Oracle® Application Express

SQL Workshop Guide

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Preface

Oracle Application Express SQL Workshop and Utilities Guide describes how to use Oracle Application Express SQL Workshop and utilities to load and unload data from an Oracle database, generate DDL, view object reports, and restore dropped database objects.

This preface contains these topics:

- Topic Overview
- Audience
- Documentation Accessibility
- Related Documents
- Conventions

Topic Overview

This document contains the following chapters:

Title	Description
Managing Database Objects with Object Browser	Explains how Object Browser enables developers to browse, create, and edit objects in a database.
Using SQL Commands	Provides information on how to use SQL Commands to create, edit, view, run, and delete SQL commands.
Using SQL Scripts	Describes how to use SQL Scripts to create, edit, view, run and delete script files.
Building Queries with Query Builder	Explains how Query Builder's graphical user interface enables database developers to build queries without the need for manual SQL coding.
Using Oracle Application Express Utilities	Describes how to use Oracle Application Express utilities to load and unload data from an Oracle database, generate DDL, view object reports and restore dropped database objects.

Audience

Oracle Application Express SQL Workshop Guide is intended for application developers who are building database-centric Web applications using Oracle Application Express. The guide describes how to use Oracle Application Express SQL Workshop and

utilities to load and unload data from an Oracle database, generate DDL, view object reports, and restore dropped database objects.

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

> **See Also:** *Oracle Database 2 Day + Application Express Developer's Guide*

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Related Documents

For more information, see these Oracle resources:

- *Oracle Application Express Release Notes*
- *Oracle Application Express Installation Guide*
- *Oracle Database 2 Day + Application Express Developer's Guide*
- *Oracle Application Express Application Builder User's Guide*
- *Oracle Application Express Advanced Tutorials*
- *Oracle Application Express API Reference*
- *Oracle Application Express Administration Guide*
- *Oracle Application Express Migration Guide*

- *Oracle Application Express SQL Workshop Guide*
- *Oracle Database Concepts*
- *Oracle Database Advanced Application Developer's Guide*
- *Oracle Database Administrator's Guide*
- *Oracle Database SQL Language Reference*
- *SQL*Plus User's Guide and Reference*
- *Oracle Database PL/SQL Language Reference*

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

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

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

http://apex.oracle.com/pls/apex/f?p=9830:28:0::NO:RIR:P28_PRODUCT_SUITE,IR_P

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

Many books in the documentation set use the sample schemas of the seed database, which is installed by default when you install Oracle. 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://shop.oracle.com/

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

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

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

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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.

Convention	Meaning
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Managing Database Objects with Object Browser

Object Browser enables developers to browse, create, and edit objects in a database.

Topics:

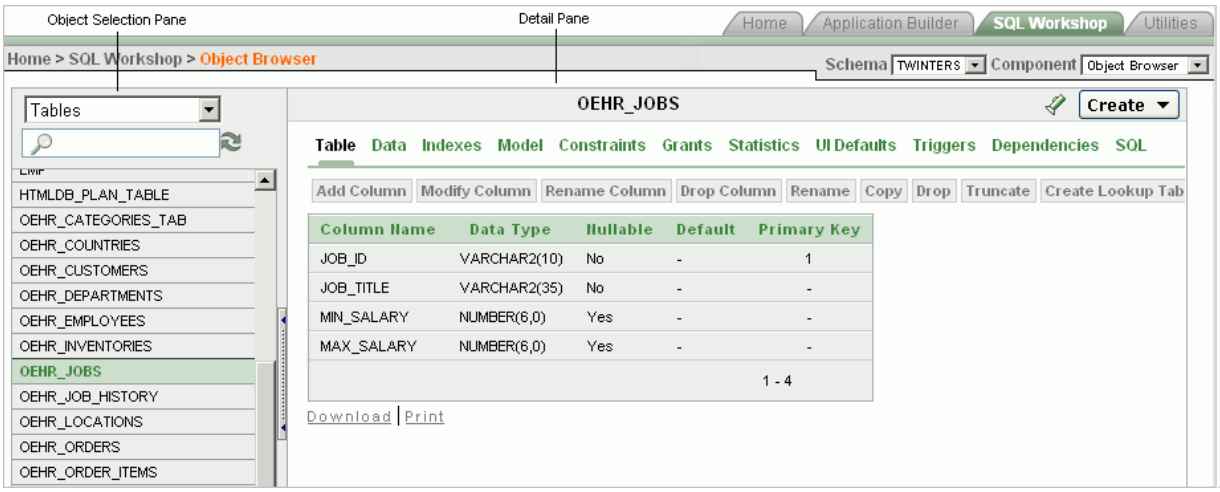
- About Object Browser
- Searching for and Browsing Database Objects
- About Creating Database Objects
- Managing Tables
- Managing Views
- Managing Indexes
- Managing Sequences
- Managing Types
- Managing Packages
- Managing Procedures
- Managing Functions
- Managing Triggers
- Managing Database Links
- Managing Materialized Views
- Managing Synonyms

See Also: *Oracle Database SQL Language Reference*

About Object Browser

The Object Browser page is divided into two sections:

- **Object Selection pane** displays on the left side of the Object Browser page and lists database objects of a selected type within the current schema. You can further narrow the results by filtering on the object name.
- **Detail pane** displays to the right of the page and displays detailed information about the selected object. To view object details, select an object in the Object Selection pane. Click the tabs at the top of the Detail pane to view additional details about the current object. To edit an object, click the appropriate button.



Selecting a Schema

A schema is a logical container for database objects. To access objects in another schema, make a selection from the Schema list in the upper right side of the page. Only schemas assigned to your workspace are listed.

Switching to Another SQL Workshop Component

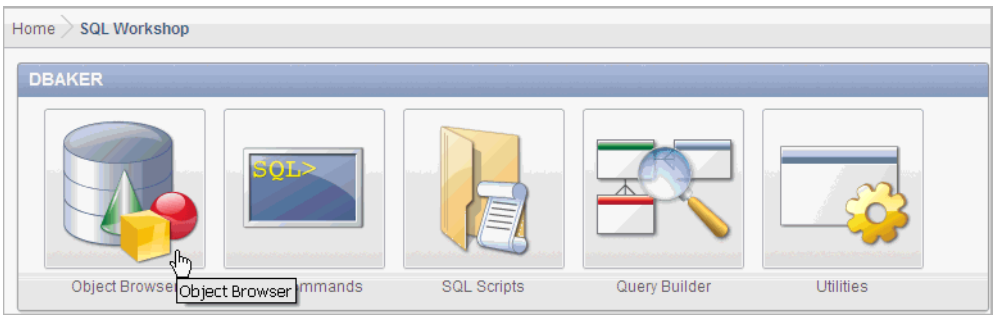
You can navigate to another SQL Workshop component by selecting the corresponding icon located on the upper right side of the page:

- **Object Browser**. See "Managing Database Objects with Object Browser" on page 1-1.
- **SQL Commands**. See "Using SQL Commands" on page 2-1.
- **SQL Scripts**. See "Using SQL Scripts" on page 3-1.
- **Query Builder**. See "Building Queries with Query Builder" on page 4-1.
- **Utilities**. See Using Oracle Application Express Utilities on page 5-1.

Accessing Object Browser

To access Object Browser:

1. Log in to the Workspace home page.
2. Click **SQL Workshop**.
3. Click **Object Browser** to drill down to the Object Browser home page.



Searching for and Browsing Database Objects

The Object Selection pane displays on the left side of the Object Browser page and lists database objects by type with the current schema. You can filter the view by selecting an object type or entering a case insensitive search term.

Topics:

- Searching For and Selecting Database Objects
- Hiding the Object Selection Pane

Searching For and Selecting Database Objects

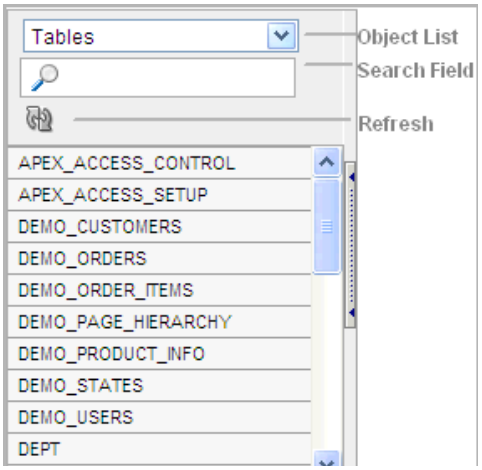
To search for a database object in the Object Selection pane:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. Select an object type from the Object list.

   The list of objects that appears depends upon the available objects in the current schema. Note that any object having a red bar adjacent to it is invalid.



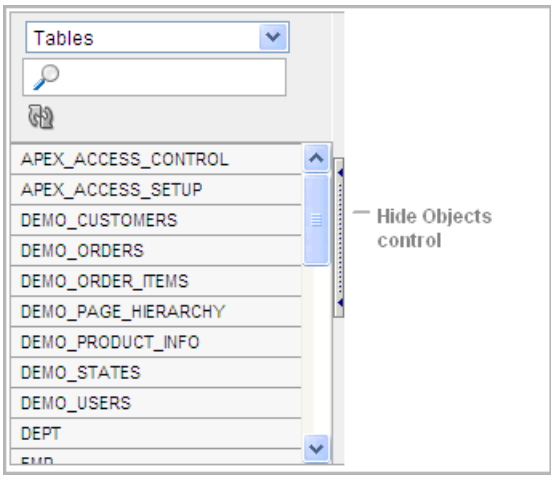
3. To search for an object name, enter a case insensitive search term in the Search field.

4. To view all objects, leave the search field blank.

Once you locate the database object you want to view, simply select it. The selected object displays in the Detail pane. If no object is selected, the Detail pane is blank.

Hiding the Object Selection Pane

You can hide the Object Selection pane by selecting the **Hide Objects** control. This control displays on the right side of the Object Selection pane. If the Object Selection pane appears, selecting this control hides it. Similarly, if the Object Selection pane is hidden, selecting this control causes the pane to reappear.



About Creating Database Objects

You can create database objects using the Create Database Object Wizard. Once you select an object, a set of tabs and buttons appears at the top of the Detail pane. Use the tabs to view different aspects of the current items (for example, a tables indexes). Use the buttons to modify the current object.

To create an object:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**, located in the upper right corner of the Detail pane.
3. From the list of object types, select the type of object you want to create.
4. Follow the on-screen instructions.

Managing Tables

A table is a unit of data storage in an Oracle database, containing rows and columns. When you view a table in Object Browser, a table description appears that describes each column in the table.

Topics:

- Creating a Table
- Browsing a Table
- Editing a Table
- Dropping a Table

See Also:

- *Oracle Database Administrator's Guide* for information on managing tables.
- *Oracle Database Concepts* for conceptual information on tables types.
- *Oracle Database SQL Language Reference* for the syntax required to create and alter tables.

Creating a Table

To create a table:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. Click **Create**.
3. From the list of object types, select **Table**.
4. Enter a table name.

   Table names must conform to Oracle naming conventions and not contain spaces or start with a number or underscore.

5. To have the final table name match the case entered in the Table Name field, click **Preserve Case**.
6. Enter details for each column. For each column:
   a. Enter the column name.
   b. Select the column type.
   c. Enter the following additional information as appropriate:
      – Precision

        The precision is the number of digits before the decimal point. Not all column types have this setting. Precision must be a positive integer. Only `NUMBER`, `FLOAT`, `INTERVAL YEAR TO MONTH`, and `INTERVAL DAY TO SECOND` have this setting. For example, if a column of type `NUMBER` has precision of 4, the column value can be 0 through 9999.

      – Scale

        The function of the scale setting depends on the column type. For `NUMBER` types, scale is the number of digits after the decimal point. For `VARCHAR2` and `CHAR` types, scale is the number of stored characters and must be no more than 4000 bytes. For `TIMESTAMP` types, scale is the fractional seconds precision and must be a number between 0 and 9. Scale must be a positive number. For example, if a column type `TIMESTAMP` has a scale of 3, seconds are between .000 seconds and .999 seconds.

   d. To specify a column must always have a value, select the check box in the **Not Null** column.

      To change the order of previously entered columns, click the **Up** and **Down** arrows in the Move column. To add additional columns, click **Add Column**.

   e. Click **Next**.

   Next, define the primary key for this table (optional). A primary key is a single field or combination of fields that uniquely identifies a record.

7. For Primary Key, select the appropriate option and click **Next**:
   - **No Primary Key** - No primary key is created.
   - **Populate from a new sequence** - Creates a primary key and creates a trigger and a sequence. The sequence is used in the trigger to populated the selected primary key column. The primary key can only be a single column.

- **Populated from an existing sequence** - Creates a primary key and creates a trigger. The selected sequence is used in the trigger to populate the selected primary key column. The primary key can only be a single column.
- **Not populated** - Defines a primary key but does not have the value automatically populated with a sequence within a trigger. You can also select this option to define a composite primary key (that is, a primary key made up of multiple columns).

Next, add foreign keys (optional). A foreign key establishes a relationship between a column (or columns) in one table and a primary or unique key in another table.

8. To add a foreign key:
   a. Name - Enter a name of the foreign key constraint that you are defining.
   b. Select Key Column(s) - Select the columns that are part of the foreign key, then click the **Add** icon to move them to Key Column(s).
   c. References Table - Select the table which is referenced by this foreign key. Then, select the columns referenced by this foreign key. Once selected, click the **Add** icon to move the selected columns to Referenced Column(s).
   d. Select the appropriate option:
      – **Disallow Delete** - Blocks the delete of rows from the referenced table when there are dependent rows in this table.
      – **Cascade Delete** - Deletes the dependent rows from this table when the corresponding parent table row is deleted.
      – **Set to Null on Delete** - Sets the foreign key column values in this table to null when the corresponding parent table row is deleted.
   e. Click **Add**.
   f. Click **Next**.

   Next, add a constraint (optional). You can create multiple constraints, but you must add each constraint separately.

9. To add a constraint:
   a. Specify the type of constraint (Check or Unique).

      A **check constraint** is a validation check on one or more columns within the table. No records can be inserted or updated in a table which violates an enabled check constraint. A **unique constraint** designates a column or a combination of columns as a unique key. To satisfy a unique constraint, no two rows in the table can have the same values for the specified columns.
   b. Enter the constraint in the field provided. For unique constraints, select the column(s) that are to be unique. For check constraints, enter the expression that should be checked such as `flag in ('Y','N')`.
   c. Click **Add**.
10. Click **Next**.

    A confirmation page appears.
11. Click **Create**.

    Note that it is not necessary to follow the steps for creating a table in the order described in the previous procedure. Instead of navigating through the wizard by

clicking the Next and Previous button, you can also access a specific step by selecting it in the progress indicator on the left side of the page.

> **See Also:** "Using the Table Finder" in *Oracle Application Express Application Builder User's Guide* and "Overview of Tables" in *Oracle Database Concepts* for information about tables.

Browsing a Table

When you view a table in Object Browser, the table description appears. While viewing this description, you can add a column, modify a column, rename a column, drop a column, rename the table, copy the table, drop the table, truncate the table, or create a lookup table based upon a column in the current table. Additionally, you have access to other reports that offer related information including the table data, indexes, data model, constraints, grants, statistics, user interface defaults, triggers, dependencies, and SQL to produce the selected table.

To view a table description:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, ensure **Tables** is selected.

3. From the Object Selection pane, select a table.

   The table description appears.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the table. Table 1–1 describes all available views.

Table 1–1 Available Views for Tables

View	Description
Table	Displays details of the first 57 columns including the column name, data type, nullable status, default value, and primary key. While viewing table details you can add, modify, delete, or rename a column. Additionally, you can drop, rename, copy, or truncate the table only if the referencing table has no records and create a lookup table. To export the data as a comma-delimited file (.csv) file, click the **Download** link. **See Also:** "Editing a Table" on page 1-8
Data	Displays a report of the data in the current table. Actions you can perform include: ■ **Query** - Enables you to sort by column. To restrict specific rows, enter a condition in the Column Condition field. Use the percent sign (%) for wildcards. From Order by, select the columns you want to review and click **Query**. ■ **Count Rows** - Displays a report of the number of rows in the current table. ■ **Insert Row** - Enables you to insert a row into the table. ■ **Download** - Exports all data in the table to a spreadsheet. Click the download link at the bottom of the page to export all data in the selected table.

Table 1–1 (Cont.) Available Views for Tables

View	Description
Indexes	Displays indexes associated with this table. Actions you can perform include **Create** and **Drop**. **See Also:** "Managing Indexes" on page 1-12
Model	Displays a graphical representation of the selected table along with all related tables. Related tables are those that reference the current table in a foreign key and those tables referenced by foreign keys within the current table. You can position the cursor over an underlined table name to view the relationship between that table and the current table. Click an underlined table name to view the model of the related table.
Constraints	Displays a list of constraints for the current table. Actions you can perform include **Create**, **Drop**, **Enable**, and **Disable**.
Grants	Displays a list of grants on the current table, including the grantee, the privilege, and grant options. Actions you can perform in this view include **Grant** and **Revoke**.
Statistics	Displays collected statistics about the current table, including the number of rows and blocks, the average row length, sample size, when the data was last analyzed, and the compression status (enabled or disabled). Click **Analyze** to access the Analyze Table Wizard.
UI Defaults	Displays user interface defaults for forms and reports. User interface defaults enable developers to assign default user interface properties to a table, column, or view within a specified schema. Click **Edit** to edit defined user interface defaults. Click **Create Defaults** to initialize user interface defaults for tables that do not currently have user interface defaults defined. **See Also:** "Managing User Interface Defaults" in *Oracle Application Express Application Builder User's Guide*.
Triggers	Displays a list of triggers associated with the current table. Actions you can perform include **Create**, **Drop**, **Enable**, and **Disable**. To view trigger details, click the trigger name. **See Also**: "Managing Triggers" on page 1-26
Dependencies	Displays report showing objects referenced by this table, objects this table references, and synonyms for this table.
SQL	Displays the SQL necessary to re-create this table, including keys, indexes, triggers and table definition.

Editing a Table

While viewing a table description, you can edit it by clicking the buttons above the table description.

To edit a table:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, ensure **Tables** is selected.
3. From the Object Selection pane, select a table.

The table description appears.

4. Click the appropriate button described in Table 1–2.

Table 1–2 Edit Table Buttons

Button	Description
Add Column	Adds a column to the table. Enter a column name and select a type. Depending upon the column type, specify whether the column requires a value, the column length, precision, and scale.
Modify Column	Modifies the selected column.
Rename Column	Renames the selected column.
Drop Column	Drops the selected column.
Rename	Renames the selected table.
Copy	Copies the selected table.
Drop	Drops the selected table. **See Also:** "Using the Recycle Bin to View and Restore Dropped Objects" on page 5-16
Truncate	Removes all rows from the selected table. Truncating a table can be more efficient than dropping and re-creating a table. Dropping and re-creating a table may invalidate dependent objects, requiring you to regrant object privileges or re-create indexes, integrity constraints, and triggers.
Create Lookup Table	Creates a lookup table based on the column you select. That column becomes a foreign key to the lookup table.

Dropping a Table

To drop a table:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, ensure **Tables** is selected.
3. From the Object Selection pane, select a table.

   The table description appears.

4. Click **Drop**.
5. To confirm, click **Finish**.

> **See Also:** "Using the Recycle Bin to View and Restore Dropped Objects" on page 5-16

Managing Views

A view is a logical representation of another table or combination of tables. A view does not contain or store data but derives its data from the views or tables on which it is based. These tables are called **base tables**. All operations performed on a view affect the base table of the view. In order to be updatable, a view cannot contain any of the following constructs: SET or DISTINCT, operators, aggregate or analytic functions, GROUP BY, ORDER BY, CONNECT BY, START WITH clause, subquery or collection expression in a SELECT list.

For an example where using a view might be preferable to a table, consider the HR.EMPLOYEES table which has several columns and numerous rows. To allow users to see only five of these columns or only specific rows, a view is created as follows:

```
CREATE VIEW staff AS
SELECT employee_id, last_name, job_id, manager_id, department_id
FROM employees
```

Topics:

- Creating a View
- Browsing a View
- Editing a View
- Compiling a View
- Dropping a View

See Also: *Oracle Database Administrator's Guide*

Creating a View

To create a view:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. Click **Create**.
3. From the list of object types, select **View**.
4. Define the view:
   - **View Name** - Enter a name for the View.
   - **Query** - Specify a query to define the view.

     To access Query Builder or SQL Command Processor, click the appropriate link at the bottom of the page. The selected tool appears in a pop-up window. Once you create the appropriate SQL, click **Return** to automatically close the popup window and return to the wizard with the SQL.
5. Click **Next**.

   A confirmation page appears.
6. Click **Create**.

See Also: "Building Queries with Query Builder" on page 4-1 and "Using SQL Commands" on page 2-1

Browsing a View

When you access a view in Object Browser, the Detail pane displays a report listing the columns in that view.

To browse a view:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Views**.

3. From the Object Selection pane, select a view.

   The view definition appears displaying the appropriate columns.

Summary of Available Views

Click the tabs at the top of the page to view different reports. Table 1–3 describes all available views.

Table 1–3 Available Views for Views

View	Description
View	(Default) Displays the columns in the current view. Actions you can perform include: ▪ Compile ▪ Drop **See Also:** "Editing a View" on page 1-11, "Compiling a View" on page 1-12, and "Dropping a View" on page 1-12
Code	Displays the code editor. **See Also**: "Editing a View" on page 1-11.
Data	Displays a report of the data in the columns in the view. Actions you can perform include: ▪ **Query** - Enables you to sort by column. To restrict specific rows, enter a condition in the Column Condition field. Use the percent sign (%) for wildcards. From Order by, select the columns you want to review and click **Query**. ▪ **Count Rows** - Enables you to count rows in the table. ▪ **Insert Row** - Enables you to insert a row into the table.
Grants	Displays a list of grants associated with the columns in the view. Grant details include grantee, privilege, and grant options. Actions you can perform include **Grant** and **Revoke**.
UI Defaults	Displays user interface defaults for forms and reports. User interface defaults enable developers to assign default user interface properties to a table, column, or view within a specified schema. Click **Edit** to edit existing user interface defaults. Click **Create** to initialize user interface defaults for views that do not currently have user interface defaults defined. **See Also:** "Managing User Interface Defaults" in *Oracle Application Express Application Builder User's Guide*.
Dependencies	Displays a report showing objects referenced by this view, objects this view references, and synonyms for this view.
SQL	Displays the SQL necessary to re-create this view.

Editing a View

When you edit a view you can edit the code manually, perform a search and replace, and compile the view. Additionally, you can save the view as a file or drop it.

Editing a View Manually

To edit a view manually:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Views**.
3. From the Object Selection pane, select a view.
4. Select the **Code** tab.

   The code editor appears.

   If you edit and make changes to a view, you must compile. See "Compiling a View" on page 1-12.

Using Find and Replace

Click **Find & Replace** to perform a basic search and replace.

Downloading a View

Click **Download Source** to save the current view as a file.

Compiling a View

If you edit and make changes to a view, you must compile to save your changes. Note that there is no save function since this is just a view of the object within the database.

Click **Save & Compile** to re-create the current view.

Dropping a View

To drop a view:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Views**.
3. From the Object Selection pane, select a view.
4. Select the **View** tab or the **Code** tab.
5. Click **Drop**.
6. To confirm, click **Finish**.

Managing Indexes

An index is an optional structure associated with tables and clusters. You can create indexes on one or more columns of a table to speed access to data on those columns.

When you view an index in Object Browser, the Detail pane displays a report containing the index name, index type, table owner, table type, uniqueness, compression, prefix length, tablespace name, status, last analyzed and a listing of the indexed columns.

Topics:

- Creating an Index
- Browsing an Index
- Dropping an Index

Creating an Index

To create an index:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. Click **Create**.
3. From the list of object types, select **Index**.
4. Select a table and select the type of index you want to create. Available index types include:
   - **Normal** - Indexes one or more scalar typed object attributes of a table
   - **Text** - Creates a text index (Oracle Text)
5. Click **Next**.
6. Create the index definition. Specify an index name, select one or more columns to be indexed, and click **Next**.
7. To confirm, click **Finish**.

Browsing an Index

To browse an index:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Indexes**.
3. From the Object Selection pane, select an index.

   The index appears displaying the index name, type, table owner, table type and a listing of indexed columns.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the index. Table 1–4 describes all available views.

Table 1–4 Available Views for Indexes

View	Description
Object Details	Displays the index name, index type, table owner, table name, table type, uniqueness, compression, prefix length, tablespace name, status, last analyzed and also a listing of the indexed columns. Actions you can perform while viewing Object Details include: ■ Disable - Disables the current index ■ Drop - Drops the current index ■ Rebuild - Rebuilds the current index
Statistics	Displays collected statistics about the current view, including the number of rows, sample size, when the data was last analyzed, and the compression status (enabled or disabled). Click **Analyze** to refresh the displayed statistics.
SQL	Displays the SQL necessary to re-create this index.

Dropping an Index

To drop an index:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Indexes**.
3. From the Object Selection pane, select an index.
4. Under Object Details, click **Drop**.
5. To confirm, click **Finish**.

Managing Sequences

A sequence generates a serial list of unique numbers for numeric columns of a database table. Database sequences are generally used to populate table primary keys.

Topics:

- Creating a Sequence
- Browsing a Sequence
- Dropping a Sequence

Creating a Sequence

To create a sequence:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Sequence**.
4. Specify the following and click **Next**:
   - Sequence Name - Enter the name of the sequence.
   - Preserve Case - To have the final sequence name match the case entered in the Sequence Name field, click **Preserve Case**.
   - Start With - Enter the number of the first sequence. The first reference to sequence_name.nextval returns this number.
   - Minimum Value - Enter the minimum value this sequence can return.
   - Maximum Value - Enter the maximum value this sequence can return.
   - Increment By - Each call to sequence_name.nextval will return a value greater than the last, until the maximum value is reached. Enter the value used to increment to the next sequence number.
   - Cycle - Select this option to restart the sequence number to the minimum value when the maximum value is reached. This is not recommended if using the sequence for primary key creation.
   - Number to Cache - For faster access, specify how many sequence values are stored in memory.
   - Order -

A confirmation page appears.

5. Click **Create**.

Browsing a Sequence

To browse a sequence:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Sequences**.
3. From the Object Selection pane, select a sequence.

   The Object Details view appears.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the sequence. Table 1–5 describes all available views.

Table 1–5 Available Views for Sequences

View	Description
Object Details	Displays details about the current sequence. Actions you can perform in this view include **Alter** and **Drop**.
Grant	Displays a list of grants associated with the sequence. Grant details include grantee, privilege, and grant options. Actions you can perform include **Grant** and **Revoke**.
Dependencies	Displays a list of objects that use (or depend) upon this sequence.
SQL	Displays the SQL necessary to re-create this sequence.

Dropping a Sequence

To drop a sequence:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Sequences**.
3. From the Object Selection pane, select a sequence.

   The Object Details view appears.

4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Types

A type is a user-specified object or collection definition. Oracle Application Express currently only supports collection definitions. There are two categories of Oracle collections (SQL collections):

- Variable-length arrays (`VARRAY` types)
- Nested tables (`TABLE` types)

VARRAY types are used for one-dimensional arrays, while nested table types are used for single-column tables within an outer table.

Topics:

- Creating a Type
- Browsing a Type
- Dropping a Type

> **See Also:** *Oracle Database Concepts* and *Oracle Database PL/SQL Language Reference* for information about collection types

Creating a Type

To create a collection type:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Type**.
4. Specify a name and click **Next**.
5. Select a type, data type, limit, and click **Next**.

   A confirmation page appears. To view the SQL used to create the collection type, click **Show SQL**.
6. Click **Finish**.

Browsing a Type

To browse a collection type:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Types**.
3. From the Object Selection pane, select a type.

   The Object Details view appears.

Summary of Available Views

Click the tabs at the top of the page to view different reports. Table 1–6 describes all available views.

Table 1–6 Available Views for Types

View	Description
Object Details	Displays details about the selected type. To drop a type, click **Drop**.
Synonyms	Displays a list of synonyms for the current type.
Grants	Displays a list of grants associated with the type. Grant details include grantee, privilege, and grant options. Actions you can perform include **Grant** and **Revoke**.
SQL	Displays the SQL necessary to re-create this type.

Dropping a Type

To drop a collection type:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Types**.
3. From the Object Selection pane, select a type.

   The Object Details view appears.

4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Packages

A package is a database object that groups logically related PL/SQL types, items, functions and procedures. Packages usually have two parts, a specification and a body. The **specification** is the interface to your application. The **body** implements the specification.

Topics:

- Creating a Package
- Viewing a Package
- Editing a Package
- Compiling a Package
- Downloading a Package
- Dropping a Package

See Also:

- "Using PL/SQL Packages" in *Oracle Database PL/SQL Language Reference* for additional information on PL/SQL packages.
- "Using PL/SQL Subprograms" in *Oracle Database PL/SQL Language Reference* for information on PL/SQL subprograms

Creating a Package

To create a package:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. Click **Create**.
3. From the list of object types, select **Package**.
4. Select the type of package you want to create, then click **Next**:
   - Specification
   - Body
   - Package with methods on database tables
5. If you select **Specification**:

a. Enter a name and click **Next**.

   The wizard creates a dummy package specification and displays it for editing.

b. Edit the specification and click **Finish**.

6. If you select **Body**:

   a. Select the package you want to create the body for and click **Next**

      The wizard creates a package body with stubbed out calls identified in the specification and displays it for editing.

   b. Edit the package body and click **Finish**.

7. If you select **Package with methods on database tables**:

   a. Enter a name and click **Next**.

   b. Select up to ten tables and click **Next**.

      The wizard creates a specification and body with insert, update, delete, and GET APIs for the selected tables. Note that you have the option to show or download the specification or body.

   c. To confirm, click **Finish**.

Viewing a Package

When you access a package in Object Browser the specification appears.

To view a specification:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Packages**.

3. From the Object Selection pane, select a package.

   The Specification appears. You can also edit the code in this view.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the package. Table 1–7 describes all available views.

Table 1–7 Available Views for Packages

View	Description
Specification	Displays the package specification. This defines the interface to your application. Actions you can perform include: ▪ **Edit** ▪ **Undo** ▪ **Redo** ▪ **Save & Compile** ▪ **Download Source** ▪ **Drop** ▪ **Find & Replace**

Table 1–7 (Cont.) Available Views for Packages

View	Description
Body	Displays the package body, if one exists, for the selected package. Actions you can perform include: ■ **Edit** ■ **Undo** ■ **Redo** ■ **Save & Compile** ■ **Download Source** ■ **Drop** ■ **Find & Replace**
Dependencies	Displays objects that use (or depend on) on the current package and objects the package depends on.
Errors	Displays errors related to the current package.
Grants	Lists details of grants for the current package, including privilege, grantee, grantable, grantor, and object name.

Editing a Package

When you edit a package, you can edit the code manually, perform a search and replace, and compile the package.

Editing a Package Manually

To edit a package manually:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Packages**.
3. From the Object Selection pane, select a package.

   The Specification appears. You can edit the code in this view.

4. Click **Find & Replace** to perform a basic search and replace.

Compiling a Package

If you edit and make changes to a package, you must compile to save your changes. There is no save function because this is just a view of the object within the database.

To compile a package:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Packages**.
3. From the Object Selection pane, select a package.

   The Specification appears.

4. Click **Save & Compile** to compile the current package.

   Compiling re-creates the object in the database. If the compile fails, an error message display above the code.

Downloading a Package

To download a package:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Packages**.
3. From the Object Selection pane, select a package.

   The Specification appears.
4. Click **Download Source** to save the current package as a file.

Dropping a Package

To drop a package while viewing the Specification:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Packages**.
3. From the Object Selection pane, select a package.

   The Specification appears.
4. Click **Drop**.
5. To confirm, click **Finish**.

To drop a package while viewing the Body:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Packages**.
3. From the Object Selection pane, select a package.

   The Specification appears.
4. Click the **Body** tab.
5. Click **Drop**.
6. To confirm, click **Finish**.

Managing Procedures

A procedure is a subprogram that performs a specific action. You can use Object Browser to view, create, edit, download, and drop procedures.

Topics:

- Creating a Procedure
- Browsing a Procedure
- Editing a Procedure
- Compiling a Procedure
- Downloading a Procedure
- Dropping a Procedure

See Also: *Oracle Database PL/SQL Language Reference*

Creating a Procedure

To create a procedure:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Procedure**.
4. Enter a procedure name and click **Next**.
5. Define the arguments by specifying the following information (optional):
   - Argument Name
   - In/Out (the parameter mode)
   - Argument Type (datatype)
   - Default (value)

   To add additional arguments, click **Add Argument**.
6. Click **Next**.
7. Enter PL/SQL block you want to use as the procedure body and click **Next**.

   A confirmation page appears.
8. Click **Finish**.

Browsing a Procedure

To browse a procedure:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Procedures**.
3. From the Object Selection pane, select a procedure.

   The Code view appears, displaying the source code for the procedure. You can edit the code in this view.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the procedure. Table 1–8 describes all available views.

Table 1–8 Available Views for Procedures

View	Description
Code	(Default) Displays the source code for the procedure. You can edit the code in this view. Actions you can perform in this view include: ▪ **Edit** ▪ **Undo** ▪ **Redo** ▪ **Save & Compile** ▪ **Download Source** ▪ **Drop** ▪ **Find & Replace** **See Also:** "Editing a Procedure" on page 1-22, "Compiling a Procedure" on page 1-22, "Downloading a Procedure" on page 1-23, and "Dropping a Procedure" on page 1-23
Dependencies	Displays objects that use (or depend) on the current procedure and objects the procedure depends on.
Errors	Lists errors related to the current procedure.
Grants	Lists details of grants for the current procedure, including privilege, grantee, grantable, grantor, and object name.

Editing a Procedure

When you edit a procedure you can edit the code manually or perform a search and replace.

Editing a Procedure Manually

To edit a procedure manually:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Procedures**.
3. From the Object Selection pane, select a procedure.

   The Code view appears. You can edit the code in this view.

4. Click **Find & Replace** to perform a basic search and replace.

Compiling a Procedure

If you edit and make changes to a procedure, you must compile to save your changes. There is no save function because this is just a view of the object within the database.

To compile a procedure:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Procedures**.
3. From the Object Selection pane, select a procedure.
4. Click **Save & Compile** to compile the current procedure.

Compiling re-creates the object in the database. If the compile fails, an error message display above the code.

Downloading a Procedure

To download a procedure:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Procedures**.
3. From the Object Selection pane, select a procedure.
4. Click **Download Source** to save the current procedure as a file.

Dropping a Procedure

To drop a procedure:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Procedures**.
3. From the Object Selection pane, select a procedure.
4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Functions

A function is a subprogram that can take parameters and return a single value.

Topics:

- Creating a Function
- Browsing a Function
- Editing a Function
- Compiling a Function
- Downloading a Function
- Dropping a Function

> **See Also:** *Oracle Database SQL Language Reference* for information about PL/SQL functions and *Oracle Database PL/SQL Language Reference*

Creating a Function

To create a function:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Function**.

4. Enter a function name, specify the return datatype, and click **Next**.
5. Define the arguments and click **Next** (optional):
   - Argument Name
   - Argument Type (datatype)
   - Default (value)

   To add additional arguments, click **Add Argument**.
6. Enter PL/SQL block you want to use as the function body and click **Next**.

   To link to SQL Commands, click **SQL Commands.**

   A confirmation page appears.
7. Click **Finish**.

Browsing a Function

To view a function in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Functions**.
3. From the Object Selection pane, select a function.

   The Code view appears. You can edit the code in this view.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the function. Table 1–9 describes all available views.

Table 1–9 Available Views for Functions

View	Description
Code	(Default) Displays the source code for the function. You can edit the code in this view. Actions you can perform in this view include: ■ **Edit** ■ **Undo** ■ **Redo** ■ **Save & Compile** ■ **Download Source** ■ **Drop** ■ **Find & Replace** **See Also:** "Editing a Function" on page 1-25, "Compiling a Function" on page 1-25, "Downloading a Function" on page 1-25, and "Dropping a Function" on page 1-25
Dependencies	Displays objects that use (or depend) on the current function and objects the function depends on.
Errors	Displays errors related to the current function.
Grants	Lists details of grants for the current function, including privilege, grantee, grantable, grantor, and object name.

Editing a Function

When you edit a function you can edit the code manually, perform a search and replace, and compile the function.

Editing a Function Manually

To edit a function manually:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Functions**.
3. From the Object Selection pane, select a function.

   The Code view appears. Be default, you can copy code from this view for use in other tools.

4. Click **Edit** to activate manual edit mode.
5. Click **Find** to perform a basic search and replace.

Compiling a Function

If you edit and make changes to a function, you must compile to save your changes. There is no save function because this is just a view of the object within the database.

To compile a function in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Functions**.
3. From the Object Selection pane, select a function.

   The Code view appears.

4. Click **Save & Compile** to compile the current function.

   Compiling re-creates the object in the database. If the compile fails, an error message display above the code.

Downloading a Function

To save a function to a file in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Functions**.
3. From the Object Selection pane, select a function.

   The Code view appears.

4. Click **Download Source** to save the current function as a file.

Dropping a Function

To drop a function in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

Object Browser appears.

2. From the Object list, select **Functions**.
3. From the Object Selection pane, select a function.

   The Code view appears.
4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Triggers

A database trigger is a stored subprogram associated with a database table, view, or event. The trigger can be called once, for example when an event occurs, or many times, for example for each row affected by an INSERT, UPDATE, or DELETE statement.

Topics:

- Creating Triggers
- Browsing a Trigger
- Editing a Trigger
- Compiling a Trigger
- Downloading a Trigger
- Dropping a Trigger

See Also:

- *Oracle Database Concepts*
- *Oracle Database Advanced Application Developer's Guide*

Creating Triggers

To create a trigger in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Trigger**.
4. Select a table name and click **Next**.
5. Select the appropriate trigger attributes, enter the trigger body, and click **Next**.

   A confirmation page appears.
6. Click **Finish**.

Browsing a Trigger

To browse a trigger in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Triggers**.

3. From the Object Selection pane, select a trigger.

   The Object Details view appears.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the trigger. Table 1–10 describes all available views.

Table 1–10 Available Views for Triggers

View	Description
Object Details	(Default) Lists of the details about the current trigger. Actions you can perform include: ▪ **Compile** ▪ **Download** ▪ **Drop**
Code	Displays the source code for the trigger. You can edit the code in this view. Actions you can perform in this view include: ▪ **Edit** ▪ **Undo** ▪ **Redo** ▪ **Save & Compile** ▪ **Download Source** ▪ **Drop** ▪ **Find & Replace** **See Also:** "Editing a Trigger" on page 1-27, "Compiling a Trigger" on page 1-27, "Downloading a Trigger" on page 1-28, and "Dropping a Trigger" on page 1-28
Errors	Displays errors related to the current trigger.
SQL	Displays the SQL necessary to re-create the trigger.

Editing a Trigger

When you edit a trigger you can edit the code manually, perform a search and replace, and compile the trigger.

Editing a Trigger Manually

To edit a trigger manually:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Triggers**.
3. From the Object Selection pane, select a trigger.
4. Select the **Code** tab to activate manual edit mode.
5. Click **Find & Replace** to perform a basic search and replace.

Compiling a Trigger

If you edit and make changes to a function, you must compile to save your changes. There is no save function because this is just a view of the object within the database.

To compile a trigger in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Triggers**.
3. From the Object Selection pane, select a trigger.

   The Details view appears.
4. Click **Save & Compile** to compile the current trigger.

   Compiling re-creates the object in the database. If the compile fails, an error message display above the code.

Downloading a Trigger

To save the current trigger as a file:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Triggers**.
3. From the Object Selection pane, select a trigger.

   The Details view appears.
4. Click **Download Source** to save the current trigger as a file.

Dropping a Trigger

To save drop a trigger in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Triggers**.
3. From the Object Selection pane, select a trigger.

   The Details view appears.
4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Database Links

A database link is a schema object in one database that enables you to access objects in another database. Once you create a database link, you can access the remote objects by appending `@dblink` to the table or view name, where `dblink` is the name of the database link.

Topics:

- Creating a Database Link
- Browsing a Database Link
- Dropping a Database Link

Creating a Database Link

To create a database link:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Database Link**.
4. Specify the following information and click **Next**.
   - Database Link Name
   - Connect To Schema
   - Password
   - Remote Hostname or IP
   - Remote Host Port
   - SID or Service Name

   A confirmation page appears.
5. Click **Create**.

Browsing a Database Link

To browse a database link:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Database Links**.
3. From the Object Selection pane, select a database link.

   The Object Details view appears.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the database link. Table 1–11 describes all available views.

Table 1–11 Available Views for Database Links

View	Description
Object Details	(Default) Displays details about the database link. Actions you can perform include: ■ **Drop** - Deletes the database link ■ **Test** - Tests the database link
Dependencies	Displays a list of objects that use (or depend) upon this database link.
SQL	Displays the SQL necessary to re-create this database link.

Dropping a Database Link

To drop a database link in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

Object Browser appears.

2. From the Object list, select **Database Links**.
3. From the Object Selection pane, select a database link.

   The Object Details View appears.
4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Materialized Views

A materialized view provides indirect access to table data by storing the results of a query in a separate schema object. Unlike an ordinary view, which does not take up any storage space or contain any data, a materialized view contains the rows resulting from a query against one or more base tables or views. A materialized view can be stored in the same database as its base tables or in a different database.

Materialized views are often used to improve performance, especially when storing data locally that is sourced from tables or views using a database link. Similarly, materialized views are often used instead of views when there are extensive calculations or summarizations, especially on particularly large data sets. Materialized views are refreshed at specified intervals which means the data is not always up-to-date but queries against them will be significantly faster for the examples given above.

Topics:

- Creating a Materialized View
- Browsing a Materialized View
- Dropping a Materialized View

> **See Also:** *Oracle Database Concepts* for information about materialized views

Creating a Materialized View

To create a materialized view:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Materialized View**.
4. Define the materialized view:
   a. **Materialized View Name** - Enter a name.
   b. **Query** - Specify a query to define the view.

      To access Query Builder or SQL Command Processor, click the appropriate link at the bottom of the page. The selected tool appears in a pop-up window. Once you generate the appropriate SQL, click **Return** to automatically close the popup window and return to the wizard with the SQL.
   c. Click **Next**.

      A confirmation page appears.

5. Click **Create**.

> **See Also:** "Building Queries with Query Builder" on page 4-1 and "Using SQL Commands" on page 2-1

Browsing a Materialized View

To view a materialized view:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.

2. From the Object list, select **Materialized Views**.
3. From the Object Selection pane, select a view.

   The Materialized View appears.

Summary of Available Views

Click the tabs at the top of the page to view different reports about the materialized view. Table 1–12 describes all available views.

Table 1–12 Available Views for Materialized View

View	Description
Materialized View	(Default) Displays details about the columns in the materialized view, including: ▪ Column Name ▪ Data type ▪ Nullable flag ▪ Default value ▪ Primary key Click **Drop** to delete the current materialized view.
Data	Displays a report of the data in the columns. Actions you can perform include: ▪ **Query** - Enables you to sort by column. To restrict specific rows, enter a condition in the Column Condition field. Use the percent sign (%) for wildcards. From Order by, select the columns you want to review and click Query. ▪ **Count Rows** - Displays a report of the data in the current table. ▪ **Download** - Click this link to export the data as a comma-delimited file (.csv) file.
Details	Displays object details stored in `DBA_SNAPSHOTS` such as updatable and status.
Grants	Displays a list of grants on the current view, including grantee, privilege, and grant options. Actions you can perform in this view include **Grant** and **Revoke**.
Dependencies	Displays a list of objects that use (or depend) upon this materialized view.
SQL	Displays the SQL necessary to re-create this materialized view.

Dropping a Materialized View

To drop a materialized view in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Materialized Views**.
3. From the Object Selection pane, select a view.

   The Materialized View appears.
4. Click **Drop**.
5. To confirm, click **Finish**.

Managing Synonyms

A synonym is an alias for a schema object. Synonyms can provide a level of security by masking the name and owner of an object and by providing location transparency for remote objects of a distributed database. Also, they are convenient to use and reduce the complexity of SQL statements for database users.

Topics:

- Creating Synonyms
- Viewing a Synonym
- Dropping a Synonym

> **See Also:** *Oracle Database Administrator's Guide* for information about synonyms

Creating Synonyms

To create a synonym:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. Click **Create**.
3. From the list of object types, select **Synonym**.
4. Define the synonym:
   a. **Synonym Name** - Enter a name.
   b. **Public or Private** - Specify whether the synonym should be public or private.
   c. **Schema** - Select the database schema (or user name) which owns the object upon which you want to create your synonym.
   d. **Object** - Enter the name of the object upon which you want to create a synonym.
   e. **Database Link** - Enter the name of the database link to use if the synonym is to be create on a remote object.
   f. Click **Next**.

   A confirmation page appears.
5. Click **Finish**.

See Also: "Managing Synonyms" on page 1-32

Viewing a Synonym

To view a synonym:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Synonyms**.
3. From the Object Selection pane, select a synonym.

   The Object Details view appears displaying the following:

   - Synonym owner
   - Synonym name
   - Object owner
   - Object Name
   - Object Type
   - Status

Dropping a Synonym

To drop a synonym in Object Browser:

1. On the Workspace home page, click **SQL Workshop** and then **Object Browser**.

   Object Browser appears.
2. From the Object list, select **Synonyms**.
3. From the Object Selection pane, select a synonym and click **Drop**.
4. To confirm, click **Finish**.

2

Using SQL Commands

This section provides information on how to use SQL Commands to create, edit, view, run, and delete SQL commands.

Topics:

- What is SQL Commands?
- Accessing SQL Commands
- About the SQL Commands Home Page
- Using the Command Editor
- Saving an SQL Command
- Copying a Command
- Using Saved Commands
- Using SQL Command History
- Viewing Results
- Using Explain Plan

See Also:

- *Oracle Database SQL Language Reference* for detailed information about SQL statements and other parts of SQL, such as operators, functions, and format models
- *Oracle Database Concepts* for conceptual information about SQL
- *SQL*Plus User's Guide and Reference* for information about SQL*Plus, Oracle's version of SQL
- *Oracle Database Sample Schemas* for information about the `HR` sample schema that is used for examples in this chapter

What is SQL Commands?

You can use SQL Commands to create, edit, view, run, and delete database objects. A SQL command can contain SQL statements or PL/SQL blocks.

When using SQL Commands, remember the following:

- SQL commands created in the Query Builder can be accessed from SQL Commands.
- Saved SQL commands must have unique names within a given workspace.

- There is no interaction between SQL Commands and SQL Scripts.
- You can cut and paste an SQL command from SQL Commands to run in the SQL Script Editor.

See Also: "Using SQL Scripts" on page 3-1

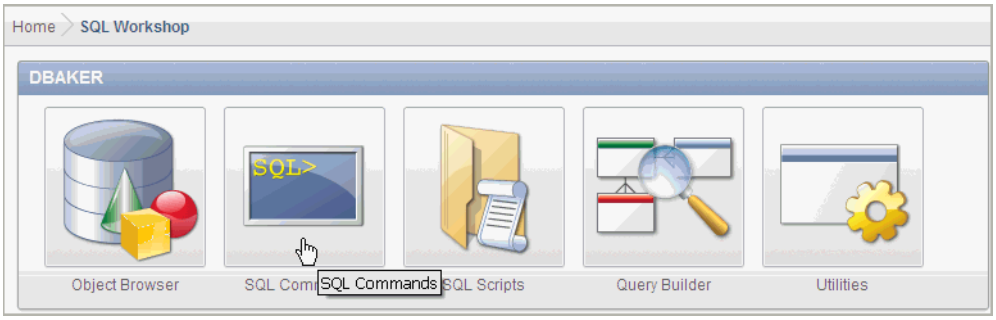
Accessing SQL Commands

To access SQL Commands:

1. Log in to the Workspace home page.

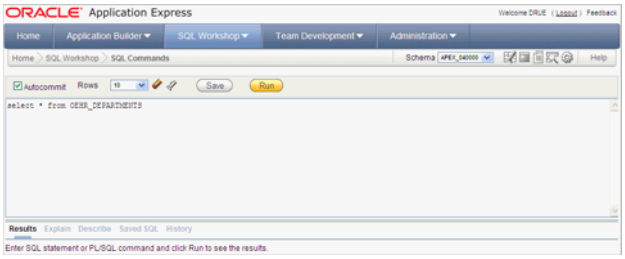
   The Workspace home page appears.

2. Click **SQL Workshop**.
3. Click **SQL Commands** to drill-down to the SQL Commands home page.



About the SQL Commands Home Page

The SQL Commands home page is divided into two sections: a command editor and a display pane. You use the command editor to execute SQL commands and the display pane to view output, saved command lists, and history lists.



The top of the SQL Commands home page features a command editor and the following controls:

- **Autocommit**. If available, click the **Autocommit** check box to enable autocommit and disable transactional commands. See "About Transactions in SQL Commands" on page 2-5.
- **Display**. Make a selection from the Display list to specify the number of rows of output to display simultaneously up to a maximum of 100,000. All rows of DBMS Output are displayed regardless of the Display list setting.
- **Clear Command icon.** The Clear Command icon resembles a pencil with an eraser. Use this icon to clear the text in the command editor.

- **Save**. Click the **Save** button to save the contents of the command editor, or the currently highlighted content to a file. You are prompted to enter a name and an optional description. The command appears in the Saved SQL list. See "Saving an SQL Command" on page 2-7.
- **Run**. Click the **Run** button to run the command in the command editor, or the currently highlighted command in the command editor. See "Running a SQL Command" on page 2-4.

See Also: "Using the Command Editor" on page 2-4

Selecting a Schema

A schema is a logical container for database objects. To access objects in another schema, make a selection from the Schema list in the upper right side of the page.

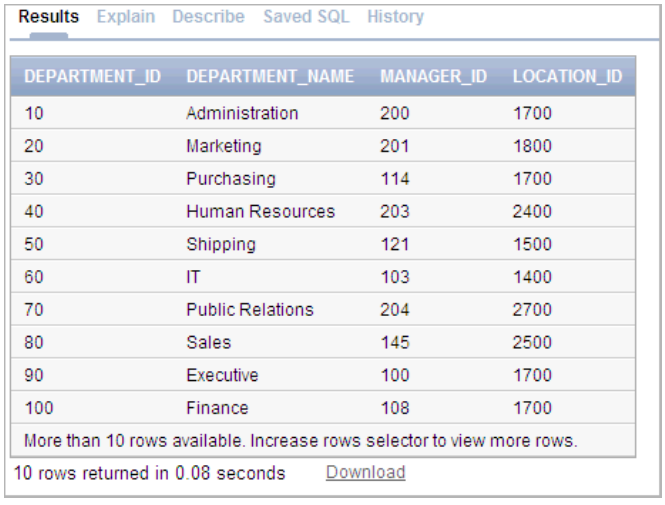
Switching to Another SQL Workshop Component

You can navigate to another SQL Workshop component by making a selection from the Component list located on the upper right side of the page:

- **Object Browser**. See "Managing Database Objects with Object Browser" on page 1-1.
- **SQL Commands**. See "Using SQL Commands" on page 2-1.
- **SQL Scripts**. See "Using SQL Scripts" on page 3-1.
- **Query Builder**. See "Building Queries with Query Builder" on page 4-1.
- **Utilities**. See "Using Oracle Application Express Utilities" on page 5-1.

About the Display Pane

A display pane displays at the bottom of the SQL Commands home page.



The display pane features five tabs:

- **Results.** Click the **Results** tab to see the results from the last successfully executed SQL command. Click **DBMS Output** at the bottom of the displayed results to display lines of DBMS output. This control only appears when there is DBMS output to display. Click **Download** to export results to a comma-delimited file on your local file system. See "Viewing Results" on page 2-10.

- **Explain.** Click the **Explain** tab to examine the execution plan used by the optimizer for statements that make changes to the database. Objects in the output are linked to the Object Browser. Click the linked object to view its properties in the Object Browser. See "Using Explain Plan" on page 2-11.
- **Describe.** Enter Describe *object_name* and click **Run** to display column definitions for a table or view, or specifications for a function or procedure in the **Describe** tab. Select links in the Describe results to write that information into the command editor. For example, click a table name to add *owner.table*, click a column name to add the *column name*, click a procedure or function name to add the object call with parameters, or click a package name to add the package call.
- **Saved SQL.** Click the **Saved SQL** tab to display a list of all SQL commands saved in the current workspace. Click the command title to load it into the command editor. See "Using Saved Commands" on page 2-8
- **History.** Click the **History** tab to list your recently executed commands. Your last 200 executed commands are saved. See "Using SQL Command History" on page 2-9.

Using the Command Editor

You use the command editor in SQL Commands to execute SQL commands within Application Express.

Topics:

- Running a SQL Command
- About Transactions in SQL Commands
- About Unsupported SQL*Plus Commands
- About Command Termination
- Using Bind Variables
- Using the Find Tables Icon

Running a SQL Command

To execute a SQL Command:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.
2. Enter the SQL command you want to run in the command editor.
3. Click **Run** (Ctrl+Enter) to execute the command.

   Tip: To execute a specific statement, select the statement you want to run and click **Run**.

   The results appear in the Results pane.
4. To export the resulting report as a comma-delimited file (.csv), click the **Download** link.

   See Also: "Viewing Results" on page 2-10

About Transactions in SQL Commands

To disable transactional SQL commands in SQL Commands, check the Autocommit check box. Attempting to use any transactional SQL commands such as COMMIT or ROLLBACK when transactional mode is disabled returns an error message.

To enable transactional SQL commands, clear the Autocommit check box. Oracle Application Express verifies that the necessary system resources are available before entering the transactional mode. If resources are unavailable, an error message is displayed.

Transactional mode is a stateful transaction mode where you can, for example, perform an update, select data for review, and COMMIT or ROLLBACK changes. It is implemented using DBMS_JOBS.

Consider the following behavior in transactional mode:

- Actions are not committed to the database until you enter an explicit COMMIT command.
- Exiting SQL Commands terminates and rolls back the current transaction.
- A session timeout terminates and rolls back the current transaction.

  Note that the Environment Setting, `SQL Commands Maximum Inactivity in minutes`, sets the time before an inactive session times out. The default timeout is 60 minutes. See "Configuring SQL Workshop" in *Oracle Application Express Administration Guide*.
- The **CSV Export** option is not available.

About Unsupported SQL*Plus Commands

SQL Commands does not support SQL*Plus commands. If you attempt to enter an SQL Command Line command such as `SET ECHO` or `DEFINE` in SQL Commands, an error message displays.

About Command Termination

You can terminate a command in SQL Commands using a semicolon (;), a slash (/), or with nothing. Consider the following valid alternatives:

```
SELECT * from emp;

SELECT * from emp
/

SELECT * from emp
```

The first example demonstrates the use of a semicolon (;), the second example demonstrates using a slash (/), and the final example demonstrates a command with no termination.

Using Bind Variables

Bind variables are supported. You are prompted to enter values for bind variables during command execution. Bind variables are prefixed with a colon.

For example

```
SELECT * from emp where deptno = :dept
```

Run the following SQL command to check your Workspace ID:

```
SELECT v('WORKSPACE_ID') FROM dual
```

Using the Find Tables Icon

The Find Tables icon resembles a flashlight. Click this icon to view tables within the currently selected schema.



To view tables within the current schema:

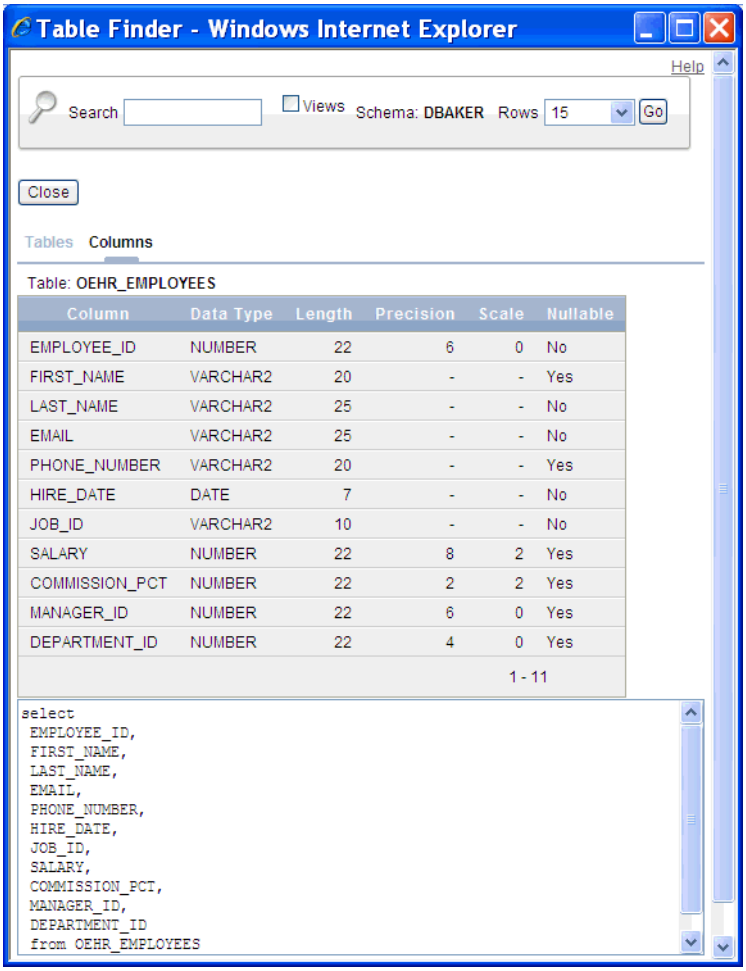
1. Navigate to SQL Commands.
2. From the Schema list, select a schema (optional).
3. Click the **Find Tables** icon.

   The Table Finder appears. A search bar displaying the selected schema displays at the top of the page and contains the following controls:

   - **Search**. Search for a table name. Enter case insensitive keywords in the Search field and click **Go**. To view all tables, leave the Search field blank and click **Go**.
   - **Views**. Select the **Views** check box and click **Go** to include views in the resulting report.
   - **Rows.** Determine how many rows display in the resulting report. To change the number of rows that display, make a selection from the list and click **Go**.

   The Table Finder report appears displaying the table name, the number of rows, last analyzed date, and the object type.
4. Select a table name.

   The Table Finder report appears.



This report displays the column names, data type, length, precision, scale and the SQL necessary to re-create the table that appears at the bottom of the page.

Saving an SQL Command

You can save commands you enter in SQL Commands.

To save an SQL command:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.

2. Enter the command in the command editor.
3. Click **Save** to save the command.

   You are prompted to enter a name and description for the command.

4. Click **Save**, or click **Cancel** to return to the command editor without saving.

   The saved command is listed in the display area.

Copying a Command

To copy a SQL command:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.
2. Click **Saved SQL**.

   The Saved SQL list of commands appears in the display pane.
3. Click the name of the command to load it into the command editor
4. Click **Save** to save the command.
5. Enter a name for the command in the Name field and click **Save**.

   The command is copied to the new name.

Using Saved Commands

You can access the commands you save and commands saved by other users in the same workspace. You can also access SQL commands you and other users of the same workspace saved from the Query Builder.

Topics:

- Accessing Saved Commands
- About the Saved SQL Pane

Accessing Saved Commands

To access saved SQL commands:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.
2. Click the **Saved SQL** tab.

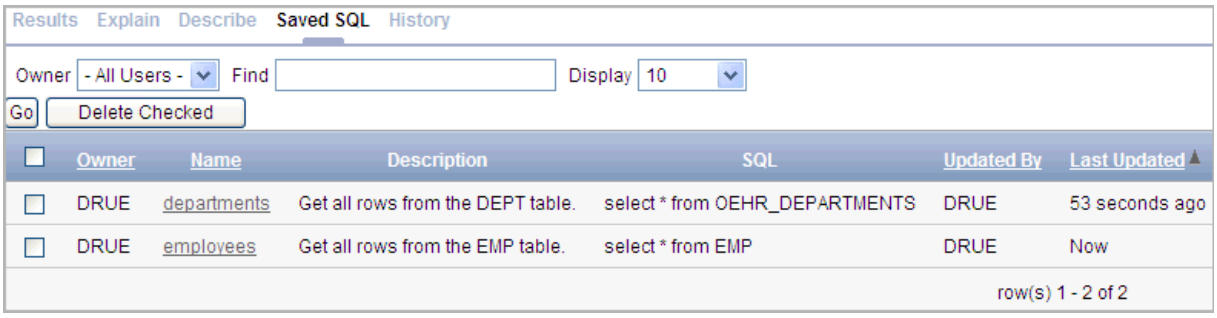
   The Saved SQL list of commands appears in the display pane.
3. Click the title of the command to load it into the command editor.

   The command appears in the editor.
4. Click **Run** to execute the command.

About the Saved SQL Pane

The Saved SQL pane displays a list of all commands saved under the current workspace. The list displays commands saved from SQL Commands and SQL commands saved from Query Builder. Saved SQL commands must have unique names in the current workspace. The same name cannot be used in the Query Builder and SQL Commands.

Each command entry shows the owner name, the command name, a description if it exists, the first characters of the SQL command, who last updated the command and when.



On the Saved SQL pane you can:

- **Show commands by owner.** Make a selection from the Owner list to specify the user whose commands you want to display. To view all scripts select -All Users-.
- **Search for a command.** Enter a command name or partial name, or enter a code snippet in the Find field and click **Go**. To view all scripts, leave the Find field blank and click **Go**. You control how many rows display by making a selection from the Rows list.
- **Set the Number of Output Rows.** Make a selection from the Display list to specify the number of Saved SQL commands to display simultaneously.
- **Delete a command.** Click the check box associated with each command you want to delete, and click **Delete Checked**.
- **Sort commands.** Click a column heading to sort the listed commands by that column.

Using SQL Command History

Commands you have executed are stored in the command history regardless of whether you explicitly save them. You use SQL Command History to access commands you have executed in SQL Commands.

Topics:

- Accessing a Command from Command History
- About the History Pane

Accessing a Command from Command History

To access history commands:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.

2. Click the **History** tab.

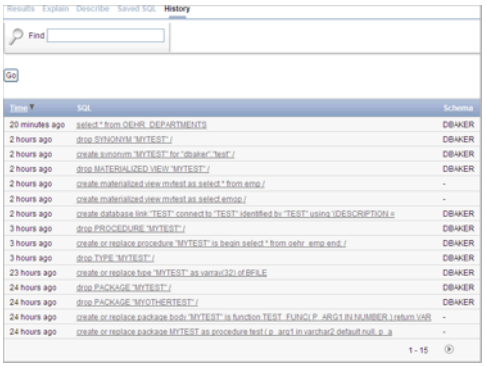
   The list of commands in History appears in the display pane.

3. Click the partial command displayed in the SQL column.

   The command appears in the editor.

About the History Pane

The History pane displays a list of commands you have executed.



Each history entry shows the time the command was last executed, the first characters of the command, and the schema in which it was executed.

On the History pane you can:

- **Load a command.** Click the partial command displayed in the SQL column to load the command into the command editor. When the command loads, it also sets the schema in which it was last executed.
- **Sort by time.** Click the Time column heading to sort the command history by least recent or most recent.

Viewing Results

When you execute a SQL command, the results are displayed. The results of the last executed command are available until you execute another SQL command, or leave SQL Commands.

Topics:

- Accessing the Results Pane
- About the Results Pane

Accessing the Results Pane

To display SQL command results:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.

2. Click the **Results** tab.



The HTML formatted results appear in the display pane.

3. Click **DBMS Output** to display plain text DBMS output results.

   The **DBMS Output** control only appears if there is DBMS output results.

About the Results Pane

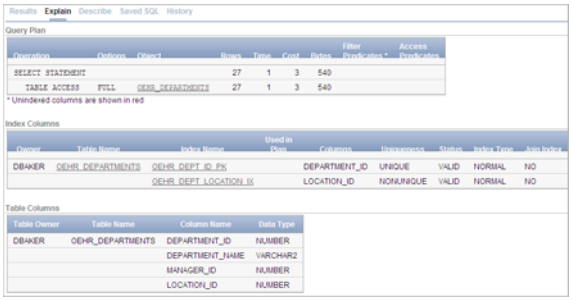
The Results pane displays SQL command results as HTML formatted table. The number of rows returned appears after the output, and the time taken. DBMS output appears as plain text after the HTML formatted results.

On the Results pane you can:

- **Display DBMS output.** Automatically displays HTML output or DBMS output depending on type of SQL command entered, SQL or PL/SQL block with DBMS output.
- **Export results.** Click **Download** to export results to a comma-delimited file on your local file system. You are prompted to enter a name and directory for the file. Only available for HTML output.

Using Explain Plan

You can view the explain plan the Oracle Optimizer uses to run your SQL command. It is not necessary to execute the command to view the explain plan.



Topics:

- Viewing an Explain Plan
- About Explain Plan Pane

Viewing an Explain Plan

To view the Explain Plan:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Commands**.

   The SQL Commands page appears.

2. Enter or load the command whose plan you want to view.
3. Click the **Explain** tab.

   The explain plan used by the optimizer appears in the display pane.

About Explain Plan Pane

The Explain Plan pane shows the plan used by the Oracle Optimizer to run your SQL command. It typically displays the Query Plan, Index Columns and Table Columns used.

On the Explain Plan pane you can:

- **View object definitions.** Click the object name in Query Plan to display the object definition in the Object Browser.
- **View index definitions.** Click the index name in Table Columns to display the index definition in the Object Browser.

3

Using SQL Scripts

This section provides information on how to use SQL Scripts to create, edit, view, run, and delete script files.

Topics:

- What is SQL Scripts?
- Accessing SQL Scripts
- Creating a SQL Script
- Using the Script Editor
- Deleting a SQL Script
- Copying a SQL Script
- Executing a SQL Script
- Viewing SQL Script Results
- Exporting and Importing SQL Scripts
- Viewing Script and Result Quotas

What is SQL Scripts?

A SQL script is a set of SQL commands saved as a file in SQL Scripts. A SQL script can contain one or more SQL statements or PL/SQL blocks. You can use SQL Scripts to create, edit, view, run, and delete database objects.

When using SQL Scripts, remember the following:

- SQL*Plus commands in a SQL script are ignored at run time.
- There is no interaction between SQL Commands and SQL Scripts.
- You can cut and paste a SQL command from the SQL Script editor to run it in SQL Commands.
- SQL Scripts does not support bind variables.

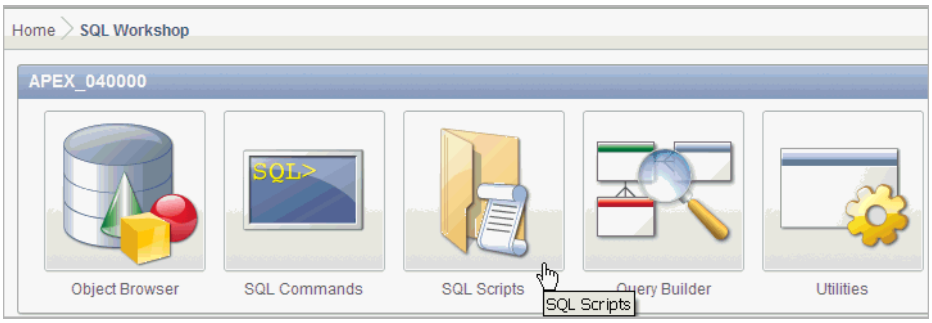
> **See Also:** "Using SQL Commands" on page 2-1 and "About Long Operations" on page 5-22

Accessing SQL Scripts

To access SQL Scripts:

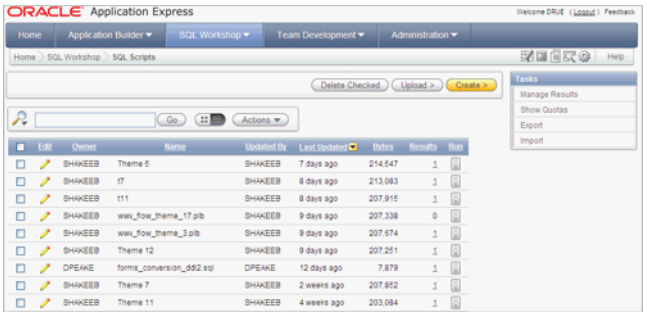
1. Log in to the Workspace home page.

2. Click the **SQL Workshop** icon and then **SQL Scripts** to drill-down to the SQL Scripts page.



About the SQL Scripts Page

The SQL Scripts page displays an Interactive Report of all SQL scripts created by the current user. You can alter the layout of report data by choosing the columns you are interested in, applying filters, highlighting, and sorting. You can also define breaks, aggregations, different charts, group bys, and add your own computations See "Customizing Interactive Reports" in the *Oracle Application Express Application Builder User's Guide*. The Report view displays each script as a row in a report.



The SQL Scripts page features the following controls:

- **View Icons.** Displays each script as an icon identified by the script name.
- **View Reports**. Displays each script as a line in a report. Each line includes a check box to enable the selection of scripts for deletion, an edit icon to enable the script to be loaded into the script editor, the script name, the script owner, when the script was last updated and by who, the size in bytes, the number of times the script has been run linked to the run results, and an icon to enable the script to be run.

  Reports view offers the following additional controls:

  - **Delete Checked.** In Reports view, select the check box associated with the script you want to delete and click **Delete Checked**. See "Deleting a SQL Script" on page 3-7.
  - **Sort.** In Reports view, click a column heading to sort the listed scripts by that column. For additional customization options, see "Customizing Interactive Reports" in the *Oracle Application Express Application Builder User's Guide*.
- **Upload.** Click **Upload** to upload a script from your local file system into SQL Scripts. See "Creating a SQL Script" on page 3-3.

- **Create.** Click **Create** to create a script in the Script Editor. See "Creating a SQL Script" on page 3-3.

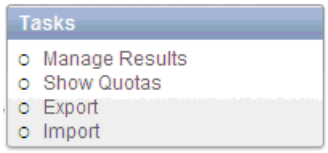
Switching to Another SQL Workshop Component

You can navigate to another SQL Workshop component by making a selection from the Component list located on the upper right side of the page:

- **Object Browser**. See "Managing Database Objects with Object Browser" on page 1-1.
- **SQL Commands**. See "Using SQL Commands" on page 2-1.
- **SQL Scripts**. See "Using SQL Scripts" on page 3-1.
- **Query Builder**. See "Building Queries with Query Builder" on page 4-1.
- **Utilities**. See Using Oracle Application Express Utilities on page 5-1.

About the Tasks List

A Tasks list displays on the right side of the SQL Scripts page.



The Task list contains the following links:

- **Manage Results** enables you to view, search, and display results. See "Viewing SQL Script Results" on page 3-9.
- **Show Quotas** displays the Script Quotas page. The Script Quotas page shows the maximum size of a single result, the maximum size of all results, the quota used and the quota free. It also shows the maximum size of a SQL Script.
- **Export** enables you to export multiple scripts from the current SQL Script Repository for import into SQL Scripts in a different workspace. The scripts you select to export are encoded in a single export script written to your local file system. The export script is named *workspace_name*_script.sql by default. See "Exporting and Importing SQL Scripts" on page 3-11.
- **Import** enables you to import a script exported by this workspace, or a different workspace. **Import** only imports scripts encoded in an export script created using **Export**. The export script to import must be accessible on your local file system. See "Exporting and Importing SQL Scripts" on page 3-11.

Creating a SQL Script

You can create a script in the Script Repository by:

- Creating a script in the Script Editor
- Uploading a script from your local file system

Topics:

- Creating a SQL Script in the Script Editor
- Uploading a SQL Script

Creating a SQL Script in the Script Editor

To create an SQL script in the Script Editor:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. Click the **Create** button.

   The Script Editor appears.

3. Enter a name for the script in the Script Name field.

   Script name extensions are optional.

4. Enter the SQL statements, PL/SQL blocks and SQL*Plus commands you want to include in your script.

   Remember that SQL Command Line commands are ignored at run time.

5. Click **Save** to save your script to the repository.

   The SQL Scripts page appears listing your newly saved script.

Uploading a SQL Script

To upload a script from your local file system:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. Click the **Upload** button.

   The Upload Script dialog appears.

3. To upload a script you can either:

   - Enter the name and path to the script you want to upload to the Script Repository.
   - Using the **Browse** button, select the script you want to upload.

4. Optionally rename the script by entering the new name in the Script Name field.

   This is the name given to the script in the Script Repository.

5. Click **Upload** to add the script to the Script Repository.

   The SQL Scripts page appears listing your newly uploaded script.

   The script is parsed during runtime. When parsed, ignored statements such as SQL*PLUS are listed. Any invalid SQL is identified only in results.

   If a script of the same name exists in the Script Repository, you are prompted to rename it.

Using the Script Editor

You use the Script Editor to add content to a new script, to edit existing scripts, and to run and delete scripts in the script repository.

Topics:

- Editing an Existing Script
- Searching and Replacing Text or Regular Expressions

- Summary of Script Editor Controls

Editing an Existing Script

To edit a SQL script:

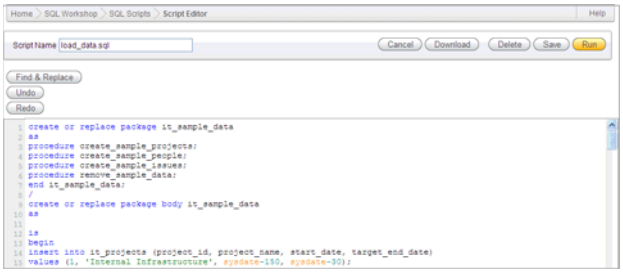
1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. You can load a script into the editor as follows:

   - In Icons view, click the script icon.
   - In Report view, click the **Edit** icon.

   The Script Editor appears.



3. Edit the script.

   Note that new lines are automatically indented to the previous line start column. Other features of the Script Editor include:

   - Search and Replace. Click **Find & Replace** to display the text and JavaScript regular expression find and replace options. Click **Find & Replace** again to hide the options. See "Searching and Replacing Text or Regular Expressions" on page 3-5.
   - **Cut, Copy, and Paste.** Use standard edit controls to cut, copy and paste content in the Script Editor.
   - **Undo**. Use to undo the last edit.
   - **Redo**. Use to reapply the last undone edit.

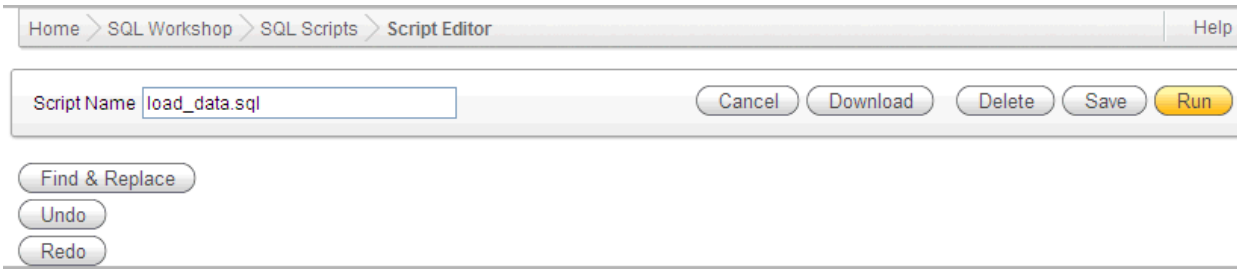
   You can test your script during editing by running the script to reveal errors. The Run Script dialog and the Script Results pages enable you to resume editing the script. See "Executing a SQL Script" on page 3-8, and "Viewing SQL Script Results" on page 3-9.

4. Click **Save** to save your script to the Script Repository,

   The SQL Scripts page appears.

Searching and Replacing Text or Regular Expressions

Clicking the **Find & Replace** button in the Script Editor displays the Find and Replace with fields at the top of the page. Use these fields to search for and replace text strings and JavaScript regular expressions within a script. To exit Find mode, click **Find** again.



To access Find mode in the Script Editor:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. Select a script.

   The Script Editor appears.

3. Click the **Find& Replace** button.

   The Find and Replace fields appear.

4. In the Find field, enter the string you want to find. In Replace with, enter the new string to be added and then click the appropriate button (Find Next, Replace, or Replace All.)

   To further refine your search, select the Match Case check box.

5. To exit Find mode, click **Find & Replace**.

Summary of Script Editor Controls

Table 3–1describes the buttons and controls available within the Script Editor

Table 3–1 Buttons and Controls within the Script Editor

Button	Descriptions
Cancel	Cancel the editing session and exit the Script Editor without saving changes made since the last save.
Download	Saves a copy of the current script to your local file system. Enter a name for the script on your local file system and a directory path.
Delete	Removes the current script from the Script Repository. **See Also:** "Deleting a SQL Script" on page 3-7
Save	Save your changes to the current script to the Script Repository.
Run	Submits the script for execution. **See Also:** "Executing a SQL Script" on page 3-8
Undo (Ctrl+Z)	Removes, or undoes, the most recent line edit made in the Script Editor.
Redo (Ctrl+Y)	Repeats the most recent line edit made in the Script Editor.
Find & Replace	Click Find & Replace to access search and replace mode. Click Find & Replace again to exit Find mode. **See Also:** "Searching and Replacing Text or Regular Expressions" on page 3-5

Deleting a SQL Script

You can delete scripts from the Script Repository by deleting selected scripts from the SQL Scripts page, or deleting the current script in the Script Editor.

Topics:

- Deleting Scripts from the SQL Scripts Page
- Deleting a Script in the Script Editor

Deleting Scripts from the SQL Scripts Page

To delete scripts from the SQL Scripts page.

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. From the View list, select **Reports** view.

   Reports view appears.

3. Select the scripts to be deleted.

   To select individual scripts, click the check box to the left of the Edit icon. To select all scripts visible in the current page, click the check box in the column heading.

4. Click **Delete Checked** to permanently remove the selected scripts from the Script Repository. You are prompted to confirm this action before the script is deleted.

   The message `"Script(s) deleted"` appears above the updated list of Scripts.

Deleting a Script in the Script Editor

To delete a script in the Script Editor:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. Open the script you want to delete in the Script Editor.

3. Click **Delete** to permanently remove the script from the Script Repository. You are prompted to confirm this action before the script is deleted.

   The SQL Scripts page appears. The message `"Script(s) deleted"` appears above the updated list of scripts.

Copying a SQL Script

You can copy a script in the Script Repository by saving it with a new name.

To copy a script:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. Load the script to copy into the editor.

3. Enter a name for the copied script in the Script Name field.

4. Click **Save** to save a copy of the script in the Script Repository.

   The SQL Scripts page appears listing the newly copied script.

Executing a SQL Script

You can execute scripts stored in the Script Repository. You can submit a script for execution either from the Script Editor, or from the SQL Scripts page.

When you submit a script for execution, the Run Script page appears. It displays the script name, when it was created and by who, when it was last updated and by who, the number of statements it contains, and its size in bytes. It also lists unknown statements such as SQL*Plus commands that are ignored during execution.

Finally, it lists statements with errors. If there are errors, the **Run** control does not appear.

Topics:

- Executing a SQL Script in the Script Editor
- Executing a SQL Script from the SQL Scripts Page
- About the Run Script Page

See Also: "About Long Operations" on page 5-22

Executing a SQL Script in the Script Editor

To execute a script in the Script Editor:

1. Open the script you want to execute in the Script Editor. See "Using the Script Editor" on page 3-4.
2. Click **Run** in the Script Editor.
3. The Run Script page appears.

   The Run Script page displays information about the script and lists statements in error preventing execution, or statements such as SQL*Plus commands that are ignored when the script is executed.

   The Run Script page has three controls:

   - **Cancel** returns you to the SQL Scripts page without executing the script.
   - **Run in Batch** runs the job utilizing DDBMS_JOB rather than directly from Oracle Application Express.
   - **Run Now** to submit the script for execution.
4. Click **Run Now** to submit the script for execution.

   The Manage Script Results page appears listing script results.
5. To view script results, click the **View** icon under View Results.

See Also: "Viewing SQL Script Results" on page 3-9

Executing a SQL Script from the SQL Scripts Page

To execute a script from the SQL Scripts page:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.
2. From the View list, select **Details** and click **Go**.

   Details view appears.

3. Click the **Run** icon for the script you want to execute. The Run icon is located on the far right side adjacent to the script name.
4. The Run Script page appears.

   The Run Script page displays information about the script and lists statements in error preventing execution, or statements such as SQL*Plus commands that are ignored when the script is executed. The Run Script page has three controls:

   Cancel to return to the SQL Scripts page without executing the script.

   Run in Batch runs the job utilizing DDBMS_JOB rather than directly from Oracle Application Express.

   Run Now to submit the script for execution. **Run Now** is not available for scripts with errors.
5. Click **Run Now** to submit the script for execution.

   The Manage Script Results page appears listing available results for the script.
6. Click the View icon for the results you want to view. The View icon is at the right end of the scripts listed in the Manage Script Results page.

See Also: "Viewing SQL Script Results" on page 3-9

About the Run Script Page

On the Run Script page, you can:

- **Cancel the execution.** Click **Cancel** to exit the Run Script page without executing the script. The SQL Scripts page appears.
- **Edit the script. Edit Script** appears instead of **Run** when a script has errors. Click **Edit Script** to load the script into the Script Editor to remove the lines with errors.
- **Execute the script.** Click **Run** to execute the script.

Viewing SQL Script Results

You use the Manage Script Results page to view and delete script results.

You can also select script results to view from the Icons view of the SQL Scripts page, and from the Results column of the SQL Scripts page Details view.

Topics:

- Viewing Results from the SQL Scripts Page
- About the Results Page

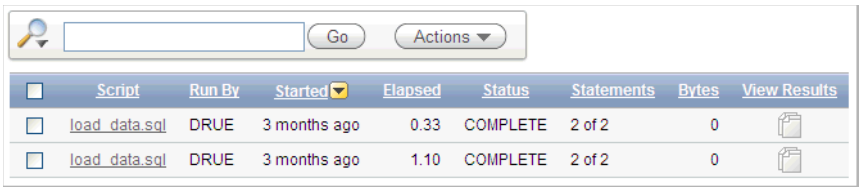
Viewing Results from the SQL Scripts Page

To view script results from the SQL Scripts page:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.
2. On the Tasks list, click **Manage Results**.
3. For the results you want to view, click the **View Results** icon.

   The Manage Script Results page appears, listing available results for the script. See "About the Manage Script Results Page" on page 3-10.



****

4. Click the **View Results** icon for the results you want to view. The View icons display on the far right side of page under the heading View Results.

   The Results page appears. See "About the Results Page" on page 3-10.

About the Manage Script Results Page

On the Manage Script Results page you can:

- **Search for a result.** Enter a result name or partial name in the Script field and click **Go**. To view all results, leave the Script field blank and click **Go**. You control how many rows display by making a selection from the Display list.
- **Change the Page View.** You can change the appearance of the page by making a selection from the View list. Available View options include:
  - **Icons** displays each result as an icon identified by the script name, and time and date stamp.
  - **Details** displays each result as a line in a report. Each line includes a check box to enable the selection of results for deletion, the associated script name which is a link enabling it to be loaded into the Script Editor, who ran the script, when the run started, how long it took to run, whether the run is complete or not, the number of statements executed, the size in bytes, and a View icon to view the results.
- **Delete a result.** In Details view, select the check box associated with each result you want to delete, and click **Delete Checked**.
- **Sort results.** In Details view, click a column heading to sort the listed results by that column.

About the Results Page

The Results page displays the script name and status (Complete, Canceled, Executing or Submitted), and lists the statements executed.



On the Results page you can:

- **Choose the view.** Click the **Detail** or **Summary** option and click **Go** to specify whether to display complete or summarized information.
- **Choose the number of rows to display.** In Summary view, make a selection from the Display list and click **Go** to specify the number of rows displayed.
- **Sort the statement report.** In Summary view, select a column heading to sort the listed values by that column.
- **Edit the script.** Click **Edit Script** to load the script into the Script Editor. See "Using the Script Editor" on page 3-4.

Exporting and Importing SQL Scripts

You can transfer scripts from your current Script Repository to a Script Repository in a different workspace by using the Export and Import tasks. Exported scripts are encoded in a single file on your local file system. Once exported, you then log in to another workspace and import the file. During import, the file is run to re-create the scripts in the current Script Repository.

By default, the Export SQL Scripts page lists all scripts in the Script Repository created by the current user. There are two panes on the Export SQL Scripts page, the Scripts pane and the Scripts to Export pane. You use the Scripts pane to select scripts to export. Then, you use the Scripts to Export pane to finalize the scripts to export, to choose a name for the export script, and to save the selected scripts in the export script on your local file system. You use the Import Scripts pane to select the export script containing the scripts to import.

Topics:

- Copying Scripts to an Export Script
- Importing Scripts from an Export Script

Copying Scripts to an Export Script

To copy scripts to an export script:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. On the Tasks list, click **Export**.

   The Export SQL Scripts page appears.

3. Click the check box for each of the scripts you want to export. The check boxes display on the left side adjacent to the script name. To select all displayed scripts for export, click the column head check box.

4. Click **Add to Export** to create a list of scripts to be added to the export script.

   The selected scripts are added to the list of scripts in the Scripts to Export pane.

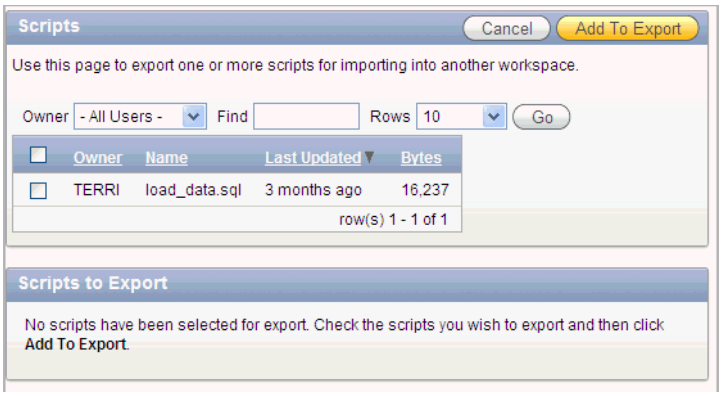
5. Enter a name for the export script in the File Name field.

   The default script name is *workspace_name*_script.sql.

6. Click **Export All** to export the scripts to the export script.

   You are prompted to enter the directory where you want to save the export script.

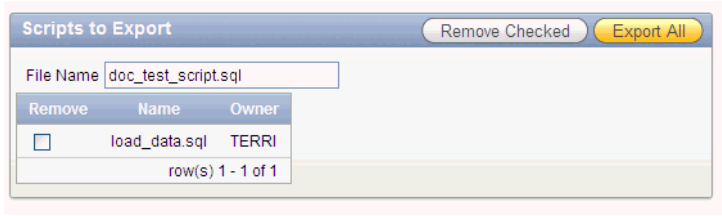
About the Scripts Pane



In the Scripts pane you can:

- **Search for a script.** Enter a script name or partial name in the Find field and click **Go**. To view all scripts, leave the Find field blank, select **- All Users -** from the Owner list and click **Go**. You control how many rows display by making a selection from the Rows list.
- **Cancel the export.** Click **Cancel** to return to the SQL Scripts page without exporting any scripts, or to return to the SQL Scripts page after saving an export script.
- **Selecting scripts to export.** Click **Add to Export** to add scripts to the export script. Scripts added to the export script are no longer listed in the Script pane, but appear in the Scripts to Export pane.
- **Sort scripts.** Click a column heading to sort the listed scripts by that column.

About the Scripts to Export Pane



In the Scripts to Export pane you can:

- **Rename the export script.** Enter a name for the export script in the File Name field or leave the default script name.
- **Remove scripts.** Click the check box adjacent to the scripts you want to remove f and click **Remove Checked**. Scripts removed are no longer listed in the Scripts to Export pane, but appear in the Scripts pane.
- **Save the export script.** Click **Export All** to save the export script to your local file system. You are prompted to enter the directory where you want to save the export script.

Importing Scripts from an Export Script

To import scripts from an export script:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. On the Tasks list, click **Import**.

   The Import Scripts pane appears. See "About the Import Scripts Pane" on page 3-13.

3. Enter the name and path to the export script you want to import to the Script Repository, or click **Browse** to locate the export script you want to import.

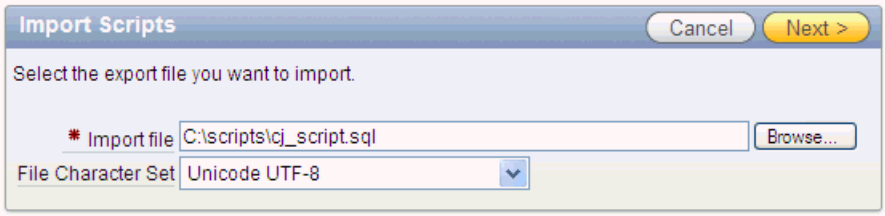
4. Click **Next** to list the scripts in the export script.

   The Action column indicates whether the imported script is new, or whether it replaces an existing script of the same name.

5. Click **Import Script(s)** to import the listed scripts into the current Script Repository.

   The SQL Scripts page appears listing the imported scripts.

About the Import Scripts Pane



In the Import Scripts pane you can:

- **Enter the export script.** Enter the name and path of the script to import in the Import file field, or click **Browse** to locate the script.
- **Cancel the import.** Click **Cancel** to return to the SQL Scripts page without importing scripts.
- **Proceed with the import.** Click **Next** to import the scripts in the specified export script. You can review the listed scripts to import.
- **Choose another export file.** Click **Previous** to return to the Import Scripts file selection page to choose a different export script.

Viewing Script and Result Quotas

You can view the script limits in the current workspace on the Script Quotas page.

To view the Script Quotas page:

1. On the Workspace home page, click **SQL Workshop** and then **SQL Scripts**.

   The SQL Scripts page appears.

2. On the Tasks list, click **Show Quotas**.

   The Script Quotas page appears.

3. Click **Cancel** to return to the SQL Scripts page.

About the Script Quotas Page

The Script Quotas page displays the following limits:

- Result Quota in Bytes:
  - **Maximum Script Result Size.** The maximum size in bytes of a single script result.
  - **Quota for All Script Results.** The maximum size in bytes of all results in this workspace.
  - **Used.** The number of bytes currently used in this workspace.
  - **Free.** The number of bytes currently free in this workspace.
  - **Quota.** A usage bar illustrating the percentage of quota currently used.
- Script Quota in Bytes:
  - **Maximum Script Size.** The maximum size in bytes of a single script. The size is set by the Oracle Application Express administrator and cannot be changed from within the Workspace.

4

Building Queries with Query Builder

Query Builder's graphical user interface enables database developers to build SQL queries without the need for manual SQL coding. Using Query Builder, you can search and filter database objects, select objects and columns, create relationships between objects, view formatted query results, and save queries with little or no SQL knowledge.

Topics:

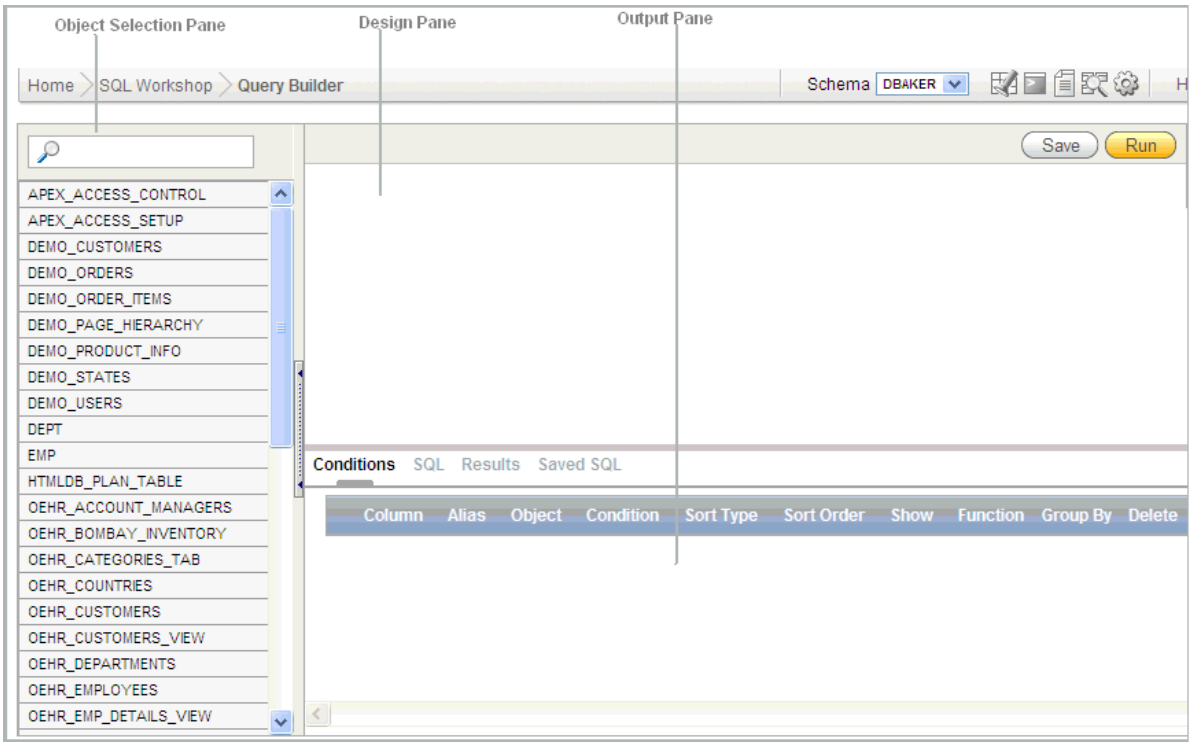
- About Query Builder
- Using the Object Selection Pane
- Selecting Objects
- Specifying Query Conditions
- Creating Relationships Between Objects
- Working with Saved Queries
- Viewing Generated SQL
- Viewing Query Results

> **See Also:** "Using the Query Finder" in *Oracle Application Express Application Builder User's Guide*

About Query Builder

The Query Builder page is divided into three sections:

- **Object Selection pane** displays on the left side of the page and contains a list objects from which you can build queries. Only objects in the current schema display.
- **Design pane** displays to the right of the Object Selection pane and above the Conditions, SQL, Results, and Saved SQL tabs. When you select an object from the Object Selection pane, it appears in the Design pane.
- **Output pane** displays below the Design pane. Once you select objects and columns, you can create conditions, view the generated SQL, or view query results.



Selecting a Schema

A schema is a logical container for database objects. To access objects in another schema, make a selection from the Schema list in the upper right side of the page.

Switching to Another SQL Workshop Component

You can navigate to another SQL Workshop component by selecting a component from the Component list located on the upper right side of the page:

- **Object Browser**. See "Managing Database Objects with Object Browser" on page 1-1.
- **SQL Commands**. See "Using SQL Commands" on page 2-1.
- **SQL Scripts**. See "Using SQL Scripts" on page 3-1.
- **Query Builder**. See "Building Queries with Query Builder" on page 4-1.
- **Utilities**. See Using Oracle Application Express Utilities on page 5-1.

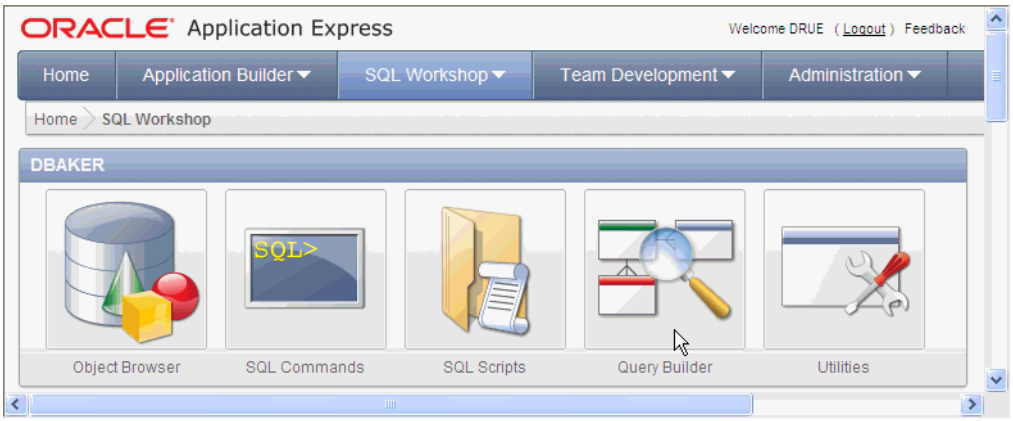
Topics:

- Accessing Query Builder
- Understanding the Query Building Process

Accessing Query Builder

To access Query Builder:

1. Log in to the Workspace home page.
2. Click **SQL Workshop**.
3. Click **Query Builder**.



Understanding the Query Building Process

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

1. Select objects from the Object Selection pane. See "Using the Object Selection Pane" on page 4-3.
2. Add objects to the Design pane and select columns. See "Selecting Objects" on page 4-4.
3. **Optional**: Establish relationships between objects. See "Creating Relationships Between Objects" on page 4-7.
4. **Optional**: Create query conditions. See "Specifying Query Conditions" on page 4-6.
5. Execute the query and view results. See "Viewing Query Results" on page 4-12.

> **See Also:** "Viewing Generated SQL" on page 4-11 and "Working with Saved Queries" on page 4-10

Using the Object Selection Pane

The Object Selection pane displays on the left side of the Query Builder page and lists tables, views, and materialized views within the current schema.

Topics in this section include:

- Searching and Filtering Objects
- Hiding the Object Selection Pane

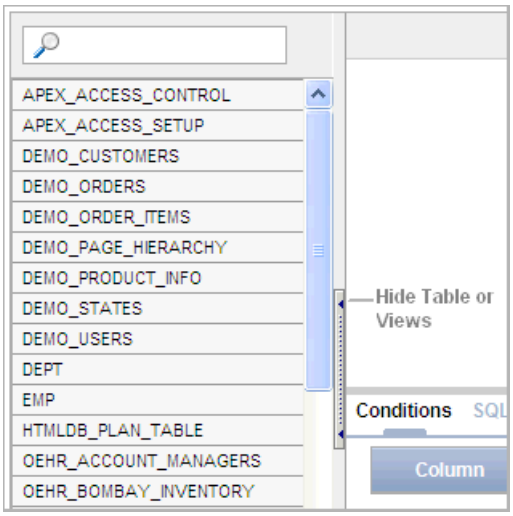
Searching and Filtering Objects

Use the Object Selection pane to search for and view tables, views, and materialized views within the current schema.

To search or filter objects:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.
2. In the search field at the top of the pane, enter a case insensitive query.
3. To view all tables or views within the currently selected schema, leave the search field blank.



Hiding the Object Selection Pane

You can hide the Object Selection pane by selecting the **Hide Table or Views** control. By hiding the Object Selection pane, you can increase the size of the Design and Result panes.

The Hide Table or Views control displays on the right side of the Object Selection pane. If the Object list appears, selecting this control hides it. Similarly, if the Object list is hidden, selecting this control causes the pane to reappear.

Selecting Objects

The Design pane displays to the right of the Object Selection pane. When you select an object from the Object Selection pane, it appears in the Design pane. You use the Object Selection pane to select objects (that is, tables, views, and materialized views) and the Design pane to identify how those selected objects are used in a query.

Topics:

- About Supported Column Types
- Adding an Object to the Design Pane
- Removing or Hiding Objects in the Design Pane

See Also: "Creating Relationships Between Objects" on page 4-7

About Supported Column Types

Columns of all types available in Oracle Database 10g Release (10.2) display as objects in the Design pane. Note the following column restrictions:

- You may only select a maximum of 60 columns for each query.
- The following column types are not selectable and cannot be included in a generated query:
  - `BLOB`
  - `NCLOB`
  - `RAW`

- LONG
- LONG RAW
- XMLType
- Any other nonscalar column types

Adding an Object to the Design Pane

You add an object to the Design pane by selecting it from the Object Selection pane.

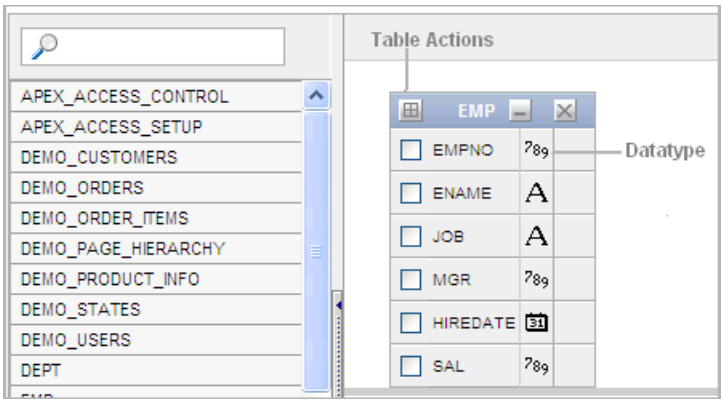
To add an object to the Design pane:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.

2. Select an object from the Object Selection pane.

   The selected object appears in the Design Pane. Note that a graphical representation of the datatype displays to the right of the column name.



3. Select the columns to be included in your query by clicking the check box to the left of the column name.

   When you select a column you are indicating it is included in the query. As you select a column, it appears on the Conditions tab. Note that the Show check box on the Conditions tab controls whether a column is included in query results. Be default, this check box is selected.

   To select the first twenty columns, click the **Table Actions** icon in the upper left corner of the object. The Actions window appears. Select **Check All**.

4. To execute the query and view results, click **Run** (CTRL + ENTER).

   The Results pane displays the query results.

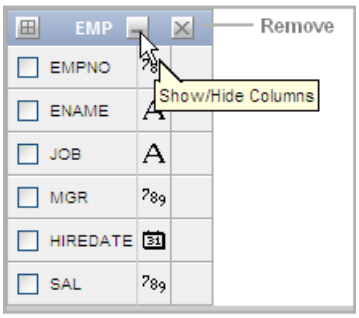
   See Also: "Specifying Query Conditions" on page 4-6

Resizing the Design and Results Panes

As you select objects, you can resize Design and Results panes by selecting the gray horizontal rule in the center of the page. Moving the rule up, shrinks the Design pane. Moving the rule down expands the Design pane.

Removing or Hiding Objects in the Design Pane

You remove or hide objects in the Design pane by selecting controls at the top of the object. To remove an object, select the **Remove** icon in the upper right corner. To temporarily hide the columns within an object, click the **Show/Hide Columns** icon.



Specifying Query Conditions

Conditions enable you to filter and identify the data you want to work with. As you select columns within an object, you can specify conditions on the Conditions tab. You can use these attributes to modify the column alias, apply column conditions, sort columns, or apply functions.

To specify query conditions:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.

2. Select an object from the Object Selection pane.

   The selected object appears in the Design Pane.

3. Select the columns to be included in your query by clicking the box to the left of the column name.

   When you select a column, you are indicating you want to include it in your query. As you select each column, it appears as a separate row in the Conditions view. Table 4–1 describes the attributes available on the Conditions tab.

Table 4–1 Conditions Tab

Condition Attribute	Description
Up and Down Arrows	Controls the order that the columns to be displayed in the resulting query. Click the arrow buttons to move columns up and down. **See Also:** "Viewing Query Results" on page 4-12
Column	Displays the column name.
Alias	Specify an optional column alias. An **alias** is an alternative column name. Aliases are used to make a column name more descriptive, to shorten the column name, or prevent possible ambiguous references.
Object	Specifies table or view name.

Table 4–1 (Cont.) Conditions Tab

Condition Attribute	Description

Condition	Specify a condition for the column.
	The condition you enter modifies the query's `WHERE` clause. When specifying a column condition, you must include the appropriate operator and operand. Consider the following examples:
	`>=10`
	`='VA'`
	`IN (SELECT dept_no FROM dept)`
	`BETWEEN SYSDATE AND SYSDATE + 15`

Sort Type	Select a sort type. Options include: ■ Ascending (`Asc`) ■ Descending (`Desc`)
Sort Order	Enter a number (1, 2, 3, and so on) to specify the order in which selected columns should display.
Show	Select this check box to include the column in your query results. It is not necessary to select Show to add a column to the query for filtering only. For example, suppose you want to create following query: `SELECT ename FROM emp WHERE deptno = 10` To create this query in Query Builder: 1. From the Object list, select EMP. 2. In the Design Pane, select `ename` and `deptno`. 3. For the deptno column, in Condition enter `=10` and uncheck the Show check box.
Function	Select an argument function. Available functions are dependent on the column type and include: ■ **NUMBER columns** - `COUNT`, `COUNT DISTINCT`, `AVG`, `MAXIMUM`,. `MINIMUM`, `SUM` ■ **VARCHAR2, CHAR columns** - `COUNT`, `COUNT DISTINCT`, `INITCAP`, `LENGTH`, `LOWER`, `LTRIM`, `RTRIM`, `TRIM`, `UPPER` ■ **DATE, TIMESTAMP columns** - `COUNT`, `COUNT DISTINCT`
Group By	Specify columns to be used for grouping when an aggregate function is used. Only applicable for columns included in output.
Delete	Deselect the column, excluding it from the query.

As you select columns and define conditions, Query Builder writes the SQL for you.

4. To view the underlying SQL, click the **SQL** tab.

Creating Relationships Between Objects

You can create relationships between objects by creating a join. A **join** identifies a relationship between two or more tables, views, or materialized views.

Topics:

■ About Join Conditions

- Joining Objects Manually
- Joining Objects Automatically

About Join Conditions

When you write a join query, you specify a condition that conveys a relationship between two objects. This condition is called a **join condition**. A join condition determines how the rows from one object combine with the rows from another object.

Query Builder supports inner, outer, left, and right joins. An **inner join** (also called a **simple join**) returns the rows that satisfy the join condition. An outer join extends the result of a simple join. An **outer join** returns all rows that satisfy the join condition and returns some or all of those rows from one table for which no rows from the other satisfy the join condition.

> **See Also:** *Oracle Database SQL Language Reference* for information about join conditions

Joining Objects Manually

You can create a join manually by selecting the Join column in the Design pane.

To join two objects manually:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.

2. From the Object Selection pane, select the objects you want to join.

   The objects display in the Design pane.

3. Identify the columns you want to join.

   You create a join by selecting the Join column adjacent to the column name. The Join column displays to the right of the datatype, beneath the Remove icon. When your cursor is in the appropriate position, the following help tip displays:

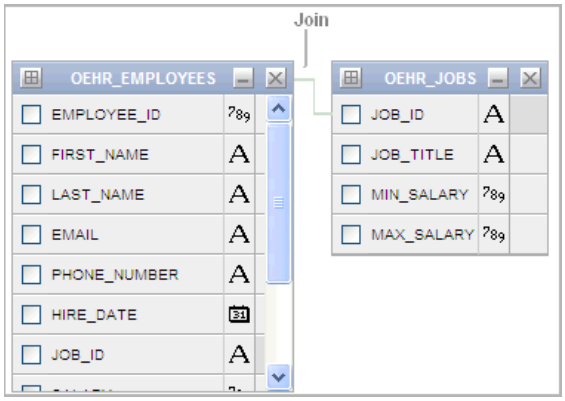
   ```
   Click here to select column for join
   ```

4. Select the appropriate Join column for the first object.

   When selected, the Join column displays as a dark gray. To deselect a Join column, simply select it again or press **ESC**.

5. Select the appropriate Join column for the second object.

> **Tip:** You can also join two objects by dragging and dropping. Select a column in the first table and then drag and drop it onto a column in another table.



When joined, a line connects the two columns.

6. Select the columns to be included in your query. You can view the SQL statement resulting from the join by positioning the cursor over the line.
7. Click **Run** to execute the query.

   The Results pane displays the query results.

Joining Objects Automatically

When you join objects automatically, the Query Builder suggests logical, existing parent and child relationships between existing columns.

To join objects automatically:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.
2. From the Object Selection pane, select an object.

   The object displays in the Design pane.
3. Click the small icon in the upper left corner of the object. Depending upon the selected object, the icon label displays as **Table Actions** or **View Actions**.

   The Actions window appears. Use the Actions window to select all columns within the current object or objects related to the current object.
4. In the Actions window, select the appropriate options:
   - **Check All** - Select this option to select the first twenty columns in the current object.
   - **Add Parent** - Displays tables that are referenced as a foreign key to the current object.
   - **Add Child** - Displays tables that reference the current object in a foreign key.

   If using Add Parent or Add child, the selected object appears and a line connects the foreign key columns.
5. Select additional columns to be included in your query.

   You can view the SQL statement resulting from the join by positioning the cursor over the green line.
6. Click **Run** to execute the query.

   The Results pane displays the query results.

Working with Saved Queries

As you create queries, you can save them by clicking the Save button in the Design pane. Once you save a query, you can access it later in the Saved SQL view.

Topics:

- Saving a Query
- Editing a Saved Query
- Deleting a Saved Query

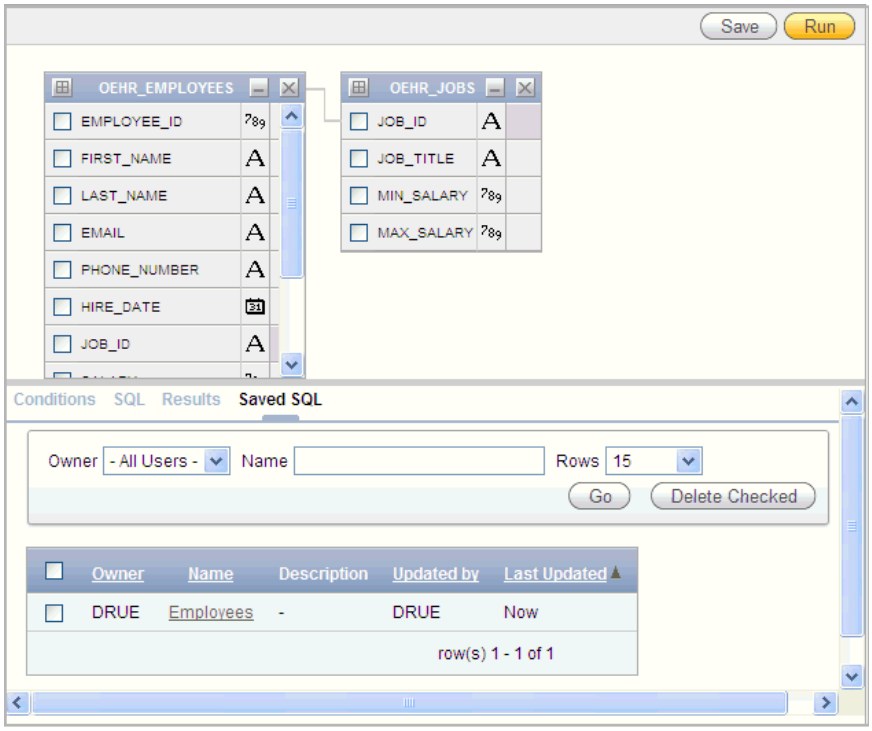
Saving a Query

To save a query:

1. Build a query:
   a. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

      Query Builder appears.
   b. Select objects from the Object Selection pane.
   c. Add objects to the Design pane and select columns.
   d. Execute the query.
2. Click **Save**.
3. Enter a name and description and click **Save**.

   The saved query displays in the Saved SQL view.



Note that Query Builder does not support duplicate query names. If you open an existing query, keep the existing name, and save it again, Query Builder over-writes

the existing query. If you change the name of an existing query and save it again, Query Builder saves the query again under the new name.

Editing a Saved Query

Once you save a query, you can access it in the Saved SQL view.

To edit a Saved SQL query:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.

2. Select the **Saved SQL** tab.
3. To filter the display, you can:
   - Make a selection from the Owner list and click **Go**.
   - Enter a search query in the Name field and click **Go**.
4. To edit a query, select the appropriate name.

   The saved query appears. The selected objects display in the Design pane and the Conditions view appears.

Deleting a Saved Query

To delete a Saved SQL query:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.

2. Select the **Saved SQL** tab.
3. Select the queries to be deleted and click **Delete Checked**.

Viewing Generated SQL

The SQL view presents a read-only, formatted representation of the SQL generated by Query Builder. You can copy the SQL code that appears in the SQL View for use in other tools such as SQL Command Processor or Application Builder.

See Also: "Using SQL Commands" on page 2-1

To access the SQL view:

1. On the Workspace home page, click **SQL Workshop** and then **Query Builder**.

   Query Builder appears.

2. Select an object from the Object Selection pane.

   The selected object appears in the Design Pane.

3. Select the columns to be included in your query.
4. Click the **SQL** tab.

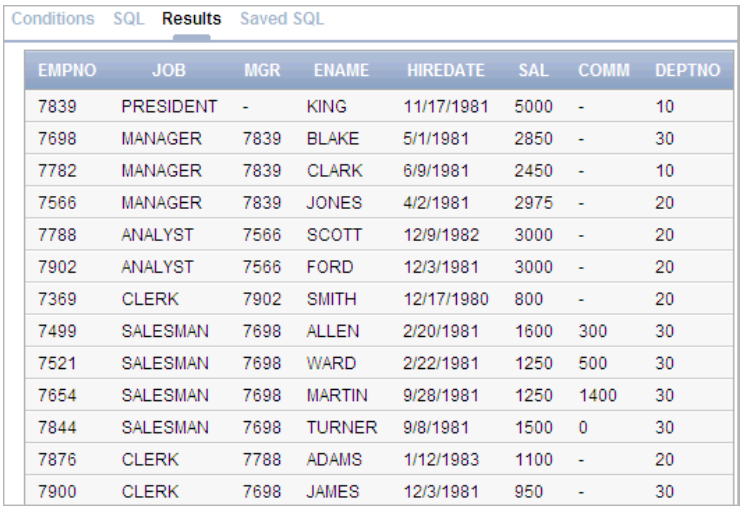
   The SQL code generated by Query Builder appears.

Viewing Query Results

Once you select objects and determine what columns to include in your query, you execute a query by:

- Clicking the **Run** button (or pressing **CTRL + ENTER**)
- Selecting the **Results** tab

The Results view appears, displaying formatted query results. To export the report as a comma-delimited file (.csv) file, click the Download link at the bottom of the page.


Conditions SQL Results Saved SQL

EMPNO	JOB	MGR	ENAME	HIREDATE	SAL	COMM	DEPTNO
7839	PRESIDENT	-	KING	11/17/1981	5000	-	10
7698	MANAGER	7839	BLAKE	5/1/1981	2850	-	30
7782	MANAGER	7839	CLARK	6/9/1981	2450	-	10
7566	MANAGER	7839	JONES	4/2/1981	2975	-	20
7788	ANALYST	7566	SCOTT	12/9/1982	3000	-	20
7902	ANALYST	7566	FORD	12/3/1981	3000	-	20
7369	CLERK	7902	SMITH	12/17/1980	800	-	20
7499	SALESMAN	7698	ALLEN	2/20/1981	1600	300	30
7521	SALESMAN	7698	WARD	2/22/1981	1250	500	30
7654	SALESMAN	7698	MARTIN	9/28/1981	1250	1400	30
7844	SALESMAN	7698	TURNER	9/8/1981	1500	0	30
7876	CLERK	7788	ADAMS	1/12/1983	1100	-	20
7900	CLERK	7698	JAMES	12/3/1981	950	-	30

5

Using Oracle Application Express Utilities

This section describes how to use Oracle Application Express utilities to load and unload data from an Oracle database, generate DDL, view object reports, and restore dropped database objects.

This section describes how to use Oracle Application Express Utilities to load and unload data from an oracle database, generate DDL, view object reports, and restore dropped database objects.

Topics:

- About Importing, Exporting, Loading, and Unloading Data
- Loading and Unloading Data from the Database
- Viewing Object Reports
- Generating DDL
- Managing User Interface Defaults
- Using the Recycle Bin to View and Restore Dropped Objects
- Comparing Schemas
- Monitoring the Database
- Viewing Database Details

About Importing, Exporting, Loading, and Unloading Data

You have several options when copying data between Oracle databases or between an Oracle database and external files. Data copying is accomplished by *exporting* and *importing* data, and by *unloading* and *loading* data. The following table defines these terms.

Term	Definition
Exporting	Copying database data to external files for import into another Oracle database only. The files are in a proprietary binary format.
Importing	Copying data into the database from external files that were created by exporting from another Oracle database.
Unloading	Copying database data to external text files for consumption by another Oracle database or another application (such as a spreadsheet application). The text files are in an industry-standard format such as tab-delimited or comma-delimited (`CSV`).

Term	Definition
Loading	Copying data into the database from external text files that are in either a standard delimited format or in any of the formats that are supported by the Oracle SQL*Loader utility.

You can export data from any Oracle Database edition (Express Edition, Standard Edition, and Enterprise Edition) into any other edition.

Topics:

This section contains the following topics:

- Choosing the Right Import/Export/Load/Unload Option

Choosing the Right Import/Export/Load/Unload Option

The Oracle Database and Oracle Application Express provide several powerful options for importing, exporting, loading, and unloading data. Table 5–1 provides a summary of these options.

Table 5–1 Summary of Oracle Application Express Import/Export Options

Feature or Utility	Description
Data Load/Unload wizards in Oracle Application Express	■ Easy to use graphical interface ■ Loads/unloads from and to external text files (delimited fields) or XML files ■ Loads/unloads tables only, one table at a time ■ Access only to schema of logged-in user ■ No data filtering on upload.
SQL*Loader utility	■ Command-line interface, invoked with `sqlldr` command ■ Bulk-loads data into the database from external files ■ Supports numerous input formats, including delimited, fixed record, variable record, and stream ■ Loads multiple tables simultaneously ■ Powerful data filtering capabilities
Data Pump Export and Data Pump Import utilities	■ Command-line interface, invoked with `expdp` and `impdp` commands ■ Exports and imports from one Oracle database to another (proprietary binary format) ■ Imports/exports all schema object types ■ Imports/exports entire database, entire schema, multiple schemas, multiple tablespaces, or multiple tables ■ Powerful data filtering capabilities ■ High speed

Table 5–1 (Cont.) Summary of Oracle Application Express Import/Export Options

Feature or Utility	Description
Export and Import utilities	■ Command-line interface, invoked with `exp` and `imp` commands ■ Exports and imports from one Oracle database to another (proprietary binary format) ■ Supports XMLType data ■ Does not support the `FLOAT` and `DOUBLE` data types ■ Capabilities similar to Data Pump; Data Pump is preferred

Table 5–2 provides several load, unload, import, and export scenarios and suggests the appropriate option to use for each.

Table 5–2 Import/Export Scenarios and Recommended Options

Import/Export Scenario	Recommended Option
You have fewer than 10 tables to load, the data is in spreadsheets or tab- or comma-delimited text files, and there are no complex data types (such as objects or multivalued fields).	Data Load/Unload wizards in Oracle Application Express
You have to load data that is not delimited. The records are fixed length, and field definitions depend on column positions.	SQL*Loader
You have tab-delimited text data to load, and there are more than 10 tables.	SQL*Loader
You have text data to load, and you want to load only records that meet certain selection criteria (for example, only records for employees in department number 3001).	SQL*Loader
You want to import or export an entire schema from or to another Oracle database. There is no XMLType data in any of the data.	Data Pump Export and Data Pump Import
You want to import or export data from or to another Oracle database. The data contains XMLType data and contains no `FLOAT` or `DOUBLE` data types.	Import (`imp`) and Export (`exp`)

See Also: *Oracle Database Utilities* for more information on Data Pump, the Import and Export utilities, and SQL*Loader

Loading and Unloading Data from the Database

The Data Load/Unload wizards in Oracle Application Express enable you to easily load and unload delimited text data to and from the database. The step-by-step wizards have the following features:

- You can load or unload XML files or delimited-field text files (such as comma-delimited (`.csv`) or tab-delimited files).
- You can load by copying and pasting from a spreadsheet.
- You can omit (skip) columns when loading or unloading.
- You can load into an existing table or create a new table from the loaded data.
- When loading into a new table, the primary key can be taken from the data or generated from a new or existing Oracle sequence.

- When loading into a new table, column names can be taken from the loaded data.
- Each time that you load from a file, file details are saved in a Text Data Load Repository. You can access these files from within the repository at any time.

Limitations include the following:

- The wizards load and unload table data only. They do not load or unload other kinds of schema objects.
- You can load and unload to and from your own schema only. This is also true for users with administrator privileges.
- You can load or unload only a single table at a time.
- There are no data type limitations for unloading to text or XML files, or for loading from XML files. However, when loading from spreadsheets (through copy and paste) or from text files, only the following data types are supported: `NUMBER`, `DATE`, `VARCHAR2`, `CLOB`, `BINARY_FLOAT`, and `BINARY_DOUBLE`.

Supported unload formats include:

- Text such as comma-delimited or tab-delimited data
- XML documents

Topics:

- Accessing the Data Load/Unload Page
- Loading Data
- Unloading Data
- Using Repository

Accessing the Data Load/Unload Page

To access the Data Load/Unload page:

1. On the Workspace home page, click the **SQL Workshop** icon.
2. Click **Utilities**.
3. Click **Data Workshop**.

   The Data workshop page appears.
4. Click the appropriate icon to load data, unload data, or view the repository.

Loading Data

You can load data into the Oracle Application Express database in the following ways:

- Copy and paste data from a spreadsheet.
- Upload a spreadsheet file in a delimited format (such as comma-delimited (.csv) or tab-delimited).
- Upload a text file containing comma-delimited or tab-delimited data.
- Upload an XML document.

Topics:

- Loading a Text File or Spreadsheet Data
- Loading an XML Document

See Also: "Choosing the Right Import/Export/Load/Unload Option" on page 5-3

Loading a Text File or Spreadsheet Data

You can upload a Text file or copy and paste tab-delimited data directly into the Load Data Wizard.

To load data from a text file:

1. On the Workspace home page, click the **SQL Workshop** icon.
2. Click **Utilities**.
3. Click **Data Workshop**.
4. Under Data Load, click **Text Data**.

   The Load Data Wizard appears.
5. Under Load To, select either **Existing table** or **New table**.
6. Under Load From, select either **Upload file** or **Copy and paste**.
   - Upload file - Select to specify an existing text file to upload.
   - Copy and paste - Select to create a text file to upload by performing a copy and paste.
7. Click **Next**.
8. If you selected Upload file, under Load Data, make the following changes:
   - Text File - Browse for or enter the name of the Text File to load.
   - Separator - Enter the column separator character. See item Help for more details.
   - Optionally Enclosed By - If your data contains a delimiter character, enter it here. See item Help for more details.
   - First row contains column names - Check this box if the first row of your data contains column names. See item Help for more details.
   - File Character Set - Select the character set in which your text file is encoded. See item Help for more details.
9. If you selected Copy and paste, under Data make these changes:
   - Data - Enter the text file to upload.
   - First row contains column names - Check this box if the first row of your data contains column names.
10. Under Globalization, make the following changes:
    - Currency Symbol - If your data contains an international currency symbol, enter it here. See item Help for more details.
    - Group Separator - If your data contains a character that separates integer groups, for example to show thousands and millions, enter it here. See item Help for more details.
    - Decimal Character - If your data contains a character that separates the integer and decimal parts of a number, enter it here. See item Help for more details.
11. Click Next.

The table Properties page appears. Before performing the data upload, this page allows you to optionally customize the data.

12. For Table Properties, make the following changes and click **Next**:
    - Schema - Select the schema containing the table to load.
    - Table Name - Enter the table to load.
    - Column Names - Enter the names of the columns.
    - Data Type - Select the data type for this column.
    - Column Length - Enter the length of the data in this column.
    - Upload - Select **Yes** to upload data for this column. Select **No** to not upload data for this column and skip to the next column.
13. For Primary Key, make the following changes:
    - Primary Key From - Define the primary key column by choosing either an existing column or creating a new column.

      If you choose an existing column you must select the column from the columns being loaded.

      If you choose to create a new column you must specify the name of the new column.
    - PK Constraint Name - The constraint name will default to the table name appended with _PK. You can update the name if desired.
    - Primary Key Population - You need to decide how your primary key is populated. You either generate it from a new sequence, from a new sequence or not at all.

      If you choose a new sequence, you can use the sequence name given or update it as necessary. The sequence will be created for you.

      If you choose an existing sequence, you must select the sequence from those currently defined in your schema.

      If you generate the primary key from a sequence, either new or existing, the wizard creates a trigger on the table to retrieve the next sequence value and populate the primary key when a record is inserted.
14. Click **Load Data**.

Loading an XML Document

Oracle Application Express supports XML documents in Oracle's canonical XML format.

In Oracle's canonical XML format, each element represents a column value, each element is named after the column, all elements that are part of the same row are children of a <ROW> element, and all <ROW> elements are children of a <ROWSET> element.

To load an XML document:

1. On the Workspace home page, click the **SQL Workshop** icon.
2. Click **Utilities**.

3. Click **Data Workshop**.
4. Click **Load XML Data**.

   The Load XML Data Wizard appears.
5. Select the appropriate schema for your data and click **Next**.
6. Select the table to load the data into and click **Next**.
7. Follow the on-screen instructions.

Unloading Data

You can use the Unload page to export the contents of a table to a text file or XML document.

Topics:

- Unloading a Text File
- Unloading to an XML Document

See Also: "Choosing the Right Import/Export/Load/Unload Option" on page 5-2

Unloading a Text File

Use the Unload to Text Wizard to export the contents of a table to a text file. For example, you could export an entire table to a comma-delimited file (.csv).

To unload a table to a text file:

1. On the Workspace home page, click the **SQL Workshop** icon.
2. Click **Utilities.**
3. Under Data Unload, click **To Text**.

   The Unload to Text Wizard appears.
4. Select the appropriate schema and click **Next**.
5. Select the table to unload and click **Next**.
6. Highlight the columns to include, optionally enter a Where Clause to limit the records unloaded and click **Next**.
7. For Options, enter the following:
   - Separator - Enter the type of separator used to separate column values.
   - Optionally Enclosed By - If your data contains a delimiter character, enter it here. See item Help for more details.
   - Include Column Names - Check this box to include the name of each column in the text file. See item Help for more details.
   - File Format - Select the appropriate file format. See item Help for more details.
   - File Character Set - Select the character set in which your text file is encoded. See item Help for more details.
8. Click **Unload Data**.

   The File Download window appears.
9. Click **Save** to download the file.

Unloading to an XML Document

Use the Unload to XML Wizard to export the contents of a table to an XML document adhering to the Canonical XML specification.

To unload a table to an XML document:

1. On the Workspace home page, click the **Utilities** icon.
2. Click **Data Workshop**.
3. Under data Unload, click **to XML**.

   The Unload to XML Wizard appears.
4. Select the appropriate schema and click **Next**.
5. Select the table to unload and click **Next**.
6. Highlight the columns to include.
7. Check **Export as File** if you would like to save the output directly to a file.

   If you do not check Export as File, the XML document will be displayed in your browser and can be saved to a file or cut and pasted as necessary.
8. Optionally enter a Where Clause to limit the records unloaded, and click **Unload Data.**

   A browser displays the XML data.

Using Repository

Loaded text data files and spreadsheets are stored in the Repository.

To access the different repositories:

1. On the Workspace home page, click the **Utilities** icon.
2. Click **Data Workshop**.
3. Make one of the following selections:
   - Import Repository - Displays the status of loaded Text data. Details include file name, imported by, imported on, schema, table, bytes, and the number of rows that were loaded successfully and the number were not.

     By clicking the details magnifying glass you can review the failed rows.
   - Spreadsheet Imports - Displays the status of loaded spreadsheet data. Details include file name, imported by, imported on, schema, table, and the number of rows that were loaded successfully and the number were not.

     By clicking the details magnifying glass you can review the failed rows.
4. To filter the display, make a selection from the Show list and click **Go**.
5. To view information about a specific file, click the **View** icon.
6. To delete an imported file, select it and click **Delete Checked**.

Viewing Object Reports

Utilities includes a variety of object reports to help you better manage the objects in your database.

Topics:

- Table Reports
- Security Reports
- PL/SQL Reports
- Exception Reports
- All Object Reports

Table Reports

Use the Table reports to view specific details about the tables within your database.

To view the Table reports:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Object Reports**.

   The Object Reports page appears.
4. In the Table Reports section, select the report you want to view:
   - Table Columns
   - Table Comments
   - Table Constraints
   - Table Statistics
   - Table Storage Sizes
5. To filter a report, enter search criteria in the fields provided or make selections from the lists, and click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details.
6. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

Security Reports

Use the Security reports to view object or column privileges granted on database objects owned by other schemas. You can also use these reports to view database role and system privileges.

To view the Security reports:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Object Reports**.

   The Object Reports page appears.
4. In the Security Reports section, click the report you want to view:
   - **Object Grants** - View the privileges for an existing schema and also understand what privileges have been granted from the selected schema to other schemas.

- **Column Privileges** - View the privileges for columns within your schema and also understand what privileges have been granted from the selected schema to other schemas.
- **Role Privileges** - View the database roles that have been granted to a selected schema. Roles are collections of various privileges.
- **System Privileges** - View the database privileges that have been granted to a selected schema.

5. To filter a report, enter search criteria in the fields provided or make selections from the lists, and click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details.
6. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

PL/SQL Reports

Use the PL/SQL reports to view program unit arguments or unit line counts and also to search PL/SQL source code.

Topics:

- Program Unit Arguments
- Unit Line Counts
- Search PL/SQL Source Code

Program Unit Arguments

Use the Program Unit Arguments report to view package input and output parameters.

To view the PL/SQL Unit Arguments report:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Object Reports**.

   The Object Reports page appears.
4. In the PL/SQL Reports section, click **Program Unit Arguments**.
5. To filter a report, enter search criteria in the fields provided or make selections from the lists, and click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details.
6. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

Unit Line Counts

Use the Unit Line Counts report to view the number of lines of code for each object. Use this report to identify larger PL/SQL program units.

To view the Unit Line Counts report:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Object Reports**.

The Object Reports page appears.

4. In the PL/SQL Reports section, click **Unit Line Counts**.
5. To filter the report, enter an object name and click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details.
6. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

Search PL/SQL Source Code

Use the Search PL/SQL Source code page to search the text within your PL/SQL code. Use this report to find references to tables or functions you might be thinking of deleting. You can also use this page to locate code when you can only recall a code snippet.

To search for PL/SQL source code:

1. On the Workspace home page, click the **Utilities** icon.
2. Click **Object Reports**.

   The Object Reports page appears.
3. In the PL/SQL Reports section, click **Search PL/SQL Source Code**.
4. To filter the report:
   a. In From/To Line, enter the range of lines you want to search.
   b. Click **Set**.
   c. To filter the report, enter an object name and click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details
5. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

Exception Reports

Use the Exception Reports to view unindexed foreign keys and tables without primary keys, indexes, or triggers.

To view Exception reports:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Object Reports**.

   The Object Reports page appears.
4. In the Exception Reports section, click the report you want to view.
   - Tables without Primary Keys
   - Tables without Indexes
   - Unindexed Foreign Keys
   - Tables without Triggers

5. To filter the report, enter a table name and click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details.
6. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

All Object Reports

Use the All Object reports to view objects for the selected schema.

To view the All Object reports:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Object Reports**.

   The Object Reports page appears.
4. In the All Object Reports section, select the report you want to view:
   - **All Objects** - List all objects in the current schema. Displays creation date and when the last DDL (data definition language) was performed.
   - **Invalid Objects** - View all invalid objects in the database by object type.
   - **Object Creation Calendar** - View all objects in a calendar format based on the date each database object was created.
   - **Object Counts by Type** - View the number of database objects by type for the selected schema.
   - **Data Dictionary** - View the data dictionary for this database.

     An Oracle data dictionary is a set of tables and views used as a read-only reference about the database. For example, a data dictionary stores information about both the logical and physical structure of the database.

     A data dictionary also stores information about valid Oracle database users, integrity constraints for tables in the database, and the amount of space allocated for a schema object and the amount being used.
5. For All reports, you can filter the report:
   a. Select an object type.
   b. Enter an object name.
   c. Click **Go**. See *Customizing Interactive Reports* in the *Oracle Application Express Application Builder User's Guide* for further details
6. To view reports for a different schema, select the schema from the Schema list on the upper right side of the page.

   See Also: *Oracle Database Concepts* for information about the data dictionary

Generating DDL

With Oracle Application Express, you can generate data definition language (DDL) statements from the Oracle data dictionary. These scripts can be used to create or re-create database schema objects. The scripts can be generated to display inline or

saved as a script file. You can generate the create scripts for all objects for a specific schema, specific object types, or specific objects.

To generate a DDL statement:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Generate DDL**.

   The Generate DDL page appears.
4. Click **Create Script**.

   The Generate DDL Wizard appears.
5. Select a database schema and click **Next**.
6. Define the object type:
   a. Output - Specify an output format. Select either **Display Inline** or **Save As Script File**.
   b. Check All - Select this option to include all object types for which to generate DDL.
   c. Object Type - Select the object types for which to generate DDL.
   d. To select object names for the selected object types, click **Next** and follow the on-screen instructions.
7. Click **Generate DDL**.

See Also:

- *Oracle Database SQL Language Reference* for information about DDL statements
- "The Data Dictionary" in *Oracle Database Concepts* for information about the data dictionary

Managing User Interface Defaults

User Interface Defaults enable you to assign default user interface properties for regions and items. The wizard allows you to specify whether or not you want to use User Interface Defaults if they exist. When you create a form or report using a wizard, the wizard uses this information to create default values for region and item properties. Utilizing user interface defaults can save valuable development time and has the added benefit of providing consistency across multiple pages in an application. User Defaults are divided into two categories, the Table Dictionary and the Attribute Dictionary.

- The Table Dictionary allows you to specify defaults for tables and columns that are intialized from the database definition.
- The Attribute Dictionary allows you to create defaults based on attribute or column names, thus being usable across all tables. Attribute definitions can also have synonyms, allowing more than one attribute to share a common definition.

The Table Dictionary takes priority over the Attribute Dictionary when User Interface Defaults are used during creation of pages and regions. If a table and column combination exists, that will be used rather than an attribute definition of the same name. This can be useful, for example, when you want to have a specific label or help

text for the CREATED_BY column in the EMP table but then use more generic defaults for CREATED_BY in another other table.

Topics:

- Creating User Interface Defaults for a Table
- Modifying Table User Interface Defaults
- Creating User Interface Attributes
- Modifying User Interface Attributes
- About Exporting and Importing User Interface Defaults

Creating User Interface Defaults for a Table

If no defaults have been created for a table, use the Table Dictionary Create Defaults wizard to automatically generate defaults based on the database table and column definitions. After the initial defaults are created, you can modify the individual default values. See "Modifying Table User Interface Defaults" on page 5-14.

To create the initial user interface defaults for tables:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **User Interface Defaults**.

   The Dashboard page for User Interface Defaults appears.

   The current schema displays to the right of the breadcrumb menu.
4. Click **Manage Table Dictionary**.

   The Table Dictionary page displays a report of all objects in your workspace that includes a Defaults Exist column indicating whether or not defaults have been created for each object.
5. Click the object name you want to create defaults for.

   The Create Table Dictionary Defaults page appears.
6. Click **Create Defaults**.

   The Table Dictionary page displays a report showing that defaults exist for the object you selected.

> **Note:** Synchronizing defaults with the database data dictionary creates table based defaults for any tables in the current schema that do not have defaults yet and adjusts those of tables that do to match the database definition.

Modifying Table User Interface Defaults

To modify existing table defaults:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **User Interface Defaults**.

   The Dashboard page for User Interface Defaults appears.

The current schema displays to the right of the breadcrumb menu.

4. Click **Manage Table Dictionary**.

   The Table Dictionary page displays a report of all objects in your workspace that includes a Defaults Exist column indicating whether or not defaults have been created for each object.

5. Click the object name you want to modify.

   The Table and Column Properties page displays a report of column defaults.

6. Click the column name you want to modify.

   The Column Defaults page displays.

7. Make modifications and click **Apply Changes**.

   See Item Help for a description of the individual settings on this page.

Note: A column can be removed from the Table Dictionary, thus allowing the Attribute Dictionary defaults to be used during the creation process. For example, when auditing columns where you may want the exact same labels and help across every instance of `CREATED_BY` and `CREATED_ON`, regardless of which table they come from, you could simply remove the column defaults from each table for those columns.

Creating User Interface Attributes

Use the Attribute Dictionary Create wizard to define and add new attributes.

To create an attribute:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **User Interface Defaults**.

   The Dashboard page for User Interface Defaults appears.

   The current schema displays to the right of the breadcrumb menu.

4. Click **Manage Attribute Dictionary**.

   The Attribute Dictionary page displays a report of all attributes in your workspace.

5. Click **Create**.

   The Column Details page appears.

Note: If you select to edit a synonym, identified by have the `Synonym of` column populated, you are taken to the definition for the base column, because the base column and all synonyms share one definition. If you want to delete the synonym, select the synonym within the Synonyms region. Deleting the base column will delete the column and all synonyms.

---

6. Enter attribute specifications and click **Create**.

See Item Help for a description of the individual settings on this page.

Modifying User Interface Attributes

To modify an existing attribute:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **User Interface Defaults**.

   The Dashboard page for User Interface Defaults appears.

   The current schema displays to the right of the breadcrumb menu.
4. Click **Manage Attribute Dictionary**.

   The Attribute Dictionary page displays a report of all attributes in your workspace.
5. To edit select attributes for all displayed columns:
   a. Click **Grid Edit**.
   b. Edit the appropriate attributes and click **Apply Changes**.
6. To edit a specific column, click the edit icon for the attribute you want to modify.

   The Column Details page displays.
7. Make modifications and click **Apply Changes**.

   See Item Help for a description of the individual settings on this page.

About Exporting and Importing User Interface Defaults

You export user interface defaults in the same way you export any related application file. Exporting user interface defaults from one development instance to another involves the following steps:

1. Export the user interface defaults using the Export User Interface Defaults utility. See "Exporting user Interface Defaults" in *Oracle Application Express Application Builder User's Guide*.
2. Import the exported file into the target Oracle Application Express instance. See "Importing User Interface Defaults" in *Oracle Application Express Application Builder User's Guide*.
3. Install the exported file from Export Repository. See "Installing Export Files" in *Oracle Application Express Application Builder User's Guide*.

When you export user interface defaults, all user interface defaults for the selected schema are exported to a single script. The file contains an API call to create table hints by making calls to the application PL/SQL API. You can use this file to import user interface defaults to another database and Oracle Application Express instance.

Using the Recycle Bin to View and Restore Dropped Objects

You can use the Recycle Bin to view and restore dropped database objects. When you drop a table, the space associated with the table is not immediately removed. The

Oracle database renames the table and places it and any associated objects in the Recycle Bin. You can recover objects in the Recycle Bin at a later time.

Topics:

- Managing Objects in the Recycle Bin
- Emptying the Recycle Bin Without Viewing the Objects

Note: The Recycle Bin feature is only available if you run with an Oracle 10g or later database.

See Also: "Backing Up and Recovering the Database" in *Oracle Database Express Edition 2 Day DBA*

Managing Objects in the Recycle Bin

You can view objects in the Recycle Bin on the Dropped Objects page. Once you select an object and view the Object Details page, you can choose to purge the object or restore the object by clicking the appropriate button.

To view objects in the Recycle Bin:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Recycle Bin.**
4. Click **Dropped Objects**.

   The Dropped Objects page appears.
5. To filter the report, select an object type, enter the object name in the Original Name field, and click **Go**.
6. To view object details, click the object name.

   The Object Details page appears.
7. To restore the current object, click **Restore Object**.
8. To permanently delete the current object, click **Purge Object**.

Emptying the Recycle Bin Without Viewing the Objects

To empty the Recycle Bin without viewing the objects:

1. On the Workspace home page, click **SQL Workshop**.
2. Click **Utilities**.
3. Click **Recycle Bin**.
4. Click **Purge Recycle Bin**.

   The Purge Recycle Bin page appears.
5. Confirm your request by clicking **Purge Recycle Bin** again.

Comparing Schemas

You can run a report that compares database objects in two schemas, displaying differences between them. You can compare all objects in the schemas or limit your report to specific objects. To compare two schemas, both must be available to your workspace.

Examples:

- Compare `DEMO_` objects by searching for that naming convention. The report indicates if the object exists in each of the two schemas.
- Analyze the object details in the two schemas to determine why one implementation is different. For example, the report might show that an index in one schema has an additional column or a column with a different data type.

To compare schemas:

1. On the Workspace home page, click **SQL Workshop**.
2. Click **Utilities**.
3. Under additional Utilities, click **Schema Comparison**.
4. On the Schema Comparison page, make the appropriate selections to run the comparison:
   - Schema 1 and Schema 2 - Select the schemas to compare.
   - Compare - Restrict the report to show one object type or select **All** to show all database objects.
   - Search - Enter a case insensitive query for the object name.
   - Display - To change the number of rows that appear in the report, make a selection from the Display list.
   - Go - Click **Go** to find the results matching your selections.
   - Show Differences Only or Show Details - Select the type of information you want to review.

Monitoring the Database

The reports available on the Database Monitor page provide a database-wide view of the database sessions, system statistics, SQL statements, and longer operations. You can use these reports to identify poorly preforming SQL and to better understand the workload of the database.

To access any of the icons on the Database Monitor page, you must have an account that has been granted an administrator role.

Topics:

- Sessions
- About System Statistics
- About Top SQL
- About Long Operations

Sessions

A session is the connection of a user to an Oracle database instance. A session lasts from the time the user connects until the time the user disconnects or exits the database application.

You must have database administrator privileges to access the Sessions page.

To access reports on the Sessions page:

1. On the Workspace home page, click **SQL Workshop**.
2. Click **Utilities**.
3. Click **Database Monitor**.
4. Click **Sessions**.
5. If prompted, enter the appropriate database administrator user name and password and click **Login**.

   The Sessions page appears.
6. To view a report, select one of the following tabs at the top of the page:
   - Sessions
   - Locks
   - Waits
   - I/O
   - SQL
   - Open Cursors

   The sections that follow describe each report.

Sessions Report

The Sessions Report displays information about the current sessions in the database. Use the controls at the top of page to narrow the view:

- **Search**. Enter search criteria and click **Go**. For search details, click the Search label.
- **Status**. Select a status and click **Go**.
- **Show**. Select how many columns to display and click **Go**.
- **Display**. Select the number of rows to appear in the report and click **Go**.

To view session details, click the Session ID (SID). The Session Details page appears. To remove the current session, navigate to the Session Details page and click **Kill Session**.

Locks Report

The Locks report displays a report of sessions which have locks that are blocking other session(s). To control the number of rows that appear, make a selection from the Display list and click **Go**.

Waits Report

The Waits report displays the wait events for each session. Use the controls at the top of page to narrow the view:

- **Search**. Enter search criteria and click **Go**. For search details, click the Search label.
- **Status**. Select a status and click **Go**.

- **Show**. Select how many columns to display and click **Go**.
- **Display**. Select the number of rows to appear in the report and click **Go**.

To view session details, click the Session ID (SID). The Session Details page appears. To remove the current session, click **Kill Session**.

I/O Report

The I/0 report displays details about the I/O for each session. Use the controls at the top of page to narrow the view:

- **Search**. Enter search criteria and click **Go**. For search details, click the Search label.
- **Display**. Select the number of rows to appear in the report and click **Go**.

To view session details, click the Session ID (SID). The Session Details page appears. To remove the current session, click **Kill Session**.

SQL Report

The SQL report displays details about the current or last SQL statement executed for each session. Use the controls at the top of page to narrow the view:

- **Search**. Enter search criteria and click **Go**. For search details, click the Search label.
- **Status**. Select a status and click **Go**.
- **Show**. Select how many columns to display and click **Go**.
- **Display**. Select the number of rows to appear in the report and click **Go**.

To view session details, click the Session ID (SID). The Session Details page appears. To remove the current session, click **Kill Session**.

Open Cursors

The Open Cursors report displays details about the number of open cursors for each session. Use the controls at the top of page to narrow the view:

- **Search**. Enter search criteria and click **Go**. For search details, click the Search label.
- **Status**. Select a status and click **Go**.
- **Display**. Select the number of rows to appear in the report and click **Go**.

To view details about a specific open cursor count, click the numeric link under the Open Cursor Count column.

To view session details, click the Session ID (SID). The Session Details page appears. To remove the current session, click **Kill Session**.

About System Statistics

The System Statistics page displays statistics for:

- **Physical I/O**. A physical I/O is an I/O that requires disk access. This report displays disk access statistics for physical reads and writes.
- **Logical I/O**. A logical I/O is an I/O that is satisfied in memory or disk. Displays the sum of buffer reads which might be consistent gets or current mode gets. Redo is the buffer in the SGA that contains information about changes.
- **Memory Statistics**. Displays memory consumption of the database.
- **Time Statistics**. Shows various times consumed by the database.

- **SQL Cursor** Statistics. Displays statistics about the cursors in the Oracle database.
- **Transaction Statistics**. Shows the number of transactions performed.

To view the System Statistics page:

1. On the Workspace home page, click **SQL Workshop**.
2. Click **Utilities**.
3. Click **Database Monitor**.
4. Click **System Statistics**.
5. If prompted, enter the appropriate administrator user name and password and click **Login**.

   The System Statistics page appears.

Additional controls on the System Statistics page include:

- **Refresh Report** - Refresh the System Statistics report.
- **Save Statistics** - Save the current report.
- **Show delta between current and saved values** - Click this check box to display actual statistic values, or display deltas between an saved value and the current value.

> **See Also:** "Memory Configuration and Use" in *Oracle Database Performance Tuning Guide*

About Top SQL

The "top" SQL statements represent the SQL statements that are executed most often, that use more system resources than other SQL statements, or that use system resources more frequently than other SQL statements.

Use the Top SQL page to identify poorly performing SQL.

To view the Top SQL page:

1. On the Workspace home page, click the **SQL Workshop.**
2. Click **Utilities**.
3. Click **Database Monitor**.
4. Click **Top SQL**.
5. If prompted, enter the appropriate administrator user name and password and click **Login**.

   The Top SQL page appears. Use the search fields and lists and the top of the page and click Go to narrow the display. For details on each field or list, click the Search label.
6. To access the SQL Plan page, click the **View** icon.



The SQL Plan page appears, containing the following sections:

- **Query Plan** - Contains a color coded explain plan. Note that unindexed columns display in red.

- **SQL Text** - Displays the full text of the SQL statement.
- **Indexes** - Displays all indexes on the table in the query. There is a checkmark when that index is used in the query.
- **Table Columns** - Shows all columns on all tables or views in the query.

About Long Operations

The Long Operations page displays the status of various operations that run for longer than 6 seconds (in absolute time). These operations currently include many backup and recovery functions, statistics gathering, and query execution, and more operations are added for every Oracle release.

To view the Long Operations page:

1. On the Workspace home page, click the **SQL Workshop**.
2. Click **Utilities**.
3. Click **Database Monitor.**
4. Click **Long Operations**.
5. If prompted, enter the appropriate administrator user name and password and click **Login**.

See Also: "V$SESSION_LONGOPS" in *Oracle Database Reference*

Viewing Database Details

You can view details about your database on the About Database page.

To access details about your database:

1. On the Workspace home page, click **SQL Workshop**.
2. Click Utilities.
3. Under Additional Utilities, click **About Database**.
4. If prompted, enter the appropriate administrator user name and password and click **Login**.

   The About Database page appears. The About Database page is divided into two sections: Database and Version.
5. To view additional information about installed options, currently used features, or National Language Support, select one of the following check boxes and click **Go**:
   - Version
   - Settings
   - Options
   - National Language Support
   - CGI Environment
   - Parameters

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