Oracle® Application Express
Administration Guide

Release 18.1
E86884-02
May 2018

Oracle Application Express Administration Guide, Release 18.1

E86884-02

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A DBMS_SCHEDULER Jobs

A.1 List of DBMS_SCHEDULER Jobs A-1

Index

Preface

Oracle Application Express is a hosted declarative development environment for developing and deploying database-centric web applications. Oracle Application Express turns a single Oracle database into a shared service by enabling multiple workgroups to build and access applications as if they were running in separate databases.

Oracle Application Express Administration Guide describes how to perform administration tasks for an Oracle Application Express workspace, application, or an entire development instance.

- Audience (page xi)
- Documentation Accessibility (page xi)
- Related Documents (page xi)
- Conventions (page xii)

Audience

Oracle Application Express Administration Guide describes how to perform administration tasks for an Oracle Application Express workspace, application, or an entire development instance.

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

Documentation Accessibility

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

Access to Oracle Support

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

Related Documents

For more information, see these Oracle resources:

- *Oracle Application Express Release Notes*
- *Oracle Application Express Installation Guide*
- *Oracle Application Express End User Guide*
- *Oracle Application Express App Builder User's Guide*
- *Oracle Application Express SQL Workshop Guide*
- *Oracle Application Express API Reference*
- *Oracle Application Express Application Migration Guide*
- *Oracle Database Concepts*

Conventions

The following text conventions are used in this document:

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

Changes in This Release

This preface contains:

- Changes in Oracle Application Express Release 18.1 (page xiii)

Changes in Oracle Application Express Release 18.1

The following are changes in *Oracle Application Express Administration Guide* for Oracle Application Express release 18.1.

- Deprecated and Desupported Features (page xiii)
- Other Changes (page xiii)

Deprecated and Desupported Features

See "Deprecated Features" and "Desupported Features" in *Oracle Application Express Release Notes*.

Other Changes

The following are additional changes in the release:

- All content has been updated to reflect new functionality.
- Screen captures and graphics have been added and updated to reflect the current Oracle Application Express user interface.

1
Workspace and Application Administration

In an Oracle Application Express development environment, users sign in to a shared work area called a workspace. Workspace administrators monitor and administer a shared work area called a workspace.

- Understanding Workspace Administration (page 1-2)
  Use Workspace Administration to monitor and administer a workspace.
- Monitoring Activity Within a Workspace (page 1-12)
  Monitor developer activity and changes within a workspace by accessing the Monitor Activity page.
- Using the Manage Service Page (page 1-16)
  Use the Manage Service page to manage service requests, configure workspace preferences, edit workspace announcements, and view reports. Additionally, administrators use this page to clear log files, manage session state, clear cached content, manage Websheet database objects, and manage interactive report settings.
- Making a Service Request (page 1-19)
  Workspace administrators use the Request Service page to request a schema, add storage space, terminate a workspace, or request another workspace.
- Configuring Workspace Preferences (page 1-22)
  Configure workspace preferences for workspace login controls, access to App Builder and SQL Workshop, support for PL/SQL editing and RESTful services, and access to Team Development.
- Defining a Workspace Message (page 1-28)
  Workspace administrators can quickly communicate with other users by creating workspace messages.
- Managing Users in a Workspace (page 1-31)
  Create new user accounts, manage existing user accounts, and change user passwords.
- Purging the Developer Activity and Click Count Log Files (page 1-42)
  Manually purge developer logs and the External Count Clicks log on the Log files page. Log entries older then one month are automatically deleted.
- Managing Session State for a Workspace (page 1-43)
  A session establishes persistence (or stateful behavior) across page views. Workspace administrators can view session details for the current session or for recent sessions, purge the current session state, or purge sessions based on their age.
- Managing User Preferences (page 1-46)
  Developers can use preferences to store values for a specific Application Express user across distinct sessions. Once set, these preferences can be removed programmatically or manually. Administrators can set user preferences by creating a page process, by the calculation of a preference Item Source Value, or programmatically by using a PL/SQL API.

- Managing Page and Region Caching (page 1-51)
  Improve an application's performance by taking advantage of page and region caching.
- Changing Build Status for Multiple Applications (page 1-52)
  Configure the Build Status attribute at the workspace-level tp prevent an application from being modified by other developerl.
- Viewing Workspace Dashboards (page 1-53)
  Use the Dashboard page to view details about the current workspace and monitor overall workspace activity.
- Leveraging App Builder Defaults (page 1-57)
  App Builder Defaults enable developers to reduce the number of steps needed to create a new application.

> **See Also:**
>
> "Oracle Application Express Administration Services (page 2-1)" and "Understanding Administrator Security Best Practices" in *Oracle Application Express App Builder User's Guide*

1.1 Understanding Workspace Administration

Use Workspace Administration to monitor and administer a workspace.

- What is a Workspace Administrator? (page 1-3)
  Workspace administrators have all the rights and privileges available to developer and manage administrator tasks specific to a workspace.
- Accessing the Workspace Administration Page (page 1-3)
  Use the Workspace Administration page to monitor and administer a workspace.
- Workspace Administration Page (page 1-4)
  Use the Workspace Administration page to manage service requests, manage users and groups, monitor activity, view dashboards, view the Utilization Report, change your password, manage users and user groups, manage interactive report settings, manage the Export Repository and Websheet Database objects, and request a new workspace.
- Resetting Your Password (page 1-6)
  Click Change Password on the Workspace Administration page to reset your password.
- Viewing Product Release and Environment Information (page 1-7)
  Access the About Application Express page to view basic product information, including the Application Express release number, workspace name, environment details, and database information.
- Managing Exported Files (page 1-8)
  Use the Manage Export Repository page to manage files in the current workspace.
- Managing Saved Interactive Reports (page 1-8)
  View and delete saved interactive reports as well as manage interactive report subscriptions.

- Viewing a Workspace Summary (page 1-10)
  Use the Workspace Utilization report to view a comprehensive summary of the current workspace, including summaries of schemas, database applications, Websheet applications, SQL Workshop scripts and results, Team Development details, application activity, developer activity, and counts of database objects.
- Removing and Validating Websheet Database Objects (page 1-11)
  Remove or validate the data objects associated with Websheet.
- Requesting a New Workspace Manually (page 1-12)
  Workspace administrators can request a new workspace manually on the Workspace Administration page.

1.1.1 What is a Workspace Administrator?

Workspace administrators have all the rights and privileges available to developer and manage administrator tasks specific to a workspace.

In Oracle Application Express, users sign in to a shared work area called a workspace. A workspace enables multiple users to work within the same Oracle Application Express installation while keeping their objects, data and applications private. This flexible architecture enables a single database instance to manage thousands of applications.

Within a workspace, **End users** can only run existing database or Websheet application. **Developers** can create and edit applications, monitor workspace activity, and view dashboards. Oracle Application Express includes two administrator roles:

- **Workspace administrators** are users who perform administrator tasks specific to a workspace.
- **Instance administrators** are superusers that manage an entire hosted Oracle Application Express instance which may contain multiple workspaces.

Workspace administrators can reset passwords, view product and environment information, manage the Export repository, manage saved interactive reports, view the workspace summary report, and manage Websheet database objects. Additionally, workspace administrators manage service requests, configure workspace preferences, manage user accounts, monitor workspace activity, and view log files.

1.1.2 Accessing the Workspace Administration Page

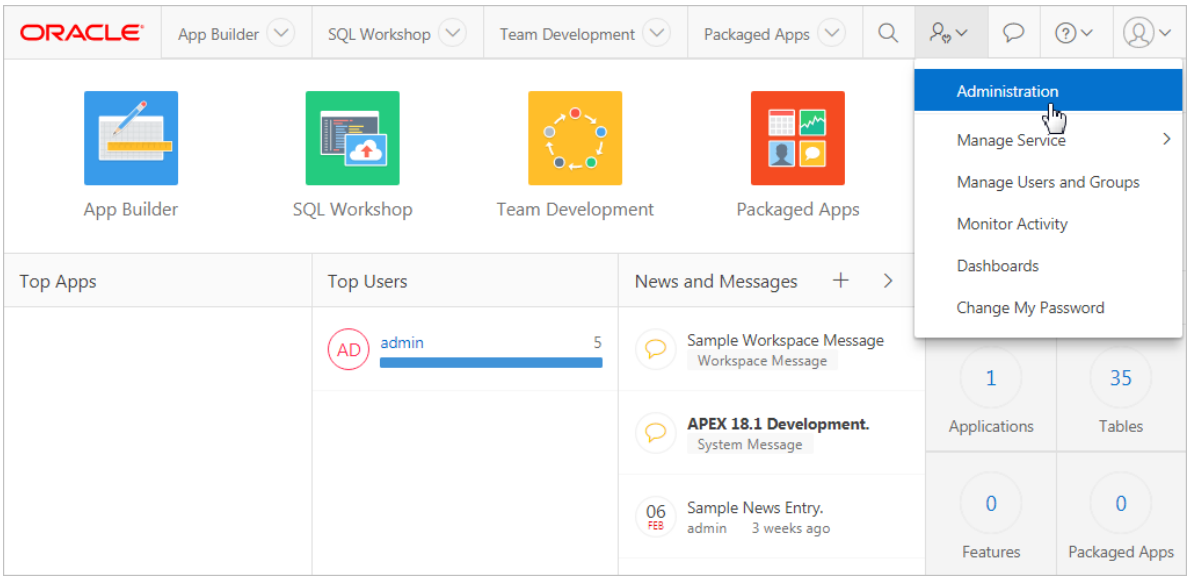
Use the Workspace Administration page to monitor and administer a workspace.

> **Tip:**
>
> You can access many workspace administration functions from both the Administration menu and Workspace Administration home page and . Notice that Administration menu includes options for Manage Service, Manage Users and Groups, Monitor Activity, Dashboards, and Change My Password. For consistency, the procedures in this document navigates the user to the Workspace Administration home page.

To access the Workspace Administration page:

1. Sign in to Oracle Application Express.

   The Workspace home page appears.
2. At the top of the page, click the **Administration** menu.
3. From the Administration menu, select **Administration**.

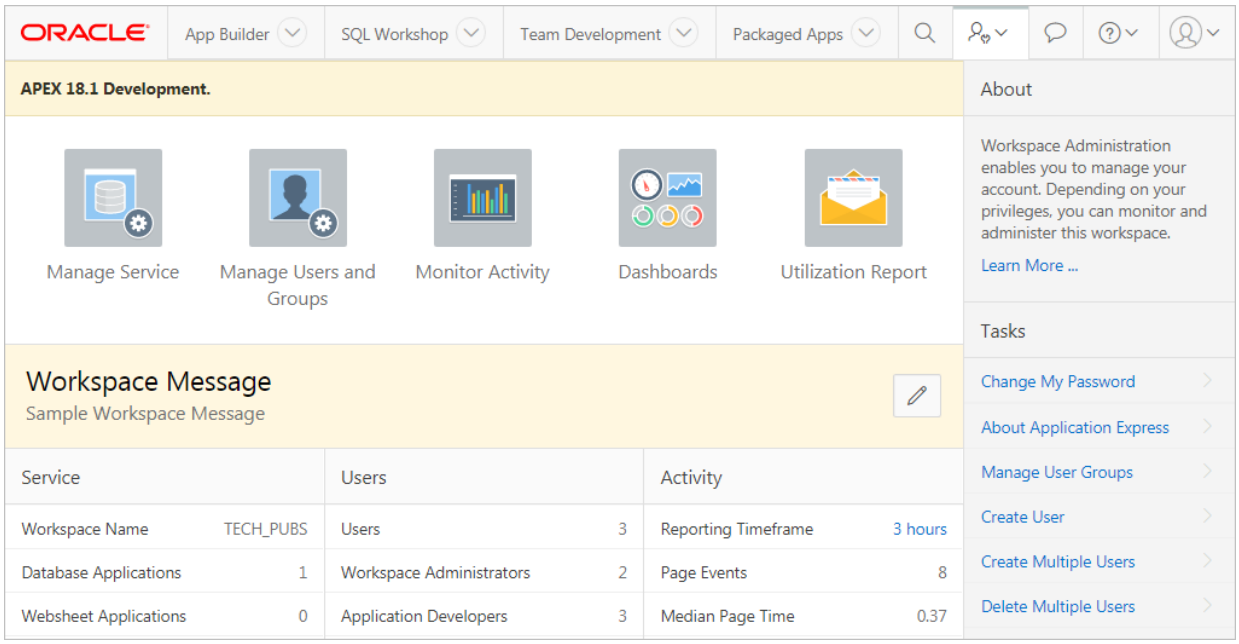


The Administration page appears.

1.1.3 Workspace Administration Page

Use the Workspace Administration page to manage service requests, manage users and groups, monitor activity, view dashboards, view the Utilization Report, change your password, manage users and user groups, manage interactive report settings,

manage the Export Repository and Websheet Database objects, and request a new workspace.



The top of Workspace Administration page contains the following icons:

- **Manage Service**. Links to the Manage Service page. Use this page to manage service requests (including, schema requests, storage requests, and service termination) and configure workspace preferences, edit announcements, view utilization reports and log files, and manage session state.
- **Manage Users and Groups**. Links to the Manage Users and page. Use this page to manage Application Express user accounts and user groups.
- **Monitor Activity**. Links to the Monitor Activity page. Use this page to monitor page views, developer activity, active sessions, view page view analysis reports, environment reports such as browser usage and click counts, and user login reports.
- **Dashboards**. Links to the Dashboards page. Use this page to view details about the current workspace and monitor users, activity, developer activity, performance, Websheet application development, database application development, and view database details.
- **Utilization Report**. Links to the Workspace Utilization report. Use this report view a comprehensive summary of the current workspace, including schemas, database applications, Websheet applications, SQL Workshop scripts and results, Team Development details, application activity, developer activity, and counts of database objects.

Workspace Message

The Workspace Message region displays directly below the icons at the top of the Workspace Administration page. Use this region to communicate information to other users.

Tasks Region

A Tasks region displays on the right side of the Workspace Administration page and contains the following links:

- **Change My Password**. Links to the Change Password section of the Edit Profile page.
- **About Application Express**. Links to an About page that lists basic product information.
- **Manage User Groups**. Links to the User groups page. Workspace administrators can use groups for categorization and manage privileges.
- **Create User**. Links to a form where Workspace administrators can create new user.
- **Create Multiple Users**. Enables Workspace administrators to create multiple users once.
- **Delete Multiple Users**. Enables Workspace administrators to delete multiple users at once.
- **Manage Interactive Report Settings**. Enables Workspace administrators to manage saved reports and subscriptions.
- **Manage Export Repository**. Displays to the Manage Export Repository. Use the Manage Export Repository page to manage files in the current workspace.
- **Websheet Database Objects**. Displays the Websheet Database Objects page. All Websheet application data is stored within tables owned by a schema associated with this workspace. The tables are all prefixed by `APEX$_`. Use the Websheet Database Objects page to manage these tables.
- **Request a New Workspace**. Launches the Request a Workspace wizard. Enables Workspace administrators to request a new workspace manually on the Workspace Administration page without having to access the Oracle Application Express Administration Services application.

1.1.4 Resetting Your Password

Click Change Password on the Workspace Administration page to reset your password.

To reset your password from the Administration page:

> **Tip:**
>
> You can access many workspace administration functions (such as **Change My Password**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.

   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. On the Tasks list, click **Change My Password**.
3. Under Change Password, enter the following:
   - Enter Current Password - Enter your current password.
   - Enter New Password - Enter your new password.
   - Confirm New Password - Enter your new password again.
4. Click **Apply Changes**.

1.1.5 Viewing Product Release and Environment Information

Access the About Application Express page to view basic product information, including the Application Express release number, workspace name, environment details, and database information.

To view the About Application Express page:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Tasks list, click **About Application Express**.

   The About Application Express page appears. The page is divided into these sections: About; Visit Oracle Online For More Information; CGI Environment; and Database Version.

The Details section displays the following information:

- Product build
- Schema compatibility
- Last DDL time
- Host schema
- Application Owner
- Workspace ID
- Workspace Name
- Current user
- Language Preference
- Current Time (on server)

CGI Environment provides information about the currently installed web server software such as currently defined parameters and variables.

Database Version lists details about the currently installed database version.

Character Set lists currently selected character sets. The selected character set determines the encoding scheme used to display characters on screen.

1.1.6 Managing Exported Files

Use the Manage Export Repository page to manage files in the current workspace.

To access the Manage Export Repository page:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Tasks list, click **Manage Export Repository**.

   The Manage Export Repository page appears.

   You can customize the appearance of the page using the Search bar at the top of the page.
3. To remove a file, select the file and click **Delete Checked**.

1.1.7 Managing Saved Interactive Reports

View and delete saved interactive reports as well as manage interactive report subscriptions.

- About Saved Interactive Reports (page 1-8)
  Oracle Application Express includes four types of saved interactive reports: Primary Default, Alternative Report, Public Report, and Private report. Both developers and end users can save interactive reports. However, only a developer can save the report that initially displays (called the Primary Default) or create an Alternative report.
- Viewing and Deleting Saved Interactive Reports (page 1-9)
  View and delete saved interactive reports on the Saved Reports page.
- Managing Interactive Report Subscriptions (page 1-9)
  End users can receive updated versions of a report by subscribing to it. Workspace administrators can view and manage these subscriptions on the Subscriptions page.

> **See Also:**
>
> "Managing Reports" in *Oracle Application Express App Builder User's Guide*

1.1.7.1 About Saved Interactive Reports

Oracle Application Express includes four types of saved interactive reports: Primary Default, Alternative Report, Public Report, and Private report. Both developers and

end users can save interactive reports. However, only a developer can save the report that initially displays (called the Primary Default) or create an Alternative report.

Oracle Application Express includes four types of saved interactive reports:

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

Workspace administrators can view and manage these reports on the Saved Reports page.

1.1.7.2 Viewing and Deleting Saved Interactive Reports

View and delete saved interactive reports on the Saved Reports page.

To manage saved interactive reports:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. From the Tasks list, click **Manage Interactive Report Settings**.
3. Click **Saved Reports**.

   The Saved Reports page appears.

   You can customize the appearance of the page using the Search bar at the top of the page.
4. To delete a report:
   a. Select the report to be removed.
   b. Click **Delete Checked**.

1.1.7.3 Managing Interactive Report Subscriptions

End users can receive updated versions of a report by subscribing to it. Workspace administrators can view and manage these subscriptions on the Subscriptions page.

To manage interactive report subscriptions:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. From the Tasks list, click **Manage Interactive Report Settings**.
3. Click **Subscriptions**.

   The Subscriptions page appears.

   You can customize the appearance of the page using the Search bar at the top of the page.
4. To link to an application, page or region, click the appropriate hyperlink.
5. To delete a subscription:
   a. Select the subscription to be removed.
   b. Click **Delete Checked**.

1.1.8 Viewing a Workspace Summary

Use the Workspace Utilization report to view a comprehensive summary of the current workspace, including summaries of schemas, database applications, Websheet applications, SQL Workshop scripts and results, Team Development details, application activity, developer activity, and counts of database objects.

- Viewing the Workspace Utilization Report (page 1-10)
  View the Workspace Utilization Report which details workspace activity and contents.
- Emailing the Workspace Utilization Report (page 1-10)
  Email specific recipients a workspace summary report by clicking the Email button while viewing the Workspace Utilization Report.

1.1.8.1 Viewing the Workspace Utilization Report

View the Workspace Utilization Report which details workspace activity and contents.

To view the Workspace Utilization report:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Workspace Administration page, click **Manage Service**.
3. Click **Workspace Utilization**.
4. From Show, select a time interval.
5. Scroll down to view the report.

1.1.8.2 Emailing the Workspace Utilization Report

Email specific recipients a workspace summary report by clicking the Email button while viewing the Workspace Utilization Report.

To email the Workspace Utilization report:

1. Navigate to the Workspace Administration page:

   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Workspace Administration page, click **Manage Service**.
3. Click **Workspace Utilization**.
4. From Show, select a time interval.
5. To email the report:
   a. Click **Email**.
   b. In the Email form:
      - Reporting Periods - Select a time interval for the report.
      - **To** - Enter valid email addresses. Separate multiple entries with a comma.
      - **Subject** - Enter text that describes the message.
      - **Body** - Enter optional body text.
      - Click **Email**.

      The report is automatically emailed to the specified recipients.

1.1.9 Removing and Validating Websheet Database Objects

Remove or validate the data objects associated with Websheet.

All Websheet application data is stored within tables owned by a schema associated with this workspace. The tables are all prefixed by `APEX$_`. Workspace administrators use the Websheet Database Objects page to manage these tables.

To access the Manage Export Repository page:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Tasks list, click **Manage Websheet Database Objects**.

   The Websheet Database Objects page appears.
3. Select one of the following and follow the on-screen instructions:
   - **Remove Websheet Database Objects** - Drop Websheet database objects and data from your schema.
   - **Validate Websheet Database Objects** - Validate the integrity of Websheet database objects and correct identified problems.

1.1.10 Requesting a New Workspace Manually

Workspace administrators can request a new workspace manually on the Workspace Administration page.

To request a new workspace:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Tasks list, click **Request a New Workspace**.

   The Request a Workspace Wizard appears.
3. Select one of the following and click **Next**:
   - **Application Development**
   - **Packaged Apps Only**
4. For Identification:
   a. First Name - Enter your first name.
   b. Last Name - Enter your last name.
   c. Email - Enter the email address to which account will be sent.
   d. First Name - Enter a workspace name.
   e. Click **Next**.
5. For Schema:
   a. Configuration - Select whether you wish to create a new database schema or configure an existing database schema for your new workspace.
   b. Existing Schema - Enter the name of the schema you wish to make accessible to your new Application Express workspace.
   c. Click **Next**.
6. Review and accept the service agreement. Click **Next**.
7. Verify your request and click **Submit Request**.

1.2 Monitoring Activity Within a Workspace

Monitor developer activity and changes within a workspace by accessing the Monitor Activity page.

The Monitor Activity page features links to numerous reports that track page views, developer activity, active sessions and also view page view analysis reports, environment reports such as browser usage and click counts, and login reports. This section only describes a few reports in detail.

- Accessing the Monitor Activity Page (page 1-13)
  Use the Monitor Activity page to view developer activity and application change information.
- Viewing Application Changes by Developer (page 1-14)
  Access the Application Changes by Developer report displays the number of pages changed by each developer and offers a graphical representation of the information in either a bar chart or pie chart format.
- Viewing Application Changes by Day (page 1-14)
  Access the Application Changes by Day report displays a summary of the number of application changes by day. You have the option to view this information by month, as a line chart, or by developer.
- Viewing Active Sessions (page 1-15)
  A session is a logical construct that establishes persistence (or stateful behavior) across page views. Use the Active Sessions report to view active sessions in the current workspace.
- Viewing Schema Reports (page 1-16)
  View Schema Reports to review summaries of schema tablespace utilization and database privileges by schema, and a list of all database schemas available in the current workspace.

See Also:

"Viewing Workspace Dashboards (page 1-53)," "Monitoring Activity Across a Development Instance (page 2-128)," and "Creating Custom Activity Reports Using APEX_ACTIVITY_LOG" in *Oracle Application Express App Builder User's Guide*

1.2.1 Accessing the Monitor Activity Page

Use the Monitor Activity page to view developer activity and application change information.

To access the Monitor Activity page:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Monitor Activity**.

   The Monitor Activity page appears and is divided into the following sections:
   - **Page Views** - Contains reports of page views organized by view, user, application, application and page, day, hour, and by interactive report.
   - **Developer Activity** - Offers reports of developer activity organized by developer, day, application, application changes, and day or month.
   - **Sessions** - Lists active sessions with the current workspace (report or chart).

- **Page View Analysis** - Contains reports analyzing page views, such most viewed pages, page views by day, usage by day (chart), weighted page performance, and Websheet page views.
- **Environment** - Contains reports of environments organized by user agent, browser, external clicks, or operating system.
- **Login Attempts** - Offers reports listing login attempts, login attempts by authentication result, and a developer login summary.
- **Application Errors** - Contains a report of application errors.
- **Workspace Schema Reports** - Offers summaries of schema tablespace utilization, database privileges by schema, workspace schemas, and tablespace utilization.
- **Archived Activity Reports** - Lists archived reports.

3. Select a report to review.

1.2.2 Viewing Application Changes by Developer

Access the Application Changes by Developer report displays the number of pages changed by each developer and offers a graphical representation of the information in either a bar chart or pie chart format.

To view application changes by developer:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Monitor Activity**.
3. Under Developer Activity, select **By Developer**.
4. Make a time selection from the Since list, an application (if applicable), and click **Set**.

   You can customize the appearance of the page using the Search bar at the top of the page.

1.2.3 Viewing Application Changes by Day

Access the Application Changes by Day report displays a summary of the number of application changes by day. You have the option to view this information by month, as a line chart, or by developer.

To view application changes by day:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Monitor Activity**.
3. Under Developer Activity, click **By Day**.

   The Application Changes by Day page appears.
4. Make a time selection from the Since list, an application (if applicable), and click **Set**.

   You can customize the appearance of the page using the Search bar at the top of the page.

1.2.4 Viewing Active Sessions

A session is a logical construct that establishes persistence (or stateful behavior) across page views. Use the Active Sessions report to view active sessions in the current workspace.

- What is an Active Session? (page 1-15)
  An active session is a session that has not yet been purged from the sessions table.
- Viewing the Active Sessions Report (page 1-15)
  View the Active Sessions report to view active sessions in the current workspace.

> **See Also:**
>
> "Undertanding Session State Management" in *Oracle Application Express App Builder User's Guide*

1.2.4.1 What is an Active Session?

An active session is a session that has not yet been purged from the sessions table.

Whenever an application is run, the Application Express engine maintains a record in a database table in the Oracle Application Express schema. This table records a numeric identifier (or session ID), the authenticated (or public) user identifier, the creation date, and other information. The session is the key record that enables session state, or persistence, across page requests. By viewing the Active Sessions report, a developer or administrator can see who has been using applications in a workspace. An **active session** is a session that has not yet been purged from the sessions table. An **expired session** is a session which has been existing longer than its maximum lifetime or which has not been used for longer than its maximum idle time. A DBMS job runs every hour and purges expired sessions.

1.2.4.2 Viewing the Active Sessions Report

View the Active Sessions report to view active sessions in the current workspace.

To view active session details:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.

   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Monitor Activity**.
3. Under Sessions, select **Active Sessions**.

   You can customize the appearance of the page using the Search bar at the top of the page.

4. Click a session ID to view the Session Details page.

1.2.5 Viewing Schema Reports

View Schema Reports to review summaries of schema tablespace utilization and database privileges by schema, and a list of all database schemas available in the current workspace.

To view Schema Reports:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Monitor Activity**.
3. Under Workspace Schema Reports, click one of the following reports:
   - **Schema Tablespace Utilization**
   - **Database Privileges by Schema**
   - **Workspace Schemas**
   - **Report Tablespace Utilization (popup)**

   You can customize the appearance of the Database Privileges and Workspace Schemas reports using the Search bar at the top of the page.

1.3 Using the Manage Service Page

Use the Manage Service page to manage service requests, configure workspace preferences, edit workspace announcements, and view reports. Additionally, administrators use this page to clear log files, manage session state, clear cached content, manage Websheet database objects, and manage interactive report settings.

- Accessing the Manage Service Page (page 1-17)
  Access the Manage Service page to manage service requests, configure workspace preferences, edit workspace announcements, and view reports.
- Manage Service Page (page 1-17)
  Use the Manage Service page to manage service requests, configure workspace preferences, edit workspace announcements, and view workspace utilization reports.

1.3.1 Accessing the Manage Service Page

Access the Manage Service page to manage service requests, configure workspace preferences, edit workspace announcements, and view reports.

To access the Manage Service page:

> **Tip:**
>
> You can access many workspace administration functions (such as **Manage Service**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

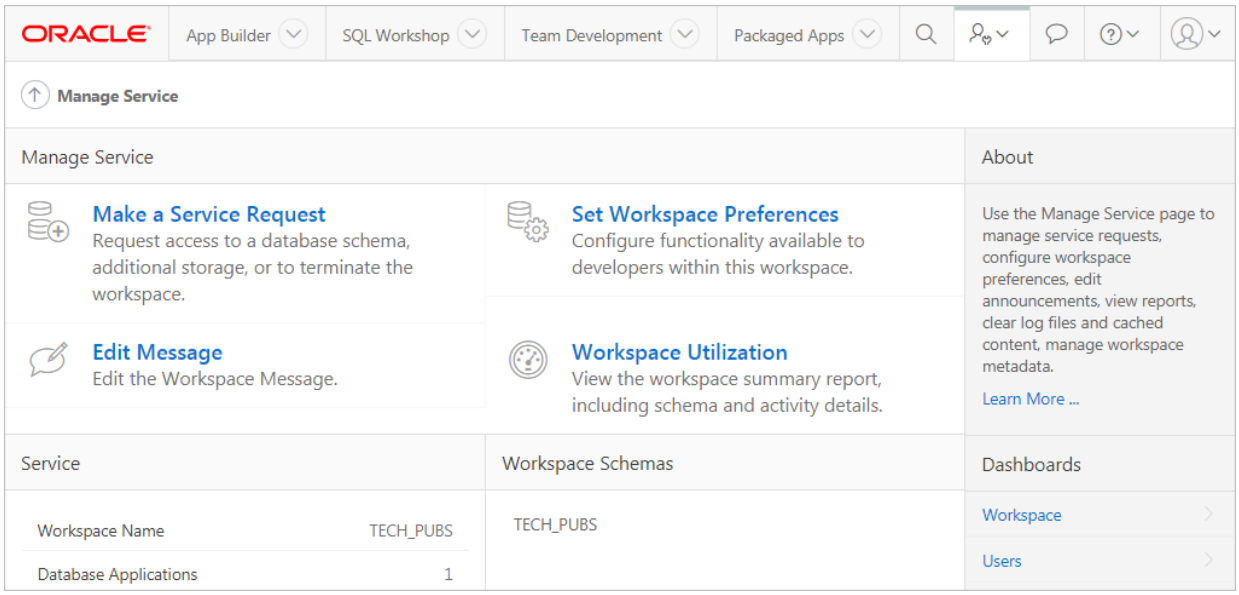
1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.

   The Manage Service page appears.

1.3.2 Manage Service Page

Use the Manage Service page to manage service requests, configure workspace preferences, edit workspace announcements, and view workspace utilization reports.



The center of the Manage Service page contains the following links:

- **Make a Service Request**. Request a new schema, request additional storage space, or terminate a workspace.
- **Set Workspace Preferences**. Configure login controls, App Builder, SQL Workshop, PL/SQL editing capability, RESTful service support, and Team Development.
- **Edit Message**. Create a message that displays on the Workspace home page and on the Workspace Administration page.
- **Workspace Utilization**. View a summary report about the current workspace.

> **See Also:**
>
> - "Making a Service Request (page 1-19)"
> - "Configuring Workspace Preferences (page 1-22)"
> - "Defining a Workspace Message (page 1-28)"
> - "Viewing a Workspace Summary (page 1-10)"

Dashboards

The **Dashboards** region displays links to specific dashboards, including: Workspace, Users, Activity, Developer Activity, Performance, Applications, and Database.

> **See Also:**
>
> "Viewing Workspace Dashboards (page 1-53)"

Manage Meta Data

Links under **Manage Meta Data** enable administrators to manage log files, session state, page and region caching, Websheet Database objects, application build status, file utilization, and interactive report settings. The Manage Meta Data region displays on the right side of the page and displays the following links:

- **Developer Activity and Click Count Logs** - Manually purge developer logs and the External Count Clicks log on the Log files page.
- **Session State** - View session details for the current session or for recent sessions, purge the current session state, or purge sessions based on their age.
- **Application Cache** - View and purge cached regions and pages.
- **Websheet Database Objects** - View the Websheet Database Objects page.
- **Application Build Status** - Configure Build Status at the workspace-level.
- **File Utilization** - Use the File Utilization report to identify areas using excessive storage.
- **Interactive Report Settings** - View pages to view and manage saved interactive reports and manage email subscriptions.

1.4 Making a Service Request

Workspace administrators use the Request Service page to request a schema, add storage space, terminate a workspace, or request another workspace.

> **Tip:**
>
> You can access many workspace administration functions (such as **Manage Service, Make a Service Request**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

- Requesting a New Schema (page 1-19)
  Request a new schema by making a service request and selecting Request Schema.
- Requesting More Storage (page 1-20)
  Request more storage for a workspace by making a service request and selecting Request Storage.
- Terminating a Workspace (page 1-20)
  Terminate a workspace by making a service request and selecting Request Termination.
- Determining the Amount of Space Available in Your Workspace (page 1-21)
  Workspace administrators can use the Detailed Tablespace Utilization report to see the amount of free space available in a workspace. Viewing this report prior to requesting additional storage, enables administrators to determine how much additional storage space they need.
- Signing Up for Another Workspace (page 1-22)
  Sign up for another workspace by making a service request and selecting Sign up for another workspace.

> **See Also:**
>
> "Managing Workspace and Change Requests (page 2-10)"

1.4.1 Requesting a New Schema

Request a new schema by making a service request and selecting Request Schema.

A schema is named collection of database objects, including logical structures such as tables and indexes. A schema has the name of the database user who owns it.

To request a new schema:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.

   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Manage Service**.
3. Click **Make a Service Request**.
4. Click **Request Schema**.
5. On Request Database Schema, specify the following:
   a. Schema - Select either **Request a new schema** or **Use an existing schema**.
   b. Schema Name - Enter a new name or select one from the list.
   c. Click **Next**.
6. Click **Finish**.

1.4.2 Requesting More Storage

Request more storage for a workspace by making a service request and selecting Request Storage.

To request more storage:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Manage Service**.
3. Click **Make a Service Request**.
4. Click **Request Storage**.

   > **Tip:**
   >
   > To see the amount of free space available in the workspace, click **Detailed Tablespace Utilization Report (may take several seconds)**.

5. On Request Storage, specify the following:
   a. Amount of Storage to Add - Select the amount of storage to add..
   b. Click **Next**.
6. Confirm your request by clicking **Request Storage**.

1.4.3 Terminating a Workspace

Terminate a workspace by making a service request and selecting Request Termination.

To terminate a workspace:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Make a Service Request**.
4. Click **Request Termination**.
5. Confirm your request by clicking **Next**.

1.4.4 Determining the Amount of Space Available in Your Workspace

Workspace administrators can use the Detailed Tablespace Utilization report to see the amount of free space available in a workspace. Viewing this report prior to requesting additional storage, enables administrators to determine how much additional storage space they need.

> **See Also::**
>
> Requesting More Storage (page 1-20)

- Viewing the Detailed Tablespace Utilization Report (page 1-21)
  Determine the amount of space available in a workspace by viewing the Detailed Tablespace Utilization Report.

1.4.4.1 Viewing the Detailed Tablespace Utilization Report

Determine the amount of space available in a workspace by viewing the Detailed Tablespace Utilization Report.

To view the Detailed Tablespace Utilization report:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Make a Service Request**.
4. Click **Detailed Tablespace Utilization Report** (may take several seconds).

   A report appears displaying the tablespace name, available bytes, amount used, amount free, and percentage used.

1.4.5 Signing Up for Another Workspace

Sign up for another workspace by making a service request and selecting Sign up for another workspace.

To request another workspace:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Make a Service Request**.
4. Click **Sign up for another workspace**.
5. Follow the online registration instructions.

1.5 Configuring Workspace Preferences

Configure workspace preferences for workspace login controls, access to App Builder and SQL Workshop, support for PL/SQL editing and RESTful services, and access to Team Development.

> **Tip:**
>
> You can access many workspace administration functions (such as **Manage Service, Set Worksapce Preferences**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

> **Tip:**
>
> Some workspace preferences can also be configured for an entire instance. If applicable, the section includes references to any instance-level settings.

- Creating Account Login Controls for a Workspace (page 1-23)
  Configure workspace login controls such as account expiration and locking, maximum number of failed login attempts, and password lifetime.
- Controlling Access to App Builder (page 1-24)
  Control whether developers can access App Builder.
- Controlling Access to SQL Workshop (page 1-25)
  Control whether developers can access to SQL Workshop. SQL Workshop includes tools for viewing and managing database objects.

- Disabling PL/SQL Program Unit Editing for a Workspace (page 1-26)
  Determine whether developers have the ability to edit and compile PL/SQL program units from Object Browser.
- Enabling RESTful Services for a Workspace (page 1-26)
  Workspace administrators can control whether RESTful Services are enabled in the current workspace.
- Managing Team Development (page 1-27)
  Use the options under Team Development to specify whether Team Development is available in the current workspace, enable support for file attachments, and specify the maximum size of uploaded files.

1.5.1 Creating Account Login Controls for a Workspace

Configure workspace login controls such as account expiration and locking, maximum number of failed login attempts, and password lifetime.

- About Login Controls (page 1-23)
  Workspace administrators can configure login controls for an individual workspace.
- Configuring Workspace Account Login Controls (page 1-24)
  Configure workspace account login controls on the Set Workspace Preferences page.

> **See Also:**
>
> "Configuring Authentication Controls for an Instance (page 2-39)"

1.5.1.1 About Login Controls

Workspace administrators can configure login controls for an individual workspace.

Workspace administrators can also configure login controls for an entire Oracle Application Express instance. For example, if an Instance administrator configures account login controls in Oracle Application Express Administration Services that configuration applies to all Application Express accounts in all workspaces across an entire instance.

If the Instance administrator does *not* enable login controls across an entire instance, then each Workspace administrator can configure the following controls on a workspace-by-workspace basis:

- End-user account expiration and locking
- A maximum number of failed login attempts for end-user accounts
- The password lifetime (or number of days an end-user account password can be used before it expires for end-user accounts

> **Tip:**
>
> This feature applies only to accounts created using the Application Express user creation and management. Application Accounts Authentication provides additional authentication security for applications. See "Managing Users in a Workspace (page 1-31)."

1.5.1.2 Configuring Workspace Account Login Controls

Configure workspace account login controls on the Set Workspace Preferences page.

To configure login controls for a workspace:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Set Workspace Preferences**.
4. Under Account Login Control:
   a. Account Expiration and Locking - Make a selection to determine whether Application Express end user accounts can be expired or locked. This feature applies only to end-user accounts created using the Application Express user management interface. Options include: **Enable** or **Disable**.
   b. Maximum Login Failures Allowed - Enter a positive integer for the maximum number of consecutive unsuccessful authentication attempts allowed before an end-user account is locked. If you do not specify a value in this field, the instance-level setting for Maximum Login Failures Allowed is used.

      > **Tip:**
      >
      > If the Instance administrator sets the **Require User Account Expiration and Locking** preference to **Yes**, this preference defaults to **Enable** and you cannot update it.

   c. End User Account Lifetime (days) - Enter a positive integer for the maximum number of days an end-user account password may be used before the account expires. If you do not specify a value in this field, the instance-level setting for Account Password Lifetime is used.
5. Click **Apply Changes**.

1.5.2 Controlling Access to App Builder

Control whether developers can access App Builder.

To control access to App Builder:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Set Workspace Preferences**.
4. Scroll down to App Builder.
   - To Enable App Builder, select **Yes**.
   - To disable App Builder, select **No**.
5. Click **Apply Changes**.

> **Tip:**
>
> These settings can be overridden by an Instance administrator. See "Managing Component Availability for an Instance (page 2-111)."

1.5.3 Controlling Access to SQL Workshop

Control whether developers can access to SQL Workshop. SQL Workshop includes tools for viewing and managing database objects.

To control access to SQL Workshop:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Set Workspace Preferences**.
4. Scroll down to SQL Workshop.
   - To Enable SQL Workshop, select **Yes**.
   - To disable SQL Workshop, select **No**.
5. Click **Apply Changes**.

> **Tip:**
>
> These settings can be overridden by an Instance administrator. See "Managing Component Availability for an Instance (page 2-111)."

1.5.4 Disabling PL/SQL Program Unit Editing for a Workspace

Determine whether developers have the ability to edit and compile PL/SQL program units from Object Browser.

By default, developers can change and compile PL/SQL source code when browsing database procedures, packages, and functions in SQL Workshop Object Browser. Workspace administrators can disable PL/SQL program unit editing by selecting **Do not allow PL/SQL program unit editing** on the Set Workspace Preferences page.

To disable PL/SQL program unit editing:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Set Workspace Preferences**.
4. Scroll down to SQL Workshop.
5. Under PL/SQL Editing, select one of the following:
   - **Allow PL/SQL program unit editing**
   - **Do not allow PL/SQL program unit editing**

   If you select **Do not allow PL/SQL program unit editing**, developers can still create and replace PL/SQL program units using scripts or SQL Commands.
6. Click **Apply Changes**.

1.5.5 Enabling RESTful Services for a Workspace

Workspace administrators can control whether RESTful Services are enabled in the current workspace.

> **Tip:**
>
> RESTful Services requires that the web listener in your configuration uses Oracle REST Data Services release 2.0 or later.

To configure RESTful access:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Manage Service**.
3. Click **Set Workspace Preferences**.
4. Scroll down to SQL Workshop.
5. From Enable RESTful Services, select one of the following:
   - **Yes** - Enables developers to expose report regions as RESTful services.
   - **No** - Prevents developers from exposing report regions as RESTful services.
6. If Enabled RESTful Services is set to **Yes**, configure Path Prefix. In Path Prefix, specify the URI path prefix to be used to access RESTful Services in the current workspace. The default path prefix value is the name of the workspace.

   For example, a workspace named **QA_1** could have a path prefix set to **QA**. In this case, the sample RESTful service would be available at:

   `http://www.example.com/apex/qa/hr/employees/`
7. Click **Apply Changes**.

1.5.6 Managing Team Development

Use the options under Team Development to specify whether Team Development is available in the current workspace, enable support for file attachments, and specify the maximum size of uploaded files.

> **Tip:**
>
> The Enable File Repository attribute can only be modified if the instance-level setting, Enable Team Development's File Repository is set to **Yes**. See "Enabling Instance-level Support for File Upload in Team Development (page 2-23)."

- Enabling Team Development for a Workspace (page 1-27)
  Control whether developers can access Team Development.
- Enabling Workspace-level Support for File Upload in Team Development (page 1-28)
  Control whether Team Development supports file upload.

1.5.6.1 Enabling Team Development for a Workspace

Control whether developers can access Team Development.

To enable Team Development:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.

3. Click **Set Workspace Preferences**.
4. Scroll down to Team Development.
5. For Enable Team Development:
   - Select **Yes** to enable Team Development in the current workspace.
   - Select **No** to disable Team Development in the current workspace.
6. Click **Apply Changes**.

1.5.6.2 Enabling Workspace-level Support for File Upload in Team Development

Control whether Team Development supports file upload.

To enable support for file upload in for Team Development file upload:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Service**.
3. Click **Set Workspace Preferences**.
4. Scroll down to Team Development.
5. Scroll down to Team Development. Specify whether to enable file upload in Team Development.
   a. Enable File Repository:
      - **Yes** - Enables support for file attachments in Team Development and creates a local `APEX$` table to store the files.
      - **No** - Disables support for file attachments in Team Development.

      > **Tip:**
      >
      > This attribute can only be modified if the instance-level setting, Enable Team Development's File Repository, is set to **Yes**. See "Enabling Instance-level Support for File Upload in Team Development (page 2-23)."

   b. Maximum File Size (in MB) - Select the maximum file size for any file uploaded into the team development file repository. The default value is 15 MB.
6. Click **Apply Changes**.

1.6 Defining a Workspace Message

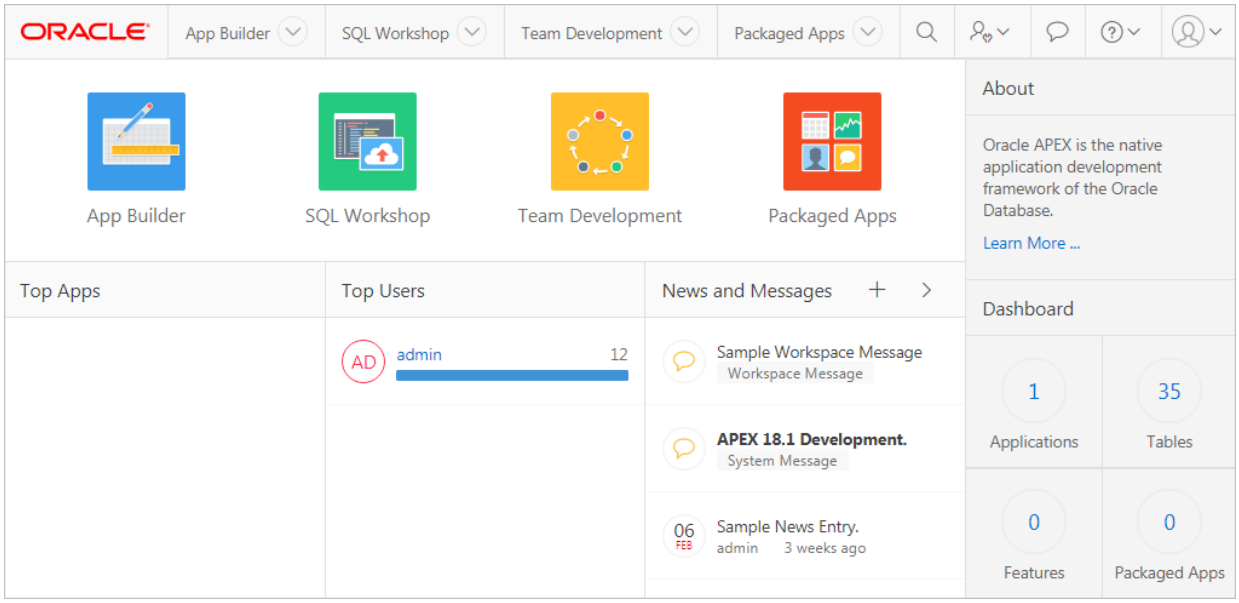
Workspace administrators can quickly communicate with other users by creating workspace messages.

- About Workspace Messages (page 1-29)
  Workspace messages enable administrators to quickly communicate with other users.
- Creating and Editing a Workspace Message (page 1-30)
  Create or edit a workspace message from the Workspace Administration page.

1.6.1 About Workspace Messages

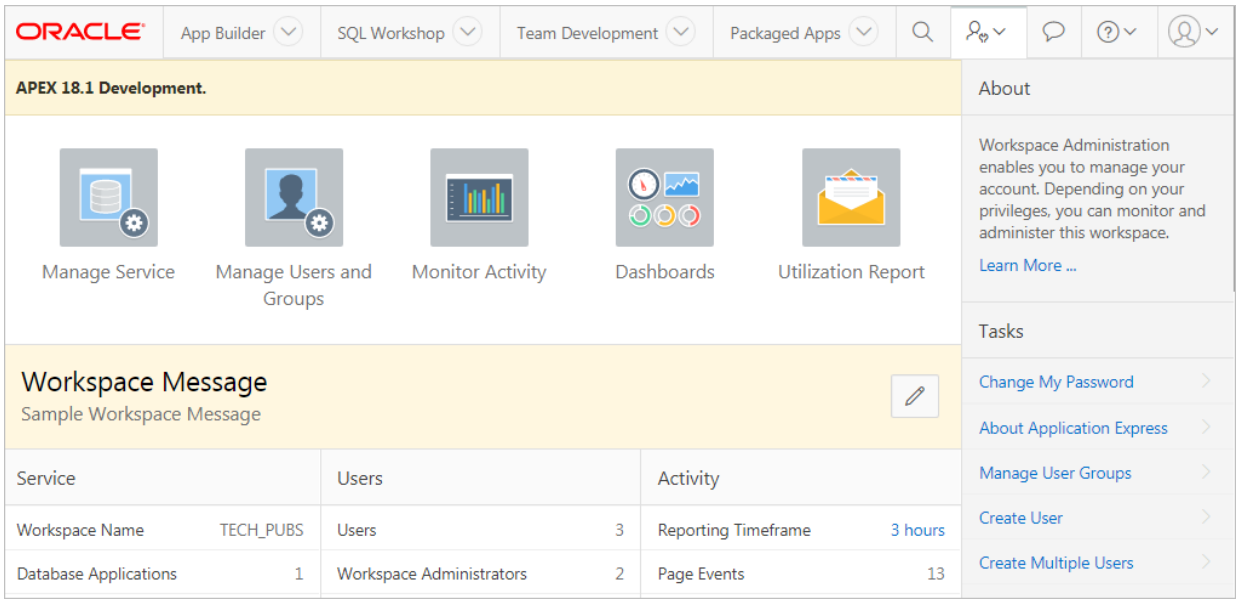
Workspace messages enable administrators to quickly communicate with other users.

Workspace messages display both on the Workspace home page and on the Workspace Administration page. As shown in the following illustration, workspace message display in the **News and Messages** region on the Workspace home page.



Workspace messages include a gold icon to the left of message text and the textual identifier, `Workspace Message`, displays beneath the message text.

Workspace messages also display in the center of the Workspace Administration page as shown in the next illustration.



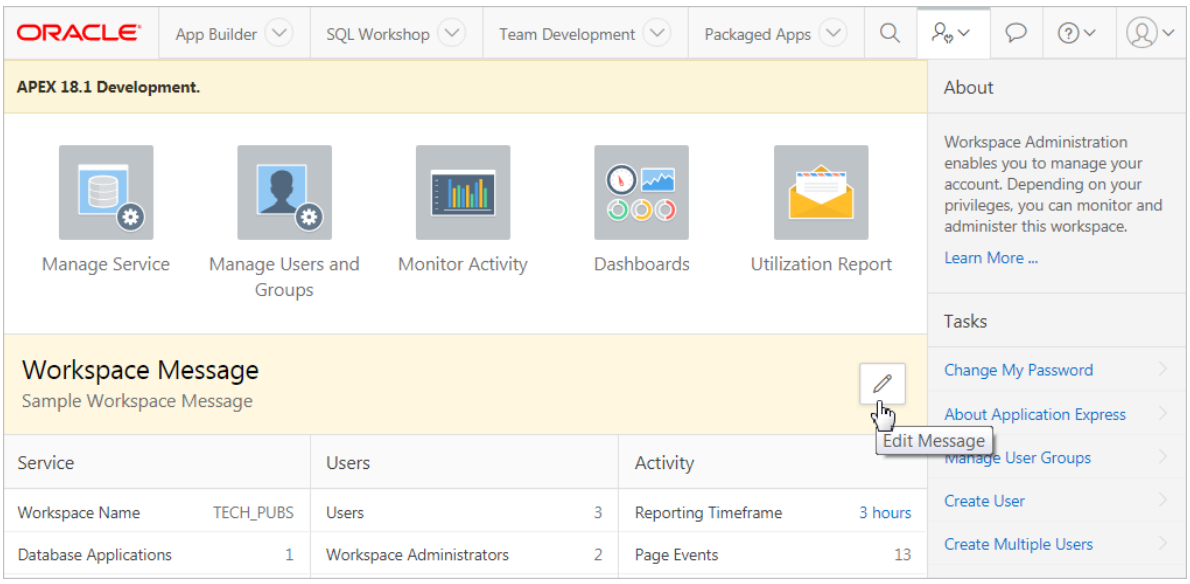
1.6.2 Creating and Editing a Workspace Message

Create or edit a workspace message from the Workspace Administration page.

To create or edit a workspace message:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. To create or edit a message, click the **Edit Message** icon.



3. In Message, enter text. Use standard HTML tags to include formatting.
4. Click **Apply Changes**.

> **Tip:**
>
> You can also create or edit announcements by navigating to the Workspace Administration page and then clicking **Manage Service** and then **Edit Message**.

1.7 Managing Users in a Workspace

Create new user accounts, manage existing user accounts, and change user passwords.

> **Tip:**
>
> You can access many workspace administration functions (such as **Manage Service, Manage Users and Groups**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

- About Application Accounts Authentication (page 1-32)
  Application Express Accounts authentication is an built-in authentication method in which user accounts are created and managed in the Oracle Application Express user repository. User accounts are particularly useful if your application is using Application Express Accounts authentication.
- About Application Express User Roles (page 1-32)
  Oracle Application Express users are divided into four roles.
- Creating User Accounts (page 1-32)
  Workspace administrators can create new user accounts one at a time, or create multiple accounts in a single operation.
- Editing Existing User Accounts (page 1-36)
  Edit existing user accounts on the Manage Users and Groups page.
- Locking and Unlocking a User Account (page 1-36)
  Control access to a workspace by locking and unlocking a user account.
- Changing a User Account Password (page 1-37)
  Change user account passwords on the Manage Users and Groups page.
- Deleting User Accounts (page 1-37)
  Workspace administrators can delete user accounts one at a time or delete multiple accounts in a single operation.
- Viewing the Users Dashboard (page 1-38)
  The Users Dashboard displays a summary of your account information, users in the current workspace, defined user groups, recently created users, and user status

- Using Groups to Manage Application Express Users (page 1-39)
  Workspace administrators can create and manage Application Express users using groups. You can use groups for categorization and to manage privileges.

> **See Also:**
>
> "Creating Account Login Controls for a Workspace (page 1-23)" and "Managing Users Across an Application Express Instance (page 2-124)"

1.7.1 About Application Accounts Authentication

Application Express Accounts authentication is an built-in authentication method in which user accounts are created and managed in the Oracle Application Express user repository. User accounts are particularly useful if your application is using Application Express Accounts authentication.

1.7.2 About Application Express User Roles

Oracle Application Express users are divided into four roles.

To access the Oracle Application Express development environment, users sign in to a shared work area called a workspace. Users are divided into the following primary roles:

- **End users** do not have access to development or administrative capabilities. End cannot sign into a workspace and create applications. End users can only run existing database or Websheet applications.
- **Developers** are users who create and edit applications, monitor workspace activity, and view dashboards.
- **Workspace administrators** are users who perform administrator tasks specific to a workspace such as managing user accounts, monitoring workspace activity, and viewing log files.
- **Instance administrators** are superusers that manage an entire hosted instance using the Application Express Administration Services application. Instance administrators manage workspace provisioning, configure features and instance settings, and manage security.

1.7.3 Creating User Accounts

Workspace administrators can create new user accounts one at a time, or create multiple accounts in a single operation.

- Creating a New User Account (page 1-33)
  Create new user accounts from the Manage Users and Groups page.
- Creating Multiple Users Simultaneously (page 1-34)
  Create multiple new user accounts simultaneously.

1.7.3.1 Creating a New User Account

Create new user accounts from the Manage Users and Groups page.

To create a new user account:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Click **Create User**.

   The Create User page appears.
4. Under User Identification, enter:
   a. Username - Enter the username used to sign in to the system. Restrictions include:
      - Maximum length of 100 characters
      - No spaces
      - Only these special characters are permitted: ampersand (&) and period (.)
   b. Email Address - Enter the valid email address for this user.
   c. First Name - Enter the first or given name to further identify the user (optional).
   d. Last Name - Enter the last or family name to further identify the user (optional).
   e. Description - Enter comments about this user (optional).
   f. Default Date Format - Specify the default Oracle date format for the user. This option controls the default date format within SQL Workshop.
5. Under Account Privileges:
   a. Default Schema - Specify the default schema used for data browsing, application creation, and SQL script execution. When using workspaces that have more than one schema available, this schema is the default. This setting does not control security, only the user's preference.
   b. Accessible Schemas (null for all) - Leave this blank to enable the end user to access all schemas associated with the workspace.
   c. User is a workspace administrator - Select **Yes** or **No** to specify if this user should have workspace administrator privileges. Administrators are given access to all components. Additionally, they can manage user accounts, groups, and development services. Components may not be available if they are switched off by Instance administrators.
   d. User is a developer - Select **Yes** or **No** to specify if this user should have developer privileges.

      Developers create and modify applications and database objects and view developer activity, session state, workspace activity, application, and schema reports. Developers must have access to either App Builder, SQL Workshop,

or both. Components may not be available if they are switched off by Instance administrators.

e. App Builder Access - Determines whether a developer has access to App Builder.

f. SQL Workshop Access - Determines whether a developer has access to the SQL Workshop.

g. Team Development Access - Determines whether a developer has access to the Team Development.

h. Set Account Availability - Select **Locked** to prevent the account from being used. Select **Unlocked** to allow the account to be used. If the user has exceeded the maximum login failures allowed as defined in Workspace Preferences, then the account is locked automatically.

6. Under Password:

   a. Password - Enter a case-sensitive password.

   b. Confirm Password - Enter the password again.

   c. Require Change of Password On First Use - Select **No** to allow the user to use the same password until it expires. Select **Yes** to require the user to change the password immediately when logging in the first time.

7. Under Group Assignments, specify the groups to which this user belongs. To assign a user to a group, select the group and click Move. To select multiple groups, press and hold the **CTRL** key and then click **Move All**. To remove a user from a group, select the group and click **Remove**.

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

> **Tip:**
>
> An Instance administrator can configure these settings for an entire Oracle Application Express instance and define password complexity policies. See "About Authentication Controls (page 2-39)," "About Strong Password Policies (page 2-42)," and "Configuring Password Policies (page 2-43)."

1.7.3.2 Creating Multiple Users Simultaneously

Create multiple new user accounts simultaneously.

> **Tip:**
>
> You can access many workspace administration functions (such as **Manage Service, Manage Users and Groups**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

To create multiple user accounts simultaneously:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Click **Create Multiple Users**.

   The Create Multiple Users page appears.
4. List of Email Addresses - Enter or copy and paste email addresses separated by commas, semicolons, or new lines. Note that if you copy and paste email addresses from email messages, extraneous text will be filtered out.
5. Usernames - Specify whether to include or exclude the domain name. Select one of the following:
   - **Set username to full email address** - Includes the full email address.
   - **Exclude @ domain as part of the username** - Removes all text after the @ symbol (for example, `user1@xyz.com` becomes `user1`)
6. Under Account Privileges:
   a. Default Schema - Specify the default schema used for data browsing, application creation, and SQL script execution. When using workspaces that have more than one schema available, this schema is the default. This setting does not control security, only the user's preference.
   b. Accessible Schemas (null for all) - Enter a colon-delimited list of schemas for which this developer has permissions when using the SQL Workshop. The list of schemas you enter here restricts the user to a subset of the full set of schemas provisioned for the workspace and determines what schema names the user sees in SQL Workshop.
   c. Uses are workspace administrators - Select **Yes** or **No**. Specify if these users should have workspace administrator privileges. Like developers, workspace administrators can create and modify applications and database objects. Additionally, they can also manage user accounts, groups, and development services.
   d. Users are developers - Select **Yes** or **No**. Specify if these users should have developer privileges. Developers can create and modify applications and database objects.
   e. App Builder Access - Determines whether a developer has access to App Builder. An administrator always has access to the App Builder. A Developer must have access to either the App Builder, the SQL Workshop, or both.
   f. SQL Workshop Access - Determines whether a developer has access to the SQL Workshop. An administrator always has access to SQL Workshop. A Developer must have access to either the App Builder, the SQL Workshop, or both.
   g. Team Development Access - Determines whether a developer has access to the Team Development. An administrator always has access to Team Development.
7. Under Password:

- Password - Specify a password. Passwords are case-sensitive. Developers can change their own passwords. Developers with Administrator privilege can change the passwords of users within the same workspace.
- Confirm Password - Enter the password again.

8. Click **Next**.
9. Click **Create Valid Users**.

1.7.4 Editing Existing User Accounts

Edit existing user accounts on the Manage Users and Groups page.

To edit an existing user account:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Select a user.

   The Edit User page appears.
4. Edit the appropriate attributes. To learn more, see field-level Help.
5. Click **Apply Changes**.

1.7.5 Locking and Unlocking a User Account

Control access to a workspace by locking and unlocking a user account.

To lock or unlock a user account:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Select a user.

   The Edit User page appears.
4. Scroll down to Account Privileges.
5. Under Account Privileges, Account Availability:
   - **Locked** - Select this option prevent the account from being used.
   - **Unlocked** - Select this option to enable the account to be used.

> **Tip:**
>
> If the user exceeds the maximum login failures specified in Workspace Preferences, then the account is locked automatically. Instance administrators can configure these settings for an entire Oracle Application Express instance.

6. Click **Apply Changes**.

1.7.6 Changing a User Account Password

Change user account passwords on the Manage Users and Groups page.

To change an user account password:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Select a user.

   The Edit User page appears.
4. Scroll down to Password. Under Password:
   a. Password - Enter a case-sensitive password.
   b. Confirm Password - Enter the password again.
   c. Require Change of Password On First Use - Select **No** to allow the user to use the same password until it expires. Select **Yes** to require the user of this account to change the password immediately after logging in the first time using the current password. This rule applies to the use of this account for workspace administration or development as well as to use of this account to sign in to running applications.
5. Click **Apply Changes**.

1.7.7 Deleting User Accounts

Workspace administrators can delete user accounts one at a time or delete multiple accounts in a single operation.

- Deleting a Single User Account (page 1-38)
  Delete single user accounts on the Manage Users and Groups page.
- Deleting Multiple Users at Once (page 1-38)
  Delete multiple user accounts at once on the Manage Users and Groups page.

1.7.7.1 Deleting a Single User Account

Delete single user accounts on the Manage Users and Groups page.

To delete a user account:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Select a user.

   The Edit User page appears.
4. Click **Delete User**.
5. Confirm your selection and click **OK**.

1.7.7.2 Deleting Multiple Users at Once

Delete multiple user accounts at once on the Manage Users and Groups page.

To delete multiple user accounts in a single operation:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. On the Tasks list, click **Delete Multiple Users**.

   The Delete Multiple Users page appears.
4. Select the users to be deleted.
5. Click **Delete Users**.

1.7.8 Viewing the Users Dashboard

The Users Dashboard displays a summary of your account information, users in the current workspace, defined user groups, recently created users, and user status

To view the Users Dashboard:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.

2. Click **Dashboards**.

   The Dashboard page appears.

3. Click **Users**.

   The Users Dashboard appears listing the following information:

   - **Your Account** lists information about your account including your username, workspace, account credentials, and email address.
   - **Workspace Users** lists statistics about all users in the current workspace.
   - **User Groups** lists all currently defined user groups.
   - **Recently Created** lists recently created users.
   - **User Status** lists valid passwords, expired passwords, locked accounts, unlocked accounts, and any accounts for which no email address is defined.

1.7.9 Using Groups to Manage Application Express Users

Workspace administrators can create and manage Application Express users using groups. You can use groups for categorization and to manage privileges.

- About Groups (page 1-39)
  Administrators can create user groups to restrict access to various parts of an application.
- Creating a Group (page 1-40)
  Create user groups on the Groups page.
- Editing an Existing User Group (page 1-40)
  Edit user groups on the Groups page.
- Adding and Removing Users from a Group (page 1-41)
  Add and remove user groups on the Edit User page.
- Assigning a Group to Another Group (page 1-41)
  Manage privileges by assigning application groups to user groups.
- Viewing Group Assignments (page 1-42)
  The Group Assignments page lists groups assigned to users and other groups. You can use groups for categorization and to manage privileges.

> **See Also:**
>
> "Managing Users in a Workspace (page 1-31)" and About Application Accounts Authentication (page 1-32)

1.7.9.1 About Groups

Administrators can create user groups to restrict access to various parts of an application.

Creating user groups enables administrators to:

- Control access to application components.

- Manage the privileges for a group of users. You can assign application groups to user groups to control user access.

User groups are not portable over different authentication schemes and are primarily useful when using Application Express Account Credentials authentication.

1.7.9.2 Creating a Group

Create user groups on the Groups page.

To create a new group:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Click **Groups**.
4. Click **Create User Group**.

   On the User Group Page:
   a. Group Name - Enter a name for group to be created.
   b. Description - Enter a description for the group to be created.
   c. Group Grants - The current group is a member of the groups on the right. To make the current group a member of an additional group, select the group and click **Move**. To remove group membership, select the group and click **Remove**.
5. Click **Create Group**.

1.7.9.3 Editing an Existing User Group

Edit user groups on the Groups page.

To edit an existing group assignment:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. You can customize the appearance of the page using the Search bar at the top of the page.
4. Select a group.

   The User Group page appears.
5. Make the appropriate edits and click **Apply Changes**.

1.7.9.4 Adding and Removing Users from a Group

Add and remove user groups on the Edit User page.

To add or remove a user from a group:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Select a user.

   The Edit User page appears.
4. Scroll down to Group Assignments.

   Each user belongs to the groups on the right.
5. To add a user to a group, select the group and click **Move**.
6. To remove a user from a group, select the group and click **Remove**.
7. Click **Apply Changes**.

1.7.9.5 Assigning a Group to Another Group

Manage privileges by assigning application groups to user groups.

To assign a group to another group:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Click **Groups**.
4. Select the user group.
5. Scroll down to Group Grants.

   The current group is a member of the groups on the right. To make the current group a member of an additional group, select the group and click **Move**. To remove group membership, select the group and click **Remove**.
6. Click **Apply Changes**.

1.7.9.6 Viewing Group Assignments

The Group Assignments page lists groups assigned to users and other groups. You can use groups for categorization and to manage privileges.

To view group assignments:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click **Manage Users and Groups**.
3. Click **Group Assignments**.
4. Select the grantee to edit.

1.8 Purging the Developer Activity and Click Count Log Files

Manually purge developer logs and the External Count Clicks log on the Log files page. Log entries older then one month are automatically deleted.

> **Tip:**
>
> You can access many workspace administration functions (such as **Manage Service**) from both the Administration menu and the Workspace Administration home page. For consistency, this section navigates the user to the Workspace Administration home page.

- Purging the Developer Activity Log (page 1-42)
  The Developer Activity Log tracks changes to applications within the current workspace.
- Purging the External Click Count Log (page 1-43)
  The external Click Count Log counts clicks from an application to an external site. You can implement this functionality using the `APEX_UTIL.COUNT_CLICK` procedure.

> **See Also:**
>
> "Managing Logs and Files (page 2-84)"

1.8.1 Purging the Developer Activity Log

The Developer Activity Log tracks changes to applications within the current workspace.

To purge the Developer Activity Log:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Developer Activity and Click Count Logs**.
4. Click the **Manage Developer Activity Log** tab.
5. Click **Purge Developer Log**.

1.8.2 Purging the External Click Count Log

The external Click Count Log counts clicks from an application to an external site. You can implement this functionality using the `APEX_UTIL.COUNT_CLICK` procedure.

To purge the external Click Count Log:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Developer Activity and Click Count Logs**.
4. Click the **Manage Click Counting Log** tab.
5. Click **Purge Click Log**.

1.9 Managing Session State for a Workspace

A session establishes persistence (or stateful behavior) across page views. Workspace administrators can view session details for the current session or for recent sessions, purge the current session state, or purge sessions based on their age.

- About Session State (page 1-44)
  A session is a logical construct that establishes persistence (or stateful behavior) across page views. Each session is assigned a unique ID, which the Application Express engine uses to store and retrieve an application's working set of data (or session state) before and after each page view. Sessions persist in the database until purged.
- Removing Session State After Reviewing Session Details (page 1-44)
  Determine whether to remove existing sessions by first reviewing session details. From the Session Details page, administrators can remove the session record or session state.
- Viewing Session State for the Current Session (page 1-45)
  View sessions state for the current session on the Session State page.

- Purging Sessions by Age (page 1-45)
  Purge existing sessions by age on the Purge Sessions page.
- Purging Session State for the Current Session (page 1-46)
  Purge session state for the current session on the Purge Session State page.

> **See Also:**
>
> "Managing Session State" in *Oracle Application Express App Builder User's Guide* and "Managing Session State for an Instance (page 2-75)"

1.9.1 About Session State

A session is a logical construct that establishes persistence (or stateful behavior) across page views. Each session is assigned a unique ID, which the Application Express engine uses to store and retrieve an application's working set of data (or session state) before and after each page view. Sessions persist in the database until purged.

1.9.2 Removing Session State After Reviewing Session Details

Determine whether to remove existing sessions by first reviewing session details. From the Session Details page, administrators can remove the session record or session state.

To view session details and remove session state:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Recent Sessions**.

   You can customize the appearance of the page using the Search bar at the top of the page
5. To view session details, select the session ID.
6. On the Sessions Details page, click one of the following buttons:
   - **Remove State** clears the session data from the session state tables (including collections data) but does not remove the session record. Removing a session is a good approach for developers during debugging. This is the equivalent of clearing session state for the current session using the Clear Cache argument value `SESSION` in the f?p URL. This option might also be used by developers during debugging.
   - **Remove Session** removes the record of the session from the `SESSIONS` table along with the session state (including collections data) associated with the

session. Any user using a session that has removed is no longer able to use the session and is prompted to re-authenticate upon their next page request (in most situations). This option can be used by administrators who must ensure a specific user can no longer access an Oracle Application Express application.

1.9.3 Viewing Session State for the Current Session

View sessions state for the current session on the Session State page.

To view session state for the current or recent sessions:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Session State for Current Session**.

   You can customize the appearance of the page using the Search bar at the top of the page

1.9.4 Purging Sessions by Age

Purge existing sessions by age on the Purge Sessions page.

To purge existing sessions by age:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Purge Sessions by Age**.
5. On Purge Sessions, make a selection from the Sessions older than list.
6. Click one of the following buttons:
   - **Report Sessions** generates a report detailing the total number of sessions for the workspace, the number of users, and the number of old sessions.
   - **Purge Sessions** purges existing sessions by the age you selected.

1.9.5 Purging Session State for the Current Session

Purge session state for the current session on the Purge Session State page.

To purge session state for the current session:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Purge Session State for Current Session**.
5. Click one of the following buttons:
   - **View Session State** - Displays information about the current session.
   - **Purge Session State** - Resets the session state for the current session.

1.10 Managing User Preferences

Developers can use preferences to store values for a specific Application Express user across distinct sessions. Once set, these preferences can be removed programmatically or manually. Administrators can set user preferences by creating a page process, by the calculation of a preference Item Source Value, or programmatically by using a PL/SQL API.

- Setting User Preferences (page 1-47)
  Workspace administrators can set user preferences within an application by creating a page process, creating a preference item, or programmatically using a PL/SQL API.
- Viewing Preferences by User (page 1-49)
  View user preferences by user on the Preferences by User page.
- Viewing Current User Preferences (page 1-49)
  View current user preferences.
- Purging Preferences for a Specific User (page 1-49)
  Purge preferences for a specific user on the Purge Preferences page.
- Purging Preferences for the Current User (page 1-50)
  Purge preferences for the current user on the Current User Preferences page.
- Removing User Preferences Programmatically (page 1-50)
  Remove user preferences programmatically using a PL/SQL API.
- Resetting User Preferences Using a Page Process (page 1-50)
  Reset user preferences by creating a page process and selecting the Reset Preferences process type.

1.10.1 Setting User Preferences

Workspace administrators can set user preferences within an application by creating a page process, creating a preference item, or programmatically using a PL/SQL API.

- Setting User Preferences by Creating a Page Process (page 1-47)
  Developers can set user preference values by creating a page process.
- Setting the Source of an Item Based on a User Preference (page 1-47)
  You can set the source of an item based on a user preference by defining the item source type as Preference.
- Setting User Preferences Programmatically (page 1-48)
  You can set or reference user preferences programmatically using a PL/SQL API.

1.10.1.1 Setting User Preferences by Creating a Page Process

Developers can set user preference values by creating a page process.

To set user preference values by creating a page process:

1. View the page in Page Designer and click the **Processing** tab.
2. Under Processes, right-click and select **Create Process**.

   Process attributes display in the Property Editor.
3. Under Identification:
   a. Name - Enter the name of the process.
   a. Type - Select **User Preferences**.
4. Under Settings, Type - Select **Reset Preferences (remove all preferences for current user)**.
5. Under Execution Options:
   a. Sequence - Specify the sequence for this component. The sequence determines the order of execution.
   b. Point - Select the point at which the process executes.
6. Review and complete any additional attributes.

   > **Tip:**
   >
   > To learn more about an attribute, select the attribute in the Property Editor and click the **Help** tab in the center pane.

7. Click **Save**.

1.10.1.2 Setting the Source of an Item Based on a User Preference

You can set the source of an item based on a user preference by defining the item source type as Preference.

To define the source of item based on a user preference:

1. View the page in Page Designer.
2. Click the **Rendering** tab.
3. Locate the region to contain the item, right-click and select **Create Page Item**.

   Item attributes display in the Property Editor.

   > **Note:**
   >
   > To learn more about an attribute, select the attribute and click the **Help** tab in the central pane.

4. Under Identification:
   a. Name - Enter a name of the item.
   a. Type - Select **Hidden**.
5. Under Settings, Value Protected - Specify whether the item is protected, preventing the value from being manipulated when the page is posted. Select **Yes**.
6. Under Layout:
   a. Sequence - Enter the display sequence for this item. The sequence and other layout settings determine where this item is displayed in relation to other items within the region..
   a. Region - Select the region in which the item displays. All items should be specified in a region.
7. Under Source:
   a. Type - Select the source type the value of this item is based on.
   b. Used - Select which value takes precedence (that is, the value from session state or the item source value).
8. Under Default, Type - Select a default value type for this item..
9. Click **Save**.

1.10.1.3 Setting User Preferences Programmatically

You can set or reference user preferences programmatically using a PL/SQL API.

User-level caching is available programmatically. You can use the `SET_PREFERENCE` procedure to set a user level preference called `NAMED_PREFERENCE`. For example:

```
APEX_UTIL.SET_PREFERENCE(
 p_preference=>'NAMED_PREFERENCE',
 p_value =>:ITEM_NAME);
```

You can reference the value of a user preference using the function `GET_PREFERENCE`. For example:

```
NVL(APEX_UTIL.GET_PREFERENCE('NAMED_PREFERENCE'),15)
```

In the previous example, the preference would default to the value 15 if the preference contained no value.

1.10.2 Viewing Preferences by User

View user preferences by user on the Preferences by User page.

To view the preferences by user:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Preferences by User**.

   The Preferences by User page appears.
5. You can customize the appearance of the page using the Search bar at the top of the page.

1.10.3 Viewing Current User Preferences

View current user preferences.

To view current user preferences:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Current User Preferences**.

   The Current user Preferences page appears.

   You can customize the appearance of the page using the Search bar at the top of the page.

1.10.4 Purging Preferences for a Specific User

Purge preferences for a specific user on the Purge Preferences page.

To purge preferences for a specific user:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

The Workspace Administration home page appears.

2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Purge Preferences by User**.

   The Purge Preferences page appears.
5. Select a specific user and click **Report**.

   A report appears at the bottom of the page.
6. To purge the displayed user preferences, click **Purge User Preferences**.

1.10.5 Purging Preferences for the Current User

Purge preferences for the current user on the Current User Preferences page.

To purge preferences for the current user:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Session State**.
4. Click **Purge Preferences for Current User**.
5. Click **View Preferences** or **Reset Preferences**.
6. If you select **View Preferences**, the Current User Preferences page appears. To reset the user preferences, click **Reset**.

1.10.6 Removing User Preferences Programmatically

Remove user preferences programmatically using a PL/SQL API.

To remove user preferences programmatically, use the `REMOVE_PREFERENCE` procedure to remove a user level preference called `NAMED_PREFERENCE`. For example:

```
APEX_UTIL.REMOVE_PREFERENCE(
p_preference=>'NAMED_PREFERENCE');
```

1.10.7 Resetting User Preferences Using a Page Process

Reset user preferences by creating a page process and selecting the Reset Preferences process type.

To reset user preferences using a page process:

1. View the page in Page Designer and click the **Processing** tab.
2. Under Processes, right-click and select **Create Process**.

   Process attributes display in the Property Editor.

> **Tip:**
>
> To learn more about an attribute, select the attribute in the Property Editor and click the Help tab in the center pane.

3. Under Identification:
   a. Name - Enter the name of the process.
   a. Type - Select **Clear Session State**.
4. Under Settings, Type - Select **Clear Session State**.
5. Under Execution Options:
   a. Sequence - Specify the sequence for this component. The sequence determines the order of execution.
   b. Point - Select the point at which the process executes.
   c. Run Process - Select the frequency that this process is executed.
6. Review and complete any additional attributes.
7. Click **Save**.

1.11 Managing Page and Region Caching

Improve an application's performance by taking advantage of page and region caching.

Developers can configure page and region caching by setting the Cache attribute on the Edit Page or Edit Region pages. Workspace administrators can view and purge cached regions and pages.

- Purging Cached Regions and Pages (page 1-51)
  View and purge cached regions and pages on the Manage Application Cache page.

1.11.1 Purging Cached Regions and Pages

View and purge cached regions and pages on the Manage Application Cache page.

To view and purge cached regions:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Application Cache** and select a purge option.
4. Follow the on-screen instructions.

1.12 Changing Build Status for Multiple Applications

Configure the Build Status attribute at the workspace-level tp prevent an application from being modified by other developerl.

- About Changing Application Build Status? (page 1-52)
  Use the Build Status attribute to prevent an application from being modified by other developers.
- Managing Build Status in Workspace Administration (page 1-52)
  Workspace administrators can change the Build Status of all applications within the current workspace on Application Build Status page.

> **See Also:**
>
> "Changing Build Status in Administration Services (page 2-123)"

1.12.1 About Changing Application Build Status?

Use the Build Status attribute to prevent an application from being modified by other developers.

The Build Status attribute has two settings:

- **Run and Build Application** - Developers can both run and edit an application.
- **Run Application Only** - Developers can only run an application.

  Selecting **Run Application Only** is an effective way to prevent other developers from modifying it.

Ways to Modify Build Status

You can modify the application Build Status in the following ways:

- **Application-level** - Developers and administrators can change the Build Status attribute on the Edit Application page. See "Availability" in *Oracle Application Express App Builder User's Guide*.
- **Workspace-level** - Workspace administrators can change the Build Status of all applications within the current workspace on Application Build Status page. See "Changing Build Status for Multiple Applications (page 1-52)."
- **Instance-level** - Instance administrators can change the Build Status of an application on the Build Status page in the Oracle Application Express Administration Services application. See "Changing Application Build Status in Administration Services (page 2-122)."

1.12.2 Managing Build Status in Workspace Administration

Workspace administrators can change the Build Status of all applications within the current workspace on Application Build Status page.

To manage application Build Status in Workspace Administration:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. On the Administration page, click **Manage Service**.
3. Under Manage Meta Data, click **Application Build Status**.

   Next, select a status. Status specifies whether the application is available or unavailable for use.
4. For each application, select a **Status**. Options include:
   - **Available** - Application is available with no restrictions.
   - **Available with Developer Toolbar** - Application is available for use. For developers, the Developer toolbar displays at the bottom of each page. Requires the developer to be logged in to the App Builder in the same browser session.
   - **Available to Developers Only** - Application is available to users having developer privileges.
   - **Restricted Access** - Application is available to developers named in the Restrict to comma separated user list.
   - **Unavailable** - Application cannot be run or edited. The message in Message for unavailable application displays when users attempt to access the application.
   - **Unavailable (Status Shown with PL/SQL)** - Application cannot be run or edited.
   - **Unavailable (Redirect to URL)** - Application cannot be run or edited.
5. For each application, select a Build Status. Options include:
   - **Run and Build Application** - Developers can both run and edit an application.
   - **Run Application Only** - Developers can only run an application.
6. Click **Apply Changes**.

1.13 Viewing Workspace Dashboards

Use the Dashboard page to view details about the current workspace and monitor overall workspace activity.

- Accessing the Workspace Dashboards (page 1-54)
  Use the Dashboard page to view details about the current workspace and monitor overall workspace activity.
- Workspace Dashboard (page 1-55)
  View a summary of workspace users. Activity attributes display based on the selected time frame.

- Users Dashboard (page 1-55)
  View a summary of workspace users. Activity attributes display based on the selected time frame.
- Activity Dashboard (page 1-55)
  View a summary of workspace user activity for the selected time frame.
- Developer Activity Dashboard (page 1-56)
  View a summary of developer application and page changes for the selected time frame.
- Performance Dashboard (page 1-56)
  View pages having the worst page performance.
- Websheets Dashboard (page 1-56)
  View a summary of websheet activity for the selected timeframe.
- Applications Dashboard (page 1-56)
  View a summary of database applications.
- Database Dashboard (page 1-57)
  View a summary of database objects by schema. Row counts are based on database table statistics.

> **See Also:**
>
> "Monitoring Activity Across a Development Instance (page 2-128)" and "Creating Custom Activity Reports Using APEX_ACTIVITY_LOG in *Oracle Application Express App Builder User's Guide*

1.13.1 Accessing the Workspace Dashboards

Use the Dashboard page to view details about the current workspace and monitor overall workspace activity.

To view the Administration Dashboard:

1. Navigate to the Workspace Administration page:
   a. Sign in to Oracle Application Express.
   b. At the top of the Workspace home page, click the **Administration** menu and select **Administration**.

   The Workspace Administration home page appears.
2. Click the **Dashboards** icon.

   The Dashboard page appears.
3. Select a dashboard to review:
   - **Workspace** - See "Workspace Dashboard (page 1-55)."
   - **Users** - See "Users Dashboard (page 1-55)."
   - **Activity** - See "Activity Dashboard (page 1-55)."
   - **Developer Activity** - See "Developer Activity Dashboard (page 1-56)."
   - **Performance** - See "Performance Dashboard (page 1-56)."

- **Websheets** - See "Websheets Dashboard (page 1-56)."
- **Applications** - See "Applications Dashboard (page 1-56)."
- **Database** - See "Database Dashboard (page 1-57)."

1.13.2 Workspace Dashboard

View a summary of workspace users. Activity attributes display based on the selected time frame.

The **Workspace** dashboard offers a summary of workspace attributes and statistics, including:

- Service - Lists the workspace name, the number and type of applications, SQL scripts, schemas, and open service requests.
- Available Schemas - Lists schemas within the current workspace.
- Files - Details the space used by specific file types.
- Recent Service Requests lists pending service requests.

1.13.3 Users Dashboard

View a summary of workspace users. Activity attributes display based on the selected time frame.

The **Users** dashboard displays a summary of workspace users, including:

- Your Account - List your username, associated user roles, workspace name, creation date, and email address.
- Workspace Users - Lists statistics about all users in the current workspace.
- User Groups - Lists are currently defined user groups.
- Recently Created - Lists recently created users.
- User Status - Lists valid passwords, expired passwords, locked accounts, unlocked accounts, and any accounts for which no email address is defined.

1.13.4 Activity Dashboard

View a summary of workspace user activity for the selected time frame.

The **Activity** dashboard displays a summary of workspace user activity for the selected time frame, including:

- Top Users - Lists the most active users in the workspace.
- Top Applications - Lists applications having the most activity.
- Top Pages - Lists the application pages having the most activity.
- Recent Logins- Shows the time and date a user authenticated to an application.
- Recent Errors - Lists errors that have occurred in the current workspace from the Application Express activity log.

1.13.5 Developer Activity Dashboard

View a summary of developer application and page changes for the selected time frame.

The **Developer Activity** dashboard displays a summary of developer application and page changes for the selected time frame, including:

- Top Developers - Lists the most active developers in the workspace.
- Top Applications - Lists the applications having the most developer activity.
- Top Pages - Lists the application pages having the most developer activity.
- Recent Changes - Lists changes by application, page, and user.
- Recent Application Edits - Lists edits by application.

1.13.6 Performance Dashboard

View pages having the worst page performance.

The **Performance** dashboard displays a report of pages having the worst page performance. Page performance is calculated by multiplying page events by median elapsed server page generation time. Page events include page gets, page posts, and partial page gets.

1.13.7 Websheets Dashboard

View a summary of websheet activity for the selected timeframe.

The **Websheets** dashboard displays a websheet activity for the selected time frame. Sections include:

- Workspace Summary
- Recent Views
- Recently Created
- Recently Updated

1.13.8 Applications Dashboard

View a summary of database applications.

The **Applications** dashboard displays a summary of applications in the current workspace. Sections include:

- Summary - Lists the number of applications, pages, and workspace themes.
- Application Groups - Lists defined application groups.
- Recently Created - Lists recently created applications.
- Defaults - Lists defined defaults.

1.13.9 Database Dashboard

View a summary of database objects by schema. Row counts are based on database table statistics.

The **Database** dashboard displays a summary of database objects by schema. Row counts are based on database table statistics. Sections include:

- Recently Modified Program Units
- Object Counts
- Recently Created Tables
- Top Tables by Row Count

1.14 Leveraging App Builder Defaults

App Builder Defaults enable developers to reduce the number of steps needed to create a new application.

By configuring these attributes, developers can exit the Create Application Wizard early and can create a new application in two simple steps.

- About App Builder Defaults (page 1-57)
  App Builder Defaults are specific to a workspace not individual developers.
- Configuring App Builder Defaults (page 1-57)
  Configure App Builder Defaults.

1.14.1 About App Builder Defaults

App Builder Defaults are specific to a workspace not individual developers.

App Builder Defaults enable a workspace administrator to define preferences for tabs, authentication schemes, themes, and globalization attributes such as Default Language, Default Language Derived From, Date Format, Date Time Format, Timestamp Format, and Timestamp Time Zone Format. Once defined, developers can use these defaults when creating a new application or application components. For example, App Builder Defaults enable a developer to create a new application using the Create Application Wizard in two easy steps.

1.14.2 Configuring App Builder Defaults

Configure App Builder Defaults.

To configure App Builder Defaults:

1. On the Workspace home page, click the **App Builder** icon.
2. Click **Workspace Utilities**.
3. Click **App Builder Defaults**.

   The Manage App Builder Defaults page appears and is divided into the following sections:

   - Settings

- Theme
- Globalization

4. For each section of the page, select the appropriate default.

   To learn more about an attribute, see field-level Help.

5. Click **Apply Changes**.

2

Oracle Application Express Administration Services

Instance administrators manage an entire Oracle Application Express hosted instance using the Oracle Application Express Administration Services application.

> **Note:**
>
> The topics in this section are not applicable to all customers, specifically to those using a hosted instance. This section only applies to administrators who have access to the Oracle Application Express Administration Services application.

- What Is an Instance Administrator? (page 2-2)
  Instance administrators manage an entire Oracle Application Express hosted instance.
- Signing In To Oracle Application Express Administration Services (page 2-3)
  Sign in to the Oracle Application Express Administration Services to manage an Oracle Application Express instance.
- Overview of Oracle Application Express Administration Services (page 2-4)
  Key pages in the Oracle Application Express Administration Services application include: Instance Administration home, Manage Instance, and Manage Workspaces.
- Managing Workspace and Change Requests (page 2-10)
  Approve and decline workspace service requests and change requests on the Manage Request page.
- Managing Instance Settings (page 2-16)
  Use the Instance settings region of the Manage Instance page to configure feature availability, security, instance settings (that is, general workspace behavior), and workspace purge settings.
- Managing Custom Applications, Packaged Applications, and Public Themes (page 2-70)
  Manage custom applications uploaded to the Packaged Applications repository, monitor packaged application installations, and manage public themes.
- Managing Meta Data (page 2-75)
  Use the links under Manage Meta Data to view and manage session state, the mail queue, installed translations, and interactive report descriptions.
- Installing Exported Applications in a Runtime Environment (page 2-78)
  Instance administrators manage the Oracle Application Express runtime environment using SQL*Plus and the `APEX_INSTANCE_ADMIN` API.

- Managing Messages (page 2-79)
  Administrators can create login and system messages to communicate with all system users, for example regarding privacy notices or access restrictions
- Managing Logs and Files (page 2-84)
  Delete log entries and configure log intervals.
- Including an Agreement or Survey When Running the Signup Wizard (page 2-88)
  Instance administrators have the option to create and include an agreement or survey when users run the New Signup Wizard.
- Managing Schemas (page 2-90)
  Manage the schemas within an Oracle Application Express instance.
- Creating Workspaces (page 2-95)
  Users access Oracle Application Express by signing in to a shared work area called a workspace. An administrator can create workspaces manually or take advantage of an automated approach in which users click a link a login page.
- Managing Existing Workspaces (page 2-101)
  Instance administrators can manage existing workspaces within an Oracle Application Express instance.
- Managing Users Across an Application Express Instance (page 2-124)
  An Instance administrator manages all user accounts within an Oracle Application Express instance on the Manage Developers and Users page.
- Monitoring Activity Across a Development Instance (page 2-128)
  Monitor all end user and developer activity for an Oracle Application Express instance.

See Also:

- "Workspace and Application Administration (page 1-1)"
- "Understanding Administrator Security Best Practices" in *Oracle Application Express App Builder User's Guide*

2.1 What Is an Instance Administrator?

Instance administrators manage an entire Oracle Application Express hosted instance.

In Oracle Application Express, users sign in to a shared work area called a workspace. A workspace enables multiple users to work within the same Oracle Application Express installation while keeping their objects, data, and applications private. This flexible architecture enables a single database instance to manage thousands of applications.

Within a workspace, **End users** can only run existing database or Websheet application. **Developers** can create and edit applications, monitor workspace activity, and view dashboards. Oracle Application Express includes two administrator roles:

- **Workspace administrators** are users who perform administrator tasks specific to a workspace.
- **Instance administrators** are superusers that manage an entire hosted Oracle Application Express instance which may contain multiple workspaces.

Instance administrators have all the rights and privileges available to developers and workspace administrators. In addition, instance administrators are responsible for managing an entire Oracle Application Express instance using the Oracle Application Express Administration Services application. Instance administrators manage workspace provisioning, configure features and instance settings, and manage security.

> **Tip:**
>
> To learn more about creating an Instance Administrator account in a new installation, see the "Creating or Updating Your Instance Administration Account" section for your Web Listener in *Oracle Application Express Installation Guide*.

2.2 Signing In To Oracle Application Express Administration Services

Sign in to the Oracle Application Express Administration Services to manage an Oracle Application Express instance.

To access Oracle Application Express Administration Services:

1. In a web browser, navigate to the Oracle Application Express Administration Services application. By default, Oracle Application Express Administration Services installs to the following location:
   - For Oracle REST Data Services, go to:

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

     Where:

     - *hostname* is the name of the system where Oracle REST Data Services is installed.
     - *port* is the port number assigned when configuring the Oracle REST Data Services. In a default installation, this number is 8080.
     - `apex` is the service name defined when configuring the Oracle REST Data Services.
   - For the embedded PL/SQL gateway, go to:

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

     Where:

     - *hostname* is the name of the system where Oracle XML DB Protocol Server is installed.
     - *port* is the port number assigned to HTTP on the Oracle XML DB Protocol Server. In a default installation, this number is 8080.
     - `apex` is the Database Access Descriptor (DAD) defined in the configuration file.

- For Apache and `mod_plsql`, go to:

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

  Where:

  – *`hostname`* is the name of the system where Oracle HTTP Server is installed.

  – *`port`* is the port number assigned to Oracle HTTP Server. In a default installation, this number is 7777.

  – `pls` is the indicator to use the `mod_plsql` cartridge.

  – `apex` is the Database Access Descriptor (DAD) defined in the `mod_plsql` configuration file.

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

The Sign In page appears.

2. In Username, enter the username of the Instance administrator.
3. In Password, enter your Instance administrator account password.

> **Tip:**
>
> `admin` is the default Instance administrator account. As a post installation step, administrators can run the script `apxchpwd.sql` to create one or more Instance administrator accounts or change passwords for these accounts.

4. Click **Sign In to Administration**.

   Oracle Application Express Administration Services appears.

2.3 Overview of Oracle Application Express Administration Services

Key pages in the Oracle Application Express Administration Services application include: Instance Administration home, Manage Instance, and Manage Workspaces.

- Instance Administration Home Page (page 2-5)
  The Instance Administration home page is the starting point for managing an entire Oracle Application Express instance.
- Manage Instance Page (page 2-7)
  Instance administrators use the Manage Instance page to control and configure key features of an Oracle Application Express instance. Many of these links also display on the Instance Administration home page.
- Manage Workspaces Page (page 2-8)
  Instance administrators use the Manage Workspaces page to manage workspaces for an Oracle Application Express instance. A workspace is a shared work area where multiple developers can create applications. Each workspace has the privilege to parse as one or more database schemas.

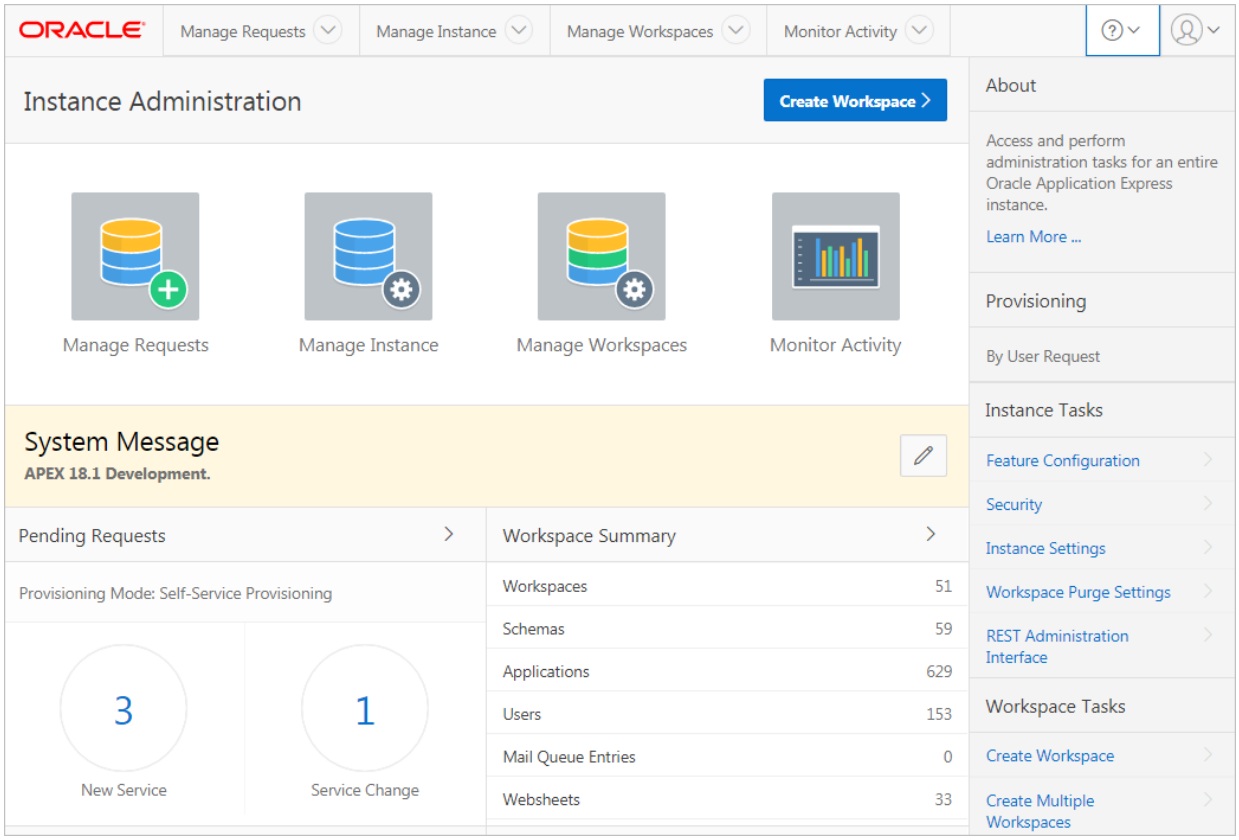
> **See Also:**
>
> "Managing Workspace and Change Requests (page 2-10)" and "Monitoring Activity Across a Development Instance (page 2-128)"

2.3.1 Instance Administration Home Page

The Instance Administration home page is the starting point for managing an entire Oracle Application Express instance.

The top of the Instance Administration home page features four icons:

- **Manage Requests**. Approve and decline workspace service requests and change requests.
- **Manage Instance**. Control and configure key features of the Oracle Application Express instance.
- **Manage Workspaces**. Create, remove and lock workspaces, manage workspace schema assignments, manage developers and users, view workspace reports, import and export workspaces, and manage application behaviors.
- **Monitor Activity**. View various reports on applications, developers, and session activity.



System Message Region

The System Message region displays in the center of the page. Instance administrators can use this region to communicate with other users in the workspace. To add a system message, click the **Edit System Message** icon.

Instance Tasks Region

The Instance Tasks region displays on the right side of the page and features the following links:

- **Feature Configuration**. Manage configuration settings that apply to an entire Oracle Application Express instance.
- **Security**. Manage security settings that apply to an entire Oracle Application Express instance.
- **Instance Settings**. Manage settings that apply to an entire Oracle Application Express instance such as enabling self service workspace provisioning, configuring storage, and configuring support for email, wallets, and report printing.
- **Workspace Purge Settings**. Configure purge behavior for inactive workspaces.

Workspace Tasks Region

Use the Workspace Tasks region also displays on the right side of the page and features the following links:

- **Create Workspace**. Links to the Create Workspace Wizard.
- **Create Multiple Workspaces**. Links to the Create Multiple Workspace Wizard.
- **Find a Workspace**. Displays a searchable report of all workspaces.
- **Manage Workspaces**. Links to the Manage Workspaces page.
- **Create User**. Enables you to create a new user.
- **Find a User**. Displays a searchable report of all users in the current instance.
- **Reset User Password**. Links to the Manage Developer and Users page. To reset a user, click the user, edit the attributes under Password, and click Apply Changes.

Available Updates

The Available Updates region indicates if updates are available for Oracle Application Express and the Oracle REST Data Services. If your installation is current the following message displays:

```
System is up-to-date
```

To configure updates, click **Set Preferences for Available Updates** icon which resembles a gear. The Available Updates dialog appears. You can enable or disable updates by selecting **Yes** or **No** from Check for Available Updates. To learn more, see field-level Help.

> **Tip:**
>
> To perform this check Application Express transmits the version number of Oracle Application Express and other system components to Oracle Corporation. To continuously improve our products, Oracle is interested in learning about product usage. To that end, statistics can occasionally be sent to Oracle describing the product features in use. No personally identifiable information is sent. To review Oracle's privacy policy, see:
>
> http://www.oracle.com/us/legal/privacy/overview/index.html

2.3.2 Manage Instance Page

Instance administrators use the Manage Instance page to control and configure key features of an Oracle Application Express instance. Many of these links also display on the Instance Administration home page.

Instance Settings

Instance Settings contains the following links:

- **Feature Configuration**. Manage configuration settings that apply to an entire Oracle Application Express instance.
- **Security**. Manage security settings that apply to an entire Oracle Application Express instance.
- **Instance Settings**. Manage settings that apply to an entire Oracle Application Express instance such as enabling self service workspace provisioning, configuring storage, and configuring support for email, wallets, and report printing.
- **Workspace Purge Settings**. Configure purge behavior for inactive workspaces.

Manage Shared Components

Manage Shared Components contains the following links:

- **Packaged Applications**. Manage packaged application available in an Oracle Application Express instance.
- **Public Themes**. Create and manage public themes for an instance.

Manage Meta Data

Manage Meta Data contains the following links:

- **Session State**. Monitor and manage the session state repository.
- **Mail Queue**. Monitor the email messages in the mail queue.
- **Installed Translations**. Links to the Installed Translation report which indicates which translations have been loaded for the Oracle Application Express instance.
- **Interactive Report Subscriptions**. View and manage subscriptions created by end users using interactive reports in the instance.

Messages

Messages contains the following links:

- **Define Login Message**. Enables an instance administrator to create and manage login message.
- **Define System Message**. Enables an instance administrator to create and manage system message.
- **Manage Site-Specific Tasks**. Create and manage a Site-Specific Tasks lists. These links display on the Workspace home page and on the Workspace Login page.

Manage Logs and Files

Manage Logs and Files contains the following links:

- **SQL Workshop Log**. View SQL Workshop logs and delete log entries.
- **Page View Activity Log**. View and delete User Activity log entries.
- **Developer Activity Log**. View and delete Developer Activity log entries.
- **External Click Counting Log**. View and delete External Click Counting log entries.
- **Login Access Log**. View and delete Login Access log entries.
- **Archive Activity Log**. Create an archive of Application Express Activity log.
- **Web Service Activity Log**. Create an archive of Web Service activity .

Self Service Sign Up

Self Service Sign Up contains the following links:

- **Manage New Service Signup Wizard**. Create and manage the New Service Signup Wizard. This wizard requires users fill out a justification and accept an agreement submits a workspace request.
- **Run New Service Signup Wizard**. Run the New Service Signup Wizard.

2.3.3 Manage Workspaces Page

Instance administrators use the Manage Workspaces page to manage workspaces for an Oracle Application Express instance. A workspace is a shared work area where multiple developers can create applications. Each workspace has the privilege to parse as one or more database schemas.

Workspace Actions

Manage Workspaces contains the following links:

- **Create Workspace**. Create a new workspace using the Create Workspace wizard.
- **Create Multiple Workspaces**. Create multiple workspaces using the Create Multiple Workspaces wizard.
- **Remove Workspace**. Remove a workspace.

- **Lock Workspace**. Lock a workspace. Locking a workspace disables all workspace administrator, developer, and user accounts in the workspace and makes all applications unavailable.
- **Manage Workspace to Schema Assignments**. View a report that lists the schemas in which a given workspace can build. When developers create new applications they must choose a schema from the list of schemas assigned to the workspace.
- **Manage Developers and Users**. To access the Oracle Application Express development environment, users sign in to a shared work area called a workspace. Use the Manage Developers and Users page to create, edit, and delete users.
- **Manage Component Availability**. View a report of Workspace Settings by workspace. To override the current settings, click the workspace name and edit the setting on the Workspace Settings page.

Workspace Reports

Use Workspace Reports to access the following links:

- **Existing Workspaces**. View a report of provisioned workspaces. Click the workspace name for a details of a specific workspace. Click **Delete** in the action column to start the Remove Workspace Wizard.
- **Workspace Details**. Select a workspace and click **Edit**, **Schema Assignments**, and **Manage Users** to view key attributes about the workspace.
- **Workspace Database Privileges**. View a report of workspace database privilege details. To edit a workspace, click the workspace name.
- **Workspaces with Only Sample Application**. View a report of workspaces containing only Sample Database Application. Use this report to gauge workspace activity.
- **Manage File Utilization**. View the File Utilization by Workspace report. This report lists the workspace name, total file size, file counts, and the relative age of the newest and oldest files. Use this report to gauge workspace activity.
- **Find and Email Workspace Summary**. View the Workspace Search report. Click the workspace name to view workspace details and email the report.

Export Import

Use Export Import to access the following links:

- **Import Workspaces**. Links to the Import Workspace Wizard. Use this wizard to import a workspace into the export repository.
- **Export Workspaces**. Links to the Export Workspace page. Use this page to select a workspace and access the Export Workspace Wizard.

Manage Applications

Use Manage Applications to access the following links:

- **Application Attributes**. Links to the Application Attributes page key application attributes including the workspace name and ID, application ID, parsing schema, number of application pages, logging status, build status, application status, and application alias.

- **Build Status**. Dislays the Build Status report. Use this report to review and change the Build Status attribute of any application in any workspace.
- **Parsing Schemas**. Displays the Parsing Schema report. Use this report to identify the current parsing schema of each application in any workspace.

2.4 Managing Workspace and Change Requests

Approve and decline workspace service requests and change requests on the Manage Request page.

- About Workspace Requests and Change Requests (page 2-10)
  Instance administrators are responsible for approving or declining service requests made by workspace administrators.
- Viewing Requests on the Instance Administration Home Page (page 2-10)
  View a summary of pending new service and change requests on the Instance Administration home page. The total number of pending requests displays in the Pending Requests region.
- Viewing Pending Requests (page 2-11)
  View pending service requests on the Manage Requests page.
- Managing Workspace Requests (page 2-12)
  A Workspace Request enables a user to request a workspace by clicking a link on the login page to access a request form. Once submitted, the Instance administrator can review the request and either approve or decline it.
- Managing Change Requests (page 2-15)
  A Change Request enables users to modify an existing workspace (for example, by adding a new schema or increasing the available disk space). Once submitted, the Instance administrator reviews and either approves or declines the change request

2.4.1 About Workspace Requests and Change Requests

Instance administrators are responsible for approving or declining service requests made by workspace administrators.

Service requests fall into one of two categories. A **Workspace Request** enables users to request workspaces directly in a self-service fashion. For example, users could click a link on the login page to access a request form. Once the Instance administrator approves the workspace request, each user is automatically emailed the appropriate login information. To use workspace requests, an Instance administrator must select the Self Service Provisioning Status, **Request** on the Instance Settings page.

A **Change Request** enables users to modify an existing workspace (for example, add a new schema or increase the disk space limit).

2.4.2 Viewing Requests on the Instance Administration Home Page

View a summary of pending new service and change requests on the Instance Administration home page. The total number of pending requests displays in the Pending Requests region.

To view a summary of new service and change requests on the Instance Administration home page:

1. Sign in to Oracle Application Express Administration Services.

   The Pending Requests region lists the total number of new service requests and service change requests.

2. To view pending new service requests, click the **New Service** number.

   The All Workspace Requests report appears listing the workspace name, schema, size, request date, and status.

   - To approve or decline the request, click **Provision** in the Action column.
   - To edit the provisioning request, click the Workspace name.

3. To view pending change requests, click the **Service Change** number.

   The All Change Requests report displays.

   - To view a pending change requests, click **View Request**.
   - Approve and deny the request as is appropriate.

2.4.3 Viewing Pending Requests

View pending service requests on the Manage Requests page.

To view pending service requests from the Manage Service Requests page:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Requests**.

   The Manage Service Requests page appears and has three tabs:

   - **Open Requests** displays all pending service requests and change requests.
   - **All Workspace Requests** displays pending workspace requests.
   - **All Change Requests** displays pending change requests.

3. Click **Open Requests** to view a pending new service requests and change requests.

   - To approve or decline a new request, click the **Edit** icon to the left of the request description.
   - Approve and deny the request as is appropriate.

4. Click **All Workspace Requests** to view a pending workspace requests..

   The All Workspace Requests report appears listing the workspace name, schema, size, request date, and status.

   - To approve or decline the request, click **Provision** in the Action column.
   - To edit the provisioning request, click the Workspace name.

5. Click **All Change Requests** to view pending changes to existing services.

   All Change Requests report appears listing the workspace name, request change description, requestor, and status.

6. To view a request, click **View Request**.

   The View Change Request page appears.

   - To approve the request, click **Assign Schema**.
   - To deny a request, click **Deny Request**.

- To deny and delete a request, select **Delete this request if denying?**and then click **Deny Request**.

2.4.4 Managing Workspace Requests

A Workspace Request enables a user to request a workspace by clicking a link on the login page to access a request form. Once submitted, the Instance administrator can review the request and either approve or decline it.

- About the Workspace Request Approval Process (page 2-12)
  The Instance administrator determines how workspace request process works depends on the defined Provisioning Status.
- Approving or Declining a Pending Workspace Request (page 2-13)
  Approve or decline pending workspace requests on the All Workspace Requests page.
- Changing the Status of an Existing Workspace Request (page 2-14)
  Change the status of an existing workspace request on the All Workspace Requests page.
- Deleting a Workspace Request (page 2-14)
  Delete workspace requests on the All Workspace Requests page.

> **See Also:**
>
> "About Workspace Requests and Change Requests (page 2-10)" and "About Specifying How Workspaces Are Created (page 2-95)"

2.4.4.1 About the Workspace Request Approval Process

The Instance administrator determines how workspace request process works depends on the defined Provisioning Status.

To determine how provisioning works, an Instance Administrator selects one of the following Provisioning Status options on the Instance Settings page:

- **Manual** - An Instance administrator creates new workspaces and notifies the Workspace administrator of the login information.
- **Request** - Users request workspaces directly in a self-service fashion. Users click a link on the login page to access a request form. After the workspace request has been granted, users are automatically emailed the appropriate login information.
- **Request with Email Verification** - In this mode, users request workspaces directly by clicking a link on the Sign In page to access a request form. Each user receives an initial email containing a verification link. When the user clicks the verification link, the request is processed. The user can then access the workspace using the Sign In page.

To enable users to request a workspace using a link on the Sign In page, the Instance administrator must choose the provisioning status of **Request** or **Request with Email Verification** . If the provisioning status is set to **Manual**, no link appears on the sign in page.

About Request with Email Verification

If your workspace uses the Provisioning Status **Request with Email Verification** when an Instance administrator approves a workspace request, the following events occur:

1. An email containing a verification link is sent to the user.
2. When user clicks the verification link, the workspace is created.
3. Another email is sent to the user containing login credentials (that is, the workspace name, username, and password).
4. The status of the workspace request changes from `Accepted` to `Approved`.

What Happens When an Error Occurs?

If an error occurs during the workspace creation process, the status of the request reverts to `Requested` and an email is sent to the user containing the following message:

```
Please contact administrator.
```

Once the issue is resolved, the administrator can again repeat the previous procedure and approve the request.

2.4.4.2 Approving or Declining a Pending Workspace Request

Approve or decline pending workspace requests on the All Workspace Requests page.

To approve or decline a pending workspace request:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Requests**.
3. Click the **All Workspace Requests** tab.

   The All Workspace Requests report appears listing the workspace name, schema, size, request date, and status.
4. To approve a request:
   a. Click **Provision** in the Actions column.
   b. On the Provisioning Administration page, click **Approve**.
   c. Review the email message.
   d. If needed, update the message and click **Approve and Send Email**.
5. To decline a request:
   a. Click **Provision** in the Actions column.
   b. On the Provisioning Administration page, click **Decline**.
   c. Review the email message.
   d. If needed, update the message, for example to add the reason for declining a request, and click **Decline and Send Email**.

      The email is sent to the user notifying them the request was declined.

> **Tip:**
>
> If the instance has the Provisioning Status, **Email Verification**, an email containing a verification link is sent to the user. To create the workspace, the user must click the verification link to create the workspace. See "About Specifying How Workspaces Are Created (page 2-95)."

2.4.4.3 Changing the Status of an Existing Workspace Request

Change the status of an existing workspace request on the All Workspace Requests page.

To change the status of an existing workspace request:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Requests**.
3. Click the **All Workspace Requests** tab.

   The All Workspace Requests report appears listing the workspace name, schema, size, request date, and status.
4. To review all workspace requests, deselect the filter **Status_Code = '1'**.
5. Locate a request to review.
6. Click **Adjust** in the Actions column.

   The Adjust Request page appears.
7. From the Project Status list, select a new status.
8. Click **Apply Changes**.

> **Note:**
>
> Be careful when setting the Project Status to **Requested**. Although **Requested** enables you to provision a workspace, it could result in data corruption due to the manner in which accounts are provisioned. The provisioning system assumes Requested workspace requests do not have the corresponding schemas and dictionary entries for a Workspace administrator or developers. If you must change the Project Status for an **Approved** workspace to **Requested**, terminate the service first and then change the status to Requested.

2.4.4.4 Deleting a Workspace Request

Delete workspace requests on the All Workspace Requests page.

To delete a workspace request:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Requests**.
3. Click the **All Workspace Requests** tab.

The All Workspace Requests report appears listing the workspace name, schema, size, request date, and status.

4. Click the workspace name.
5. On the Edit Provisioning Request page, select the appropriate button:
   - If the Project Status is `Approved`, click **Terminate or Delete**.
   - If the Project Status is `Declined`, `Requested`, `Terminated`, or `Accepted`, click **Delete**.
6. Click **Delete Request**.

2.4.5 Managing Change Requests

A Change Request enables users to modify an existing workspace (for example, by adding a new schema or increasing the available disk space). Once submitted, the Instance administrator reviews and either approves or declines the change request

- Approving or Declining a Pending Change Request (page 2-15)
  Approve or decline pending change requests on the All Workspace Requests page.

> **See Also:**
>
> "About Workspace Requests and Change Requests (page 2-10)"

2.4.5.1 Approving or Declining a Pending Change Request

Approve or decline pending change requests on the All Workspace Requests page.

To approve or decline a pending change request:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Requests**.
3. Click the **All Change Requests** tab.
4. Locate the request and click **View Request** under the Action column.

   The View Change Request page appears. Note that the buttons that display depend upon the nature of the change request.
5. To approve the request, click one of the following:
   - **Create Schema** - Approves a schema request.
   - **Deny Request** - Denies the current change request.
   - **Add Space** - Approves a request for additional disk space.
   - **Terminate Service** - Approves a request to terminate the service.

2.5 Managing Instance Settings

Use the Instance settings region of the Manage Instance page to configure feature availability, security, instance settings (that is, general workspace behavior), and workspace purge settings.

- Managing Feature Configuration (page 2-16)
  Use the Feature Configuration page to configure the application development environment, SQL Workshop functionality, database monitoring, application activity logging, and instance-level support for file upload.
- Configuring Security (page 2-24)
  Instance administrators can configure instance security, including service-level security, configuring support for Real Application Security, configuring session time out, preventing browser attacks by isolating workspaces, excluding domains from regions and Web services, configuring authentication controls, creating strong password policies, restricting access by Database Access Descriptor (DAD), and managing authorized URLs.
- Configuring Instance Settings (page 2-48)
  Control a variety of general settings for an Oracle Application Express development instance including configuring workspace provisioning behavior, storage, email, wallet information, report printing, Help menu, workspace size options, and application ID ranges.
- Purging Inactive Workspaces (page 2-64)
  Inactive workspaces consume valuable storage space and degrade system performance. Instance administrator can configure an instance to periodically purge inactive workspaces.
- Using the REST Administration Interface to View Usage Statistics (page 2-66)
  The REST Administration Interface enables Instance administrators to automatically fetch usage metrics for an Oracle Application Express instance with a REST client.

2.5.1 Managing Feature Configuration

Use the Feature Configuration page to configure the application development environment, SQL Workshop functionality, database monitoring, application activity logging, and instance-level support for file upload.

- Disabling PL/SQL Program Unit Editing for an Instance (page 2-17)
  Control if PL/SQL program unit editing is available in an instance on the Feature Configuration page.
- Enabling the Creation of Demonstration Objects in New Workspaces (page 2-18)
  Enable the creation of demonstration objects when creating new workspaces on the Feature Configuration page.
- Enabling the Creation of Websheet Objects in New Workspaces (page 2-18)
  Enable the creation of Websheet objects when creating new workspaces on the Feature Configuration page.
- Enabling and Disabling SQL Access in Websheets (page 2-18)
  Control the ability to use the SQL tag and the ability to create SQL reports in Websheets on the Feature Configuration page.

- Configuring Packaged Application Installation Options (page 2-19)
  Enable or disable support for specific authentication schemes when installing packaged applications on the Feature Configuration page.
- Configuring SQL Workshop (page 2-19)
  Configure basic SQL Workshop behavior for an instance.
- Enabling Database Monitoring (page 2-20)
  Enable monitoring within SQL Workshop.
- Enabling Application Activity Logging (page 2-21)
  Configure application activity logging for all applications on the instance.
- Enabling Web Service Activity Logging (page 2-21)
  Configure web service activity logging for all workspaces on the instance.
- Enabling Application Tracing (page 2-22)
  Control application tracing at the instance-level.
- Enabling REST for an Instance (page 2-22)
  Control the ability to create and access RESTful Services for an instance.
- Enabling Service Requests (page 2-23)
  Determine if workspace administrators to make service requests from Workspace Administration.
- Enabling Instance-level Support for File Upload in Team Development (page 2-23)
  Control whether Team Development supports file upload.

> **See Also:**
>
> "Managing Component Availability for an Instance (page 2-111)"

2.5.1.1 Disabling PL/SQL Program Unit Editing for an Instance

Control if PL/SQL program unit editing is available in an instance on the Feature Configuration page.

By default, developers can change and compile PL/SQL source code when browsing database procedures, packages, and functions in Object Browser. As an Instance administrator, you can control if PL/SQL program unit editing is available on an Oracle Application Express instance.

To disable PL/SQL program unit editing:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Locate the Application Development section.
5. For Allow PL/SQL Program Unit Editing, select **No**.
6. Click **Apply Changes**.

2.5.1.2 Enabling the Creation of Demonstration Objects in New Workspaces

Enable the creation of demonstration objects when creating new workspaces on the Feature Configuration page.

When creating a new workspace, an Instance administrators can create demonstration objects by enabling the attribute,**Create demonstration objects in new workspaces** . When this attribute is set to **Yes**, new workspaces include a demonstration applications and demonstration database objects.

To enable the creation of demonstration database objects in a new workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Locate the Application Development section.
5. For **Create demonstration objects in new workspaces**, select **Yes** to include demonstration applications and demonstration database objects when creating new workspace. To disable the creation of demonstration applications, select **No**.
6. Click **Apply Changes**.

2.5.1.3 Enabling the Creation of Websheet Objects in New Workspaces

Enable the creation of Websheet objects when creating new workspaces on the Feature Configuration page.

When creating a new workspace, an Instance administrators can create demonstration Websheet objects by enabling the attribute, **Create Websheet objects in new workspaces** . When this attribute is set to **Yes**, new workspaces include a sample Websheet application and other sample database objects.

To enable the creation of sample Websheet objects in a new workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Locate the Application Development section.
5. For **Create Websheet objects in new workspaces**, select **Yes**. To disable the creation of Websheet objects, select **No**.
6. Click **Apply Changes**.

2.5.1.4 Enabling and Disabling SQL Access in Websheets

Control the ability to use the SQL tag and the ability to create SQL reports in Websheets on the Feature Configuration page.

An Instance administrator can control the ability to use the SQL tag and the ability to create SQL reports in Websheets. When disabled, all Websheet applications in all workspaces in the instance are prevented from using the SQL tag or creating SQL reports.

To control SQL access in Websheets:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Locate the Application Development section.
5. For Enable SQL Access in Websheets, select **Yes** or **No**.
6. Click **Apply Changes**.

2.5.1.5 Configuring Packaged Application Installation Options

Enable or disable support for specific authentication schemes when installing packaged applications on the Feature Configuration page.

To configure packaged application installation options:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Under Packaged Application Install Options, select **Yes** to support the authentication schemes when installing new packaged, or select **No** to disable support for the authentication schemes:
   - **Allow HTTP Header Variable authentication**
   - **Allow LDAP Directory authentication**
   - **Allow Oracle Application Server Single Sign-On authentication**
5. Click **Apply Changes**.

> **See Also:**
>
> "Utilizing Packaged Applications" in *Oracle Application Express App Builder User's Guide*

2.5.1.6 Configuring SQL Workshop

Configure basic SQL Workshop behavior for an instance.

Instance administrators can configure SQL Workshop behavior on the Feature Configuration page.

To configure SQL Workshop:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Under SQL Workshop, enter the following attributes:

Table 2-1 SQL Workshop Attributes

Attribute	Description
SQL Commands Maximum Inactivity in minutes	Identify the maximum amount of time a transactional command in the SQL Command Processor waits before timing out.
SQL Scripts Maximum Script Output Size in bytes	Identify the maximum amount of output a single SQL script can generate. SQL scripts are run from the SQL Workshop.
SQL Scripts Maximum Workspace Output Size in bytes	Identify the maximum amount of space all scripts within a workspace may consume. SQL script results are the output generated when running SQL scripts from the Script Editor or from the SQL Scripts home page.
SQL Scripts Maximum Script Size in bytes	Identify the maximum size of a SQL script used within the SQL Workshop.
Enable Transactional SQL Commands	Select **Yes** to enable transactional SQL commands for the entire Oracle Application Express instance. Enabling this feature permits SQL Command Processor users to issue multiple SQL commands within the same physical database transaction. When you select **Yes**, an Autocommit check box appears on the SQL Command Processor page. By default, this option is set to **No**.

5. Click **Apply Changes**.

2.5.1.7 Enabling Database Monitoring

Enable monitoring within SQL Workshop.

Before you can access the Database Monitoring page, an Instance administrator must enable database monitoring. See "Monitoring the Database" in *Oracle Application Express SQL Workshop Guide*

> **Note:**
>
> Only users having a database user account that has been granted a DBA role can access the Database Monitor page.

Setting Enable Database Monitoring to **Yes** enables monitoring within SQL Workshop. Before you can access the Database Monitoring page, an Instance administrator must enable database monitoring.

To enable database monitoring:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Scroll down to Monitoring.

5. For Enable Database Monitoring, select **Yes**.
6. Click **Apply Changes**.

2.5.1.8 Enabling Application Activity Logging

Configure application activity logging for all applications on the instance.

To configuring application activity logging:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Scroll down to Monitoring.
5. For Application Activity Logging, select one of the following:
   - **Use Application Settings (default)** - Use the Logging attribute of each application to determine if activity is logged.
   - **Never** - Disable activity logging for all applications in the instance.
   - **Always** - Enable activity logging for all applications in the instance.
   - **Initially Disabled for New Applications and Packaged Applications** - New applications and packaged applications will initially have activity logging disabled.
6. Click **Apply Changes**.

2.5.1.9 Enabling Web Service Activity Logging

Configure web service activity logging for all workspaces on the instance.

To configuring web service activity logging:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Scroll down to Monitoring.
5. For Web Service Activity Logging, select one of the following:
   - **Use Application Settings (default)** - Use the Web Service Logging attribute of each workspace to determine if activity is logged.
   - **Never** - Disable web service activity logging for all workspaces in the instance.
   - **Always** - Enable web service activity logging for all workspaces in the instance.
6. Click **Apply Changes**.

2.5.1.10 Enabling Application Tracing

Control application tracing at the instance-level.

Instance administrators can control whether developers or users can generate database trace files simply by specifying `&p_trace=YES` on the URL when displaying a page. The ability to generate a trace file is already controlled if Debug is enabled for the application.

To control application tracing at the instance-level:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Scroll down to Monitoring.
5. From Enable Application Tracing, select:
   - **Yes** - Any application which has Debug enabled can also generate a server-side database trace file for a page using `&p_trace=YES` on the URL. To learn more, see "Enabling SQL Tracing and Using TKPROF" in *Oracle Application Express App Builder User's Guide*.
   - **No** - Tracing cannot be enabled for any application on the instance. If someone attempts to run an application with `&p_trace=YES` in the URL, the page renders but the request to generate the SQL trace file is silently ignored.
6. Click **Apply Changes**.

2.5.1.11 Enabling REST for an Instance

Control the ability to create and access RESTful Services for an instance.

> **Tip:**
>
> RESTful Services requires that the web listener in your configuration uses Oracle REST Data Services release 2.0 or later.

To enable RESTful Services:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Sign in to Oracle Application Express**.
3. Under Instance Settings, click **Feature Configuration**.
4. Under REST, enter the following attributes:

Table 2-2 REST Attributes

Attribute	Description
Enable RESTful Services	Controls the ability to create and access RESTful Services mapped to SQL and PL/SQL.

Table 2-2 (Cont.) REST Attributes

Attribute	Description
Swagger UI URL	Defines a URL pointing to the SWAGGER UI 2.0+ server used by the ORDS REST Workshop when generating documentation for a module. If a URL is specified, the URI to the web service's swagger documentation is passed to the Swagger UI server. If a there is no URL specified, raw JSON is produced. **Note**: In order to generate the documentation the Swagger UI server must be able to reach the referenced web service URI.

5. Click **Apply Changes**.

2.5.1.12 Enabling Service Requests

Determine if workspace administrators to make service requests from Workspace Administration.

Controls the ability for workspace administrators to make service requests from Workspace Administration. Service Requests include the ability to request a new schema, request storage, or request termination of their workspace.

To enable service requests:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Scroll down to Workspace Administration.
5. For Enable Service Requests, select **Yes**.
6. Click **Apply Changes**.

2.5.1.13 Enabling Instance-level Support for File Upload in Team Development

Control whether Team Development supports file upload.

To enable support for file upload in Team Development for an instance:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Feature Configuration**.
4. Under Team Development:
   a. Enable Team Development's File Repository - Specify whether to enable file upload in Team Development:
      - **Yes** - Select **Yes** for all new workspaces created in this instance to allow files to be uploaded into the Team Development file repository. Select **No** for all new workspaces created in this instance to not allow files to be uploaded into the Team Development file repository.

- **No** - Select **No** to disable support for file attachments in Team Development.

> **Tip:**
>
> These settings do not affect existing workspaces.

b. Maximum File Size (in MB) - Select the maximum file size for any file uploaded into the team development file repository. The default value is 15 MB.

5. Click **Apply Changes**.

2.5.2 Configuring Security

Instance administrators can configure instance security, including service-level security, configuring support for Real Application Security, configuring session time out, preventing browser attacks by isolating workspaces, excluding domains from regions and Web services, configuring authentication controls, creating strong password policies, restricting access by Database Access Descriptor (DAD), and managing authorized URLs.

- Configuring Service-level Security Settings (page 2-25)
  Instance administrators can configure service-level security in Manage Instance, Security, Security Settings, Security.
- Configuring HTTP Protocol Attributes (page 2-32)
  Determine HTTPS requirements for an Oracle Application Express instance and all related applications.
- Enabling Real Application Security (page 2-35)
  Enable Oracle Real Application Security.
- Configuring Session Timeout (page 2-36)
  Use the Session Timeout attributes to reduce exposure at the application-level for abandoned computers with an open web browser.
- Isolating All Workspaces in an Instance (page 2-36)
  Instance administrators can prevent browser attacks by isolating a workspace.
- Defining Excluded Domains for Regions and Web Services (page 2-39)
  Define a list of restricted domains for regions of type URL and Web services. If a Web service or region of type URL contains an excluded domain, an error displays informing the user that it is restricted.
- Configuring Authentication Controls for an Instance (page 2-39)
  Configure authentication controls for an entire Oracle Application Express instance.
- Creating Strong Password Policies (page 2-42)
  Instance administrators can create strong password policies for an Oracle Application Express instance.
- Restricting Access to Oracle Application Express by Database Access Descriptor (DAD) (page 2-45)
  Restrict access to Oracle Application Express by Database Access Descriptor (DAD).

- Managing Authorized URLs (page 2-47)
  Create and manage a list of authorized URLs.

2.5.2.1 Configuring Service-level Security Settings

Instance administrators can configure service-level security in Manage Instance, Security, Security Settings, Security.

Service-level security includes configuring login controls, controlling file upload capability, restricting access by IP address, configuring a proxy server for an instance, controlling support for URLs containing session IDs, and controlling how Oracle Application Express displays the results of unhandled errors.

- Controling If Cookies Populate the Login Form (page 2-26)
  Control if a convenience cookie is sent to a user's computer whenever a developer or administrator logs in to a workspace from the Application Express Login page.
- Disabling Access to Oracle Application Express Administration Services (page 2-26)
  Prevent a user from logging in to Oracle Application Express Administration Services.
- Enabling Access to Oracle Application Express Administration Services (page 2-27)
  If access to Oracle Application Express Administration Services has been disabled, an Instance administrator can re-enable again by running the following SQL statements.
- Disabling Workspace Login Access (page 2-27)
  Restrict user access to Application Express by disabling workspace login. Disabling workspace login in production environments prevents users from running Application Express applications such as App Builder, SQL Workshop, Team Development, and Workspace Administration.
- Controlling Public File Upload (page 2-28)
  Use the Allow Public File Upload attribute to control whether unauthenticated users can upload files in applications that provide file upload controls.
- Restricting User Access by IP Address (page 2-28)
  Restrict user access to an Oracle Application Express instance by specifying a comma-delimited list of allowable IP addresses.
- Configuring a Proxy Server for an Instance (page 2-29)
  Configure an entire Oracle Application Express instance to use a proxy for all outbound HTTP traffic.
- Selecting a Checksum Hash Function (page 2-29)
  Select a hash function that Application Express uses to generate one way hash strings for checksums.
- Configuring Rejoin Sessions for an Instance (page 2-30)
  Control if Oracle Application Express supports application URLs that do not contain session IDs.
- Configuring Unhandled Errors (page 2-31)
  Control how Oracle Application Express displays the results of unhandled errors

2.5.2.1.1 Controling If Cookies Populate the Login Form

Control if a convenience cookie is sent to a user's computer whenever a developer or administrator logs in to a workspace from the Application Express Login page.

If Set Workspace Cookie option is set to **Yes**, Oracle Application Express sends a persistent cookie that:

- Combines the last used workspace name and user name
- Has a lifetime of six months
- Is read to populate the Application Express Workspace Login form (but not the Oracle Application Express Administration Services Login form)

To control if cookies populate the login form:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. For Set Workspace Cookie, select **No**.
   - **Yes** - Enables the Application Express workspace login page to send a persistent cookie containing the last used workspace name and username combination.

     This cookie has a lifetime of six months and is used to populate the Workspace and Username fields of the Application Express workspace login form (not the Service Administration login form).
   - **No** - Prevents this cookie from being sent.
6. Click **Apply Changes**.

> **Note:**
>
> If your system has received this cookie, you can physically remove it from its persistent location on disk using browser tools or system utilities. The cookie is named `ORA_WWV_REMEMBER_UN`. In older releases of Oracle Application Express, this cookie was named `ORACLE_PLATFORM_REMEMBER_UN`. It may exist for each Oracle Application Express service accessed having distinct hostname and path components.

2.5.2.1.2 Disabling Access to Oracle Application Express Administration Services

Prevent a user from logging in to Oracle Application Express Administration Services.

Instance administrators can prevent a user from logging in to Oracle Application Express Administration Services. Disabling administrator login in production environments prevents unauthorized users from accessing Application Express Administration Services and possibly compromising other user login credentials.

To disable user access to Oracle Application Express Administration Services:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. For Disable Administrator Login, select **Yes**.

> **Note:**
>
> Selecting **Yes** and signing out prevents anyone from accessing Oracle Application Express Administration Services.

6. Click **Apply Changes**.

2.5.2.1.3 Enabling Access to Oracle Application Express Administration Services

If access to Oracle Application Express Administration Services has been disabled, an Instance administrator can re-enable again by running the following SQL statements.

To enable user access to Oracle Application Express Administration Services if it has been disabled:

1. Connect in SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`, for example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100;
   ```

3. Run the following statement:

   ```
   BEGIN
     APEX_INSTANCE_ADMIN.SET_PARAMETER('DISABLE_ADMIN_LOGIN', 'N');
     commit;
   END;
   /
   ```

2.5.2.1.4 Disabling Workspace Login Access

Restrict user access to Application Express by disabling workspace login. Disabling workspace login in production environments prevents users from running Application Express applications such as App Builder, SQL Workshop, Team Development, and Workspace Administration.

To disable user access to the Internal workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. From Disable Workspace Login, select **Yes**.

   Selecting **Yes** effectively sets a Runtime-Only environment while still allowing Instance administrators to sign in to Instance Administration. Selecting **Yes** in production environments prevents developers from changing applications or data.
6. Click **Apply Changes**.

2.5.2.1.5 Controlling Public File Upload

Use the Allow Public File Upload attribute to control whether unauthenticated users can upload files in applications that provide file upload controls.

To control file upload:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. From Allow Public File Upload, select one of the following:
   - **Yes** - Enables unauthenticated users to upload files in applications that provide file upload controls.
   - **No** - Prevents unauthenticated users from uploading files in applications that provide file upload controls.
6. Click **Apply Changes**.

2.5.2.1.6 Restricting User Access by IP Address

Restrict user access to an Oracle Application Express instance by specifying a comma-delimited list of allowable IP addresses.

To restrict user access by IP address:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. For Disable Administrator Login, select **No**.
6. In Restrict Access by IP Address, enter a comma-delimited list of allowable IP addresses. Use an asterisk (*) to specify a wildcard.

   You can enter IP addresses from one to four levels. For example:

   ```
   141, 141.* ...
   192.128.23.1 ...
   ```

> **Note:**
>
> When using wildcards, do not include additional numeric values after wildcard characters. For example, `138.*.41.2`.

7. Click **Apply Changes**.

2.5.2.1.7 Configuring a Proxy Server for an Instance

Configure an entire Oracle Application Express instance to use a proxy for all outbound HTTP traffic.

Setting a proxy at the instance-level supersedes any proxies defined at the application-level or in web service references. If a proxy is specified, regions of type URL, Web services, and report printing will use the proxy.

To configure a proxy for an Oracle Application Express instance:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. In Instance Proxy, enter the address of the proxy to be used for the entire instance. In No Proxy Domains, enter a list of domains, for which the proxy server should not be used.
6. Click **Apply Changes**.

2.5.2.1.8 Selecting a Checksum Hash Function

Select a hash function that Application Express uses to generate one way hash strings for checksums.

The Checksum Hash Function attribute enables you to react to recent developments and switch between algorithms based on new research. Use the Checksum Hash Function attribute to select a hash function that Oracle Application Express uses to generate one way hash strings for checksums. This attribute is also the default value for the Security Bookmark Hash Function attribute in new applications. Applications use the Bookmark Hash Function when defining bookmark URLs.

> **Tip:**
>
> Changing the Checksum Hash Function does not change the Bookmark Hash Function currently defined for existing applications because this would invalidate all existing bookmarks saved by end users. Oracle strongly recommends going into existing applications, expiring existing bookmarks, and then updating the Bookmark Hash Function to the same value defined for Checksum Hash Function.

To select a checksum hash function:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. From Checksum Hash Function, select a a hash function that Application Express uses to generate one way hash strings for checksums.

   The **SHA-2** algorithms are only supported on Oracle Database 12*c* or later. **Most Secure** automatically selects the most secure algorithm available. Therefore, Oracle recommends this setting. On Oracle Database 12*c* or later, this evaluates to **SHA-2, 512 bit** and on Oracle Database 11*g*, **SHA-1** is the most secure algorithm. Since the **MD5** algorithm is deprecated, Oracle does not recommend this setting.
6. Click **Apply Changes**.

2.5.2.1.9 Configuring Rejoin Sessions for an Instance

Control if Oracle Application Express supports application URLs that do not contain session IDs.

By configuring the Rejoin Sessions attribute, Instance administrators can control if Oracle Application Express supports URLs that contain session IDs. When rejoin sessions is enabled, Oracle Application Express attempts to use the session cookie to join an existing session, when a URL does not contain a session ID.

> **Warning:**
>
> For security reasons, Oracles recommends that administrators disable support for session joining unless they implement workspace isolation by configuring the Allow Hostname attributes. See "Isolating a Workspace to Prevent Browser Attacks (page 2-112)" and "Isolating All Workspaces in an Instance (page 2-36)."

> **Note:**
>
> Enabling rejoin sessions may expose your application to possible security breaches by enabling attackers to take over existing end user sessions. To learn more, see *Oracle Application Express App Builder User's Guide*.

To configure Rejoin Sessions:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. From Rejoin Sessions, select an option:

- **Disabled** - If the URL does not contain a session ID, Oracle Application Express creates a new session.
- **Enabled for Public Sessions** - If the URL goes to a public page and does not contain a session ID Application Express attempts to utilize the existing session cookie established for that application. For applications with both public and authenticated pages, a session ID is defined after the end user authenticates. Application Express only joins via the cookie when the session is not yet authenticated.
- **Enabled for All Sessions** - If the URL does not contain a session ID, Oracle Application Express attempts to use the existing session cookie established for that application, providing one of the following conditions are met:
  - Session State Protection is enabled for the application and the URL includes a valid checksum. For public bookmarks, the most restrictive item level protection must be either **Unrestricted** or **Checksum Required - Application Level**.
  - The URL does not contain payload (a request parameter, clear cache or data value pairs). This setting requires that Embed In Frames is set to **Allow from same origin** or to **Deny** for the application.

  Enabled for All Sessions requires that **Embed in Frames** is set to **Allow from same origin** or **Deny**. This is not tied to a condition about the URL payload, but also applies to session state protected URLs.

6. Click **Apply Changes**.

2.5.2.1.10 Configuring Unhandled Errors

Control how Oracle Application Express displays the results of unhandled errors

When Oracle Application Express encounters an unhandled error during processing, an error page displays to the end user of the application. From a security standpoint, it is often better to not display these messages and error codes to the end user and simply return a HTTP 400 (Bad Request) error code to the client browser.

To configure Unhandled Errors:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate the Security section.
5. From Unhandled Errors, select an option:
   - **Show Error Page** - This is the default behavior. For any error or exception which is not handled by the error processing of an application, an error page displays to the end user with the specific error and the error code.
   - **Return HTTP 400** - Returns an HTTP 400 status to the end user's client browser when the Application Express engine encounters an unhandled error.
6. Click **Apply Changes**.

2.5.2.2 Configuring HTTP Protocol Attributes

Determine HTTPS requirements for an Oracle Application Express instance and all related applications.

> **Note:**
>
> Require HTTPS make Oracle Application Express unreachable by the HTTP protocol. Before enabling this setting, ensure that the HTTPS protocol is enabled and configured correctly on your server.

- About SSL (page 2-32)
  Secure Socktets Layer (SSL) is a protocol for managing the security of data transmitted on the Internet. For web applications, SSL is implemented by using the HTTPS protocol. Oracle recommends running Oracle Application Express applications using SSL (HTTPS protocol) to prevent any sensitive data from being sent over an unencrypted (cleartext) communication channel.
- Requiring HTTPS (page 2-33)
  Configure both the Oracle Application Express instance and all related applications to require HTTPS by configuring the Require HTTPS and Require Outbound HTTPS attributes.
- Reversing Require HTTPS (page 2-33)
  If you enable Reverse HTTPS, an Instance administrator can disable it by running the following SQL statements.
- Reversing Require Outbound HTTPS (page 2-34)
  If you enable Require Outbound HTTPS, an Instance administrator can disable it by running the following SQL statements.
- Configuring Additional Response Headers (page 2-35)
  Enter additional HTTP response headers that Oracle Application Express should send on each request, for all applications.

2.5.2.2.1 About SSL

Secure Socktets Layer (SSL) is a protocol for managing the security of data transmitted on the Internet. For web applications, SSL is implemented by using the HTTPS protocol. Oracle recommends running Oracle Application Express applications using SSL (HTTPS protocol) to prevent any sensitive data from being sent over an unencrypted (cleartext) communication channel.

2.5.2.2.2 Requiring HTTPS

Configure both the Oracle Application Express instance and all related applications to require HTTPS by configuring the Require HTTPS and Require Outbound HTTPS attributes.

> **Important:**
>
> If you enable **Require HTTPS** makes Oracle Application Express unreachable by the HTTP protocol. Before enabling this setting, ensure that the HTTPS protocol is enabled and configured correctly on your server.

To require HTTPS in Oracle Application Express:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under HTTP Protocol, configure the following:
   a. Require HTTPS:
      - **Always** - Enforces HTTPS for all applications (including the Oracle Application Express development and administration applications) to require HTTPS.

        If set to **Always**, the Strict-Transport-Security Max Age attribute displays. Use this field to specify the time period in seconds during which the browser shall access the server with HTTPS only. To learn more, see field-level Help.
      - **Development and Administration** - Forces all internal applications within Oracle Application Express (that is, App Builder, SQL Workshop, Instance Administration and so on) to require HTTPS.
      - **Application specific** - Makes HTTPS dependent on application-level settings.

   b. Require Outbound HTTPS - Select **Yes** to require all outbound traffic from an Application Express instance to use the HTTPS protocol.
   c. HTTP Response Headers - Enter additional HTTP response headers that Oracle Application Express should send on each request for all applications. Developers can specify additional headers at application-level. Each header has to start on a new line. Note that support for various headers differs between browsers. To learn more, see field-level Help.
5. Click **Apply Changes**.

2.5.2.2.3 Reversing Require HTTPS

If you enable Reverse HTTPS, an Instance administrator can disable it by running the following SQL statements.

To reverse Require HTTPS:

1. Connect in SQL*Plus or SQL Developer with the Application Express engine schema as the current schema, for example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100;
   ```

3. Run the following statement:

   ```
   BEGIN
       APEX_INSTANCE_ADMIN.SET_PARAMETER('REQUIRE_HTTPS', 'N');
       commit;
   end;
   /
   ```

2.5.2.2.4 Reversing Require Outbound HTTPS

If you enable Require Outbound HTTPS, an Instance administrator can disable it by running the following SQL statements.

To reverse Require Outbound HTTPS:

1. Connect in SQL*Plus or SQL Developer with the Application Express engine schema as the current schema, for example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100;
   ```

3. Run the following statement:

   ```
   BEGIN
       APEX_INSTANCE_ADMIN.SET_PARAMETER('REQUIRE_OUT_HTTPS', 'N');
       commit;
   end;
   /
   ```

2.5.2.2.5 Configuring Additional Response Headers

Enter additional HTTP response headers that Oracle Application Express should send on each request, for all applications.

To configure additional response headers:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate HTTP Protocol.
5. In HTTP Response Headers, enter additional HTTP response headers that Oracle Application Express should send on each request for all applications.

   Developers can specify additional headers at application-level. Each header has to start on a new line. Support for various headers differs between browsers.

   One important security related header is Content-Security-Policy. Sending this header can significantly reduce the risk of cross site scripting (XSS) and related attacks. To learn more, see field-level Help.
6. Click **Apply Changes**.

2.5.2.3 Enabling Real Application Security

Enable Oracle Real Application Security.

To enable Real Application Security:

If you are running Oracle Database 12c Release 1 (12.1.0.2) or later, you can enable Oracle Real Application Security. Oracle Real Application Security (RAS) is a database authorization framework that enables application developers and administrators to define, provision, and enforce application-level security policies at the database layer.

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Locate Real Application Security.
5. For Allow Real Application Security.
   - **Yes** - Enables Oracle Database Real Application Security support for applications. If Real Application Security is configured in an application's authentication scheme, Oracle Application Express creates a Real Application Security session for a new Oracle Application Express session and automatically attaches to it.
   - **No** - Disables Oracle Database Real Application Security.
6. Click **Apply Changes**.

> **See Also:**
>
> *Oracle Database Real Application Security Administrator's and Developer's Guide*

2.5.2.4 Configuring Session Timeout

Use the Session Timeout attributes to reduce exposure at the application-level for abandoned computers with an open web browser.

To configure session timeout for an instance:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under Session Timeout For Application Express, specify the following:
   - **Maximum Session Length in Seconds** - Defines how long (in seconds) sessions can exist and be used by applications in this Oracle Application Express instance. This setting is superseded by the corresponding workspace level setting and application level setting.
     - Enter a positive integer to control how long a session can exist.
     - Enter 0 to have the session exist indefinitely.
     - Leave the value empty in order to revert to the default value of 8 hours (28800 seconds).
   - **Maximum Session Idle Time in Seconds** - Session Idle Time is the time between the last page request and the next page request. This setting is superseded by the corresponding workspace level setting and application level setting.
     - Enter a positive integer to control the default idle time for sessions used by applications in this Application Express instance.
     - Leave the value empty in order to revert to the default value of 1 hour (3600 seconds).
5. Click **Apply Changes**.

2.5.2.5 Isolating All Workspaces in an Instance

Instance administrators can prevent browser attacks by isolating a workspace.

- About Isolating Workspaces to Prevent Browser Attacks (page 2-37)
  Isolating workspaces is an effective approach to preventing browser attacks.
- Configuring Instance-Level Workspace Isolation Attributes (page 2-37)
  Configure isolation and resource limitation default values for all workspaces. Workspace administrators can override these default values at the workspace-level.

2.5.2.5.1 About Isolating Workspaces to Prevent Browser Attacks

Isolating workspaces is an effective approach to preventing browser attacks.

The only way to truly isolate a workspace is to enforce different domains in the URL by configuring the Allow Hostnames attribute. When the URLs of the attacker and the victim have different domains and hostnames, the browser's same-origin policy prevents attacks.

2.5.2.5.2 Configuring Instance-Level Workspace Isolation Attributes

Configure isolation and resource limitation default values for all workspaces. Workspace administrators can override these default values at the workspace-level.

To configure instance-level Workspace Isolation attributes:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under Workspace Isolation, configure the following attributes:

> **Tip:**
>
> To learn more about an attribute, see field-level Help.

Table 2-3 Workspace Isolation Attributes

Attribute	Description
Allow Hostnames	Enter a comma separated list of hostnames that can be used to access this instance. This attribute can be used to specify which DNS aliases of the web server can be used with applications. You can configure specific values that override this one at workspace level. If you enter one or more hostnames, the incoming HTTP request URL's hostname part must match one of the listed hostnames.
Resource Consumer Group	Specify the Database Resource Manager consumer group to be used for all page events on the instance. You can configure specific values that override this one at the workspace-level. At the beginning of every request, the Application Express engine switches the current consumer group of the current database session to the consumer group that is defined at workspace or instance level. This applies to both executing applications and any of the applications used within the Application Express development environment. The privilege to switch to this consumer group must be granted to either PUBLIC or the Application Express schema. This privilege is typically granted using the procedure `DBMS_RESOURCE_MANAGER_PRIVS.GRANT_SWITCH_CONSUMER_GROUP`.

Table 2-3 (Cont.) Workspace Isolation Attributes

Attribute	Description
Maximum Concurrent Workspace Requests	Enter the maximum number of concurrent page events that Oracle Application Express supports for all applications. You can configure a specific value at the workspace-level. Instead of processing a page event, Oracle Application Express shows an error message when the limit is already reached. Oracle Application Express keeps track of workspace requests by querying the `CLIENT_INFO` column of `GV$SESSION`. This tracking will not work if developers overwrite `CLIENT_INFO`, for example, with a call to `DBMS_APPLICATION_INFO.SET_CLIENT_INFO`.
Maximum Concurrent Session Requests	Enter the maximum number of concurrent page events that Oracle Application Express supports for each session for applications in this instance. You can configure a specific value at the workspace-level. Instead of processing a new page event, Oracle Application Express shows an error message when the limit is already reached. Alternatively, you can use the Concurrent Session Requests Kill Timeout attribute to kill an active database session, to process the new page event. Oracle Application Express keeps track of session requests by querying the `CLIENT_IDENTIFIER` column of `GV$SESSION`. This tracking will not work if developers overwrite `CLIENT_IDENTIFIER`, for example, with a call to `DBMS_SESSION.SET_IDENTIFIER`.
Concurrent Session Requests Kill Timeout	If a new page event comes in that is outside the limits of Maximum Concurrent Session Requests, Oracle Application Express can execute `alter system kill session` on the oldest active database session which processes another page event for this Application Express session. The Concurrent Session Requests Kill Timeout attribute specifies the number of seconds a database process has to be active, before it can be killed. If you leave this attribute empty, Application Express will not kill any database sessions. **Warning**: Killing sessions can cause problems with the application server's database session pool.
Maximum Size of Files in Workspace	Enter the total size (in bytes) of all files that can be uploaded to a workspace. You can configure a specific value at the workspace-level.
Maximum Web Service Requests	Enter the maximum number of web service requests that Application Express supports for each workspace in this instance. You can configure a more specific value at the workspace-level.

5. Click **Apply Changes**.

2.5.2.6 Defining Excluded Domains for Regions and Web Services

Define a list of restricted domains for regions of type URL and Web services. If a Web service or region of type URL contains an excluded domain, an error displays informing the user that it is restricted.

To define a list of excluded domain from regions of type URL and Web services:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under Domain Must Not Contain, enter a colon-delimited list of excluded domains, for example:

   ```
   mycompany.com:yourcompany.com:abccompany.com
   ```

5. Click **Apply Changes**.

2.5.2.7 Configuring Authentication Controls for an Instance

Configure authentication controls for an entire Oracle Application Express instance.

- About Authentication Controls (page 2-39)
  Administrators can configure authentication controls for an entire instance or for each individual workspace.
- Configuring Security for Developer and End User Login (page 2-40)
  Configure developer and end user login security settings.
- Configuring Security Settings for Workspace Administrator and Developer Accounts (page 2-41)
  Manage security settings for workspace administrator and workspace developer accounts.
- Editing Development Environment Authentication Scheme (page 2-41)
  Manage development environment authentication schemes.

> **See Also:**
>
> "Creating Account Login Controls for a Workspace (page 1-23)"

2.5.2.7.1 About Authentication Controls

Administrators can configure authentication controls for an entire instance or for each individual workspace.

For example, if an instance administrator configures authentication controls in Oracle Application Express Administration Services that configuration applies to all Application Express accounts in all workspaces across an entire development instance.

If the instance administrator does *not* enable authentication controls across an entire instance, then each Workspace administrator can enable the following controls on a workspace-by-workspace basis:

- User account expiration and locking
- A maximum number of failed login attempts for user accounts
- Account password lifetime (or number of days an end-user account password can be used before it expires for end-user accounts)

> **Tip:**
>
> This feature applies only to accounts created using the Application Express user creation and management. It provides additional authentication security for applications. See "Managing Users in a Workspace (page 1-31)."

2.5.2.7.2 Configuring Security for Developer and End User Login

Configure developer and end user login security settings.

To configure security settings for developer and end user login:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under General Settings, configure the following attributes:
   a. **Delay after failed login attempts in Seconds** - After failed logins, Oracle Application Express displays a countdown of this number times the number of failed login attempts, before it accepts new login attempts with the same username. Enter 0 to disable the countdown and allow immediate access.
   b. **Method for computing the Delay** - Select a method for computing the delay for failed log ins. The computation methods are based on recent data in the Login Access Log.

      See item help for further details.
   c. **Inbound Proxy Servers** - Enter a comma-separated list of IP addresses for well known proxy servers, through which requests come in. Oracle Application Express uses this list to compute the actual client address from the HTTP Headers `X-Forwarded-For` and `REMOTE_ADDR`.
   d. **Single Sign-On Logout URL** - Enter the URL Application Express redirects to trigger a logout from the Single Sign-On server. Application Express automatically appends `?p_done_url=...login url....`
5. Click **Apply Changes**.

2.5.2.7.3 Configuring Security Settings for Workspace Administrator and Developer Accounts

Manage security settings for workspace administrator and workspace developer accounts.

To configure security controls for workspace administrator and workspace developer accounts accounts:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under Development Environment Settings,, configure the following attributes:
   a. **Username Validation Expression** - Enter a regular expression to validate the usernames of developers and administrators. Enter `*` to bypass the validation. The following example validates that the username is an email address:

      ```
      ^[[:alnum:]._%-]+@[[:alnum:].-]+\.[[:alpha:]]{2,4}$
      ```

   b. **Require User Account Expiration and Locking** - Applies to end user accounts created using the Oracle Application Express account management interface. Select **Yes** to enable Application Express user account expiration and locking features across all workspaces. This selection prevents the same feature from being disabled at the workspace-level. Select **No** to relinquish control to each Workspace administrator.
   c. **Maximum Login Failures Allowed** - Enter a integer for the maximum number of consecutive unsuccessful authentication attempts allowed before a developer or administrator account is locked. If you do not specify a value in this field, the default value is 4.

      This setting applies to administrator and developer accounts. It does not apply to end user accounts. The value you enter is used as the default for the workspace-level **Maximum Login Failures Allowed** preference if the Workspace administrator does not specify a value. That preference is used for end-user accounts within the respective workspace.
   d. **Account Password Lifetime (days)** - Enter a number for the maximum number of days a developer or administrator account password may be used before the account expires. If you do not specify a value in this field, a default value is 45 days.

      This setting applies to accounts used to access the Application Express administration and development environment only. It does not apply to end user accounts. The value you enter is used as the default workspace-level **End User Account Lifetime** preference which workspace administrators can change. The workspace-level preference applies to the accounts within that workspace.
5. Click **Apply Changes**.

2.5.2.7.4 Editing Development Environment Authentication Scheme

Manage development environment authentication schemes.

To edit development environment authentication schemes:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Scroll down to Development Environment Authentication Schemes.
5. Click the Edit icon adjacent to the authentication scheme you wish to edit.
6. Edit the appropriate attributes. To make the selected authentication scheme current, click **Make Current Scheme**.

   To learn more about an attribute, see field-level Help.
7. To save you changes, click **Apply Changes**.

> **Tip:**
>
> You can also change the authentication scheme using the `APEX_BUILDER_AUTHENTICATION` parameter in `APEX_INSTANCE_ADMIN` package. See "Available Parameter Values" in *Oracle Application Express API Reference*.

2.5.2.8 Creating Strong Password Policies

Instance administrators can create strong password policies for an Oracle Application Express instance.

- About Strong Password Policies (page 2-42)
  Manage password policy for Application Express users (workspace administrators, developers, and end users) in all workspaces.
- Configuring Password Policies (page 2-43)
  Manage password policy for Application Express users (workspace administrators, developers, and end users) in all workspaces.

2.5.2.8.1 About Strong Password Policies

Manage password policy for Application Express users (workspace administrators, developers, and end users) in all workspaces.

Password policies can:

- Apply to all users (including, Workspace administrators, developers, and end users) in an Oracle Application Express instance.
- Include restrictions on characters, password length, specific words, and differences in consecutive passwords.
- Apply to users signing in to Oracle Application Express Administration Services.

The Application Express instance administrator can select the password policy for service administrators. Options include:

- **Use policy specified in Workspace Password Policy** - Applies the password rules specified the in Workspace Password Policy.
- **Use default strong password policy** - Adds another layer of security to prevent hackers from determining an administrator's password. This password policy requires that service administrator passwords meet these restrictions:

- Consist of at least six characters.
- Contain at least one lowercase alphabetic character, one uppercase alphabetic character, one numeric digit, and one punctuation character.
- Cannot include the username.
- Cannot include the word Internal.
- Cannot contain any words shown in the Must Not Contain Workspace Name field in this section.

Password policies add another layer of security to prevent hackers from determining an administrator's password.

2.5.2.8.2 Configuring Password Policies

Manage password policy for Application Express users (workspace administrators, developers, and end users) in all workspaces.

To configure password policies:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Under Password Policy and specify the following attributes:

Table 2-4 Workspace Password Policy Attributes

Attribute	Description
Password Hash Function	Select a hash function that Application Express uses to generate one way hash strings for workspace user passwords. To learn, see field-level Help.
Minimum Password Length	Enter a number to set a minimum character length for passwords for workspace administrator, developer, and end user accounts.
Minimum Password Differences	Enter the number of differences required between old and new passwords. The passwords are compared character by character, and each difference that occurs in any position counts toward the required minimum difference. This setting applies to accounts for workspace administrators, developers, and end users.
Must Contain At Least One Alphabetic Character	Select **Yes** to require that workspace administrator, developer, and end user account passwords contain at least one alphabetic character as specified in the Alphabetic Characters field.
Must Contain At Least One Numeric Character	Select **Yes** to require that workspace administrator, developer, and end user account passwords contain at least one Arabic numeric character (for example, 0,1,2,3,4,5,6,7,8,9).
Must Contain At Least One Punctuation Character	Select **Yes** to require that workspace administrator, developer, and end user account passwords contain at least one punctuation character as specified in the Punctuation Characters field.

Table 2-4 (Cont.) Workspace Password Policy Attributes

Attribute	Description
Must Contain At Least One Upper Case Character	Select **Yes** to require that workspace administrator, developer, and end user account passwords contain at least one uppercase alphabetic character.
Must Contain At Least One Lower Case Character	Select **Yes** to require that workspace administrator, developer, and end user account passwords contain at least one lowercase alphabetic character.
Must Not Contain Username	Select **Yes** to prevent workspace administrator, developer, and end user account passwords from containing the username.
Must Not Contain Workspace Name	Select **Yes** to prevent workspace administrator, developer, and end user account passwords from containing the workspace name, regardless of case.
Must Not Contain	Enter words, separated by colons, that workspace administrator, developer, and end user account passwords must not contain. These words may not appear in the password in any combination of uppercase or lowercase. This feature improves security by preventing the creation of simple, easy-to-guess passwords based on words like *hello*, *guest*, *welcome*, and so on.
Alphabetic Characters	Enter new or edit the existing alphabetic characters. This is the set of characters used in password validations involving alphabetic characters.
Punctuation Characters	Enter new or edit existing punctuation characters. This set of characters must be used in password validations involving punctuation characters.

5. For Service Administrator Password Policy, select an option:
   - **Use policy specified in Workspace Password Policy** - Applies the password rules specified above in Workspace Password Policy to service administrator passwords.
   - **Use default strong password policy** - Requires that service administrator passwords meet these restrictions:
     - Consist of at least six characters
     - Contain at least one lowercase alphabetic character, one uppercase alphabetic character, one numeric digit, and one punctuation character
     - Cannot include the username
     - Cannot include the word Internal
     - Cannot contain any words shown in the Must Not Contain field specified above in Workspace Password P
6. Click **Apply Changes**.

2.5.2.9 Restricting Access to Oracle Application Express by Database Access Descriptor (DAD)

Restrict access to Oracle Application Express by Database Access Descriptor (DAD).

> **Tip:**
>
> The PL/SQL Request Validation Function directive is only available in Oracle Application Server 10*g* and Oracle HTTP Server 11*g* or later, and the embedded PL/SQL gateway in Oracle Database 11*g* or later. This directive is not available in Oracle HTTP Server Release 9.0.3.

- About Enforcing Access Restrictions Per DAD (page 2-45)
  You can restrict access to Oracle Application Express by DAD by creating a request validation function directive when you create the DAD.
- About Changing and Recompiling wwv_flow_epg_include_local (page 2-46)
  You can change and recompile the `wwv_flow_epg_include_local` function to restrict access.
- Specifying Allowed Named Procedures (page 2-46)
- Altering the Product Schema (page 2-47)
  You can restrict access by altering the product schema.

2.5.2.9.1 About Enforcing Access Restrictions Per DAD

You can restrict access to Oracle Application Express by DAD by creating a request validation function directive when you create the DAD.

`mod_plsql` and the embedded PL/SQL gateway support a directive which enables you to name a PL/SQL function which is called for each HTTP request. You can use this functionality to restrict the procedures that can be called through the embedded PL/SQL gateway or `mod_plsql`. The function returns `TRUE` if the named procedure in the current request is allowed and `FALSE` if it is not allowed. You can also use this function to enforce access restrictions for Oracle Application Express on a per-Database Access Descriptor (DAD) basis.

During installation, the installer also creates a PL/SQL function in the Oracle Application Express product schema (`APEX_180100`). To restrict access, you can change and recompile this function. The source code for this function is not wrapped and can be found in the Oracle Application Express product core directory in the file named `wwv_flow_epg_include_local.sql`.

Oracle Application Express ships with a request validation function named `wwv_flow_epg_include_modules.authorize`. This function specifies access restrictions appropriate for the standard DAD configured for Oracle Application Express.

The `wwv_flow_epg_include_mod_local` function is called by Oracle Application Express's request validation function which itself is called by the embedded PL/SQL gateway or `mod_plsql`. The Oracle Application Express function first evaluates the request and based on the procedure name, approves it, rejects it, or passes it to the local function, `wwv_flow_epg_include_mod_local`, which can evaluate the request using its own rules.

When you create new DADs for use with Oracle Application Express, the request validation function directive should be specified. Specifically, the function `wwv_flow_epg_include_modules.authorize` should be named in the directive `PlsqlRequestValidationFunction` in the Database Access Descriptor entry in `dads.conf`.

If you have no additional restrictions beyond those implemented in the `wwv_flow_epg_include_modules.authorize` function, there is no need to take any action with respect to the source code for the `wwv_flow_epg_include_mod_local` function.

2.5.2.9.2 About Changing and Recompiling wwv_flow_epg_include_local

You can change and recompile the `wwv_flow_epg_include_local` function to restrict access.

The source code for the `wwv_flow_epg_include_local` function is not wrapped and can be found in the Oracle Application Express product core directory in the file named `wwv_flow_epg_include_local.sql`. The source code is as follows:

```
CREATE OR REPLACE FUNCTION
wwv_flow_epg_include_mod_local(
    PROCEDURE_NAME IN VARCHAR2)
RETURN BOOLEAN
IS
BEGIN
    RETURN FALSE; -- remove this statement when
you add procedure names to the "IN" list
    IF UPPER(procedure_name) IN (
          '') THEN
        RETURN TRUE;
    ELSE
        RETURN FALSE;
    END IF;
END wwv_flow_epg_include_mod_local;
/
```

2.5.2.9.3 Specifying Allowed Named Procedures

You can restrict access by specifying the names of procedures that should be allowed in `wwv_flow_epg_include_local`.

To specify names of procedures that should be allowed, edit `wwv_flow_epg_include_local`as follows:

1. Remove or comment out the `RETURN FALSE` statement that immediately follows the `BEGIN` statement:

   ```
   ...
   BEGIN
       RETURN FALSE; -- remove this statement when
   you add procedure names to the "IN" list
   ...
   ```

2. Add names to the clause representing procedure names that should be allowed to be invoked in HTTP requests. For example to allow procedures `PROC1` and `PROC2` the `IN` list you would write `IN ('PROC1', 'PROC2')`.

   After changing the source code of this function, alter the Oracle Application Express product schema (`APEX_180100`) and compile the function in that schema.

2.5.2.9.4 Altering the Product Schema

You can restrict access by altering the product schema.

To alter the product schema, `APEX_180100`

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Alter the product schema (`APEX_180100`) by entering the following command:

   ```
   ALTER SESSION SET CURRENT_SCHEMA APEX_180100;
   ```

3. Compile the function `wwv_flow_epg_include_local.sql`.

2.5.2.10 Managing Authorized URLs

Create and manage a list of authorized URLs.

Authorized URLs identify the list of URLs that can be used as parameter values of certain Oracle Application Express procedures. This includes the `APEX_UTIL.COUNT_CLICK` procedure, which has an input parameter named `P_NEXT_URL`.

If the parameter value to `P_NEXT_URL` is not a relative URL and not to the current host name, then it must be contained in this list of Authorized URLs.

- Defining a List of Authorized URLs (page 2-47)
  Define a list of authorized URLs.
- Editing a Defined Authorized URL (page 2-48)
  Edit a URL included in the list of authorized URLs.
- Deleting Defined Authorized URL (page 2-48)
  Delete a URL included in the list of authorized URLs.

2.5.2.10.1 Defining a List of Authorized URLs

Define a list of authorized URLs.

To define a list of Authorized URLs:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Click the **Authorized URLs** tab.
5. Click **Create Authorized URL.**

6. In Authorized URL, identify an authorized URL that can be used as the parameter value to certain Application Express procedures, including `APEX_UTIL.COUNT_CLICK`.

   The entire Authorized URL value will be compared with the URL parameter value in these procedures. If there is an exact match up to and including the entire length of the Authorized URL value, then the URL parameter value will be permitted.

7. Enter **Create Authorized URL**.

2.5.2.10.2 Editing a Defined Authorized URL

Edit a URL included in the list of authorized URLs.

To edit an existing URL:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Click the **Authorized URLs** tab.
5. Click the **Edit** icon adjacent to the URL.
6. Edit the Authorized URL and Description fields.
7. Click **Apply Changes**.

2.5.2.10.3 Deleting Defined Authorized URL

Delete a URL included in the list of authorized URLs.

To delete a URL included in the list of authorized URLs:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Security**.
4. Click the **Authorized URLs** tab.
5. Click the **Edit** icon adjacent to the URL.
6. Click **Delete**.
7. Click **OK** to confirm your selection.

2.5.3 Configuring Instance Settings

Control a variety of general settings for an Oracle Application Express development instance including configuring workspace provisioning behavior, storage, email, wallet information, report printing, Help menu, workspace size options, and application ID ranges.

- About Configuring Self Service Workspace Provisioning (page 2-49)
  The Instance administrator determines the amount of automation when provisioning (or creating) a workspace.

- Disabling Email Provisioning (page 2-50)
  Use Email Provisioning to disable workspace provisioning when provisioning with Email Verification.
- Configuring Storage (page 2-50)
  Instance administrators can configure the following storage options: require a new schema when requesting a workspace, auto extend tablespaces, or delete uploaded files are a specified number of days.
- Configuring Email (page 2-53)
  To enable Oracle Application Express to send mail, an instance administrator must configure instance-level email settings.
- Configuring Wallet Information (page 2-57)
  Configure wallet information (which store authentication and signing credentials) for an Oracle Application Express instance.
- Configuring Report Printing (page 2-60)
  Enable end users to download and print reports in various formats, including PDF.
- Configuring the Help Menu (page 2-63)
  Configure the target URL of the Help menu that displays in the upper right corner of the Oracle Application Express development environment.
- Configuring Workspace Size Options for Requests (page 2-63)
  Configure the workspace size options available to users when they request a new workspace and schema and request additional space for an existing workspace.
- Managing Application ID Range (page 2-64)
  Control the range for IDs of new database applications and Websheet applications.

> **See Also:**
>
> "Creating Workspaces (page 2-95)"

2.5.3.1 About Configuring Self Service Workspace Provisioning

The Instance administrator determines the amount of automation when provisioning (or creating) a workspace.

To determine how provisioning works, an Instance Administrator selects one of the following **Provisioning Status** options on the Instance Settings page:

- **Manual** - In this mode, an instance administrator creates new workspaces and notifies the Workspace administrator of the login information.
- **Request** - Users request workspaces directly in a self-service fashion. Users click a link on the login page to access a request form. After the workspace request has been granted, users are automatically emailed the appropriate login information.
- **Request with Email Verification** - In this mode, users request workspaces directly by clicking a link on the Sign In page to access a request form. Each user receives an initial email containing a verification link. When the user clicks the verification link, the request is processed. The user can then access the workspace using the Sign In page.

> **Note:**
>
> To enable users to request a workspace using a link on the Sign In page, you must choose the provisioning status of **Request** or **Request with Email Verification** . If the provisioning status is set to **Manual**, no link appears on the sign in page.

2.5.3.2 Disabling Email Provisioning

Use Email Provisioning to disable workspace provisioning when provisioning with Email Verification.

To disable email provisioning:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. From Email Provisioning, select **Disabled**.

   Selecting **Disabled** completely disables workspace provisioning when provisioning with Email Verification.
5. In Message, enter a message that explains why email provisioning is disabled.
6. Click **Apply Changes**.

2.5.3.3 Configuring Storage

Instance administrators can configure the following storage options: require a new schema when requesting a workspace, auto extend tablespaces, or delete uploaded files are a specified number of days.

- Requiring a New Schema (page 2-51)
  Control if a user requesting a workspace can select an existing schema or must request a new schema.
- Enabling Auto Extend Tablespaces (page 2-51)
  Enable Auto Extend Tablespaces.
- Enabling Bigfile Tablespaces (page 2-51)
  Enable support for bigfile tablespaces.
- Enabling Encrypted Tablespaces (page 2-52)
  Enable support for encrypted tablespaces.
- Deleting Uploaded Files (page 2-53)
  Specify the number of days after which Oracle Application Express automatically deletes uploaded files.

2.5.3.3.1 Requiring a New Schema

Control if a user requesting a workspace can select an existing schema or must request a new schema.

To require a new schema when creating a workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Scroll down to Storage.
5. From Require New Schema, select one of the following:
   - **Yes** - Requires users to request a new schema when they request a new workspace.
   - **No** - Enables users to select an existing schema when they request a new workspace.
6. Click **Apply Changes**.

> **See Also:**
>
> "Enabling Auto Extend Tablespaces (page 2-51)."

2.5.3.3.2 Enabling Auto Extend Tablespaces

Enable Auto Extend Tablespaces.

If Auto Extend Tablespaces is enabled, tablespaces provisioned with Oracle Application Express are created with a data file that is one tenth the requested size. The data file automatically extends up to the requested size. For example, if a user requests a 100 MB workspace, the initial size of the data file is 10 MB and automatically extends up to a maximum size of 100 MB.

To enable Auto Extend Tablespaces:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Scroll down to Storage.
5. To enable Auto Extend Tablespaces, select **Yes**.
6. Click **Apply Changes**.

2.5.3.3.3 Enabling Bigfile Tablespaces

Enable support for bigfile tablespaces.

When a workspace is provisioned, Oracle Application Express creates the associated database user, tablespace, and data file. If Bigfile Tablespaces is enabled,

tablespaces provisioned with Oracle Application Express are created as bigfile tablespaces. A bigfile tablespace is a tablespace with a single, but very large data file. Traditional smallfile tablespaces, in contrast, can contain multiple data files, but the files cannot be as large.

> **Tip:**
>
> Oracle does not recommend using bigfile tablespaces on platforms that do not support large file sizes and can limit tablespace capacity. Refer to your operating system specific documentation for information about maximum supported file sizes.

To enable bigfile tablespaces:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Scroll down to Storage.
5. For Bigfile Tablespaces, select **Yes**.
6. Click **Apply Changes**.

2.5.3.3.4 Enabling Encrypted Tablespaces

Enable support for encrypted tablespaces.

If Encrypted Tablespaces is enabled, tablespaces provisioned with Oracle Application Express are created as encrypted tablespaces using the Oracle database feature Transparent Data Encryption (TDE). TDE encrypts sensitive data stored in data files. To prevent unauthorized decryption, TDE stores the encryption keys in a security module external to the database.

To be able to exploit this feature in Application Express, an encryption wallet must be created and with a master encryption key set. Additionally, the encryption wallet must be open before provisioning a new Application Express workspace.

To enable Encrypted Tablespaces:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Scroll down to Storage.
5. For Encrypted Tablespaces, select **Yes**.
6. Click **Apply Changes**.

2.5.3.3.5 Deleting Uploaded Files

Specify the number of days after which Oracle Application Express automatically deletes uploaded files.

Use Delete Uploaded Files After (days) to specify the number of days after which Oracle Application Express automatically deletes uploaded files. Note this automatic deletion process applies to all workspaces in an Oracle Application Express instance. The types of files that are deleted include:

- Application Export
- CSS Export
- Images Export
- Page Export
- Plug-in
- Script Export
- Spreadsheet / Text Data Import
- Static Files Export
- Themes
- User Interface Defaults
- Workspace Export
- XML Data Import

To configure when export and import files are deleted:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Scroll down to Storage.
5. In Delete Uploaded Files After (days), enter the number of days after which Oracle Application Express deletes uploaded files.

   Enter a positive, whole number. If this setting is null, then no files are automatically deleted.
6. Click **Apply Changes**.

> **Tip:**
>
> To view a summary of deleted files, see the Automatic File Delete Log. See "Monitoring Activity Across a Development Instance (page 2-128)"

2.5.3.4 Configuring Email

To enable Oracle Application Express to send mail, an instance administrator must configure instance-level email settings.

> **Tip:**
>
> You can configure Oracle Application Express to automatically email users their login credentials when a new workspace request has been approved. See "About Specifying How Workspaces Are Created (page 2-95)" and "Selecting a Provisioning Mode (page 2-96)."

- About Enabling Network Services (page 2-54)
  To send outbound mail, use Web services, or use PDF/report printing in Oracle Application Express, an Instance administrator must enable network services.
- Configuring Email in a Full Development Environment (page 2-55)
  An Instance administrator must configure Oracle Application Express to send mail in a full development environment.
- Configuring Email in a Runtime Environment (page 2-56)
  An Instance administrator must configure Oracle Application Express to send mail in a runtime environment.
- Determining Email Settings in a Runtime Environment (page 2-56)
  Determine email settings in runtime environment

> **See Also:**
>
> "Managing the Mail Queue (page 2-77)" and "APEX_MAIL" in *Oracle Application Express API Reference*

2.5.3.4.1 About Enabling Network Services

To send outbound mail, use Web services, or use PDF/report printing in Oracle Application Express, an Instance administrator must enable network services.

If you are running Oracle Application Express with Oracle Database 11*g* or later, you must enable outbound mail. Starting with Oracle Database 11*g* Release 1 (11.1), the ability to interact with network services is disabled by default.

By default, the ability to interact with network services is disabled in Oracle Database 11g or later. Therefore, if you are running Oracle Application Express with Oracle Database 11*g* or later, you must use the `DBMS_NETWORK_ACL_ADMIN` package to grant connect privileges to any host for the `APEX_180100` database user. Failing to grant these privileges results in issues with:

Failing to grant these privileges results in issues with:

- Sending outbound mail in Oracle Application Express.
- Using Web services in Oracle Application Express.
- PDF/report printing.

2.5.3.4.2 Configuring Email in a Full Development Environment

An Instance administrator must configure Oracle Application Express to send mail in a full development environment.

To configure Oracle Application Express to send mail in a full development environment:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Scroll down to Storage.
5. Under Email, edit the following:
   a. **Application Express Instance URL** - Specify the URL to this Application Express instance, including the trailing slash after the Database Access Descriptor or Context Root. This setting is used for system-generated emails. For example:

      `https://www.example.com/apex/`

   b. **Application Express Images URL** - Specify the full URL to the images directory of this Application Express instance, including the trailing slash after the images directory. This setting is used for system-generated emails..

      `https://www.example.com/i/`

   c. **SMTP Host Address** - Defines the server address of the SMTP server. By default on installation, this is set to `localhost`. If you are using another server as an SMTP relay, change this parameter to that server's address.
   d. **SMTP Host Port** - Defines the port the SMTP server listens to for mail requests. The default setting is 25.
   e. **SMTP Authentication Username** - If you enter a username, Oracle Application Express authenticates against it when sending emails. Prior to Oracle Database 11*g* Release 2 (11.2.0.2), only the SMTP authentication scheme "LOGIN" is supported. On newer database versions, all authentication schemes of `UTL_SMTP` are supported.
   f. **SMTP Authentication Password** - If you enter a password, Oracle Application Express authenticates against it when sending emails. Prior to Oracle Database 11*g* Release 2, Release 11.2.0.2, only the SMTP authentication scheme "LOGIN" is supported. On newer database versions, all authentication schemes of `UTL_SMTP` are supported.
   g. **Use SSL/TLS** - Beginning with Oracle Database 11*g* Release 2, Release 11.2.0.2, Application Express supports secure SMTP connections.

      Options include:

      - **Yes** - A secure connection with SSL/TLS is made before SMTP communication.
      - **After connection is established** - Oracle Application Express sends the SMTP command `STARTTLS` immediately after the connection is opened.
      - **No** - A non-secure connection is opened.

h. **Default Email From Address** - Defines the `from` address for tasks that generate email, such as approving a provision request or resetting a password.

i. **Maximum Emails per Workspace** - Defines the number of email messages that can be sent with the `APEX_MAIL` API per workspace per 24 hour period.

6. Click **Apply Changes**.

2.5.3.4.3 Configuring Email in a Runtime Environment

An Instance administrator must configure Oracle Application Express to send mail in a runtime environment.

To configure Oracle Application Express to send mail in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:

   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
   ```

3. Run the following statement:

   ```
   BEGIN
      APEX_INSTANCE_ADMIN.SET_PARAMETER(PARAMETER_NAME, PARAMETER_VALUE);
   END;
   ```

   > **Tip:**
   >
   > For a description of email parameters, see "Configuring Email in a Full Development Environment (page 2-55)."

2.5.3.4.4 Determining Email Settings in a Runtime Environment

Determine email settings in runtime environment

To determine email settings in runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:

   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

- On UNIX and Linux:

```
$ sqlplus /nolog
SQL> CONNECT SYS as SYSDBA
Enter password: SYS_password
```

2. Run the following statement:

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
```

3. Run the following statement:

```
SELECT
APEX_INSTANCE_ADMIN.GET_PARAMETER(PARAMETER_NAME)
FROM DUAL;
```

> **Tip:**
>
> For a description of email parameters, see "Configuring Email in a Full Development Environment (page 2-55)."

2.5.3.5 Configuring Wallet Information

Configure wallet information (which store authentication and signing credentials) for an Oracle Application Express instance.

- About SSL and Wallet Creation (page 2-57)
  A wallet is a password-protected container that stores authentication and signing credentials (including private keys, certificates, and trusted certificates) needed by SSL.
- Configuring a Wallet in a Full Development Environment (page 2-58)
  Configure wallet settings a full development environment on the Instance Settings page.
- Configuring a Wallet in a Runtime Environment (page 2-58)
  Configure wallet settings a runtime environment by starting SQL*Plus and running the following SQL statements.
- Determining Wallet Settings in a Runtime Environment (page 2-59)
  Configure wallet settings in a runtime environment by starting SQL*Plus and running the following SQL statements.

2.5.3.5.1 About SSL and Wallet Creation

A wallet is a password-protected container that stores authentication and signing credentials (including private keys, certificates, and trusted certificates) needed by SSL.

Secure Sockets Layer (SSL) is an industry standard protocol that uses RSA public key cryptography with symmetric key cryptography to provide authentication, encryption, and data integrity. When SSL is enabled, `https` displays in the URL.

You must create a wallet if you:

- Call a SSL-enabled URL (for example, by invoking a Web service).
- Create a region of type URL that is SSL-enabled.

- Configure secure SMTP, by setting the Use SSL/TLS attribute to **Yes**.
- Have applications with LDAP authentication schemes that are configured to use SSL with Authentication.

Overview of Creating a Wallet

To create a wallet:

1. The database administrator must create a wallet on the Oracle Application Express database instance.
2. The instance administrator configures the Wallet attributes on the Instance Settings page to specify the file system path to the wallet and the wallet password (if required).

2.5.3.5.2 Configuring a Wallet in a Full Development Environment

Configure wallet settings a full development environment on the Instance Settings page.

To specify wallet settings in a full development environment:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Click **Wallet**.
5. Under Wallet:
   a. Wallet Path - Enter the path on the file system where the wallet is located using the following format:

      `file:directory-path`

      See field-level Help for examples.

   b. Password - Enter the password needed to open the wallet. Select **Check to confirm that you wish to change the wallet password** to indicate that you have changed the password.
6. Click **Apply Changes**.

2.5.3.5.3 Configuring a Wallet in a Runtime Environment

Configure wallet settings a runtime environment by starting SQL*Plus and running the following SQL statements.

To specify wallet settings in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

```
$ sqlplus /nolog
SQL> CONNECT SYS as SYSDBA
Enter password: SYS_password
```

2. Run the following statement:

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
```

3. Run the following statement:

```
BEGIN
    APEX_INSTANCE_ADMIN.SET_PARAMETER(PARAMETER_NAME, PARAMETER_VALUE);
END;
```

For a description of wallet parameters, seeTable 2-5 (page 2-59).

Table 2-5 Wallet Parameters

Parameter Name	Description
WALLET_PATH	The path to the wallet on the file system, for example: file:/home/*username*/wallets
WALLET_PWD	The password associated with the wallet.

2.5.3.5.4 Determining Wallet Settings in a Runtime Environment

Configure wallet settings in a runtime environment by starting SQL*Plus and running the following SQL statements.

To determine wallet settings in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as SYS. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
```

3. Run the following statement:

```
SELECT
APEX_INSTANCE_ADMIN.GET_PARAMETER(PARAMETER_NAME)
FROM DUAL;
```

For a description of wallet parameters, see Table 2-5 (page 2-59).

2.5.3.6 Configuring Report Printing

Enable end users to download and print reports in various formats, including PDF.

- About Configuring Report Printing (page 2-60)
  You enable report printing by configuring printing settings as the site-level, instance-level, and page and region-level.
- Configuring Report Printing in a Full Development Environment (page 2-60)
  Configure report printing at the instance-level on the Instance Settings page.
- Configuring Report Printing Settings in a Runtime Environment (page 2-61)
  Configure report printing settings in a runtime environment by starting SQL*Plus and running the following SQL statements.
- Determining Report Printing Settings in a Runtime Environment (page 2-62)
  Determine report printing settings in a runtime environment.

2.5.3.6.1 About Configuring Report Printing

You enable report printing by configuring printing settings as the site-level, instance-level, and page and region-level.

To set up report printing functionality, you must configure the following printing settings:

1. **Site Level**: Instance administrators must specify the level of functionality (Standard or Advanced) for an entire Oracle Application Express instance, as described in this section.
2. **Application Level**: Workspace administrators and developers can define Report Queries and Report Layouts. Report Queries and Report Layouts are stored under Shared Components and are not tied to a specific page.
3. **Page/Region Level**: Developers can edit the Report regions on specific pages to enable printing. This enables end users to print regions as reports in various formats.

2.5.3.6.2 Configuring Report Printing in a Full Development Environment

Configure report printing at the instance-level on the Instance Settings page.

To configure the printing of reports in a full development environment:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Click **Report Printing**.
5. For Printer Server, select an option:
   - **Oracle REST Data Services** - Select this option if you are using the Oracle REST Data Services release 2.0 or later. This option enables you to use the basic printing functionality, which includes creating report queries and printing report regions using the default templates provided in Application Express and using your own customized XSL-FO templates.

> **Note:**
>
> The Oracle REST Data Services option does not require an external print server, instead the report data and style sheet are downloaded to the listener, rendered into PDF format by the listener and then sent to the client. The PDF documents in this setup are not returned back into the database, thus the print APIs are not supported when using the Oracle REST Data Services-based configuration.

- **External (Apache FOP)** - Select this option if you are using Apache FOP on an external J2EE server. This option enables you to use the basic printing functionality, which includes creating report queries and printing report regions using the default templates provided in Application Express and using your own customized XSL-FO templates.
- **Oracle BI Publisher** - This option requires a valid license of Oracle BI Publisher (also known as Oracle XML Publisher). This option enables you to take report query results and convert them from XML to RTF format using Oracle BI Publisher. Select this option to upload your own customized RTF or XSL-FO templates for printing reports within Application Express.

6. If you selected **External (Apache FOP)** or **Oracle BI Publisher** in the previous step, specify the following:
   - Print Server Protocol - Select the protocol (HTTP or HTTPS) that the print server uses.
   - Print Server Host Address - Specify the host address of the print server engine. By default, this is set to `localhost`. Enter the appropriate host address if the print server is installed at another location.
   - Print Server Port - Define the port of the print server engine. The default setting is `8888`.
   - Print Server Script - Defines the script that is the print server engine. The default setting is:

     ```
     /xmlpserver/convert
     ```
7. In Print Timeout, enter the number of seconds. This option defines the transfer timeout for communicating with the print server in seconds.
8. Click **Apply Changes**.

2.5.3.6.3 Configuring Report Printing Settings in a Runtime Environment

Configure report printing settings in a runtime environment by starting SQL*Plus and running the following SQL statements.

To configure report printing settings in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

- On UNIX and Linux:

```
$ sqlplus /nolog
SQL> CONNECT SYS as SYSDBA
Enter password: SYS_password
```

2. Run the following statement:

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
```

3. Run the following statement:

```
BEGIN
    APEX_INSTANCE_ADMIN.SET_PARAMETER(PARAMETER_NAME, PARAMETER_VALUE);
END;
```

For a description of available parameters, see Table 2-6 (page 2-62).

Table 2-6 Report Printing Parameters in Runtime Environment

Parameter Name	Description
PRINT_BIB_LICENSED	Specify either standard support or advanced support. Advanced support requires an Oracle BI Publisher license. Valid values include: • STANDARD • ADVANCED • APEX_LISTENER
PRINT_SVR_HOST	Specifies the host address of the print server converting engine, for example, localhost. Enter the appropriate host address if the print server is installed at another location.
PRINT_SVR_PORT	Defines the port of the print server engine, for example 8888. Value must be a positive integer.
PRINT_SVR_PROTOCOL	Valid values include: • http • https
PRINT_SVR_SCRIPT	Defines the script that is the print server engine, for example: /xmlpserver/convert

2.5.3.6.4 Determining Report Printing Settings in a Runtime Environment

Determine report printing settings in a runtime environment.

To determine report printing settings in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as SYS. For example:

- On Windows:

```
SYSTEM_DRIVE:\ sqlplus /nolog
SQL> CONNECT SYS as SYSDBA
Enter password: SYS_password
```

- On UNIX and Linux:

```
$ sqlplus /nolog
SQL> CONNECT SYS as SYSDBA
Enter password: SYS_password
```

2. Run the following statement:

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
```

3. Run the following statement:

```
SELECT
APEX_INSTANCE_ADMIN.GET_PARAMETER(PARAMETER_NAME)
FROM DUAL;
```

2.5.3.7 Configuring the Help Menu

Configure the target URL of the Help menu that displays in the upper right corner of the Oracle Application Express development environment.

By default, the Help menu points to the current Oracle Application Express online documentation library.

To configure the Help menu:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Click **Help**.
5. In Help URL, edit the URL.

   The URL defined here displays when users click the Help link from within Oracle Application Express.
6. Click **Apply Changes**.

2.5.3.8 Configuring Workspace Size Options for Requests

Configure the workspace size options available to users when they request a new workspace and schema and request additional space for an existing workspace.

To configure workspace size options:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Click **New Workspace Request Size** and **Workspace Change Request Size**. Specify the following:
   - Size in Megabytes - Edit the default numbers to change the size options.
   - Display - Select **Yes** for all the size options you want to appear in the select list for workspace size.
   - Default - Select the default value to appear in the storage field for workspace and change requests.
5. Click **Apply Changes**.

2.5.3.9 Managing Application ID Range

Control the range for IDs of new database applications and Websheet applications.

You can separate ID ranges in large multi-instance installations to easily move workspaces between the instances and still keep their application IDs. To enable ID ranges, you must specify at least an ID Minimum.

To configure the application ID ranges:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Click **Application ID Range** and specify the following:
   - ID Minimum - Enter the lower range for database and Websheet application IDs.
   - ID Maximum - Enter the maximum range for database and Websheet application IDs.
5. Click **Apply Changes**.

2.5.4 Purging Inactive Workspaces

Inactive workspaces consume valuable storage space and degrade system performance. Instance administrator can configure an instance to periodically purge inactive workspaces.

By enabling Workspace Purge Settings, you can configure Oracle Application Express to purge inactive workspaces. If a workspace is designated as inactive, Oracle Application Express sends notification email to each workspace administrator explaining that the workspace will be purged in a specific number of days. The workspace administrator can prevent the workspace from being purged by following an embedded link and following the online instructions.

- Configuring Workspace Purge Settings (page 2-64)
  Configure workspace purge settings on the Workspace Purge Settings page.

> **See Also:**
>
> "Monitoring Activity Across a Development Instance (page 2-128)" to view reports concerning purging workspaces and *Oracle Application Express App Builder User's Guide*

2.5.4.1 Configuring Workspace Purge Settings

Configure workspace purge settings on the Workspace Purge Settings page.

If a workspace is designated as inactive, Oracle Application Expres sends a notification email to each workspace administrator explaining that the workspace will

be purged in a specific number of days. In order for this email notification to work, you must configure email for your instance. See "Configuring Email (page 2-53)."

To configure workspace purge settings:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Workspace Purge Settings**.
4. On the Workspace Purge Settings, configure the following:
   a. Enabled - Select **Yes** to enable the workspace purge process. Select **No** to disable the workspace purge process.
   b. Language - Select the language of the text of emails sent to workspace administrators of inactive workspaces. Note that only one language can be selected for each instance.
   c. Purge Administration Email Address - Enter the email address (or From address) from which emails are sent to workspace administrators.
   d. Send Summary Email To - Enter a list of email addresses separated by commas. Recipients will receive a daily email summary of the purge process.
   e. Days Until Purge - Enter the number of days before a workspace is physically purged. For example, entering `10` means a workspace will be purged 10 days after it is added to the inactive list.
   f. Reminder Days in Advance - Enter the number of days before the purge date to send a reminder email to workspace administrators. Reminder email criteria includes:
      - The workspace is on the inactive list.
      - There has been no activity in the workspace.
      - The workspace administrator has not chosen to follow the link in the email to prevent the workspace from being purged.
   g. Days Inactive - Enter the number of days of inactivity before a workspace is classified as inactive. Inactivity includes not logging into the workspace and the no runtime activity of any application in the workspace.
   h. Grace Period (Days) - Enter the number of days for the grace period. The grace period starts after workspace administrators click the link in the email to not have their workspace purged. If there is no activity during the grace period, the workspace is added back to the list of inactive workspaces.
   i. Maximum Execution Time (Hours) - Enter the number limiting the number of hours that the purge process may execute per run of the workspace purge job
   j. Maximum Number of Workspaces - Enter the maximum number of workspaces to be purged per run of the workspace purge job.
   k. Maximum Number of Emails - Enter the maximum number of reminder emails and workspace inactive emails to be send per run of the workspace purge job.
5. Click **Apply Changes**.

2.5.5 Using the REST Administration Interface to View Usage Statistics

The REST Administration Interface enables Instance administrators to automatically fetch usage metrics for an Oracle Application Express instance with a REST client.

> **Tip:**
>
> The REST Administration Interface requires Oracle REST Data Services (ORDS) release 3.0.5 or later.

- About the REST Administration Interface (page 2-66)
  To use the REST Administration Interface, you first register a REST client application and then review client details to obtain an access token following the OAuth Client Credentials authentication flow.
- Enabling the REST Administration Interface (page 2-67)
  After installation, the REST Administration Interface is disabled. To enable it, an instance administrator must sign in to Oracle Application Express Administration Services.
- Registering REST Client Applications (page 2-67)
  In order for REST clients to connect, an internal administrator must register the REST Client applications.
- Viewing REST Client Details (page 2-67)
  View REST client details in the REST Administration Interface dialog.
- Removing a REST Client (page 2-69)
  Remove a REST client while viewing the ORDS Client Details dialog.
- Disabling the REST Administration Interface (page 2-69)
  Disable the REST Administration Interface in the REST Administration Interface dialog.

> **See Also:**
>
> - *REST Data Services Installation, Configuration, and Development Guide* to learn more about using OAuth flow features
> - "Using REST Administration Interface API" in *Oracle Application Express API Reference*

2.5.5.1 About the REST Administration Interface

To use the REST Administration Interface, you first register a REST client application and then review client details to obtain an access token following the OAuth Client Credentials authentication flow.

To provide the REST administration interface, Oracle Application Express creates the database user `APEX_INSTANCE_ADMIN_USER` during installation. This schema is low-privileged. It only has the `CREATE SESSION` system privilege. The service modules for the REST administration interface are being stored in the `APEX_INSTANCE_ADMIN_USER` schema. Oracle does not require or recommend direct log ins into `APEX_INSTANCE_PUBLIC_USER`.

2.5.5.2 Enabling the REST Administration Interface

After installation, the REST Administration Interface is disabled. To enable it, an instance administrator must sign in to Oracle Application Express Administration Services.

To the REST Administration Interface:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **REST Administration Interface**.
4. In the REST Administration Interface dialog, click **Enable Services**.

2.5.5.3 Registering REST Client Applications

In order for REST clients to connect, an internal administrator must register the REST Client applications.

To register REST client applications:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **REST Administration Interface**.
4. In the REST Administration Interface dialog, click **Create OAuth Client**.
5. In the Create New OAuth Client dialog, enter the following:
   - Client Name
   - Contact Email Address
   - Client Role

   Credentials for the OAuth Client Credentials Flow is automatically created (Client ID and Client Secret). With these credentials, a REST client can connect to the REST Administration Interface and execute services.
6. Click **Create OAuth Client**.

   The client appears in the OAuth Clients list.

2.5.5.4 Viewing REST Client Details

View REST client details in the REST Administration Interface dialog.

Developers can use REST Client Details to obtain an access token following the OAuth Client Credentials authentication flow.

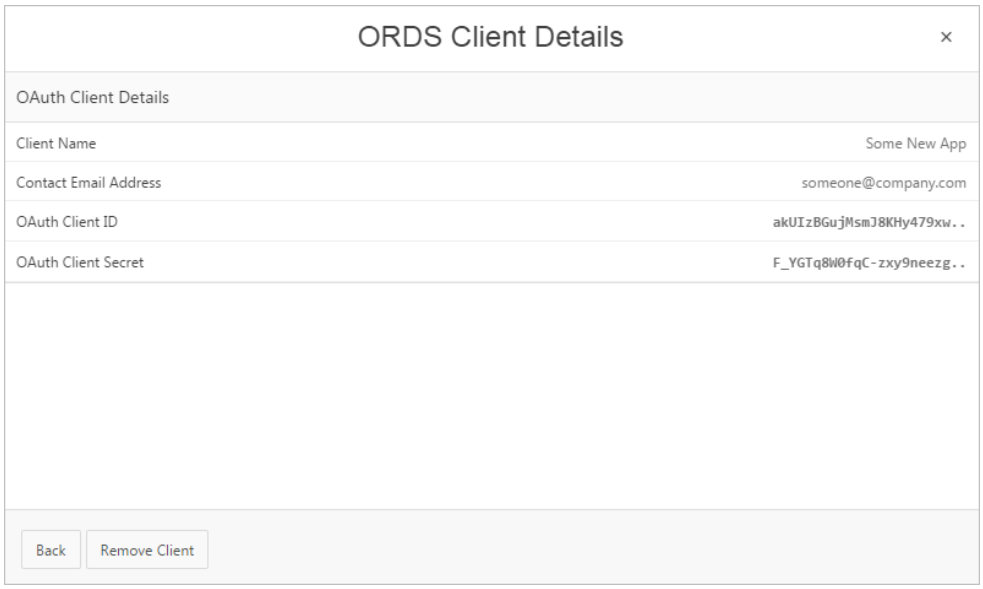
> **Tip:**
>
> To learn more about using OAuth flow features, see *REST Data Services Installation, Configuration, and Development Guide*.

To view REST client details:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **REST Administration Interface**.

   The REST Administration Interface dialog appears.
4. In the REST Administration Interface dialog, click the client name.

   The ORDS Client Details dialog appears displaying the client name, contact email address, OAuth Client ID, and OAuth Client Secret.



> **See Also:**
>
> To remove the current client, click **Remove Client**.

5. To return to the previous screen **Back**.

> **Note:**
>
> *Oracle Application Express API Reference*

2.5.5.5 Removing a REST Client

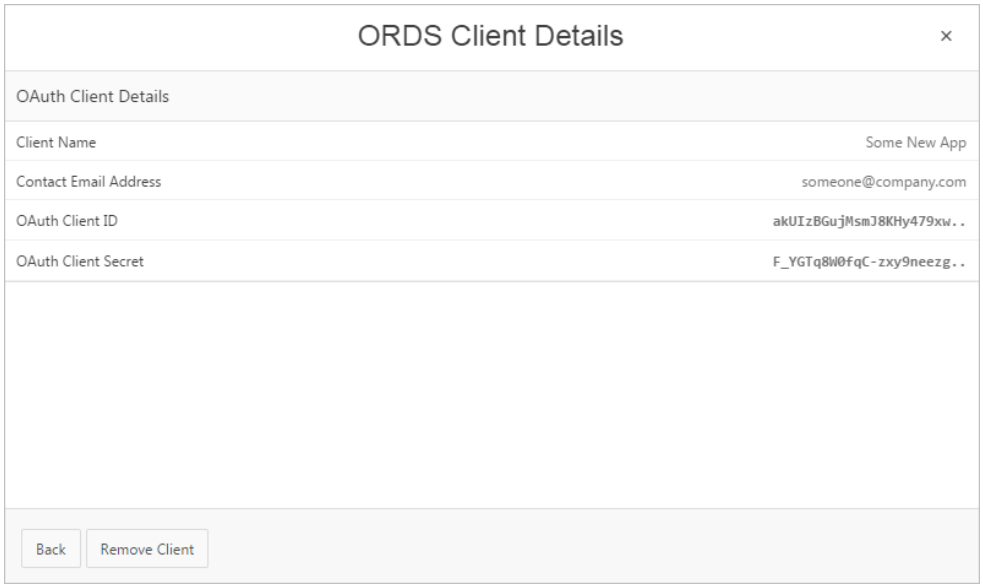
Remove a REST client while viewing the ORDS Client Details dialog.

To remove a REST client:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **REST Administration Interface**.

   The REST Administration Interface dialog appears.
4. In the REST Administration Interface dialog, click the client name.

   The ORDS Client Details dialog appears.



5. Click **Remove Client**.
6. To return to the previous screen **Back**.

2.5.5.6 Disabling the REST Administration Interface

Disable the REST Administration Interface in the REST Administration Interface dialog.

To disable the REST Administration Interface:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **REST Administration Interface**.
4. In the REST Administration Interface dialog, click **Disable Services** or **Disable Services and Remove Clients**.

2.6 Managing Custom Applications, Packaged Applications, and Public Themes

Manage custom applications uploaded to the Packaged Applications repository, monitor packaged application installations, and manage public themes.

- Managing Custom Applications (page 2-70)
  Instance administrators manage custom applications uploaded to the Packaged Applications repository.
- Managing Public Themes (page 2-73)
  Public themes are available to developers when they create an application or create a theme for an existing application.

> **See Also:**
>
> "About Specifying How Workspaces Are Created (page 2-95)"

2.6.1 Managing Custom Applications

Instance administrators manage custom applications uploaded to the Packaged Applications repository.

By adding a custom application to the Packaged Applications repository, developers can view, install, run, upgrade and deinstall it in the Apps Gallery in App Builder.

- About Making Custom Applications Available to Users (page 2-70)
  Once a custom application has been added to the Packaged Applications repository, developers can view, install, run, upgrade and deinstall it in Apps Gallery.
- Accessing the Packaged Applications Repository (page 2-71)
  The Packaged Application repository displays all applications installed in the current workspace. However, instance administrators can only upload, edit, and delete custom applications.
- Uploading a Custom Application to the Packaged Applications Repository (page 2-71)
  Upload custom applications to the Packaged Application repository.
- Editing Custom Application Details (page 2-72)
  Track a variety of information about a custom application including the application description, status, associated categories, application statistics, and version.
- Deleting a Custom Application (page 2-73)
  Delete custom applications from the Packaged Application repository.

2.6.1.1 About Making Custom Applications Available to Users

Once a custom application has been added to the Packaged Applications repository, developers can view, install, run, upgrade and deinstall it in Apps Gallery.

Developers can develop their own custom packaged applications. Like Oracle-supplied packaged applications, custom applications typically include both application pages and the supporting database objects. To create a custom applications, you first export it. Then, an instance administrator adds the application export to Packaged Applications repository.

> **Tip:**
>
> Although the Packaged Application repository displays all applications installed in the current workspace, instance administrators can only edit custom applications.

2.6.1.2 Accessing the Packaged Applications Repository

The Packaged Application repository displays all applications installed in the current workspace. However, instance administrators can only upload, edit, and delete custom applications.

To view the Packaged Application repository:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Shared Components, click **Packaged Applications**.

   The Packaged Database Applications page displays as an interactive report. You can customize the appearance of the page using the Search bar at the top of the page.

> **Tip:**
>
> Although the Packaged Application repository displays all applications installed in the current workspace, instance administrators can only edit custom applications.

2.6.1.3 Uploading a Custom Application to the Packaged Applications Repository

Upload custom applications to the Packaged Application repository.

To upload a custom application:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Shared Components, click **Packaged Applications**.
4. Click **Create**.
5. For Specify File:
   a. Import file - Navigate to the file.

   b. File Type - Select the type of export file to be imported.
   c. File Character Set - Verify that File Character Set is correct.
   d. Click **Next**.
6. For Application Details:
   a. Application ID - Specify a unique integer value that identifies the packaged application. The default is the value of Export File Application. Application IDs in the range of 3000 to 9000 are reserved for internal use by Oracle Application Express.
   b. Category - Select the primary category to associate with the application.

      To learn more about this attribute, see field-level Help.
   c. Description - Enter a brief description of the application.
   d. Click **Next**.
7. Click **Create**.

   To learn more about an attribute, see field-level Help.

2.6.1.4 Editing Custom Application Details

Track a variety of information about a custom application including the application description, status, associated categories, application statistics, and version.

> **Tip:**
>
> Although the Packaged Application repository displays all applications installed in the current workspace, instance administrators can only upload, edit, and delete custom applications.

To edit the application details:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Shared Components, click **Packaged Applications**.
4. Locate the application and click the **Edit** icon adjacent to the application name.

   The Application Detail page appears.
5. Edit the appropriate attributes.

   > **Tip:**
   >
   > Use the Status attribute to control if an application displays on the Packaged Application page. To learn more, see field-level Help.

2.6.1.5 Deleting a Custom Application

Delete custom applications from the Packaged Application repository.

To delete a custom application:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Shared Components, click **Packaged Applications**.
4. Locate the application and click the **Edit** icon adjacent to the application name.

   The Application Detail page appears.
5. Click **Delete** and follow the on-screen instructions.

2.6.2 Managing Public Themes

Public themes are available to developers when they create an application or create a theme for an existing application.

Instance administrators manage the theme repository for an entire Oracle Application Express instance. Only an Instance administrators can add or delete a theme from the repository.

- Adding a Public Theme to the Theme Repository (page 2-73)
  To create a public theme, an instance administrator adds it to the Public Themes repository.
- Deleting a Public Theme (page 2-74)
  Only an Instance administrators can delete a theme from the Public Themes repository.
- Modifying a Public Theme (page 2-74)
  Instance administrators cannot edit a public theme directly. To modify a public theme, you must create a new application using the theme, modify it, and then manually add it to the theme repository.
- About Exporting a Public Theme (page 2-75)
  Exporting a theme is similar to exporting any related application files.

> **See Also:**
>
> "Managing Workspace Themes" in *Oracle Application Express App Builder User's Guide*

2.6.2.1 Adding a Public Theme to the Theme Repository

To create a public theme, an instance administrator adds it to the Public Themes repository.

To add a theme to the Theme repository:

1. Sign in to Oracle Application Express Administration Services.

2. Click **Manage Instance**.
3. Under Manage Shared Components, click **Public Themes**.

   The Public Themes page appears.
4. Select **Create Public Theme**.
5. For Workspace, select a workspace and click **Next**.
6. For Application, select an application and click **Next**.
7. For Theme, select a theme and click **Next**.
8. For Name, specify the following:
   - Theme Number - Enter a number that uniquely identifies a theme within a workspace.
   - Theme Name - Enter a name for the workspace theme.
   - Description - Enter a description.
   - Click **Next**.
9. Click **Create Public Theme**.

2.6.2.2 Deleting a Public Theme

Only an Instance administrators can delete a theme from the Public Themes repository.

To delete a public theme:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Shared Components, click **Public Themes**.

   The Public Themes page appears.
4. Select the theme to be deleted.
5. Click **Delete**.
6. Click **OK** to confirm your selection.

2.6.2.3 Modifying a Public Theme

Instance administrators cannot edit a public theme directly. To modify a public theme, you must create a new application using the theme, modify it, and then manually add it to the theme repository.

To modify a public theme:

1. Create an application using the theme you want to modify. See "Creating a Database Application" in *Oracle Application Express App Builder User's Guide*.
2. Modify the theme. See "Editing a Theme" in *Oracle Application Express App Builder User's Guide*.
3. Delete the existing public theme.
4. Add the modified theme to the theme repository. See "Adding a Public Theme to the Theme Repository (page 2-73)."

2.6.2.4 About Exporting a Public Theme

Exporting a theme is similar to exporting any related application files.

a public theme involves the following steps:

1. Create an application using the theme you want to modify. See "Creating a Database Application" in *Oracle Application Express App Builder User's Guide*.
2. Export the application. See "Exporting an Application" in *Oracle Application Express App Builder User's Guide*.
3. Import the exported file into the target Oracle Application Express instance. See "Importing an Application, Page or Component Export" in *Oracle Application Express App Builder User's Guide*.
4. Install the exported file from the Export Repository. See "Installing Export Files" in *Oracle Application Express App Builder User's Guide*.

2.7 Managing Meta Data

Use the links under Manage Meta Data to view and manage session state, the mail queue, installed translations, and interactive report descriptions.

- Managing Session State for an Instance (page 2-75)
  View session state statistics and purge the session state on the Session State page.
- Managing the Mail Queue (page 2-77)
  Manage email sent from applications by monitoring email messages in the mail queue.
- Viewing Installed Translations (page 2-78)
  Access the Installed Translations page to view which translated languages have been installed within the current development instance.
- Deleting Interactive Report Subscriptions (page 2-78)
  Manage the interactive report subscriptions within the current development instance.

2.7.1 Managing Session State for an Instance

View session state statistics and purge the session state on the Session State page.

- About Session State (page 2-76)
  A session is a logical construct used to establish persistence (or stateful behavior) across page views.
- Viewing Session Details Before Purging (page 2-76)
  Before purging sessions, Instance administrators can view a listing of recent sessions and then drill down on session details on the Recent Sessions page.
- Purging Sessions by Age (page 2-76)
  Purge sessions by age on the Purge Session page.
- Viewing Session Statistics Before Purging (page 2-77)
  View statistics about current sessions before purging on the Session State Statistics page.

> **See Also:**
>
> "Managing Session State for a Workspace (page 1-43)" and "Managing Session State Values" in *Oracle Application Express App Builder User's Guide*

2.7.1.1 About Session State

A session is a logical construct used to establish persistence (or stateful behavior) across page views.

Each session is assigned a unique ID, which the Application Express engine uses to store and retrieve an application's working set of data (or session state) before and after each page view. An automatic process clears sessions older than 24 hours every eight hours. Instance administrators can also purge them manually.

2.7.1.2 Viewing Session Details Before Purging

Before purging sessions, Instance administrators can view a listing of recent sessions and then drill down on session details on the Recent Sessions page.

To view a listing of recent sessions:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Meta Data, click **Session State**.

   The Session State page appears.
4. Click **Recent Sessions**.
5. On the Recent Sessions page, you can:
   - Click a session number to view additional details.
   - Click **Purge Sessions** to delete the displayed sessions.

2.7.1.3 Purging Sessions by Age

Purge sessions by age on the Purge Session page.

To purge sessions by age:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Meta Data, click **Session State**.

   The Session State page appears.
4. Click **Purge Sessions**.

   The Purge Sessions page appears.
5. For Maximum Sessions to Purge, identify the maximum number of sessions to delete.

6. For Only Purge Session Older Than, specify the age of sessions to be deleted.
7. To purge the selected sessions, click **Purge Sessions**.

2.7.1.4 Viewing Session Statistics Before Purging

View statistics about current sessions before purging on the Session State Statistics page.

To view session state statistics:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Meta Data, click **Session State**.

   The Session State page appears.
4. Select **Session State Statistics**.
5. To delete current sessions, click **Purge Sessions**.

2.7.2 Managing the Mail Queue

Manage email sent from applications by monitoring email messages in the mail queue.

> **Tip:**
>
> To view the Mail Log, see "Monitoring Activity Across a Development Instance (page 2-128)"

- Sending and Deleting Messages in the Mail Queue (page 2-77)
  Use the Mail Queue to push, delete, or reset messages in the mail queue.

2.7.2.1 Sending and Deleting Messages in the Mail Queue

Use the Mail Queue to push, delete, or reset messages in the mail queue.

To send and delete messages in the mail queue:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Meta Data, click **Mail Queue**.

   The Mail Queue page appears.

   If there is an issue sending an email (for example, because of a bad email address or unavailable mail server) then the mail message remains in the queue along with the last encountered error. For every subsequent attempt to send the email, the gap in time increases between send attempts (for example, 1 minute, 2 minutes, 4 minutes, 8 minutes, 16 minutes, and so on).
4. Use the following buttons to manage messages in the mail queue:
   - **Delete** - Deletes selected messages.

- **Force Send All Mail** - The calculated delay for messages which encounter an error is ignored and an attempt is made to push all messages in the queue.
- **Send All Mail** - Pushes the messages in the queue. The calculated delay for messages which encounter an error is observed.

2.7.3 Viewing Installed Translations

Access the Installed Translations page to view which translated languages have been installed within the current development instance.

To view the list of installed translations:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Meta Data, click **Installed Translations**.

   The Installed Translations page appears. This page displays a list of languages and indicates if the translations have been loaded.

2.7.4 Deleting Interactive Report Subscriptions

Manage the interactive report subscriptions within the current development instance.

To delete an interactive report subscription:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Meta Data, click **Interactive Report Subscriptions**.

   The Interactive Report Subscriptions page displays as an interactive report. You can customize the appearance of the page using the Search bar at the top of the page.
4. Find the subscription you want to remove and select the check box to the left.
5. Click **Delete Checked**.

2.8 Installing Exported Applications in a Runtime Environment

Instance administrators manage the Oracle Application Express runtime environment using SQL*Plus and the `APEX_INSTANCE_ADMIN` API.

- About the Advantages of Using Runtime Environment (page 2-79)
  An Oracle Application Express runtime environment enables you to run production applications, but does not provide a web interface for administration or direct development of these applications.
- Installing an Exported Application in to a Runtime Environment (page 2-79)
  You administer the Oracle Application Express runtime environment using SQL*Plus and the `APEX_INSTANCE_ADMIN` API.

2.8.1 About the Advantages of Using Runtime Environment

An Oracle Application Express runtime environment enables you to run production applications, but does not provide a web interface for administration or direct development of these applications.

Oracle recommends that you run any sensitive production Oracle Application Express applications with a runtime installation of Oracle Application Express. A runtime installation does not expose the web-based application development environment, thus preventing the use of App Builder, SQL Workshop, and related utilities on a production installation. Additionally, a runtime environment only includes the Oracle Application Express database objects and privileges necessary to run applications, making it a more hardened environment.

> **Tip:**
>
> Websheets are not supported in an Oracle Application Express runtime environment.

2.8.2 Installing an Exported Application in to a Runtime Environment

You administer the Oracle Application Express runtime environment using SQL*Plus and the `APEX_INSTANCE_ADMIN` API.

To install an exported application into a runtime installation, you must:

1. Export the workspace from the Oracle Application Express instance where the application was developed as described in "Exporting and Importing a Workspace (page 2-117)."
2. Use SQL*Plus to import your workspace in to the runtime environment:
   - Connect as `APEX_180100`, `SYS`, `SYSTEM`, or any schema to which the role `APEX_ADMINISTRATOR_ROLE` has been granted.
   - Run the workspace import file.

     If the workspace export file was created with a version of Oracle Application Express lower than 3.2, you must connect as `APEX_180100`.
3. Export and then import your application using SQL*Plus in to the runtime environment.

2.9 Managing Messages

Administrators can create login and system messages to communicate with all system users, for example regarding privacy notices or access restrictions

- Defining a Login Message (page 2-80)
  Create messages that display on the Oracle Application Express Sign In page.

- Defining a System Message (page 2-81)
  Create a system message that displays on the Workspace home page.
- Creating a Site-Specific Tasks List (page 2-82)
  Create a Site-Specific Tasks list of links on the Workspace home page or Workspace login page.

> **See Also:**
>
> - "Defining a Workspace Message (page 1-28)"
> - "Defining a Workspace Message in Administration Services (page 2-112)"

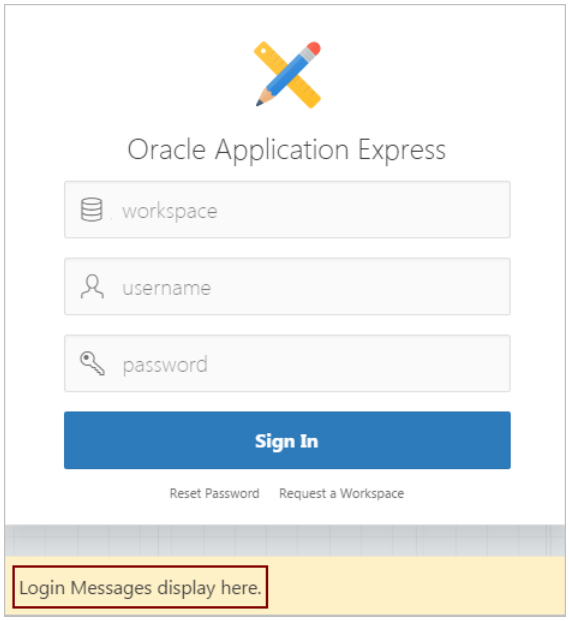
2.9.1 Defining a Login Message

Create messages that display on the Oracle Application Express Sign In page.

- About Login Messages (page 2-80)
  Login messages display directly below the Oracle Application Express Sign In page.
- Creating a Login Message (page 2-81)
  Instance administrators create login messages under Messages on the Manage Instance page.
- Editing or Removing a Login Message (page 2-81)
  Instance administrators edit and remove login messages under Messages on the Manage Instance page.

2.9.1.1 About Login Messages

Login messages display directly below the Oracle Application Express Sign In page.



2.9.1.2 Creating a Login Message

Instance administrators create login messages under Messages on the Manage Instance page.

To create a login message:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Messages, click **Define Login Message**.
4. In Message, enter a message. The message can contain any text and can optionally include HTML formatting.
5. Click **Apply Changes**.

2.9.1.3 Editing or Removing a Login Message

Instance administrators edit and remove login messages under Messages on the Manage Instance page.

To edit or remove a login message:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Messages, click **Define Login Message**.
4. In Message, edit or remove the text.
5. Click **Apply Changes**.

2.9.2 Defining a System Message

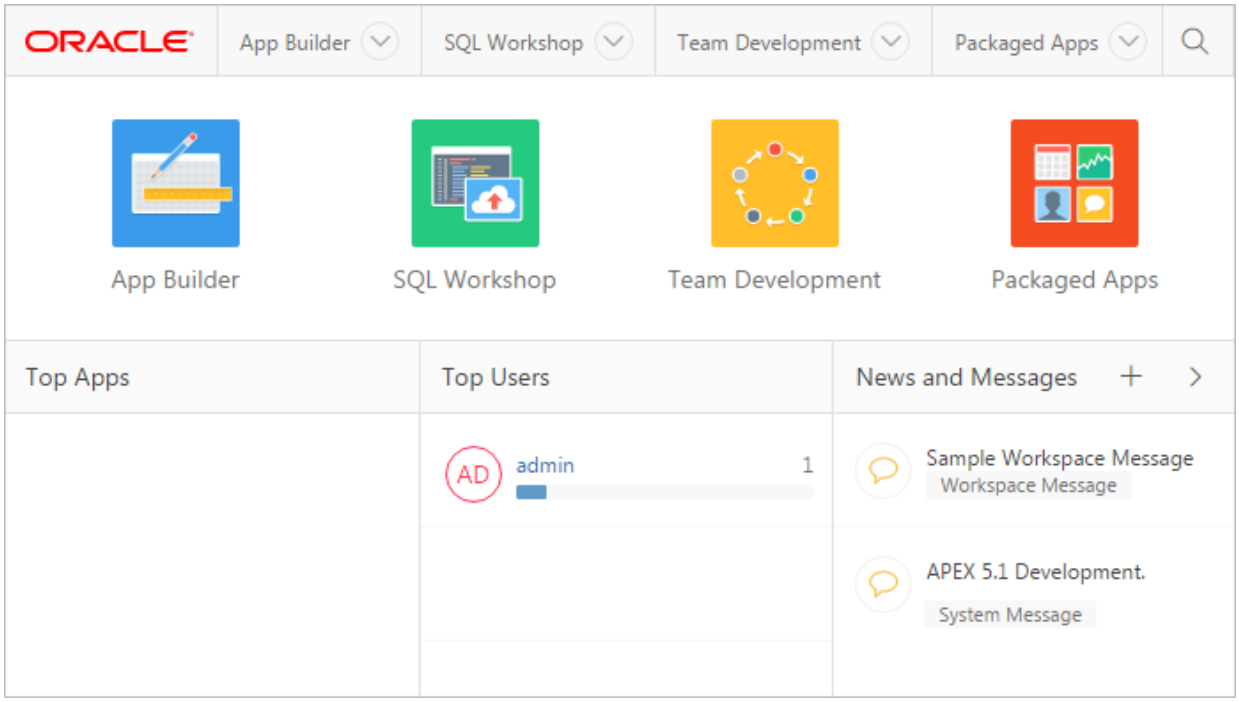
Create a system message that displays on the Workspace home page.

- About System Messages (page 2-81)
  System message display on the Workspace home page under News and Message.
- Creating and Editing a System Message (page 2-82)
  Instance administrators create and edit system message.

2.9.2.1 About System Messages

System message display on the Workspace home page under News and Message.

System messages display a gold icon to the left of message text. The textual identifier `System Message` also displays directly beneath the message text.



2.9.2.2 Creating and Editing a System Message

Instance administrators create and edit system message.

To create a system message:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Messages, click **Define System Message**.
4. In Message, enter a message. The message can contain any text and can include HTML formatting.
5. Click **Apply Changes**.

2.9.3 Creating a Site-Specific Tasks List

Create a Site-Specific Tasks list of links on the Workspace home page or Workspace login page.

You can use the Site-Specific Tasks list to include to links to important user information such as training, discussion forums, and user feedback applications.

> **Tip:**
>
> The Site-Specific Tasks region only displays if links are defined.

- Adding a New Task (page 2-83)
  Instance administrators create a Site-Specific Tasks list under Manage Site-Specific Tasks on the Manage Instance page.
- Editing an Existing Task (page 2-83)
  Instance administrators edit existing task on the Site-Specific Task page.
- Deleting a Task (page 2-84)
  Instance administrators can delete existing task on the Site-Specific Task page.

2.9.3.1 Adding a New Task

Instance administrators create a Site-Specific Tasks list under Manage Site-Specific Tasks on the Manage Instance page.

To add a new task to a Site-Specific Tasks list:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Messages, click **Manage Site-Specific Tasks**.

   The Site-Specific Tasks page appears.
4. To create a new link, click **Create**.
5. On the Create/Edit Site-Specific Tasks page, you can specify the following”
   a. Display Sequence - Indicate the relative order of this task within the list.
   b. Display Location - Indicate the page on which the task should display. Options include:
      - **Workspace Login**
      - **Workspace Home**
   c. Task Name - Enter a name for this task.
   d. Tasks Link - Enter the link target for this task using either a relative URL (for example, using `f?p` syntax) or an absolute URL (such as `http://www.oracle.com/technetwork/index.html`).
   e. Displayed - Select **Yes** to display the task link. Select No to disable the display.
6. Click **Create**.

2.9.3.2 Editing an Existing Task

Instance administrators edit existing task on the Site-Specific Task page.

To edit an existing task:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Messages, click **Site-Specific Tasks**.

   The Site-Specific Tasks page appears.
4. Select the task name.

5. On the Create/Edit Site-Specific Tasks page, edit the appropriate attributes.
6. Click **Apply Changes**.

2.9.3.3 Deleting a Task

Instance administrators can delete existing task on the Site-Specific Task page.

To delete an existing task:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Messages, click **Site-Specific Tasks**.

   The Site-Specific Tasks page appears.
4. Select the task name.
5. Click **Delete**.

2.10 Managing Logs and Files

Delete log entries and configure log intervals.

- Deleting SQL Workshop Logs (page 2-85)
  Delete SQL Workshop log entries. The SQL Workshop maintains a history of SQL statements run in the SQL Commands.
- Deleting Page View Activity Log Entries (page 2-85)
  Delete Page View Activity Log entries. Page View Activity Logs track user activity for an application.
- Deleting Developer Activity Log Entries (page 2-86)
  Delete Developer Activity Log entries.
- Managing Developer Log Retention (page 2-86)
  Manage Developer Log retention.
- Deleting Click Counting Log Entries (page 2-87)
  Delete External Clicks Counting Log entries.
- Deleting Web Service Log Entries (page 2-87)
  Delete Web Service Log entries.
- Deleting the Login Access Log (page 2-87)
  Delete Login Access Log entries.
- Managing Log Intervals (page 2-88)
  Use the Manage Log Interval page to set the minimum number of days to retain log information for log files.
- Archiving the Activity Log (page 2-88)
  Archiving the Activity log takes the Oracle Application Express Activity log, summarizes it, and writes the results to an archived activity log

2.10.1 Deleting SQL Workshop Logs

Delete SQL Workshop log entries. The SQL Workshop maintains a history of SQL statements run in the SQL Commands.

To delete SQL Workshop log entries:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **SQL Workshop Log**.
4. On the SQL Workshop Logs page, click one of the following:
   - **Script File executions log entries**
   - **SQL Command Processor history entries**
5. On the Clean up Logs page, click one of the following:
   a. For Delete entries this number of days and older - Select the number of days.
   b. Click one of the following:
      - **Truncate Log** - To delete all entries, click .
      - **Delete Entries** - To delete entries by age, specify the age of the entries to be deleted and click .

2.10.2 Deleting Page View Activity Log Entries

Delete Page View Activity Log entries. Page View Activity Logs track user activity for an application.

- About Page View Activity Logs (page 2-85)
  Page View Activity Logs track user activity for an application.
- Truncating Page View Activity Logs Manually (page 2-86)
  Delete Page View Activity logs manually.

2.10.2.1 About Page View Activity Logs

Page View Activity Logs track user activity for an application.

The Application Express engine uses two logs to track user activity. At any given time, one log is designated as current. For each rendered page view, the Application Express engine inserts one row into the log file. A log switch occurs at the interval listed on the Page View Activity Logs page. At that point, the Application Express engine removes all entries in the noncurrent log and designates it as current.

> **Tip:**
>
> Developers enable logging within their application using the Logging attribute on the Edit Application Definition page.

2.10.2.2 Truncating Page View Activity Logs Manually

Delete Page View Activity logs manually.

To truncate the activity logs manually:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Page View Activity Log**.

   The Page View Activity Logs page appears.
4. Click **Truncate Logs**.
5. Click either **Truncate Log 1** or **Truncate Log 2**.

2.10.3 Deleting Developer Activity Log Entries

Delete Developer Activity Log entries.

The Developer Activity log tracks changes to applications within an individual workspace.

To delete Developer Activity Log entries manually:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Developer Activity Log**.

   The Developer Activity Log page appears.
4. Specify the age of the entries to be deleted and click **Delete Entries**.

2.10.4 Managing Developer Log Retention

Manage Developer Log retention.

The Developer Activity log tracks changes to applications within an individual workspace. You can specify the number of days to retain log entries.

To specify the number of days to retain log entries:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Developer Activity Log**.

   The Developer Activity Log page appears.
4. Specify the number of days to retain developer log entires and click **Save Retention Setting**.

2.10.5 Deleting Click Counting Log Entries

Delete External Clicks Counting Log entries.

The External Clicks Counting log counts clicks from an Oracle Application Express application to an external site. You can implement this functionality using the `APEX_UTIL.COUNT_CLICK` procedure.

To delete External Clicks Counting log entries:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **External Click Counting Log**.

   The External Click Counting Log page appears.
4. Specify the age of the entries to be deleted and click **Delete Entries**.

2.10.6 Deleting Web Service Log Entries

Delete Web Service Log entries.

The Web Service Activity Log records all web service requests initiated from the Application Express instance.

To delete Web Service Activity log entries:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Web Service Activity Log**.

   The Web Service Activity Log page appears.
4. Specify the age of the entries to be deleted and click **Delete Entries**.

2.10.7 Deleting the Login Access Log

Delete Login Access Log entries.

The Login Access log records authentication events by developers and administrators accessing the Oracle Application Express environment and by end users of Oracle Application Express applications that use the built-in login APIs available to developers. Log entries are aged out of the log tables and purged periodically.

To truncate the Login Access log:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Login Access Log**.

   The Login Access Log page appears.
4. Specify the age of the entries to be deleted and click **Delete Entries**.

2.10.8 Managing Log Intervals

Use the Manage Log Interval page to set the minimum number of days to retain log information for log files.

To manage the log interval:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Manage Log Interval**.

   The Manage Log Interval page appears.
4. For each log type, enter the duration of the interval in days.

   The maximum value that can be specified is 180 days, with a default value of 14 days. Keeping log information for longer periods can degrade runtime performance.
5. Click **Apply Changes**.

2.10.9 Archiving the Activity Log

Archiving the Activity log takes the Oracle Application Express Activity log, summarizes it, and writes the results to an archived activity log

Archiving the Activity log takes the Oracle Application Express Activity log, summarizes it, and writes the results to an archived activity log.

To archive the Oracle Application Express Activity log:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Manage Logs and Files, click **Archive Activity Log**.

   The Archive Activity Log page appears listing the last archive date, archive day count, and workspace count.
4. Click **Archive Activity Summary**.

2.11 Including an Agreement or Survey When Running the Signup Wizard

Instance administrators have the option to create and include an agreement or survey when users run the New Signup Wizard.

- Defining an Agreement (page 2-89)
  When users run the New Service Signup Wizard, Instance administrators can require they accept an agreement before the wizards submits the service request.
- Defining a Signup Survey (page 2-89)
  Instance administrators can also include survey questions users must complete when running the New Service Signup Wizard.

- Running a New Service Signup Wizard (page 2-90)
  Instance administrators can run the Signup Wizard by clicking **Run New Service Signup Wizard** on the Manage Instance page.

2.11.1 Defining an Agreement

When users run the New Service Signup Wizard, Instance administrators can require they accept an agreement before the wizards submits the service request.

To include and define an agreement:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Self Service Sign Up, click **Manage New Service Signup Wizard**.
4. Under Justification and Agreement:
   a. For Require Justification, select **Yes** or **No**.
   b. For Enable Agreement, select whether to include an agreement. Options include:
      - **Yes** - Includes the agreement you define when users run the New Signup Service Wizard.
      - **No** - Excludes the agreement you define when users run the New Signup Service Wizard.
   c. In Agreement Text, enter the text of the agreement.
5. Click **Apply Changes**.

2.11.2 Defining a Signup Survey

Instance administrators can also include survey questions users must complete when running the New Service Signup Wizard.

To include and define a survey:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Self Service Sign Up, click **Manage New Service Signup Wizard**.
4. Under Survey Questions:
   a. For Enable Survey, select whether to include a survey. Options include:.
      - **Yes** - Includes the survey questions you define when users run the New Signup Service Wizard.
      - **No** - Excludes the survey questions you define when users run the New Signup Service Wizard.
   b. Under Questions, enter questions and answers.

      Enter all answers for each question in one field, delimited by a new line. Use the Pre Text and Post Text fields to include introductory and closing text.
5. Click **Apply Changes**.

2.11.3 Running a New Service Signup Wizard

Instance administrators can run the Signup Wizard by clicking **Run New Service Signup Wizard** on the Manage Instance page.

To run a new Service Signup Wizard:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Self Service Sign Up, click **Run New Service Signup Wizard**.
4. Follow the on-screen instructions.

2.12 Managing Schemas

Manage the schemas within an Oracle Application Express instance.

- What Is the Oracle Application Express Engine Schema? (page 2-90)
  A schema is a logical container for the database objects.
- Determining the Oracle Application Express Engine Schema (page 2-91)
  Determine the current Application Express engine schema for an instance.
- Understanding Oracle Default Schema Restrictions (page 2-91)
  A database administrator (DBA) grants and revokes privileges within an Oracle Application Express instance.

> **See Also:**
>
> - "Viewing the Parsing Schemas Report (page 2-124)"
> - "Managing Workspace to Schema Assignments (page 2-107)"

2.12.1 What Is the Oracle Application Express Engine Schema?

A schema is a logical container for the database objects.

Instance administrators may need to perform certain actions within the Application Express engine schema. For example, in order for an Instance administrator to have the ability to assign Oracle default schemas, the database administrator (DBA) must explicitly grant the privilege by running the `APEX_SITE_ADMIN.UNRESTRICT_SCHEMA` procedure within the Application Express engine.

2.12.2 Determining the Oracle Application Express Engine Schema

Determine the current Application Express engine schema for an instance.

> **See Also:**
>
> "Understanding Oracle Default Schema Restrictions (page 2-91)" for information about the `APEX_SITE_ADMIN.UNRESTRICT_SCHEMA` procedure

To determine the current Application Express engine schema for your Oracle Application Express instance:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following query in a schema with DBA privileges (for example, `SYSTEM`).

   ```
   SELECT DISTINCT TABLE_OWNER FROM all_synonyms
   WHERE SYNONYM_NAME = 'WWV_FLOW' and OWNER = 'PUBLIC'
   ```

2.12.3 Understanding Oracle Default Schema Restrictions

A database administrator (DBA) grants and revokes privileges within an Oracle Application Express instance.

- About Assigning Oracle Default Schemas to Workspaces (page 2-92)
  In order for an Instance administrator to assign most Oracle default schemas to workspaces, a DBA must explicitly grant the privilege.
- Granting the Privilege to Assign Oracle Default Schemas (page 2-92)
  DBAs can grant an Instance administrator the ability to assign Oracle schemas to workspaces.
- Revoking the Privilege to Assign Oracle Default Schemas (page 2-93)
  DBAs can revoke the privilege to assign default schemas.
- Working with Restricted Schemas (page 2-93)
  DBAs can work with restricted schemas by designating specific workspaces as exceptions, remove all workspaces exceptions for a schema, or remove all schema exceptions for a workspace.
- Determining the Privilege Status (page 2-94)
  DBAs can determine the current status of the privileges.

2.12.3.1 About Assigning Oracle Default Schemas to Workspaces

In order for an Instance administrator to assign most Oracle default schemas to workspaces, a DBA must explicitly grant the privilege.

When Oracle Application Express installs, the Instance administrator does not have the ability to assign Oracle default schemas to workspaces. Default schemas such as `SYS`, `SYSTEM`, and `RMAN` are reserved by Oracle for various product features and for internal use. Access to a default schema can be a very powerful privilege. For example, a workspace with access to the default schema `SYSTEM` can run applications that parse as the `SYSTEM` user.

In order for an Instance administrator to have the ability to assign most Oracle default schemas to workspaces, the DBA must explicitly grant the privilege using SQL*Plus to run a procedure within the `APEX_INSTANCE_ADMIN` package.

> **Tip:**
>
> Beginning with Oracle Application Express release 3.1, the `SYS` and `SYSTEM` schemas may no longer be used by workspaces as parsing schemas.

> **Note:**
>
> All schema and workspace names used as arguments to procedures in the `APEX_INSTANCE_ADMIN` package are used exactly as they are provided by the caller.
>
> For example, if you pass an argument value such as `p_schema =>'system'`, the lower-case schema name `'system'` is recorded and referenced. This example could return unexpected results if you really meant to reference the common schema name SYSTEM, which would be referenced using upper case.

2.12.3.2 Granting the Privilege to Assign Oracle Default Schemas

DBAs can grant an Instance administrator the ability to assign Oracle schemas to workspaces.

A DBA grants an Instance administrator the ability to assign Oracle schemas to workspaces by using SQL*Plus to run the `APEX_INSTANCE_ADMIN.UNRESTRICT_SCHEMA` procedure from within the Application Express engine schema. For example:

```
EXEC APEX_INSTANCE_ADMIN.UNRESTRICT_SCHEMA(p_schema => 'RMAN');
COMMIT;
```

This example would enable the Instance administrator to assign the `RMAN` schema to any workspace.

2.12.3.3 Revoking the Privilege to Assign Oracle Default Schemas

DBAs can revoke the privilege to assign default schemas.

A DBA revokes the privilege to assign default schemas using SQL*Plus to run the `APEX_INSTANCE_ADMIN.RESTRICT_SCHEMA` procedure from within the Application Express engine schema. For example:

```
EXEC APEX_180100.APEX_INSTANCE_ADMIN.RESTRICT_SCHEMA(p_schema => 'RMAN');
COMMIT;
```

This example would prevent the Instance administrator from assigning the `RMAN` schema to any workspace. It does not, however, prevent workspaces that have already had the `RMAN` schema assigned to them from using the `RMAN` schema.

2.12.3.4 Working with Restricted Schemas

DBAs can work with restricted schemas by designating specific workspaces as exceptions, remove all workspaces exceptions for a schema, or remove all schema exceptions for a workspace.

- Removing Workspace Exceptions for a Schema (page 2-93)
  DBAs can remove all workspace exceptions for a schema.
- Removing Schema Exceptions for a Workspace (page 2-93)
  DBAa can remove all schema exceptions for a workspace.
- Designating Specific Workspaces as Exceptions (page 2-94)
  DBAs can designate specific workspaces as exceptions.

2.12.3.4.1 Removing Workspace Exceptions for a Schema

DBAs can remove all workspace exceptions for a schema.

A DBA can remove all workspace exceptions for a schema by using SQL*Plus to run the `APEX_INSTANCE_ADMIN.REMOVE_SCHEMA_EXCEPTIONS` procedure from within the Application Express engine schema. For example:

```
EXEC APEX_050200.APEX_INSTANCE_ADMIN.REMOVE_SCHEMA_EXCEPTIONS(p_schema => 'RMAN');
COMMIT;
```

This example would prevent the Instance administrator from assigning the `RMAN` schema to any workspaces if the `RMAN` schema were already restricted, but had one or more exceptions previously created for it.

2.12.3.4.2 Removing Schema Exceptions for a Workspace

DBAa can remove all schema exceptions for a workspace.

The DBA can remove all schema exceptions for a workspace by using SQL*Plus to run the `APEX_INSTANCE_ADMIN.REMOVE_WORKSPACE_EXCEPTIONS` procedure from within the Application Express engine schema. For example:

```
EXEC APEX_180100.APEX_INSTANCE_ADMIN.REMOVE_WORKSPACE_EXCEPTIONS(p_workspace =>
'AUDITOR_WORKSPACE');
COMMIT;
```

This example would prevent the Instance administrator from assigning any restricted schemas to the workspace named AUDITOR_WORKSPACE if that workspace had exceptions previously created for it for any restricted schemas.

2.12.3.4.3 Designating Specific Workspaces as Exceptions

DBAs can designate specific workspaces as exceptions.

If a schema has been designated as restricted using the `CREATE_SCHEMA_EXCEPTION` procedure, the DBA can designate specific workspaces as exceptions by running the `APEX_INSTANCE_ADMIN.CREATE_SCHEMA_EXCEPTION` procedure. For example:

```
EXEC APEX_180100.APEX_INSTANCE_ADMIN.CREATE_SCHEMA_EXCEPTION(p_schema => 'RMAN',
p_workspace=> 'DBA_WORKSPACE');
EXEC APEX_180100.APEX_INSTANCE_ADMIN.CREATE_SCHEMA_EXCEPTION(p_schema => 'RMAN',
p_workspace  => 'AUDITOR_WORKSPACE');
COMMIT;
```

This example would prevent the Instance administrator from assigning the `RMAN` schema to the workspace named AUDITOR_WORKSPACE. However this restriction only applies to workspace provisioning requests processed after the `REMOVE_SCHEMA_EXCEPTION` procedure has been run. If the AUDITOR_WORKSPACE has the `RMAN` schema assigned to it, this method would not prevent that workspace from continuing to use the schema.

2.12.3.5 Determining the Privilege Status

DBAs can determine the current status of the privileges.

A DBA can determine the current status of the privileges by using SQL*Plus to run the script `report_instance_configuration.sql` in the utilities directory. For example:

To run the script `report_instance_configuration.sql` in the utilities directory:

1. Change to the `utilities` directory.

   ```
   $ cd utilities
   ```

2. Connect in SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`, for example:

   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

3. Run the following statement:

   ```
   SQL> @report_instance_configuration.sql
   ```

The resulting report displays general information about the Application Express instance, including restricted schemas and schema exceptions.

2.13 Creating Workspaces

Users access Oracle Application Express by signing in to a shared work area called a workspace. An administrator can create workspaces manually or take advantage of an automated approach in which users click a link a login page.

- About Workspaces (page 2-95)
  A workspace enables multiple users to work within the same Oracle Application Express installation while keeping their objects, data and applications private. Each workspace has a unique numeric ID and name.
- About Specifying How Workspaces Are Created (page 2-95)
  The Instance administrator determines how the process of provisioning (or creating) a workspace works for a specific Oracle Application Express instance.
- Selecting a Provisioning Mode (page 2-96)
  To determine how provisioning works, an Instance Administrator selects a provisioning mode.
- How Oracle-Managed Files Effects Workspace Provisioning (page 2-97)
  When an Instance administrator creates a new workspace with a new schema, a new tablespace and data file are created for that schema. If Oracle-Managed Files is enabled, it manages the data file for the new tablespace.
- Creating a Workspace Manually (page 2-97)
  Instance administrators can provision a workspace manually in either a full development environment or a runtime environment.
- Creating Multiple Workspaces (page 2-99)
  Provision multiple workspaces by running the Create Multiple Workspaces Wizard

See Also:

"Managing Existing Workspaces (page 2-101)"

2.13.1 About Workspaces

A workspace enables multiple users to work within the same Oracle Application Express installation while keeping their objects, data and applications private. Each workspace has a unique numeric ID and name.

To make changes to a workspace, the Workspace administrators must submit a service or change requests to an Instance administrator. Only the Instance administrator can approve change requests or provision new workspaces.

2.13.2 About Specifying How Workspaces Are Created

The Instance administrator determines how the process of provisioning (or creating) a workspace works for a specific Oracle Application Express instance.

To determine how provisioning works, an Instance Administrator selects an option on the Instance Settings page:

- **Manual** - An Instance administrator creates new workspaces and notifies the Workspace administrator of the login information.
- **Request** - Users request workspaces directly in a self-service fashion. Users click a link on the login page to access a request form. After the workspace request has been granted, users are automatically emailed the appropriate login information.
- **Request with Email Verification** -Users request workspaces directly by clicking a link on the login page to access a request form. Each user receives an initial email containing a verification link. When the user clicks the verification link, the request is processed. The user can then access the workspace using the Sign In page.

> **Note:**
>
> To enable users to request a workspace using a link on the Login page, you must choose the provisioning status of **Request** or **Request with Email Verification**. If the provisioning status is set to **Manual**, no link appears on the login page.

2.13.3 Selecting a Provisioning Mode

To determine how provisioning works, an Instance Administrator selects a provisioning mode.

To select a provisioning mode:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Instance**.
3. Under Instance Settings, click **Instance Settings**.
4. Under Self Service, select a Provisioning Status:
   - **Manual** - An Instance administrator manually creates new workspaces and notifies the Workspace administrator of the login information.
   - **Request** - Users request workspaces directly in a self-service fashion. Selecting this option displays a link on the Login page enabling users to request a workspace. When a user requests a workspace, each request is submitted to a queue for approval. When the request is approved, the user is sent an email containing login credentials (the workspace name, username, and password).
   - **Request with Email Verification** - Users request workspaces directly by clicking a link on the Sign In page to access a request form. Each user receives an initial email containing a verification link. When the user clicks the verification link, the request is processed. The user can then access the workspace using the Sign In page.

> **Note:**
>
> To enable users to request a workspace using a link on the Login page, you must choose the provisioning status of **Request** or **Request with Email Verification** . If the provisioning status is set to **Manual**, no link appears on the login page.

5. If you select **Request** or **Request with Email Verification**:
   - Require Verification Code - Determines if a verification code displays and is required during the request process. Select **Yes** or **No**.
   - Notification Email Address - Enter the email address to receive notification email messages for new workspace requests and change workspace requests. If not specified, no workspace request notification email messages is sent.
6. Click **Apply Changes**.

> **Tip:**
>
> If you select **Request with Email Verification**, you can disable workspace provisioning and send users a message. See "Disabling Email Provisioning (page 2-50)."

2.13.4 How Oracle-Managed Files Effects Workspace Provisioning

When an Instance administrator creates a new workspace with a new schema, a new tablespace and data file are created for that schema. If Oracle-Managed Files is enabled, it manages the data file for the new tablespace.

Using Oracle-managed files simplifies the administration of the Oracle database and eliminates the need for the database administrator (DBA) to directly manage the operating system files that comprise the database. Using Oracle-managed files, the DBA specifies operations in terms of database objects rather than file names. The data file for the new tablespaces are named according to the Oracle-managed files conventions. The placement of these files is determined by the database initialization parameter `DB_CREATE_FILE_DEST`.

If the Oracle-Managed Files is not enabled, the data file is created in the same directory as the first data file of the tablespace in which Oracle Application Express is installed.

2.13.5 Creating a Workspace Manually

Instance administrators can provision a workspace manually in either a full development environment or a runtime environment.

- Creating Workspace Manually in a Full Development Environment (page 2-98) Instance administrators can create workspaces manually in a full development environment by running the Create Workspace Wizard.

- Creating a Workspace Manually in a Runtime Environment (page 2-99)
  Instance administrators can create workspaces manually in a runtime environment starting SQL*Plus and running the following SQL statements.

2.13.5.1 Creating Workspace Manually in a Full Development Environment

Instance administrators can create workspaces manually in a full development environment by running the Create Workspace Wizard.

To create a workspace manually:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Create Workspace**.

   The Create Workspace Wizard appears.
4. For Identify Workspace:
   a. Workspace Name - Enter a unique workspace name.
   b. Workspace ID - Leave Workspace ID blank to have the new Workspace ID automatically generated. A Workspace ID must be a positive integer greater than 100000.
   c. Workspace Description - Enter a workspace description.
   d. Click **Next**.
5. For Identify Schema, specify whether you are re-using an existing schema or creating a new one.

   If you are using an existing schema:
   a. Re-use existing schema - Select **Yes**.
   b. Schema Name - Select a schema from the list.
   c. Inspect the information in the report **Information on Schema**. If the report shows **Suggested Additional Privileges**, consider granting these privileges to the schema, to avoid privilege errors when using it as an application parsing schema.
   d. Click **Next**.

   If you are creating a new schema:
   a. Re-use existing schema - Select **No**.
   b. Schema Name - Select a schema from the list.
   c. Schema Password - Enter a password.
   d. Space Quota (MB) - If creating a new schema, select the maximum size of the tablespace to be associated with that schema. You can adjust this limit later.
   e. Click **Next**.
6. For Identify Administrator, enter the Workspace administrator information and click **Next**.
7. Confirm your selections and click **Create Workspace**.

2.13.5.2 Creating a Workspace Manually in a Runtime Environment

Instance administrators can create workspaces manually in a runtime environment starting SQL*Plus and running the following SQL statements.

To add a workspace in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
   ```

3. The following example demonstrates how to use the `ADD_WORKSPACE` procedure to add a new workspace named `MY_WORKSPACE` using the primary schema, `SCOTT`, along with additional schema mappings for HR and OE.

   ```
   BEGIN
       APEX_INSTANCE_ADMIN.ADD_WORKSPACE (
           p_workspace_id => 8675309,
           p_workspace => 'MY_WORKSPACE',
           p_primary_schema => 'SCOTT',
           p_additional_schemas => 'SCOTT' );
   END;
   ```

2.13.6 Creating Multiple Workspaces

Provision multiple workspaces by running the Create Multiple Workspaces Wizard

To create multiple workspaces:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Create Multiple Workspaces**.

   The Create Multiple Workspaces Wizard appears.
4. For Provision Workspace Using:
   - **System Generated Workspace Names**
   - **Statically Prefixed Workspace Name with Sequential Integer Suffix**
   - **Email Domain Name as Workspace Name, with Sequential Integer Suffix for duplicates**

   What displays next depends upon the option you select.

> **Tip:**
>
> To learn more about a specific field, see field-level Help.

5. If you select **System Generated Workspace Names**, specify the following:
   a. Workspace Count
   b. Install Sample Application
   c. Install Sample Websheet
   d. Install Sample EMP and DEPT Tables
   e. Space Quota (MB)
   f. Resource Manager Consumer Group
   g. Allow workspaces to be automatically purged
   h. Workspace Description
6. If you select **Statically Prefixed Workspace Name with Sequential Integer Suffix**, specify the following:
   a. Workspace Prefix
   b. Workspace Count
   c. Install Sample Application
   d. Install Sample Websheet
   e. Install Sample EMP and DEPT Tables
   f. Space Quota (MB)
   g. Resource Manager Consumer Group
   h. Allow workspaces to be automatically purged
   i. Workspace Description
7. If you select **Email Domain Name as Workspace Name, with Sequential Integer Suffix for duplicates**, specify the following:
   a. Install Sample Application
   b. Install Sample Websheet
   c. Install Sample EMP and DEPT Tables
   d. Space Quota (MB)
   e. Resource Manager Consumer Group
   f. Allow workspaces to be automatically purged
   g. Email Addresses (cut and paste any text that contains email addresses)(Value Required)
   h. Workspace Description
8. Click **Next**.
9. Confirm your choices and click **Provision Workspaces**.

2.14 Managing Existing Workspaces

Instance administrators can manage existing workspaces within an Oracle Application Express instance.

- Viewing Existing Workspace Information (page 2-102)
  Use the Existing Workspaces report to view an interactive report of existing workspaces. From the Existing Workspaces report, you can view or edit workspace details.
- Deleting a Workspace (page 2-102)
  Deleting a workspace does not remove any of the associated database objects. To remove the associated schemas, a database administrator (DBA) must use a standard database administration tool, such as Oracle Enterprise Manager or SQL*Plus.
- Locking a Workspace (page 2-107)
  Instance administrators can lock a workspace to address security or performance issues.
- Managing Workspace to Schema Assignments (page 2-107)
  Instance administrators can view, edit, and remove schema and workspace assignment, associate additional schemas with a workspace, and create new schemas.
- Managing Component Availability for an Instance (page 2-111)
  Control which components are available within an Oracle Application Express instance, including App Builder, SQL Workshop, Allow PL/SQL Editing in SQL Workshop, Team Development, or packaged applications.
- Defining a Workspace Message in Administration Services (page 2-112)
  Create a workspace message in Administration Services.
- Performing a Workspace Search (page 2-112)
  Perform a workspace search by clicking Find a Workspace on the Worspace Tasks page.
- Isolating a Workspace to Prevent Browser Attacks (page 2-112)
  Instance administrators can configure limits to isolate a workspace and prevent browser attacks.
- Viewing the Workspace Summary Report (page 2-115)
  View workspace information by viewing the Workspace Summary Report.
- Viewing Workspace Database Privileges (page 2-116)
  View a summary of workspace database privileges on the Workspace Database Privileges page.
- Viewing File Size and File Count by Workspace (page 2-117)
  View total file size and file count by workspace on the File Utilization by Workspace page.
- Finding and Emailing Workspace Summary (page 2-117)
  View total file size and file count by workspace on the File Utilization by Workspace page.
- Exporting and Importing a Workspace (page 2-117)
  Move a workspace and all associated users to a new Oracle Application Express instance by exporting and importing.

- Changing Application Build Status in Administration Services (page 2-122)
  An Instance administrator can change the build status of an application.
- Viewing the Parsing Schemas Report (page 2-124)
  Use the Parsing Schemas report to identify the current parsing schema of each application in any workspace.

> **See Also:**
>
> - "Creating Workspaces (page 2-95)"
> - "Managing Schemas (page 2-90)"
> - "Managing Users Across an Application Express Instance (page 2-124)"
> - "Monitoring Activity Across a Development Instance (page 2-128)"

2.14.1 Viewing Existing Workspace Information

Use the Existing Workspaces report to view an interactive report of existing workspaces. From the Existing Workspaces report, you can view or edit workspace details.

To view and edit existing workspaces:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Existing Workspaces**.

   The Existing Workspaces page appears
4. To edit a workspace, click the workspace name.

   The Edit Workspace Information page appears.

> **See also:**
>
> "Isolating a Workspace to Prevent Browser Attacks (page 2-112)" and "Viewing the Workspace Summary Report (page 2-115)"

2.14.2 Deleting a Workspace

Deleting a workspace does not remove any of the associated database objects. To remove the associated schemas, a database administrator (DBA) must use a standard database administration tool, such as Oracle Enterprise Manager or SQL*Plus.

- Identifying and Deleting Inactive Workspaces (page 2-103)
- Deleting Workspaces in a Full Development Environment (page 2-106)
  Delete workspaces in a full development environment.

- Deleting Workspaces in a Runtime Development Environment (page 2-106)
  Delete workspaces in a runtime development environment.

> **See Also:**
>
> "Viewing the Workspace Summary Report (page 2-115)" and "Creating Workspaces (page 2-95)"

2.14.2.1 Identifying and Deleting Inactive Workspaces

Learn how to identify and delete inactive workspaces.

- How to Identify Inactive Workspaces (page 2-103)
- Identifying Inactive Workspaces By Checking Recent Updates (page 2-103)
- Viewing Workspaces with Only a Sample Application (page 2-105)
- Removing the Resources Associated with Inactive Workspaces (page 2-105)
- Deleting Inactive Workspaces (page 2-105)

2.14.2.1.1 How to Identify Inactive Workspaces

If you are managing a large hosted Oracle Application Express instance, manually deleting inactive workspaces can free up resources for other users. The process of manually deleting inactive workspaces consists of the following steps:

- **Step 1:** Identify inactive workspaces. See "Identifying Inactive Workspaces By Checking Recent Updates (page 2-103)" and "Viewing Workspaces with Only a Sample Application (page 2-105)."
- **Step 2:** Remove the resources (that is, the database schemas, tablespaces, and data files) associated with each inactive workspace. See "Removing the Resources Associated with Inactive Workspaces (page 2-105)."
- **Step 3:** Drop the inactive workspaces from Oracle Application Express. See "Deleting Inactive Workspaces (page 2-105)."

> **Tip:**
>
> To systematically purge inactive workspaces you must configure Workspace Purge settings. See "Purging Inactive Workspaces (page 2-64)."

2.14.2.1.2 Identifying Inactive Workspaces By Checking Recent Updates

The first step in determining if a workspace is inactive is to establish some basic rules. A common approach is to base the rules on the Oracle Application Express activity records found in the current Application Express engine schema.

> **See Also:**
>
> "Determining the Oracle Application Express Engine Schema (page 2-91)"

The following DDL (data definition language) creates a table of all workspaces requested before June 28, 2004 but that have been inactive since June 10, 2004. In this example, inactivity is determined by checking a key within the Application Express engine schema for the most recent updates by each workspace.

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_18100;
CREATE TABLE ws_to_purge AS
 SELECT c.security_group_id, c.company_name, c.admin_email, c.request_date,
 SYSDATE last_updated_on, 'Y' ok_to_delete
   FROM wwv_flow_provision_company c
  WHERE
c.request_date <= to_date('20040628','YYYYMMDD') AND
     (  not exists
 (SELECT NULL /* Activity Log */
        FROM wwv_flow_activity_log l
       WHERE l.security_group_id = c.security_group_id
         AND l.time_stamp > to_date('20040610','YYYYMMDD'))
 )
    AND NOT EXISTS
     (SELECT NULL /* workspace applications */
        FROM wwv_flows f
       WHERE f.security_group_id = c.security_group_id
         AND f.last_updated_on > to_date('20040610','YYYYMMDD'))
    AND NOT EXISTS
     (SELECT NULL /* Pages */
        FROM wwv_flow_steps s
       WHERE s.security_group_id = c.security_group_id
         AND s.last_updated_on > to_date('20040610','YYYYMMDD'))
    AND NOT EXISTS
     (SELECT NULL /* Regions */
        FROM wwv_flow_page_plugs p
       WHERE p.security_group_id = c.security_group_id
         AND p.last_updated_on > to_date('20040610','YYYYMMDD'))
    AND NOT EXISTS
     (SELECT NULL /* Items */
        FROM wwv_flow_step_items i
       WHERE i.security_group_id = c.security_group_id
         AND i.last_updated_on > to_date('20040610','YYYYMMDD'))
    AND NOT EXISTS
     (SELECT NULL /* Templates */
        FROM wwv_flow_templates t
       WHERE t.security_group_id = c.security_group_id
         AND t.last_updated_on > to_date('20040610','YYYYMMDD'))
    AND NOT EXISTS
     (SELECT NULL /* Files uploaded */
        FROM wwv_flow_file_objects$ o
       WHERE o.security_group_id = c.security_group_id
         AND o.created_on > to_date('20040610','YYYYMMDD'))
    AND NOT EXISTS
     (SELECT NULL /* SQL Workshop history */
        FROM wwv_flow_sw_sql_cmds s
       WHERE s.security_group_id = c.security_group_id
         AND s.created_on > to_date('20040610','YYYYMMDD'));
```

2.14.2.1.3 Viewing Workspaces with Only a Sample Application

Another way to identify potentially inactive workspaces is to view the Workspaces with Only Sample Application report.

To view a report or workspaces only containing only a sample application:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Workspaces with Only Sample Application**.

   The Workspaces with Only Sample Applications page appears.

   This page displays as an interactive report. To customize the report, use the Search bar at the top of the page.

2.14.2.1.4 Removing the Resources Associated with Inactive Workspaces

After you have identified inactive workspaces in a single table, the next step is to remove them.

> **Note:**
>
> Before removing the schemas, tablespaces, or data files associated with inactive workspaces, make sure these resources are not being used in any other workspace or application.

To remove the resources associated with inactive workspaces:

1. Identify the schemas used by the workspaces to be deleted by joining the table containing the identified inactive workspaces to `wwv_flow_company_schemas`.
2. Drop the schemas, tablespaces, and data files used exclusively by the inactive workspaces from the database. You can identify the schemas to drop by running a query similar to the following:

```
SELECT s.schema
  FROM ws_to_purge ws,
       wwv_flow_company_schemas s
WHERE s.security_group_id = ws.security_group_id
   AND ws.ok_to_delete = 'Y';
```

2.14.2.1.5 Deleting Inactive Workspaces

Once you remove the resources associated with an inactive workspace, you can delete the workspace. You can delete inactive workspaces manually using the Oracle Application Express Administration Services application. Or, you can delete them programmatically as shown in the following PL/SQL example.

```
BEGIN
     FOR c1 IN (SELECT security_group_id
                FROM ws_to_purge
                WHERE ok_to_delete = 'Y')
     LOOP
         WWV_FLOW_PROVISIONING.TERMINATE_SERVICE_BY_SGID(c1.security_group_id);
```

```
    END LOOP;
END;
```

2.14.2.2 Deleting Workspaces in a Full Development Environment

Delete workspaces in a full development environment.

To delete a workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Existing Workspaces**.

   The Existing Workspaces page appears.
4. Under the Action column, click **Delete**.
5. On Verify Applications:
   a. Review the workspace name and the number of applications and users.
   b. Select **Check to confirm that you wish to proceed with the removal**.
   c. Click **Next**.
6. Confirm the displayed information and click **Remove Workspace**.

2.14.2.3 Deleting Workspaces in a Runtime Development Environment

Delete workspaces in a runtime development environment.

To delete a workspace in a runtime development environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```
   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```
2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
   ```
3. Run the following statement:

   ```
   BEGIN
   APEX_INSTANCE_ADMIN.REMOVE_WORKSPACE(WORKSPACE_NAME, DROP_USER, DROP_TABLESPACE)
   END;
   ```

   Where:
   - `WORKSPACE_NAME` is the name of the workspace.
   - `DROP_USER` is either Y or N. The default is N.
   - `DROP_TABLESPACE` is either `Y` or `N`. The default is `N`.

2.14.3 Locking a Workspace

Instance administrators can lock a workspace to address security or performance issues.

Locking a workspace immediately locks all workspace administrator, developer, and user accounts in the workspace. It also changes the status of all applications in the workspace to Unavailable.

> **Warning:**
>
> Locking a workspace makes it permanently inaccessible.

To lock a workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Lock Workspace**.
4. For Workspace, select the workspace you want to lock and click **Next**.
5. Review the information about applications and users and click **Lock Workspace**.

2.14.4 Managing Workspace to Schema Assignments

Instance administrators can view, edit, and remove schema and workspace assignment, associate additional schemas with a workspace, and create new schemas.

When users sign in to Oracle Application Express, they access a shared work area called a workspace. Each workspace can have multiple associated (or mapped) schemas. By associating a workspace with a schema, developers in that workspace can create new database objects in that schema and build applications that interact with the database objects in that schema.

- Viewing Schema and Workspace Assignments in a Development Environment (page 2-108)
  View an existing schema to workspace assignments in a full development environment.
- Viewing Schema and Workspace Assignments in a Runtime Environment (page 2-108)
  View the existing schema to workspace assignments in a runtime environment.
- Editing Existing Schema and Workspace Assignments (page 2-109)
  Edit existing schema and workspace assignments.
- Associating Schemas in a Full Development Environment (page 2-109)
  Associate existing or new schemas with a workspace on the Manage Workspace to Schema Assignments page.
- Associating Additional Schemas in a Runtime Environment (page 2-110)
  Associate additional schemas with a workspace in a runtime environment.

- Removing a Schema Mapping from a Workspace in a Runtime Environment (page 2-110)
  Remove a schema mapping from a workspace in a runtime environment.

> **See Also:**
>
> "Managing Schemas (page 2-90)" and "Viewing the Parsing Schemas Report (page 2-124)"

2.14.4.1 Viewing Schema and Workspace Assignments in a Development Environment

View an existing schema to workspace assignments in a full development environment.

To view an existing schema to workspace assignment:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Manage Workspace to Schema Assignments**.

   The Manage Workspace to Schema Assignments page appears, listing all workspaces in your environment along with their associated schemas.

   This page displays as an interactive report. To customize the report, use the Search bar at the top of the page.

2.14.4.2 Viewing Schema and Workspace Assignments in a Runtime Environment

View the existing schema to workspace assignments in a runtime environment.

To view the existing schema to workspace assignment in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:
   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
   ```

3. Run the following statement:

```
SELECT APEX_INSTANCE_ADMIN.GET_SCHEMAS(WORKSPACE_NAME)
FROM DUAL;
```

Where `WORKSPACE_NAME` is the name of the workspace.

2.14.4.3 Editing Existing Schema and Workspace Assignments

Edit existing schema and workspace assignments.

To edit an existing schema and workspace assignment:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Manage Workspace to Schema Assignments**

   The Manage Workspace to Schema Assignments page appears.
4. To edit an existing workspace to schema assignment:
   a. Select the workspace name.
   b. Select a new workspace or database schema.
   c. Click **Apply Changes**.

2.14.4.4 Associating Schemas in a Full Development Environment

Associate existing or new schemas with a workspace on the Manage Workspace to Schema Assignments page.

To associate an schemas with a workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Manage Workspace to Schema Assignments**.

   The Manage Workspace to Schema Assignments page appears.
4. Click **Add Schema**.

   The Add Schema wizard appears.
5. The schema is a - Select **Existing** or **New**.

   The options that display next differ depending upon your selection.
6. If you select **Existing**:
   a. Workspace - Enter the name of the workspace, or select one from the list.
   b. Schema - Enter new schema name.
   c. Click **Next**.
7. If you select **New**:
   a. Workspace - Enter the name of the workspace, or select one from the list.
   b. Schema - Enter new schema name.
   c. Password - Enter a password for schema..
   d. Default Tablespace - Enter the default tablespace for the provisioned schema, or select one from the list.

e. Temporary Tablespace - Enter the temporary tablespace for the provisioned schema, or select one from the list.

f. Click **Next**.

8. Review your selections and click **Add Schema**.

2.14.4.5 Associating Additional Schemas in a Runtime Environment

Associate additional schemas with a workspace in a runtime environment.

To associate additional schemas with a workspace in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:

   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

     ```
     $ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

2. Run the following statement:

   ```
   ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
   ```

3. Run the following statement:

   ```
   BEGIN
   APEX_INSTANCE_ADMIN.ADD_SCHEMA(WORKSPACE_NAME, SCHEMA_NAME)
   END;
   ```

   Where:

   - `WORKSPACE_NAME` is the name of the workspace.
   - `SCHEMA_NAME` is the name of the schema.

2.14.4.6 Removing a Schema Mapping from a Workspace in a Runtime Environment

Remove a schema mapping from a workspace in a runtime environment.

To remove a schema mapping from a workspace in a runtime environment:

1. Start SQL*Plus and connect to the database where Oracle Application Express is installed as `SYS`. For example:

   - On Windows:

     ```
     SYSTEM_DRIVE:\ sqlplus /nolog
     SQL> CONNECT SYS as SYSDBA
     Enter password: SYS_password
     ```

   - On UNIX and Linux:

```
$ sqlplus /nolog
SQL> CONNECT SYS as SYSDBA
Enter password: SYS_password
```

2. Run the following statement:

```
ALTER SESSION SET CURRENT_SCHEMA = APEX_180100
```

3. Run the following statement:

```
BEGIN
APEX_INSTANCE_ADMIN.REMOVE_SCHEMA(WORKSPACE_NAME, SCHEMA_NAME)
END;
```

   Where:

   - `WORKSPACE_NAME` is the name of the workspace.
   - `SCHEMA_NAME` is the name of the schema.

2.14.5 Managing Component Availability for an Instance

Control which components are available within an Oracle Application Express instance, including App Builder, SQL Workshop, Allow PL/SQL Editing in SQL Workshop, Team Development, or packaged applications.

To configure component availability:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Manage Component Availability**.

   The Component Availability page appears. To customize the report, use the Search bar at the top of the page.
4. Locate the workspace for which you want to enable or disable components.
5. Click the workspace name.

   The Workspace Settings page appears.
6. Under Workspace Settings, select **Yes** to enable a component or **No** to disable it. Options include:
   - Enable App Builder - Determines the availability of App Builder in this workspace.
   - Enable SQL Workshop - Determines the availability of SQL Workshop in this workspace.
   - Enable PL/SQL Editing in SQL Workshop - Allow PL/SQL procedures, packages, functions, and triggers to be edited in the browser.
   - Enable Team Development - Determines the availability of Team Development in this workspace.
   - Enable Packaged Application Installation - Controls the ability to install packaged applications in the current workspace.
7. Click **Apply Changes**.

2.14.6 Defining a Workspace Message in Administration Services

Create a workspace message in Administration Services.

Workspace messages display both on the Workspace home page and on the Workspace Administration page. Nn the Workspace home page, workspace message display in the News and Messages region.

To define a workspace message:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Actions, click **Manage Component Availability**.

   The Component Availability page appears. To customize the report, use the Search bar at the top of the page.
4. Locate and select the workspace for which you want to define a workspace message.

   The Workspace Settings page appears.
5. Under Workspace Message, enter a message in the Message field. To format the display, include standard HTML tags.
6. Click **Apply Changes**.

2.14.7 Performing a Workspace Search

Perform a workspace search by clicking Find a Workspace on the Worspace Tasks page.

To perform a workspace search:

1. Sign in to Oracle Application Express Administration Services.
2. Under Workspace Tasks, click **Find a Workspace**.

   The Workspace Search page appears. To customize the report, use the Search bar at the top of the page.
3. To view workspace details, click a workspace name.

   The Workspace Details report appears.
4. To email the report to other users, click **Email** and follow the on-screen instructions.

> **See also:**
>
> "Viewing the Workspace Summary Report (page 2-115)"

2.14.8 Isolating a Workspace to Prevent Browser Attacks

Instance administrators can configure limits to isolate a workspace and prevent browser attacks.

- About Isolating a Workspace to Prevent Browser Attacks (page 2-113)
  Isolating workspaces is an effective approach to preventing browser attacks.
- Configuring Workspace Isolation Attributes (page 2-113)
  Configure Workspace Isolation attributes.

> **See Also:**
>
> - "Isolating All Workspaces in an Instance (page 2-36)"
> - "About Isolating Workspaces" in *Oracle Application Express App Builder User's Guide*

2.14.8.1 About Isolating a Workspace to Prevent Browser Attacks

Isolating workspaces is an effective approach to preventing browser attacks.

The only way to truly isolate a workspace is to enforce different domains in the URL by configuring the Allow Hostnames attribute. When the URLs of the attacker and the victim have different domains and hostnames, the browser's same-origin policy prevents attacks.

2.14.8.2 Configuring Workspace Isolation Attributes

Configure Workspace Isolation attributes.

To configure Workspace Isolation attributes:

1. View the existing workspace:
   a. Sign in to Oracle Application Express Administration Services.
   b. Click **Manage Workspaces**.
   c. Under Workspace Reports, click **Existing Workspaces**.
   d. Click a workspace name.

   The Edit Information page appears.
2. Locate Workspace Isolation and edit the attributes as described in the following table.

> **Tip:**
>
> To learn more about an attribute and view examples, see field-level Help.

Table 2-7 Workspace Isolation Attributes

Attribute	Description
Allow Hostnames	Enter a comma separated list of hostnames that can be used to access this workspace. If you leave this attribute empty, the instance-level value applies. If you enter one or more hostnames, the incoming HTTP request URL's hostname part must match one of the listed hostnames. To learn more, see field-level Help.
Resource Consumer Group	Specify the Database Resource Manager consumer group to be used for all page events associated with this workspace. If you leave this attribute empty, the instance-level value applies. At the beginning of every request, the Application Express engine switches the current consumer group of the current database session to the workspace's consumer group. This applies to both executing applications and any of the applications used within the Application Express development environment. The privilege to switch to this consumer group must be granted to either PUBLIC or the Application Express schema. This privilege is typically granted using the procedure `DBMS_RESOURCE_MANAGER_PRIVS.GRANT_SWITCH_CONSUMER_GROUP`.
Maximum Concurrent Workspace Requests	Enter the maximum number of concurrent page events that Oracle Application Express supports for all applications of this workspace. If you leave this attribute empty, the instance-level value applies. Instead of processing a page event, Application Express shows an error message when the limit is already reached. Application Express keeps track of session requests by querying the `CLIENT_INFO` column of `GV$SESSION`. This tracking will not work if developers overwrite `CLIENT_INFO`, e.g. with a call to `DBMS_APPLICATION_INFO.SET_CLIENT_INFO`.
Maximum Concurrent Session Requests	Enter the maximum number of concurrent page events that Oracle Application Express supports for each session of this workspace's applications. Instead of processing a new page event, Application Express shows an error message when the limit is already reached. Alternatively, use the Concurrent Session Requests Kill Timeout attribute to kill an active database session, to process the new page event. Application Express keeps track of session requests by querying the `CLIENT_IDENTIFIER` column of `GV$SESSION`. This tracking will not work if developers overwrite `CLIENT_IDENTIFIER`, for example with a call to `DBMS_SESSION.SET_IDENTIFIER`.

Table 2-7 (Cont.) Workspace Isolation Attributes

Attribute	Description
Concurrent Session Requests Kill Timeout	If a new page event comes in that is outside the limits of **Maximum Concurrent Session Requests**, Application Express can execute `alter system kill session` on the oldest active database session which processes another page event for this Application Express session. This attribute specifies the number of seconds a database process has to be active, before it can be killed. If you leave this attribute empty, the instance-level value applies. **Warning**: Killing sessions can cause problems with the application server's database session pool.
Maximum Size of Files in Workspace	Enter the total size (in bytes) of all files that can be uploaded to this workspace.
Maximum Email Messages	Enter the maximum number of email messages that can be sent with the `APEX_MAIL API` per 24 hour period. This value overrides the instance-level setting.
Maximum Web Service Requests	Enter the maximum number of web service requests that can be sent per 24 hour period.
Content Cache target size	Denotes the target size for the content cache on workspace level. This value overrides the instance-level setting.
Content Cache maximum entry size	Denotes the maximum size for content to be placed into the content cache. This value overrides the instance-level setting.

3. Click **Apply Changes**.

2.14.9 Viewing the Workspace Summary Report

View workspace information by viewing the Workspace Summary Report.

To view the Workspace Summary Report:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Workspace Details**.

   The Workspace Details page appears.
4. Make a selection from the Workspace list at the top of the page and click **Set**.

   The Workspace Summary Report page appears. The following buttons display above the report:

   - **Remove** - Removes the current workspace.
   - **Edit** - Displays the Edit Workspace Information page.
   - **Schema Assignments** - Manage workspace schema assignments.
   - **Manage Users** - Edit or create new users.
   - **Email** - Send this report by email.

The Workspace Summary Report is divided into the following major sections:

- **Workspace**. Displays high-level information about selected workspace.
- **Workspace Schemas**. Displays the schema name, and default tablespace, privileges granted, and database role privileges.

  When users sign in to Oracle Application Express, they sign in to a shared work area called a workspace. Each workspace can have multiple associated schemas. By associating a workspace with a schema, developers can build applications that interact with the objects in that schema and create new database objects in that schema. To edit workspace to schema assignments, click **Workspace to Schema Assignments**.
- **Database Applications**. Lists details about the database applications within the workspace.
- **Websheet Applications**. Lists details about the websheets within the workspace.
- **Packaged Applications**. Lists packaged application within the workspace.
- **SQL Workshop**. Lists the number of SQL scripts, SQL script results, and SQL Command history.
- **Team Development**. Lists the number of features, milestones, bugs, To Dos, feedback entries, news entries, and links.
- **Workspace Application Activity Summary**. Details statistics about workspace applications.

Other sections include:

- Developer Activity Summary
- Database Object Counts by Object Type
- 5 Top Tables by Row Count, Reported by Schema

Note:

- "Isolating a Workspace to Prevent Browser Attacks (page 2-112)"
- "Managing Schemas (page 2-90)"
- "Managing Users Across an Application Express Instance (page 2-124)"
- "Managing Schemas (page 2-90)"

2.14.10 Viewing Workspace Database Privileges

View a summary of workspace database privileges on the Workspace Database Privileges page.

To view workspace database privileges:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Workspace Database Privileges**.

The Workspace Database Privileges page appears. This page displays as an interactive report. To customize the report, use the Search bar at the top of the page

4. To view workspace details, click the workspace name.

   The Workspace Summary report appears.

2.14.11 Viewing File Size and File Count by Workspace

View total file size and file count by workspace on the File Utilization by Workspace page.

To view total file size and file count by workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Manage File Utilization**.

   The File Utilization by Workspace page appears. This page displays as an interactive report.
4. To customize the report, use the Search bar at the top of the page.

2.14.12 Finding and Emailing Workspace Summary

View total file size and file count by workspace on the File Utilization by Workspace page.

To find and email workspace summary:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Workspace Reports, click **Find and Email Workspace Summary**.

   The Workspace Search page appears. This page displays as an interactive report.
4. To view workspace details, click the workspace name.

   The Workspace Summary report appears.
5. Click **Email**.

   The Email page appears.
6. Enter content in the **Body** field.
7. Click **Email**.

2.14.13 Exporting and Importing a Workspace

Move a workspace and all associated users to a new Oracle Application Express instance by exporting and importing.

> **Tip:**
>
> To review recommendations about optimizing the development and deployment of Oracle Application Express applications throughout their life-cycle, see *Life Cycle Management with Oracle Application Express*. Go to Life Cycle Management with Oracle Application Express.

- About Exporting and Importing a Workspace (page 2-118)
  To move a workspace and all associated users to a new Oracle Application Express instance, you export the workspace.
- Importing a Workspace in Administration Services (page 2-119)
  Import a workspace by clicking Import Workspace on the Manage Workspaces page.
- Exporting a Workspace in Administration Services (page 2-119)
  Export a workspace by clicking Export Workspace on the Manage Workspaces page.
- Exporting Applications and Workspaces from a Command-line (page 2-119)
  You can also export workspaces, applications, and related files from a command-line using the `APEXExport` and `APEXExportSplitter` programs located in the `Utilities` folder in the downloaded installation zip file.
- Viewing Application Attributes (page 2-122)
  View applications by workspace on the Application Attributes page.

> **See Also:**
>
> *Oracle Application Express App Builder User's Guide*

2.14.13.1 About Exporting and Importing a Workspace

To move a workspace and all associated users to a new Oracle Application Express instance, you export the workspace.

When you export a workspace, Oracle Application Express generates a text file. This file contains information about your workspace, all the users in your workspace, and any groups in your workspace (if applicable). You can import this file into another Oracle Application Express instance.

Exporting a workspace and importing it into a new database instance enables developers to import application components. When building new environments (for example, moving from development to testing or testing to production), Oracle recommends creating workspaces by importing them.

Keep in mind, this method only imports workspace, users, and groups. This file does not contain:

- The schemas associated with this workspace or the objects in those schemas.
- Any applications, images, cascading style sheets, and static text files.

These items must be exported separately.

2.14.13.2 Importing a Workspace in Administration Services

Import a workspace by clicking Import Workspace on the Manage Workspaces page.

To import a workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Export Import, click **Import Workspace**.
4. Locate the import file and click **Next**.
5. To install the workspace, click **Install**.
6. Follow the on-screen instructions.

2.14.13.3 Exporting a Workspace in Administration Services

Export a workspace by clicking Export Workspace on the Manage Workspaces page.

To export a workspace:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Export Import, click **Export Workspace**.
4. Select a workspace and then click **Export Workspace**.
5. On Export Workspace:
   a. Include Team Development - Set to **Yes** to include Team Development components such as Features, Milestones, To Dos, Bugs, Feedback, Links and News in your workspace export file. Otherwise, select **No**.
   b. Export Type:
      - **Minimal**

        - In most cases, you should not change the default value.
      - **Full** - Includes all workspace artifacts including SQL Scripts, SQL Command History, saved SQL, user preferences, developer login history, email logs, and user interface defaults.
   c. File Format - Select how rows in the export file will be formatted:
      - **UNIX** - The resulting file contains rows delimited by line feeds.
      - **DOS** - The resulting file contains rows delimited by carriage returns and line feeds.
6. To export the selected workspace, click **Save File**.

2.14.13.4 Exporting Applications and Workspaces from a Command-line

You can also export workspaces, applications, and related files from a command-line using the `APEXExport` and `APEXExportSplitter` programs located in the `Utilities` folder in the downloaded installation zip file.

- APEXExport Program (page 2-120)
  Use the `APEXExport` program to export Oracle Application Express applications or workspaces from the command-line, without requiring a manual export from the Web interface of Oracle Application Express.
- APEXExportSplitter Program (page 2-121)
  Use the `APEXExportSplitter` program to split Oracle Application Express export files into separate SQL scripts. This is useful when managing files corresponding to the discrete elements of an Oracle Application Express application.

2.14.13.4.1 APEXExport Program

Use the `APEXExport` program to export Oracle Application Express applications or workspaces from the command-line, without requiring a manual export from the Web interface of Oracle Application Express.

Program Requirements

The `APEXExport` program requires:

- JDK (Java Development Kit) release 1.5 or higher
- the Oracle JDBC class libraries must be in your CLASSPATH

About APEXExport

To use `APEXExport`:

1. Set the CLASSPATH. For example:
   - On UNIX and Linux:

     ```
     export CLASSPATH=.:${ORACLE_HOME}/jdbc/lib/ojdbc5.jar...from the Bash
     shell or ...
     ```

     From the Bash shell or ...

     ```
     set CLASSPATH=%CLASSPATH%;.\;%ORACLE_HOME%\jdbc\lib\ojdbc5.jar
     ```
   - On Windows:

     From the `apex/utilities` directory, issue the command:

     ```
     java oracle.apex.APEXExport
     ```
2. Returns the following output with both usage directions and examples.

```
Usage APEXExport -db  -user  -password  -applicationid  -workspaceid -instance -
expWorkspace -expMinimal -expFiles -skipExportDate
-expPubReports -expSavedReports -expIRNotif -expTranslations -expTeamdevdata -
expFeedback -deploymentSystem -expFeedbackSince
-expOriginalIds -debug -expNoSubscriptions -expComments -expSupportingObjects -
nochecksum -split
 -db:                   Database connect url in JDBC format
 -user:                 Database username
 -password:             Database password
 -applicationid:        ID for application to be exported
 -workspaceid:          Workspace ID for which all applications to be exported
or the workspace to be exported
 -instance:             Export all applications
 -expWorkspace:         Export workspace identified by -workspaceid or all
workspaces if -workspaceid not specified
 -expMinimal:           Only export workspace definition, users, and groups
```

```
 -expFiles:             Export all workspace files identified by -workspaceid
 -skipExportDate:       Exclude export date from application export files
 -expPubReports:        Export all user saved public interactive reports
 -expSavedReports:      Export all user saved interactive reports
 -expIRNotif:           Export all interactive report notifications
 -expTranslations:      Export the translation mappings and all text from the
translation repository
 -expFeedback:          Export team development feedback for all workspaces or
identified by -workspaceid to development or deployment
 -expTeamdevdata:       Export team development data for all workspaces or
identified by -workspaceid
 -deploymentSystem:     Deployment system for exported feedback
 -expFeedbackSince:     Export team development feedback since date in the
format YYYYMMDD
 -expOriginalIds:       If specified, the application export will emit ids as
they were when the application was imported
 -debug: Print debug output
 -expNoSubscriptions:   Do not export references to subscribed components
 -expComments:          Export developer comments
 -expSupportingObjects: Pass (Y)es, (N)o or (I)nstall to override the default

 -nochecksum:           Overwrite existing files even if the contents have not
changed
 -split:                Split applications into multiple files

Single Application Example:
    APEXExport -db localhost:1521:ORCL -user scott -password scotts_password -
applicationid 31500
  All Applications in a Workspace Example:
    APEXExport -db localhost:1521:ORCL -user scott -password scotts_password -
workspaceid 9999
  All Applications in an Instance Example:
    APEXExport -db localhost:1521:ORCL -user system -password systems_password -
instance
  Export All Workspaces Example:
    APEXExport -db localhost:1521:ORCL -user system -password systems_password -
expWorkspace
  Export Feedback to development environment:
    APEXExport -db localhost:1521:ORCL -user scott -password scotts_password -
workspaceid 9999 -expFeedback
    Export Feedback to deployment environment EA2 since 20100308:
    APEXExport -db localhost:1521:ORCL -user scott -password scotts_password -
workspaceid 9999 -expFeedback -deploymentSystem EA2 -expFeedbackSince 20100308
```

2.14.13.4.2 APEXExportSplitter Program

Use the `APEXExportSplitter` program to split Oracle Application Express export files into separate SQL scripts. This is useful when managing files corresponding to the discrete elements of an Oracle Application Express application.

Program Requirements

The `APEXExportSplitter` program requires:

- JDK (Java Development Kit) release 1.5 or higher
- That Oracle JDBC class libraries must be in your `CLASSPATH`

About APEXExportSplitter

To use `APEXExportSplitter`:

1. Set the CLASSPATH. For example:
   - On UNIX and Linux:

     ```
     export CLASSPATH=.:$CLASSPATH
     ```

     From the Bash shell or ...

     ```
     set CLASSPATH=%CLASSPATH%;.\;
     ```

   - On Windows:

     From the `apex/utilities` directory, issue the command:

     ```
     java oracle.apex.APEXExportSplitter
     ```

2. Returns the following output with usage directions.

   ```
   Usage java oracle.apex.APEXExportSplitter filename
   -help       : < print this syntax >
   -flat       : < flat file structure >
   -debug      : < print debug info >
   -update     : < create update file >
   -nochecksum : < do not check for changes
   ```

3. To split an application export file and create a sub directories for each component type, issue the command:

   ```
   java oracle.apex.APEXExportSplitter f123.sql
   ```

   Where `f123.sql` is the application export file.

4. To split an application export file containing the component type in the file name an not create any directories), issue the command:

   ```
   java oracle.apex.APEXExportSplitter f123.sql -flat
   ```

   Where `f123.sql` is the application export file.

2.14.13.5 Viewing Application Attributes

View applications by workspace on the Application Attributes page.

To view the Application Attributes page:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Manage Applications, click **Application Attributes**.

   The Application Attributes page appears.

   This page displays as an interactive report. To customize the report, use the Search bar at the top of the page.

2.14.14 Changing Application Build Status in Administration Services

An Instance administrator can change the build status of an application.

- About Changing Application Build Status (page 2-123)
  Use the Build Status attribute to prevent an application from being modified by other developers.
- Changing Build Status in Administration Services (page 2-123)
  Change a Build Status in Administration Services under Manage Workspaces, Manage Applications.

> **See Also:**
>
> "Managing Build Status in Workspace Administration (page 1-52)"

2.14.14.1 About Changing Application Build Status

Use the Build Status attribute to prevent an application from being modified by other developers.

The Build Status attribute has two settings:

- **Run and Build Application** - Developers can both run and edit an application.
- **Run Application Only** - Developers can only run an application.

  Setting the Build Status to **Run Application Only** is an effective way to prevent other developers from modifying it.

Ways to Modify Build Status

You can change the Build Status of an application as follows:

- **Application-level** - Developers and administrators can change the Build Status attribute on the Edit Application page. See "Availability" in *Oracle Application Express App Builder User's Guide*.
- **Workspace-level** - Workspace administrators can change the Build Status of applications within the current workspace on the Manage Application Build Status page. See "Changing Build Status for Multiple Applications (page 1-52)."
- **Instance-level** -Instance administrators can change the Build Status of an application on the Build Status page as described in "Changing Build Status in Administration Services (page 2-123)."

2.14.14.2 Changing Build Status in Administration Services

Change a Build Status in Administration Services under Manage Workspaces, Manage Applications.

To change a Build Status in Administration Services:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Manage Applications, click **Build Status**.

   The Build Status page appears. To customize the report, use the Search bar at the top of the page.

4. Click the **Edit** icon adjacent to the appropriate workspace.

   The Edit Build Status page appears.

5. Select an alternate Build Status:.
   - **Run Application Only** - Developers can only run an application. Application will not appear in the list of applications shown in the App Builder for the workspace.
   - **Run and Build Application** - Developers can both run and edit an application. Application will appear in the App Builder's list of applications for the workspace.

6. Click **Apply Changes**.

> **Tip:**
>
> Note that if you select **Build Application Only** during deployment, the only way to change this setting is change it on the Build Status page in Oracle Application Express Administration Services.

2.14.15 Viewing the Parsing Schemas Report

Use the Parsing Schemas report to identify the current parsing schema of each application in any workspace.

The Parsing Schemas report identifies the Oracle database schema whose privileges are used when Application Express dynamically executes the application's SQL and PL/SQL code at runtime.

To view the Parsing Schemas report:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Manage Applications, click **Parsing Schemas**.

   The Parsing Schemas report appears. To customize the report, use the Search bar at the top of the page.

2.15 Managing Users Across an Application Express Instance

An Instance administrator manages all user accounts within an Oracle Application Express instance on the Manage Developers and Users page.

- About the Advantages of Managing Users at the Instance Level (page 2-125) When setting up user accounts, instance administrators can take advantage of security capabilities such locking accounts, configuring password to have a fixed lifetime, and requiring user passwords be changed on first use.

- About Application Accounts Authentication (page 2-125)
  User accounts are particularly useful if your application is using Application Express Accounts authentication. Application Express Accounts is a built-in authentication method in which user accounts are created and managed in the Oracle Application Express user repository.
- About Application Express User Roles (page 2-125)
  Oracle Application Express users are divided into four roles.
- Creating New User Accounts in Administration Services (page 2-126)
  Create new user accounts in Administration Services on the Manage Developers and Users page.
- Editing an Existing User Account in Administration Services (page 2-128)
  Edit user accounts in Administration Services on the Manage Developers and Users page.
- Deleting User Accounts in Administration Services (page 2-128)
  Delete user accounts in Administration Services on the Manage Developers and Users page.

See Also:

- "Workspace and Application Administration (page 1-1)"
- "Managing Users in a Workspace (page 1-31)"
- "Application Express Account Credentials" in *Oracle Application Express App Builder User's Guide*

2.15.1 About the Advantages of Managing Users at the Instance Level

When setting up user accounts, instance administrators can take advantage of security capabilities such locking accounts, configuring password to have a fixed lifetime, and requiring user passwords be changed on first use.

2.15.2 About Application Accounts Authentication

User accounts are particularly useful if your application is using Application Express Accounts authentication. Application Express Accounts is a built-in authentication method in which user accounts are created and managed in the Oracle Application Express user repository.

2.15.3 About Application Express User Roles

Oracle Application Express users are divided into four roles.

To access the Oracle Application Express development environment, users sign in to a shared work area called a workspace. Users are divided into four primary roles:

- **End users** do not have access to development or administrative capabilities. End cannot sign into a workspace and create applications. End users can only run existing database or Websheet applications.
- **Developers** are users who create and edit applications, monitor workspace activity, and view dashboards.
- **Workspace administrators** are users who perform administrator tasks specific to a workspace such as managing user accounts, monitoring workspace activity, and viewing log files.
- **Instance administrators** are superusers that manage an entire hosted instance using the Application Express Administration Services application. Instance administrators manage workspace provisioning, configure features and instance settings, and manage security.

2.15.4 Creating New User Accounts in Administration Services

Create new user accounts in Administration Services on the Manage Developers and Users page.

To create a new user account:

> **Tip:**
>
> You can also access the Create/Edit User page by clicking **Create User** on the Workspace Tasks list on the Instance Administration home page.

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Manage Workspaces, click **Manage Developers and Users**.

   The Manage Developers and Users page appears.
4. Click **Create User**.

   The Create/Edit User page appears.
5. Under User Attribute:
   a. **Username** - Enter the username used to sign in to the system. Restrictions include:
      - Maximum length of 100 characters
      - No spaces
      - Only these special characters are permitted: amerpsand (&) and period (.)
   b. **Email Address** - Enter the valid email address for this user.
   c. **First Name** - Enter the first or given name to further identify the user (optional).
   d. **Last Name** - Enter the last or family name to further identify the user (optional).
   e. **Description** - Enter comments about this user (optional).

f. **Default Date Format** - Specify the default Oracle date format for the user. This option controls the default date format within SQL Workshop.

6. Under Account Privileges:

   a. **Workspace** - Select a workspace in which to create the user.

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

   c. **Accessible Schemas** (null for all) - Enter a colon-delimited list of schemas for which this developer has permissions when using the SQL Workshop. The list of schemas you enter here restricts the user to a subset of the full set of schemas provisioned for the workspace and determines what schema names the user sees in SQL Workshop.

   d. **User is an administrator** - Select **Yes** or **No** to specify if this user should have workspace administrator privileges. Administrators are given access to all components. Additionally, they can manage user accounts, groups, and development services. Components may not be available if they are switched off by Instance Administrators.

   e. **User is a developer** - Select **Yes** or **No** to specify if this user should have developer privileges. Developers create and modify applications and database objects and view developer activity, session state, workspace activity, application, and schema reports.

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

   f. **App Builder Access** - Determines whether a developer has access to App Builder

   g. **SQL Workshop Access** - Determines whether a developer has access to the SQL Workshop.

   h. **Team Development Access** - Determines whether a user has access to the Team Development.

   i. **Account Availability** - Select **Locked** to prevent the account from being used. Select **Unlocked** to allow the account to be used.

7. Under Password:

   a. **Password** - Enter a case-sensitive password.

   b. **Confirm Password** - Enter the password again.

   c. **Require Change of Password On First Use** - Select **No** to require this user to change his or her password at first log in. Select **Yes** to require the user to change the password immediately after logging in the first time.

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

2.15.5 Editing an Existing User Account in Administration Services

Edit user accounts in Administration Services on the Manage Developers and Users page.

To edit an existing user account in Administration Services:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Manage Workspaces, click **Manage Developers and Users**.

   The Manage Developers and Users page appears.
4. To edit account details, click a user.
5. Edit the appropriate attributes.

   > **Tip:**
   >
   > To learn more about an attribute, see field-level Help.

6. Click **Apply Changes**.

   > **See Also:**
   >
   > "Creating New User Accounts in Administration Services (page 2-126)"

2.15.6 Deleting User Accounts in Administration Services

Delete user accounts in Administration Services on the Manage Developers and Users page.

To delete a user account in Administration Services:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Manage Workspaces**.
3. Under Manage Workspaces, click **Manage Developers and Users**.

   The Manage Developers and Users page appears.
4. To edit account details, click a user.
5. Click **Delete User**.
6. Confirm your selection and click **OK**.

2.16 Monitoring Activity Across a Development Instance

Monitor all end user and developer activity for an Oracle Application Express instance.

- Monitoring Activity (page 2-129)
  Monitor all user activity for an instance on the Monitor Activity page.
- Viewing the Signup Survey Report (page 2-130)
  View the Signup Survey report to view the survey questions, answers, and the number of responses.

> **See Also:**
>
> "Viewing Workspace Dashboards (page 1-53)"

2.16.1 Monitoring Activity

Monitor all user activity for an instance on the Monitor Activity page.

To monitor activity:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Monitor Activity**.

   The Monitor Activity page appears.
3. Click the appropriate link to view reports across all workspaces.

   The Monitor Activity page is divided into the following sections:

   - **Activity Summary** - View activity summaries including: **Top Applications**, **Top Workspaces**, **Activity Summary**, and **Packaged App Installs**.
   - **Page Views** - View activity by view, application and user, user, application, workspace, or day.
   - **Service Requests** - View new service requests or signup survey activity.
   - **Workspace Purge** - View a dashboard summary, inactive workspaces, workspaces purged, workspaces that became active, or a workspace purge log.
   - **Logs** - View the mail log, jobs log, automatic delete log, or monitor packaged application installations.
   - **Environment Reports** - View a summary of used operating systems, browser types, user agent, or external sites.
   - **Login Attempts** - View login attempts or developer last login.
   - **Calendar Reports** - View workspaces by last date used, by day and then by application and user, or by hour.
   - **Developer Activity** - View application changes by developer or workspace.
   - **Archived Activity** - View archived activity reports.

2.16.2 Viewing the Signup Survey Report

View the Signup Survey report to view the survey questions, answers, and the number of responses.

Instance administrators can also include survey questions users must complete when running the New Service Signup Wizard.

To view the Signup Survey report:

1. Sign in to Oracle Application Express Administration Services.
2. Click **Monitor Activity**.

   The Monitor Activity page appears.
3. Under Service Requests, click the **Signup Survey**.

   The Signup Survey appears displaying the survey questions, answers, and the number of responses.
4. To clear the Signup Survey report, click **Reset Report**.

A

DBMS_SCHEDULER Jobs

The DBMS_SCHEDULER package provides a collection of scheduling functions and procedures that can be called from any PL/SQL program.

- List of DBMS_SCHEDULER Jobs (page A-1)
  The following table describes DBMS_SCHEDULER jobs that are created in the database when you install Oracle Application Express.

A.1 List of DBMS_SCHEDULER Jobs

The following table describes DBMS_SCHEDULER jobs that are created in the database when you install Oracle Application Express.

Table A-1 DBMS_SCHEDULER Jobs

Job Name	Description	To Learn More
ORACLE_APEX_PURGE_SESSIONS	Purges sessions older than 12 hours (the default). This job runs every hour.	See "Managing Session State for an Instance (page 2-75)"
ORACLE_APEX_MAIL_QUEUE	Sends mail that is in the mail queue every 5 minutes.	See "APEX_MAIL" in *Oracle Application Express API Reference* and "Configuring Email (page 2-53)"
ORACLE_APEX_WS_NOTIFICATIONS	Determines Websheet notifications that must be sent every 30 minutes.	See "About Websheet Applications" in *Oracle Application Express App Builder User's Guide*
ORACLE_APEX_DAILY_MAINTENANCE	Performs nightly maintenance, every day at 0100. This job archives the activity summary and runs the workspace purge process.	See"Purging Inactive Workspaces (page 2-64)"

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