. Click **Next**.
16. Accept the remaining defaults, click **Next**, and then click **Finish**.

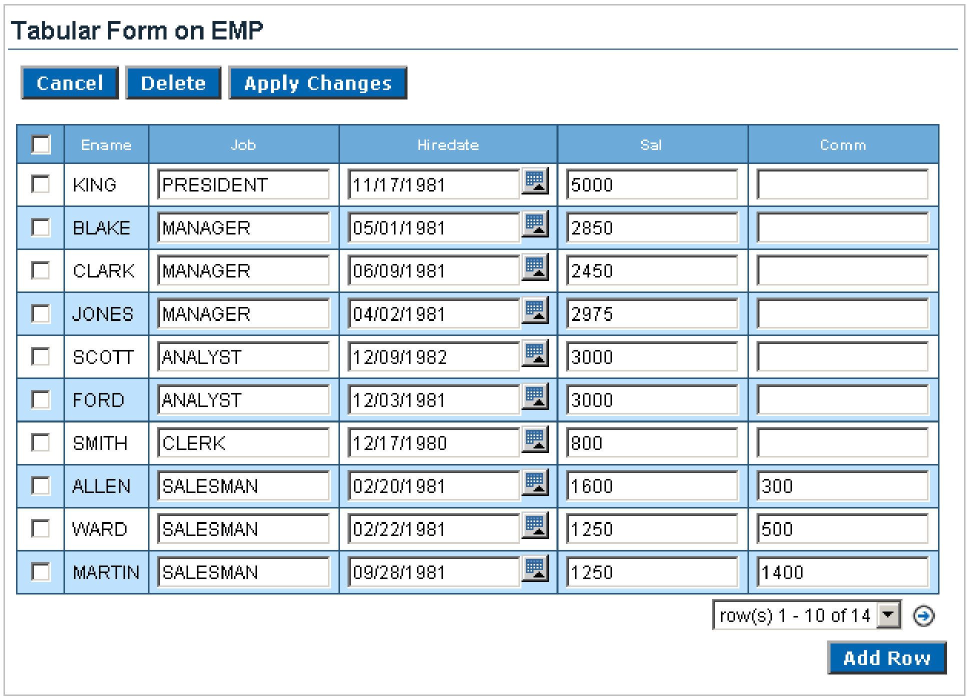
Next, run the page to view your new form.

To run the page:

1. Click **Run Page**.
2. If prompted to enter a username and password:
    a. For User Name, enter either `demo` or `admin`.
    b. For Password, enter the name of the current workspace using all lowercase letters.
    c. Click **Login**.
    d. Navigate to page 800:
        – Select **Edit Page 1** from the Developer Toolbar.
        – In Page, enter **800** and click **Go**.
        – Click the **Run Page** icon.

As shown in Figure 1–1, note the tabular form contains four buttons. Cancel, Delete, and Apply Changes display in the upper right corner and Add Row displays in the bottom right corner. Additionally, a check box appears to the left of each row enabling the user to select one row at a time, or a user can select all rows at once by selecting the check box to the left of the column headings. The check box is used in conjunction with the Delete button to identify the rows to be deleted.

Figure 1–1 Tabular Form on the EMP Table



	Ename	Job	Hiredate	Sal	Comm
	KING	PRESIDENT	11/17/1981	5000	
	BLAKE	MANAGER	05/01/1981	2850	
	CLARK	MANAGER	06/09/1981	2450	
	JONES	MANAGER	04/02/1981	2975	
	SCOTT	ANALYST	12/09/1982	3000	
	FORD	ANALYST	12/03/1981	3000	
	SMITH	CLERK	12/17/1980	800	
	ALLEN	SALESMAN	02/20/1981	1600	300
	WARD	SALESMAN	02/22/1981	1250	500
	MARTIN	SALESMAN	09/28/1981	1250	1400

Changing Updatable Column Display Type

When the Tabular Form Wizard creates a tabular form, updatable columns display by default as text fields. You can change this default display by editing report column attributes.

To change the default display of `JOB` to a select list:

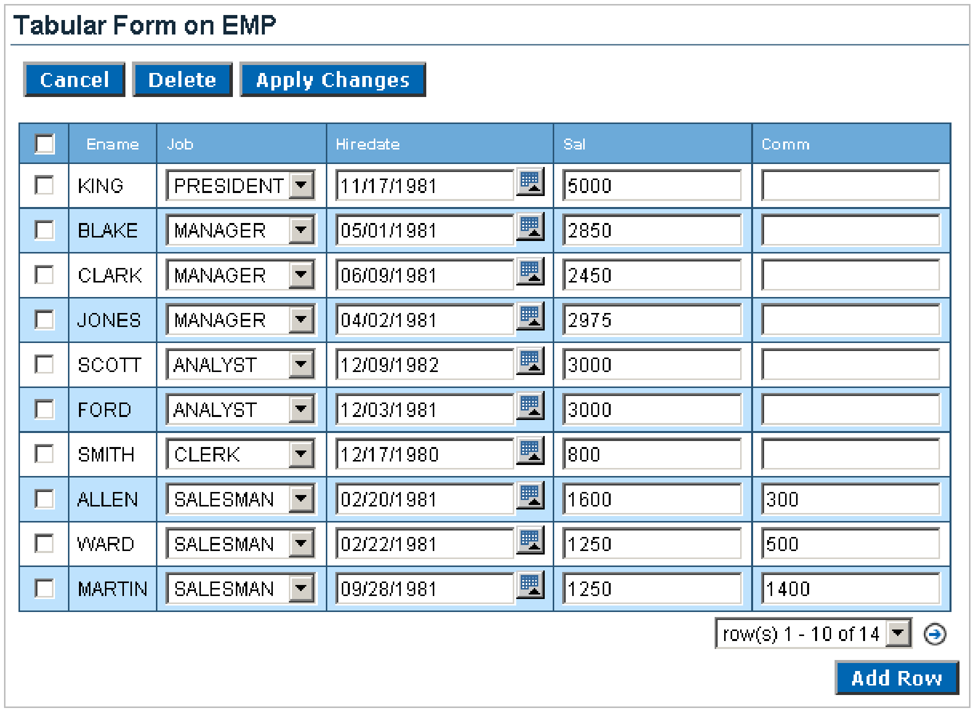
1. Navigate to the Page Definition for page 800. Select **Edit Page 800** from the Developer Toolbar.
2. Under Regions, click **Report** next to Tabular Form on EMP.

   The Report Attributes page appears.
3. Under Column Attributes, click the **Edit** icon next to the JOB column.
4. Scroll down to Tabular Form Element. From Display As, select **Select List (query based LOV)**.
5. Under List of Values, enter the following LOV query:

   ```
   SELECT DISTINCT job a, job b FROM emp
   ```
6. Click **Apply Changes**.
7. Click the **Run Page** icon in the upper right corner the page.

   As shown in Figure 1–2, notice the Job column now displays as a select list.

Figure 1–2 Job Column Changed to a Select List



Note: Do not modify the select list of a SQL statement of a tabular form after it has been generated. Doing so can result in a checksum error when altering data of the form and applying updates.

Consider the following example:

```
SELECT ename FROM emp;
```

Note that this should not be altered to:

```
SELECT lower(ename) FROM emp
```

2

How to Create a Parameterized Report

In an Oracle HTML DB application, a report is the formatted result of a SQL query. You can generate reports in three ways:

- Running a built-in wizard
- Defining a report region based on a SQL query
- Creating a report region based on a PL/SQL function returning a SQL query

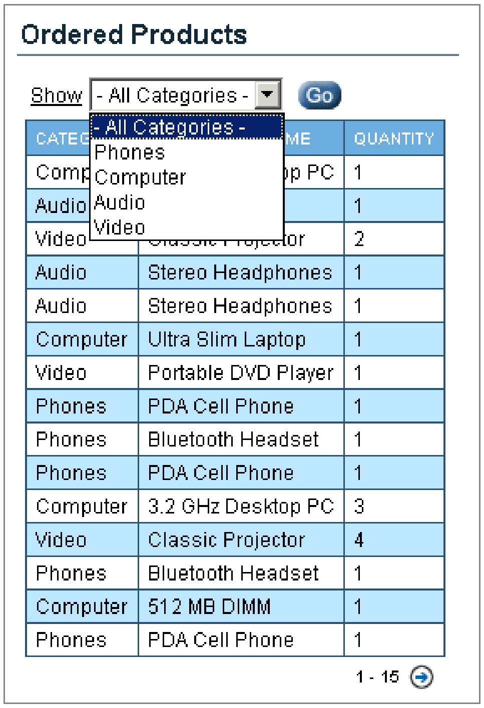
This tutorial illustrates how to create a report in which the results depend on the form input, or a parameterized report. In this exercise, you create a report region based on a SQL query which references the value of a form item within the application.

This section contains the following topics:

Sample Report Utilizing a Form Input

Figure 2–1 on page 2-2 is an example of a form in which the report results are based on user input. In this example, this user populates the form by making a selection from the Show list. The easiest way to create this type of report in Oracle HTML DB is to define a report region based on a SQL query.

Figure 2–1 Sample Report



About Sample Application

Oracle HTML DB installs with a number of demonstration applications. In this exercise you will create a tabular form within the demonstration application, *Sample Application*.

To see if *Sample Application* is installed:

1. Log in to Oracle HTML DB.
2. Click the down arrow on the right side of the **Application Builder** icon.
3. From the menu, select **Demonstrations**.

   The Demonstration Applications page appears, displaying links to the following applications:

   - *Sample Application* offers a working demonstration that highlights basic design concepts
   - *Collection Showcase* demonstrates shopping cart concepts
   - *Web Services* serves an example of how you can use Web Services
   - *Presidential Inaugural Addresses* demonstrates Oracle Text
4. Locate Sample Application and check the Status column:

   a. If the Status column displays **Installed**, return to the Workspace home page.

   b. If the Status column displays **Not Installed**, select **Install** in the Action column.

   c. Follow the on-screen instructions.

Creating a New Page

First, you create a new blank page and within *Sample Application*.

To create a new page:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select **Sample Application**.
4. Click the **Create Page** button.
5. On Create Page, select **Blank Page** and click **Next**.
6. For Page, enter 700 and click **Next**.
7. In Name, enter `Ordered Products` and click **Next**.
8. For Tabs, accept the default, **No,** and click **Next**.
9. Review your selections and click **Finish**.
10. On the Success Page, click **Edit Page**.

    The Page Definition for page 700 appears.

Creating the Query Region

Next, you need to create a report.

To create a the query region to contain the report:

1. Under Regions, click the **Create** icon.
2. Select **Report** and click **Next**.
3. For Report Implementation, select **SQL Report** and click **Next**.
4. For Display Region Attributes:
    a. For Title, enter `Ordered Products`.
    b. Accept the remaining default values and click **Next**.
5. Enter following SQL query:

```
SELECT p.category,
       p.product_name,
       i.quantity
  FROM demo_product_info p,
       demo_order_items i
WHERE p.product_id = i.product_id
  AND ( p.category = :P700_SHOW or :P700_SHOW = 'ALL' )
```

6. Click **Create Region**.

Adding an Item

The previous SQL query references an item named P700_SHOW.

To create the select list P700_SHOW:

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.

3. For Select List Control Type, accept the default of **Select List** and click **Next**.
4. For Item Name, enter `P700_SHOW` and click **Next**.
5. On Identify List of Values:
   a. For Named LOV, select **CATEGORIES**.
   b. For Null Text, enter:

      ```
      - All Categories -
      ```

   c. For Null Value, enter:

      ```
      ALL
      ```

   d. Click **Next**.
6. For Identify Item Attributes, accept the defaults and click **Next**.
7. Click **Create Item**.

Adding a Button to Submit the Page

For the report to be driven by the Product Category select list (the form input), you need to submit the page. To accomplish this, you need add a button.

To add a button to submit the page:

1. Under Buttons, click the **Create** icon.
2. Select the region **Ordered Products** and click **Next**.
3. On Identify Button Position, select **Create a button displayed among this region's items** and click **Next**.
4. For Button Name, enter `P700_GO`.
5. Click **Create Button**.

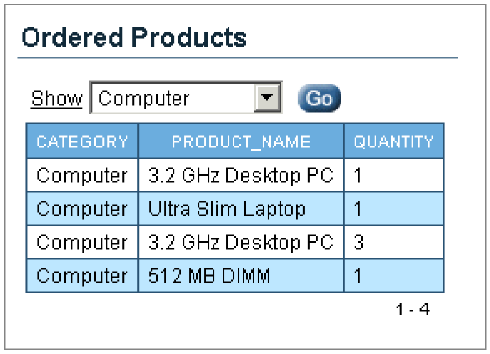
Run the Page

To run the page:

1. Click the **Run Page** icon.
2. If prompted to enter a username and password:
   a. For User Name, enter either `demo` or `admin`.
   b. For Password, enter the name of the current workspace using all lowercase letters.
   c. Click **Login**.
3. When the Order Products page appears, select **Computer** from the Show menu and click **Go**.

As shown in Figure 2–2 on page 2-5, notice that making a selection from the Show menu populates the form.

Figure 2–2 Form Results Being Populated from a Select List



CATEGORY	PRODUCT_NAME	QUANTITY
Computer	3.2 GHz Desktop PC	1
Computer	Ultra Slim Laptop	1
Computer	3.2 GHz Desktop PC	3
Computer	512 MB DIMM	1

3

How to Create a Drill Down Report

A drill down report is a type of report that displays summary data with links to related detail data in a second report.

This tutorial describes how to create a report on the DEMO_ORDERS table with links to drill down detail data in the DEMO_ORDER_ITEMS table. Both tables are installed with the demonstration application, *Sample Application*.

This section contains the following topics:

- About Sample Application
- Creating a New Application
- Creating Reports for DEMO_ORDERS and DEMO_ORDER_ITEMS
- Customizing the DEMO_ORDER_ITEMS Report
- Linking the DEMO_ORDERS Report to the DEMO_ORDER_ITEMS Report

About Sample Application

Oracle HTML DB installs with a number of demonstration applications. To complete this exercise you must install the demonstration application, *Sample Application*.

To see if *Sample Application* is installed:

1. Log in to Oracle HTML DB.
2. Click the down arrow on the right side of the **Application Builder** icon.
3. From the menu, select **Demonstrations**.

   The Demonstration Applications page appears, displaying links to the following applications:

   - *Sample Application* offers a working demonstration that highlights basic design concepts
   - *Collection Showcase* demonstrates shopping cart concepts
   - *Web Services* serves an example of how you can use Web Services
   - *Presidential Inaugural Addresses* demonstrates Oracle Text
4. Locate Sample Application and check the Status column:

   a. If the Status column displays **Installed**, return to the Workspace home page.

   b. If the Status column displays **Not Installed**, select **Install** in the Action column.

c. Follow the on-screen instructions.

Creating a New Application

First, create a new application.

To create an application:

1. From the Workspace home page, click the **Application Builder** icon.
2. From the Application Builder home page, click **Create**.
3. Select **Create Application** and click **Next**.
4. Specify the page name.
   a. For Name, enter `Drilldown Reports`.
   b. For Application, accept the default ID.
   c. For Create Application, select **From scratch**.
   d. Click **Next**.

   Next, you need to add pages. You have the option of adding a blank page, a report, a form, a tabular form, or a report and form. For this exercise, you will add two blank pages.
5. Add the first blank page:
   a. Under Select Page Type, select **Blank** and click **Add Page**.

   The page appears in the list at the top of the page.

   b. Select the Name **Page 1**.
   c. In Page Name, enter `Orders` and click **Apply Changes**.
6. Add the second blank page:
   a. Under Select Page Type, select **Blank** and click **Add Page**.

   The page appears in the list at the top of the page.

   b. Select the Name **Page 2**.
   c. In Page Name, enter `Order Items` and click **Apply Changes**.
7. Click **Next**.
8. For Tabs, accept the default, **One Level of Tabs,** and click **Next**.
9. For Copy Shared Components from Another Application, accept the default, **No**, and click **Next**.
10. For Attributes, accept the defaults for Authentication Scheme, Language, and User Language Preferences Derived From and click **Next**.
11. For User Interface, select **Theme 2** and click **Next**.
12. Review your selections and click **Create**.

Creating Reports for DEMO_ORDERS and DEMO_ORDER_ITEMS

Next, you need to create reports for the `DEMO_ORDERS` and the `DEMO_ORDER_ITEMS` tables.

Topics in this section include:

- Create a Report for DEMO_ORDERS
- Create a Report for DEMO_ORDER_ITEMS

Create a Report for DEMO_ORDERS

To create a report on the `DEMO_ORDERS` table:

1. On the Application home page, click **Create Page**.
2. For the page type, select **Report** and click **Next**.
3. For Page, select **Wizard Report** and click **Next**.
4. For Page Attributes:
   a. For Page, select **1 Orders**.
   b. In Page Title and Region Title, enter `Orders`.
   c. Click **Next**.
5. For Tabs, accept the default, **Do not use tabs,** and click **Next**.
6. For Tables and Columns:
   a. For Table/View Owner, select the appropriate schema.
   b. For Table/View, select **DEMO_ORDERS**.
   c. From the Available Columns list, press **CTRL** and move the following columns to the Displayed Columns list:

      ```
      ORDER_ID, ORDER_TOTAL, ORDER_TIMESTAMP
      ```

      Next, create a join with the `DEMO_CUSTOMERS` table to display the customer name.
   d. From the Table/View list, select **DEMO_CUSTOMERS**.
   e. From the Available Columns list, select **CUST_LAST_NAME** and move it to the Display Columns list.
   f. Click **Next**.
7. For Join Conditions, accept the join by clicking **Next**.
8. For Report Options, accept the defaults and click **Next**.
9. Click **Create Report Page**.
10. Run by page by clicking **Run Page**. If prompted for a user name and password, enter your workspace credentials.

    As shown in Figure 3–1 on page 3-4, a report on the `DEMO_ORDERS` table appears.

Figure 3–1 Report on DEMO_ORDERS Table

Orders

Order Id	Order Total	Cust Last Name	Order Timestamp
1	1200	Dulles	15-JUL-05
2	599	Hartsfield	10-JUL-05
3	1999	Hartsfield	05-JUL-05
4	750	Logan	30-JUN-05
5	40	Logan	25-JUN-05
6	250	OHare	20-JUN-05
7	3800	LaGuardia	15-JUN-05
8	40	Lambert	10-JUN-05
9	450	Lambert	05-JUN-05
10	500	Bradley	31-MAY-05

1 - 10

11. Select **Edit Application** from the Developer Toolbar to return to Application Builder.

Create a Report for DEMO_ORDER_ITEMS

To create a report on the `DEMO_ORDER_ITEMS` table:

1. On the Application home page, click **Create Page**.
2. For Page, select **Report** and click **Next**.
3. On Create Page, select **Wizard Report** and click **Next**.
4. For Page Attributes:
   a. For Page, select `2 Order Items`.
   b. In Page Title and Region Title, enter `Order Items`.
   c. Click **Next**.
5. For Tabs, accept the default **Do not use tabs** and click **Next**.
6. For Tables and Columns:
   a. For Table/View Owner, select the appropriate schema and click **Next**.
   b. For Table/View, select **DEMO_ORDER_ITEMS**.
   c. From the Available Columns list, press **CTRL** and move the following columns to the Displayed Columns list:

      ```
      ORDER_ITEM_ID, ORDER_ID, UNIT_PRICE, QUANTITY
      ```

      Next, create a join with the `DEMO_PRODUCT_INFO` table to display the product name.
   d. For Show Only Related Tables, select **No**.
   e. From the Table/View list, select **DEMO_PRODUCT_INFO**.
   f. From the Available Columns list, select **PRODUCT_NAME** and move it to the Display Columns list.
   g. Click **Next**.

7. For Join Conditions, accept the join by clicking **Next**.
8. For Report Options, accept the defaults and click **Next**.
9. Click **Create Report Page**.
10. Run by page by clicking **Run Page**.

    As shown inFigure 3–2, a report on the `DEMO_ORDER_ITEMS` table appears.

Figure 3–2 Report on DEMO_ORDER_ITEMS Table

Order Items

Order Item Id	Order Id	Product Name	Unit Price	Quantity
1	1	3.2 GHz Desktop PC	1200	1
2	2	3.2 GHz Desktop PC	199	1
3	2	3.2 GHz Desktop PC	50	2
4	2	3.2 GHz Desktop PC	150	1
5	2	3.2 GHz Desktop PC	150	1
6	3	3.2 GHz Desktop PC	1999	1
7	4	3.2 GHz Desktop PC	500	1
8	4	3.2 GHz Desktop PC	250	1
9	5	3.2 GHz Desktop PC	40	1
10	6	3.2 GHz Desktop PC	250	1
11	7	3.2 GHz Desktop PC	1200	3
12	7	3.2 GHz Desktop PC	50	4
13	8	3.2 GHz Desktop PC	40	1
14	9	3.2 GHz Desktop PC	200	1
15	9	3.2 GHz Desktop PC	250	1

row(s) 1 - 15 of 160 Next

Customizing the DEMO_ORDER_ITEMS Report

Next, you need to customize the Order Items page. In this exercise, you add an item to hold the value of the ORDER_ID, add a condition that constrains the report by the value of ORDER_ID item, and modify the Region Title to note which order is being viewed.

Topics in this section include:

- Add an Item to Hold the Value of ORDER_ID
- Add a Condition
- Modify the Region Title

Add an Item to Hold the Value of ORDER_ID

To create an item to hold the value of ORDER_ID:

1. Navigate to the Page Definition of page 2 by selecting **Edit Page 2** from the Developer Toolbar.
2. Under Items, click the **Create** icon.
3. For Item Type, select **Hidden** and click **Next**.
4. For Display Position and Name:

   a. For the Item Name, enter `P2_ORDER_ID`.
   b. For Region, select **Order Items**.
   c. Click **Next**.
5. Click **Create Item**.

Add a Condition

To add a condition to the DEMO_ORDER_ITEMS report:

1. Under Regions, select **Order Items**.
2. Select the **Query Definition** tab.
3. Click **Add/Modify Conditions**.
4. On the Conditions page:
   a. From the Columns list, select `ORDER_ID [DEMO_ORDER_ITEMS]`.
   b. Enter the following in the Conditions field:

      ```
      = :P2_ORDER_ID
      ```
5. Click **Apply Changes**.

Modify the Region Title

To modify the region title of the DEMO_ORDER_ITEMS report:

1. Under Regions, click **Order Items**.
2. In Title replace this existing text with the following:

   ```
   Order Items for Order # &P2_ORDER_ID.
   ```
3. Click **Apply Changes**.

Linking the DEMO_ORDERS Report to the DEMO_ORDER_ITEMS Report

Lastly, you link the DEMO_ORDERS report to the DEMO_ORDER_ITEMS report. To accomplish this, you edit the attributes of the `ORDER_ID` column on the DEMO_ORDERS report and create a link. The link will populate the P2_ORDER_ID hidden item on page 2 with the clicked ORDER_ID.

To create a link from the `ORDER_ID` column on the Orders report to the Order Items report:

1. Navigate to the Page Definition of page 1, Orders. Enter `1` in the Page field and click **Go**.
2. Under Regions, select **Orders**.
3. Click the **Report Attributes** tab.
4. Click the **Edit** icon adjacent to ORDER_ID.
5. Scroll down to Column Link:
   a. In the Page field, select **2 Order Items**.
   b. From the Item 1 Name list, select **P2_ORDER_ID**.
   c. From the Item 1 Value list, select **#ORDER_ID#**.

d. From the Link Text list, select **#ORDER_ID#**.

6. Click **Apply Changes**.

7. Click the **Run Page** icon in the upper right corner of the page.

   As shown in Figure 3–3 on page 3-7, you can link to page 2 by clicking on an Order Id.

Figure 3–3 DEMO_ORDERS Report with LInk to Page 2

Orders

Order Id	Order Total	Cust Last Name	Order Timestamp
1	1200	Dulles	15-JUL-05
2	599	Hartsfield	10-JUL-05
3	1999	Hartsfield	05-JUL-05
4	750	Logan	30-JUN-05
5	40	Logan	25-JUN-05
6	250	OHare	20-JUN-05
7	3800	LaGuardia	15-JUN-05
8	40	Lambert	10-JUN-05
9	450	Lambert	05-JUN-05
10	500	Bradley	31-MAY-05

1 - 10

4

How to Control Form Layout

Data and form elements in an Oracle HTML DB application are placed on a page using containers called regions. There are several attributes that control the placement and positioning of regions on pages. In turn, you control the placement and style of form elements inside of regions using item attributes.

This tutorial describes how to create a data input form and then change its layout by changing region and item attributes.

This section contains the following topics:

About Sample Application

Oracle HTML DB installs with a number of demonstration applications. To complete this exercise you must install the demonstration application, *Sample Application*.

To see if *Sample Application* is installed:

1. Log in to Oracle HTML DB.
2. Click the down arrow on the right side of the **Application Builder** icon.
3. From the menu, select **Demonstrations**.

   The Demonstration Applications page appears, displaying links to the following applications:

   - *Sample Application* offers a working demonstration that highlights basic design concepts
   - *Collection Showcase* demonstrates shopping cart concepts

- *Web Services* serves an example of how you can use Web Services
- *Presidential Inaugural Addresses* demonstrates Oracle Text

4. Locate Sample Application and check the Status column:
   a. If the Status column displays **Installed**, return to the Workspace home page.
   b. If the Status column displays **Not Installed**, select **Install** in the Action column.
   c. Follow the on-screen instructions.

Creating a Table and Data Input Form

The first step in creating a data input form is to create the underlying data objects in SQL Workshop. In this exercise, you create a table named `HT_EMP` and then use a wizard to create a new page.

Topics in this section include:

- Create the HT_EMP Table
- Create a New Page Containing a Input Form
- Run the Page

Create the HT_EMP Table

To create the `HT_EMP` table and the appropriate associated objects:

1. Click **SQL Workshop** on the Workspace home page.
2. Click **SQL Scripts**.
3. When the SQL Scripts Repository appears, click **Create**.

   The Script Editor appears.
4. In Script Name, enter `HT_EMP`.
5. In the Script Editor, enter the following DDL:

```
CREATE TABLE ht_emp (
   emp_id                  NUMBER       primary key,
   emp_first_name          VARCHAR2(30) not null,
   emp_middle_initial      VARCHAR2(1),
   emp_last_name           VARCHAR2(45) not null,
   emp_part_or_full_time  VARCHAR2(1)  not null check (emp_part_or_full_time in
('P','F')),
   emp_salary              NUMBER,
   emp_dept                VARCHAR2(20) check (emp_dept in
('SALES','ACCOUNTING',

'MANUFACTURING','HR')),
   emp_hiredate            DATE,
   emp_manager             NUMBER       references ht_emp,
   emp_special_info        VARCHAR2(2000),
   emp_telecommute         VARCHAR2(1) check (emp_telecommute in ('Y')),
   rec_create_date         DATE         not null,
   rec_update_date         date)
/

INSERT INTO ht_emp
   (emp_id, emp_first_name, emp_middle_initial, emp_last_name, emp_part_or_
```

```
full_time,
    emp_salary, emp_dept, emp_hiredate, emp_manager, emp_special_info, emp_
telecommute,
    rec_create_date)
VALUES
   (1,'Scott','R','Tiger','F',
    100000,'SALES',sysdate,null,'cell phone number is xxx.xxx.xxxx
home phone is yyy.yyy.yyyy','Y',
    SYSDATE)
/

CREATE SEQUENCE ht_emp_seq
   start with 2
/

CREATE OR REPLACE TRIGGER bi_ht_emp
      BEFORE INSERT ON ht_emp
      FOR EACH ROW
   BEGIN
      SELECT ht_emp_seq.nextval
        INTO :new.emp_id
        FROM DUAL;
      :new.rec_create_date := SYSDATE;
   END;
/

CREATE OR REPLACE TRIGGER bu_ht_emp
      BEFORE UPDATE ON ht_emp
      FOR EACH ROW
   BEGIN
      :new.rec_update_date := SYSDATE;
   END;
/
```

6. Click **Save**.

   The script appears in the SQL Scripts Repository.

7. Run the HT_EMP script:

   a. Click the **Run** icon.

   b. On the Run Script page, click **Run** again.

8. View the script results by clicking the **View** icon.

   Red text indicates errors while executing the file.

Create a New Page Containing a Input Form

Next, create a new form using the Form on a Table or View Wizard.

To create a data input form:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select **Sample Application**.
4. Click **Create Page**.
5. For Page, select **Form** and click **Next**.
6. On Create Page, select **Form on a Table or View** and click **Next**.

7. For Table/View Owner, select the schema owner used to create the HT_EMP table and click **Next**.
8. For Table/View Name, select the **HT_EMP** table and click **Next**.
9. For Page and Region Attributes:
   a. For Page, enter `900`.
   b. For the Page Name, enter `HT_EMP`.
   c. For the Region Title, enter `How to Layout a Form`.
   d. Click **Next**.
10. For Tab Option, accept the default, **Do not use tabs,** and click **Next**.
11. For Primary Key, accept the default and click **Next**.

    Note that the wizard reads the primary key from the database definition.
12. For Source Type, accept the default **Existing Trigger** and click **Next**.
13. For Select Columns, select all columns and click **Next**.
14. For Process Options, accept the defaults and click **Next**.
15. For Branching, set all branching to the page 900 (the page you are creating) and click **Next**.

    Since this page is just for demonstration, you will not be utilizing branching.
16. Click **Finish**.
17. View the Page Definition by clicking **Edit Page.**

    The Page Definition for page 900 appears.
18. Delete the following validation:
    - Under Page Processing Validations, select **P900_REC_CREATE_DATE not null**.
    - Click **Delete**.

Run the Page

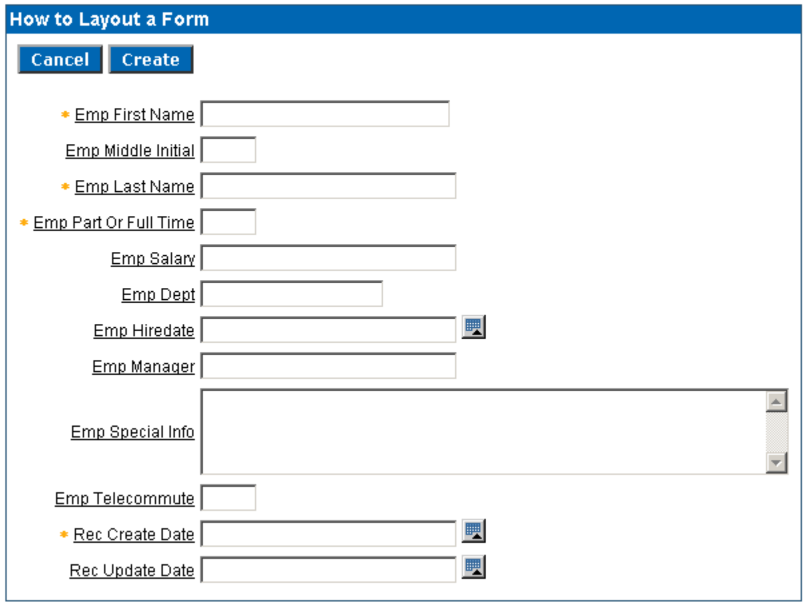
Once you create the `HT_EMP` table and page 900, the next step is to run the page.

To run the page from the Page Definition:

1. Click the **Run Page** icon in the upper right corner.
2. If prompted to enter a username and password:
   a. For User Name, enter either `demo` or `admin`.
   b. For Password, enter the name of the current workspace using all lowercase letters.
   c. Click **Login**.
   d. Navigate to page 900:
      – Select **Edit Page 1** from the Developer Toolbar.
      – In Page, enter **900** and click **Go**.
   e. On the Page Definition for page 900, click the **Run Page** icon in the upper right corner.

As shown in Figure 4–1, note that the `HT_Emp` form contains basic employee details and includes select lists, text areas, and display only items.

Figure 4–1 HT_EMP Form



By default, the Primary Key column does not display since it is assumed that the primary key is system generated. In reality, the primary key is included in the page, but appears as a hidden item.

Notice that the page defaults with one item for each row and labels display to the left of the items. The item labels default to the column names with initial capitalization and with the underscores (_) replaced with spaces. You can override this default behavior by configuring user interface defaults for the table.

Also notice that items based on date columns default to include a date picker. Lastly, notice that the Emp Special Info item was created as a text area because of the size of the base column. This item type is a better choice for large text items since it allows for wrapping of input text.

Changing the Appearance of a Page by Altering Region Attributes

You can alter the appearance of a page by changing the region attributes.

To change the region title and other region level attributes:

1. Navigate to the Page Definition for page 900. Click **Edit Page 900** on the Developer Toolbar.
2. Under Regions, select **How to Layout a Form**.

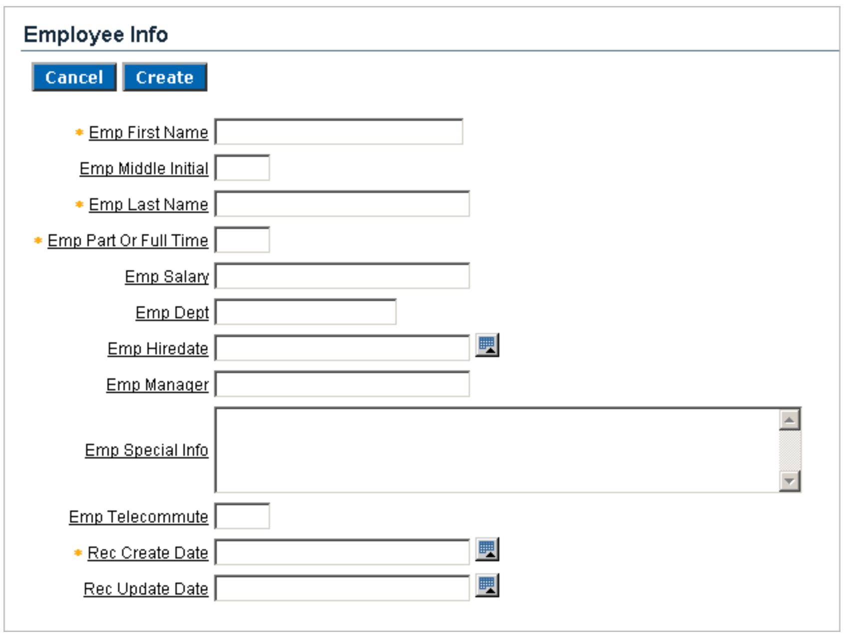
   The Region Definition appears.
3. Change the Title to `Employee Info`.
4. From Display Point, temporarily move the region by selecting **Page Template Region Position 3**.

   This moves the region to the right side of the page. The region display points are determined by the page level template. If you do not select a page level template, Oracle HTML DB uses the default page level template defined in the current theme. You can view specific positions by selecting the flashlight icon to the right of the Display Point list.

Next, temporarily change the region template.

5. From Template select **Borderless Region**.
6. Click **Apply Changes**.
7. From the Page Definition, click the **Run Page** icon in the upper right corner. (See Figure 4–2.)

Figure 4–2 HT_EMP Form with New Display Point and Template



To return the region template and display point to the original selections:

1. Navigate to the Page Definition for page 900. Click **Edit Page 900** on the Developer Toolbar.
2. Under Regions, select **Employee Info**.
3. From the Template list, select **Form Region**.
4. From the Display Point List, select **Page Template Body (3. Items above region content)**.
5. Click **Apply Changes**.

Understanding How Item Attributes Effect Page Layout

Item attributes control the display of items on a page. Item attributes determine where a label displays, how large an item will be as well as whether the item displays next to or below a previous item. You can change multiple item labels at once on the Page Items summary page.

Topics in this section include:

- Edit Item Attributes

- Fix Item Alignment
- Change Label Placement
- Change Items to Display-only

Edit Item Attributes

To edit item attributes:

1. Navigate to the Page Definition for page 900.
2. On the Page Definition, select the title **Items**.

   The Page Items summary page appears.

   You change how a page appears by editing the item attributes. Common item attribute changes include:

   - Changing item labels by editing the Prompt field.
   - Placing more than one item in certain rows to group like items together. For example, you could group all items that make up an employee's name.
   - Changing the item width. Many items display better when they have a width that is less than the maximum. To change the item width, enter a new value in the Width field.
   - Reordering the items. The initial order of items is based on the order of the columns in the table on which the region is based. You can reorder items by changing the sequence. You can reorder items by entering a new value in the Sequence field.
3. To see the how item attributes affect page layout, make the following changes:

   a. Change the values in the Prompt, New Line, and Width fields to match those in Table 4–1:

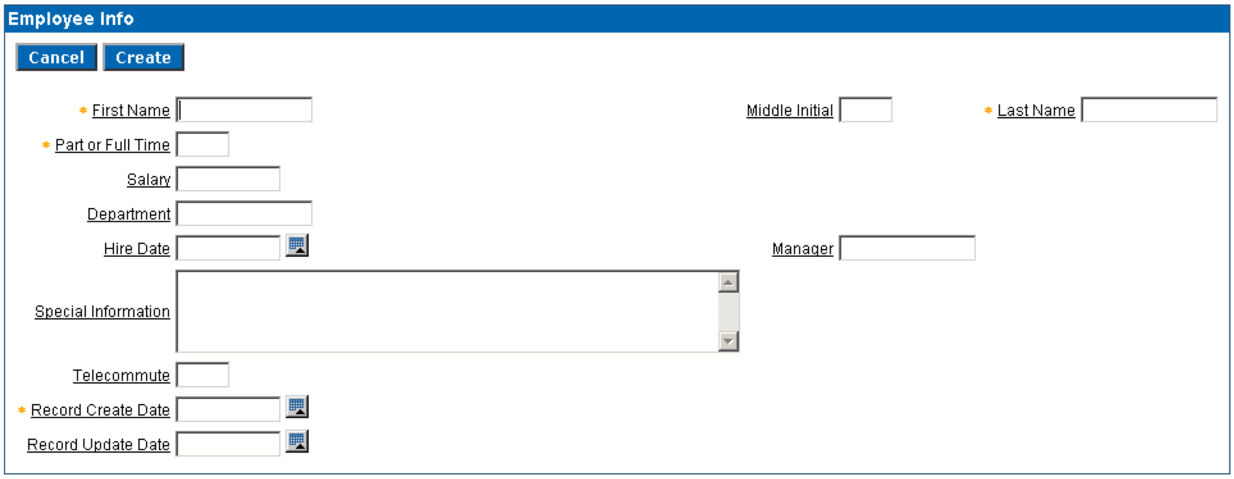
Table 4–1 New Prompt, New Line, and Width Field Values

Prompt Field	New Line	Width
Emp ID	Yes	30
First Name	Yes	15
Middle Initial	No	2
Last Name	No	15
Part or Full Time	Yes	2
Salary	Yes	10
Department	Yes	15
Hire Date	Yes	10
Manager	No	15
Special Information	Yes	60
Telecommute	Yes	2
Record Create Date	Yes	10
Record Update Date	Yes	10

   b. Click **Apply Changes**.

c. Click the **Run Page** icon. (See Figure 4–3.)

Figure 4–3 HT_EMP After Editing the Prompt, New Line, Width Attributes



Note that some items are pushed too far to the right. This display is caused by the width of the Special Information item. Oracle HTML DB lays out regions as tables and of a width of each column is determined by the largest display width of the items in that column.

Fix Item Alignment

There are several approaches to fixing item alignment:

- For the items Middle Initial, Last Name and Manager items, set New Field to equal No.

  This places the items directly after the items they follow, but in the same column. This approach is best used for positioning embedded buttons next to items. Note that this setting can make text items appear squashed.

- Change the Column Span field of the Special Information item.

  For example, setting the Column Span for the Special Information item to 5 would enable multiple items to display above and below it. This change causes five items to display above Special Information (First Name, Middle Initial, and Last Name).

  Be aware, however, that using Column Span to fix the display of the name does not result in a consistent layout. The Manager item would still be in the same column as Middle Initial. Because the Manager item is larger than Middle Initial, Last Name would still be pushed too far to the right. To fix this, you could change the Column Span of the Manager item to 3 so it displays above Special Information.

- Reset the column width in the middle of the region by adding an item of type **Stop and Start HTML Table.** This forces the close of an HTML table using the `</table>` tag and starts a new HTML table. Inserting a Stop and Start HTML Table item just after the Last Name item, results in an even layout. Note that a Stop and Start HTML Table item only displays its label. You can prevent the label from displaying at all by setting it to null. To do this, you simply remove the defaulted label.

Adding a Stop and Start HTML Table Item

To add a Stop and Start HTML Table item and reset the column width:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Items, click the **Create** icon.
3. For Item Type, select **Stop and start table**.

   The Create Item Wizard appears.
4. For Display Position and Name:
   a. In Sequence, enter `4.5`.
   b. From Region, select **Employee Info**.
   c. Click **Next**.
5. On Item Attributes:
   a. For Label, remove `X` by clicking **Clear**.
   b. Accept all other defaults and click **Next**.
6. Click **Create Item**.

   The Page Definition appears.
7. Edit the column width for Special Information:
   a. Click the title **Items**.
   b. For Special Information, change the Column Span to **3** and click **Apply Changes**.
8. Click the **Run Page** icon in the upper right corner.

Change Label Placement

Item labels can display above, below, or to the left of an item. Labels can display left, right, or center justified. For labels set to left, you can further specify the vertical alignment options of top, bottom or center. Change the position of the Special Information label to above the item.

To change the placement of the Special Information label:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Items, select item **P900_EMP_SPECIAL_INFO**.
3. Scroll down to Label.
4. From the Horizontal/Vertical Alignment, select **Above**.
5. Click **Apply Changes**.

Change Items to Display-only

There are two columns in the `HT_EMP` table for auditing, Record Create Date and Record Update Date. Because the values of these columns are set with triggers, these columns should not be updatable by users. This exercise describes how to make items display-only and then how to add them to their own region.

To make an item P900_REC_CREATE_DATE display-only:

1. Navigate to the Page Definition for page 900.
2. Under Items, select the item **P900_REC_CREATE_DATE**.
3. From Display As, select **Text Field (Disabled, saves state)**.
4. Click **Apply Changes**.

To make an item P900_REC_UPDATE_DATE display-only:

1. Navigate to the Page Definition for page 900.
2. Under Items, select the item **P900_REC_UPDATE_DATE**.
3. From Display As, select **Text Field (Disabled, saves state)**.
4. Click **Apply Changes**.

Next, create a new region and then move the audit items into that region.

To create a new region:

1. Navigate to the Page Definition for page 900.
2. Under Regions, click the **Create** icon.
3. For the region type, select **HTML** and click **Next**.
4. Specify the type of region container. Select **HTML** and click **Next**.
5. For the Title, enter `Audit Information` and click **Next**.
6. Click **Create Region**.

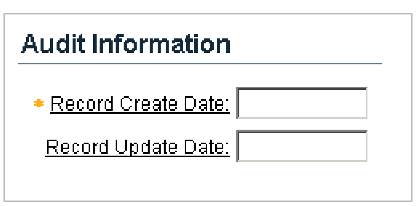
To move the items to the new region:

1. Navigate to the Page Definition for page 900.
2. Select the heading **Items**.

   A summary page appears.
3. For `P900_REC_CREATE_DATE` and `P900_REC_UPDATE_DATE`:
   a. Under Prompt, add a colon to the end of the label name.
   b. Under Region, select **Audit Information**.
   c. Click **Apply Changes**.

Figure 4–4 demonstrates how these items would display in a running page.

Figure 4–4 Audit Information Region



The Hide/Show Region template enables the user to click a plus (+) sign to expand the contents of the region or click a minus (-) sign to hide the contents. By changing the region template to Hide/Show Region, users can decide whether they want to see the Audit Information region.

To change the region template to Hide/Show Region:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Regions, select **Audit Information**.
3. Scroll down to User Interface
4. From the Template list, select **Hide and Show Region** from the Template list.
5. Click **Apply Changes**.

Adding a Region Header and Footer

Regions can have headers and footers. Headers and footers typically contain text or HTML that displays at either the top or bottom of the region.

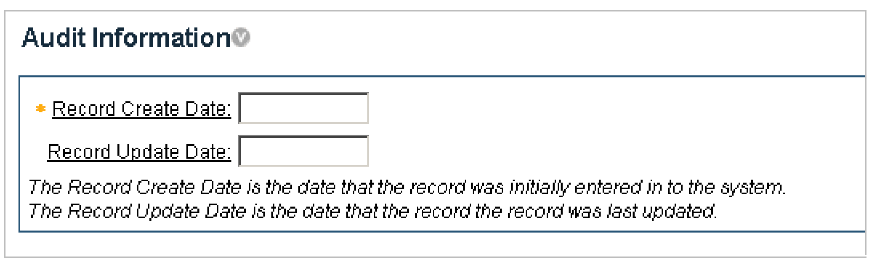
To add a region footer:

1. Navigate to the Page Definition for page 900.
2. Under Regions, select **Audit Information**.
3. Scroll down to Header and Footer.
4. Enter the following in Region Footer:

```
<i>The Record Create Date is the date that the record was initially entered in
to the system. <br>The Record Update Date is the date that the record the
record was last updated.</i>
```

5. Click **Apply Changes**.
6. Run the page by clicking the **Run Page** icon in the upper right corner.
7. Expand the Audit Information region.

Figure 4–5 Audit Information Region with Footer



As shown in Figure 4–5, the text of the footer is wrapped with the italic HTML tag and there is an imbedded a break. Without the manual break, the text would take up the entire width of the region (as defined by region template).

Making a Region Conditional

To make a region conditional you create a display condition for the Audit Information region so that it only displays if the Employee ID is not null. Since the Employee ID is set by a trigger, it only exists for records retrieved from the database. You can control the display of the Audit Information region by using a built-in condition that checks for the presence of a value for the item containing the Employee ID (that is, P900_ EMP_ID)

To display the Audit Information region conditionally:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Regions, select **Audit Information**.
3. When the Region Definition appears, scroll down to Conditional Display.
4. Under Conditional Display:
   a. From Conditional Display, select **Value of Item in Expression 1 is NOT NULL**.
   b. In Expression 1, enter:

   ```
   P900_EMP_ID
   ```
5. Click **Apply Changes**.

Adding Another Region for HTML Text

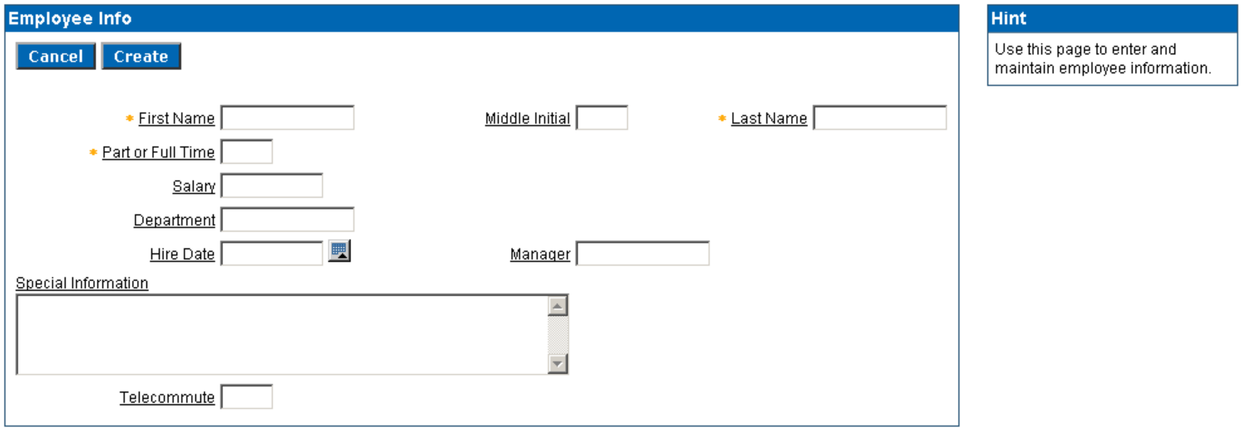
You have the option of displaying regions in columns as well as in rows. This exercise explains how to create another region to display hint text to the user.

To create a region to display hint text:

1. Navigate to the Page Definition for page 900.
2. Under Regions, click the **Create** icon.
3. For the region type, select **HTML** and click **Next**.
4. Select the type of HTML region container. Select **HTML** and click **Next**.
5. For Display Attributes:
   a. In Title, enter `Hint`.
   b. From Region Template, select **Sidebar Region**.
   c. From Display Point, select **Page Template Region Position 3**.
   d. From Column, select **3**.
   e. Click **Next**.
6. In Enter HTML Text Region Source, enter the following:

   ```
   Use this page to enter and<br>
   maintain employee information.
   ```
7. Click **Create Region**.
8. Run the page by clicking the **Run Page** icon. (See Figure 4–6.)

Figure 4–6 Page 900 with Hint Region



Changing Item Types

This exercise describes how to change item types to make data entry easier for the user. To change an item type, navigate to the Item attributes page and select another Display As option.

Topics in this section include:

- Change an Item to a Radio Group
- Change an Item to a Select List
- Change an Item to a Check Box

Change an Item to a Radio Group

Because the Part or Full-time item only has two valid choices, this item is a good candidate for either a check box or a radio group.

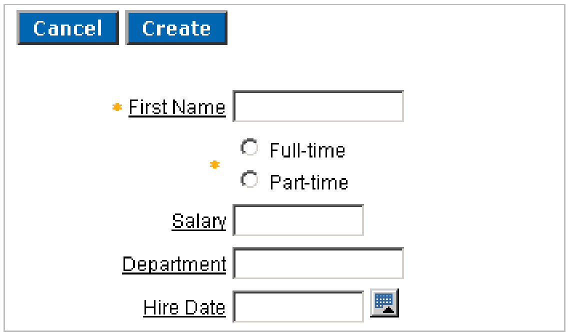
To change the Part or Full-time item to a radio group:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Items, select **P900_EMP_PART_OR_FULL_TIME**.
3. From Display As, select **Radiogroup**.
4. For Label, remove the label text. (It will be redundant.)
5. Under List of Values, create a static list of values:
   a. From Named LOV, select **Select Named LOV**.
   b. In List of values definition, enter:

   ```
   STATIC:Full-time;F,Part-time;P
   ```

   This definition will display as two radio buttons with the labels **Full-time** and **Part-time**, but the value that being inserted into the database will be either F or P.
6. Click **Apply Changes**.
7. Run the page. (See Figure 4–7.)

Figure 4–7 Part or Full-time item Changed to a Radio Group



Notice that Full-time and Part-time displays as radio group that is stacked in one column. You can have these button display side by side.

To display the Full-time and Part-time radio buttons display side by side:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Items, select **P900_EMP_PART_OR_FULL_TIME**.
3. Scroll down to Lists of Values.
4. In Columns, enter **2**.
5. Click **Apply Changes**.

By changing this setting to match the number of valid values (that is, Full-time and Part-time), the values display side by side.

Change an Item to a Select List

In the DDL you used to create the `HT_EMP` table, Department is validated by a check constraint. You can implement Department as a radio group, a select list, or a Popup LOV.

To change Department to a select list:

1. Navigate to the Page Definition for page 900.
2. Under Items, select **P900_EMP_DEPT**.
3. From Display As, select **Select List**.

   The other Select List choices are for either redirecting the user to another page or URL based on the selection, or submitting the current page which is used when other information needs to be retrieved based upon the selection in the Select List.
4. Under Lists of Values, create a static list of values:
   a. From Named LOV, select **Select Named LOV**
   b. In List of values definition, enter:

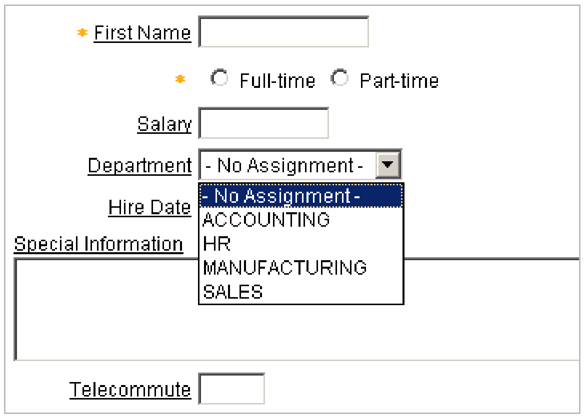
      ```
      STATIC:SALES,ACCOUNTING,MANUFACTURING,HR
      ```
   c. From Display Null, select **Yes**.
   d. In Null display value, enter:

      ```
      - No Assignment -
      ```

The last two selections take into account that the `EMP_DEPT` column can contain nulls. As a best practice, whenever you implement a select list and have a column that can be null, you should set Display Null to Yes. Failure to do so, results in the item defaulting to the first item in the select list.

5. Click **Apply Changes**.
6. Run the page by clicking the **Run Page** icon. (See Figure 4–8.)

Figure 4–8 Department Changed to a Select List



Change an Item to a Check Box

The item Telecommute is ideal for a check box. When you change the Display Type, you can also move it up on the page and place is next to the Full-time and Part-time radio group.

To change Telcommute to a check box:

1. Navigate to the Page Definition for page 900. Select **Edit Page 900** from the Developer toolbar.
2. Under Items, select **P900_EMP_TELECOMMUTE**.
3. From Display As, select **Checkbox**.
4. Under Displayed:
   a. In Sequence, enter `1.5`.
   b. From Begin on New Line, select **No**
5. Scroll down to List of Values.
6. To have the label precede the check box:
   a. From Named LOV, select **Select Named LOV**
   b. In List of values definition, enter:

   ```
   STATIC:;Y
   ```

   This displays the check box after the label, but will not display a value associated with the check box. If the check box is checked, the value passed to the database will be Y.
7. Click **Apply Changes**.
8. Run the page by clicking the **Run Page** icon.

About Label Templates

You can control the look of an item label by using a label template. *Sample Application* includes the following label templates:

- No Label
- Required Label

The Required Label template prepends a red asterisk (*) to the label. You may also create your own label templates to control the look of labels using different fonts, borders, backgrounds, and images.

To change to a different label template:

1. Navigate to the Page Definition for page 900.
2. Under Items, select an item name.
3. Scroll down to Label and make a selection from the Template list.
4. Click **Apply Changes**.
5. Run the page.

Changing Buttons

The wizard that created the form in this tutorial also created buttons. These buttons display conditionally based upon whether the page is being used to create a new record (that is `P900_EMP_ID` equals null), or the page is being used to update an existing record. These buttons were created as HTML buttons and positioned at the top of the region.

You can also position buttons at the bottom of the region, to the left or right of the page title, above the region, below the region, or in any button position defined in the region template.

To change a button position:

1. Navigate to the Page Definition for page 900.
2. Click the heading **Buttons**.
3. Make a new selection from the Position column.
4. Click **Apply Changes**.
5. Run the page.

Buttons can also have templates associated with them to refine how they look.

Running the Page for Update

You can run the page and provide it with an Employee ID to retrieve. Typically, this would be done with a link from a report page but for this example, run the page and add `::::P900_EMP_ID:1` to the end of the URL. For example:

```
http://marvel.oracle.com/pls/otn/f?p=9659:900:1284393467360777225::::P900_EMP_ID:1
```

This will pass the value `1` to the item `P9000_EMP_ID`. If you run the page note that the Delete and Apply Changes buttons now display. The Create button appeared previously because the page was expecting a new record to be created. Also note a Record Create Date now appears.

Making Data Bold

One way to make the information in a region easier to read, is to make the labels (or the data) more pronounced. You can accomplish this by changing the color, specifying another font, or using bold. To make a label bold, you could bold the data manually, or create a new label template. In the latter approach, you would create a new label template that would wrap the HTML tag for bold around the label and then associate that template with the items in the Audit Information region.

To make data bold manually:

1. Navigate to the Page Definition.
2. Under Items, select an item name.
3. Scroll down to Element.
4. In HTML Form Element Attributes, type:

   ```
   class="fielddatabold"
   ```

   This example references a class in the Cascading Style Sheet associated with this application.

5 How to Work with Check Boxes

In Oracle HTML DB, you can create check boxes as form elements, or you can create check boxes in reports. Check boxes on a form work similarly to lists of values. When you define an item to be a check box, you need to provide the check box values in the List of Values section of the Item Attributes page. You define check boxes on a report using the supplied function `HTMLDB_ITEM.CHECKBOX`.

This tutorial illustrates the different ways you can create check boxes within the demonstration application, *Sample Application* and explains how to reference and process the values of checked boxes.

This section contains the following topics:

- Accessing Sample Application
- Creating a Single Value Check Box on a Form
- Creating Multi Value Check Box to Filter Content
- Adding Check Boxes to Each Row in the Report

Accessing Sample Application

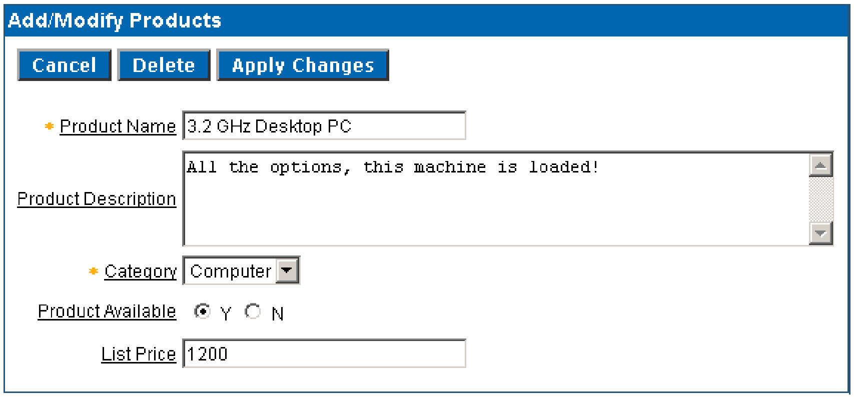
To access Sample Application:

1. Log in to Oracle HTML DB.
2. Click the down arrow on the right side of the **Application Builder** icon.
3. From the menu, select **Demonstrations**.

   The Demonstration Applications page appears.
4. Locate Sample Application and check the Status column:
   a. If the Status column displays **Installed**, click **Run** in the Action column.
   b. If the Status column displays **Not Installed**, select **Install** in the Action column. When the Application Builder home page appears, click the **Run** icon.
5. When prompted, enter the appropriate username and password and click **Login**
   - For User Name, enter either `demo` or `admin`.
   - For Password, enter the name of the current workspace using all lowercase letters.
6. Click the **Products** tab.
7. Click the **Edit** icon to the left of a product.

As shown in Figure 5–1 on page 5-2, note that Product Available is a radio group. In this exercise that follows you will change this item to a check box.

Figure 5–1 Products Available Radio Group



Creating a Single Value Check Box on a Form

In this exercise you change the Product Available radio group to a check box and then change the position of the label.

Topics in this section include:

- Change Product Available Radio Group to a Check Box
- Alter the Check Box Position
- Change Default Check Box Behavior

Change Product Available Radio Group to a Check Box

To change the Product Available radio group to a check box:

1. Navigate to the Page Definition for page 6. Select **Edit Page 6** from the Developer Toolbar.
2. Under Items, select **P6_PRODUCT_AVAIL**.
3. From Display As, select **Checkbox**.
4. Scroll down to List of Values.
5. Under List of Values:
   a. From Named LOV, select **Select Named LOV**.
   b. In List of values definition, enter:

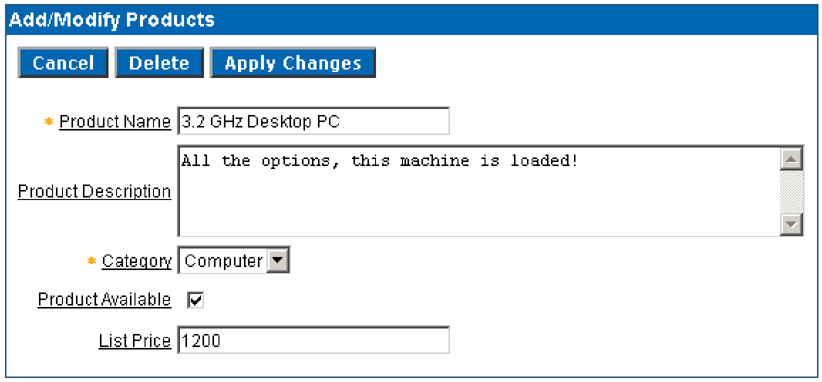
      ```
      STATIC:;Y
      ```

      In this instance, the display value is null and the return value is Y. If a display value were provided, it would appear to the left of the check box and could be used in place of the label.
6. Click **Apply Changes**.

   The Page Definition appears.
7. Run the page by clicking the **Run Page** icon.

As shown in Figure 5–2, note that the Product Available item now displays as a check box.

Figure 5–2 Product Available Item as a Check Box



Alter the Check Box Position

Next, you move the check box label to the right side of the check box.

To change the position of the check box label:

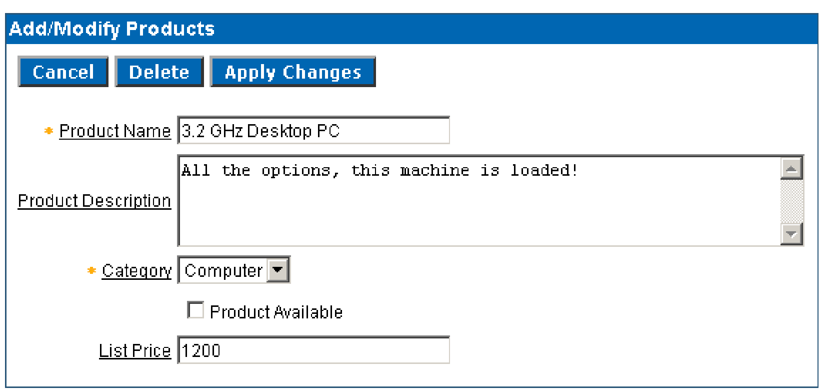
1. Navigate to the Page Definition for page 6. Select **Edit Page 6** from the Developer Toolbar.
2. Under Items, select **P6_PRODUCT_AVAIL**.
3. For Label, delete the text `Product Available`.
4. Under List of Values, change the List of values definition to:

   ```
   STATIC:Product Available;Y
   ```

5. Click **Apply Changes**.
6. Run the page by clicking the **Run Page** icon.

As shown in Figure 5–3, note that the label Product Available now displays to the right of the check box.

Figure 5–3 Product Available Label Moved to the Right



Removing the label and adding the display value to the LOV causes the HTML DB engine to render the check box first and then the display value, Product Available.

Change Default Check Box Behavior

In certain circumstances, you may want a check box to be enabled by default. You can accomplish this by setting the default value attribute of the check box item. One disadvantage of this approach is that you need to perform some extra steps to disable it. Because of the way you defined the Product Available check box, it is virtually impossible to disable it.

Consider the following example:

1. Navigate to the Home page by selecting the **Home** tab.
2. From the Tasks list, select **Add a New Product**.
3. On the Add/Modify Product page:
   a. Fill in the required fields (fields marked with an asterisk).
   b. Disable the **Product Available** check box.
   c. Click **Create**.
4. Disable the Product Available check box again and click **Apply Changes**.

   The Product Page appears.
5. Select the **Edit** icon for product you just added.

   Notice that the Product Available check box is enabled even though you disabled it twice when you added the product. This behavior results from the fact:
   - The Product Available check box has a default value of `Y`.
   - When Product Available is `NULL`, it defaults to the default value `Y` which enables the check box.

Add a Computation

You can alter this behavior by adding a computation that remembers the state of the check box.

To add a computation that tracks the state of the check box:

1. Navigate to the Page Definition for page 6. Select **Edit Page 6** from the Developer Toolbar.
2. Under Computations, click the **Create** icon.
3. For Location, select **Item on This Page** and click **Next**.
4. For Item:
   a. For Compute Item, select **P6_PRODUCT_AVAIL**.
   b. For Computation Point, select **After Submit**.
   c. For Computation Type, select **Static Assignment**.
   d. Click **Next**.
5. For Computation, enter the following and click **Next**.

   ```
   N
   ```

Note: Since this item is a check box, the computation needs to be something other than `Y` or `NULL`.

Next, create a condition that controls when the computation executes.

6. On Condition:

   a. For Condition Type, select **Value of Item in Expression 1 is NULL**.

   b. In Expression 1, enter:

   ```
   P6_PRODUCT_AVAIL
   ```

   Because of these settings, this computation will only execute when the value of the check box item, P6_PRODUCT_AVAIL is `NULL`.

7. Click **Create**.

Add another product as you did in the previous procedure. Notice that this time the Product Available check box is not automatically selected.

Creating Multi Value Check Box to Filter Content

In the next exercise, you create amulti value check box on the Product page. This check box will enable users to filter the report by selecting a category.

Topics in this section include:

- Create a Multi Value Check Box
- Alter Check Box Display Values
- Change Where the Check Boxes Display
- Create a Go Button to Submit the Page
- Adjust Default Check Box Behavior

Create a Multi Value Check Box

To a create muli value check box:

1. Navigate to the Page Definition for page 3.
2. Under Items, click the **Create** icon.
3. For Item Type, select **Check Box** and click **Next**.
4. On Display Position and Name:

   a. For Item Name, enter `P3_SHOW`.

   b. For Region, select **Products (1) 10**.

   c. Click **Next**.

5. For List of Values:

   a. For Display Null Option, select **No**.

   b. In List of Values Query, enter:

   ```
   SELECT distinct category a, category b
   FROM demo_product_info
   ORDER BY 1
   ```

   Note that to create a multi value check box, the List of Values query needs to return more than one row.

   c. Click **Next**.

6. On Item Attributes:
   a. For Label, remove the default text by clicking **Clear**.
   b. Click **Next**.
7. For Source:
   a. For Item Source, select **Static Assignment**.
   b. For Item Source Value, enter:

      ```
      Audio:Computer:Phones:Video
      ```

      When a multi value check box is submitted, the value of the item is a colon delimited string of values. Using this string as the source will ensure all boxes are checked when HTML DB engine renders the page.
   c. Click **Create Item**.

Alter Check Box Display Values

To edit check box display values (or labels) to appear in bold:

1. Navigate to the Page Definition for page 3.
2. Under Items, select **P3_SHOW**.
3. Scroll down to Element.
4. In Form Element Option Attributes, enter:

   ```
   class="fielddatabold"
   ```

   Form Element Option Attributes are used exclusively for check boxes and radio buttons and control the way the HTML DB engine renders individual options.
5. Click **Apply Changes**.

Change Where the Check Boxes Display

Next, you edit attributes so that the category check boxes display above the report. To accomplish this, you need to change the Display Point attribute of the region associated with P3_SHOW.

To change the display point of the Products region:

1. Navigate to the Page Definition for page 3.
2. Under Region, select **Products**.
3. From Display Point, select **Page Template Body (3. items above region content)**.
4. Click **Apply Changes**.

If you ran page 3 now, you would notice the category check boxes display vertically. Next, you will change the display so the category check boxes display horizontally.

To alter where the category check boxes display:

1. Navigate to the Page Definition for page 3.
2. Under Items, select **P3_SHOW**.
3. Scroll down to List of Values.
4. In Columns, enter `4`.

5. Click **Apply Changes**.

Create a Go Button to Submit the Page

In order for the report to be driven by the product category check boxes, you need to submit the page.

To create a button to submit the page:

1. Navigate to the Page Definition for page 3.
2. Under Buttons, click the **Create** icon.
3. For Button Region, select **Products (1) 10** and click **Next**.
4. For Position, select **Create a button displayed among this region's items** and click **Next**.
5. For Button Attributes:
   a. For Button Name, enter `P3_GO`.
   b. In Sequence, enter 40.
   c. Click **Create Button**.

Next, you need to create a branch to tell the HTML DB engine where to go after the user clicks the Go button.

To create a branch to page 3:

1. Navigate to the Page Definition for page 3.
2. Under Branches, click the **Create** icon.
3. For Branch Point and Type, accept the defaults and click **Next**.
4. For Page, select **3** and click **Next**.
5. Click **Create Branch**.

In order to generate a report based on the category check box values, you need to change the report query.

To edit the report query:

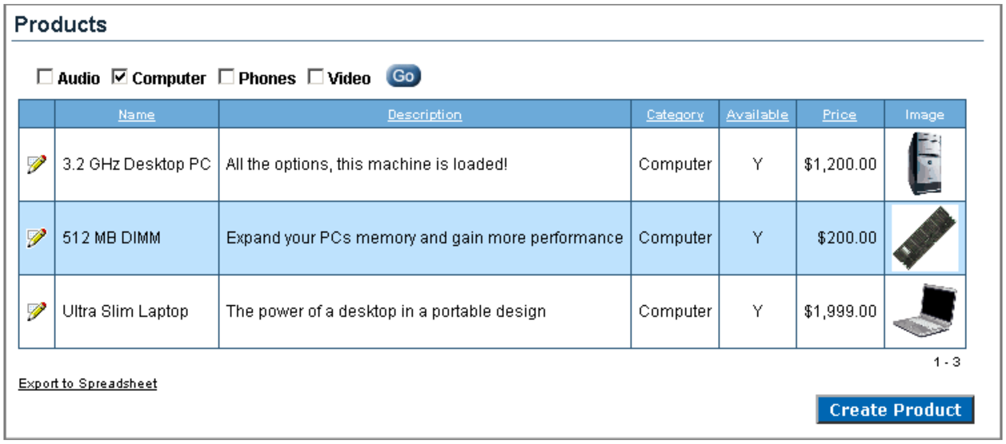
1. Under Regions, select **Products**.
2. Scroll down to Source.
3. In Region Source, change the `WHERE` clause to read:

```
WHERE p.image_id = i.image_id (+)
AND instr(':'||:P3_SHOW||':',category) > 0
```

4. Click **Apply Changes**.
5. Run the page by clicking the **Run Page** icon.

As shown in Figure 5–4, notice you can filter the report by selecting a category check box at the top of the page.

Figure 5–4 Product Page with Category Check Boxes and Go Button



Adjust Default Check Box Behavior

Although the category check boxes correctly filter the content on page 3, if you deselect all the check boxes, notice the report returns all products. This behavior results from the fact that if a check box has a NULL value (that is, it is deselected), it defaults to the default value Y. The default value of Y in turn enables the check box.

You can alter this behavior by adding a computation that remembers the state of the check box.

To add a computation that tracks the state of the check box:

1. Navigate to the Page Definition for page 3.
2. Under Computations, click the **Create** icon.
3. For Item Location, select **Item on This Page** and click **Next**.
4. For Item:
   a. For Compute Item, select **P3_SHOW**
   b. For Computation Point, select **After Submit**.
   c. For Computation Type, select **Static Assignment**.
   d. Click **Next**.
5. For Computation:
   a. For Computation:

      ```
      none(bogus_value)
      ```

   b. Click **Next**.

   > **Note:** A static assignment of an item needs to be something other than `Y` or `NULL`.

   Next, create a condition that controls when the computation executes.
6. On Condition:
   a. For Condition Type, select **Value of Item in Expression 1 is NULL**.
   b. In Expression 1, enter:

```
P3_SHOW
```

As a result of these settings, this computation will only execute when the value of the check box item, `P3_SHOW` is `NULL`.

7. Click **Create**.

Run the page again and deselect all the category check boxes. Notice that this time the report contains the expected result (no returned records).

Adding Check Boxes to Each Row in the Report

In the next exercise you add a delete check box to each row in the Products report. To accomplish this you edit the report query and make a call to `HTMLDB_ITEM` package.

`HTMLDB_ITEM` is a supplied package for generating certain form elements dynamically. In this instance, you use `HTMLDB_ITEM.CHECKBOX` to generate check boxes in the Products report. When the page is submitted, the values of the check boxes are stored in global package arrays. You can reference these values using the PL/SQL variables `HTMLDB_APPLICATION.G_F01` to `HTMLDB_APPLICATION.G_F50` based on the `p_idx` parameter value that was passed in.

Topics in this section include:

- Call HTMLDB_ITEM.CHECKBOX
- Add a Button to Submit Check Box Array Values
- Add a Process

Call HTMLDB_ITEM.CHECKBOX

To edit the query to call `HTMLDB_ITEM.CHECKBOX`:

1. Navigate to the Page Definition for page 3.
2. Under Regions, click **Products**.
3. In Region Source, add the new line appearing in bold face to the query.

```
SELECT p.product_id edit_product, p.product_id view_product_id,
htmldb_item.checkbox(1,p.product_id) del,
p.product_name, p.product_description, p.category, p.product_avail, p.list_
price, '<img src="#OWNER#.custom_image_display?p_image_id=' || nvl(i.image_
id,0) || '"
height="50" width="50" />' img
FROM demo_product_info p, demo_images i
WHERE p.image_id = i.image_id (+)
AND instr(':'||:P3_SHOW||':',category) > 0
```

HTMLDB_ITEM is an Oracle HTML DB supplied package you can use to generate certain form elements dynamically. Note the value passed in for `p_idx` in the above example is 1. You reference the check box values using the global variable `HTMLDB_APPLICATION.G_F01` later on.

4. Select the **Report Attributes** tab.
5. Under Column Attributes, locate the `Del` column.
6. Click the Up arrow until the `DEL` column is directly beneath `VIEW_PRODUCT_ID`. (See Figure 5–5).

Figure 5–5 Report Column Attributes Page

	Alias	Link	Edit			Heading	Column Alignment	Heading Alignment
	EDIT_PRODUCT	✓		▼	▲		center	center
	VIEW_PRODUCT_ID			▼	▲	ID	right	center
	DEL			▼	▲	Del	left	center
	PRODUCT_NAME			▼	▲	Name	left	center
	PRODUCT_DESCRIPTION			▼	▲	Description	left	center

7. Click **Apply Changes**.

Add a Button to Submit Check Box Array Values

To add a button to submit the check box array values:

1. Navigate to the Page Definition for page 3.
2. Under Buttons, click the **Create** icon.
3. For Select a region for the button, select **Products 1 (10)** and click **Next**.
4. For Position, select, select **Create a button in a region position** and click **Next**.
5. For Button Attributes:
   a. For Button Name, enter `DELETE_PRODUCTS`.
   b. For Label, enter `Delete Products`.
   c. Click **Next**.
6. For Button Template, accept the default selection and click **Next**.
7. For Position, select **Top of Region** and click **Next**.
8. For Branch to Page, select **3 Products** and click **Create Button**.

Add a Process

To add a process that executes when the user clicks the Delete Products button:

1. Under Processes, click the **Create** icon.
2. For Process Type, select **PL/SQL** and click **Next**.
3. For Name, enter `Delete Products` and click **Next**.
4. Enter the following PL/SQL process and click **Next**:

```
FOR i in 1..HTMLDB_APPLICATION.G_F01.count
LOOP
   DELETE FROM demo_product_info
   WHERE product_id = HTMLDB_APPLICATION.G_F01(i);
END LOOP;
```

   `HTMLDB_ITEM` is an Oracle HTML DB supplied package you can use to generate certain form elements dynamically. When a page is submitted, the values of each column are stored in global package arrays, which you can reference using the PL/SQL variable `HTMLDB_APPLICATION.G_F01` to `HTMLDB_APPLICATION.G_F50`. In this exercise, the value passed in for `p_idx` in `EMPNO` column is 1, so you reference the EMPNO column values using the global variable HTMLDB_APPLICATION.G_F01.

5. On Messages:

   a. In Success Message, enter:

      `Product(s) deleted.`

   b. In Failure Message, enter:

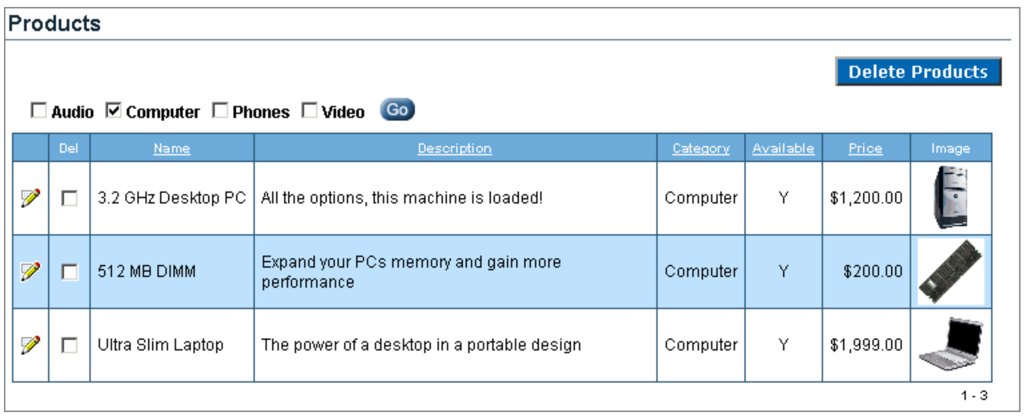
      `Unable to delete product(s).`

   c. Click **Next**.

6. Click **Create Process**.

If you run the page, the Delete Products button appears above the report. (See Figure 5–6). To remove a product from the report, select the **Del** check box and click **Delete Products**.

Figure 5–6 Products Report with Delete Products Check Box



6

How to Implement a Web Service

Web services enable applications to interact with one another over the Web in a platform-neutral, language independent environment. In a typical Web services scenario, a business application sends a request to a service at a given URL by using the HTTP protocol. The service receives the request, processes it, and returns a response. You can incorporate calls to external Web services in applications developed in Oracle HTML DB.

Web services in Oracle HTML DB are based on SOAP (the Simple Object Access Protocol). SOAP is a World Wide Web Consortium (W3C) standard protocol for sending and receiving requests and responses across the Internet. SOAP messages can be sent back and forth between a service provider and a service user in SOAP envelopes.

This tutorial illustrates how to call a Web service from within an Oracle HTML DB application.

Topics in this section include:

- About Creating Web Service References
- Creating a New Application
- Specifying an Application Proxy Server Address
- Searching a UDDI Registry for a Business Name
- Searching a UDDI Registry for a Service Name

Note: The SOAP 1.1 specification is a W3C note. (The W3C XML Protocol Working Group has been formed to create a standard that will supersede SOAP.)

For information about Simple Object Access Protocol (SOAP) 1.1 see:

`http://www.w3.org/TR/SOAP/`

About Creating Web Service References

To utilize Web services in Oracle HTML DB, you create a Web service reference using a wizard. Each Web service reference is based on a Web Services Description Language (WSDL) document that describes the target Web service. When you create a Web service reference, the wizard analyzes the WSDL and collects all the necessary information to create a valid SOAP message.

When you create a Web service reference you need to decide how to locate the WSDL. You can locate a WSDL two ways:

- By searching a UDDI registry for either a service name or business name.

  A Universal Description, Discovery, and Integration (UDDI) registry is a directory where businesses register their Web services.
- By entering the URL to the WSDL document.

In this tutorial you will create Web service references by searching a UDDI registry.

Creating a New Application

First, create a new application.

To create an application:

1. Click the **Application Builder** icon on the workspace home page.
2. When the Application Builder home page appears, click **Create**.
3. For Method, select **Create Application** and click **Next**.
4. For Name:
   a. For Name, enter `Web Services`.
   b. For Create Application, select **From Scratch**.
   c. Click **Next**.
5. Add a blank page:
   a. Under Select Page Type, select **Blank** and click **Add Page**.

      The page appears in the list at the top of the page.
   b. Select the Name **Page 1**.
   c. Enter `Web Services` in Page Name and click **Apply Changes**.
   d. Click **Next**.
6. For Tabs, accept the default **One Level of Tabs** and click **Next**.
7. For Shared Components, accept the default and click **Next**.
8. For Attributes, accept the default for Authentication Scheme, Language, and User Language Preferences Derived From and click **Next**.
9. For User Interface, select Theme 2 and click **Next**.
10. Review your selections and click **Create**.

The Application Builder home page appears.

Specifying an Application Proxy Server Address

If your environment requires a proxy server to access the Internet, you must specify a proxy server address on the Application Attributes page before you can create a Web service reference.

To specify a proxy address for an application:

1. On the Application Builder home page, click **Edit Attributes**.
2. Click **Edit Standard Attributes**.

3. Under Name, enter the proxy server in Proxy Server.
4. Click **Apply Changes**.

Searching a UDDI Registry for a Business Name

In this exercise you create a form which displays stock quotes based on a stock symbol you provide. You will create a Web service reference by searching the UDDI registry for a business name:

To create a Web service reference by searching for a business name:

1. Navigate to the Application Builder home page.
2. Click **Shared Components**.
3. Under Logic, select **Web Service References**.

   The Web Service References page appears.
4. Click **Create**.
5. When prompted whether to search a UDDI registry to find a WSDL, select **Yes** and click **Next**.
6. For UDDI Location, select **IBM UDDI** and click **Next**.
7. On Search:
   a. For Search Type, select **Business Name**.
   b. In Name, enter:

      ```
      %xMethods%
      ```
   c. Click **Search**.
   d. Under Matching Services, select **xMethods Delayed Stock Quotes**.
   e. Click **Next**.

   A summary page appears describing the selected Web service.
8. Review your selection and click **Next** to continue.

   The URL to the WSDL document displays in the WSDL Location field.
9. Click **Finish**.

Create a Form to Display a Stock Quote

Next, you will create a form to display a stock quote based on the stock symbol you provide.

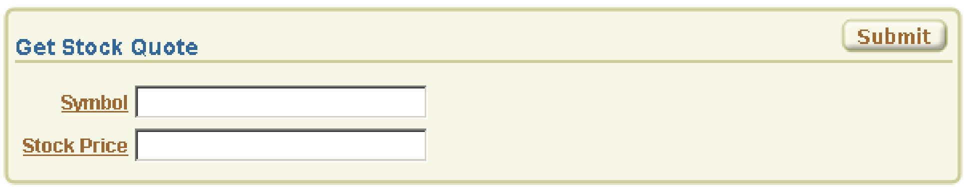
To create a form after creating a Web Service Reference:

1. On Web Service Reference Added page, select **Create Form on Web Service**.
2. On Web Service Reference and Operation:
   a. For Web Service Reference, select **XMethods Delayed Stock Quotes**.
   b. For Operation, select **getQuote**.
   c. Click **Next**.
3. For Page and Region Attributes:
   a. In Region Title, enter `Get Stock Quote`.

   b. Accept the other defaults.
   c. Click **Next**.
4. For Input Items, accept the defaults and click **Next**.
5. For Output Items:
   a. For Item Label, enter `Stock Price`.
   b. Accept the other defaults.
   c. Click **Finish**.
6. Click **Run Page** to view the form.
7. On the Log in page, enter the User Name and Password for your workspace and click **Login**.

   A form resembling Figure 6–1 appears.

Figure 6–1 Get Stock Quote Form



8. Test the form. In Symbol, enter a stock symbol (such as `ORCL`) and click **Submit**.

   The associated stock price displays in the Stock Price field.
9. Select **Edit Application** from the Developer toolbar to return to the Application Builder home page.

Searching a UDDI Registry for a Service Name

Next, you create a form that displays market futures. In this exercise you create a Web service reference by search a UDDI registry for a service name. Then, you create a form and report.

To create a new Web service by searching for a service name:

1. Navigate to the Application Builder home page.
2. Click **Shared Components**.

   The Shared Components page appears.
3. Under Logic, select **Web Service References**.

   The Web Service References page appears.
4. Click **Create**.
5. When prompted whether to search a UDDI registry to find a WSDL, select **Yes** and click **Next**.
6. For UDDI Location, select **XMethods UDDI** and click **Next**.
7. For Search:
   a. For Search Type, select **Service Name**.

   b. In Name, enter `xignite` and click **Search**.

      This is a search engine for market news.

   c. Under Matching Services, select `XigniteFutures`.

   d. Click **Next**.

   A summary page appears describing the selected Web service.

8. Review your selection and click **Next** to continue.

   The WSDL Location field displays the URL to the WSDL document.

9. Click **Finish**.

The Web service reference, XigniteFutures, is added to the Web Service References Repository.

Create a Form and Report

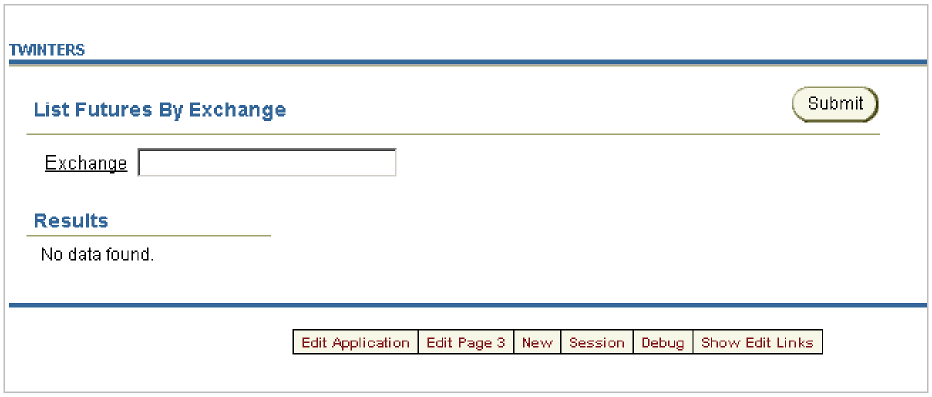
Next, you need to create a page that contains a form and report.

To create a form and report after creating a Web Service Reference:

1. On Web Service Reference Added page, select **Create Form and Report on Web Service**.
2. For Choose Service and Operation:
   a. For Web Service Reference, select **XigniteFutures**.
   b. For Operation, select **ListFuturesByExchange**.
   c. Click **Next**.
3. For Page and Region Attributes:
   a. Change Form Region Title to `List Futures By Exchange`.
   b. Accept the other defaults and click **Next**.
4. For Input Items:
   a. For P2_USERNAME, P2_PASSWORD, P2_TRACER, select **No** in the Create column.
   b. For P2_EXCHANGE, accept the default **Yes** in the Create column.
   c. Click **Next**.
5. For Web Service Results:
   a. For Temporary Result Set Name (Collection), accept the default.
   b. Result Tree to Report On, select **Future (tns:Future)**.
   c. Click **Next**.
6. For Result Parameters to Display, select all the parameters and click **Finish**.
7. Click **Run Page** to view the form.
8. If a Log in page appears, enter the User Name and Password for your workspace and click **Login**.

   A form and report resembling Figure 6–2 on page 6-6 appears. Notice that the List Futures by Exchange Form on the top of the page contains a data entry field and a submit button, but the Results Report does not contain any data.

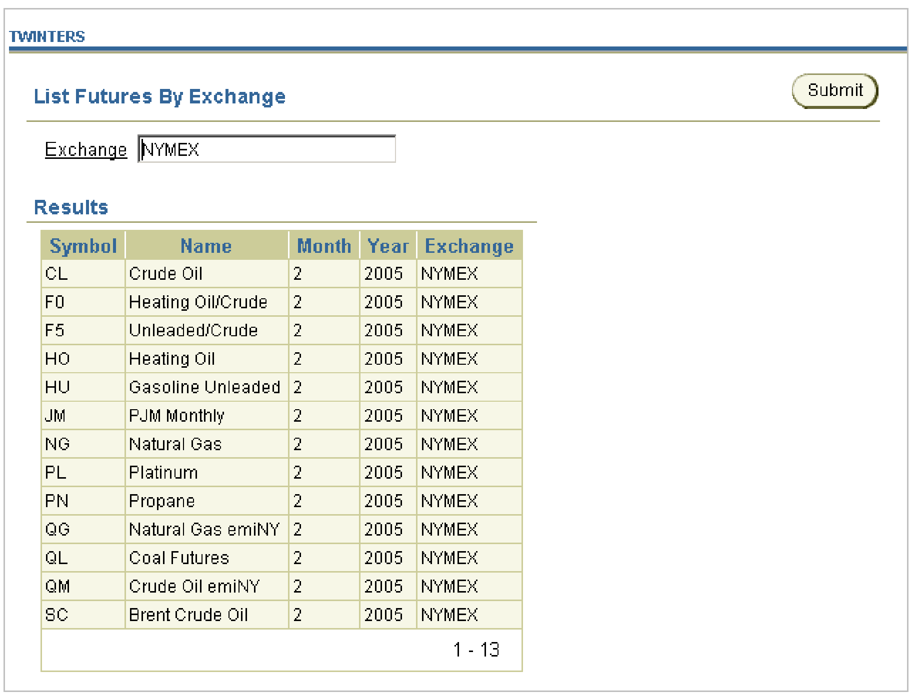
Figure 6–2 List Futures by Exchange Form and Report without Data



9. Test the form. In Exchange, enter `NYMEX` and click **Submit**.

The report at the bottom of the page should resemble Figure 6–3. The report lists the symbol, name, month, and year of futures from the New York Mercantile Exchange (NYMEX).

Figure 6–3 List Futures by Exchange Form and Report with Data



Symbol	Name	Month	Year	Exchange
CL	Crude Oil	2	2005	NYMEX
F0	Heating Oil/Crude	2	2005	NYMEX
F5	Unleaded/Crude	2	2005	NYMEX
HO	Heating Oil	2	2005	NYMEX
HU	Gasoline Unleaded	2	2005	NYMEX
JM	PJM Monthly	2	2005	NYMEX
NG	Natural Gas	2	2005	NYMEX
PL	Platinum	2	2005	NYMEX
PN	Propane	2	2005	NYMEX
QG	Natural Gas emiNY	2	2005	NYMEX
QL	Coal Futures	2	2005	NYMEX
QM	Crude Oil emiNY	2	2005	NYMEX
SC	Brent Crude Oil	2	2005	NYMEX

7

How to Create a Stacked Bar Chart

A stacked bar chart displays the results of multiple queries stacked on top of one another (either vertically or horizontally). Using a stacked bar chart is an effective way to communicate the absolute values of data points represented by the segments of each bar, as well as the total value represented by data points from each series stacked in a bar.

In Oracle HTML DB, stacked bar chart is only available as an SVG chart. To create a stacked bar chart, you can create the chart as a stacked bar chart, or you can create a regular (non-HTML) bar chart and then add queries to it.

This tutorial describes how to create a stacked bar chart using existing data within the demonstration application, *Sample Application*.

This section contains the following topics:

Accessing Sample Application

To access Sample Application:

1. Log in to Oracle HTML DB.
2. Click the down arrow on the right side of the **Application Builder** icon.
3. From the menu, select **Demonstrations**.

   The Demonstration Applications page appears.
4. Locate *Sample Application* and check the Status column:
   a. If the Status column displays **Installed**, return to the Workspace home page.
   b. If the Status column displays **Not Installed**, select **Install** in the Action column.
   c. Follow the on-screen instructions.
5. When prompted, enter the appropriate username and password and click **Login**
   - For User Name, enter either `demo` or `admin`.

- For Password, enter the name of the current workspace using all lowercase letters.

Creating a Stacked Bar Chart

To create the initial report, you can either add a region to an existing page and define it as a stacked bar chart, or you can create a new page. In this exercise, you create a new page within the Sample Application.

The chart will display the sum by product category for sales from within the Sample Application. It will contain sales for the twelve months prior to the current month. In the following exercise, you will create four queries (called series) for each of the product categories (phones, computers, audio, and video).

To create a new page:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select **Sample Application**.
4. Click **Create Page**.
5. Select **Chart** and click **Next**.
6. Select **Stacked Bar, Vertical** and click **Next**.
7. For Page Attributes:
   a. For Page, enter `750`.
   b. For Page Name, enter `Revenue by Category`.
   c. For Region Name, enter `Revenue by Category`.
   d. Click **Next**.
8. For Tab Options, accept the default **Do not use Tabs** and click **Next**.
9. For Query:
   a. For Series Name, enter `Phones`.
   b. In SQL, enter:

```
SELECT NULL l,
       sales_month,
       revenue
   FROM (
SELECT TO_CHAR(o.order_timestamp,'Mon YYYY') sales_month,
       SUM(oi.quantity * oi.unit_price) revenue,
       TO_DATE(to_char(o.order_timestamp,'Mon YYYY'),'Mon YYYY') sales_
month_order
  FROM DEMO_PRODUCT_INFO p,
       DEMO_ORDER_ITEMS oi,
       DEMO_ORDERS o
 WHERE o.order_timestamp <= (trunc(sysdate,'MON')-1)
   AND o.order_timestamp > (trunc(sysdate-365,'MON'))
   AND o.order_id = oi.order_id
   AND oi.product_id = p.product_id
   AND p.category = 'Phones'
GROUP BY TO_CHAR(o.order_timestamp,'Mon YYYY')
ORDER BY sales_month_order
)
```

The syntax for the select of a chart is `SELECT link, label, value`. You must have all three and only three items in your select. Because there is no appropriate page to link to, the link is defined as null.

You cannot have an order by in the select statement for series in a stacked chart. The information will be displayed in alphabetical order and this does not work for dates (October displays before September). To get the data to display in chronological order, you need to order the data inside a nested select.

c. For When No Data Found Message, enter:

```
No orders found in the past 12 months.
```

d. Click **Next**.

10. Review your selections and click **Finish**.

Adding Additional Series

Once you have created the new page with a region defining the query, you need to add the series. In the following exercise, you will add a series for each of the categories of product in the application (that is, computers, audio, and video). Note you have already created the phones category.

To add a series for computers category:

1. On the Success Page, select **Edit Page**.

   The Page Definition for page 750 appears.

2. Under Regions, select **Chart** to the left of Revenue by Category.

   Under Chart Series, notice that only one series appears.

3. Add a chart series for Computer. Under Chart Series, click **Add Series**.

   a. For Series Name, enter `Computer`.

   b. In SQL, enter:

```
SELECT NULL l,
       sales_month,
       revenue
   FROM (
SELECT TO_CHAR(o.order_timestamp,'Mon YYYY') sales_month,
       SUM(oi.quantity * oi.unit_price) revenue,
       TO_DATE(to_char(o.order_timestamp,'Mon YYYY'),'Mon YYYY') sales_
month_order
  FROM DEMO_PRODUCT_INFO p,
       DEMO_ORDER_ITEMS oi,
       DEMO_ORDERS o
 WHERE o.order_timestamp <= (trunc(sysdate,'MON')-1)
   AND o.order_timestamp > (trunc(sysdate-365,'MON'))
   AND o.order_id = oi.order_id
   AND oi.product_id = p.product_id
   AND p.category = 'Computer'
GROUP BY TO_CHAR(o.order_timestamp,'Mon YYYY')
ORDER BY sales_month_order
)
```

   Note that this SQL matches the previous series. The only difference is that the category in the `WHERE` clause.

c. For When No Data Found Message, enter:

```
No orders found in the past 12 months.
```

d. Click **Apply Changes**.

4. Add a chart series for Audio. Under Chart Series, click **Add Series**.

   a. For Series Name, enter `Audio`.

   b. In SQL, enter:

```
SELECT NULL l,
       sales_month,
       revenue
   FROM (
SELECT TO_CHAR(o.order_timestamp,'Mon YYYY') sales_month,
       SUM(oi.quantity * oi.unit_price) revenue,
       TO_DATE(to_char(o.order_timestamp,'Mon YYYY'),'Mon YYYY') sales_
month_order
  FROM DEMO_PRODUCT_INFO p,
       DEMO_ORDER_ITEMS oi,
       DEMO_ORDERS o
 WHERE o.order_timestamp <= (trunc(sysdate,'MON')-1)
   AND o.order_timestamp > (trunc(sysdate-365,'MON'))
   AND o.order_id = oi.order_id
   AND oi.product_id = p.product_id
   AND p.category = 'Audio'
GROUP BY TO_CHAR(o.order_timestamp,'Mon YYYY')
ORDER BY sales_month_order
)
```

   c. For When No Data Found Message, enter:

```
No orders found in the past 12 months.
```

   d. Click **Apply Changes**.

5. Add a chart series for Video. Under Chart Series, click **Add Series**.

   a. For Series Name, enter `Video`.

   b. In SQL, enter:

```
SELECT NULL l,
       sales_month,
       revenue
   FROM (
SELECT TO_CHAR(o.order_timestamp,'Mon YYYY') sales_month,
       SUM(oi.quantity * oi.unit_price) revenue,
       TO_DATE(to_char(o.order_timestamp,'Mon YYYY'),'Mon YYYY') sales_
month_order
  FROM DEMO_PRODUCT_INFO p,
       DEMO_ORDER_ITEMS oi,
       DEMO_ORDERS o
 WHERE o.order_timestamp <= (trunc(sysdate,'MON')-1)
   AND o.order_timestamp > (trunc(sysdate-365,'MON'))
   AND o.order_id = oi.order_id
   AND oi.product_id = p.product_id
   AND p.category = 'Video'
GROUP BY TO_CHAR(o.order_timestamp,'Mon YYYY')
ORDER BY sales_month_order
)
```

c. For When No Data Found Message, enter:

```
No orders found in the past 12 months.
```

d. Click **Apply Changes**.

Changing the Chart Format

Next, you will enhance the appearance of the chart with axis titles by adding a region footer.

To format the y-axis:

1. Scroll down to Axes Settings.
2. In y-axis Format, enter:

   ```
   FML999G999G999G999G990
   ```

   This formats the `sales_month` column as money, but without displaying the cents
3. Select the Region Definition tab.
4. Scroll down to Header and Footer.
5. In Region Footer, enter:

   ```
   Note: This reflects sales for the 12 months prior to the current month.
   ```

6. Click **Apply Changes**.

Viewing the Chart

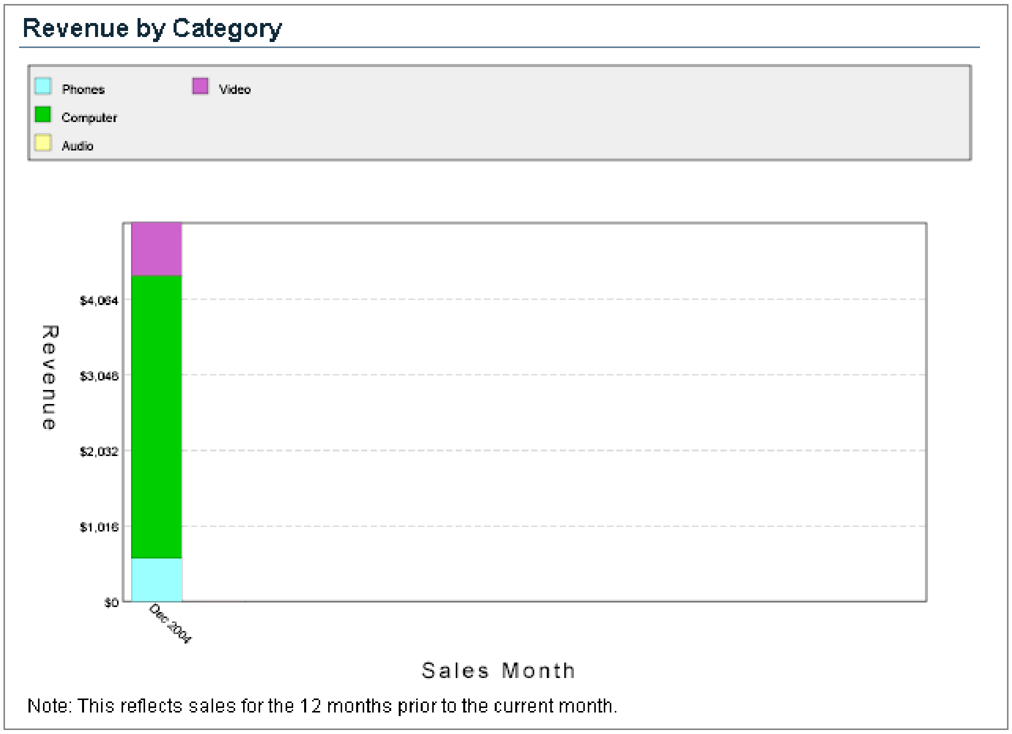
Now that the chart is complete, you can view it.

To run the chart:

1. Click the Run Page icon in the upper right corner of the page.
2. If you have already run Sample Application in this session, you will be taken to page 750. Otherwise, enter the appropriate username and password and click **Login**
   - For User Name, enter either `demo` or `admin`
   - For Password, enter the name of the current workspace using all lowercase letters
3. Navigate to page 750.

   As shown in Figure 7–1 on page 7-6, the Revenue by Category chart appears.

Figure 7–1 Revenue by Category Bar Chart



Tip: One way to navigate to a new page within a running application is to change the second parameter (the page identifier) to 750. For example, you would change:

```
http://htmldb.oraclecorp.com/pls/htmldb/f?p=2046:1: ...
```

to

```
http://htmldb.oraclecorp.com/pls/htmldb/f?p=2046:750: ...
```

8

How to Upload and Download Files in an Application

Oracle HTML DB applications may include the ability to upload and download files stored in the database. This tutorial illustrates how to create a form and report with links for file upload and download, how to create and populate a table to store additional attributes about the documents, and finally how to create the mechanism to download the document in your custom table.

This section contains the following topics:

Creating an Application

First, create a new application using the Create Application Wizard with the assumption you will include an upload form on page 2.

To create an application using the Create Application Wizard:

1. Click the **Application Builder** icon on the Workspace home page.
2. Click **Create**.
3. For Method, select **Create Application** and click **Next**.
4. For Name:
   a. For Name, enter `Download App`.
   b. For Create Application, select **From Scratch**.
   c. Click **Next**.
5. Add a blank page:
   a. Under Select Page Type, select **Blank** and click **Add Page**.

      The page appears in the list at the top of the page.
   b. Click **Next**.

6. For Tabs, select **No Tabs** and click **Next**.
7. For Shared Components, accept the defaults and click **Next**.
8. For Attributes, accept the defaults for Authentication Scheme, Language, and User Language Preferences Derived From and click **Next**.
9. For User Interface, select **Theme 2** and click **Next**.
10. Click **Create**.

Creating an Upload Form

Once you create an application, the next step is to create a form to upload documents. In the following exercise you create a form in an HTML region that contains a file upload item and a button. The button submits the page and returns the user to the same page.

Topics in this section include:

- Create an HTML Region
- Create an Upload Item
- Create a Button

Create an HTML Region

To create an HTML region:

1. Navigate to the Page Definition for page 1.
2. Under Regions, click the **Create** icon.
3. For Region, select **HTML** and click **Next**.
4. Select a type of HTML region container. Select **HTML** again and click **Next**.
5. For Title, enter **Submit File** and click **Next**.
6. Accept the remaining defaults and click **Create Region**.

Create an Upload Item

To create a file upload item:

1. Navigate to the Page Definition for page 1.
2. Under Items, click the **Create** icon.
3. For Item Type, select **File Browse** and click **Next**.
4. For Display Position and Name:
   a. For Item Name, enter `P1_FILE_NAME`.
   b. For Region, select **Submit File**.
   c. Click **Next**.
5. Accept the remaining defaults and click **Next**.
6. Click **Create Item**.

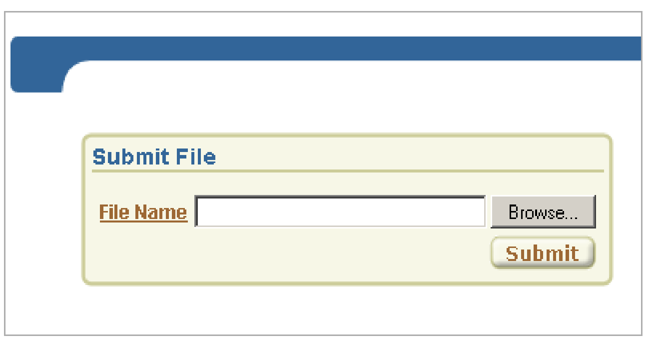
Create a Button

To create a button:

1. Under Buttons, click the **Create** icon.
2. For Button Region, select **Submit File (1) 1** and click **Next**.
3. For Button Position, select **Create a button in a region position** and click **Next**.
4. On Button Attributes:
   a. For Button Name, enter `Submit`.
   b. Accept the remaining defaults.
   c. Click **Next**.
5. For Button Template, accept the default and click **Next**.
6. On Display Properties, accept the defaults and click **Next**.
7. On Branching:
   a. In Branch to Page, select **Page 1**.
   b. Click **Create Button**.
8. Run the page by clicking the **Run Page** icon.
9. When prompted for a user name and password:
   a. For User Name, enter the name of your workspace
   b. For Password, enter the password for your workspace
   c. Click **Login**.

When you run the page, it should look similar Figure 8–1.

Figure 8–1 Submit File Form



Creating a Report with Download Links

Once you create the form to upload documents, the next step is to create a report on the document table that contains links to download documents. When you use the file upload item type, the files you upload are stored in a table called `wwv_flow_file_objects$`. Every workspace has access to this table through a view called `HTMLDB_APPLICATION_FILES`.

Topics in this section include:

- Create a Report on HTMLDB_APPLICATION_FILES

- Add Link to Download Documents

Create a Report on HTMLDB_APPLICATION_FILES

To create a report on `HTMLDB_APPLICATION_FILES`:

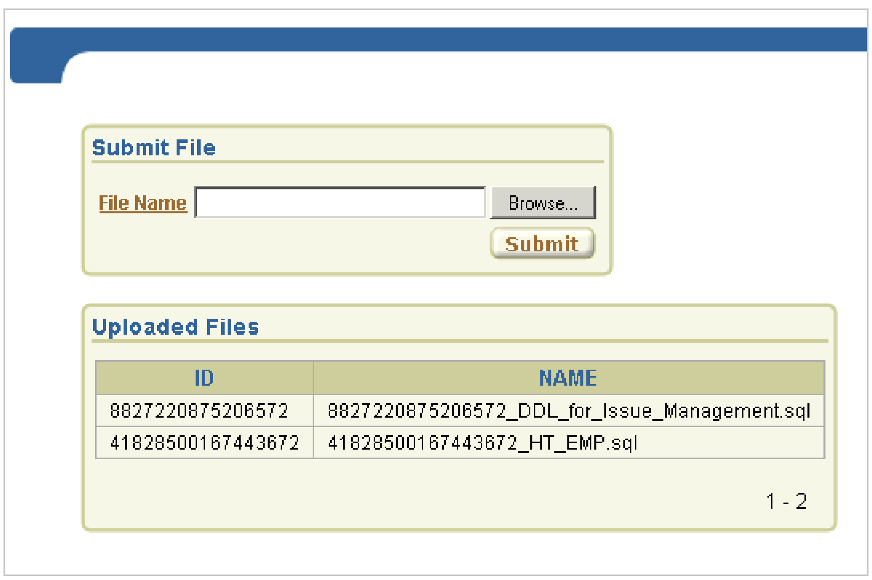
1. Navigate to the Page Definition for page 1.
2. Under Regions, click the **Create** icon.
3. For Region, select **Report** and click **Next**.
4. For Report Implementation, select **SQL Report** and click **Next**.
5. For Title, enter `Uploaded Files` and click **Next**.
6. On Source, enter the following SQL query:

```
SELECT id,name FROM HTMLDB_APPLICATION_FILES
```

7. Click **Create Region**.
8. Run the page.

As shown in Figure 8–2, the report you just created shows all documents that have been uploaded. Next, you provide a link to download the document.

Figure 8–2 Uploaded Files Report



Add Link to Download Documents

To provide a link to download the documents in the report:

1. Navigate to the Page Definition for page 1.
2. Under Regions, click **Report** adjacent to Uploaded Files.
3. Under Column Attributes, click the **Edit** icon next to the `ID` column.
4. Scroll down to Column Link. Under Column Link:

   a. In the Link Text field, enter:

   ```
   download
   ```

   b. From Target, select **URL**.
   c. In the URL field, enter the following:

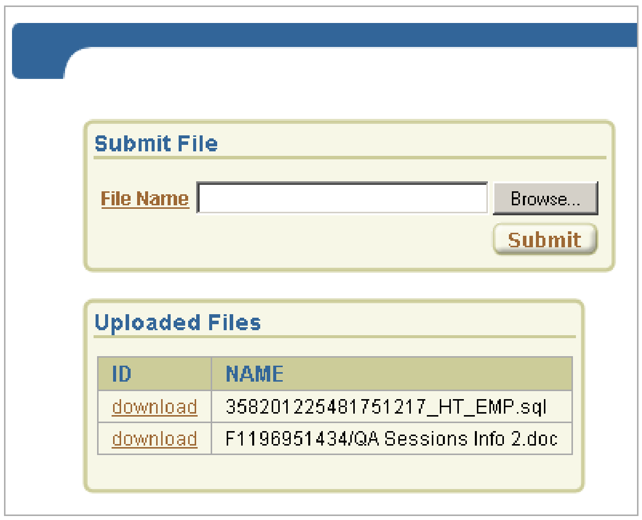
```
p?n=#ID#
```

   `#ID#` passes the value contained in the column where `ID` is the column alias.

5. Click **Apply Changes**.

When you run the page, it should look similar to Figure 8–3.

Figure 8–3 Uploaded Files Report with Download Links



Storing Additional Attributes About the Document

Next, you create another table to store additional information about the documents that are uploaded. In this exercise you:

- Add an item to the upload form to capture the information
- Add a process to insert this information along with the name of the file
- Alter the SQL Report of uploaded files to join to the table containing the additional information

Topics in this section include:

- Create a Table to Store Document Attributes
- Create an Item to Capture the Document Subject
- Create a Process to Insert Information
- Showing Additional Attributes in the Report Region

Create a Table to Store Document Attributes

To create the table to store additional information about uploaded files:

1. Navigate to the Workspace home page.
2. Click the **SQL Workshop** icon.

3. Click **SQL Commands.**
4. In the SQL Command Processor, enter:

```
CREATE TABLE file_subjects(name  VARCHAR2(4000), subject VARCHAR2(4000) );
```

5. Click **Run**.

Create an Item to Capture the Document Subject

To create an item to capture the subject of the document:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select **Download App**.
4. Navigate to the Page Definition for page 1.
5. Under Items, click the **Create** icon.
6. For Item Type, select **Text** and click **Next**.
7. For Text Control Display Type, select **Text Field** and click **Next**.
8. For Display Position and Name:
   a. For Item Name, enter `P1_SUBJECT`.
   b. From Region, select **Uploaded Files**.
   c. Accept the remaining defaults and click **Next**.
9. For Item Attributes:
   a. In the Label field, enter `Subject`.
   b. Accept the remaining defaults.
   c. Click **Next**.
10. Click **Create Item**.

Create a Process to Insert Information

To create a process to insert the subject information into the new table:

1. Navigate to the Page Definition for page 1.
2. Under Page Processing, Processes, click the **Create** icon.
3. For Process Type, select **PL/SQL** and click **Next**.
4. For Process Attributes:
   a. For Name, enter `Insert`.
   b. From Point, select **On Submit - After Computations and Validations**.
   c. For Type, select **PL/SQL anonymous block**.
   d. Click **Next**.
5. In Enter PL/SQL Page Process, enter the following PL/SQL process:

```
INSERT INTO file_subjects(name, subject) VALUES(:P1_FILE_NAME,:P1_SUBJECT);
```

6. Click **Next**.

7. For Messages:

   a. In Success Message, enter:

      ```
      Subject inserted
      ```

   b. In Failure Message enter:

      ```
      Error inserting subject
      ```

   c. Click **Next**.

8. From When Button Pressed, select **SUBMIT**.
9. Click **Create Process**.

Showing Additional Attributes in the Report Region

To alter the SQL Report region to join to the additional attributes table:

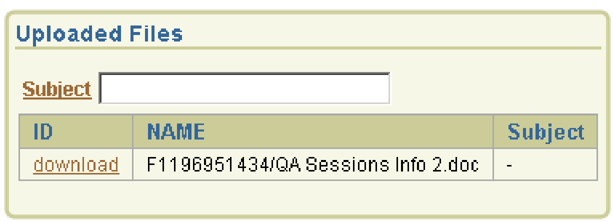
1. Under Regions, select **Uploaded Files**.
2. Replace the Region Source with the following:

   ```
   SELECT w.id,w.name,s.subject
   FROM HTMLDB_APPLICATION_FILES w,file_subjects s
   WHERE w.name = s.name
   ```

3. Click **Apply Changes**.

   Run the page. As shown in Figure 8–4, the Uploaded Files report now contains a Subject column.

Figure 8–4 Uploaded Files Report with Subject Column



Store the Document in a Custom Table

In certain cases, you may want to store uploaded documents in a table owned by your schema. For example, if you want to create an Oracle Text Index on uploaded documents, you need to store the documents in a custom table.

To store documents in your custom table:

- Add a column of type `BLOB` to hold the document
- Alter the process to insert documents into the custom table

To add a BLOB column to the `file_subjects` table:

1. Navigate to the Workspace home page.
2. Click the **SQL Workshop** icon.
3. Click **SQL Commands**.
4. Enter the following SQL statement:

```
ALTER TABLE file_subjects ADD(id number,blob_content BLOB,mime_type
varchar2(4000) );
```

5. Click **Run**.

To alter the process to insert documents into the `file_subjects` table:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select **Download App**.
4. Navigate to the Page Definition for page 1.
5. Under Processes, select **Insert**.
6. Under source, replace the process with the following:

```
IF ( :P2_FILE_NAME is not null ) THEN
   INSERT INTO file_subjects(id,NAME, SUBJECT, BLOB_CONTENT, MIME_TYPE)
      SELECT ID,:P2_FILE_NAME,:P2_SUBJECT,blob_content,mime_type
          FROM HTMLDB_APPLICATION_FILES WHERE name = :P2_FILE_NAME;
 DELETE from HTMLDB_APPLICATION_FILES WHERE name = :P2_FILE_NAME;
END IF;
```

7. Click **Apply Changes**.

Downloading Documents from the Custom Table

Now that documents are being stored in a custom table, you need to provide a way to download them. You do this by creating a procedure and granting execute on that procedure to the pseudo user `HTMLDB_PUBLIC_USER`.

To accomplish this you need to change:

- The SQL report region to no longer join to the `HTMLDB_APPLICATION_FILES` view
- The URL supplied for the ID column in the SQL report to execute the new procedure instead of executing the p procedure

To create a procedure to download documents from the `file_subjects` table and grant execute to public:

1. Navigate to the Workspace home page.
2. Click the **SQL Workshop** icon.
3. Click **SQL Commands**.
4. Enter the following SQL statement:

```
  CREATE OR REPLACE PROCEDURE download_my_file(p_file in number) AS
        v_mime  VARCHAR2(48);
        v_length  NUMBER;
        v_file_name VARCHAR2(2000);
        Lob_loc  BLOB;
BEGIN
        SELECT MIME_TYPE, BLOB_CONTENT, name,DBMS_LOB.GETLENGTH(blob_content)
                INTO v_mime,lob_loc,v_file_name,v_length
                FROM file_subjects
                WHERE id = p_file;
              --
              -- set up HTTP header
```

```
        --
            -- use an NVL around the mime type and
            -- if it is a null set it to application/octect
            -- application/octect may launch a download window from
windows
            owa_util.mime_header( nvl(v_mime,'application/octet'),
FALSE );

        -- set the size so the browser knows how much to download
        htp.p('Content-length: ' || v_length);
        -- the filename will be used by the browser if the users does a
save as
        htp.p('Content-Disposition:  attachment; filename="'||substr(v_
file_name,instr(v_file_name,'/')+1)|| '"');
        -- close the headers
        owa_util.http_header_close;
        -- download the BLOB
        wpg_docload.download_file( Lob_loc );
end download_my_file;
/
```

5. Click **Run**.
6. Enter the following SQL statement:

```
GRANT EXECUTE ON download_my_file TO PUBLIC
/
```

7. Click **Run**.

To change the SQL report region to no longer join with the `HTMLDB_APPLICATION_FILES` view:

1. Navigate to the Page Definition of page 1.
2. Under Regions, select **Uploaded Files**.
3. Replace the Region Source with the following:

```
SELECT s.id,s.name,s.subject FROM file_subjects s
```

4. Click **Apply Changes**.

To change the download link to use the new download procedure:

1. Navigate to the Page Definition of page 2.
2. Under Regions, click **Report** adjacent to Uploaded Files.
3. Next to the ID column, click the **Edit** icon.
4. Scroll down to the Column Link region.
5. Replace the existing URL with the following:

```
#OWNER#.download_my_file?p_file=#ID#
```

   In this URL:

   – `#OWNER#` is the parsing schema of the current application.
   – `download_my_file` is the new procedure you just created.
   – You are passing in the value of the column ID to the parameter `p_file`.

6. Click **Apply Changes**.

9 How to Incorporate JavaScript into an Application

Adding JavaScript to a Web applications is a great way to add features that mimic those found client/server applications without sacrificing all of the benefits of Web deployment. Oracle HTML DB includes multiple built-in interfaces especially designed for adding JavaScript.

Remember that JavaScript is not appropriate for data intensive validations. For example, to verify that a name is contained within a large database table, you would need to pull down every record to the client, creating a huge HTML document. In general, complex operations are much better suited for server-side HTML DB validations instead of JavaScript.

This tutorial describes some usage scenarios for JavaScript and includes details about how to implement them in your application.

This section contains the following topics:

Understanding How to Incorporate JavaScript Functions

There are two primary places to include JavaScript functions:

- In the HTML Header attribute of the page
- In a .js file in the page template.

Incorporating JavaScript in the HTML Header Attribute

One way to include JavaScript into your application is add it to the HTML Header attribute of the page. This is a good approach for functions that are specific to a page as well as a convenient way to test a function before you include it in the `.js` file.

You can add JavaScript functions to a page by entering the code into the HTML Header attribute on the Page Attributes page.

To add JavaScript code in the HTML Header attribute:

1. Click the **Application Builder** icon on the Workspace home page.
2. Select an application.
3. Select a page.
4. Click **Edit Attributes**.
5. Scroll down HTML Header.
6. Enter code into HTML Header and click **Apply Changes**.

For example, adding the following would test a function accessible from anywhere on the current page.

```
<script language="JavaScript1.1" type="text/javascript">
  function test(){
    alert('This is a test.');
  }
</script>
```

Including JavaScript in a .js File Referenced by the Page Template

In Oracle HTML DB you can reference a `.js` file in the page template. This approach makes all the JavaScript in that file accessible to the application. This is the most efficient approach since a `.js` file loads on the first page view of your application and is then cached by the browser.

The following demonstrates how to include a .js file in the header section of a page template.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
<head>
    <title>#TITLE#</title>
    #HEAD#
    <script src="#APP_IMAGES#custom.js" type="text/javascript"></script>
</head>
<body #ONLOAD#>#FORM_OPEN#
```

> **See Also:** ""Customizing Templates" in *Oracle HTML DB User's Guide*

About Referencing Items Using JavaScript

When you reference an item, the best approach is to reference by ID. If you view the HTML source of an Oracle HTML DB page in a Web browser, you would notice that all items have an ID attribute. This ID corresponds to the name of the item, not the item label. For example, if you create an item with the name `P1_FIRST_NAME` and a label of `First Name`, the ID will be P1_FIRST_NAME.

Knowing the item ID enables you to use the JavaScript function `getElementById` to get and set item attributes and values. The following example demonstrates how to reference an item by ID and display its value in an alert box.

```
<script language="JavaScript1.1" type="text/javascript">
  function firstName(){
    alert('First Name is ' + document.getElementById('P1_FIRST_NAME').value );
  }
 // or a more generic version would be
```

```
  function displayValue(id){
    alert('The Value is ' + document.getElementById(id).value );
  }
</script>

  // Then add the following to the "Form Element Attributes" Attribute of the
item:
  onChange="javascript:displayValue('P1_FIRST_NAME');"
```

Calling JavaScript from a Button

Calling a JavaScript from a button is a great way to confirm a request. Oracle HTML DB uses this technique for the delete operation of most objects. For example, when you delete a button, a JavaScript message appears asking you to confirm your request. Consider the following example:

```
<script language="JavaScript1.1" type="text/javascript">
  function deleteConfirm(msg)
  {
var confDel = msg;
if(confDel ==null)
  confDel= confirm("Would you like to perform this delete action?");
else
  confDel= confirm(msg);

if (confDel== true)
  doSubmit('Delete');
  }
</script>
```

This example creates a function to confirm a delete action and then calls that function from a button. Note that the function optionally submits the page and sets the value of the internal variable `:REQUEST` to `Delete`, thus performing the delete using a process that conditionally executes based on the value of request.

Note that when you create the button you would need to select **Action Redirect to URL without submitting page**. Then, you would specify a URL target such as the following:

```
javascript:confirmDelete('Would you like to perform this delete action?');
```

Creating a Client Side JavaScript Validation

Client side validations give immediate feedback to users using a form. One very common JavaScript validation is field not null. For example, you can create a function in the HTML Header attribute of a page and then call that function from an item.

Creating this type of JavaScript validation involves the following steps:

- Create a new application on the EMP table.
- Create an item on page 1 called P1_ENAME that has a label of Employee Name.
- Add a function to the HTML Header attribute on page 3
- Edit the P3_ENAME item on page 3 to call the function

Topics in this section include:

- Create an Application on the EMP Table

- Add a Function to the HTML Header Attribute
- Edit an Item to Call the Function

Create an Application on the EMP Table

To create a new application on the `EMP` table:

1. Click the **Application Builder** icon on the Workspace home page.
2. Click **Create**.
3. For Method, select **Create Application**.
4. For Name:
   a. In Name, enter a name that describes the application.
   b. For Create Application, select **From scratch**.
   c. Click **Next**.
5. Add a blank page, containing a report:
   a. Under Select Page Type, select **Report and Form**.
   b. From Table or View, select **EMP**.
   c. Select **Include Analysis Pages**.
   d. Click **Add Page**.
6. Configure Analysis Pages:
   a. For Summarize by Column, press **CTRL** and select the columns **JOB**, **MGR**, and **DEPTNO** and click **Next**.
   b. On Aggregate by Column, select **SAL** and **COMM** and click **Next**.
   c. For Chart Type, select **Pie** and click **Next**.
   d. Review your selections and click **Add Analysis Pages**.

      The new pages appears in the list at the top of the page.
   e. Click **Next**.
7. For Tabs, select **One Level of Tabs** and click **Next**.
8. For Shared Components, accept the default, **No**, and click **Next**.
9. For Attributes, accept the defaults for Authentication Scheme, Language, and User Language Preferences Derived From and click **Next**.
10. For User Interface, select a theme and click **Next**.
11. Click **Create**.

To view the application:

1. Click **Run Application**.
2. When prompted for a user name and password:
   - For User Name, enter the name of your workspace
   - For Password, enter the password for your workspace

   The application contains the following pages:
   - a standard report

- an insert form
- an update form
- a success form (indicates when a record is successfully inserted)
- an analysis menu page
- analysis reports
- analysis charts
- a login page

3. Select **Edit Application** from the Developer Toolbar.

Add a Function to the HTML Header Attribute

To add a function to the HTML Header attribute on page 2:

1. Navigate to the Page Definition for page 2, the Amp insert form.
2. Under Regions, select **EMP**.
3. Change Title to **Insert Form** and click **Apply Changes**.
4. Click **Edit Attributes**.

   The Edit Page attributes page appears.
5. Scroll down to HTML Header.
6. In HTML Header, enter the following:

```
<script language="JavaScript1.1" type="text/javascript">
  function notNull(object){
    if(object.value=="")
   alert('This field must contain a value.');
  }
</script>
```

7. Click **Apply Changes**.

Edit an Item to Call the Function

The next step is to edit the `P2_ENAME` item and add code to the HTML Form Element Attributes attribute to call the function.

To edit the `P2_ENAME` item to call the function:

1. Navigate to the Page Definition for page 2, Insert Form.
2. Under Items, select **P2_ENAME**.
3. Scroll down to Element.
4. In HTML Form Element Attributes, enter the following:

```
onBlur="javascript:notNull(this);"
```

5. Click **Apply Changes**.
6. Run the page. If you position the cursor in the `Ename` field and click **Create**, the following message appears:

```
This field must contain a value.
```

Enabling and Disabling Form Elements

While Oracle HTML DB enables you to conditionally display a page item, it is important to note that a page must be submitted for any changes on the page to be evaluated. The following example demonstrates how to use JavaScript to disable a form element based on the value of another form element.

First, you write a function and place it in the HTML Header attribute of the page containing your update form. Second, you call the function from an item on the page. The following example demonstrates how to add a JavaScript function to prevent users from adding commissions to employees who are not in the Sales Department (deptno = 30).

Topics in this section include:

- Add a Function the HTML Header Attribute
- Edit an Item to Call the Function
- Change P2_DEPTNO to a Select List
- Create a Call to disFormItems from the Region Footer

Add a Function the HTML Header Attribute

To add a function to the HTML Header attribute on page 2:

1. Navigate to the Page Definition for page 2.
2. On the Page Definition, click **Edit Attributes**.

   The Page Attributes appear.
3. Scroll down to HTML Header.
4. In HTML Header, enter the following:

```
<script language="JavaScript1.1" type="text/javascript">

   // This function takes in:
   //   1. A string expression to evaluate.  For example:
   //      'document.getElementById(\'P2_DEPTNO\').value==\'0\'
   //      Notice the quotes are escaped using a "\"
   //   2. One or more arguments which are item ID's as strings.  For example:
    //      ...,'P2_ENAME','P2_SAL'...);
    //      Notice the ID's are the item names, NOT item labels

function
disFormItems(testString,item1,item2,item3,item4,item5,item6,item7,item8,item9,i
tem10){

   if(theTest){
       for(var i=1;i<12;i++){
           if (arguments[i]){
              disItem = document.getElementById(arguments[i]);
               disItem.style.background = '#cccccc';
               disItem.disabled = true;
               }
           }
       }
   else{
       for(var i=1;i<12;i++){
           if (arguments[i]){
               disItem = document.getElementById(arguments[i]);
```

```
                disItem.disabled = false;
                disItem.style.background = '#ffffff';
                }
            }
    }
     }
</script>
```

5. Click **Apply Changes**.

Edit an Item to Call the Function

The next step is to edit the `P2_DEPTNO` item and add code to the HTML Form Element Attributes attribute to call the function.

To edit the `P2_DEPTNO` item to call the function:

1. Navigate to the Page Definition for page 2.
2. Under Items, select **P2_DEPTNO**.
3. Scroll down to Element.
4. In HTML Form Element Attributes, enter the following:

```
onChange="javascript:disFormItems('document.getElementById(\'P2_
DEPTNO\').value!=\'30\'','P2_COMM');"
```

5. Click **Apply Changes**.

Change P2_DEPTNO to a Select List

To change the `P2_DEPTNO` to display as a select list:

1. Navigate to the Page Definition for page 2.
2. Under Items, select **P2_DEPTNO**.
3. Under Display As, select **Select List**.
4. Scroll down to List of Values.
5. Under List of Values:
   a. From Display Null, select **No**.
   b. In List of Values definition, enter:

   ```
   SELECT dname, deptno FROM dept
   ```

6. Click **Apply Changes**.

Create a Call to disFormItems from the Region Footer

Finally, you need to create a call to the `disFormItems` function after the page is rendered to disable `P2_COMM` if the selected employee is not a SALES representative. A good place to make this call would be from the Region Footer of the region which contains the items.

To disable `P2_COMM` when the page is first loaded:

1. Navigate to the Page Definition for page 2.
2. Under Regions, select **Insert Form**.

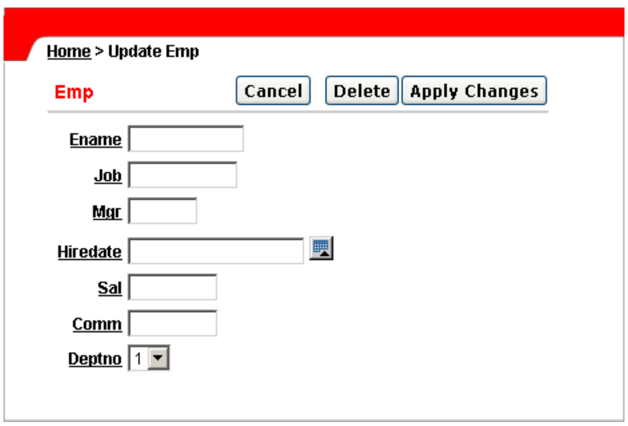
3. Scroll down to Header and Footer.
4. In Region Footer, enter the following:

```
<script language="JavaScript1.1" type="text/javascript">
  // This code calls the function when the page loads, thus setting the items
state correctly.
  disFormItems('document.getElementById(\'P2_DEPTNO\').value!=\'30\'','P2_
COMM');
</script>
```

5. Click **Apply Changes**.
6. Run the page by clicking the Run Page icon.

Figure Figure 9–1 demonstrates the completed form.

Figure 9–1 Completed Form



Changing the Value of Form Elements

In the following example, there are four text boxes in a region. The fourth text box contains the sum of the other three. To calculate this sum you will add a JavaScript function to the HTML Header attribute and then call that function from the first three items

To call the function from the first three items:

1. Navigate to the appropriate Page Definition.
2. On the Page Definition, click **Edit Attributes**.

   The Page Attributes appear.
3. In HTML Header, enter the following:

```
<script language="JavaScript1.1" type="text/javascript">
  function sumItems(){
    function getVal(item){
   if(document.getElementById(item).value != "")
     return parseFloat(document.getElementById(item).value);
   else
     return 0;
    }
    document.getElementById('P1_TOTAL').value =
  getVal('P1_ONE') + getVal('P1_TWO') + getVal('P1_THREE');
  }
```

```
</script>
```

4. Click **Apply Changes**.

To call the function from all three items:

1. Navigate to the appropriate Page Definition.
2. For each item:
   a. Select the item name.
   b. Scroll down to Element.
   c. In HTML Form Element Attributes, enter:
      ```
      onChange="javascript:sumItems();"
      ```
   d. Click **Apply Changes**.

10

How to Build and Deploy an Issue Tracking Application

Storing information in an Oracle database organizes it into tables that group similar information together and removes redundancies. Using the Oracle HTML DB development environment, you can quickly build an application that enables a user to view and update information stored in an Oracle Database.

This tutorial describes how to use Oracle HTML DB to create and deploy an application that tracks the assignment, status, and progress of issues related to a project.

Topics in this section include:

Business Scenario

Effective project management is the key to completing any project on time and within budget. Within every project there are always multiple issues that need to be tracked, prioritized, and dealt with.

The MRVL Company has several projects that must be completed on time for the company to be profitable. Missing deadlines for any of the projects will cause the company to lose money. The project leads are tracking issues in several different ways. Some individuals are manually tracking issues in notebooks, others are tracking issues in text documents, and other managers are using spreadsheets.

By creating a hosted application in Oracle HTML DB, each project lead can easily record and track issues in one central location. Not only will everyone have access to just the data they need, but having the data stored in one location, will make it easier for management to determine if any critical issues are not being addressed.

Planning and Project Analysis

Before any beginning development on an application, you first need to define requirements that describe what the application does. Once defined, you can turn these requirements into a database design and an outline that describes how the user interface accepts and presents data.

For this business scenario, the project leads establish requirements that define what information needs to be tracked, how security will work, what data management functions will be included, and how data will be presented to users.

Topics in this section include:

- Necessary Data
- Requested Security
- Data Management Functions
- Data Presentation Functions
- Special Functions

Necessary Data

Currently, each project lead tracks information slightly differently. Together, everyone agrees that the application should include the following information:

- Summary of the issue
- Detailed description of the issue
- Who identified the issue
- The date the issue was identified
- Which project the issue is related to
- Who the issue is assigned to
- A current status of the issue
- Priority of the issue
- Target resolution date
- Actual resolution date
- Progress report
- Resolution summary

Requested Security

Because the project leads were concerned about everyone having access to all the information, they agree upon the following access rules:

- Each team member and project lead is only assigned to one project at a time
- Each team member and project lead must be assigned to a project
- Managers are never assigned to a specific project
- Only managers can define and maintain projects and people
- Everyone can enter new issues
- Once assigned, only the person assigned or a project lead can change data about the issue

- Management needs views that summarize the data without access to specific issue details

Data Management Functions

Next, the project leads determine how information will be entered into the system. In this case, users must be able to:

- Create issues
- Assign issues
- Edit issues
- Create projects
- Maintain projects
- Create people
- Maintain people information
- Maintain project assignments

Data Presentation Functions

Once the data is entered into the application, users will need to view the data. The team decides they initially need to be able to view the following:

- All issues by project
- Open issues by project
- Overdue issues, by project and for all
- Recently opened issues
- Unassigned issues
- Summary of issues by project, for managers
- Resolved issues by month identified
- Issue resolution dates displayed on a calendar
- Days to Resolve Issues by person

Special Functions

Finally, the project leads determine the application must support the following special functions:

- Notify people when an issue is assigned to them
- Notify the project lead when any issue becomes overdue

Designing the Database Objects

Once you have defined the database object requirements, the next step is to turn these requirements in a database design and an outline that describes how the user interface accepts and presents data. In this step you need to think about how information should be organized in the tables in the underlying database. Given the requirements described "Planning and Project Analysis" on page 10-2, for this project you need to create three tables:

- `Projects` tracks all current projects

- `People` contains information about who can be assigned to handle issues
- `Issues` tracks all the information about an issue, including the project to which it is related and the person assigned to rectify the issue

Be aware that you will also need create additional database objects, such as sequences and triggers, to support the tables. System generated primary keys will be used for all tables so that all the data can be edited without needing to implement a cascade update.

Topics in this section include:

About the Projects Table

Each project must have a name and include a project start date as well as the projected end date. These dates will be used to help determine if any outstanding issues are jeopardizing the end date. Table 10–1 describes the columns to be included in the Projects table.

Table 10–1 Project Table Details

Column Name	Type	Size	Not Null?	Constraints	Description
project_id	integer	n/a	Yes	Primary key	A unique numeric identification number for each project. Populated by a sequence using a trigger.
project_name	varchar2	100	Yes	Unique key	A unique alphanumeric name for the project.
start_date	date	n/a	Yes	None	The project start date.
target_end_date	date	n/a	Yes	None	The targeted project end date.
actual_end_date	date	n/a	No	None	The actual end date.

About the People Table

Each person will have a defined name and role. Project leads and team members will also have an assigned project. To tie the current user to their role within the organization, e-mail addresses will be used for user names.

Table 10–2 on page 10-5 describes the columns that will be included in the People table.

Table 10–2 People Table Details

Column Name	Type	Size	Not Null?	Constraints	Description
person_id	integer	n/a	Yes	Primary key	A numeric ID that identifies each user. Populated by a sequence using a trigger.
person_name	varchar2	100	Yes	Unique key	A unique name that identifies each user.
person_email	varchar2	100	Yes	None	User e-mail address.
person_role	varchar2	7	Yes	Check constraint	The role assigned to each user.

Note: For the purposes of this exercise, this application has been simplified. People data is usually much more elaborate and is often pulled from a corporate Human Resource system. Also, people typically work on more than one project at a time. If the roles that are assigned to a person need to be dynamic, you would implement roles as a separate table with a foreign key back to the people table.

About the Issues Table

When the project leads defined their application requirements, they determined they needed to track specific issues assigned to a specific person. Issues will be included as a columns along with additional columns to provide an audit trail. The audit trail will track who created the issue, when it was created, as well as who last modified the issue and on what date that modification was made.

Table 10–3 describes the columns to be included in the Issues table.

Table 10–3 Issue Table Details

Column Name	Type	Size	Not Null?	Constraints	Description
issue_id	integer	n/a	Yes	primary key	A unique numeric ID that identifies an issue. Populated by a sequence using a trigger
issue_summary	varchar2	200	Yes	None	A brief summary of the issue.
issue_description	varchar2	2000	No	None	A detailed description of the issue.
identified_by	integer	n/a	Yes	foreign key to People	The user who identifies the issue.
identified_date	date	n/a	Yes	None	The date the issue was identified
related_project	integer	n/a	Yes	foreign key to Projects	Projects related to the issue.
assigned_to	integer	n/a	No	foreign key to People	The person who owns this issue.

Table 10–3 (Cont.) Issue Table Details

Column Name	Type	Size	Not Null?	Constraints	Description
status	varchar2	8	Yes	check constraint	The issue status. Automatically set to `Open` when new and set to Closed when actual resolution date entered
priority	varchar2	6	No	check constraint	The priority of the issue.
target_resolution_date	date	n/a	No	None	The target resolution date.
progress	varchar2	2000	No	None	The progress of the issue.
actual_resolution_date	date	n/a	No	None	Actual resolution date of the issue.
resolution_summary	varchar2	2000	No	None	Resolution summary.
created_date	date	n/a	Yes	None	Populated by a trigger.
created_by	varchar2	60	Yes	None	User who create this issue.
last_modified_date	date	n/a	No	None	Populated by a trigger.

Note: A real-world application might need more extensive auditing. For example, you might need to track each change to the data rather than just the last change. Tracking each change to the data would require an additional table, linked to the issues table. If the valid priorities assigned to issues needed to be dynamic, you would need to add a separate table with a foreign key back to the issues table.

Implementing Database Objects

This first step in building an application is to create the database objects in the underlying database. You create database objects within a user account in the Oracle database. To create this application, you need to request a new workspace within the Oracle HTML DB development environment. An administrator creates a workspace within an initial schema that will house the application objects.

Topics in this section include:

- Request a New Workspace
- Build the Database Objects

Request a New Workspace

Note: If you have a local installation of Oracle HTML DB, you may skip this section and use and existing workspace.

To request a workspace:

1. In a Web browser, navigate to the Oracle HTML DB Login page. To log in to the Oracle supported site of Oracle HTML DB development, go to:

   `http://htmldb.oracle.com/`

The Login page appears.

2. Under Tasks, click **Request a Workspace**.
3. Click **Continue** and follow the on-screen instructions.

   You will be notified through e-mail when your request has been approved and your workspace has been provisioned.

Build the Database Objects

There are several ways to create objects in Oracle HTML DB. You can:

- **Create an Object in Object Browser**. Use Object Browser to create tables, views, indexes, sequences, types, packages, procedures, functions, triggers database links, materialized views, and synonyms. A wizard walks you through the choices necessary to create the selected database object. To create an object in Object Browser, navigate to Object Browser and click **Create**.
- **Execute commands in SQL Command Processor.** Run SQL commands by typing or pasting them into the SQL Command Processor. To access SQL Command Processor, click **SQL Workshop** on Workspace home page and then select **SQL Commands**.
- **Upload a script.** Upload and script that contains all the necessary create object statements to the SQL Script Repository. To upload a script, click **SQL Workshop** on Workspace home page, select **SQL Scripts**, and then click **Upload**.
- **Create script online.** Create a script online in the Script Repository. This is the method you will use to create the database objects for this exercise. To create a script online, click the **SQL Workshop** icon on Workspace home page, select **SQL Scripts**, and then click **Create**.

To build database objects by creating a script:

1. Log in to Oracle HTML DB.
2. Click the **SQL Workshop** icon on the Workspace home page.
3. Click **SQL Scripts**.
4. Click **Create**.
5. In the Script Editor:
   a. For Script Name, enter `DDL for Issue Management Application`.
   b. In Script, copy and paste the DDL (data definition language) in "Create Application Database Objects DDL" on page A-1.
   c. Click **Save**.

To run the DDL for Issue Management Application script:

1. On the SQL Scripts page, select the DDL for **Issue Management Application** icon.

   The Script Editor appears.
2. Click **Run**.

   A summary page appears.
3. Click **Run** again.

Viewing Created Database Objects

You can view database objects using Object Browser.

To view database objects in SQL Workshop:

1. Click the **SQL Workshop** tab.
2. Click **Object Browser**.
3. From the Object list on left side of the page, select **Tables**.
4. Under Database Browser, click **Tables**.
5. To view the details of a specific object (`HT_ISSUES`, `HT_PEOPLE`, or `HT_PROJECTS`), simply select it.

Loading Demonstration Data

Once you have created all the necessary database objects, the next step is to load data into the tables. You can manually load data using the import functionality available in SQL Workshop. In the following exercise, you will use SQL Workshop to load demonstration data.

Look at the DDL you copied from "Create Application Database Objects DDL" on page A-1. Notice that the sequences used for the primary keys start at 40 in order to leave room for the demonstration data. Because the before insert triggers are coded so that the sequence is only accessed if a primary key value is not provided, they will not needed to be disabled in order for you to load data.

Topics in this section include:

- Load Projects Data
- Load People Data
- Load Issues Data

Load Projects Data

To import data into the Projects table:

1. Select the **SQL Workshop** tab.
2. Click **SQL Scripts**.
3. Click **Create**.
4. In the Script Editor:

   a. For Script Name, enter `Load Project Data`.

   b. In Script, copy and paste the following:

```
INSERT INTO ht_projects
      (project_id, project_name, start_date, target_end_date)
   values
      (1, 'Internal Infrastructure', sysdate-150, sysdate-30)
/
INSERT INTO ht_projects
      (project_id, project_name, start_date, target_end_date)
   values
      (2, 'New Payroll Rollout', sysdate-150, sysdate+15)
/
INSERT INTO ht_projects
      (project_id, project_name, start_date, target_end_date)
```

```
   values
      (3, 'Email Integration', sysdate-120, sysdate-60)
/
INSERT INTO ht_projects
      (project_id, project_name, start_date, target_end_date)
   values
      (4, 'Public Website Operational', sysdate-60, sysdate+30)
/
insert into ht_projects
      (project_id, project_name, start_date, target_end_date)
   values
      (5, 'Employee Satisfaction Survey', sysdate-30, sysdate+60)
/
```

c. Click **Save**.

5. On the SQL Scripts page, select the **Load Project Data** icon.
6. Click **Run**.

   A summary page appears.
7. Click **Run** again.

Update Dates to Make the Projects Current

Although you have created the Projects, the dates need to be updated to make the projects current. To accomplish this, you run another script.

To update the project dates and make the projects current:

1. Select the **SQL Workshop** tab.
2. Click **SQL Scripts**.
3. Click **Create**.
4. In the Script Editor:
   a. For Script Name, enter `Update Project Dates`.
   b. In Script, copy and paste the following:

```
UPDATE ht_projects
   SET start_date = sysdate-150,
       target_end_date = sysdate-30
 WHERE project_id = 1
/

UPDATE ht_projects
   SET start_date = sysdate-150,
       target_end_date = sysdate+15
 WHERE project_id = 2
/
UPDATE ht_projects
   SET start_date = sysdate-120,
       target_end_date = sysdate-60
 WHERE project_id = 3
/
UPDATE ht_projects
   SET start_date = sysdate-60,
       target_end_date = sysdate+30
 WHERE project_id = 4
/
UPDATE ht_projects
```

```
  SET start_date = sysdate-30,
      target_end_date = sysdate+60
 WHERE project_id = 5
/
```

   c. Click **Save**.
5. On the SQL Scripts page, select the **Update Project Dates** icon.
6. Click **Run**.

   A summary page appears.
7. Click **Run** again.

Load People Data

Once you have loaded data into the Project table, you can load People data. Because of foreign keys in the Projects table, People data must be loaded after Project data. You will load data into the People table by creating and running a script in SQL Workshop.

To load data into the People table:

1. Select the **SQL Workshop** tab.
2. Click **SQL Scripts**.
3. Click **Create**.
4. In the Script Editor:
   a. For Script Name, enter `Load People Data`.
   b. In Script, copy and paste the following:

```
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (1, 'Joe Cerno', 'joe.cerno@mrvl-bademail.com', 'CEO', null)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (2, 'Kim Roberts', 'kim.roberts@mrvl-bademail.com', 'Manager', null)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (3, 'Tom Suess', 'tom.suess@mrvl-bademail.com', 'Manager', null)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (4, 'Al Bines', 'al.bines@mrvl-bademail.com', 'Lead', 1)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (5, 'Carla Downing', 'carla.downing@mrvl-bademail.com', 'Lead', 2)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (6, 'Evan Fanner', 'evan.fanner@mrvl-bademail.com', 'Lead', 3)
```

```
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  values
     (7, 'George Hurst', 'george.hurst@mrvl-bademail.com', 'Lead', 4)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
VALUES
     (8, 'Irene Jones', 'irene.jones@mrvl-bademail.com', 'Lead', 5)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (9, 'Karen London', 'karen.london@mrvl-bademail.com', 'Member', 1)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
   values
     (10, 'Mark Nile', 'mark.nile@mrvl-bademail.com', 'Member', 1)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (11, 'Jane Kerry', 'jane.kerry@mrvl-bademail.com', 'Member', 5)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (12, 'Olive Pope', 'olive.pope@mrvl-bademail.com', 'Member', 2)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (13, 'Russ Sanders', 'russ.sanders@mrvl-bademail.com', 'Member', 3)
/
INSERT INTO ht_people
     (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
     (14, 'Tucker Uberton', 'tucker.uberton@mrvl-bademail.com', 'Member',
3)
/
INSERT INTO ht_people
      (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
      (15, 'Vicky Williams', 'vicky.willaims@mrvl-bademail.com', 'Member',
4)
/
INSERT INTO ht_people
      (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
      (16, 'Scott Tiger', 'scott.tiger@mrvl-bademail.com', 'Member', 4)
/
INSERT INTO ht_people
      (person_id, person_name, person_email, person_role, assigned_project)
  VALUES
      (17, 'Yvonne Zeiring', 'yvonee.zeiring@mrvl-bademail.com', 'Member',
4)
/
```

c. Click **Save**.

5. On the SQL Scripts page, select the **Load People Data** icon.
6. Click **Run**.

   A summary page appears.
7. Click **Run** again.

Load Issues Data

The last data you need to load is the Issues data. As with People data, you will create and run a script to populate the `Issues` table.

To load data into the `Issues` table:

1. Select the **SQL Workshop** tab.
2. Click **SQL Scripts**.
3. Click **Create**.
4. In the Script Editor:
   a. For Script Name, enter `Load Issue Data`.
   b. In Script, copy and paste the script in "Create Issues Script" on page A-1.
   c. Click **Save**.
5. On the SQL Scripts page, select the **Load Issue Data** icon.
6. Click **Run**.

   A summary page appears.
7. Click **Run** again.

Building a Basic User Interface

Once you have created the objects that support your application and have loaded the demonstration data, the next step is to create a user interface. In this exercise, you use the Create Application Wizard in Application Builder to create an application and then the pages that support the data management and data presentation functions described in "Planning and Project Analysis" on page 10-2.

Topics in this section include:

- Create the Application
- Add Pages to Maintain Projects
- Add Pages to Track People
- Add Pages to Track Issues
- Create Summary Reports
- Add Content to the Home Page
- Add a Breadcrumb

Create the Application

You can use the Create Application Wizard to create an application that contains pages that enables users to view a report on and create data for selected tables within a schema. Alternatively, you can create an application first and then add pages to it. Since the application requirements include customized overview pages, for this exercise you will use latter approach.

To create the application manually:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Click **Create**.
4. For Method, select **Create Application**.
5. For Name:
   a. In Name, enter a `Issue Tracker`.
   b. For Create Application, select **From scratch**.
   c. Click **Next**.
6. Add a blank page:
   a. Under Select Page Type, select **Blank**.
   b. Click **Add Page**.
   c. Click **Next**.
7. For Tabs, select **No Tabs** and click **Next**.
8. For Shared Components, accept the defaults and click **Next**.
9. For Attributes, accept the defaults for Authentication Scheme, Language, and User Language Preferences Derived From and click **Next**.
10. For User Interface, select **Theme 10** and click **Next**.
11. Click **Create**.

To view the application:

1. Click the **Run Application** icon on the Applications home page.
2. When prompted, enter your workspace username and password and click **Login**.

   This authentication is part of the default security of any newly created application. As shown in Figure 10–1, the home page appears.

Figure 10–1 Issue Tracking Application Home Page

Although the page has no content, notice that the Create Application Wizard created the following items:

- **Navigation Links** - A navigation bar entry displays in the upper right of the page. Logout enables the user to log out of the application.
- **Developer Links** - The Developer Toolbar appears at the bottom of the page. These links only display if you are logged in as a developer. Regular users, those who only have access to run the application, will not see these links. From left to right, the Developer Toolbar contains the following links:
  - **Edit Application** - Edit the application by linking to the Application Builder home page.
  - **Edit Page 1** - Edit the current running page. This link takes you to Page Definition for the current page.
  - **Create** - Add a new component to the current page.
  - **Session** - Open a new page containing session details for the current page.
  - **Debug** - Display the current page in debug mode.
  - **Show Edit Links** - Displays edit links next to each object on the page that can be edited. Each edit link resembles two colons (: :) and appears to the right of navigation bar items, tabs, region titles, buttons, and items. Clicking a edit link displays another window in which to edit the object.

3. Click **Edit Application** on the Developer Toolbar to return to Application Builder home page. Notice that the Create Application Wizard also created a Login page.

Once you have created the basic application structure, the next step is to create individual pages.

Add Pages to Maintain Projects

First, you need to create pages that enable users to view and add data to tables. To accomplish this, you will use the Form on a Table with Report Wizard. This wizard

creates a report page and maintenance page for each table the start with HT_
PROJECTS.

Topics in this section include:

- Create Pages for Maintaining Projects
- Refine the Appearance of the Projects Report Page
- Refine the Create/Edit Project Page

Create Pages for Maintaining Projects

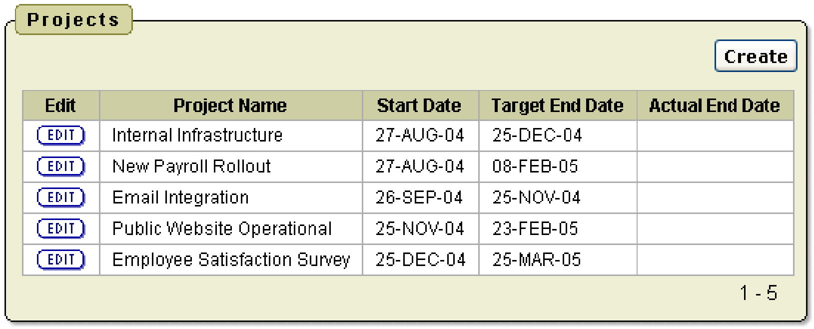
To create pages for maintaining HT_PROJECTS table:

1. On the Application Builder home page, click **Create Page**.
2. Select **Form** and click **Next**.
3. Select **Form on a Table with Report** and click **Next**.
4. For Table/View Owner, select the appropriate schema and click **Next**.
5. For Table/View Name, select HT_PROJECTS and click **Next**.
6. For Define Reports Page:
   a. For Page, enter 2.
   b. For Page Name and Region Title, enter Projects.
   c. Click **Next**.
7. For Tab Options, accept the default selection **Do not use tabs** and click **Next**.
8. For Select Column(s), select every column except PROJECT_ID and click **Next**.

   Note that Project Name is unique and identifies the project. The ID was added to simplify the foreign key and enable cascading updates.
9. For **Edit Link Image**, select the third option (the word Edit in blue with a white background) and click **Next**.
10. For Define Form Page:
    a. For Page, enter 3.
    b. For Page Name and Region Title, enter Create/Edit Project.
    c. Click **Next**.
11. For Tab Options, accept the default **Do not use tabs** and click **Next**.
12. For Primary Key, accept the default PROJECT_ID and click **Next**.
13. For Source Type, accept the default Existing Trigger and click **Next**.
14. For Select Column(s), selected all columns and click **Next**.
15. Under Identify Process Options, accept the defaults for **Insert**, **Update** and **Delete**, and click **Next**.
16. Review your selections and click **Finish**.

To preview your page, click **Run Page**. As shown in Figure 10–2 on page 10-5, the newly created report displays the demo data.

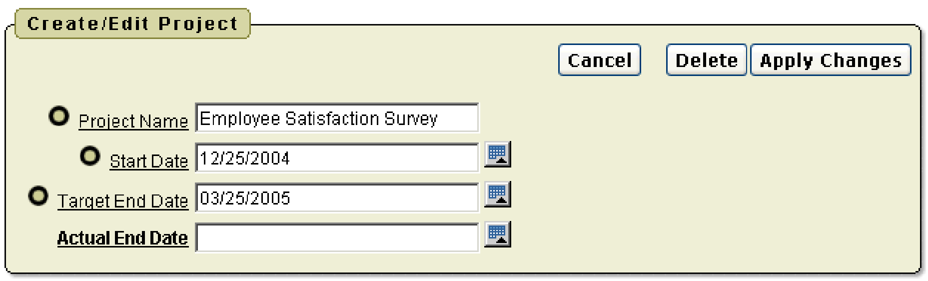
Figure 10–2 Projects Page



Edit	Project Name	Start Date	Target End Date	Actual End Date
EDIT	Internal Infrastructure	27-AUG-04	25-DEC-04	
EDIT	New Payroll Rollout	27-AUG-04	08-FEB-05	
EDIT	Email Integration	26-SEP-04	25-NOV-04	
EDIT	Public Website Operational	25-NOV-04	23-FEB-05	
EDIT	Employee Satisfaction Survey	25-DEC-04	25-MAR-05	

Click the **Edit** icon to view an existing row or click the **Create** button to create a new record. If you click the **Edit** icon to the left of Employee Satisfaction Survey, a form resembling Figure 10–3 appears.

Figure 10–3 Create/Edit Project Form



Refine the Appearance of the Projects Report Page

You can change the appearance of the Projects report page by adding a format mask to the dates.

To add a format mask to the dates on the Create/Edit Project page:

1. Navigate to the Page Definition for page 2, Projects. Select **Edit Page 2** from the Developer Toolbar.
2. Under Regions, select **Report** adjacent to Projects.
3. Edit the format for the START_DATE:
   a. Click the **Edit** icon the left of `START_DATE`.

      The Column Attributes page appears.

   b. For Number/Date Format, enter `DD-MON-YYYY`.
4. Edit the format for the TARGET_END_DATE:
   a. Click the Next button (>) at the top of the page to navigate to the next Report Item.

      The Column Attributes page appears.

   b. For Number/Date Format, enter `DD-MON-YYYY`.
5. Edit the format for the ACTUAL_END_DATE:
   a. Click the Next button (>) at the top of the page to navigate to the next Report Item.

The Column Attributes page appears.

   b. For Number/Date Format, enter `DD-MON-YYYY`.

6. Click **Apply Changes**.

   The Report Attributes page appears.

7. For PROJECT_ID, delete the Heading **Edit**.
8. For the START_DATE, TARGET_END_DATE and ACTUAL_END_DATE columns, select **center** for Column Alignment and Heading Alignment.
9. To enable column heading sorting, check **Sort** for all columns except PROJECT_ID.
10. For PROJECT_NAME, select **1** for Sort Sequence.

    This selection specifies PROJECT_NAME as the default column to sort on. Note this functionality can overridden by any user selections.

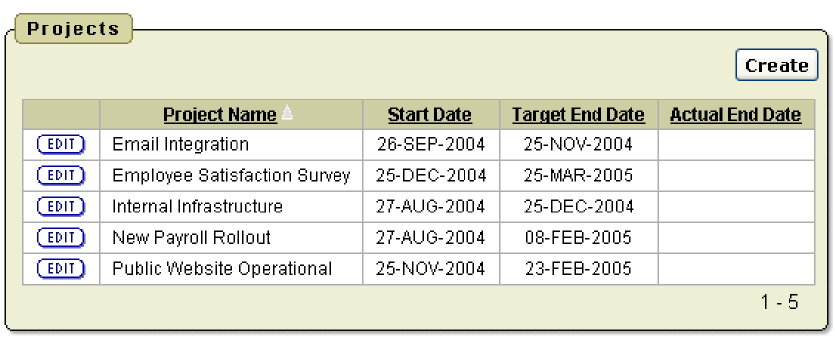
11. Scroll down to Sorting. For Ascending and Descending Image, select the light gray arrow.
12. Under Messages, enter the following in When No Data Found Message:

    ```
    No Projects found.
    ```

13. Click **Apply Changes**.

To view your changes, click the **Run** icon in the upper right of the page. As shown in Figure 10–4, note the addition of a sort control on the Project Name column and the format of the dates in the Start Date and Target End Date columns.

Figure 10–4 Projects Page with Sort Control



Refine the Create/Edit Project Page

Next, you will customize the Create/Edit Project page to make the Project Name field larger, the date fields smaller, change the date picker type and add a format mask for dates, and add validations that check if the target and actual end dates are after the start date.

To make the Project Name field larger and the date fields smaller:

1. Navigate to the Page Definition for Page 3, Create/Edit Project.

   a. From the Developer toolbar, select **Edit Application**.

   b. Select **Create/Edit Project**.

2. Under Items, select the heading **Items**.
3. Scroll to the right and locate the **Width** column:

a. For Project Name, enter `60`.
b. For Start Date, enter `12`.
c. For Target End Date, enter `12`.
d. For Actual End Date, enter `12`.
e. Click **Apply Changes**.

4. Click the **Edit Page** icon in the upper right corner of the page to return to the Page Definition.

To change the date picker type and add a format mask for dates:

1. Edit the item P3_START_DATE.
   a. Under Items, select **P3_START_DATE**.
   b. Under Identification, for Display As select **Date Picker (DD-MON-YYYY)**.
   c. Click **Apply Changes**.

   Edit the item P3_TARGET_END_DATE.
   a. Under Items, select **P3_TARGET_END_DATE**.
   b. Under Identification, for Display As select **Date Picker (DD-MON-YYYY)**.
   c. Click **Apply Changes**.

   Edit the item P3_ACTUAL_END_DATE.
   a. Under Items, select **P3_ACTUAL_END_DATE**.
   b. Under Identification, for Display As select **Date Picker (DD-MON-YYYY)**.
   c. Click **Apply Changes**.

To add validations to check if the target and actual end dates are after the start date:

1. Under the Validations section, click the **Create** icon.
2. For Identify the validation level, accept the default **Item level validation** and click **Next**.
3. For Item, select **Create/Edit Project: 40. P3_TARGET_END_DATE (Target End Date)** and click **Next**.
4. For Select a validation method, select **PL/SQL** and click **Next**.
5. Specify the type of validation you want to create. Accept the default **PL/SQL Expression** and click **Next**.
6. For Validation Name, enter `TARGET_AFTER_START` and click **Next**.
7. On Identify Validation and Error Message:
   a. For Validation, enter:

   ```
   to_date(:P3_ACTUAL_END_DATE,'DD-MON-YYYY') >= to_date(:P3_START_
   DATE,'DD-MON-YYYY')
   ```

   b. For Error Message, enter:

   ```
   Actual End Date must be same or after Start Date.
   ```

   c. Click **Next**.
8. For Conditions:

a. For **Condition Type**, select the shortcut link **[item not null]**.

   Selecting this shortcut link selects **Value of Item in Expression 1 is NOT NULL** from the Condition Type list.

b. For Expression 1, enter:

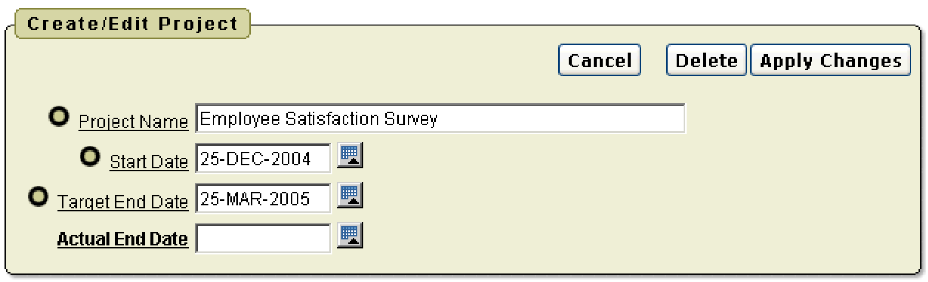
```
P3_ACTUAL_END_DATE.
```

   This selection ensures that this validation will only execute if the user enters an Actual End Date.

c. Click **Create.**

To view your changes, click the **Run Page** icon in the upper right of the page. (See Figure 10–5.)

Figure 10–5 Modified Create/Edit Project



Add Pages to Track People

Once the initial Projects pages are complete, you create pages for maintaining people.

Topics in this section include:

- Create Pages for Maintaining People
- Modify the People Report Page
- Refine the Create/Edit People Page

Create Pages for Maintaining People

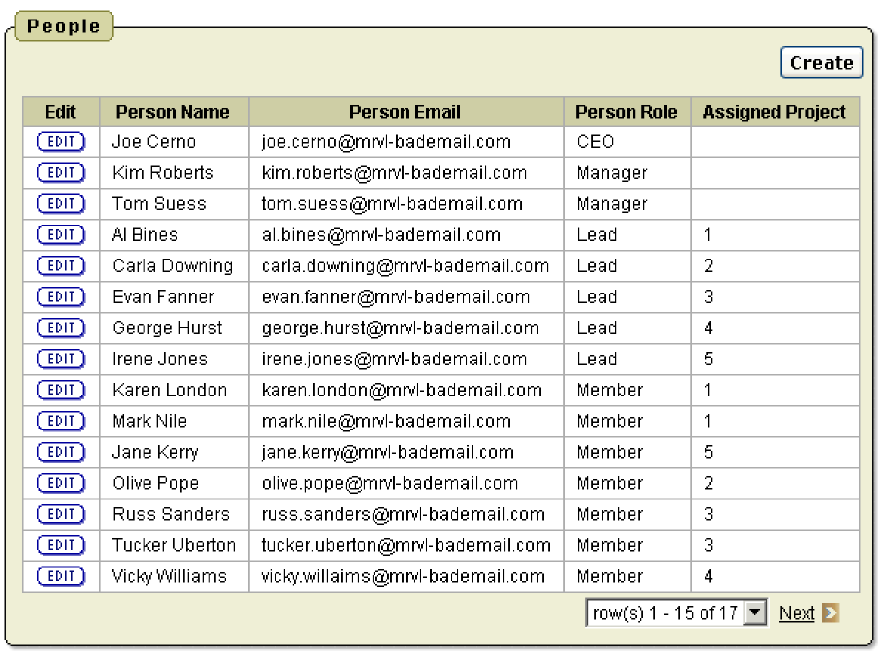
To create pages for maintaining the `HT_PEOPLE` table:

1. Return to the Application home page.
2. Click **Create Page**.
3. Select **Form** and click **Next**.
4. Select **Form on a Table with Report** and click **Next**.
5. For Table/View Owner, select the appropriate schema and click **Next**.
6. For Table/View Name, select **HT_PEOPLE** and click **Next**.
7. For Define Report Attributes:
   a. For Page, enter `4`.
   b. For Page Name and Region Title, enter `People`.
   c. Click **Next.**
8. For **Tab Options**, accept the default **Do not use tabs** and click **Next**.

9. For **Select Column(s)**, select all columns except `PERSON_ID` and click **Next**.
10. For **Edit Link Image**, select the third option (the word Edit in blue with a white background) and click **Next**.
11. For Define Form Page:
    a. For Page, enter `5`.
    b. For Page Name and Region Title, enter `Create/Edit Person. Information`.
    c. Click **Next.**
12. For Tab Options, accept the default **Do not use tabs** and click **Next**.
13. For Primary Key, accept the default **PERSON_ID** and click **Next**.
14. Specify the source for the primary key columns. Accept the default **Existing Trigger** and click **Next**.
15. For Select Column(s), select all the columns and click **Next**.
16. For Insert, Update and Delete, accept the defaults and click **Next**.
17. Review your selections and click **Finish**.

To preview your page, select Run Page. As shown in Figure 10–6 on page 10-20, notice the newly created report displays the demo data.

Figure 10–6 People Page


People

Create

Edit	Person Name	Person Email	Person Role	Assigned Project
EDIT	Joe Cerno	joe.cerno@mrvl-bademail.com	CEO	
EDIT	Kim Roberts	kim.roberts@mrvl-bademail.com	Manager	
EDIT	Tom Suess	tom.suess@mrvl-bademail.com	Manager	
EDIT	Al Bines	al.bines@mrvl-bademail.com	Lead	1
EDIT	Carla Downing	carla.downing@mrvl-bademail.com	Lead	2
EDIT	Evan Fanner	evan.fanner@mrvl-bademail.com	Lead	3
EDIT	George Hurst	george.hurst@mrvl-bademail.com	Lead	4
EDIT	Irene Jones	irene.jones@mrvl-bademail.com	Lead	5
EDIT	Karen London	karen.london@mrvl-bademail.com	Member	1
EDIT	Mark Nile	mark.nile@mrvl-bademail.com	Member	1
EDIT	Jane Kerry	jane.kerry@mrvl-bademail.com	Member	5
EDIT	Olive Pope	olive.pope@mrvl-bademail.com	Member	2
EDIT	Russ Sanders	russ.sanders@mrvl-bademail.com	Member	3
EDIT	Tucker Uberton	tucker.uberton@mrvl-bademail.com	Member	3
EDIT	Vicky Williams	vicky.willaims@mrvl-bademail.com	Member	4

row(s) 1 - 15 of 17 Next

To preview the page for adding or editing people, click the **Edit** button in the far left column.

Modify the People Report Page

Next, you will alter the People Report by changing the query to include a join to the Projects table and modify the headings.

To change the query to include a join to the Projects table:

1. Navigate to the Page Definition for page 4, People.
2. Under Regions, select **People**.
3. Scroll down to Source.
4. In Region Source, enter:

```
SELECT a."PERSON_ID",
       a."PERSON_NAME",
       a."PERSON_EMAIL",
       a."PERSON_ROLE",
       b."PROJECT_NAME"
   FROM "#OWNER#"."HT_PEOPLE" a,
        "#OWNER#"."HT_PROJECTS" b
 WHERE a.assigned_project = b.project_id (+)
```

   Note that the outer join is necessary because the project assignment is optional.

5. Select the Report Attributes tab.
   a. For PERSON_ID, remove the Heading **Edit**.
   b. For PERSON_NAME, change Heading to `Name`.
   c. For PERSON_EMAIL, change Heading to `Email`.
   d. For PERSON_ROLE, change Heading to `Role`.
   e. For PROJECT_NAME, change Heading to `Assigned Project` and select **left** for Heading Align.
6. Enable column heading sorting by selecting **Sort** for all columns except PERSON_ID.
7. For PERSON_NAME, select 1 for Sort Sequence.

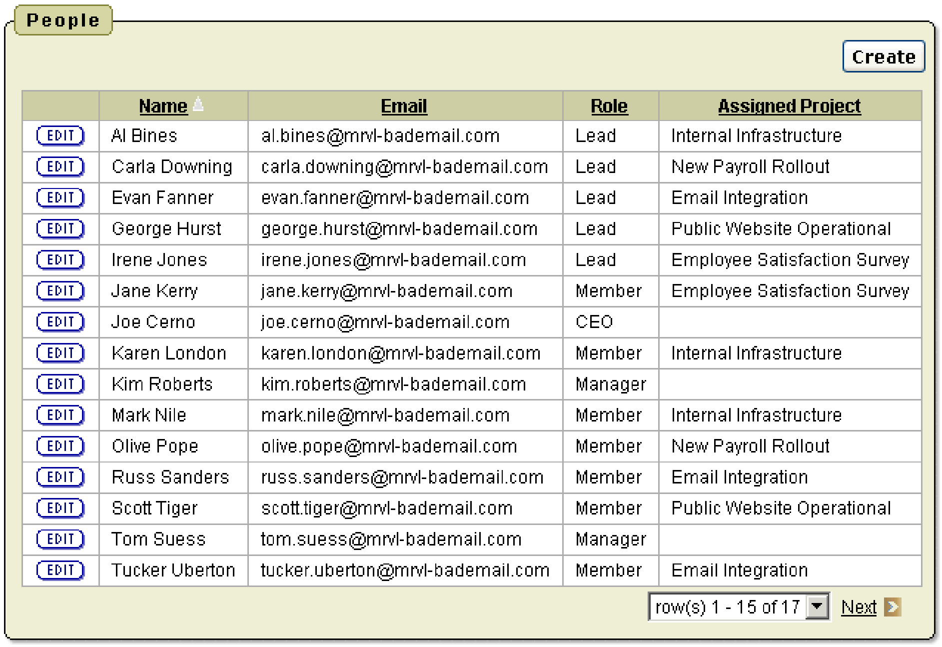
   This selection specifies PERSON_NAME as the default column to sort on. Note this functionality can overridden by user selections.
8. Scroll down to Sorting. For Ascending and Descending Image, select the light gray arrow.
9. Under Messages, enter the following in When No Data Found Message:

```
No people found.
```

10. Click **Apply Changes**.

To view your changes, click the **Run Page** icon in the upper right of the page. As shown in Figure 10–7, note the addition of a sort control on the Name column.

Figure 10–7 Revised People Page


People

Create

	Name	Email	Role	Assigned Project
EDIT	Al Bines	al.bines@mrvl-bademail.com	Lead	Internal Infrastructure
EDIT	Carla Downing	carla.downing@mrvl-bademail.com	Lead	New Payroll Rollout
EDIT	Evan Fanner	evan.fanner@mrvl-bademail.com	Lead	Email Integration
EDIT	George Hurst	george.hurst@mrvl-bademail.com	Lead	Public Website Operational
EDIT	Irene Jones	irene.jones@mrvl-bademail.com	Lead	Employee Satisfaction Survey
EDIT	Jane Kerry	jane.kerry@mrvl-bademail.com	Member	Employee Satisfaction Survey
EDIT	Joe Cerno	joe.cerno@mrvl-bademail.com	CEO	
EDIT	Karen London	karen.london@mrvl-bademail.com	Member	Internal Infrastructure
EDIT	Kim Roberts	kim.roberts@mrvl-bademail.com	Manager	
EDIT	Mark Nile	mark.nile@mrvl-bademail.com	Member	Internal Infrastructure
EDIT	Olive Pope	olive.pope@mrvl-bademail.com	Member	New Payroll Rollout
EDIT	Russ Sanders	russ.sanders@mrvl-bademail.com	Member	Email Integration
EDIT	Scott Tiger	scott.tiger@mrvl-bademail.com	Member	Public Website Operational
EDIT	Tom Suess	tom.suess@mrvl-bademail.com	Manager	
EDIT	Tucker Uberton	tucker.uberton@mrvl-bademail.com	Member	Email Integration

row(s) 1 - 15 of 17 Next

Refine the Create/Edit People Page

Next, you will customize the Create/Edit People page by adding lists of values to make it easier for users to select a Role or Assigned Project.

Add Lists of Values To add a list of values for Projects:

1. Navigate to the Page Definition for page 5, Create/Edit Person.
2. Under Shared Components, locate the Lists of Values section and click the **Create** icon.
3. For Create List of Values, accept the default **From Scratch** and click **Next**.
4. For Name and Type:
   a. For Name, enter `PROJECTS`.
   b. For Type:, select **Dynamic**.
   c. Click **Next**.
5. In Query, enter:

```
SELECT project_name d, project_id v
  FROM ht_projects
 ORDER BY d
```

6. Click **Create List of Values**.

To add a list of values for Roles:

1. Under Shared Components, locate the Lists of Values section and click the **Create** icon.
2. For Create List of Values, accept the default From Scratch and click **Next**.
3. For Name and Type:
   a. For Name, enter `ROLES`.

   b. For Type:, select **Static**
   c. Click **Next**.
4. Enter the display value and return value pairs shown in Table 10–4:

Table 10–4 Display Value and Return Value pairs

Display Value	Return Value
CEO	CEO
Manager	Manager
Lead	Lead
Member	Member

5. Click **Create List of Values**.
6. Return to the Page Definition for Page 5. Click the **Edit Page** icon in the upper right corner.

Edit Display Attributes To edit display attributes for P5_PERSON_ROLE:

1. Under Items, select **P5_PERSON_ROLE**.
2. Under Name, select **Radiogroup** from the Display As list.
3. Scroll down to Label.
4. Edit Label to be `Role`.
5. Under Element, enter the following in Form Element Option Attribute:

   ```
   class="instructiontext"
   ```

   This specifies that the text associated with each radio group option is the same size as other items on the page.
6. Scroll down to List of Values.
7. From the Named LOV list, select **ROLES**.
8. Click **Apply Changes**.

To edit display attributes for P5_ASSIGNED_PROJECT:

1. Under Items, select **P5_ASSIGNED_PROJECT**.
2. Under Name, select **Select List** from the Display As list.
3. Scroll down to List of Values.
4. Under List of Values:
   a. From the Named LOV list, select **PROJECTS**.

      Next, specify that the underlying column is not mandatory.
   b. For Null display value, enter:

      ```
      - None -
      ```
5. Click **Apply Changes**.

To alter the display of fields and field labels:

1. Click the heading **Items**.

2. For P5_PERSON_NAME:
   a. For Prompt, enter `Name`.
   b. For Width, enter `60`.
3. For P5_PERSON_EMAIL:
   a. For Prompt, enter `Email Address`.
   b. For Width, enter `60`.
4. Click **Apply Changes**.
5. Click the **Edit Page** icon in the upper right corner to return to the Page Definition for Page 5.

Create a Validation The wizard created not null validations for Name, Email and Role. You must manually create another validation to ensure that Leads and Members have an assigned project while the CEO and Managers do not. As a best practice, it is generally best to use built-in validation types since they are faster. However, for this compound type of validation, you will write a PL/SQL validation.

To add validations to ensure the correct people are assigned projects:

1. Under the Validations section, click the **Create** icon.
2. On Identify Validation Type, accept the default **Item level validation** and click **Next**.
3. For Item, select **Create/Edit Person Information: 50. P5_ASSIGNED_PROJECT (Assigned Project)** and click **Next**.
4. For Validation Method, select **PL/SQL** and click **Next**.
5. Specify the type of PL/SQL validation you want to create. Accept the default **PL/SQL Expression** and click **Next**.
6. For Validation Name, enter `PROJECT_MAND_FOR_LEADER_AND_MEMBER` and click **Next**.
7. On Identify Validation and Error Message:
   a. For Validation, enter:

      ```
      (:P5_PERSON_ROLE IN ('CEO','Manager') AND
      :P5_ASSIGNED_PROJECT = '%'||'null%') OR
      (:P5_PERSON_ROLE IN ('Lead','Member') AND
      :P5_ASSIGNED_PROJECT != '%'||'null%')
      ```

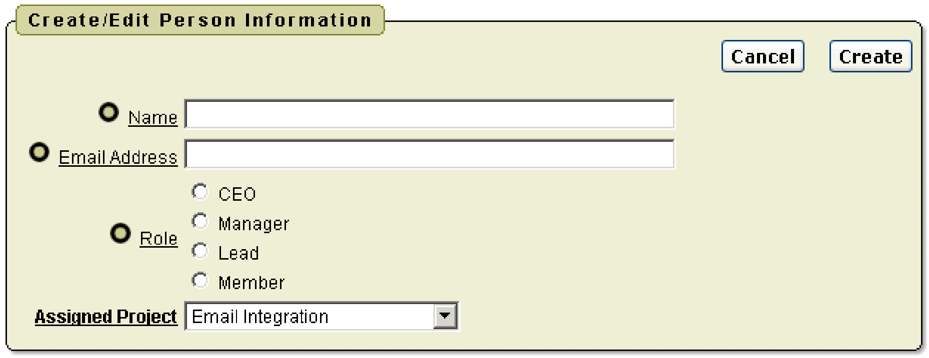
      Oracle HTML DB passes nulls as `%null%`. It also replaces `%null%` with a null when it processes data so to keep it in the validation, you need to break the string apart so that it is not recognized and replaced.
   b. For Error Message, enter:

      ```
      Leads and Members must have an Assigned Project. CEO and Managers cannot
      have an Assigned Project.
      ```

   c. Click **Next**.
8. Click **Create**.

To view your changes, click the **Run Page** icon in the upper right of the page. (See Figure 10–8.)

Figure 10–8 Revised Create/Edit Person Information Form



Try entering some records to test the validation. Try to enter a CEO with a project and then try to enter a Lead without a project. Both cases will fail and display the error message you defined.

Add Pages to Track Issues

Lastly, you need to create pages for `HT_ISSUES`. This application needs multiple views on Issues. You can create these views as one, more complex reports or as separate reports. For this exercise you will be creating the complex report. This report will have an Issues maintenance form. You will then link this maintenance form in multiple places. Ultimately, the Issues report will display Issues by the person who identified the issue, project, assigned person, status, or priority.

Topics in this section include:

- Create a Report for HT_ISSUES
- Refine the Create/Edit Issues Page
- Refine the Issues Report
- Add a Page to Support Assigning Multiple Issues Simultaneously

Create a Report for HT_ISSUES

To create a report for maintaining `HT_ISSUES`:

1. Return to the Application home page.
2. Click **Create Page**.
3. Select **Form** and click **Next**.
4. Select **Form on a Table with Report** and click **Next**.
5. For Table/View Owner, select the appropriate schema and click **Next**.
6. For Table/View Name, select **HT_ISSUES** and click **Next**.
7. For Page and Region Attributes:
   a. For Page, enter `6`.
   b. For Page Name and Region Title, enter `Issues`.
   c. Click **Next**.
8. For Tab Options, accept the default **Do not use tabs** and click **Next**.
9. For Select Column(s), select the following and click **Next**:

- ISSUE_SUMMARY
- IDENTIFIED_BY
- RELATED_PROJECT
- ASSIGNED_TO
- STATUS
- PRIORITY
- TARGET_RESOLUTION_DATE
- ACTUAL_RESOLUTION_DATE

10. For **Edit Link Image**, select the third option (the word Edit in blue with a white background) and click **Next**.
11. For Define Form Page:
    a. For Page, enter `7`.
    b. For Page Name and Region Title, enter `Create/Edit Issues`.
    c. Click **Next.**
12. For Tab Options, accept the default **Do not use tabs** and click **Next**.
13. For Primary Key, accept the default **ISSUE_ID** and click **Next**.
14. Define the source for the primary key columns. Accept the default **Existing Trigger** and click **Next**.
15. For Select Column(s), select all the columns and click **Next**.
16. For Insert, Update and Delete, accept the default value **Yes** and click **Next**.
17. Review your selections and click **Finish**.

Refine the Create/Edit Issues Page

When you refine the Create/Edit Page you will:

- Add lists of values to make it easier for users to select foreign key columns
- Organize and clean up items
- Change the display of audit columns
- Add a button to make data entry faster

Add Lists of Values Next, you need to add lists of values for Status, Priorities, and People.

To add a list of values for Status:

1. Navigate to the Page Definition for page 7.
2. Under the Lists of Values section and click the **Create** icon.
3. For Create List of Values, accept the default **From Scratch** and click **Next**.
4. On Create List of Values (LOV):
    a. For Name, enter `STATUS`.
    b. For Type, select **Static**.
    c. Click **Next**.

5. Enter the Display Value and Return Value pairs shown in Table 10–5:

Table 10–5 Display Value and Return Value Pairs

Display Value	Return Value
Open	Open
On-Hold	On-Hold
Closed	Closed

6. Click **Create List of Values**.

To add a list of values for Priorities:

1. Return to the Page Definition for Page 7. Click the **Edit Page** icon in the upper right corner.
2. Under the Lists of Values section and click the **Create** icon.
3. For Create List of Values, accept the default **From Scratch** and click **Next**.
4. On Create List of Values (LOV):
   a. For Name, enter `PRIORITIES`.
   b. For Type, select **Static** and click **Next**.
5. Enter the Display Value and Return Value pairs shown in Table 10–6.

Table 10–6 Display Value and Return Value Pairs

Display Value	Return Value
High	High
Medium	Medium
Low	Low

6. Click **Create List of Values**.

To add a list of values for People:

1. Return to the Page Definition for Page 7. Click the **Edit Page** icon in the upper right corner.
2. Under the Lists of Values section and click the **Create** icon.
3. For Create List of Values, accept the default **From Scratch** and click **Next**.
4. On Create List of Values (LOV):
   a. For Name, enter `PEOPLE`.
   b. For Type, select **Dynamic** and click **Next**.
5. In Query enter:

```
SELECT person_name d, person_id v
   FROM ht_people
 ORDER BY 1
```

6. Click **Created List of Values**.

Edit Specific Items Next, you edit individual items.

To edit P7_IDENTIFIED_BY:

1. Return to the Page Definition for Page 7. Click the **Edit Page** icon in the upper right corner.
2. Under Items, select **P7_IDENTIFIED_BY**.
3. Under Name, select **Select List** from the Display As list.
4. Scroll down to List of Values:
   a. For Named LOV, select **PEOPLE**.
   b. For Display Null, select **Yes**. The base column is mandatory but you do not want the first name in the list becoming the default value.
   c. For Null display value, enter:

      ```
       - Select Person -
      ```
5. Click the Next button (>) at the top of the page to navigate to the next item.

To edit P7_IDENTIFIED_DATE:

1. Navigate to P7_IDENTIFIED_DATE.
2. Under Name, for select **Date Picker (DD-MON-YYYY)** from the Display As list.
3. Scroll down to Default:
   a. For Default Value, enter:

      ```
      to_char(sysdate,'DD-MON-YYYY')
      ```
   b. For Default Value Type, select **PL/SQL Expression**.
4. Click the Next button (>) at the top of the page to navigate to the next item.

To edit P7_RELATED_PROJECT:

1. Navigate to P7_RELATED_PROJECT.
2. Under Identification, for select **Select List** from the Display As list.
3. Scroll down to List of Values:
   a. For Named LOV, select **PEOPLE**.
   b. For Display Null, select **Yes**.
   c. For Null display value, enter:

      ```
       - Select Person -
      ```
4. Click the Next button (>) at the top of the page to navigate to P7_STATUS.

To edit P7_STATUS:

1. Navigate to P7_STATUS.
2. Under Identification, for select **Radiogroup** from the Display As list.
3. In Label, enter:

   ```
   Status:
   ```
4. Scroll down to Element. Enter the following in the Form Element Option Attributes:

   ```
   class="instructiontext"
   ```

5. Scroll down to Default. In Default Value, enter `Open`.
6. Scroll down to List of Values:
   a. For Named LOV, select **STATUS**.
   b. For Columns, enter 3.

      This selection enables the three valid values to display side by side.
7. Click the Next button (>) at the top of the page to navigate to P7_PRIORITY.

To edit P7_PRIORITY:

1. Navigate to P7_PRIORITY.
2. Under Name, for select **Radiogroup** from the Display As list.
3. In Label, enter:

   ```
   Priority:
   ```

4. Scroll down to Element. Enter the following in the Form Element Option Attributes:

   ```
   class="instructiontext"
   ```

5. Scroll down to Default. In Default value, enter `Open`.
6. Scroll down to List of Values:
   a. For Named LOV, select **PRIORITIES**.
   b. For Display Null, select **Yes**.
   c. For Columns, enter 4.

      This selection reflects that fact there are three valid values plus the null value.
   d. For Null display value, enter `None`.
7. Click the Next button (>) at the top of the page to navigate to the next item.

To edit P7_TARGET_RESOLUTION_DATE:

1. Navigate to P7_TARGET_RESOLUTION_DATE.
2. Under Name, for select **Date Picker (DD-MON-YYYY)** from the Display As list.
3. Click the Next button (>) at the top of the page to navigate to P7_ACTUAL_RESOLUTION_DATE.

To edit P7_ACTUAL_RESOLUTION_DATE:

1. Navigate to P7_ACTUAL_RESOLUTION_DATE.
2. Under Name, for select **Date Picker (DD-MON-YYYY)** from the Display As list.
3. Click **Apply Changes**.

Create Regions to Group Items Currently all items are grouped into one large region. Displaying items in logical groups will make data entry easier for users. Next, you will create four new regions named Buttons, Identification, Progress, Resolution, and Auditing.

To create new regions to group items:

1. Under Regions, click the **Create** icon.
2. Select **Multiple HTML**.

3. For the first row:
   - For Sequence, enter `5`.
   - For Title, enter `Buttons`.
   - For Template, select **Button Region without Title**.
4. For the second row, in Title enter `Progress`.
5. For the third row, in Title enter `Resolution`.
6. For the fourth row, in Title enter `Audit Information`.
7. Click **Create Region(s**).

Now that the new regions exist, rename the first region, Create/Edit Issues:

1. Under Regions, select **Create/Edit Issue**.
2. In **Title**, enter:.

   ```
   Issue Identification
   ```

3. Click **Apply Changes**.

Move Items to the Appropriate Regions Next, move each item to the appropriate region. Note that you will also need to modify some item widths.

To move items to the appropriate regions:

1. Under Items, select the **Items** heading.
2. Under Region, select **Progress** for the following items:
   - P7_ASSIGNED_TO
   - P7_STATUS
   - P7_PRIORITY
   - P7_TARGET_RESOLUTION_DATE
   - P7_PROGRESS
3. Under Region, select **Resolution** for the following items:
   - P7_ACTUAL_RESOLUTION_DATE
   - P7_RESOLUTION_SUMMARY
4. Under Region, select **Audit Information** for the following items:
   - P7_CREATED_DATE
   - P7_CREATED_BY
   - P7_LAST_MODIFIED_DATE
   - P7_LAST_MODIFIED_BY
5. For P7_ISSUE_SUMMARY, enter `60` for Width.
6. For P7_IDENTIFIED_DATE, enter `12` for Width.
7. For P7_TARGET_RESOLUTION_DATE, enter `12` for Width.
8. For P7_ACTUAL_RESOLUTION_DATE, enter `12` for Width.
9. Click **Apply Changes**.
10. Click the **Edit Page** icon in the upper right to return the Page Definition of Page 7.

To move buttons to the Button region:

1. Return to the Page Definition for Page 7.
2. Under the Buttons section, click the **Buttons** heading.
3. Under Region for all buttons, select **Buttons**.
4. Click **Apply Changes**.
5. Click the **Edit Page** icon in the upper right to return the Page Definition of Page 7.

Change the Display of Audit Columns Because the Audit columns should be viewable but not editable, you need to make them display only. In the following exercise, you create a condition for the Audit Information region. As a result, the Audit Information region will display when a user edits an existing issue, but will not appear when a user creates a new issue.

To create a condition for the Audit Information region.

1. On the Page Definition of Page 7, select the **Audit Information** region.
2. Scroll down to Conditional Display.
3. From Condition Type, select **Value of Item in Expression 1 is NOT NULL**.
4. In Expression 1, enter `P7_ISSUE_ID`.
5. Click **Apply Changes**.

Next, change the audit columns to display only.

To edit P7_CREATED_DATE:

1. Under Items, select **P7_CREATED_DATE**.
2. Under Name, select **Display as Text (saves state)** from the Display As list.
3. Scroll down to Label:
   a. For Label, enter:

      ```
      Created Date:
      ```

   b. For Template, select **Optional Label with Help**.
   c. For HTML Table Cell Attributes, enter:

      ```
      class="instructiontext"
      ```

4. Under Source, enter the following in Format Mask:

   ```
   DD-MON-YYYY
   ```

5. Click the Next button (>) at the top of the page to navigate to the next item.

To edit P7_CREATED_BY:

1. Under Name, select **Display as Text (saves state)** from the Display As list.
2. Scroll down to Label:
   a. For Label, enter:

      ```
      Created By:
      ```

   b. For Template, select **Optional Label with Help**.
   c. For HTML Table Cell Attributes, enter:

```
class="instructiontext"
```

3. Click the Next button (>) at the top of the page to navigate to the next item.

To edit P7_LAST_MODIFIED_DATE:

1. Under Name, select **Display as Text (saves state)** from the Display As list.
2. Scroll down to Label:
   a. For Label, enter:
      ```
      Last Modified Date:
      ```
   b. For Template, select **Optional Label with Help**.
   c. For HTML Table Cell Attributes, enter:
      ```
      class="instructiontext"
      ```
3. Under Source, for Format Mask, enter:
   ```
   DD-MON-YYYY
   ```
4. Click the Next button (>) at the top of the page to navigate to the next item.

To edit P7_LAST_MODIFIED_BY:

1. Under Name, select **Display as Text (saves state)** from the Display As list.
2. Scroll down to Label:
   a. For Label, enter:
      ```
      Last Modified By:
      ```
   b. For Template, select **Optional Label with Help**.
   c. For HTML Table Cell Attributes, enter:
      ```
      class="instructiontext"
      ```
3. Click **Apply Changes**.

Remove Unnecessary Validations The wizard created not null validations for Issue Summary, Identified By, Related Project, Status, Created Date, and Created By. Since the Audit columns are set by a trigger, you need to remove these validations.

To remove not null validations:

1. Under Validations, select **P7_CREATED_DATE not null**.
2. Click **Delete**.
3. Click **OK** to confirm your selection.
4. Under Validations, select **P7_CREATED_BY not null**.
5. Click **Delete**.
6. Click **OK** to confirm your selection.

Return the User to the Calling Page Because this Create/Edit page will be called from several places, when users finish with the display they should return to the calling page. To accomplish this, you create an item and change the branch on this page. Every time this page is called, the item must be set with the number of the calling page.

To create a hidden item:

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Hidden** and click **Next**.
3. For Display Position and Name:
   a. For Item Name, enter:
      ```
      P7_PREV_PAGE
      ```
   b. For Region, select **Issue Identification**.
   c. Click **Next**.
4. Click **Create Item**.

   Next, edit the Cancel button.
5. Under Buttons, select **Cancel**.
6. Scroll down to Optional URL Redirect.
7. In Page, enter:
   ```
   &P7_PREV_PAGE.
   ```
   Note the period at the end.
8. Click **Apply Changes**.

   Next, edit the branch.
9. Under Branches, select the **After Processing** branch.
10. Under Action, enter the following in Page:
    ```
    &P7_PREV_PAGE.
    ```
11. Click **Apply Changes**.

Add Functionality to Support Adding Multiple Issues Sequentially Next, you will add functionality that will enable users to add more than one issue at time. To accomplish this, you will first add a new button and then a new branch.

To add a new button:

1. Under the Buttons section, click the **Copy** icon.
2. Under Name, select **CREATE**.
3. For Target Page, accept the default **7** and click **Next**.
4. For Button Name, enter `CREATE_AGAIN`.
5. For Label, enter `Create and Create Another`.
6. Click **Copy Button**.

Functionally, the Copy Button currently works the same as the CREATE button. Next, create a branch that keeps the user on the create page.

Note that this branch will also reset P7_PREV_PAGE because the value of that item will be lost when the cache of the page is cleared. The sequence of this new branch will be 0. That will make it fire before the default branch but only when the Create and Create Another button is used.

To create a branch that keeps the user on the create page:

1. Under Branches, click the **Create** icon.
2. For Point and Type, accept the defaults and click **Next**.
3. For Target:
   a. For Page, enter `7`.
   b. For Clear Cache, enter `7`.
   c. For Set these items, enter:

      ```
      P7_PREV_PAGE
      ```

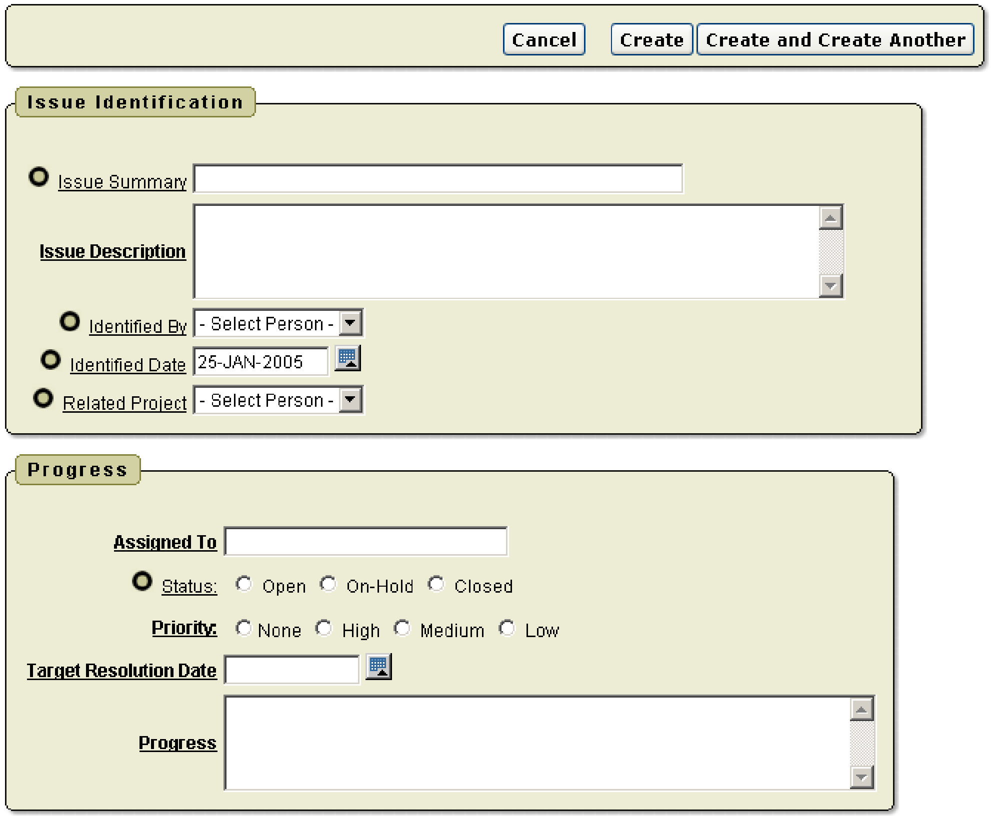
   d. For With these values, enter:

      ```
      &P7_PREV_PAGE.
      ```

   e. Click **Next**.
4. For Branch Conditions:
   a. For Sequence, enter 0.
   b. For When Button Pressed, select **CREATE_AGAIN**.
5. Click **Create Branch**.
6. Under Branches, select the newly created branch.
7. Under Branch Action, select **include process success message**.
8. Click **Apply Changes**.

   To see the changes, click the **Run Page** icon. (See Figure 10–9.)

Figure 10–9 Create/Edit Issues Form



The branch you just created is looking for a value in P7_PREV_PAGE. Since the page was not called from another page, the value has not been set. You will fix that next.

Refine the Issues Report

Next, you will refine the Issues report page to support dynamic modification of the query. To accomplish this, you must:

- Move the Create button to a new region and edit the label
- Create new items that will enable the user to restrict the query
- Add a `WHERE` clause to reference those new items
- Alter the report column attributes to display each person's name and the project
- Modify headings

Move Create Button to a New Region To create a new region of the Create button:

1. Navigate to the Page Definition for page 6, Issues.
2. Under Regions, click the **Create** icon.
3. Select **HTML** and click **Next**.
4. Specify the type of HTML region container you want to create. Select **HTML** and click **Next**.
5. For Display Attributes:
   a. For Title, enter `Buttons`.

   b. For Region Template, select **Button Region without Title**.
   c. For Display Point, select **Page Template Body (2. items below region content)**.
   d. Click **Next**.
6. Click **Create Region**.

To move the Create button to the Buttons region:

1. Under Buttons, select the **CREATE** button.
2. In Text Label, enter:

   ```
   Add a New Issue
   ```

3. From Display in Region, select **Buttons**.
4. Scroll down to Optional URL Redirect:
   a. For Set These Items, enter:

      ```
      P7_PREV_PAGE
      ```

   b. For With These Values, enter `6`.
5. Click **Apply Changes**.

Alter the Query and Display Next, alter the query to display the actual values for people and projects instead of the ID and then clean up the report display.

To edit column attributes for ISSUE_ID:

1. Under the Regions section, select **Report** adjacent to Issues.
2. Click the **Edit Icon** to the left of ISSUE_ID.
3. Scroll down to Column Link.
   a. For Item 2, for Name enter:

      ```
      P7_PREV_PAGE
      ```

   b. For Item 2, for Value enter 6.
4. Click **Apply Changes**.

To edit column attributes for IDENTIFIED_BY, RELATED_PROJECT and ASSIGNED_TO:

1. Click the **Edit Icon** to the left of IDENTIFIED_BY.
2. Scroll down to Tabular Form Element. From the Display As list, select **Display as Text (based on LOV, does not save state).**
3. Scroll down to List of Values. For Named LOV, select **PEOPLE**.
4. Return to the top of the page and click the **Next** (>) icon.

   The Column Attributes page for RELATED_PROJECT appears.
5. Scroll down to Tabular Form Element. From the Display As list, select **Display as Text (based on LOV, does not save state).**
6. Scroll down to List of Values:
   a. For Named LOV, select **PROJECTS**.
   b. For Display Null, select **Yes**.

   c. In Null Text, enter a hyphen (-).

7. Return to the top of the page and click the **Next** (>) icon.

   The Column Attributes page for ASSIGNED_TO appears.

8. Scroll down to Tabular Form Element. From the Display As list, select **Display as Text (based on LOV, does not save state).**

9. Scroll down to List of Values:

   a. For Named LOV, select **PEOPLE**.

   b. For Display Null, select **Yes**.

   c. In Null Text, enter a hyphen (-).

10. Click **Apply Changes**.

Next, you will customize how the report displays by changing report attributes.

To alter the report display:

1. For ISSUE_ID, delete the Heading **Edit**.
2. For ISSUE_SUMMARY, change Heading to `Summary`.
3. For TARGET_RESOLUTION_DATE:

   a. Force the heading to wrap. In Heading, enter:

   ```
   Target<br>Resolution<br>Date
   ```

   b. For Column Align., select **center**.

   c. For Heading Align. select **center**.

4. For all columns except ISSUE_ID, check **Sort**.
5. For ISSUE_SUMMARY, select **1** for Sort Sequence.
6. Scroll down to Layout and Pagination:

   a. For Show Null Values as, enter a hyphen (-).

   b. For Number of Rows, enter `5`.

7. Under Sorting, select the light gray arrow for Ascending and Descending Image.
8. Under Messages, enter the following in When No Data Found Message:

   ```
   No issues found.
   ```

9. Click **Apply Changes**.

Add Support of Filtering Although the report now displays nicely, it does not support filtering by the end user. To add this functionality, you will first create items that will enable the user to set values to query against. You will store these new items in a new region which will display above the report.

To create a new region:

1. Under Regions, click the **Create** icon.
2. Select **HTML** and click **Next**.
3. Select the type of HTML region container you want to create. Select **HTML** and click **Next**.
4. For Display Attributes:

a. For Title, enter `Issue Report Parameters`.
b. For Region Template, select accept the default of **Reports Region**.
c. For Sequence, enter `5`.
d. Click **Next**.

5. Click **Create Region**.

Next, create the items.

To create the item for Identified By:

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.
3. For Select List Control Type, accept the default selection **Select List** and click **Next**.
4. On Identify Item Name and Display Position:
   a. For Item Name, enter `P6_IDENTIFIED_BY`.
   b. For Region, select **Issue Report Parameters**.
   c. Click **Next**.
5. On Identify List of Values:
   a. For Named LOV, select **PEOPLE**.
   b. For Null Text, enter:

      ```
      - All -
      ```

   c. For Null Value, enter:

      ```
      -1
      ```

   d. Click **Next**.
6. For Item Attributes, accept the defaults and click **Next**.
7. For Default, enter:

   ```
   -1
   ```

8. Click **Create Item**.

To create an item for Assigned To.

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.
3. For Select List Control Type, accept the default selection **Select List** and click **Next**.
4. For Display Position and Name:
   a. For Item Name, enter `P6_ASSIGNED_TO`.
   b. For Region, select **Issue Report Parameters**.
   c. Click **Next**.
5. On Identify List of Values:
   a. For Named LOV, select **PEOPLE**.
   b. For Null Text, enter:

```
- All -
```

c. For Null Value, enter:

```
-1
```

d. Click **Next**.

6. For Item Attributes, accept the defaults and click **Next**.
7. For Default, enter:

```
-1
```

8. Click **Create Item**.

To create an item for Status.

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.
3. For Select List Control Type, accept the default selection **Select List** and click **Next**.
4. On Identify Item Name and Display Position:
   a. For Item Name, enter `P6_STATUS`.
   b. For Region, select **Issue Report Parameters**.
   c. Click **Next**.
5. On Identify List of Values:
   a. For Named LOV, select **STATUS**.
   b. For Null Text, enter:

```
- All -
```

   c. For Null Value, enter:

```
-1
```

   d. Click **Next**.
6. For Item Attributes, accept the defaults and click **Next**.
7. For Default, enter:

```
-1
```

8. Click **Create Item**.

To create an item for Priority.

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.
3. For Select List Control Type, accept the default selection **Select List** and click **Next**.
4. On Identify Item Name and Display Position:
   a. For Item Name, enter `P6_PRIORITY`.
   b. For Region, select **Issue Report Parameters**.
   c. Click **Next**.
5. On List of Values:

   a. For Named LOV, select **PRIORITIES**.
   b. For Null Text, enter:

      ```
      - All -
      ```

   c. For Null Value, enter:

      ```
      -1
      ```

   d. Click **Next**.

6. For Identify Item Attributes, accept the defaults and click **Next**.
7. For Default, enter:

   ```
   -1
   ```

8. Click **Create Item**.

To create an item for Related Project.

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.
3. For Select List Control Type, accept the default selection **Select List** and click **Next**.
4. On Identify Item Name and Display Position:
   a. For Item Name, enter `P6_RELATED_PROJECT`.
   b. For Region, select **Issue Report Parameters**.
   c. Click **Next**.
5. On Identify List of Values:
   a. For Named LOV, select **PRIORITIES**.
   b. For Null Text, enter:

      ```
      - All -
      ```

   c. For Null Value, enter:

      ```
      -1
      ```

   d. Click **Next**.
6. For Identify Item Attributes, accept the defaults and click **Next**.
7. For Default, enter:

   ```
   -1
   ```

8. Click **Create Item**.

Next, create a Go button. This button will enable the user to execute the query once they select report parameters. Buttons can be created in region positions or displayed among items. For this exercise, the Go button will display just to the right of the last report parameter so you will create it among the region's items.

To create Go button:

1. Under Buttons, click the **Create** icon.
2. For Select a region for the button, select **Issue Report Parameters** and click **Next**.

3. For Position, select **Create a button displayed among this region's items** and click **Next**.
4. For Button Name, enter `P6_GO`.
5. For Button Style, select **Template Based Button**.
6. For **Template**, select **Button**.
7. Click **Create Button**.

Currently the items display stacked on top of one another. To use space more efficiently, change the position of P6_RELATED_PROJECT, P6_STATUS, and P6_PRIORITY so they display next to each other. Place P6_RELATED_PROJECT, P6_STATUS on the first line and P6_PRIORITY on the second line.

To change the position of 6_RELATED_PROJECT, P6_STATUS, and P6_PRIORITY:

1. Under the Items section, click the heading **Items**.
2. For P6_RELATED_PROJECT, P6_STATUS, and P6_PRIORITY, select **No** for New Line.
3. Click **Apply Changes**.
4. Click the Edit Page icon in the upper right corner to return to the Page Definition for page 6.

Next, you need to modify the report to react to the parameters. To accomplish this, you need to modify the `WHERE` clause of the query. One approach would be add the following `WHERE` clause. For example:

```
WHERE (IDENTIFIED_BY = :P6_IDENTIFIED_BY OR
       :P6_IDENTIFIED_BY = '-1')
   AND (RELATED_PROJECT = :P6_RELATED_PROJECT OR
       :P6_RELATED_PROJECT = '-1')
   AND (ASSIGNED_TO = :P6_ASSIGNED_TO OR
       :P6_ASSIGNED_TO = '-1')
   AND (STATUS = :P6_STATUS OR
       :P6_STATUS = '-1')
   AND (PRIORITY = :P6_PRIORITY OR
       :P6_PRIORITIY = '-1')
```

Although this is a valid approach, the query will execute faster if you generate it with the `WHERE` clause that needs it. To accomplish this, turn the Issues region into a PL/SQL Function Body Returning a SQL Query.

To turn the Issues region into a PL/SQL Function Body Returning a SQL Query:

1. Under Regions, select **Issues**.
2. For Type, select **SQL Query (Pl/Sql Function Body Returning Sql Query)**.
3. For Region Source, enter the following:

```
DECLARE

   q VARCHAR2(32767); -- query
   w VARCHAR2(4000) ; -- where clause
   we VARCHAR2(1) := 'N'; -- identifies if where clause exists

BEGIN

   q := 'SELECT "ISSUE_ID", '||
        ' "ISSUE_SUMMARY", '||
        ' "IDENTIFIED_BY", '||
```

```
        ' "RELATED_PROJECT", '||
        ' "ASSIGNED_TO", '||
        ' "STATUS", '||
        ' "PRIORITY", '||
        ' "TARGET_RESOLUTION_DATE", '||

        ' "ACTUAL_RESOLUTION_DATE" '||
        ' FROM "#OWNER#"."HT_ISSUES" ';

   IF :P6_IDENTIFIED_BY != '-1'
      THEN
      w := ' IDENTIFIED_BY = :P6_IDENTIFIED_BY ';
      we := 'Y';
   END IF;

   IF :P6_RELATED_PROJECT != '-1'
      THEN
      IF we = 'Y'
         THEN
         w := w || ' AND RELATED_PROJECT = :P6_RELATED_PROJECT ';
      ELSE
         w := ' RELATED_PROJECT = :P6_RELATED_PROJECT ';
         we := 'Y';
      END IF;
   END IF;

   IF :P6_ASSIGNED_TO != '-1'
      THEN
      IF we = 'Y'
         THEN
         w := w || ' AND ASSIGNED_TO = :P6_ASSIGNED_TO ';
    ELSE
         w := ' ASSIGNED_TO = :P6_ASSIGNED_TO ';
         we := 'Y';
    END IF;
   END IF;

   IF :P6_STATUS != '-1'
      THEN
      IF we = 'Y'
         THEN
         w := w || ' AND STATUS = :P6_STATUS ';
      ELSE
         w := ' STATUS = :P6_STATUS ';
         we := 'Y';
      END IF;
END IF;

   IF :P6_PRIORITY != '-1'
       THEN
       IF we = 'Y'
          THEN
          w := w || ' AND PRIORITY = :P6_PRIORITY ';
       ELSE
          w := ' PRIORITY = :P6_PRIORITY ';
          we := 'Y';
       END IF;
   END IF;

   IF we = 'Y'
```

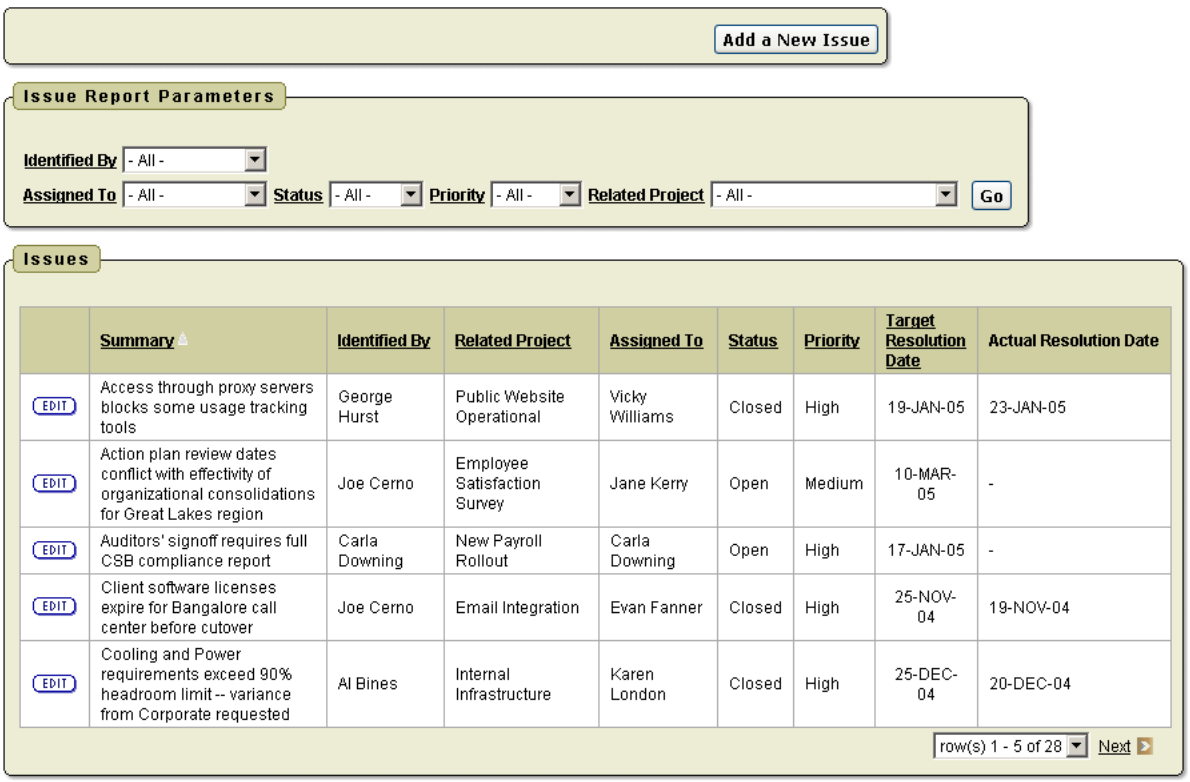
```
        THEN q := q || ' WHERE '|| w;
    END IF;

RETURN q;

END;
```

4. Click **Apply Changes**.

Note that this function first sets the variable `q` to the original `SELECT` statement. It then builds `WHERE` clause (`w`) composed of just the variables set by the user. If any variables have been set, it appends the WHERE clause to the original `SELECT` and passes that new SELECT to the database.

The report is now complete. Click the **Run Page** icon. (See Figure 10–10).

Figure 10–10   Issues Report



To change the report parameters, make new selections under Issue Report Parameters and click **Go**.

Add a Page to Support Assigning Multiple Issues Simultaneously

Currently, you can assign an issue by editing it. Next, you will add a new page that will enable users to assign multiple issues at once and modify the Related Project, Status, and Priority.

Create a Tabular Form To add a new page to support assigning multiple issues:

1. Navigate to the Application home page.
2. Click **Create Page**.

3. Select **Form** and click **Next**.
4. Select **Tabular Form** and click **Next**.
5. For Table/View Owner, select the appropriate schema.

   Since the purpose of this form is to enable users to assign issues, it is assumed they will only update existing records, not create or delete issues.
6. To enforce this assumption, select **Update Only** from the Allowed Operations list and click **Next**.
7. For Table/View Name, select **HT_ISSUES** and click **Next**.
8. For Displayed Columns, select the following columns and click **Next**:
   - ISSUE_SUMMARY
   - IDENTIFIED_BY
   - IDENTIFIED_DATE
   - RELATED_PROJECT
   - ASSIGNED_TO
   - STATUS
   - PRIORITY
9. For Primary Key, accept the default **ISSUE_ID** and click **Next**.
10. For Primary Key Source, accept the default **Existing trigger** and click **Next**.
11. For Updatable Columns, select the following and click **Next**:
    - RELATED_PROJECT
    - ASSIGNED_TO
    - STATUS
    - PRIORITY
12. For Page and Region Attributes:
    a. For Page, enter `8`.
    b. For Page Name, enter `Assign Issues`.
    c. For Region Title, enter `Assign Issues`.
    d. Click **Next**.
13. For Tab Options, accept the default **Do not use tabs** and click **Next**.
14. On Button Labels:
    a. For Cancel Button Label, accept the default.
    b. For Submit Button Label, enter `Apply Changes`.
    c. Click **Next**.
15. For Branching, accept the defaults and click **Next**.
16. Review your selections and click **Finish**.

Add Lists of Values Once you have created the initial tabular form, you need to add lists of values to make it easier to select issues. Additionally, you need to restrict the query to only display unassigned issues.

To add lists of values:

1. From the Success page, select **Edit Page**.

   The Page Definition for page 8, Assign Issues, appears.

2. Under Regions, select **Assign Issues**.
3. In **Region Source**, enter the following:

```
SELECT "ISSUE_ID",
       "ISSUE_SUMMARY",
       "IDENTIFIED_BY",
       "IDENTIFIED_DATE",
       "RELATED_PROJECT",
       "ASSIGNED_TO",
       "STATUS",
       "PRIORITY"
  FROM "#OWNER#"."HT_ISSUES"
WHERE assigned_to IS NULL
```

To edit report attributes:

1. Select the **Report Attributes** tab.
2. Under Report Column Attributes:
   a. For ISSUE_SUMMARY, edit the existing Heading to read:

      ```
      Summary
      ```

   b. For all columns except ISSUE_ID, select **Sort**.
   c. For IDENTIFIED_DATE, for **Sort Sequence**, select **1**.
3. Click the **Edit** icon to the left of IDENTIFIED_BY and edit the following attributes:
   a. Scroll down to Tabular Form Element. From the Display As list, select **Display as Text (based on LOV, does not save state)**.
   b. Scroll down to List of Values. From Named LOV list, select **PEOPLE**.
   c. Click the Next button (>) at the top of the page to navigate to the next column.
4. Edit the following attributes for IDENTIFIED_DATE:
   a. Under Column Formatting, enter `DD-MON-YYYY` in Number/Date Format.
   b. Click the Next button (>) at the top of the page to navigate to the next column.
5. Edit the following attributes for RELATED_PROJECT:
   a. Scroll down to Tabular Form Element. From Display As, select **Select List (Named LOV)**.
   b. Scroll down to List of Values. From the Named LOV list, select **PROJECTS**.
   c. Click the Next button (>) at the top of the page to navigate to the next column.
6. Edit the following attributes for ASSIGNED_TO:
   a. Scroll down to Tabular Form Element. From Display As, select **Select List (Named LOV)**.
   b. Scroll down to List of Values:
      – From the Named LOV list, select **PEOPLE**.
      – For Display Null, select **Yes**.

   - For Null Text, enter a hyphen (-).

   c. Click the Next button (>) at the top of the page to navigate to the next column.

7. Edit the following attributes for STATUS:

   a. Scroll down to Tabular Form Element. From Display As, select **Select List (Named LOV)**.

   b. Scroll down to List of Values. From the Named LOV lists, select **STATUS**.

   c. Click the Next button (>) at the top of the page to navigate to the next column.

8. Edit the following attributes for PRIORITY:

   a. Scroll down to Tabular Form Element. From Display As, select **Select List (Named LOV)**.

   b. Scroll down to List of Values:

      - From Named LOV, select **PRIORITIES**.
      - For Display Null, select **Yes**.
      - For Null Text, enter a hyphen (-).

   c. Click **Apply Changes**.

   The Report Attributes page appears.

9. Scroll down to Sorting. Under Ascending and Descending Image, select the light gray arrow.

10. Under Messages, enter the following in When No Data Found Message:

    ```
    No Unassigned Issues.
    ```

11. Click **Apply Changes**.

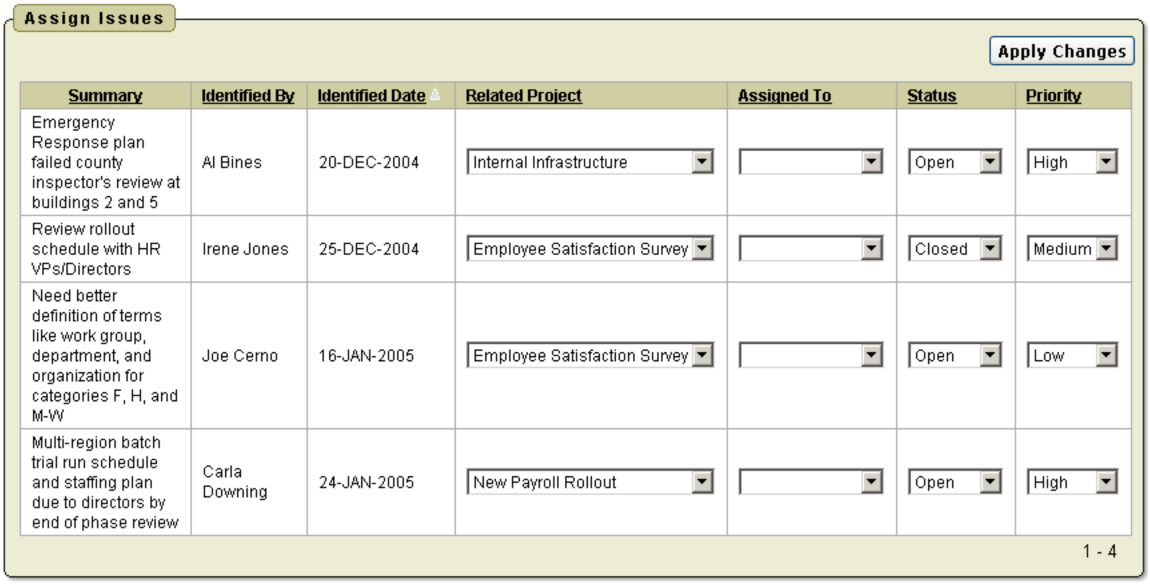
The wizard created an unnecessary Cancel button.

To delete the Cancel button:

1. On the Page Definition for page 8, select the **CANCEL** button.
2. Click **Delete**.
3. Click **OK** to confirm your selection.

The tabular form is now complete. To view the new form, click the **Run Page** icon. (See Figure 10–11 on page 10-47.)

Figure 10–11 Assign Issues



To assign an issue, make a selection from the Assigned To list and click **Apply Changes**. Notice that once an issue has been assigned, the issue no longer displays.

Create Summary Reports

Lastly, you will add four summary reports.

Topics in this section include:

- Add a Issue Summary by Project Report
- Add Resolved by Month Identified
- Add Target Resolution Dates
- Add Average Days to Resolve

Add a Issue Summary by Project Report

The Issue Summary report enable users to select a project and then see a summary of issues related to that project. This report includes the following summary information:

- Date first issue identified
- Date last issue closed
- Total number of issues
- Number of issues by status
- Number of open issues by priority
- Assignments by status

To create this report, you will code the information in two SQL statements. The first statement gathers information having a a singular result and the second statement gathers information having multiple results.

To add an Issue Summary by Project report:

1. Navigate to the Application home page.

2. Click **Create Page**.
3. Select **Report** and click **Next**.
4. Select **SQL Report** and click **Next**.
5. On Page Attributes:
    a. For Page, enter `9`.
    b. For Page Name, enter `Issue Summary by Project`.
    c. Click **Next**.
6. For Tab Options, accept the default **Do not use tabs** and click **Next**.
7. Enter the following **SQL SELECT** statement and click **Next**:

```
SELECT MIN(identified_date) first_identified,
       MAX(actual_resolution_date) last_closed,
       COUNT(issue_id) total_issues,
       SUM(DECODE(status,'Open',1,0)) open_issues,
       SUM(DECODE(status,'On-Hold',1,0)) onhold_issues,
       SUM(DECODE(status,'Closed',1,0)) closed_issues,
       SUM(DECODE(status,
                  'Open',decode(priority,null,1,0),
                  0))                       open_no_prior,
       SUM(DECODE(status,
                  'Open',decode(priority,'High',1,0),
                  0))                       open_high_prior,
       SUM(DECODE(status,
                  'Open',decode(priority,'Medium',1,0),
                  0))                       open_medium_prior,
       SUM(DECODE(status,
                  'Open',decode(priority,'Low',1,0),
                  0))                       open_low_prior
   FROM ht_issues
WHERE related_project = :P9_PROJECT
```

8. For Report Attributes:
    a. For Report Template, select **default: vertical report, look 1 (include null columns)**.
    b. For Region Name, enter `Issue Summary by Project`.
    c. Click **Next**.
9. Review your selections and click **Finish**.

Now that you have the first query, you need to edit the headings and create the item to control the related project. First, create a region to display above the report and that will contain the Project parameter.

Create a New Region To create a new region to display above the report:

1. From the Success page, click **Edit Page**.

    The Page Definition for page 9, Issue Summary by Project appears.
2. Under Regions, click the **Create** icon.
3. Select **HTML** and click **Next**.
4. Select the type of HTML region container you want to create. Select **HTML** and click **Next**.

5. For Display Attributes:
   a. For Title, enter `Issue Summary Report Parameters`.
   b. For Display Point, select **Page Template Body (2. items below region content)**.
   c. For Sequence, enter `5`.
   d. Click **Next**.
6. Click **Create Region**.

Create the Project Item To create the Project item:

1. Under Items, click the **Create** icon.
2. For Select Item Type, select **Select List** and click **Next**.
3. For Select List Control Type, accept the default **Select List** and click **Next**.
4. On Display Position and Name:
   a. For Item Name, enter `P9_PROJECT`.
   b. For Region, select **Issue Summary Report Parameters**.
   c. Click **Next**.
5. On Identify List of Values:
   a. For Named LOV, select **PROJECTS**.
   b. For Null Text, enter:

      ```
      - Select -
      ```

   c. For **Null Value**, enter `-1`.
   d. Click **Next**.
6. On Identify Item Attributes, accept the defaults and click **Next**.
7. For Default, enter `-1`.
8. Click **Create Item**.

Create a Go Button To create a Go button to execute the query:

1. Under Buttons, click the **Create** icon.
2. For Button Region, select **Issue Summary Report Parameters** and click **Next**.
3. For Position, select **Create a button displayed among this region's items** and click **Next**.
4. On Button Attributes:
   a. For Button Name, enter `P9_GO`.
   b. For Button Style, select **Template Based Button**.
   c. For Template, select **Button**.
5. Click **Create Button**.

Edit Headings and Report Settings Next, you need to edit the headings and report setting for the report region. You also need to set the report regions to conditionally display when the user has selected a project.

To edit the headings and report settings:

1. Under Regions, select **Report** adjacent to **Issue Summary by Project**.
2. For Headings Type, select **Custom**.
3. Under Report Column Attributes:
   a. Change the Heading for FIRST_IDENTIFIED to:
      ```
      First Issue Identified:
      ```
   b. Change the Heading for LAST_CLOSED to:
      ```
      Last Issue Closed:
      ```
   c. Change the Heading for TOTAL_ISSUES to:
      ```
      Total Issues:
      ```
   d. Change the Heading for OPEN_ISSUES to:
      ```
      Open Issues:
      ```
   e. Change the Heading for ONHOLD_ISSUES to:
      ```
      On-Hold Issues:
      ```
   f. Change the Heading for CLOSED_ISSUES to:
      ```
      Closed Issues:
      ```
   g. Change the Heading for OPEN_NO_PRIOR to:
      ```
      Open Issues with No Priority:
      ```
   h. Change the Heading for OPEN_HIGH_PRIOR:
      ```
      Open Issues of High Priority:
      ```
   i. Change the Heading for OPEN_MEDIUM_PRIOR to:
      ```
      Open Issues of Medium Priority:
      ```
   j. Change the Heading for OPEN_LOW_PRIOR:
      ```
      Open Issues of Low Priority:
      ```
4. Scroll down to Layout and Pagination:
   a. For Show Null Values as, enter a hyphen (-).
   b. For Pagination Scheme, select **- No Pagination Selected -**.
5. Select the **Region Definition** tab at the top of the page.
   a. Scroll down to Conditional Display.
   b. For Condition Type, select **Value of Item in Expression 1 Is NOT Contained within Colon Delimited List in Expression 2.**
   c. In Expression 1, enter `P9_PROJECT`.
   d. For Expression 2, enter `-1`.
6. Click **Apply Changes**.

Create a Query to Retrieve Assignments To create a query to retrieve assignments by status.

1. Under Regions, click the **Create** icon.
2. Select **Report** and click **Next**.
3. For Report Implementation, select **SQL Report** and click **Next**.
4. On Display Attributes:
   a. For Title, enter `Assignments by Status`.
   b. For Column, select **2**.
   c. Click **Next**.
5. For Source:
   a. In **Enter SQL Query**, enter:

   ```
   SELECT p.person_name,
          i.status,
          COUNT(i.issue_id) issues
     FROM ht_issues i,
          ht_people p
   WHERE i.related_project = :P9_PROJECT
     AND i.assigned_to = p.person_id
   GROUP BY person_name, status
   ```

   b. For Rows Per Page, enter `20`.
   c. For Break Columns, select **Column 1**.
   d. Click **Next**.
6. For Conditional Display:
   a. From Condition Type, select **Value of Item in Expression 1 Is NOT Contained within Colon Delimited List in Expression 2**.
   b. In Expression 1 enter:

   ```
   P9_PROJECT
   ```

   c. For Expression 2 enter `-1`.
7. Click **Create Region**.

To edit headings and report settings:

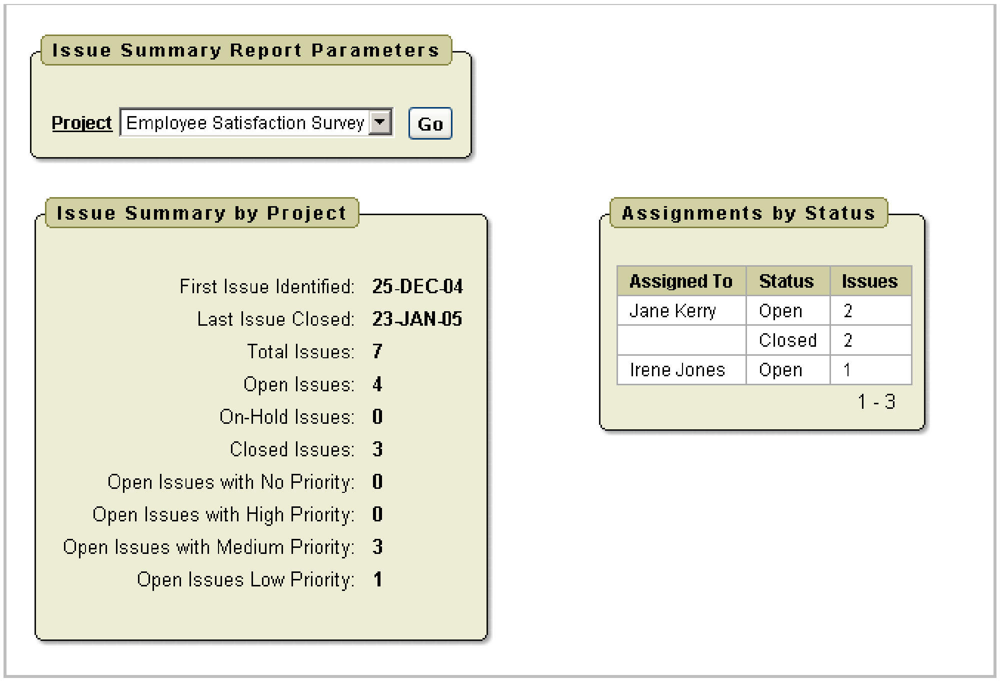
1. Under Regions, select **Report** adjacent to **Assignments by Status**.
2. For Headings Type, select **Custom**.
3. For PERSON_NAME, change Heading to `Assigned To`.
4. Scroll down to Layout and Pagination. From Pagination Scheme, select **Row Ranges 1-15 16-30 in select list**.
5. Under Messages, enter the following in When No Data Found Message:

   ```
   No Issues found.
   ```

6. Click **Apply Changes**.

To see your newly created report, click the **Run Page** icon. Note that initially no data displays since no project is selected. Select a project. Your report should resemble Figure 10–12.

Figure 10–12 Issue Summary by Project Report



Add Resolved by Month Identified

The Resolved by Month Identified report is a line chart. This report first calculates the number of days it took to resolve each closed issue, averaged by the month the issue was identified, and finally displayed by the month.

To add a Resolved by Month Identified report:

1. Navigate to the Application home page.
2. Click **Create Page**.
3. Select **Chart** and click **Next**.
4. Select **Line** and click **Next**.
5. For Page Attributes:
   a. For Page, enter `10`.
   b. For Page Name and Region Name, enter `Resolved by Month Identified`.
   c. Click **Next**.
6. For Tab (Optional), accept the default **Do not use tabs** and click **Next**.
7. For Query:
   a. For Series Name, enter Resolved.
   b. In **SQL**, enter:

```
SELECT NULL l,
       TO_CHAR(identified_date,'Mon YYYY') month,
       AVG(actual_resolution_date-identified_date) days
   FROM ht_issues
  WHERE status = 'Closed'
  GROUP BY TO_CHAR(identified_date,'Mon YYYY')
```

Note that this query has no link (that is, the l column). It extracts the month from the identified date so that the data can be grouped by month. Lastly, it calculates the average number of days it took for the issues to be closed that were identified in that month.

c. For **When No Data Found Message**, enter:

```
No Closed Issues found.
```

8. Click **Next**.
9. Review your selections and click **Finish**.

Next, add a correct axis label and turn off the Chart Title and legend.

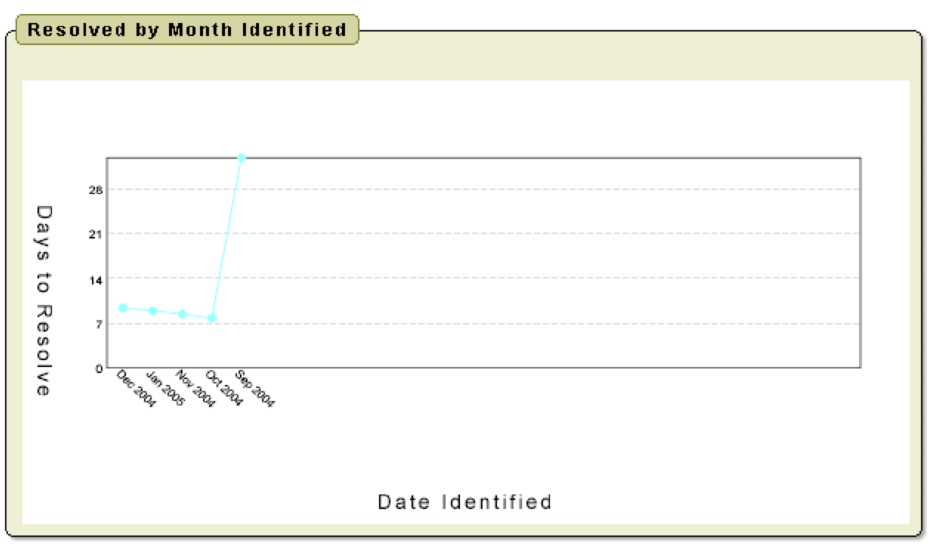
To edit the chart:

1. From the Success page, select **Edit Page**.

   The Page Definition for page 10, Resolved by Month Identified, appears.
2. Under Regions, select **Chart** adjacent to Resolved by Month Identified.
3. Under Chart Settings:
   a. For Chart Height, enter `300`.
   b. Disable **Show Legend**.
4. Under the Axes Setting section:
   a. For X Axis Title, enter `Date Identified`.
   b. For Y Axis Title, enter `Days to Resolve`.
5. Click **Apply Changes**.

To view your newly created line chart, click the **Run Page** icon. Your line chart should resemble Figure 10–13.

Figure 10–13 Resolved by Month Identified Line Chart



Add Target Resolution Dates

The Target Resolution Dates report is a calendar which displays issues that have not yet closed and the assigned person on the day that corresponds to the issue target resolution date.

Create a Calendar To create a calendar of target resolution dates:

1. Navigate to the Application home page.
2. Click **Create Page**.
3. Select **Calendar** and click **Next**.
4. Select **SQL Calendar** and click **Next**.
5. For Page Attributes:
   a. For Page, enter `11`.
   b. For Page Name and Region Name, enter `Target Resolution Dates`.
   c. Click **Next**.
6. For Tab Options, accept the default **Do not use tabs** and click **Next**.
7. For **Enter SQL Query**, enter the following and click **Next**:

```
SELECT I.TARGET_RESOLUTION_DATE,
       I.ISSUE_SUMMARY ||
          ' ('||nvl(P.PERSON_NAME,'Unassigned') ||') ' disp,
       I.ISSUE_ID
  FROM HT_ISSUES I,
       HT_PEOPLE P
  WHERE I.ASSIGNED_TO = P.PERSON_ID (+)
   AND (I.RELATED_PROJECT = :P11_PROJECT OR
        :P11_PROJECT = '-1')

AND I.STATUS != 'Closed'
```

   Note that:

   - The `target_resolution_date` is the date on which the issue will display
   - The `issue_summary` is concatenated with the person assigned
   - The `issue_id` will not display, but will be used to create a link to enable the user to view and edit the issue

8. On Identify Calendar Columns:
   a. For Date Column, select **TARGET_RESOLUTION_DATE**.
   b. For Display Column, select **DISP**.
   c. Click **Next**.
9. Review your selections and click **Finish**.

Add an Item to Support Project Look Up To enable the user to look up one project or all projects, you need to add an item.

To add an item to support project look up:

1. From the Success page, select **Edit Page**.

   The Page Definition for page 11, Target Resolution Dates, appears.

2. Under Items, click the **Create** icon.
3. For Select Item Type, select **Select List** and click **Next**.
4. For Select List Control Type, accept the default of **Select List** and click **Next**.
5. For Item Name, enter `P11_PROJECT` and click **Next**.
6. For List of Values:
   a. For Named LOV, select **PROJECTS**.
   b. For Null Text, enter:

      ```
      - All Projects -
      ```

   c. For Null Value, enter:

      ```
      -1
      ```

   d. Click **Next**.
7. For Item Attributes, accept the defaults and click **Next**.
8. For **Default**, enter:

   ```
   -1
   ```

9. Click **Create Item**.

Create a Go Button To create a Go button to execute the query:

1. Under Buttons, click the **Create** icon.
2. For Button Region, select **Target Resolution Dates** and click **Next**.
3. For Postilion, select **Create a button displayed among this region's items** and click **Next**.
4. For Button Attributes:
   a. For Button Name, enter `P11_GO`.
   b. For Button Style, select **Template Based Button**.
   c. For Template, select **Button**.
5. Click **Create Button**.

Modify Calendar Attributes Lastly, you need to modify the Calendar Attributes to add link support for viewing and editing the displayed issues. To accomplish this, you need to call page 7, View/Edit Issues, clear any data from the page and pass in the current issue ID along with the fact that page 11 was the calling page. Then, you need to add a note that displays when the query excludes Closed issues.

To modify the Calendar Attributes:

1. Under Regions, select **CAL** to the left of Target Resolution Dates.
2. Scroll down to Column Link:
   a. For Page, enter `7`.
   b. For Clear Cache, enter `7`.
   c. For Set these items, enter:

      ```
      P7_ISSUE_ID,P7_PREV_PAGE
      ```

d. For With these values, enter:

```
#ISSUE_ID#,11
```

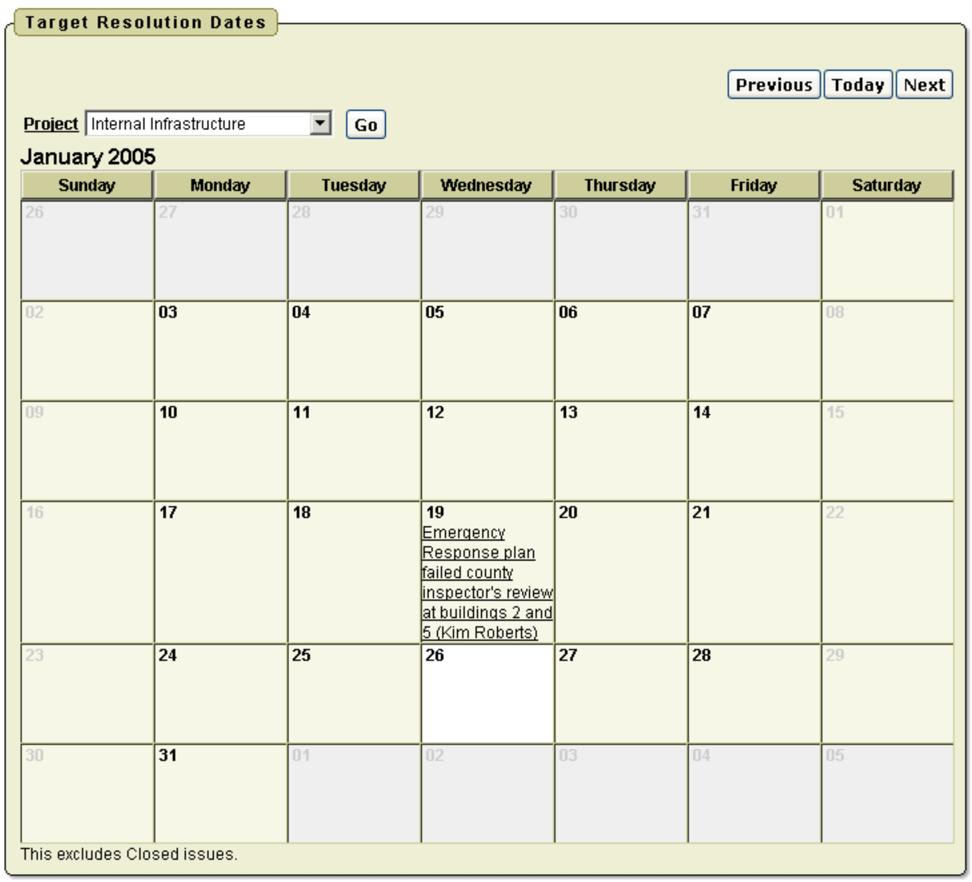
3. Select the **Region Definition** tab.
4. Scroll down to Header and Footer Text.
5. Enter the following in Region Footer:

```
This excludes Closed issues.
```

6. Click **Apply Changes**.

To see your newly created calendar, click the **Run Page** icon. Your report should resemble Figure 10–14 on page 10-56. Note that you can click the text displayed for an issue to display the Edit Issue page. To return to the calendar, click **Cancel**.

Figure 10–14 Target Resolution Dates Report



Add Average Days to Resolve

The Average Days to Resolve report is a bar chart that calculates the number of days it takes to resolve each closed issue and then averages that number that by assigned person.

To add the Average Days to Resolve report:

1. Navigate to the Application home page.

2. Click **Create Page**.
3. Select **Chart** and click **Next**.
4. Select **Bar (HTML)** and click **Next**.
5. On Identify Page Attributes:
   a. For Page, enter `12`.
   b. For Page Name, enter `Average Days to Resolve`.
   c. For Region Name, enter `Average Days to Resolve`.
   d. Click **Next**.
6. For Tab (Optional), accept the default **Do not use tabs** and click **Next**.
7. On Identify Chart Attributes:
   a. In **Chart SQL,** enter:

```
SELECT NULL l,
       NVL(p.person_name,'None Assigned') person,
       AVG(i.actual_resolution_date-i.identified_date) days
  FROM ht_issues i,
       ht_people p
 WHERE i.assigned_to = p.person_id (+)
   AND i.status = 'Closed'
 GROUP BY p.person_name
```

   In the above SELECT statement:

   – The first item selected is the link. Because this report will not link to any other page, `NULL` was selected.

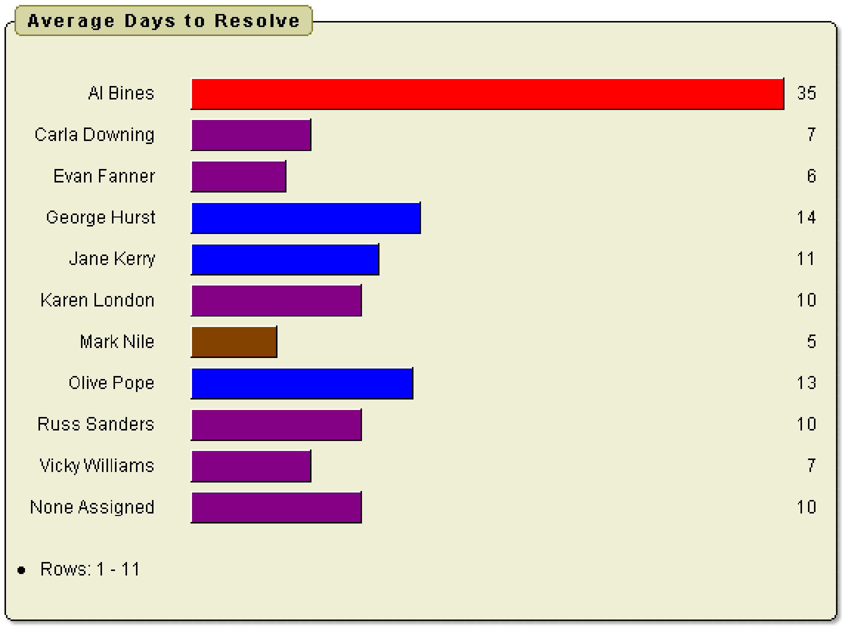
   – The second item is the person's name, or `None Assigned` if `assigned_to` is `NULL`.

   – The third item selected is the average number of days it took for that person to resolve all their issues so the issues have a status of closed.

   b. For Include in summary, select only **Number of data points**. Deselect all other options.
   c. Click **Next**.
8. Review your selections and click **Finish**.

To view your newly created bar chart, select **Run Page**. Your report should resemble Figure 10–15.

Figure 10–15 Average Days to Resolve Report



Add Content to the Home Page

Now that you have completed all the detail pages, next you need to add content to the home page and tie all the pages together. In this section, you modify the home page to display the following information:

- A menu of all available reports
- Navigation to the maintenance pages
- A button to **Add a New Issue**
- Overdue Issues
- Recently Opened Issues
- Open Issues by Project as a chart
- Unassigned Issues

Topics in this section include:

- Add a Reports Menu
- Add Maintenance Navigation
- Add a New Issues Button
- Add Overdue Issues Report
- Add Unassigned Issues Report
- Add Recently Opened Issues Report
- Add Open Issues by Project

Add a Reports Menu

First, you add a menu implemented as a list.

To add a menu:

1. Navigate to the Application home page.
2. Select **Shared Components**.
3. Under Navigation, select **Lists**.
4. Click **Create**.
5. For Name, enter `Main Menu`.
6. For **List Template**, select **Vertical Sidebar List**.
7. Click **Create**.

Create List Entries Now that the list has been created, you add list items to it. You need to add one list item for each report page.

To add a list item for Assign Issues:

1. Click **Create List Entry**.
2. For List Entry Label, enter `Assign Issues`.
3. Under Target:
   a. For Page, select **8**.
   b. Select **reset pagination for this page**.
4. Click **Create**.

Now you will create four more list items, one for each of the other reports in your application.

To add list items for each of the other reports in your application:

1. Click **Create List Entry**.
2. To define list item attributes for Issues:
   a. For Sequence, enter `20`.
   b. For List Entry Label, enter `Issues`.
   c. Under the Target section:
      – For Page, select `6`.
      – Select **reset pagination for this page**.
      – For Clear Cache, enter `6`.

        This clears any selections for page 6 from the session state.
3. Click **Create and Create Another**.
4. To define list item attributes for Issue Summary:
   a. For Sequence, enter `30`.
   b. For List Entry Label, enter `Issue Summary by Project`.
   c. Under the Target section:
      – For Page, select **9**.
      – Select **reset pagination for this page**.
      – For **Clear Cache**, enter `9`.
5. Click **Create and Create Another**.

6. To define list item attributes for Resolved by Month Identified:
   a. For Sequence, enter `40`.
   b. For List Entry Label, enter `Resolved by Month Identified (chart).`
   c. Under the Target section, select **10** for Page.
7. Click **Create and Create Another**.
8. To define list item attributes for Target Resolution Dates:
   a. For List, select **Main Menu**.
   b. For Sequence, enter `50`.
   c. For List Entry Label, enter `Target Resolution Dates (calendar).`
   d. Under the Target section:
      – For Page, select **11**.
      – Select **reset pagination for this page**.
9. Click **Create and Create Another**.
10. To define list item attributes for Average Days to Resolve:
    a. For Sequence, enter `60`.
    b. For List Entry Label, enter `Average Days to Resolve (chart).`
    c. Under Target, select **12** for Page.
11. Click **Create**.

Include the List on the Home Page Now that the list is created, you need to include it on the home page. To display the list in the left margin, you need to change the page template to one that supports the appropriate region position.

To change the page template on the home page:

1. Click the **Edit Page** icon.

   The Page Definition for page 12, Average Days to Resolve, appears.
2. In the Page field, enter `1` and click **Go**.
3. Click **Edit Attributes**.
4. Locate Display Attributes.
5. From the Page Template list, select **No Tabs with Sidebar**.
6. Click **Apply Changes**.

Next, create a region to contain your menu.

To create a a new region:

1. Under Regions, click the **Create** icon.
2. Select **List** and click **Next**.
3. For Display Attributes:
   a. For Title, enter `Menu`.
   b. For Region Template, select **No Template**.
   c. For Display Point, select **Page Template Region Position 2** (or select the quick link **[Pos. 2]**.

   d. Click **Next**.

4. For List, select **Main Menu**.
5. Click **Create List Region**.

Add Maintenance Navigation

Next, you will add maintenance navigation as a list. This list will display just below the reports in the left margin.

1. Navigate to the Application home page.
2. Click **Shared Components**.
3. Under Navigation, select **Lists**.
4. Click **Create**.
5. For Name, enter `Maintenance`.
6. For **List Template**, select **Vertical Sidebar List**.
7. Click **Create**.

Next, create three list items. The first list item acts as a separator between the two navigation regions. The other two enable users to view people and projects.

To add list items:

1. Click **Create List Entry**.
2. To define list item attributes for the first list item:
   a. For List Entry Label, enter:

      ```
       
      ```

   b. Under Target, select **1** for Page.
3. Click **Create and Create Another**.
4. To define list item attributes for Projects:
   a. For Sequence, enter `20`.
   b. For List Entry Label, enter:

      ```
      Projects
      ```

   c. Under Target:
      – For Page, select **2**.
      – Check **reset pagination for this page**.
5. Click **Create and Create Another**.
6. To define list item attributes for People:
   a. For Sequence, enter `30`.
   b. For List Entry Label, enter:

      ```
      People
      ```

   c. Under Target:
      – For Page, select **4**.
      – Check **reset pagination for this page**.

7. Click **Create**.

To create a region to display the new list.

1. Click the **Edit Page** icon.
2. Under Regions, click the **Create** icon.
3. Select **List** and click **Next**.
4. For Display Attributes:
   a. For Title, enter `Maintenance`.
   b. For Region Template, select **No Template**.
   c. For Display Point, select **Page Template Region Position 2** (or select the quick link **[Pos. 2]**.
   d. Click **Next**.
5. For List, select **Maintenance**.
6. Click **Create List Region**.

Add a New Issues Button

Next, you create a button to navigate the user to page 7, Create/Edit Issue.

To create a region to contain the button:

1. Under Regions, click the **Create** icon.
2. Select **HTML** and click **Next**.
3. Select the type of HTML region container you want to create. Select **HTML** and click **Next**.
4. For Display Attributes:
   a. For Title, enter `Buttons`.
   b. For Region Template, select **No Template**.
   c. For Display Point, select **Page Template Region Position 1** (or select the quick link **[Pos. 1]**.
   d. Click **Next**.
5. Click **Create Region**.

To add a button:

1. Under Buttons, click the **Create** icon.
2. For Region, select **Buttons** and click **Next**.
3. For Button Position, accept the default **Create a button in a region position** and click **Next**.
4. For Button Attributes:
   a. For Button Name, enter `ADD`.
   b. For Label, enter:

      ```
      Add a New Issue
      ```

   c. For Action, select **Redirect to URL without submitting page**.
   d. Click **Next**.

5. For Button Template, select **Button** and click **Next**.
6. For Position, select **Top of Region** and click **Next**.

   On the Branching page, you need to call the correct page, clear the cache, and specify that the Create and Cancel buttons returns the user to the home page.
7. On Branching:
   a. For Page, select **7**.
   b. For Clear Cache, enter `7`.
   c. For Set these items, enter:

      ```
      P7_PREV_PAGE
      ```
   d. For With these values, enter `1`.
8. Click **Create Button**.

Add Overdue Issues Report

Next, add some content to the home page. In this exercise you add a report to display overdue issues. The query for this report retrieves all unclosed issues with a past target resolution date.

To add a report to display overdue issues:

1. Under Regions, click the **Create** icon.
2. Select **Report** and click **Next**.
3. For Report Implementation, select **SQL Report** and click **Next**.
4. For Display Attributes, enter `Overdue Issues` for Title and click **Next**.
5. For Enter SQL Query, enter:

   ```
   SELECT i.issue_id,
          i.priority,
          i.issue_summary,
          p.person_name assignee,
          i.target_resolution_date,
          r.project_name
     FROM ht_issues i,
          ht_people p,
          ht_projects r
    WHERE i.assigned_to = p.person_id (+)
      AND i.related_project = r.project_id
      AND i.target_resolution_date < sysdate
      AND i.status != 'Closed'
   ```

   The outer join is necessary because the assignment is optional.
6. Click **Create Region**.

Now that the region has been created, you need to edit the headings and turn the summary into a link to display the issue details.

To edit the column headings:

1. Under Regions, select **Report** to the left of Overdue Issues.
2. For Headings Type, select **Custom**.
3. For ISSUE_ID, remove the Heading.

4. For ISSUE_SUMMARY, edit the Heading to read:

   ```
   Summary
   ```

5. For ASSIGNEE, change the Heading to:

   ```
   Assigned To
   ```

6. For TARGET_RESOLUTION_DATE:

   a. For Heading, enter:

      ```
      Target<br>Resolution<br>Date
      ```

   b. For Column Align, select **center**.

   c. For Heading Align, select **center**.

7. For **ISSUE_ID**, deselest **Show**.

   This enables the query to pass in the link, but not display it.

8. Select **Sort** for all columns except ISSUE_ID.

9. For TARGET_RESOLUTION_DATE, select **1** for Sort Sequence.

10. For ISSUE_SUMMARY, select 2 for Sort Sequence.

To edit column attributes for ISSUE_SUMMARY:

1. Click the **Edit** icon to the left of ISSUE_SUMMARY.

2. Scroll down to Column Link:

   a. For Link Text, use the quick link of **[Icon 3]**.

   b. For Page, select **7**.

   c. For Clear Cache, select `7`.

   d. For Item 1, enter the Name:

      ```
      P7_ISSUE_ID
      ```

   e. For Item 1, enter the Value:

      ```
      #ISSUE_ID#
      ```

   f. For Item 2, enter the Name:

      ```
      P7_PREV_PAGE
      ```

   g. For Item 2, enter the Value:

      ```
      1
      ```

3. Click **Apply Changes**.

To select layout and pagination attributes:

1. Scroll down to Layout and Pagination:

   a. For Pagination Scheme, select **Search Engine 1,2,3,4 (set based pagination)**.

   b. For Number of Rows, enter `5`.

2. Under Sorting, select the light gray arrow for Ascending and Descending Image.

3. Under the Messages section, enter the following in When No Data Found Message:

```
No Overdue Issues.
```

4. Click **Apply Changes**.

Add Unassigned Issues Report

The next report you add displays unassigned, open issues. This report is very similar to Overdue Issues. Rather than creating it manually, you will copy the Overdue Issues report and modify it.

To create the Unassigned Issues report by copying an existing report:

1. Under Regions, click the **Copy** icon.
2. Under Name, select **Overdue Issues**.
3. For To Page, accept the default **1** and click **Next**.
4. For Region Name, enter `Unassigned Issues`.
5. Click **Copy Region**.

To modify the query and edit the report region:

1. Under the Regions section, select **Unassigned Issues**.
2. For **Region Source**, enter:

```
SELECT i.issue_id,
       i.priority,
       i.issue_summary,
       i.target_resolution_date,
       r.project_name,
       p.person_name identifiee
  FROM ht_issues i,
       ht_people p,
       ht_projects r
 WHERE i.assigned_to IS NULL
   AND i.status != 'Closed'
   AND i.related_project = r.project_id
   AND i.identified_by = p.person_id
```

3. Select the **Report Attributes** tab.

   Note that previously defined columns have retained their modified attributes.

4. For IDENTIFIEE, enter the following Heading:

```
Identified By
```

5. Under Messages, enter the following in When No Data Found Message:

```
No Unassigned Issues.
```

6. Click **Apply Changes**.

Add Recently Opened Issues Report

Lastly, you will add a report of recently opened issues. The underlying query displays the five most recently opened issues. As in the existing exercise, you will copy an existing report and modify it.

To create a report of recently opened issues by copying an existing report:

1. Under Regions, click the **Copy** icon.

2. Under Name, select **Unassigned Issues**.
3. For To Page, accept the default **1** and click **Next**.
4. For Region Name, enter `Recently Opened Issues`.
5. Click **Copy Region**.

To modify the query and edit the report region:

1. Under Regions, click the **Report** to the left of Recently Opened Issues.
2. For all columns:
   a. Disable sorting by deselecting **Sort**.
   b. Set Sequence to **-**.
3. Select the **Region Definition** tab.
4. For **Region Source**, enter:

```
SELECT issue_id,
       priority,
       issue_summary,
       assignee,
       target_resolution_date,
       project_name,
       identifiee
FROM
(
SELECT i.issue_id,
       i.priority,
       i.issue_summary,
       p.person_name assignee,
       i.target_resolution_date,
       r.project_name,
       p2.person_name identifiee
  FROM ht_issues i,
       ht_people p,
       ht_people p2,
       ht_projects r
 WHERE i.assigned_to = p.person_id (+)
   AND i.related_project = r.project_id
   AND i.identified_by = p2.person_id
   AND i.created_date > (sysdate - 7)
 ORDER BY i.created_date desc
)
 WHERE rownum < 6
```

5. Select the **Report Attributes** tab.
6. For ASSIGNEE, click the gray up arrow to the right of the Edit column until ASSIGNEE is just after ISSUE_SUMMARY.
7. For ASSIGNEE, change Heading to:

```
Assigned To
```

8. Scroll down to Layout and Pagination section. From the Pagination Scheme list, select **- No Pagination Selected -**.
9. Under the Messages section, enter the following in When No Data Found Message:

```
No Recently Opened Issues.
```

10. Click **Apply Changes**.

Add Open Issues by Project

Next, add a pie chart displaying Open Issues by Project.

To add a pie chart:

1. Under Regions, click the **Create** icon.
2. Select **Chart** and click **Next**.
3. Select **Pie** and click **Next**.
4. For Title, enter `Open Issues by Project` and click **Next**.
5. For Enter SVG Chart SQL Query, enter:

```
SELECT NULL LINK,
       NVL(r.project_name,'No Project') label,
       COUNT(r.project_name) value
  FROM ht_issues i,
       ht_projects r
 WHERE i.status = 'Open'
   AND i.related_project = r.project_id
GROUP BY NULL, r.project_name
ORDER BY r.project_name
```

   Note that this query does not include a link, the label is the `Project Name`, and the value calculated and used for the pie chart is the total number of open issues by project.

6. Click **Create Region**.

To edit the chart.

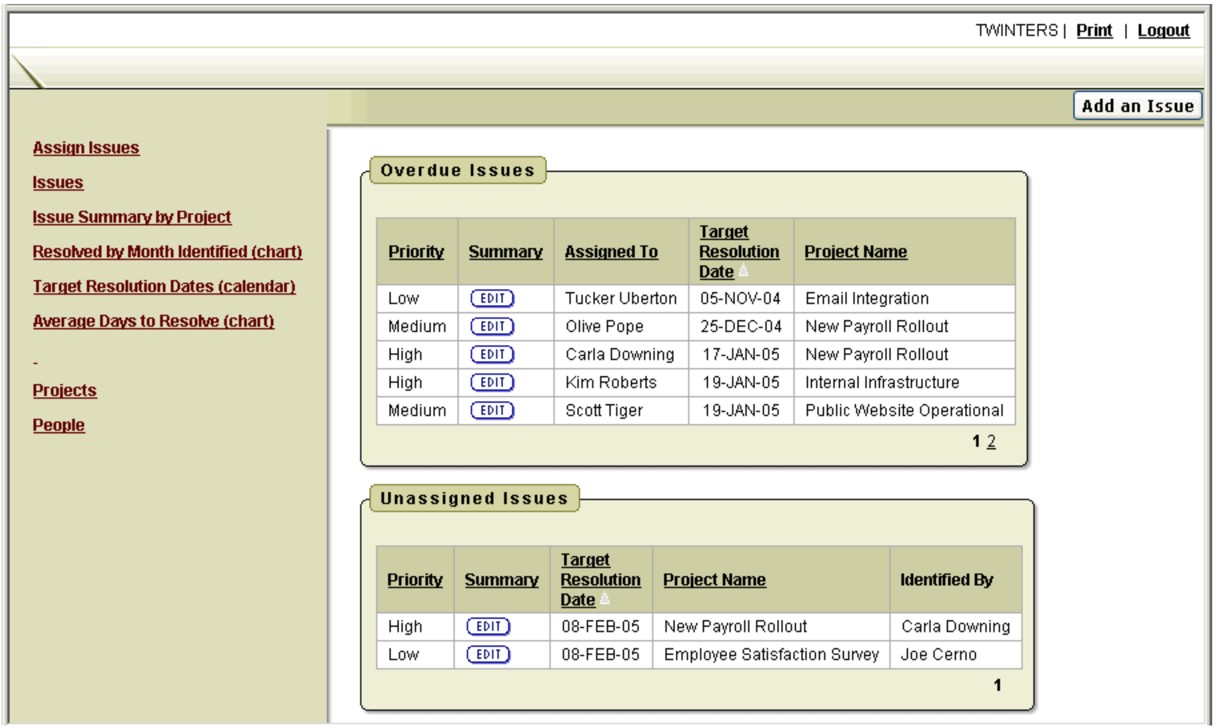
1. Under Regions, select **Chart** to the left of Open Issues by Project.
2. For Chart Width, enter `500`.
3. For Chart Height, enter `200`.
4. For Chart Title, remove the title.
5. Under Chart Query, enter the following in When No Data Found Message:

```
No Open Issues.
```

6. Under Font Settings, for Legend select **14** for the Font Size.
7. Click **Apply Changes**.

To view the revised page, click the **Run Page** icon. Your home page should resemble Figure 10–16.

Figure 10–16 Revised Home Page



Add a Breadcrumb

In the previous exercise, you created menus on the home page to enable users to navigate to various pages within your application. Next, you need to provide users with a way to navigate to the home page. You can accomplish by utilizing breadcrumb. When you created your application, the wizard automatically created a breadcrumb.

In the next exercise, you add breadcrumb entries and then include that breadcrumb within a region on page 0. Adding components to page 0 makes them display on all pages with an application.

Topics in this section include:

- Navigate to the Breadcrumbs Page
- Add Breadcrumb Entries
- Create a Page 0
- Create a Region to Contain the Breadcrumb

Navigate to the Breadcrumbs Page

To navigate to the Breadcrumbs page:

1. Navigate to the Application home page.
2. Click **Shared Components**.
3. Under Navigation, select **Breadcrumbs**.
4. Select the breadcrumb, **Breadcrumb**.

Add Breadcrumb Entries

Next, add breadcrumb entries.

To edit the existing breadcrumb entry for page 1:

1. Under Breadcrumb Entries, click **Page 1**.
2. Under Breadcrumb, enter `1` in Page.
3. For Short Name, enter `Home`.
4. Under Target, enter `1` in Page.
5. Click **Create**.

To create a breadcrumb entry for page 2:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb, enter `2` in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Projects`.
4. Under Target, enter `2` in Page.
5. Click **Create**.

To create a breadcrumb entry for page 3:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb, enter `3` in Page.
3. Under Entry:
   a. For Parent Entry, select **Projects**.
   b. For Short Name, enter `Create/Edit Projects`.
4. Under Target, enter `3` in Page.
5. Click **Create**.

To create a breadcrumb entry for page 4:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb enter `4` in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `People`.
4. Under Target, enter 4 in Page.
5. Click **Create**.

To create a breadcrumb entry for page 5:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb enter `5` in Page.
3. Under Entry:
   a. For Parent Entry, select **People**.

b. For Short Name, enter `Create/Edit Person Information`.
4. Under Target, enter 5 in Page.
5. Click **Create**.

To create a breadcrumb entry for page 6:

1. Click **Create Menu Option**.
2. Under Breadcrumb enter `6` in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Issues`.
4. Under Target, enter 6 in Page.
5. Click **Create**.

To create a breadcrumb entry for page 7:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb enter `7` in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Create/Edit Issue`.
4. Under Target, enter 7 in Page.
5. Click **Create**.

To create a breadcrumb entry for page 8:

1. Click **Create Menu Option**.
2. Under Breadcrumb enter `8` in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Assign Issues`.
4. Under Target, enter `8` in Page.
5. Click **Create**.

To create a breadcrumb entry for page 9:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb enter `9` in Page.
3. For Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Issue Summary by Project`.
4. Under Target, enter `9` in Page.
5. Click **Create**.

To create a breadcrumb entry for page 10:

1. Click **Create Breadcrumb Entry**.

2. Under Breadcrumb enter `10` in Page.
3. Under Menu Option:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Resolved by Month Identified`.
4. Under Target, enter `10` in Page.
5. Click **Create**.

To create a breadcrumb entry option for page 11:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb enter `11` in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Target Resolution Dates`.
4. Under Target, enter `11` in Page.
5. Click **Create**.

To create a breadcrumb entry for page 12:

1. Click **Create Breadcrumb Entry**.
2. Under Breadcrumb, enter 12 in Page.
3. Under Entry:
   a. For Parent Entry, select **Home**.
   b. For Short Name, enter `Average Days to Resolve`.
4. Under Target, enter `12` in Page.
5. Click **Create**.

Create a Page 0

Now that the breadcrumb exists, you need to create page 0 and then create a region to contain your Breadcrumb menu.

To create page 0:

1. Navigate to the Application home page.
2. Click **Create Page**.
3. Select **Blank Page** and click **Next**.
4. For Page, enter `0` and click **Next**.
5. For Name, enter **Breadcrumbs** and click **Next**.
6. On Identify Tabs, accept the default **No** and click **Next**.
7. Review your selections and click **Finish**.

Create a Region to Contain the Breadcrumb

To create a region to contain your breadcrumb:

1. From the Success page, select **Edit Page**.

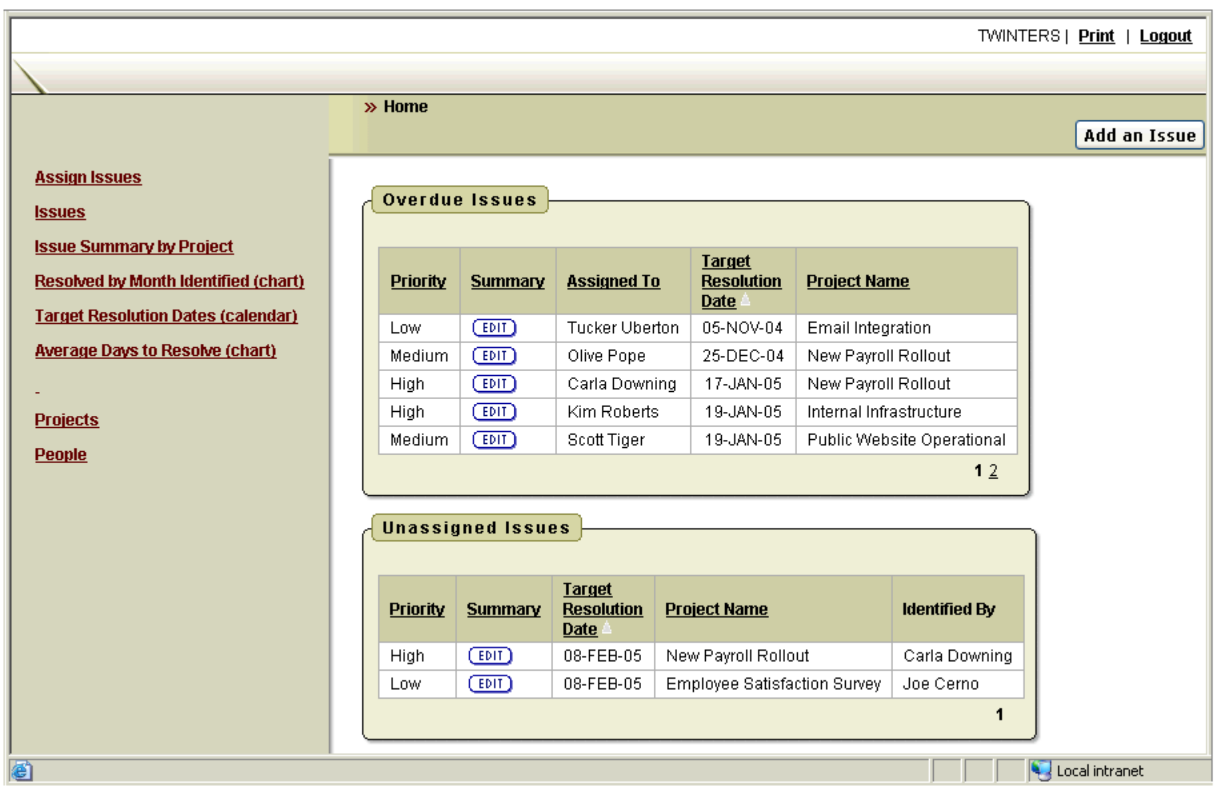
   The Page Definition for page 0 appears.

2. Under Regions, click the **Create** icon.
3. For Select a common region type, select **Breadcrumb** and click **Next**.
4. For Breadcrumb Container Region:
   a. For Title, enter **Breadcrumbs**.
   b. For Region Template, select **No Template**.
   c. For Display Point, select **Page Template Region Position 1**.

      This selection displays the breadcrumb above all other content on the page.
   d. Click **Next**.
5. For Breadcrumb:
   a. For Breadcrumb, select **Breadcrumb**.
   b. For Menu Template, select **Breadcrumb Menu**.
   c. Click **Next**.
6. For Breadcrumb Entry, accept the defaults and click **Next**.
7. Click **Finish**.

Return to the home page by clicking Edit Page. When the Page Definition for page 0 appears, click the Next Page icon (>). The Page Definition for page 1 appears. To see your completed home page, click the **Run Page** icon. Your home page should resemble Figure 10–17.

Figure 10–17 Revised Home Page with Breadcrumb Menu



Notice the Breadcrumb in the top bar. Click one of the items on the Maintenance menu on the left side of the page. Notice how the breadcrumb menu changes.and watch the breadcrumb change.

At this stage your application is fully functional, but is missing the security and email notification. Those topics will be discussed in the next section.

Adding Advanced Features

Once your application is fully functional you can focus on adding advanced features outlined during the planning and project analysis phase.

Topics in this section include:

- Add Support for E-mail Notification
- Add Application Security

Add Support for E-mail Notification

The planning and project analysis phase produced two e-mail requirements:

- Notify people when an issue is assigned to them
- Notify the project lead when any issue becomes overdue

Topics in this section include:

- How E-mail Notification Works
- Add Notification of New Assignments
- Add a Notification for Overdue Issues

How E-mail Notification Works

To send mail from within an Oracle HTML DB application, you create a PL/SQL process that calls the supplied `HTMLDB_MAIL` package.

E-mail is not sent immediately from Oracle HTML DB, but is stored in a temporary queue until a `DBMS_JOB` pushes the queue. The `DBMS_JOB` utilizes two preferences named `SMTP_HOST_ADDRESS` and `SMTP_HOST_PORT` to send mail in the queue. By default, these preferences are set to `localhost` and `25`.

If the server where Oracle HTML DB is installed is not configured for SMTP services, you will need to change the `SMTP_HOST_ADDRESS` preference. Check with your Oracle HTML DB administrator to make sure the instance you are using is properly configured to send e-mail.

The following is a description of the SEND procedure of the `HTMLDB_MAIL` package.

```
PROCEDURE SEND
Argument Name                  Type                    In/Out Default?
------------------------------ ----------------------- ------ --------
P_TO                           VARCHAR2                IN
P_FROM                         VARCHAR2                IN
P_BODY                         VARCHAR2                IN
P_BODY_HTML                    VARCHAR2                IN     DEFAULT
P_SUBJ                         VARCHAR2                IN     DEFAULT
P_CC                           VARCHAR2                IN     DEFAULT
P_BCC                          VARCHAR2                IN     DEFAULT
```

Add Notification of New Assignments

First, you will add a notification to a person when he or she has a new assignment. An assignment can be made or changed from two different pages

- Create/Edit Issue
- Assign Issues.

On the Create/Edit Issue page, you can store the initial values and then check them against any changes to see if an assignment has been made or changed. Because Assign Issues is a tabular form, there is no way to check the old values against the new values. For that reason, the best way to implement the notification is with a before insert and update trigger on `HT_ISSUES`. You can create this trigger programmatically using SQL Workshop.

> **Note:** The trigger you are about to create sends e-mails. If you plan on using this application, change the `p_to` and `p_from` to your own e-mail address so that you do not create e-mails with invalid addresses each time you assign or reassign an issue.

To create a before insert and update trigger on `HT_ISSUES`:

1. Navigate to the Workspace home page.
2. Click **SQL Workshop**.
3. Click **Object Browser**.
4. Click **Create**.
5. For Select the type of database object you want to create, select **Trigger** and click **Next**.
6. For Name:
   a. For Schema, select the appropriate schema and click **Next**.
   b. For Table Name, select **HT_ISSUES** and click **Next**.
7. For Action, keep the default of **Create Trigger** and click **Next**.
8. For Define:
   a. For Trigger Name, enter BIU_HT_ISSUES_NOTIFY_ASSIGNEE.
   b. For Firing Point, select **AFTER**.
   c. For Options, select **insert, update**.
   d. For Trigger Body, enter:

```
IF (INSERTING AND
    :new.assigned_to IS NOT NULL)
   OR
   (UPDATING AND
    (:old.assigned_to IS NULL OR
     :new.assigned_to != :old.assigned_to) AND
   :new.assigned_to IS NOT NULL)
   THEN
      FOR c1 IN
         (SELECT person_name, person_email
            FROM ht_people
           WHERE person_id = :new.assigned_to)
      LOOP
```

```
        IF c1.person_email IS NOT NULL
           THEN
              FOR c2 IN
                  (SELECT project_name
                     FROM ht_projects
                    WHERE project_id = :new.related_project)
              LOOP

              HTMLDB_MAIL.SEND(
                 p_to => c1.person_email,
                 p_from => c1.person_email,
                 p_body =>
                    'You have been assigned a new issue. '||
                    'The details are below. ' ||chr(10)||
                     chr(10)||
                    ' Project: '|| c2.project_name ||chr(10)||
                    ' Summary: '||:new.issue_summary ||chr(10)||
                    ' Status: '||:new.status ||chr(10)||
                    'Priority: '||nvl(:new.priority,'-'),
                p_subj => 'New Issue Assignment');
              END LOOP;
        END IF;

    END LOOP;
  END IF;
```

e. Click **Next**.

9. To review the code, expand the **SQL** icon.
10. Click **Finish**.

> **Note:** If you plan on using this application, you should either disable this trigger or change the `p_to` and `p_from` to your own e-mail address so that you do not create e-mails with invalid addresses each time you assign or reassign an issue.

Add a Notification for Overdue Issues

The second email notification notifies the project lead whenever an issue becomes overdue. An issue becomes overdue when the target resolution date has passed, but the issue is not yet closed. Because there is no human interaction to determine if an issues overdue, you cannot check for it on a page or in a trigger.

The best way to check for overdue issues is to write a package that queries the `HT_ISSUES` table. If it finds any overdue issues, the package will initiate an email to the Project Lead. This procedure will check for issues by project so that the project lead will receive just one email with all overdue issues rather than an email for each issue. The package will be called once a day by a `dbms_job`.

You can use the Create Object function as follows:

- Create the package and package body from within the SQL Workshop
- Use SQL Command Processor to run the create commands

For this exercise, you will use SQL Command Processor.

To create the package:

1. Navigate to the SQL Workshop home page.
2. Select **SQL Commands**.
3. For **Schema**, select the appropriate schema.
4. For Enter a SQL or PL/SQL Statement enter:

```
CREATE OR REPLACE package ht_check_overdue_issues
AS
   PROCEDURE email_overdue;
END;
/
```

5. Click **Run**.

To create the package body:

1. Navigate to the SQL Workshop home page.
2. Select **SQL Command Processor**.
3. For **Schema**, select the appropriate schema.
4. In Enter a SQL or PL/SQL Statement, enter the following:

```
CREATE OR REPLACE PACKAGE BODY ht_check_overdue_issues
AS

PROCEDURE email_overdue
IS
   l_msg_body varchar2(32000) := null;
   l_count number             := 0;
BEGIN

FOR c1 IN
   (SELECT pr.project_id,
           pr.project_name,
           pe.person_name,
           pe.person_email
      FROM ht_projects pr,
           ht_people pe
     WHERE pr.project_id = pe.assigned_project
       AND pe.person_role = 'Lead')
LOOP
   FOR c2 IN
      (SELECT i.target_resolution_date,
              i.issue_summary,
              p.person_name,
              i.status,
              i.priority
         FROM ht_issues i,
              ht_people p
        WHERE i.assigned_to = p.person_id (+)
          AND i.related_project = c1.project_id
          AND i.target_resolution_date < SYSDATE
          AND i.status != 'Closed'
     ORDER BY i.target_resolution_date, i.issue_summary)
LOOP
   IF l_count = 0
      THEN
         l_msg_body :=
           'As of today, the following issues '||
           'are overdue:'||chr(10)||
```

```
            chr(10)||
           ' Project: '|| c1.project_name ||chr(10)||
            chr(10)||
          '     Target: '||c2.target_resolution_date ||chr(10)||
          '    Summary: '||c2.issue_summary ||chr(10)||
          ' Status:     '||c2.status ||chr(10)||
          ' Priority:   '||c2.priority ||chr(10)||
          'Assigned to: '||c2.person_name;
 ELSE
        l_msg_body := l_msg_body ||chr(10)||
            chr(10)||
         '     Target: '||c2.target_resolution_date ||chr(10)||
         '    Summary: '||c2.issue_summary ||chr(10)||
         '     Status: '||c2.status ||chr(10)||
         ' Priority:   '||c2.priority ||chr(10)||
         'Assigned to: '||c2.person_name;
END IF;
l_count := l_count + 1;
END LOOP;

 IF l_msg_body IS NOT NULL
   THEN
      HTMLDB_MAIL.SEND(
          p_to => c1.person_email,
        p_from => c1.person_email,
        p_body => l_msg_body,
        p_subj => 'Overdue Issues for Project '||
                   c1.project_name);
 END IF;
 l_count := 0;

END LOOP;

END email_overdue;

END ht_check_overdue_issues;
/
```

5. Click **Run**.

To create the `DBMS_JOB`:

Note: This job generates e-mail. Do not execute the following script if you running on a hosted Oracle HTML DB instance. If you are running Oracle HTML DB instance locally and want to test this script, update the demonstration data to include valid e-mail addresses.

---

1. Navigate to the SQL Workshop home page.
2. Select **SQL Commands**.
3. For **Schema**, select the appropriate schema.
4. In Enter a SQL or PL/SQL Statement, enter the following:

```
DECLARE
   jobno number;
BEGIN
   DBMS_JOB.SUBMIT(
      job => jobno,
```

```
         what => 'BEGIN
                  ht_check_overdue_issues.email_overdue;
                  END;',
    next_date => SYSDATE,
     interval => 'TRUNC(SYSDATE)+(25/24)'
                 );
      COMMIT;
   END;
   /
```

5. Click **Run**.

This dbms_job executes just after midnight each day.

Note: If you plan on using this application, change either the `p_to` and `p_from` in the `ht_check_overdue_issues` package body to your own email address, or do not create the `dbms_job`. Running the code as written results in the creation of email with invalid addresses that will sit in mail queue.

See Also: *Send email from HTML DB applications* How To on OTN at:

`http://www.oracle.com/technology/products/database/htmldb/howtos/index.html`

Add Application Security

The planning and project analysis phase produced two security requirements:

- Only the CEO and Managers can define and maintain projects and people
- Once assigned, only the person assigned or a project lead can change data about the issue

Within Oracle HTML DB, you can define authorization schemes. Authorization controls user access to specific controls or components based on user privileges. Once defined, you can associate an authorization scheme with any page, region or item to restrict access. Each authorization schema is run only when needed and is defined to validate either once for each page view or once for each session.

Topics in this section include:

- Restrict Project and People Definition
- Restrict Issue Modification

Restrict Project and People Definition

The first requirement states only the CEO and Managers may define and maintain projects and people. To address this requirement you will:

- Create an authorization scheme to check the current user's role
- Associate the authorization scheme with the items on the Projects and People report that navigate to the Create/Edit pages
- Associate the authorization scheme with the Create/Edit pages themselves so that a user cannot bypass the security by manually editing the URL to the target page.

To reference the current user, use the session variable `:APP_USER`. This will be compared with the person's email address (which is the same as their Oracle HTML

DB user name). Whenever coding this type of security, you should always code in a user that can pass all security. You will find this user very useful for development and testing. If you do not take this approach, you will not be able to access the restricted pages unless you define yourself as the CEO or Manager.

Create the Authorization Scheme To create the authorization scheme:

1. Navigate to the Workspace home page.
2. Click **Application Builder**.
3. Select the **Issue Tracker** application.
4. Click **Shared Components**.
5. Under Security, select **Authorization Schemes**.
6. Click **Create**.
7. For Create Authorization Scheme, accept the default **From Scratch** and click **Next**.
8. Under Authorization Scheme Identification, enter the following in Name:

   ```
   USER_CEO_OR_MANAGER
   ```

9. Under Authorization Scheme:
   a. For Scheme Type, select **Exists SQL Query**.
   b. In Expression 1, enter:

   ```
   SELECT '1'
     FROM ht_people
    WHERE (upper(person_email) = UPPER(:APP_USER) AND
           person_role IN ('CEO','Manager'))
       OR (UPPER(:APP_USER) = 'HOWTO')
   ```

   c. For Identify error message displayed when scheme violated, enter:

   ```
   You are not authorized to access this function.
   ```

10. Scroll down to Evaluation Point. For Validate authorization scheme, select **Once per session**.

    This selection is sufficient in this instance since the assigned role will not typically change within a given session.
11. Click **Create**.

Next, you need to associate the authorization scheme with the appropriate objects.

Associate Objects on the Projects Report To associate the authorization scheme with the Projects report:

1. Click the **Edit Page** icon.
2. In Page, enter `2` and click **Go**.

   The Page Definition for page 2, Projects, appears.
3. Under Regions, select **Report** to the left of Projects.
4. Click the **Edit** icon to the left of `PROJECT_ID`.
5. Under Authorization, select the Authorization Scheme **USER_CEO_OR_MANAGER**.
6. Click **Apply Changes**.

7. Click **Cancel**.

To associate the authorization scheme with the Create button on the Projects report:

1. Navigate to the Page Definition for page 2.
2. Under Button, select **Create**.
3. Under Authorization, select the Authorization Scheme **USER_CEO_OR_MANAGER**.
4. Click **Apply Changes**.

Associate Objects with the Create/Edit Report To associate the authorization scheme with the Create/Edit Project page:

1. Navigate to page 3 by clicking the Next Page (>) icon.

   The Page Definition for page 3, Create/Edit Project, appears.
2. Click **Edit Attributes**.
3. Scroll down to Security.
4. Select the Authorization Scheme **USER_CEO_OR_MANAGER**.
5. Click **Apply Changes**.

Associate Objects with the People Report To associate the authorization scheme with the People report.

1. Navigate to page 4 by clicking the Next Page (>) icon.

   The Page Definition for page 4, People, appears.
2. Under Regions, select **Report** to the left of People.
3. Click the **Edit** icon to the left of PERSON_ID.
4. Under Authorization, select the Authorization Scheme **USER_CEO_OR_MANAGER**.
5. Click **Apply Changes**.
6. Click **Cancel**.

To associate the authorization scheme with the Create button on the People report:

1. Navigate to the Page Definition for page 5.
2. Under Buttons, select **Create**.
3. Under Authorization, select the Authorization Scheme **USER_CEO_OR_MANAGER**.
4. Click **Apply Changes**.

To associate the authorization scheme with the Create/Edit Person Information page:

1. Navigate to page 5.

   The Page Definition for page 5, Create/Edit Person Information, appears.
2. Click **Edit Attributes**.
3. Scroll down to Security.
4. Select the Authorization Scheme **USER_CEO_OR_MANAGER**.
5. Click **Apply Changes**.

You can test this creating a user with the username of HOWTO. The HOWTO user should be able to see the edit link. Then, create another user, HOWTO2. This user should not be able to see the link.

See Also: "Create Users" on page 10-87

Restrict Issue Modification

The second requirement states that once an issue has been assigned, only the person assigned (or a project lead) can change data about the issue. This requirement is a little trickier since it changes for every issue.

Currently, there are two pages that enable users to modify an issue, the Create/Edit Issue page and the Assign Issues page. On the Assign Issues page, the only issues that display are those that are unassigned. Since the issues are unassigned, security is not necessary.

There are many places that a user can navigate to edit an issue:

- Three regions on the home page display issues or have edit links
- The Issues report has links to edit each issue
- The Target Resolution Dates report enables users to select an issue to edit.

Although other users are not allowed to change the data, you do want to enable users to view all the detailed data about an issue so that they can view the progress and resolution. Given this requirement, the best approach would be to create an authorization scheme that will be evaluated once for each page view.

The authorization scheme will be associated with both the Apply Changes and Delete buttons on the Create/Edit Issue page. This way, unauthorized users can view all the details, but if they do change something, they have no way of saving that change.

For added security, you will also associate the authorization scheme with the process that performs the insert, update and delete on `HT_ISSUES`. This protects your application against someone changing the URL to call the Apply Changes process. To let users know why they are not able to make changes, you will add an HTML region which will display an explanation when the authorization fails. The SQL for this scheme will be specific to the Create/Edit Issues page because it needs to reference P7_ISSUE_ID. It will need to retrieve data from the database because at the time it will be evaluated, the necessary data will not be available in the session state. The only item that will be available will be P7_ISSUE_ID because it will be passed by the link.

Create the Authorization Scheme To create the authorization scheme:

1. Navigate to the Application home page.
2. Select **Shared Components**.
3. Under Security, select **Authorization Schemes**.
4. Click **Create**.
5. For Creation Method, accept the default **From Scratch** and click **Next**.
6. Under Authorization Scheme Identification, enter the following in Name:

   ```
   P7_ASSIGNED_OR_PROJECT_LEAD
   ```

7. Under Authorization Scheme:
   a. For Scheme Type, select **PL/SQL Function Returning Boolean**.
   b. For Expression 1, enter:

```
DECLARE
   l_related_project   integer;
   l_assigned_to       integer;
   l_person_id         integer;
   l_person_role       varchar2(7);
   l_assigned_project  integer;
BEGIN

-- User is HOWTO or new Issue
IF :APP_USER = 'HOWTO' or
   :P7_ISSUE_ID IS NULL
   THEN RETURN TRUE;
END IF;

FOR c1 IN (SELECT related_project,
                  assigned_to
             FROM ht_issues
            WHERE issue_id = :P7_ISSUE_ID)
LOOP
   l_related_project := c1.related_project;
   l_assigned_to     := c1.assigned_to;
END LOOP;

-- Issue not yet assigned
IF l_assigned_to IS NULL
THEN RETURN TRUE;
END IF;

FOR c2 IN (SELECT person_id,
           person_role,
           assigned_project
      FROM ht_people
     WHERE upper(person_email) = upper(:APP_USER))
LOOP
   l_person_id        := c2.person_id;
   l_person_role      := c2.person_role;
   l_assigned_project := c2.assigned_project;
END LOOP;

-- User is lead of related project
IF l_person_role = 'Lead' and
   l_assigned_project = l_related_project
   THEN RETURN TRUE;

-- User is assigned to issue
ELSIF l_assigned_to = l_person_id
   THEN RETURN TRUE;
ELSE
   RETURN FALSE;
END IF;
END;
```

c. For Identify error message displayed when scheme violated, enter:

```
This issue is not assigned to you, nor are you the Project Lead. Therefore
you are not authorized to modify the data.
```

8. Scroll down to Evaluation Point. For Validate authorization scheme, select **Once per page view**.

   This selection is necessary since each issue may have a different result.

9. Click **Create**.

Now you need to associate the authorization scheme with the appropriate objects on the Create/Edit Issue page.

Associate Objects with the Create Edit Issues Report To associate the authorization scheme with buttons and processes:

1. Navigate to Application home page.
2. Select page **7 - Create/Edit Issues**.
3. Under Buttons, select **DELETE**.
   a. Under Authorization, select the Authorization Scheme **P7_ASSIGNED_OR_PROJECT_LEAD**.
   b. Click **Apply Changes**.
4. Under Buttons, select **SAVE**.
   a. Under Authorization, select the Authorization Scheme **P7_ASSIGNED_OR_PROJECT_LEAD**.
   b. Click **Apply Changes**.
5. Under Processes, select **Process Row of HT_ISSUES**.
   a. Under Authorization, select the Authorization Scheme **P7_ASSIGNED_OR_PROJECT_LEAD**.
   b. Click **Apply Changes**.

Create an HTML Region Lastly, create a new region to display an explanation when the authorization fails

To create a new region:

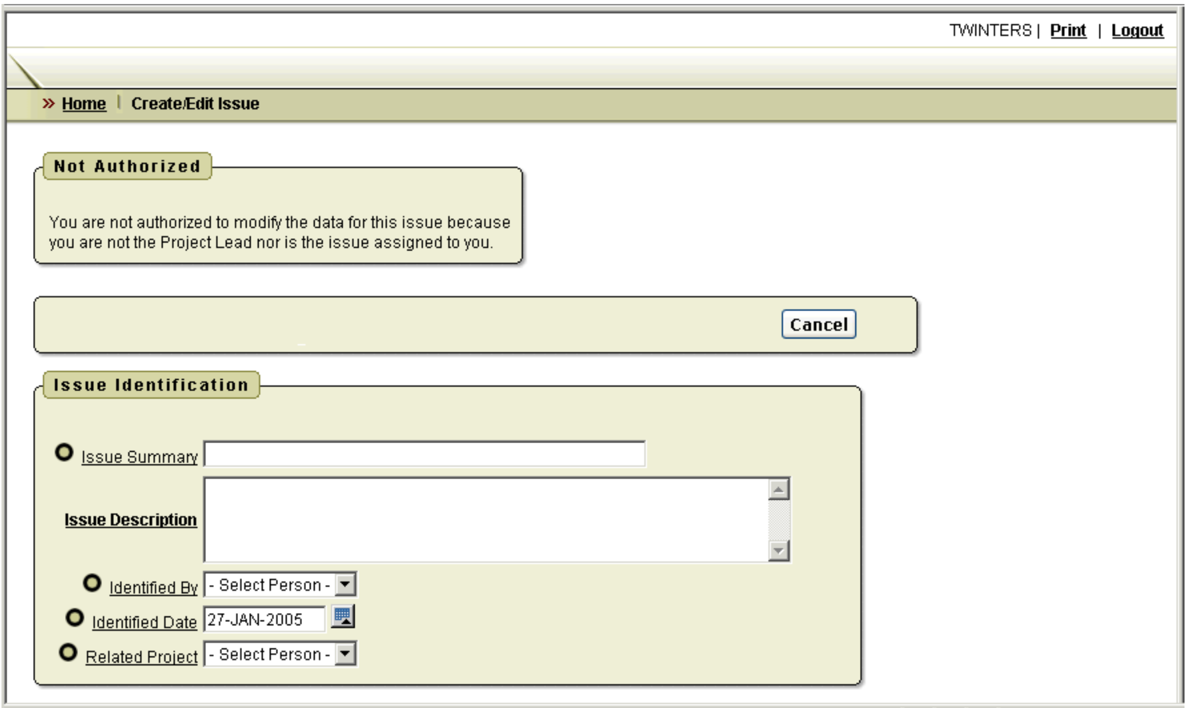
1. Under Regions, click the **Create** icon.
2. For Select a common region type, accept the default **HTML** and click **Next**.
3. On Region Type, select **HTML** and click **Next**.
4. For Display Attributes:
   a. For Title, enter `Not Authorized`.
   b. For Display Point, select **Page Template Body (2. items below region content)**.
   c. Click **Next**.
5. For Enter HTML Text Region Source, enter the following and click **Next**:

```
You are not authorized to modify the data for this issue because<br>you are not
the Project Lead nor is the issue assigned to you.
```

6. For Authorization Scheme, select **{Not}P7_ASSIGNED_OR_PROJECT_LEAD**. This will make the region only display when the Authorization Scheme fails.
7. Click **Create Region**.

Figure 10–18 displays the Create/Edit Issue page being run by a person for whom the Authorization fails. Notice a new region displays at the top of the page and that the only button being displayed is Cancel.

Figure 10–18 New Region Displaying Authorization Failure



A more elegant solution to this security requirement would be to create a different page for viewing the details of an issue. You would need to have a procedure that would take in the issue_id and current user and pass back a flag for view only or edit. Then you could dynamically build the link for all the reports to call either the View page or the Edit page based upon a call to that procedure. You would still want to protect against someone accessing the edit page without using a link so you would also check permission before firing the insert, update and delete process.

Deploying Your Application

Now that your application is complete, the next step is to deploy it. Typically, developers create applications on one server and deploy it on another. Although this approach is not required, it enables you to resolve bugs without impacting the production instance.

Note: To deploy an application on another server, you need to install and configure another Oracle HTML DB instance.

Topics in this section include:

- Move the Application Definition
- Alternate Authentication Mechanisms to Consider
- Create Users
- Publish the URL

Move the Application Definition

The definition for your application lives within the Oracle database. The application definition includes everything that makes up the application, including the templates, but it does not include database object definitions or the underlying data. To move an application to another Oracle HTML DB instance, you must export the application definition from your development server and import it into your production server.

Topics in this section include:

- Export the Application Definition
- Create the Required Objects to Support the Application
- Import the Application Definition into the Production Instance
- Load the Data

Export the Application Definition

To export the application definition from your development server:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select the application you want to export.
4. Click the **Export/Import** icon and then **Export**.
5. For Application, select the application created in this exercise.
6. Click **Export Application**.
7. When prompted, click to **Save** the file.
8. Specify a location on your local hard drive and click **Save**.

Create the Required Objects to Support the Application

On your production instance, you need to create the objects necessary to support the application. Log in to the production instance and follow the directions in "Build the Database Objects" on page 10-7.

> **Note:** Although the supporting objects do not need to exist for you to import the application definition, be aware you cannot test the code until they exist.

Import the Application Definition into the Production Instance

Login to the production instance of Oracle HTML DB:

1. Navigate to the Workspace home page.
2. Click the **Application Builder** icon.
3. Select the application you want to export.
4. Click the **Export/Import** icon and then **Import**.
5. On Import File:
   a. For Import File, click the **Browse** button and locate your exported file.
   b. For File Type, select **Application/Page Export**.
   c. For File Character Set, accept the default and click **Next**.

Once the success message appears, the next step is to install the file.

6. Click **Install**.
7. On Application Install:
   a. For Parse As Schema, select the schema on your production server that contains your application objects.
   b. For Build Status, you select **Run and Build Application**.

      This option enables other users to run the application and enables you to log in and change the code if necessary. Alternatively, you can select **Run Application Only**. Be aware that if you select this option you will not be able to access the source code for the application.
   c. For Install As Application, you can select:
      – **Reuse Application ID from Export File** - Only select this option if the application ID is not being used on the production instance.
      – **Auto Assign New Application ID** - Select this option to assign a new application ID.
      – **Change Application ID** - Select this option to change the existing application ID. If you select this option, you will be prompted to enter a new application ID.

        When you install an application having the same ID as an existing application in the current workspace, the existing application is deleted and then the new application is installed. If you attempt to install an application having the same ID as an existing application in a different workspace, an error message appears.

        If all statements are successful the install commits and becomes permanent. If any errors are encountered, the install is rolled back, resulting in no permanent changes.
   d. Click **Install Application**.

   If the install is successful, the Post-App Install Utility Options page appears. From here, you can select one of the following:

   - Select **Run Application** to see application running
   - Select **Edit Application Attributes** to view the application definition within Oracle HTML DB

Load the Data

The next step in deploying your application would be to load the data. At a minimum, you would need to populate the `project` and `people` tables.

Note there are various mechanisms you could use to accomplish this task, including:

- Use the application itself to create data.
- Use the Data Loader to load data copied from a spreadsheet.
- Use the SQL Workshop and run scripts to create data.
- If you have data existing already within an Oracle database, use either export/import to move data between machines or use SQL to retrieve and transform existing data and load it into the application tables.

See Also: "Loading Demonstration Data" on page 10-8

Alternate Authentication Mechanisms to Consider

When the application login page calls the Oracle HTML DB login API with a username and password, the HTML DB engine calls the credentials verification method specified in the application's current authentication scheme. You have three choices as to how credentials are verified from within the login API:

- Implement the method yourself as a PL/SQL function returning Boolean and put it in your application's schema.
- Use the built-in LDAP authentication method, which checks username and password against the LDAP directory that you specify.
- Use the built-in Oracle HTML DB authentication method, which checks the username and password against the Oracle HTML DB account repository.

Your application is currently using the built-in Oracle HTML DB. It is also possible to use an external authentication service such Oracle Application Server Single Sign-On. Be aware, however, that Oracle HTML DB redirects to these services instead of showing a login page.

> **See Also:** *Using Oracle AS Single Sign-On with HTML DB Applications* and *Changing Authentication Methods* How To documents on OTN:
>
> `http://www.oracle.com/technology/products/database/htmldb/howtos/index.html`

Create Users

In order for your application to be accessible, you need to create users. If you are still using Oracle HTML DB authentication, the simplest way to create users it to access the Manage Users page within the workspace that owns the application. Note that you will need to have been granted Administration rights for the workspace in order to access this page.

To create a new user:

1. Navigate to the Workspace home page and click the **Administration** icon.
2. Click **Manage HTML DB Users**.
3. Select **Create Developer**.
4. Under User Identification, enter the required information. If you are using Oracle HTML DB authentication, make User Name and Email Address identical.

   Developer Privileges enable the user to run the application but not access the Application Builder.
5. Under Developer Privileges:
   a. For User is a developer, select **No**.
   b. For User is an administrator, select **No**.
6. Click **Create** or **Create and Create Another**.

Publish the URL

Now that you have deployed your application, loaded data, and created users, you can publish your production URL.

You can determine the URL to your application by positioning the mouse over the **Run** icon on the Application home page. The URL displays in the status bar at the bottom of the page.

The Run icon gets its value from the Home link attribute on the Edit Security Attributes page. This link is only referenced by this icon and by applications that do not use the Oracle HTML DB Login API. Consider the following example:

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

Where:

- `htmldb.oracle.com` is the URL of the server
- `pls` is the indicator to use the `mod_plsql` cartridge
- `otn` is the data access descriptor (DAD) name
- `f?p=` is a prefix used by Oracle HTML DB
- `11563` is application being called
- `1` is the page within the application to be displayed
- `3397731373043366363` is the session number

To run this example application, you would use the URL:

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

When each user logs in, he or she will receive an unique session number.

As you may recall, you created the Issue Tracker application using the Create Application wizard. This wizard creates a process on the Login page (page 101) that controls authentication. The contents of the process are:

```
WWV_FLOW_CUSTOM_AUTH_STD.LOGIN(
    P_UNAME => :P101_USERNAME,
    P_PASSWORD => :P101_PASSWORD,
    P_SESSION_ID => :FLOW_SESSION,
    P_FLOW_PAGE => :APP_ID||':1'
    );
```

Note that the Page is hard coded into this process. Because of this, the page you pass in the URL is overwritten and does not need to be included. You can access the application by using the following URL:

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

As you can see from the example used, the URL has no meaning and can be rather long. The host name can be changed to make it more symbolic. You can also configure Apache to rewrite your URL so that you can publish an abbreviated format and a URL that would be more intuitive to your users. See your Apache documentation for details.

A

DDLs and Scripts for Issue Tracking Application

This appendix contains DDLs (data definition language) and scripts necessary to complete "How to Build and Deploy an Issue Tracking Application" on page 10-1.

This section contains the following topics:

- Create Application Database Objects DDL
- Create Issues Script

Create Application Database Objects DDL

The following DDL (data definition language) create all the required database objects for the issue tracking application in

```
--
-- This DDL creates all the database objects used by the
-- Issue Management Application featured in
-- the Oracle HTML DB Development Document
--
-- HT_PROJECTS
--
-- The HT_PROJECTS DDL:
--    + creates the projects table with the necessary columns,
--      including a new column for a system generated primary key
--    + declares the new primary key
--    + implements the real primary key, project name, as a unique key
--    + implements a sequence to generate project id
--    + assigns the sequence to populate the project id
--      whenever a new record is created
--    + declares table and column comments
--
```

```
CREATE TABLE ht_projects (
   project_id            INTEGER           NOT NULL,
   project_name          VARCHAR2(100)     NOT NULL,
   start_date            DATE              NOT NULL,
   target_end_date       DATE              NOT NULL,
   actual_end_date       DATE
```

```
)
/
ALTER table ht_projects
   ADD CONSTRAINT ht_projects_pk
   PRIMARY KEY (project_id)
/
ALTER TABLE ht_projects
   ADD CONSTRAINT ht_projects_uk
   UNIQUE (project_name)
/
CREATE SEQUENCE ht_projects_seq
   INCREMENT BY 1
   START WITH 40
/
CREATE OR REPLACE TRIGGER bi_ht_projects
     BEFORE INSERT ON ht_projects
     FOR EACH ROW
  BEGIN
     IF :new.project_id is null
        THEN SELECT ht_projects_seq.nextval
               INTO :new.project_id
               FROM DUAL;
     END IF;
  END;
/

COMMENT ON table ht_projects IS
   'All projects currently underway.'
/
COMMENT ON column ht_projects.project_id IS
   'The system generated unique identifier for the project.'
/
COMMENT ON column ht_projects.project_name IS
   'The unique name of the project.'
/
COMMENT ON column ht_projects.start_date IS
   'The start date of the project.'
/
COMMENT ON column ht_projects.target_end_date IS
   'The targeted end date of the project.'
/
COMMENT ON column ht_projects.actual_end_date IS
   'The actual end date of the project.'
/

--
-- HT_PEOPLE
--
-- The HT_PEOPLE DDL:
--    + creates the people table with the necessary columns,
--      including a new column for a system generated primary key
--    + declares the new primary key
--    + implements the real primary key, person name, as a unique key
--    + implements a check constraint to validate the roles that people
--      can be assigned

--    + implements a foreign key to validate that people are assigned to
--      valid projects
--    + implements a check constraint to enforce that all project leads
--      and team members are assigned to projects
```

```
--    + implements a sequence to generate person id
--    + assigns the sequence to populate the person id whenever a
--      new record is created
--    + declares table and column comments
--

CREATE TABLE ht_people (
   person_id              INTEGER           NOT NULL,
   person_name            VARCHAR2(100)     NOT NULL,
   person_email           VARCHAR2(100)     NOT NULL,
   person_role            VARCHAR2(7)       NOT NULL,
   assigned_project       INTEGER
)
/
ALTER TABLE ht_people
   ADD CONSTRAINT ht_people_pk
   PRIMARY KEY (person_id)
/
ALTER TABLE ht_people
   ADD CONSTRAINT ht_people_uk
   UNIQUE (person_name)
/
ALTER TABLE ht_people
   ADD CONSTRAINT ht_people_role_cc
   CHECK (person_role in ('CEO','Manager','Lead','Member'))
/
ALTER TABLE ht_people
   ADD CONSTRAINT ht_people_project_fk
   FOREIGN KEY (assigned_project)
   REFERENCES ht_projects
/
ALTER TABLE ht_people
   ADD CONSTRAINT ht_people_assignment_cc
   CHECK ( (person_role in ('Lead','Member') and assigned_project is not null)
   or (person_role in ('CEO','Manager') and assigned_project is null) )
/
CREATE SEQUENCE ht_people_seq
   INCREMENT BY 1
   START WITH 40
/
CREATE OR REPLACE TRIGGER bi_ht_people
      BEFORE INSERT on ht_people
      FOR EACH ROW
   BEGIN
      IF :new.person_id IS NULL
          THEN SELECT ht_people_seq.nextval
                 INTO :new.person_id
                 FROM DUAL;
      END IF;

   END;
/

COMMENT ON table ht_people IS
   'All people within the company.'
/
COMMENT ON column ht_people.person_id IS
   'The system generated unique identifier for the person.'
/
COMMENT ON column ht_people.person_name IS
```

```
   'The unique name of the person.'
/
COMMENT ON column ht_people.person_role IS
   'The role the person plays within the company.'
/
COMMENT ON column ht_people.assigned_project IS
   'The project that the person is currently assigned to.'
/

--
-- HT_ISSUES
--
-- The HT_ISSUES DDL:
--     + creates the table with the necessary columns, including a new column
--       for a system generated primary key
--     + declares the new primary key
--     + implements a foreign key to validate that the issue is identified by a
--       valid person
--     + implements a foreign key to validate that the issue is assigned to a
--       valid person
--     + implements a foreign key to validate that the issue is associated with
--       a valid project
--     + implements a check constraint to validate the status that is assigned
--       to the issue
--     + implements a check constraint to validate the priority that is assigned
--       to the issue
--     + implements a sequence to generate issue id
--     + assigns the sequence to populate the issue id and the creation date
--       whenever a new record is created, records the user creating the
--       row and also assigns status of 'Open' if no status is provided
--     + records the current date and the user whenever an issue is edited and
--       sets the status to 'Closed' if an ACTUAL_RESOLUTION_DATE is
--       provided
--     + declares table and column comments
--

create table ht_issues (
   issue_id                INTEGER           not null,
   issue_summary           VARCHAR2(200)     not null,
   issue_description       VARCHAR2(2000),
   identified_by           INTEGER NOT NULL,
   identified_date         DATE              not null,
   related_project         INTEGER           not null,
   assigned_to             INTEGER,
   status                  VARCHAR2(8)       not null,
   priority                VARCHAR2(6),
   target_resolution_date  DATE,
   progress                VARCHAR2(2000),
   actual_resolution_date  DATE,
   resolution_summary      VARCHAR2(2000),
   created_date            DATE              not null,
   created_by              VARCHAR2(60)      not null,
   last_modified_date      DATE,
   last_modified_by        VARCHAR2(60)
)
/
ALTER TABLE ht_issues
   ADD CONSTRAINT ht_issues_pk
   PRIMARY KEY (issue_id)
/
```

```
ALTER TABLE ht_issues
   ADD CONSTRAINT ht_issues_identified_by_fk
   FOREIGN KEY (identified_by)
   REFERENCES ht_people
/
ALTER TABLE ht_issues
   ADD CONSTRAINT ht_issues_assigned_to_fk
   FOREIGN KEY (assigned_to)
   REFERENCES ht_people
/
ALTER TABLE ht_issues
   ADD CONSTRAINT ht_issues_project_fk
   FOREIGN KEY (related_project)
   REFERENCES ht_projects
/
ALTER TABLE ht_issues
   ADD CONSTRAINT ht_issues_status_cc
   CHECK (status in ('Open','On-Hold','Closed'))
/
ALTER TABLE ht_issues
   ADD CONSTRAINT ht_issues_priority_cc
   CHECK (priority in ('High','Medium','Low'))

/

CREATE SEQUENCE ht_issues_seq
   INCREMENT BY 1
   START WITH 40
/
CREATE OR REPLACE TRIGGER bi_ht_issues
      BEFORE INSERT on ht_issues
      FOR EACH ROW
  BEGIN
      IF :new.issue_id IS NULL
         THEN SELECT ht_issues_seq.nextval
                INTO :new.issue_id
                FROM DUAL;
      END IF;
      IF :new.status IS NULL
         THEN :new.status := 'Open';
      END IF;
      :new.created_date := sysdate;
      :new.created_by := nvl(wwv_flow.g_user,user);
  END;
/
CREATE OR REPLACE TRIGGER bu_ht_issues
      BEFORE UPDATE ON ht_issues
      FOR EACH ROW
  BEGIN
      IF :new.actual_resolution_date IS NOT NULL
         THEN :new.status := 'Closed';
      END IF;

      :new.last_modified_date := sysdate;
      :new.last_modified_by := nvl(wwv_flow.g_user,user);
  END;
/

COMMENT ON table ht_issues IS
   'All issues related to the projects being undertaken by the company.'
```

```
/
COMMENT ON column ht_issues.issue_id IS
   'The system generated unique identifier for the issue.'
/
COMMENT ON column ht_issues.issue_summary IS
   'A brief summary of the issue.'
/
COMMENT ON column ht_issues.issue_description IS
   'A full description of the issue.'
/
COMMENT ON column ht_issues.identified_by IS
   'The person who identified the issue.'
/
COMMENT ON column ht_issues.identified_date IS
   'The date the issue was identified.'
/
COMMENT ON column ht_issues.related_project IS
   'The project that the issue is related to.'
/
COMMENT ON column ht_issues.assigned_to IS
   'The person that the issue is assigned to.'
/
COMMENT ON column ht_issues.status IS
   'The current status of the issue.'
/
COMMENT ON column ht_issues.priority IS
   'The priority of the issue. How important it is to get resolved.'
/
COMMENT ON column ht_issues.target_resolution_date IS
   'The date on which the issue is planned to be resolved.'
/
COMMENT ON column ht_issues.actual_resolution_date IS
   'The date the issue was actually resolved.'
/
COMMENT ON column ht_issues.progress IS
   'Any progress notes on the issue resolution.'
/
COMMENT ON column ht_issues.resolution_summary IS
   'The description of the resolution of the issue.'
/
COMMENT ON column ht_issues.created_date IS
   'Audit Column: Date the record was created.'
/
COMMENT ON column ht_issues.created_by IS
   'Audit Column: The user who created the record.'
/
COMMENT ON column ht_issues.last_modified_date IS
   'Audit Column: Date the record was last modified.'
/
COMMENT ON column ht_issues.last_modified_by IS
   'Audit Column: The user who last modified the record.'
/
```

Create Issues Script

The following script populates Issues table for the issue tracking application.

```
--
-- Email Integration Issues
```

```
--
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
     (1, 'Midwest call center servers have no failover due to Conn Creek plant
fire','',
     6, sysdate-80,
     3, 6, 'Closed', 'Medium', sysdate-73,
     'Making steady progress.', sysdate-73, '')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
       identified_by, identified_date,
       related_project, assigned_to, status, priority, target_resolution_date,
       progress, actual_resolution_date, resolution_summary)
  VALUES
      (2, 'Timezone ambiguity in some EMEA regions is delaying bulk forwarding to
mirror sites','',
      6, sysdate-100,
      3, 14, 'Open', 'Low', sysdate-80,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
       identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (3, 'Some vendor proposals lack selective archiving and region-keyed
retrieval sections','',
      6, sysdate-110,
      3, 13, 'Closed', 'Medium', sysdate-90,
      '', sysdate-95, '')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (4, 'Client software licenses expire for Bangalore call center before
cutover','',
      1, sysdate-70,
      3, 6, 'Closed', 'High', sysdate-60,
      '',sysdate-66,'Worked with HW, applied patch set.')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (5, 'Holiday coverage for DC1 and DC3 not allowed under union contract, per
acting steward at branch 745','',
      1, sysdate-100,
      3, 13, 'Closed', 'High', sysdate-90,
      '',sysdate-95, 'Worked with HW, applied patch set.')
```

```
/
--
-- Employee Satisfaction Survey Issues
--
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (6, 'Review rollout schedule with HR VPs/Directors','',
      8, sysdate-30,
      5, null, 'Closed', 'Medium', sysdate-15,
      '',sysdate-20,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (7, 'Distribute translated categories and questions for non-English regions
to regional team leads','',
      8, sysdate-2,
      5, 8, 'Open', 'Medium', sysdate+10,
      'currently beta testing new look and feel','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (8, 'Provide survey FAQs to online newsletter group','',
      1, sysdate-10,
      5, 11, 'Open', 'Medium', sysdate+20,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (9, 'Need better definition of terms like work group, department, and
organization for categories F, H, and M-W','',
      1, sysdate-8,
      5, null, 'Open', 'Low', sysdate+15,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (10, 'Legal has asked for better definitions on healthcare categories for
Canadian provincial regs compliance','',
      1, sysdate-10,
      5, 11, 'Closed', 'Medium', sysdate+20,
```

```
      '',sysdate-1,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (11, 'Action plan review dates conflict with effectivity of organizational
consolidations for Great Lakes region','',
      1, sysdate-9,
      5, 11, 'Open', 'Medium', sysdate+45,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (12, 'Survey administration consulting firm requires indemnification release
letter from HR SVP','',
      1, sysdate-30,
      5, 11, 'Closed', 'Low', sysdate-15,
      '', sysdate-17, '')
/
--
-- Internal Infrastructure Issues
--
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
 VALUES
      (13, 'Facilities, Safety health-check reports must be signed off before
capital asset justification can be approved','',
      4, sysdate-145,
      1, 4, 'Closed', 'Medium', sysdate-100,
      '',sysdate-110,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (14, 'Cooling and Power requirements exceed 90% headroom limit -- variance
from Corporate requested','',
      4, sysdate-45,
      1, 9, 'Closed', 'High', sysdate-30,
      '',sysdate-35,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (15, 'Local regulations prevent Federal contracts compliance on section
```

```
3567.106B','',
      4, sysdate-90,
      1, 10, 'Closed', 'High', sysdate-82,
      '',sysdate-85,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (16, 'Emergency Response plan failed county inspector''s review at buildings
2 and 5','',
      4, sysdate-35,
      1, null, 'Open', 'High', sysdate-5,
      '','','')
/
--
-- New Payroll Rollout Issues
--
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (17, 'Training for call center 1st and 2nd lines must be staggered across
shifts','',
      5, sysdate-8,
      2, 5, 'Closed', 'Medium', sysdate+10,
      '',sysdate-1,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (18, 'Semi-monthly ISIS feed exceeds bandwidth of Mississauga backup
site','',
      5, sysdate-100,
      2, 12, 'On-Hold', 'Medium', sysdate-30,
      'pending info from supplier','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
     (19, 'Expat exception reports must be hand-reconciled until auto-post
phaseout complete','',
      5, sysdate-17,
      2, 12, 'Closed', 'High', sysdate+4,
      '',sysdate-4,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
```

```
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (20, 'Multi-region batch trial run schedule and staffing plan due to
directors by end of phase review','',
      5, sysdate,
      2, null, 'Open', 'High', sysdate+15,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (21, 'Auditors'' signoff requires full CSB compliance report','',
      5, sysdate-21,
      2, 5, 'Open', 'High', sysdate-7,
      '','','')
/
--
-- Public Website Operational Issues
--
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (22, 'Review security architecture plan with consultant','',
      1, sysdate-60,
      4, 7, 'Closed', 'High', sysdate-45,
      '',sysdate-40,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (23, 'Evaluate vendor load balancing proposals against capital budget','',
      7, sysdate-50,
      4, 7, 'Closed', 'High', sysdate-45,
      '',sysdate-43,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (24, 'Some preferred domain names are unavailable in registry','',
      7, sysdate-55,
      4, 15, 'Closed', 'Medium', sysdate-45,
      '',sysdate-50,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
```

```
  VALUES
      (25, 'Establish grid management capacity-expansion policies with ASP','',
      7, sysdate-20,
      4, 16, 'Open', 'Medium', sysdate-5,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (26, 'Access through proxy servers blocks some usage tracking tools','',
      7, sysdate-10,
      4, 15, 'Closed', 'High', sysdate-5,
      '',sysdate-1,'')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (27, 'Phase I stress testing cannot use production network','',
      7, sysdate-11,
      4, 17, 'Open', 'High', sysdate,
      '','','')
/
INSERT INTO ht_issues
      (issue_id, issue_summary, issue_description,
      identified_by, identified_date,
      related_project, assigned_to, status, priority, target_resolution_date,
      progress, actual_resolution_date, resolution_summary)
  VALUES
      (28, 'DoD clients must have secure port and must be blocked from others','',
      7, sysdate-20,
      4, 17, 'On-Hold', 'High', sysdate,
      'Waiting on Security Consultant, this may drag on.','','')
/
```