Oracle® Application Express

Application Migration Guide

Release 4.0

E15518-01

June 2010

ORACLE®

Oracle Application Express Application Migration Guide, Release 4.0

E15518-01

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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 Application Migration Guide describes how to convert applications from either Microsoft Access or Oracle Forms to Oracle Application Express.

This preface contains these topics:

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

Topic Overview

This document contains the following chapters:

Title	Description
Getting Started with Application Migrations Workshop	Provides an overview of the steps needed to migrate a Microsoft Access application or Oracle Forms application and generate an Oracle Application Express application.
Overview of the Migration Process	Explains how specific types of logic is handled in Oracle Application Express.
Migrating a Microsoft Access Application	Explains how to migrate a Microsoft Access and generate an Oracle Application Express application.
Converting an Oracle Forms Application	Explains how to convert an Oracle Forms application and generate an Oracle Application Express application.
Oracle Forms Generation Capabilities and Workarounds	Describe how objects are generated during the conversion process, or alternatively how the same functionality can be implemented post-generation if necessary.

Audience

Oracle Application Express Migration Guide is intended for application developers who are building database-centric Web applications using Oracle Application Express. The guide describes how to migrate a Microsoft Access application or Oracle Forms application and generate an Oracle Application Express application.

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.

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

Documentation Accessibility

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

Accessibility of Code Examples in Documentation

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

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

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/support/contact.html` or visit `http://www.oracle.com/accessibility/support.html` if you are hearing impaired.

Related Documents

For more information, see these Oracle resources:

- *Oracle Application Express Application Builder User's Guide*
- *Oracle Application Express Release Notes*
- *Oracle Application Express Installation Guide*
- *Oracle Database 2 Day + Application Express Developer's Guide*
- *Oracle Application Express Administration Guide*

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

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

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

For additional application examples, see the Oracle by Examples (OBEs) Oracle Application Express page. OBEs provide step-by-step examples of how to perform various tasks within Oracle Application Express. See:

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

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

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

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

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

Printed documentation is available for sale in the Oracle Store at

`http://shop.oracle.com/`

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

`http://www.oracle.com/technology/documentation/`

Conventions

The following text conventions are used in this document:

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

1

Getting Started with Application Migrations Workshop

Oracle Application Express Application Migration Workshop (Application Migrations) enables you to migrate a Microsoft Access application or convert an Oracle Forms application to an Oracle Application Express application.

This section describes provides a general description of the steps needed to migrate applications from Microsoft Access or Oracle Forms to Oracle Application Express.

Topics:

- About Migrating a Microsoft Access Application
- About Converting an Oracle Forms Application

About Migrating a Microsoft Access Application

You begin the migration process by exporting your Microsoft Access metadata using the Exporter tool with Oracle SQL Developer Migration Workbench. After that initial step, you use Application Migration to review the retrieved objects and resolve any issues regarding invalid objects. As the final step, you have the option of generating either an application based on valid forms and reports or a maintenance application based on valid tables and views.

Once the application is generated, you can take advantage of all the functionality in Oracle Application Express to further develop and enhance the migrated application.

Topics in this section include:

- Preparation Checklist for Migrating Microsoft Access Applications
- Analyze Your MDB File in Microsoft Access
- About the Microsoft Access Migration to Oracle Application Express Forum

Preparation Checklist for Migrating Microsoft Access Applications

Before you begin the migration process, verify that your system meets these requirements:

- Oracle Application Express version 3.0 or later

  You must install Oracle Application Express 3.0 or later. You use the Application Migration feature within Oracle Application Express to download the Exporter tool as well as to migrate Microsoft Access forms and reports to Oracle Application Express.

- Oracle SQL Developer 2.1 or later (available in English only)

  You must install Oracle SQL Developer version 2.1 or later. You use the Migration Workbench extension to migrate the Microsoft Access schema and data to Oracle.

- Exporter tool version 10.2.0.2.5 or later (available in English only)

  You can install the Exporter tool using the Download Exporter link within Oracle Application Express. For instructions, see "Step 1: Export Microsoft Access Metadata" on page 3-2.

  If you are using Oracle SQL Developer version 2.1 or later, you can access the Exporter tool directly from the Migration menu.

- Microsoft Access

  Your local system must have Microsoft Access installed, and it must be installed where the Exporter tool and `.mdb` file reside.

- Microsoft Data Access Components (MDAC)

  Your local system should have the latest version of Microsoft Data Access Components (MDAC) installed. You can download the latest version from the Microsoft Web site.

- Printer

  Your local system must have a printer installed so that a report can be opened in design view. This is a requirement for exporting your Reports information from an `.mdb` file.

- Analyze your `.mdb` file before you export your database. Follow the instructions in the next section.

Analyze Your MDB File in Microsoft Access

Using Microsoft Access, you should analyze your `.mdb` file before you export your database. Performing these steps will minimize errors in the migration.

1. In Microsoft Access, analyze the objects in your `.mdb` file:
   a. From the Microsoft Access menu bar, select **Tools**, **Analyze**, and then **Documenter**.
   b. Select the **All Object Types** tab, and then click the **Select All** button to select all the objects within the application for analysis.
   c. Remove or resolve any erroneous objects reported by the Documenter.
2. Ensure the application contains no missing references:
   a. In Microsoft Access, launch the design IDE (press **Alt+F11** keys).
   b. From the menu bar, select **Tools** and then **References**.
   c. Remove or resolve any missing references.
3. Ensure the application compiles successfully:
   a. From the menu bar in the IDE view, select **Debug** and then **Compile**.
   b. Resolve any reported errors.
4. Perform a compact and repair on the database:
   - From the menu bar in Microsoft Access, select **Tools**, **Database Utilities**, and then **Compact and Repair Database**.

5. Ensure that all linked tables are valid links:

   a. From the menu bar in Microsoft Access, select **Tools**, **Database Utilities**, and then **Linked Table Manager**.

   b. Verify that all links are up-to-date and pointing to an existing `.mdb` file that is not read-only.

See Also: "Migrating a Microsoft Access Application" on page 3-1

About the Microsoft Access Migration to Oracle Application Express Forum

In addition to Oracle support, you can post questions on the Microsoft Access Migration to Oracle Application Express:

`http://forums.oracle.com/forums/forum.jspa?forumID=356`

About Converting an Oracle Forms Application

You begin the process by converting Oracle Forms metadata to Extensible Markup Language (XML). Then, you create a conversion project within Oracle Application Express. Once you have reviewed and edited the application metadata within the project, you generate an Oracle Application Express application. Then, you can customize your application and change application attributes or add new pages within Application Builder.

Topics in this section include:

- Preparation Checklist for Converting Oracle Forms Applications
- About the Oracle Application Express Forum

Preparation Checklist for Converting Oracle Forms Applications

Before you begin the conversion process, you must:

- Install Oracle Application Express version 3.2 or later

  You must install Oracle Application Express 3.2 or later to convert an Oracle Forms application to Oracle Application Express.

- Install Oracle*9i* Oracle Developer Suite or later

  You must install Oracle Developer Suite to convert Oracle Forms applications and Oracle Reports to XML format. Specifically, you need:

  – Oracle Forms Builder

    You must have Oracle Forms Builder installed to access the `Forms2XML` conversion tool and the File Conversion utility for converting Oracle Forms application files.

  – Oracle Reports Builder

    You must have Oracle Reports installed, to convert Oracle Reports (including, binary (`.RDF`), `ASCII` (`.REX`), and `.JSP`) to XML format.

- Convert Oracle Forms Metadata

  To start the conversion process, you convert:

  – Oracle Forms FormModule (`.FMB`), ObjectLibrary `.OLB`), or MenuModule (`.MMB`) files to XML format using the Forms to XML conversion tool, `Forms2XML`

  - Oracle Reports (including, binary (.RDF), ASCII (.REX), and .JSP) to XML format using the File Conversion option in Reports Builder
  - PL/SQL library .PLL files to .PLD text files using the File Conversion option in Oracle Forms Builder
- Associate Oracle Forms Schema with Oracle Application Express workspace

  You must ensure the schema associated with your Oracle Application Express workspace contains the database objects for your Oracle Forms application. Further information on Oracle Application Express workspaces and associating schemas is provided in subsequent chapters.

See Also: "Converting an Oracle Forms Application" on page 4-1

About the Oracle Application Express Forum

In addition to Oracle support, you can post questions on the Oracle Application Express Forum:

http://forums.oracle.com/forums/forum.jspa?forumID=137

2

Overview of the Migration Process

Whether converting from Oracle Forms or migrating from Microsoft Access, Oracle Application Express Application Migration is an effective tool to start your conversion project. This section outlines the tool's capabilities and provides important information that should be reviewed before starting a conversion project.

Topics:

- Why Migrate to Oracle Application Express?
- Before Starting the Conversion Process
- Evaluating Whether to Convert or Build an Application from Scratch
- Understanding What Oracle Application Express Application Conversion is Not
- Key Differences with Oracle Application Express
- Creating an Oracle Application Express Migration Project

Why Migrate to Oracle Application Express?

Oracle Forms modernization projects are often undertaken to convert legacy applications to the latest Oracle Database version and enable developers to satisfy user demands for greater user interactivity and Web 2.0 capabilities.

Microsoft Access presents organizations with a myriad of manageability issues. Often simple applications grow in size and complexity and become mission critical. These same applications are often scattered throughout the network making maintenance, backups, security, and access increasingly costly and inconsistent. One key reason for migrating from Microsoft Access to an Oracle database is to consolidate the data and build common applications based on a single data source.

Migrating to Oracle Application Express provides a robust, scalable, secure application development tool that takes full advantage of the Oracle database. Oracle Application Express requires only a Web browser and no client software for development, deployment, or runtime. The resulting Web pages are rendered as hypertext mark-up language (HTML). The Oracle Application Express development environment provides many out-of-the-box features, such as interactive reports and flash charts, and enables developers to rapidly deploy Web application that greatly enhance user interactivity.

Before Starting the Conversion Process

Before starting a conversion project, it is important to learn how to build applications with Oracle Application Express. The first step is to install Oracle Application Express

within an Oracle Database instance. Oracle Application Express requires an Oracle database that is release 10.2.0.3 or later. To learn more, see *Oracle Application Express Installation Guide*. To learn how to build applications based on existing Oracle database tables, review *Oracle Database 2 Day + Application Express Developer's Guide*.

The Oracle Application Express development environment utilizes wizards within a declarative environment and enables you to easily extend components using SQL and PL/SQL. You can further extend the Oracle Application Express framework by incorporating JavasScript and Asynchronous JavasScript and XML (AJAX). To learn more, see "Implementing Business Logic" on page A-6.

Evaluating Whether to Convert or Build an Application from Scratch

Thanks to how quickly you can build a new application with in Oracle Application Express, it may seem quicker to build an application from scratch rather than loading the source application definitions into an Oracle Application Express conversion project and then generating an initial design.

When compared with developing an application from scratch, converting an existing application provides many benefits. Once the source files for the original application are loaded into the Oracle Application Express project, all developers can review the pertinent information without needing to refer back to Oracle Forms or Microsoft Access. There is no need for developers to become familiar with the source tool development environment.

Having the forms, reports, and queries loaded into a conversion project also provides an easy way to review the functionality and application logic provided in the old application. Even if these components are not used to generate an Oracle Application Express application, you can view, copy, and reuse the underlying SQL.

When converting from Oracle Forms another major benefit is the ability to track the conversion to ensure you fully implement all the business logic within the new application. By utilizing annotations within the conversion project, you can assign priorities, resources, and add notes or tags to any component. Completion progress can also be tracked to provide low-level project management capabilities.

Understanding What Oracle Application Express Application Conversion is Not

When you convert an application to Oracle Application Express, you do not simply load the source files, press a few buttons, and magically generate a completed application. The conversion capabilities are designed to provide an initial design that you then must enhance and expand to fully replicate the original application. The generated applications use the same Create Application wizard that you use to build applications based on existing Oracle tables or views. However, instead of needing to specify the generated pages, these are determined from the information loaded into the conversion project. For more information on how various source components are generated, see "Oracle Forms Generation Capabilities and Workarounds" on page A-1.

Once you have generated the initial design, you can take full advantage of the rapid application development capabilities available in Oracle Application Express to enhance the generated pages. Built-in wizards also enable you to quickly expand your new application by adding new pages and links as necessary.

Key Differences with Oracle Application Express

Understanding some of the key differences between Oracle Application Express and Oracle Forms or Microsoft Access will greatly assist you in redeveloping your applications

Topics:

- Stateless Web Applications
- Evaluating User Interface Design
- About Business Logic Replication

Stateless Web Applications

Oracle Application Express does not maintain a constant state between the client (that is, the Web browser) and the database, but performs stateless transactions. A database session is only utilized when requesting or submitting a page. Because Oracle Application Express is stateless between the start and the end of a logical transaction, (for example, when updating a record) it is imperative to use optimistic locking rather than pessimistic locking.

Oracle Forms and Microsoft Access use pessimistic locking whereby the record is locked when a user requests a record for update. This lock is maintained until the record is completed (or committed) or canceled (or rolled back). One of the key reasons for not using pessimistic locking within a stateless Web application is that if a user closes their Web browser or looses their connection in the middle of a transaction, the record would remain locked.

Once form pages are generated by the Create Application or Create Page wizards, Automatic Row Fetch and Automatic Row Processing processes are generated which incorporate the MD5 checksum validation to enforce the optimistic locking. Before the record is sent to the database to be updated or deleted the MD5 initially created is compared to the MD5 value of the current database record to ensure they are the same. If they differ then the database record has been updated since it was queried and an error displays to the user.

One consequence of an HTML application is that a rendered page does not perform actions such as validations or hiding and showing fields as the user interacts with the page. Validations are performed when the user submits the page for processing. However, you can change this default behavior by utilizing JavaScript and AJAX. The time needed to load a page is influenced by the transmission speed and the speed with which the Web browser renders the page. Therefore, it is not advisable to attempt to completely replicate the client-side interactivity within a HTML application as the weight (or size) of the page will adversely affect page performance. As a best practice, only implement critical client-side actions.

Evaluating User Interface Design

Oracle Forms and Microsoft Access use different underlying technologies to present screens to users. In contrast, Oracle HTTP Server renders HTML through a Web browser. As a consequence the design of screens and items is markedly different.

When thinking about screen design, some screen layouts commonly used in Oracle Forms are not readily reproducible in Oracle Application Express. Oracle Application Express renders a complete HTML page and does not support the concept of windows and canvases. Oracle Application Express also has a limitation of one tabular form per page. Therefore, it is important to understand that it may be difficult to exactly

reproduce the screen layouts of the source application. This also presents opportunities to redesign some of the key business processes and potentially streamline them or include addition paths to provide greater flexibility.

For example, a common layout in Oracle Forms, such as a master-detail-detail form, can be redeployed using a master form with reports for each of the detail views that link to separate pages for editing these details. These same detail pages can also be accessed from elsewhere in the application very easily.

Oracle Forms often uses the same screen for both querying records and then updating a single record at a time. This is achieved by performing a query directly on the form used for updating a single record. Oracle Application Express does not support the notion of Enter Query and Execute Query. Therefore, the conversion project generates an interactive report where records can be queried with a link to a form for editing a single record.

Oracle Application Express does not support coordinate positioning of fields on a page out-of-the-box, but uses HTML tables to set out elements such as labels and items. Items can be specified with attributes (such as New Line, New Field, Column Span, and Row Span) to determine how items are located within the HTML table.

About Business Logic Replication

One of the major facets of converting from either Oracle Forms or Microsoft Access is replicating the business user interface specific logic. It is important to separate business logic from logic for manipulating the user interface. Given the differences in user interface implementation, the majority of the associated logic from the original application will no longer be relevant. Oracle Application Express uses processes, computations, and validations to implement business logic. Some logic can also be replicated by utilizing default and source values within the Oracle Application Express item definition.

The key to ensuring your new application performs correctly is to understand how and when each of these functions operates. The ability to add conditional logic to any component within Oracle Application Express (including regions, items, branches, processes, computations and validations) also provides extensive flexibility when replicating the original business logic. For more information, see "Implementing Business Logic" on page A-6.

Creating an Oracle Application Express Migration Project

In an Oracle Forms conversion project, the data structures are already defined in an Oracle Database and do not necessarily need to be migrated. However, with Microsoft Access the data structures and data must first be migrated across to Oracle using SQL Developer. For more information on how to migrate data structures "Migrating a Microsoft Access Application" on page 3-1.

Once the data structures are correctly implemented into a schema accessible to Oracle Application Express, then the basic process for conducting a conversion is to load the source application files into a project. The project is designed to show all the applicable components and provide the ability to generate an initial application design. After reviewing the project components and selecting the valid screens, reports, and items to be included, you can generate an Oracle Application Express application. With both a Forms Conversion project and an Access Migration project, some components loaded into a project cannot be generated. To learn more about generation capabilities and workarounds, see "Oracle Forms Generation Capabilities and Workarounds" on page A-1.

3

Migrating a Microsoft Access Application

This section describes the steps to migrate applications from Microsoft Access to Oracle Application Express.

Topics:

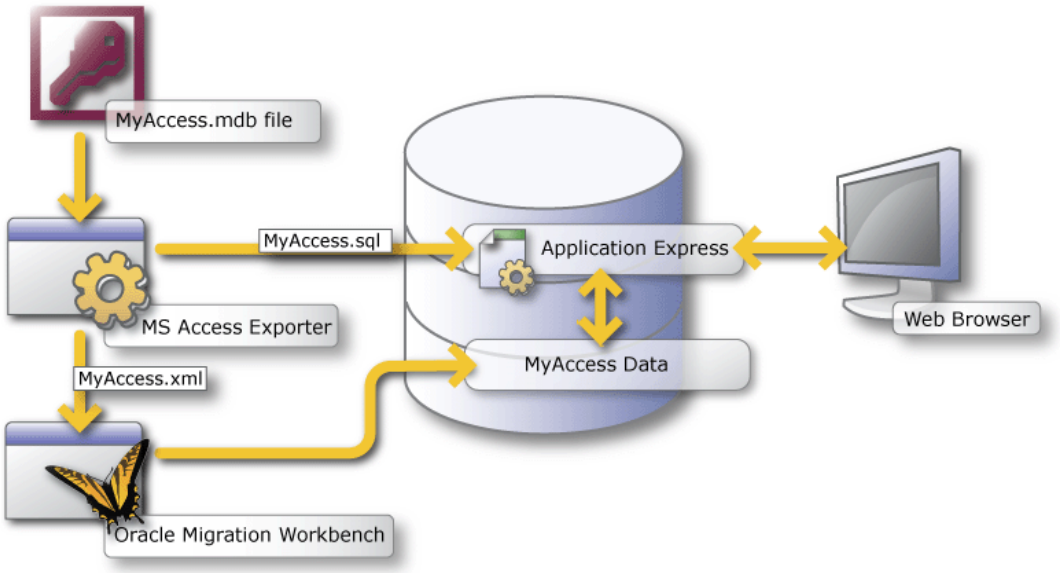
- How to Migrate a Microsoft Access Application
- Step 1: Export Microsoft Access Metadata
- Step 2: Migrate the Microsoft Access Database to Oracle
- Step 3: Create a Workspace and Add Oracle Application Express Users
- Step 4: Create a Migration Project
- Step 5: Review Your Retrieved Objects
- Step 6: Generate the Oracle Application Express Application
- Deleting a Migration Project

How to Migrate a Microsoft Access Application

Before You Begin

Read "Preparation Checklist for Migrating Microsoft Access Applications" on page 1-1.

To migrate applications from Microsoft Access to Oracle Application Express, you must perform the steps described in this section. This illustration outlines the entire process:



The migration process consists of the following steps:

Step 1: Export Microsoft Access Metadata

Step 2: Migrate the Microsoft Access Database to Oracle

Step 3: Create a Workspace and Add Oracle Application Express Users

Step 4: Create a Migration Project

Step 5: Review Your Retrieved Objects

Step 6: Generate the Oracle Application Express Application

> **Important:** You must follow the steps in the exact sequence presented in this section.

Step 1: Export Microsoft Access Metadata

To export your metadata from Microsoft Access, download the correct version of the Exporter tool, as explained in this section. Then, run the Exporter and extract the metadata from the Microsoft Access `.mdb` file. The metadata contains the necessary database and application schema information.

The export process creates two output files:

- database (`.xml` file)
- application (`.sql` file)

Exporter Tool System Requirements

To use the Exporter tool, the Microsoft Windows operating system where the Exporter tool runs must include the following libraries:

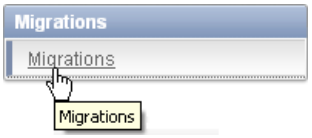
- Microsoft DAO 3.6 Object Library
- Microsoft ActiveX Data Objects 2.5 Library

Downloading the Exporter Tool

> **Note:** Follow the instructions in this section if you are downloading the Exporter tool from Oracle Application Express release 3.0 or later. Alternately, you skip the following task and access the Exporter directly from Oracle SQL Developer using the Migration menu.

To download the Exporter tool for Microsoft Access:

1. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 3-7.
2. Click the **Application Builder** icon.
3. Click **Migrations** on the right side of the page.



4. Under Tasks, click **Download Exporter for Microsoft Access**.
5. In the Download column, click the zip file that corresponds to your version of Microsoft Access. For example, download the `omwb2003.zip` file if you are using Microsoft Access 2003.
6. Save the file.
7. Unzip the file. You must *replace* the following files with the updated versions in the `msaccess_exporter` directory where you unzipped Oracle Migration Workbench:
   - `schema.dtd` file
   - Exporter tool file: `omwb<`*version*`>.mde`
   - online help file: `omwb.chm`

   Be sure to invoke the export from this directory.

Exporting Your Metadata

To export your metadata, follow the instructions found in the help file for the Exporter tool. To find the instructions, do one of the following:

- Launch the Exporter tool, and click the **Help** button.
- Open the help file (`omwb.chm`) contained in the Exporter zip file.

The instructions appear in the topic called Exporter Overview.

> **See Also:** "Step 2: Migrate the Microsoft Access Database to Oracle" on page 3-3 and "How to Migrate a Microsoft Access Application" on page 3-1

Step 2: Migrate the Microsoft Access Database to Oracle

To migrate the Microsoft Access database to Oracle:

1. Start Oracle SQL Developer version 2.1 or later. For example:

a. Create an Oracle user named `MIGRATIONS` with the default tablespace `USER` and temporary tablespace `TEMP` and grant it at least `RESOURCE`, `CREATE SESSION`, and `CREATE VIEW` privileges.

b. Create a database connection named `Migration_Repository` that connects to the `MIGRATIONS` user.

c. Right-click the connection, select **Migration_Repository**, and then select **Migration Repository** and then **Associate Migration Repository** to create the repository.

2. Load the database metadata (`.xml` file) created in step 1. On the Oracle SQL Developer toolbar, select **Tools**, **Migration**, and then **Capture Microsoft Access Exported XML**.

   This captures the schema and creates a Captured Model of the Microsoft Access database.

3. Convert the captured database schema to Oracle. Right-click **Captured Model** and select **Convert to Oracle Model**.

4. Generate the migrated Oracle database schema. Right-click **Converted Model** and select **Generate**.

   The generated DDL statements should execute against your Oracle database instance, to generate the migrated schema objects.

For more information about Oracle SQL Developer Migration Workbench, see:

`http://www.oracle.com/technology/tech/migration//workbench/index_sqldev_omwb.html`

Verifying If Generated DDL Executes Against the Appropriate Instance

When using Oracle SQL Developer Migration Workbench, you must verify that the generated DDL statements are executed against the same instance where Oracle Application Express 3.0 or later is installed. If you select a Least Privilege Schema Migration, the migrated objects can be created in an existing schema on your database instance. Otherwise, a schema of the same name as the captured database (for example, *Northwind*) is created on your database instance.

The migrated Oracle database schema objects must be in the same instance where Oracle Application Express 3.0 is installed. If they are not, you will not be able to complete the next step.

See Also: "Step 3: Create a Workspace and Add Oracle Application Express Users" on page 3-4 and "How to Migrate a Microsoft Access Application" on page 3-1

Step 3: Create a Workspace and Add Oracle Application Express Users

A **workspace** is a virtual private database allowing multiple users to work within the same Oracle Application Express installation while keeping their objects, data and applications private. Each workspace has a unique ID and name.

An Oracle Application Express administrator can create a workspace manually within Oracle Application Express Administration Services or have users submit requests. Oracle Application Express Administration Services is a separate application for managing an entire Oracle Application Express instance. See "Creating Workspaces" and "Managing Workspace Requests"in *Oracle Application Express Administration Guide*.

See Also: *Oracle Database 2 Day + Application Express Developer's Guide* if you are new to Oracle Application Express

Topics:

- Creating a Workspace Manually
- Creating Oracle Application Express Users
- Logging in to Your Oracle Application Express Workspace

Creating a Workspace Manually

To create an Oracle Application Express workspace manually:

1. Log in to Oracle Application Express Administration Services.

   Oracle Application Express Administration Services is a separate application for managing an entire Oracle Application Express instance. You log in using the `ADMIN` account and password created or reset during the installation process.

   a. 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:

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

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

        Where:

        `hostname` is the name of the system where Oracle XML DB HTTP Server is installed.

        `port` is the port number assigned to Oracle XML DB HTTP Server. In a default installation, this number is 8080.

        `apex` is the database access descriptor (DAD) defined in the configuration file.

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

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

        Where:

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

        `port` is the port number assigned to Oracle HTTP Server. In a default installation, this number is 8888. See *Oracle Application Express Listener Installation Guide*.

        `apex` is the database access descriptor (DAD) defined in the configuration file.

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

      – If your setup uses 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.

b. On the Login page:

- In Username, enter `admin`.
- In Password, enter the Oracle Application Express administrator account password you specified when you installed Oracle Application Express.
- Click **Login**.

See Also: See "Logging in to Oracle Application Express Administration Services" in *Oracle Application Express Administration Guide*.

Next, create a workspace.

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

   The Create Workspace Wizard appears.
4. For Identify Workspace, enter a workspace name and description and click **Next**.
5. For Identify Schema, specify the Oracle Forms application schema:
   a. Re-use existing schema - Select **Yes**.
   b. Schema Name - Select a schema from the list.
   c. Click **Next**.
6. For Identify Administrator, enter the Workspace administrator information and click **Next**.
7. Confirm your selections and click **Create Workspace**.

Creating Oracle Application Express Users

To create an Oracle Application Express user account:

1. Log in to Oracle Application Express Administration Services. See "Logging in to Oracle Application Express Administration Services" in *Oracle Application Express Administration Guide*.
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 Attributes, enter:

a. **Username** - Enter the username used to log in to the system. Restrictions include:
   - Maximum length of 100 characters
   - No spaces
   - Only these special characters are permitted: 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).

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. **User is an administrator** - Specify if this user should have workspace administrator privileges.

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

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

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

   e. **Application Builder Access** - Determines whether a developer has access to the Application Builder.

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

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

   h. **Account Availability** - Select **Locked** to prevent the account from being used. Select **Unlocked** to allow the account to be used..

7. Under Password:

   - **Password** - Enter a case sensitive password.
   - **Confirm Password** - Enter the password again.
   - **Require Change of Password On First Use** - 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**.

Logging in to Your Oracle Application Express Workspace

Once you create a workspace, you must log in to it using your login credentials (that is, the workspace name, user name, and password).

See Also: See "Creating Workspaces" and "Managing Workspace Requests" in *Oracle Application Express Administration Guide*

To log in to a workspace:

1. In a Web browser, navigate to the Oracle Application Express Login page. By default, Oracle Application Express installs to the following location:
   - If your setup uses the embedded PL/SQL gateway, go to:

     `http://hostname:port/apex`

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

       For users who have upgraded from earlier releases, or who have a custom configuration, this value may be `htmldb` or something else. Verify your DAD with your Oracle Application Express administrator.
   - If your setup uses the Oracle Application Express Listener, go to:

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

     Where:

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

     `port` is the port number assigned to Oracle HTTP Server. In a default installation, this number is 8888. See *Oracle Application Express Listener Installation Guide*.

     `apex` is the database access descriptor (DAD) defined in the configuration file.

     For users who have upgraded from earlier releases, or who have a custom configuration, this value may be `htmldb` or something else. Verify your DAD with your Instance administrator.
   - If your setup uses Oracle HTTP Server (Apache) and `mod_plsql`, go to:

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

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

       ORACLE_BASE`\`*ORACLE_HOME*`\install\portlist.ini`
       ORACLE_BASE`\`*ORACLE_HTTPSERVER_HOME*`\Apache\Apache\conf\httpd.conf`

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

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

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

The Login page appears.

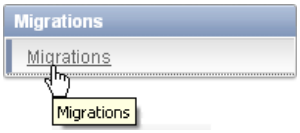
2. Under Login, enter the following:
   - In the Workspace field, enter the name of your workspace.
   - In the Username field, enter your user name.
   - In the Password field, enter your case-sensitive password.
3. Click **Login**.

   Note that, depending on your setup, you might be required to change your password when you log in for the first time.

Step 4: Create a Migration Project

To create a migration project:

1. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 3-7.
2. Click the **Application Builder** icon.
3. Click **Migrations** on the right side of the page.



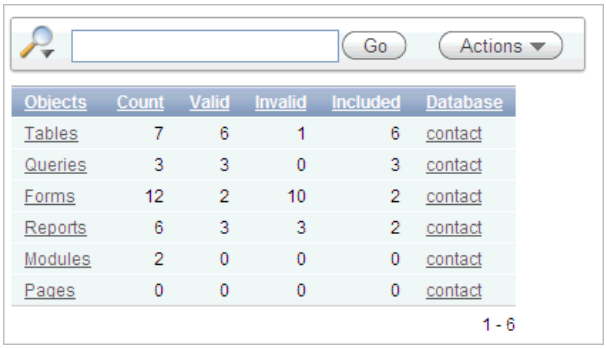
4. On the Application Migrations page, click **Create Project**.

   The Create Migration Project wizard appears. Note that the steps included in the wizard appear in a flowchart on the left of the page.
5. Enter the project details:
   a. Project Name - Enter a unique name. You might want to use the same name as the Microsoft Access `.mdb` file you used to create the project.
   b. Type - Select **Access**.
   c. Description - Enter a meaningful description for this project. You might want to describe the Microsoft Access `.mdb` file that you used to create the project.
   d. Schema - Select the schema.

      The default schema is the schema associated with your workspace. If multiple schemas are associated with your workspace, all associated schemas appear in the select list, arranged in alphabetical order. When this situation exists, select the schema associated with the SQL script you want to upload.
   e. Migration Export File - Click **Browse** and select the `.sql` file created by the Exporter tool for Microsoft Access.
   f. Click **Next**.

6. Review the project details, and click **Finish**.

   The project page appears.

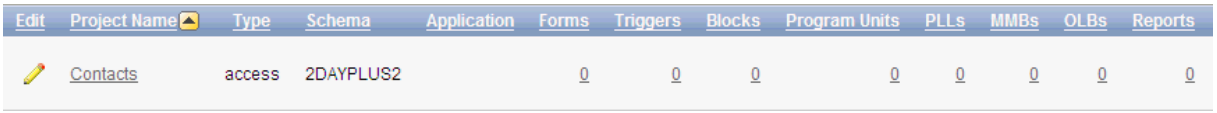


   This page displays as an interactive report. To customize the report, use the Search bar at the top of the page. See "Customizing Interactive Reports" in *Oracle Application Express Application Builder User's Guide*.

   See Also: "About the Application Migrations" on page 3-10, "Step 5: Review Your Retrieved Objects" on page 3-11, and "How to Migrate a Microsoft Access Application" on page 3-1

About the Application Migrations

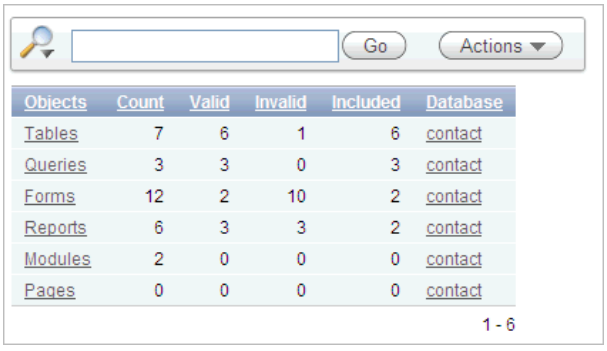
The Application Migrations page initially shows a high-level overview of the Microsoft Access objects retrieved from your Microsoft Access database.



This page displays the project name, project type, related application, and number of objects.

After you generate an application from a migration project, the application name displays in the Application column. To link to the application, select the application name.

To view project details, click the project name. The project page appears.

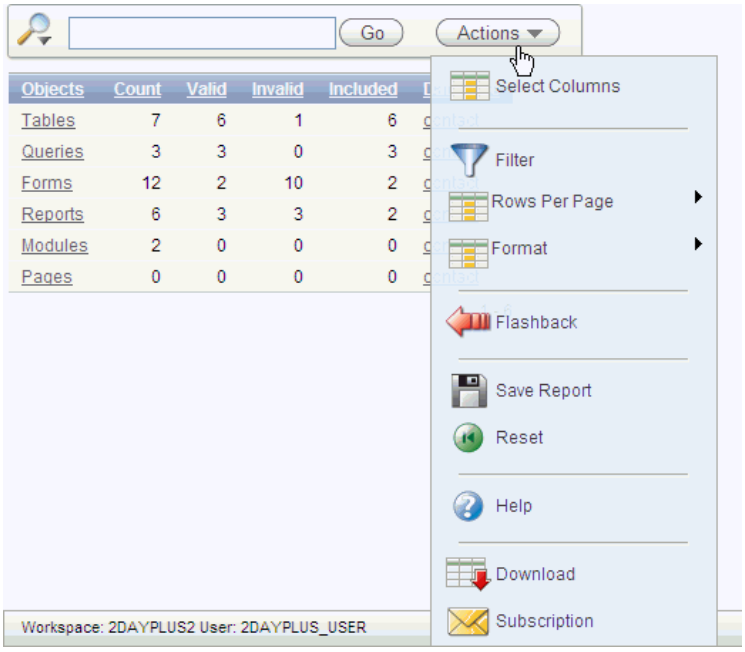


Note that your project might not include all object types. The project page lists only object types that exist in your database.

See Also: "Step 5: Review Your Retrieved Objects" on page 3-11 and "How to Migrate a Microsoft Access Application" on page 3-1

Utilizing Interactive Reports

Many pages in Application Migration Workshop display as interactive reports. You can customize the appearance of these pages using the Search bar at the top of each page.



Use the Search bar to create custom searches and customize and filter the information that appears on the page.

Available controls on the Search bar include:

- **Search icon** - Resembles a magnifying glass. Click this icon to narrow your search to only specific columns. To search all columns, select **All Columns**.
- **Text area** - Enter case insensitive search criteria (wild card characters are implied) and then click **Go**.
- **Go button** - Executes a search or applies a filter.
- **Actions menu** - Use this menu to customize an interactive report.

To learn more, see "Customizing Interactive Reports" in *Oracle Application Express Application Builder User's Guide*.

Step 5: Review Your Retrieved Objects

Next, you want to select the objects to include in the migration. The initial list consists of the Microsoft Access application metadata that is retrieved, both valid and invalid.

To include an object, it must have a status of Valid. By default, all objects with a Valid status are selected.

From within Application Migration, you can fix objects identified as invalid so that they can be included. Since the Application Migration also identifies tables without

primary keys and objects without user interface defaults, you can correct those situations to maximize application design recovery.

> **Tip:** Extensive Oracle documentation is available for broadening your knowledge of database concepts and objects. For example, to learn more about primary keys and constraints, see *Oracle Database Concepts* or *Oracle Database Application Developer's Guide - Fundamentals*, which you can download from:
>
> `http://www.oracle.com/technology/documentation/index.html`

Topics:

- Reviewing Retrieved Tables
- Reviewing Retrieved Queries
- Reviewing Retrieved Forms
- Reviewing Retrieved Reports
- Reviewing Database, Module, and Pages Information

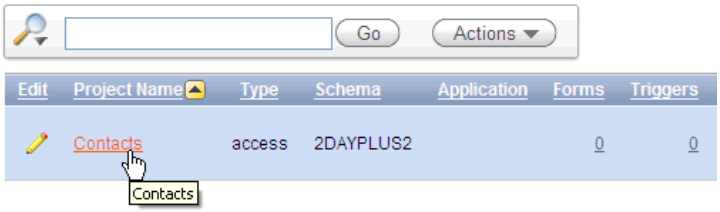
Reviewing Retrieved Tables

Next, review the Oracle tables retrieved from the Microsoft Access database. Application Migration identifies invalid tables without primary keys as well as those without user interface defaults, which you can add before migrating.

After you update the tables, select the ones you want to include in the migration. If you do not include a table, all forms and reports based on the table are excluded from the migration.

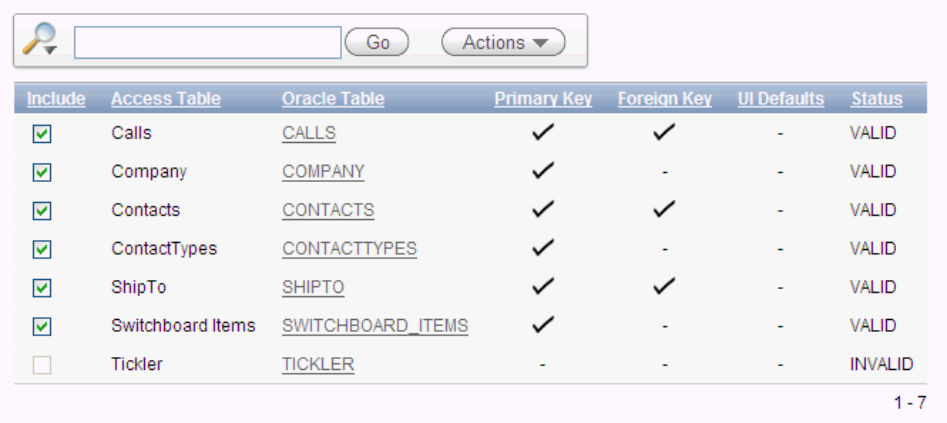
To review retrieved tables:

1. From the project page, click the project name.



2. From the project page, click **Tables**.

   The Tables page appears, showing the status of the objects ready for migration.



For each Microsoft Access table, the Tables page shows:

- **Oracle Table** - The corresponding Oracle table, which defaults to the Microsoft Access table name in all capital letters.

  Note that the name might also differ from the original one because of the collision management facility in Oracle Migration Workbench. For information about naming guidelines and restrictions, click **Help** in Oracle Migration Workbench and go to the Frequently Asked Questions section.

  If the Microsoft Access object was not successfully migrated to Oracle, then this field will not have a corresponding Oracle table name. Instead, it will contain a link to a page where you can create a corresponding Oracle table.

- **Primary Key** - Indicates if a primary key exists for the table.

  A table without a primary key is considered invalid in Application Migration. You can create a primary key at this point. All tables you want to migrate should have a primary key.

- **Foreign Key** - Indicates if a foreign key exists for the table.

  If you know a relationship exists between two tables, you should create a foreign key. You can do this in Object Browser by creating a Foreign Key Constraint. For more information, see *Oracle Application Express SQL Workshop Guide*.

- **UI Defaults** - Indicates if user interface defaults are set for the table.

  User interface defaults are used by Oracle Application Express to populate initial values for region and item properties. Using user interface defaults provides consistency across multiple applications or across multiple pages in an application.

- **Status** - Table status as either Valid or Invalid.

  Only valid tables can be included in the migration.

3. To create a table:

   a. On the Tables page, click the link in the Oracle Table column for the table you want to create.

      The Object Browser opens.

   b. Click the **Create** button.

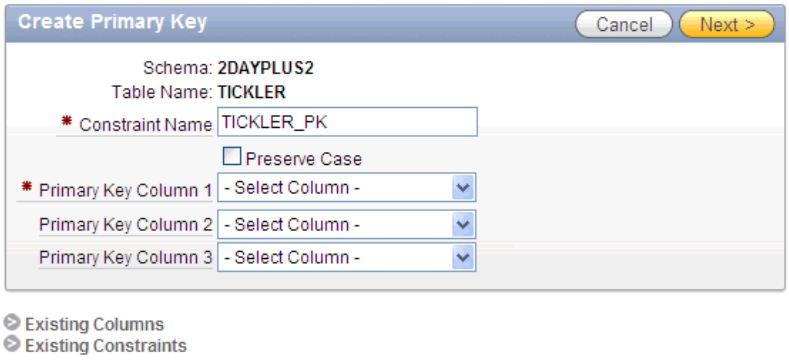
   c. From the list of object types, select **Table**.

d. Follow the on-screen instructions.

4. To add a primary key:

   a. On the Tables page, click the Oracle table name.

   b. In the Tasks list on the right, click **Create Primary Key**.



   c. For Constraint Details, fill in the information.

Tip: To review the list of existing columns or constraints, click the **Existing Columns** or **Existing Constraints** links.

   d. Click **Next**.

   e. Confirm the information and click **Finish**.

5. To add an index:

   a. On the Tables page, click the Oracle table name.

   b. In the Tasks list on the right, click **Create Index**.

   c. Select the type of index you want to create on this table.

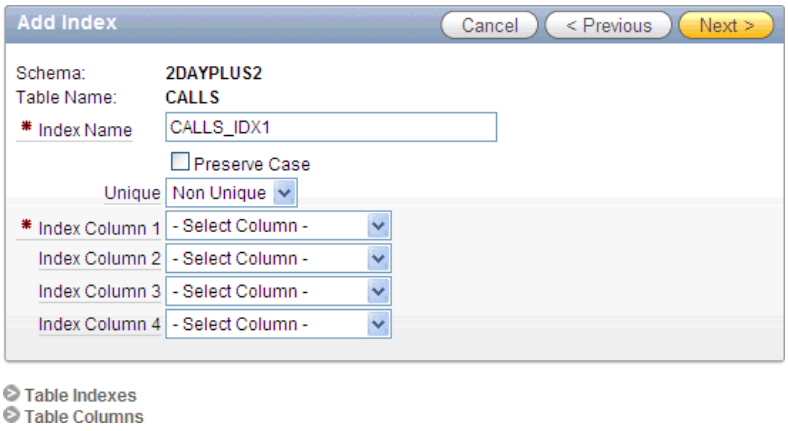
      For indexing `NUMBER`, `VARCHAR`, and `DATE`, select **Normal**. For indexing `CLOB` columns, select **Text**.



   d. Click **Next**.

   e. For Index Definition, fill in the information.

      The following graphic shows the fields to fill out if you selected Normal as the type of index.



Tip: To review the list of existing table indexes or columns, click the **Table Indexes** or **Table Columns** links.

f. Click **Next**.

g. Confirm the information and click **Finish**.

6. To set user interface defaults:

   a. On the Tables page, click the Oracle table name.

   b. In the Tasks list on the right, click **UI Defaults**.

   c. On the UI Defaults page, click **Create Defaults**.

   d. On the Create Table Dictionary Defaults page, click **Create Defaults**.

      The Table Dictionary page appears. Note that you are now working within SQL Workshop, the component of Oracle Application Express with utilities to load and unload data from an Oracle database, generate DDL, view object reports, and restore dropped database objects.

   e. On the Table Dictionary report, click the Oracle table name in the Object Name column.

      The Table and Column Properties page appears, listing column information as it will appears in forms and reports.

   f. To edit the information, click the Column name.

      The Column Defaults page appears. You can update the column label, change the sequence the columns will appear by default, and so on.

   g. Click **Apply Changes** to save your updates.

7. To include tables in the migration, select them in the left column.

8. Click **Apply Changes** to save your selections.

See Also: "Reviewing Retrieved Queries" on page 3-15, "Step 5: Review Your Retrieved Objects" on page 3-11, and "How to Migrate a Microsoft Access Application" on page 3-1

Reviewing Retrieved Queries

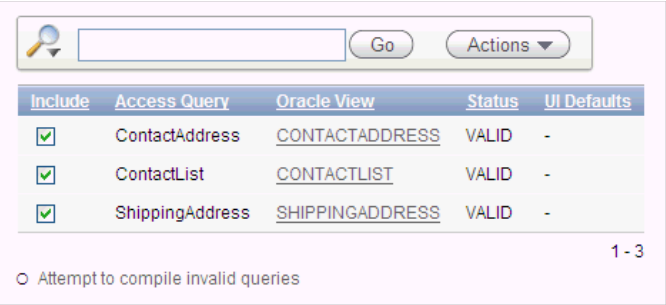
Next, review the queries retrieved from the Microsoft Access export. Application Migration identifies invalid queries as well as those without user interface defaults, which you can set before migration.

After you update the views, select the ones you want to include in the migration. If you do not include a query, any forms or reports based on the query are excluded from the migration.

To review retrieved queries:

1. From the project page, click **Queries**.

   The Queries page appears, showing the status of the objects ready for migration.



   For each Microsoft Access query, the Queries page shows:

   - Oracle View - The corresponding Oracle view, which defaults to the Microsoft Access query name in all capital letters.

     If the Microsoft Access object was not successfully migrated to Oracle, then this field will not have a corresponding Oracle view name. Instead, it will contain a link to a page where you can create a corresponding Oracle view.

   - Status - Query status as either Valid or Invalid.

     Only valid queries can be included in the migration.

   - UI Defaults - Indicates if user interface defaults are set for the query.

     User interface defaults are used by Oracle Application Express to populate initial values for region and item properties. Using user interface defaults provides consistency across multiple applications or across multiple pages in an application.

2. To run a bulk process that attempts to compile all invalid queries, click **Attempt to compile invalid queries**.

   Using this option can validate some queries that show a status of invalid when initially migrated.

3. To create a view:

   a. On the Queries page, click the link in the Oracle View column for the view you want to create.

      The Oracle View appears. The editor is populated with the syntax of the original Microsoft Access query. You may need to edit the syntax to ensure it is valid Oracle syntax before compiling.

   b. Click the **Compile** button.

   c. From the list of object types, select **View**.

   d. Follow the on-screen instructions.

4. To edit a query:

   a. On the Queries page, click the Oracle view you want to edit.

b. Click **Compile** to find the invalid part of the query.

   The Microsoft Access Query syntax appears in the edit window. It may require some modification to make it valid Oracle syntax.

c. Click **Access Query** to review the initial query and compare it to the converted query.

d. Update the query and recompile it.

e. When it is validated, click the **Queries** breadcrumb.

f. To include this validated query, select it in the left column on the Queries page and click **Apply Changes**.

5. To set user interface defaults:

   a. On the Queries page, click the Oracle view.

   b. In the Tasks list on the right, click **UI Defaults**.

   c. On the UI Defaults page, click **Create Defaults**.

   d. On the Create Table Dictionary Defaults page, click Create Defaults.

      The Table Dictionary page appears. Note that you are now working within SQL Workshop, the component of Oracle Application Express with utilities to load and unload data from an Oracle database, generate DDL, view object reports, and restore dropped database objects.

   e. To edit the information, click the Column name.

      The Column Defaults page appears. You can update the column label and change the sequence the columns will appear by default.

   f. To edit the information, click the Column name.

      The Column Defaults page appears. You can update the column label, change the sequence the columns will appear by default, and so on.

   g. Click **Apply Changes** to save your updates.

6. To include queries in the migration, select them in the left column.

7. Click **Apply Changes** to save your selections.

See Also: "Reviewing Retrieved Forms" on page 3-17, "Step 5: Review Your Retrieved Objects" on page 3-11, and "How to Migrate a Microsoft Access Application" on page 3-1

Reviewing Retrieved Forms

Next, review the forms retrieved from the Microsoft Access export. Application Migration identifies invalid forms and lists additional information, such as the form's source type and source name.

For valid forms with a source type of table, you can select the type of object you want the form to become within Oracle Application Express: form (default), report and form, or tabular form.

Microsoft Access forms based on a query are migrated to Oracle Application Express forms. Microsoft Access forms based on a SQL query are migrated to Oracle Application Express reports.

After you update the forms, select the ones you want to include in the migration.

To review retrieved forms:

1. From the project page, click **Forms**.

   The Forms page appears, showing the status of the objects ready for migration.

Include	Access Form	Source Type	Source Name	Status	Startup Form	Parent Form	Migrate To
☑	ContactTypes	Table	ContactTypes	VALID	-	-	Form
☐	ActionItem	SQL Query	SELECT Tickler.TicklerID, Tickler.ContactID, Tickler.TicklerDate, Tickler.TicklerText FROM Tickler WHERE (((Tickler.ContactID)=[forms]![Contacts]![ContactID]));	INVALID	-	-	-
☐	CallListSub	SQL Query	SELECT Calls.* FROM Calls ORDER BY Calls.CallDate, Calls.CallTime;	INVALID	-	Contacts	-
☐	CallNotesSub	SQL Query	SELECT Calls.CallID, Calls.ContactID, Calls.Notes FROM Calls;	INVALID	-	-	-
☐	Company	SQL Query	SELECT Company.* FROM Company WHERE (((Company.CompanyID)=[forms]![Contacts]![cboCompany]));	INVALID	-	-	-

   For each Microsoft Access form, the Forms page shows the following information, if available:

   - Source type:
     - Table
     - Query - The Oracle view that was migrated from the Microsoft Access query.
     - SQL Query - The original Microsoft Access SQL query that the Microsoft Access form is based on. Note that this query has not been parsed by the Oracle Migration Workbench. Therefore, you might must edit it to make it valid Oracle SQL syntax.
     - Nothing - The form has no underlying source type.
   - Source name - The Oracle table or view name if the source type is a table or query.
   - Status - Form status as Valid or Invalid. The source of the form must have a status of Valid before you can select it for migration.

     A form's status is based on two factors: status of its underlying source object and inclusion of the source object in the migration. Specifically, a form has a status of valid if either one of these situations exists:

     - Its Source Type object (table, query, or SQL query) is valid, and it has been included in the migration. Its check box is enabled and can be selected.
     - Its Source type object has a status of valid, but the source object was not included in the migration. Its check box is disabled.

     A form has a status of invalid if either one of these situations exists:

     - No Source Type is listed. Its check box is disabled.
     - Its Source Type object (table, query, or SQL query) is invalid. Its check box is disabled.
   - Startup form - Identifies the form that displays when you open your Microsoft Access database.
   - Parent form - Indicates the form/subform relationship that existed in your Microsoft Access database. For example, the **CallListSub** form shows **Contacts** as its Parent Form.
   - Migrate to: Form, Tabular Form, or Report and Form - The select list appears if the source type is a valid table.

2. To run a bulk process that attempts to compile all invalid SQL queries, click **Attempt to compile invalid SQL queries** at the bottom of the page.

   Using this option can validate some SQL queries that show a status of invalid. Note that SQL queries from Microsoft Access forms are not loaded into the Oracle Migration Workbench, and are therefore not parsed.

3. To edit a SQL query:

   a. On the Forms page, click the SQL Query you want to edit.

   b. Click **Validate** to find the invalid part of the SQL query.

   c. Update the query and validate it.

   d. When it is validated, click the project name breadcrumb.

   e. To include the validated query, click **Forms** on the project page to go to the Forms page. Then select the newly validated query in the left column and click **Apply Changes**.

4. To edit a query:

   a. On the Forms page, click **Query** for the form you want to edit.

   b. Click **Compile** to find the invalid part of the query.

   c. Click **Access Query** to review the initial query and compare it to the converted query.

   d. Update the query and recompile it.

   e. When it is validated, click the **Queries** breadcrumb.

   f. To include this validated query, select it in the left column on the Queries page and click **Apply Changes**.

5. To review details about a form, click the link in the Access Form column.

6. To include forms in the migration, select them in the left column.

7. Click **Apply Changes** to save your selections.

See Also: "Reviewing Retrieved Reports" on page 3-19, "Step 5: Review Your Retrieved Objects" on page 3-11, and "How to Migrate a Microsoft Access Application" on page 3-1

Reviewing Retrieved Reports

Next, review the reports retrieved from the Microsoft Access export. Application Migration identifies invalid reports and lists additional information, such as the report's source type and source name.

After you update the reports, select the ones you want to include in the migration. To include a report, the source of the report must have a status of Valid.

To review retrieved reports:

1. From the project page, click **Reports**.

   The Reports page appears, showing the status of the objects ready for migration.



Include	Access Report	Source Name	Source Type	Status
☐	ActionItems	SELECT DISTINCTROW Company.CompanyName, Contacts.FirstName, Contacts.LastName, Tickler.TicklerDate, Tickler.TicklerText FROM (Company RIGHT JOIN Contacts ON Company.CompanyID = Contacts.CompanyID) RIGHT JOIN Tickler ON Contacts.ContactID = Tickler.ContactID;	SQL Query	INVALID
☐	Alphabetical Contact Listing	SELECT DISTINCTROW Contacts.*, Company.CompanyName FROM Company INNER JOIN Contacts ON Company.CompanyID = Contacts.CompanyID;	SQL Query	INVALID
☐	ContactAddressEnvelope	ContactAddress	Query	VALID
☐	ShippingAddressEnvelope	ShippingAddress	Query	VALID
☐	Tickler	Tickler	Table	VALID

For each Microsoft Access report, the Reports page shows the following information, if available:

- Source type:
  - Table
  - Query - The Oracle view that was migrated from the Microsoft Access query.
  - SQL Query - The original Microsoft Access SQL query that the Microsoft Access form is based on. Note that this query has not been parsed by the Oracle Migration Workbench. Therefore, you might must edit it to make it valid Oracle SQL syntax.
  - Nothing - The report has no underlying source type.
- Source name
- Status of the report: Valid or Invalid. The source of the report must have a status of Valid before you can select it for migration.

  A report's status is based on two factors: status of its underlying source object and inclusion of the source object in the migration. Specifically, a report has a status of valid if either one of these situations exists:
  - Its Source Type object (table, query, or SQL query) is valid, and it has been included in the migration. Its check box is enabled and can be selected.
  - Its Source type object has a status of valid, but the source object was not included in the migration. Its check box is disabled.

  A report has a status of invalid if either one of these situations exists:
  - No Source Type is listed. Its check box is disabled.
  - Its Source Type object (table, query, or SQL query) is invalid. Its check box is disabled.

2. To run a bulk process that attempts to compile all invalid SQL queries, click **Attempt to compile invalid SQL queries** at the bottom of the page.

   Using this option can validate some SQL queries that show a status of invalid. Note that SQL queries from Microsoft Access forms are not loaded into the Oracle Migration Workbench and are therefore not parsed.

3. To edit a SQL query:
   a. On the Reports page, click the **SQL Query** link you want to edit.
   b. Click **Validate** to find the invalid part of the SQL query.
   c. Update the query and validate it.

d. When it is validated, click the project name breadcrumb.

e. To include the validated query, click **Reports** on the project page to go to the Reports page. Then select the newly validated SQL query in the left column and click **Apply Changes**.

4. To edit a query:

a. On the Reports page, click **Query** for the report you want to edit.

b. Click **Compile** to find the invalid part of the query.

c. Click **Access Query** to review the initial query and compare it to the converted query.

d. Update the query and recompile it.

e. When it is validated, click the **Queries** breadcrumb.

f. To include this validated query, select it in the left column on the Queries page and click **Apply Changes**.

5. To review details about a report, click the link in the Access Report column.

6. To include reports in the migration, select them in the left column.

7. Click **Apply Changes** to save your selections.

See Also: "Reviewing Database, Module, and Pages Information" on page 3-21, "Step 5: Review Your Retrieved Objects" on page 3-11, and "How to Migrate a Microsoft Access Application" on page 3-1

Reviewing Database, Module, and Pages Information

From the project page, you can drill down to see information about the database, modules, and pages for the migration project.

- Database - Displays summary information about the Microsoft Access database, including the full path and size of the `.mdb` file.
- Modules - Displays the Visual Basic Code, enabling you to extract embedded SQL statements for you to use or edit in your Oracle Application Express application.
- Pages - Displays information for reference purposes.

See Also: "Step 6: Generate the Oracle Application Express Application" on page 3-21 and "How to Migrate a Microsoft Access Application" on page 3-1

Step 6: Generate the Oracle Application Express Application

After validating and updating objects, you now need to generate the application in Oracle Application Express. You can create an application based on valid forms and reports, or a maintenance application based on valid tables and views.

When creating an application, a home page is defined by default. You have the option to create additional blank pages so that you can introduce further navigation possibilities.

You can then choose which user interface theme your application should be based on. By default, the application uses one level of tabs.

As a shortcut, you can also set some application defaults. These defaults are used whenever you create new applications.

Setting Up Application Defaults

To set up application defaults (optional):

1. On the right side of the project page, click **Set Application Defaults** in the Tasks list.
2. Select the options you want to use as defaults.

   For information, click **Help** or click the item label. Clicking the item label opens a separate window describing the item and its options.
3. Click **Apply Changes**.

   The project page appears.

Generating Applications

To generate either type of application:

1. On the right side of the project page, click one of the following in the Tasks list:
   - **Generate Application** - This option generates an application based on the forms and reports you selected to include.
   - **Generate Maintenance Application** - This option generates an application based on the tables and queries you selected to include.
2. In the Selected Application Objects section, you can customize specific pages.

   For example:
   - To rename a page, click the page name link and enter the new name on the New Page Definition page that appears.
   - To select the type of navigation on the application's home page, click the **Home Page** link.

     On the New Page Definition page that appears, select **Vertical Unordered List with Bullets, Vertical Images List**, or **Horizontal Images List**.
   - To display an image on a parent page, click the page link.

     On the New Page Definition page that appears, go to the Page Icon field and select the image you want to appear on that page. You can either select an image from the select list or click the **Find** icon (flashlight) to open a page of options.

     Repeat this step for each parent page. If you do not explicitly select an image for a page, the default image appears for that page.

     Note that for the image to appear in your application, you must have selected either Vertical Images List or Horizontal Images List for the Home page navigation.
3. To add a blank page to the application, scroll down to the Add Page section and click **Add Page**.

   Note that the new page appears at the bottom of the list in the Selected Application Objects section.
4. Click **Next** to select a theme for the application, or click **Create** to skip the theme selection step.

   If you skip the theme step, the default is used.
5. Select a theme for the application and click **Next**.

A **theme** is a collection of templates that define the layout and style of an application, including buttons and pages.

6. Confirm your selections and click **Create**.
7. To preview the application, click **Run Application**.
8. Log in using your Oracle Application Express workspace credentials.

   Your application now appears as a separate application in Oracle Application Express.
9. To customize your application, scroll down to the Developer toolbar and click **Edit Application**.

   You might want to do the following customizations immediately after you generate your application:

   - Rename the application. Each application has a unique ID, but the migration project name becomes the application name by default. To more easily identify an application, you might want to change its name to something more meaningful by editing the application attributes.
   - Change the authentication scheme. By default, the authentication scheme is Application Express authentication. You can change this by editing the application attributes.

     See Also: For instructions on editing application attributes, adding pages, deploying your application, and so on, see *Oracle Application Express Application Builder User's Guide* or the Oracle Application Express online Help.

Deleting a Migration Project

When you delete a migration project, you delete only the metadata associated with the migration project. Deleting a migration project does *not* delete or impact applications you have generated from the project or any objects, such as tables or views, in the schemas associated with your workspaces.

To delete a migration project:

1. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 3-7.
2. Click the **Application Builder** icon.
3. Click **Migrations** on the right side of the page.
4. On the Application Migrations page, click the project name.
5. On the Tasks list, click **Delete Project**.
6. Click the **Delete Project** button and confirm the deletion.

4

Converting an Oracle Forms Application

This section describes the steps to convert applications from Oracle Forms to Oracle Application Express.

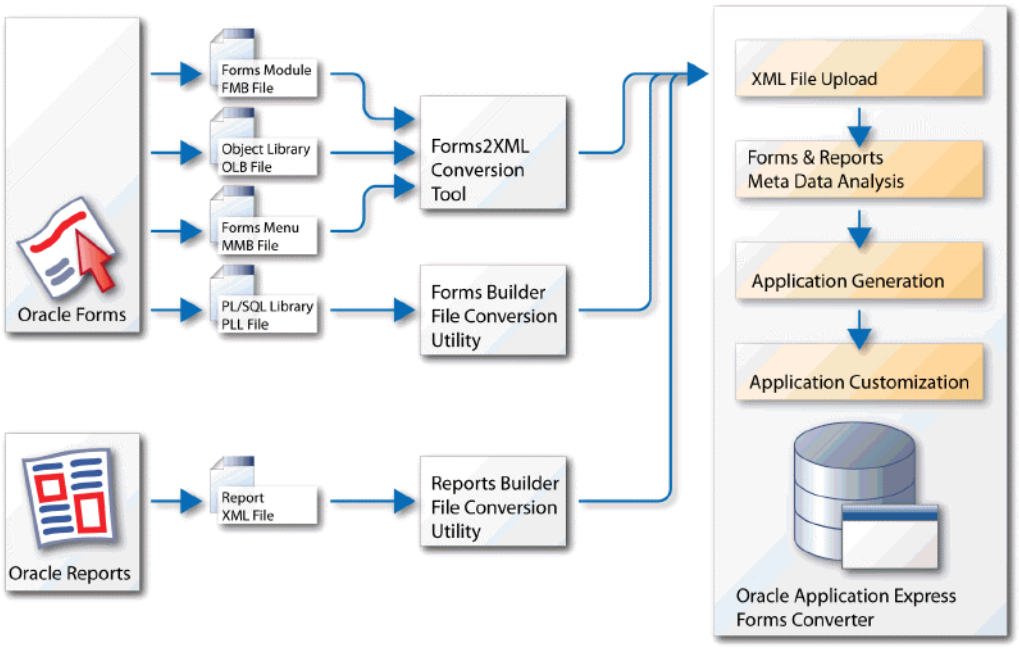
Topics:

- How to Convert Your Application
- Step 1: Convert Oracle Forms to XML
- Step 2: Create a Workspace and Add Oracle Application Express Users
- Step 3: Upload Database Objects into the Schema Associated with Your Workspace
- Step 4: Create a Conversion Project
- Step 5: Review and Edit Forms Metadata
- Step 6: Generate the Oracle Application Express Application
- Deleting a Migration Project

How to Convert Your Application

Before You Begin

To convert applications from Oracle Forms to Oracle Application Express, you must perform the steps described in this section. The following graphic outlines the entire process.



The conversion process consists of the following steps:

Step 1: Convert Oracle Forms to XML

Step 2: Create a Workspace and Add Oracle Application Express Users

Step 3: Upload Database Objects into the Schema Associated with Your Workspace

Step 4: Create a Conversion Project

Step 5: Review and Edit Forms Metadata

Step 6: Generate the Oracle Application Express Application

> **Important:** You must follow the steps in the exact sequence presented in this section.

Step 1: Convert Oracle Forms to XML

In order to convert Oracle Forms to Oracle Application Express, you must convert the Forms modules to formats the Create Migration Project wizard can consume.

Topics

- Converting FormModules, ObjectLibraries, or MenuModules to XML
- Converting a PL/SQL Library
- Converting an Oracle Report to XML

Converting FormModules, ObjectLibraries, or MenuModules to XML

You can convert Oracle Forms FormModule, MenuModule, and ObjectLibrary files to Extensible Markup Language (XML) using the Oracle Forms to XML conversion tool, `Forms2XML`.

Topics

- About the Forms2XML Conversion Tool

- Using the Forms2XML Conversion Tool From a Command Line
- Using the Forms2XML Conversion Tool in a Java Program

> **Note:** The `Forms2XML` utility must generate an XML file in English only. If the generated XML tags are not in English then the file will fail to load.

About the Forms2XML Conversion Tool

The Oracle Forms to XML conversion tool, `Forms2XML` was introduced in Oracle9*i* Oracle Developer Suite and is also available in Oracle Developer Suite 10g. This tool should also work on files from earlier releases of Oracle Forms. If the Oracle Forms to XML Conversion tool does not work for a specific file from an earlier version of Oracle Forms then that file will must be upgraded to Oracle Developer Suite 9*i* or 10*g* and then converted to XML

`Forms2XML` produces an XML file that has the same base name as the Forms file with a `.xml` extension. The extension `_fmb`, `_mmb`, or `_olb` is added to the base file name to indicate whether the original file was a Forms Modules, a MenuModule, or an Object Library. The following table displays a few examples of the changes the tool makes to the name of the file being converted:

File name before conversion	File name after conversion
myForm.fmb	*myForm*_fmb.xml
myMenu.mmb	*myMenu*_mmb.xml
myLibrary.olb	*myLibrary*_olb.xml

Using the Forms2XML Conversion Tool From a Command Line

The `Forms2XML` command takes one or more Forms Module files as an argument. The files can be FormsModule (`.fmb`), ObjectLibrary (`.olb`), or MenuModule (`.mmb`) files. The output is placed in the current folder. The command has the following syntax:

```
frmf2xml [options] file1 [file2...]
java oracle.forms.util.xmltools.Forms2XML [options] file1 [file2...]
```

Available options are described in the following table.

Options	Description
`USE_PROPERTY_IDS=YES/NO`	Setting `USE_PROPERTY_IDS` to `YES` causes the Forms to XML conversion tool to write the internal ID for Real or Character into the XML file. The default value (`NO`) generates property value names as before. **Note:** The Forms2XML utility must be run with `USE_PROPERTY_IDS=NO`.

Options	Description
OVERWRITE=YES/NO	Valid values are YES or NO. If OVERWRITE=YES, the tool overwrites any XML files with the same name that already exist in the output directory. If OVERWRITE=NO, (default) the tool does not overwrite any XML files with the same name that already exist in the output directory. The tool will stop processing and return the message: If the file *file* already exists. Use argument OVERWRITE=YES to replace.
DUMP=ALL/OVERRIDEN	If DUMP=ALL, the tool dumps all properties. If DUMP=OVERRIDEN, the tool dumps only those properties that are overridden.

Using the Forms2XML Conversion Tool in a Java Program

You can pass the Forms2XML tool a JdapiModule Java object (class oracle.forms.jdapi.JdapiModule) and dump its objects and properties to an XMLDocument (class oracle.xml.parser.v2.XMLDocument). For example:

```
...
 // get the modules in the session
 JdapiIterator mods = Jdapi.getModules();
    // ... and iterate round them
    while(mods.hasNext())
      {
        JdapiModule mod = (JdapiModule)mods.next();
        Forms2XML converter = new Forms2XML(
        XMLDocument doc = converter.dumpModule(false);
              ...
       }
```

Note that the Boolean argument taken by the dumpModule() method instructs converter to dump all properties to the XMLDocument doc, not just those which are overridden.

Once you have the module as a XMLDocument object, you could then use the XDK classes to manipulate it. For example, you could traverse it, remove or add objects, change properties, copy objects into other modules that are also saved as XMLDocument objects, and more—all programmatically.

To learn more about Oracle Forms, see the following hosted Help file:

http://www.oracle.com/webapps/online-help/forms/

Converting a PL/SQL Library

To convert a PL/SQL library, use the File > Convert option in Oracle Forms Builder to convert PL/SQL library .PLL files to .PLD text files.

To learn more about Oracle Forms, see the following hosted Help file:

http://www.oracle.com/webapps/online-help/forms/

Converting an Oracle Report to XML

To convert an Oracle Report, use the File Conversion option in Reports Builder to convert binary (`.RDF`), ASCII (`.REX`), and `.JSP` reports to XML format.

To learn more about Oracle Reports, see the following hosted Help file:

`http://www.oracle.com/webapps/online-help/reports`

Step 2: Create a Workspace and Add Oracle Application Express Users

A **workspace** is a virtual private database allowing multiple users to work within the same Oracle Application Express installation while keeping their objects, data and applications private. Each workspace has a unique ID and name.

An Oracle Application Express administrator can create a workspace manually within Oracle Application Express Administration Services or have users submit requests. Oracle Application Express Administration Services is a separate application for managing an entire Oracle Application Express instance. See "Creating Workspaces" and "Managing Workspace Requests"in *Oracle Application Express Administration Guide*.

> **See Also:** *Oracle Database 2 Day + Application Express Developer's Guide* if you are new to Oracle Application Express.
>
> Extensive Oracle documentation is available for broadening your knowledge of database concepts and objects. To learn more, see *Oracle Database Concepts*. To view a specific documentation library go to:
>
> `http://www.oracle.com/technology/documentation/index.html`

Topics

- Creating a Workspace Manually
- Creating Oracle Application Express Users
- Logging in to Your Oracle Application Express Workspace

Creating a Workspace Manually

To create an Oracle Application Express workspace manually:

1. Log in to Oracle Application Express Administration Services.

   Oracle Application Express Administration Services is a separate application for managing an entire Oracle Application Express instance. You log in using the `ADMIN` account and password created or reset during the installation process.

   a. 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:

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

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

        Where:

        `hostname` is the name of the system where Oracle XML DB HTTP Server is installed.

`port` is the port number assigned to Oracle XML DB HTTP Server. In a default installation, this number is 8080.

`apex` is the database access descriptor (DAD) defined in the configuration file.

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

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

Where:

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

`port` is the port number assigned to Oracle HTTP Server. In a default installation, this number is 8888. See *Oracle Application Express Listener Installation Guide*.

`apex` is the database access descriptor (DAD) defined in the configuration file.

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

– If your setup uses 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.

b. On the Login page:

– In Username, enter `admin`.

– In Password, enter the Oracle Application Express administrator account password you specified when you installed Oracle Application Express.

– Click **Login**.

See Also: See "Logging in to Oracle Application Express Administration Services" in *Oracle Application Express Administration Guide*.

Next, create a workspace.

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

   The Create Workspace Wizard appears.
4. For Identify Workspace, enter a workspace name and description and click **Next**.
5. For Identify Schema, specify the Oracle Forms application schema:

a. Re-use existing schema - Select **Yes**.

b. Schema Name - Select a schema from the list.

c. Click **Next**.

6. For Identify Administrator, enter the Workspace administrator information and click **Next**.

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

Creating Oracle Application Express Users

To create an Oracle Application Express user account:

1. Log in to Oracle Application Express Administration Services. See "Logging in to Oracle Application Express Administration Services" in *Oracle Application Express Administration Guide*.

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 Attributes, enter:

   a. **Username** - Enter the username used to log in to the system. Restrictions include:

      – Maximum length of 100 characters

      – No spaces

      – Only these special characters are permitted: 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).

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. **User is an administrator** - Specify if this user should have workspace administrator privileges.

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

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

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

e. **Application Builder Access** - Determines whether a developer has access to the Application Builder.

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

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

h. **Account Availability** - Select **Locked** to prevent the account from being used. Select **Unlocked** to allow the account to be used.

7. Under Password:
   - **Password** - Enter a case sensitive password.
   - **Confirm Password** - Enter the password again.
   - **Require Change of Password On First Use** - 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**.

Logging in to Your Oracle Application Express Workspace

Once you create a workspace, you must log in to it using your login credentials (that is, the workspace name, user name, and password).

> **See Also:** See "Creating Workspaces" and "Managing Workspace Requests" in *Oracle Application Express Administration Guide*

To log in to a workspace:

1. In a Web browser, navigate to the Oracle Application Express Login page. By default, Oracle Application Express installs to the following location:
   - If your setup uses the embedded PL/SQL gateway, go to:

     `http://hostname:port/apex`

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

       For users who have upgraded from earlier releases, or who have a custom configuration, this value may be `htmldb` or something else. Verify your DAD with your Oracle Application Express administrator.
   - If your setup uses the Oracle Application Express Listener, go to:

     `http://hostname:port/apex`

     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 8888.
- apex is the database access descriptor (DAD) defined in the configuration file.

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

  http://*hostname*:*port*/pls/apex

  Where:

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

    *ORACLE_BASE**ORACLE_HOME*\install\portlist.ini
    *ORACLE_BASE**ORACLE_HTTPSERVER_HOME*\Apache\Apache\conf\httpd.conf

    Be aware that if you change a port number, it is not updated in the portlist.ini file. You can only rely on this file immediately after installation.
  - pls is the indicator to use the mod_plsql cartridge.
  - apex is the database access descriptor (DAD) defined in the mod_plsql configuration file.

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

  The Login page appears.

2. Under Login, enter the following:
   - Workspace field - Enter the name of your workspace.
   - Username field - Enter your user name.
   - Password field - Enter your case-sensitive password.
3. Click **Login**.

   Note that, depending on your setup, you might be required to change your password when you log in for the first time.

Step 3: Upload Database Objects into the Schema Associated with Your Workspace

In order to start the conversion process, the database objects associated with your Oracle Forms application must reside in the same database as Oracle Application Express.

If the database objects associated with your Oracle Forms application do not reside in the same database as Oracle Application Express, you must upload them.

To upload database objects associated with your workspace:

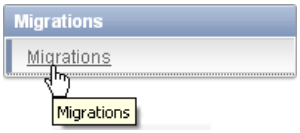
1. Create a DDL script.
2. Upload it to the SQL Script Repository and run it. See "Executing a SQL Script" in *Oracle Application Express SQL Workshop and Utilities Guide*.

Step 4: Create a Conversion Project

Next, create a conversion project by running Create Migration Project Wizard and loading the application metadata extracted in "Step 1: Convert Oracle Forms to XML" on page 4-2.

To create a conversion project:

1. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
2. Click the **Application Builder** icon.
3. Click **Migrations** on the right side of the page.



4. On the Application Migrations page, click **Create Project**.

   The Create Migration Project wizard appears. Note that the steps included in the wizard appear in a flowchart on the left of the page.
5. Enter the project details:
   a. Project Name - Enter a unique name. The project name must be unique to your current workspace and should not contain any white spaces.
   b. Type - Select **Forms**.
   c. Description - Enter a meaningful description for this project.
   d. Schema - Select the schema that contains the database schema objects associated with the Oracle Forms application you want to convert.

      The default schema is the schema associated with your workspace. If multiple schemas are associated with your workspace, all associated schemas appear in the select list, arranged in alphabetical order. When this situation exists, select the schema associated with the Oracle Forms you want to upload.
   e. Forms Module XML File - Click **Browse** and locate the XML file which contains the information of your converted Oracle FormModule (for example, `myForm_fmb.xml`).

      Note that you must upload the converted Oracle FormModule file first.
   f. Click **Next**.

      The Confirm page appears.
   g. To add more files, click **Upload Another File**.
6. To upload a file, specify the following:
   a. File Type - Select the appropriate file type. Options include:

- Forms Module - Upload a FormModule in XML format (*myForm_fmb.xml*). Use the Forms2XML conversion tool to convert Oracle FormModule .FMB files to .XML format.
- PL/SQL Library - Upload a PL/SQL Library associated with your Oracle Forms application (*myLibrary*.PLD). The library must be in text format. Use the File > Convert option in Oracle Forms Builder to convert PL/SQL library .PLLs to .PLD text files.
- Oracle Report - Upload an Oracle Report in XML format (*myReport*.XML). Use the File Conversion option in Oracle Reports Builder to convert binary(.RDF), ASCII (.REX), and .JSP Reports to XML format.
- Object Library - Upload an Object Library in XML format (*myObjects_olb*.XML). Use the Forms2XML conversion tool to convert Object Library .OLB files to .XML format.
- Forms Menu - Upload an Oracle Form Menu in XML format (*myMenu_mmb*.XML). Use the Forms2XML conversion tool to convert MenuModule .MMB files to .XML format.

b. File - Click **Browse** and locate the file your want to upload.

c. Click **Upload**.

The Confirm page appears.

7. To add more files, click **Upload Another File** and repeat the previous steps until all files appear on the Confirm page.

8. Review the project details, and click **Finish**.

The Project page appears.

Step 5: Review and Edit Forms Metadata

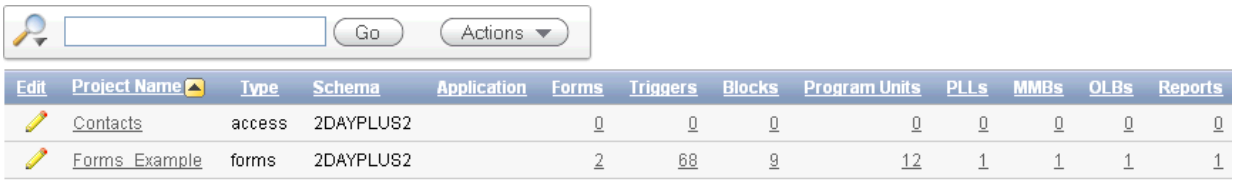
Next, use the Project pages to review and edit form attributes and track the manual conversion process.

Topics

- About the Application Migrations Page
- Editing Project Details
- Reviewing Forms Modules
- Reviewing Oracle Reports
- Reviewing PL/SQL Libraries
- Reviewing Forms Menus
- Reviewing Object Libraries
- Using Annotations to Track the Conversion Process

About the Application Migrations Page

The Project page shows a high-level overview of your Oracle Forms conversion project.



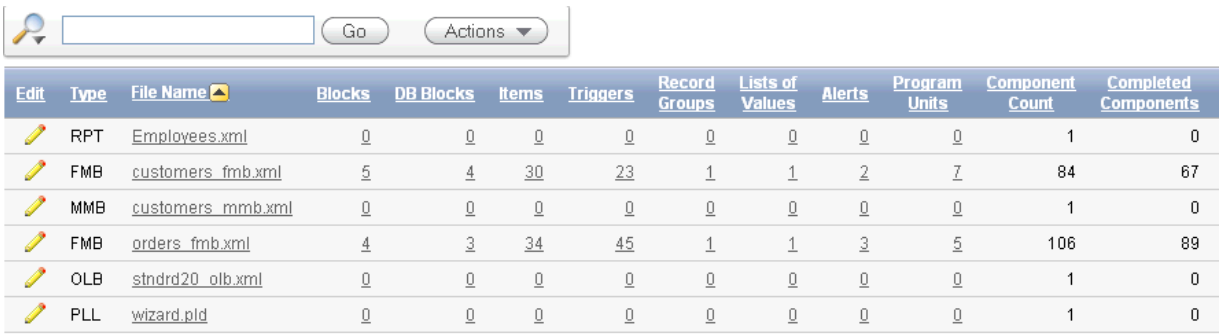
Edit	Project Name	Type	Schema	Application	Forms	Triggers	Blocks	Program Units	PLLs	MMBs	OLBs	Reports
	Contacts	access	2DAYPLUS2		0	0	0	0	0	0	0	0
	Forms_Example	forms	2DAYPLUS2		2	68	9	12	1	1	1	1

Topics

- Understanding the Project Page
- Editing Project Details
- Uploading Additional Files

Understanding the Project Page

To view project details, click the project name. The Project page appears.



Edit	Type	File Name	Blocks	DB Blocks	Items	Triggers	Record Groups	Lists of Values	Alerts	Program Units	Component Count	Completed Components
	RPT	Employees.xml	0	0	0	0	0	0	0	0	1	0
	FMB	customers_fmb.xml	5	4	30	23	1	1	2	7	84	67
	MMB	customers_mmb.xml	0	0	0	0	0	0	0	0	1	0
	FMB	orders_fmb.xml	4	3	34	45	1	1	3	5	106	89
	OLB	stndrd20_olb.xml	0	0	0	0	0	0	0	0	1	0
	PLL	wizard.pld	0	0	0	0	0	0	0	0	1	0

With the exception of the File Name column, most of the information on the Project page only applies to FormModule `XML` files (for example, Blocks, Triggers, and Program Units columns). If a column does not apply to the uploaded file, a `0` displays.

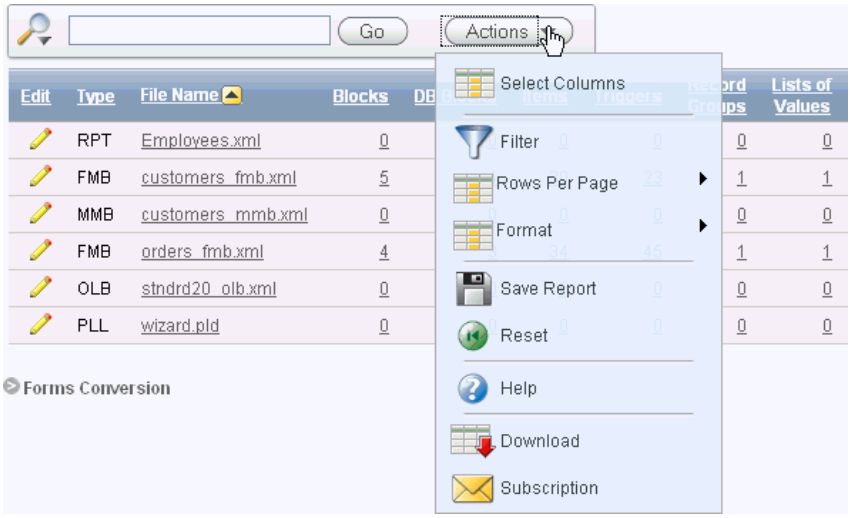
The Project page lists the following information about uploaded files:

- **Type** - Identifies the type uploaded by displaying the appropriate file extension (for example, `RPT` for Report and `FMB` for FormModule files).
- **File Name** - Displays the file name and extension (`XML` or `TXT`) uploaded into the project.
- **Blocks** - Displays a count of blocks in FormModule XML file. A single block can be mapped to a region in Oracle Application Express. A region is a area on a page that serves as a container for content. Each page can have any number of regions. You control the appearance of a region through a specific region template.
- **DB Blocks** - Displays the database data blocks in the uploaded `FormModule` XML file. These blocks can be based on any of the following block data source types: table; procedure; transactional trigger; or subquery. Blocks included in the DB Blocks count are not control blocks. Note that the associated Database Block property is set to `Yes`.
- **Triggers** - Displays a count of all form-level, block-level and item-level triggers associated with the uploaded `FormModule` XML file.
- **Record Groups** - Displays a count of Record Groups in the uploaded `FormModule` XML file.

- **Lists of Values** - Displays a count of lists of values (LOVs) in the uploaded `FormModule` XML file.
- **Alerts** - Displays a count of alerts in the uploaded `FormModule` XML file.
- **Program Units** - Displays the number of schema objects that enable you to access and manipulate database information.
- **Component Count** - Lists the number of components that have been uploaded to the Conversion project.
- **Completed Components** - Displays a count of components within the conversion process that have been reviewed and have been marked as Complete.
- **Percent Complete** - Lists percent of components which have been marked as Complete.

You can review Forms attributes and track manual conversion by clicking the links on this page.

Utilizing Interactive Reports Many pages in Application Migration Workshop display as interactive reports. You can customize the appearance of these pages using the Search bar at the top of each page.



Use the Search bar to create custom searches and customize and filter the information that appears on the page.

Available controls on the Search bar include:

- **Search icon** - Resembles a magnifying glass. Click this icon to narrow your search to only specific columns. To search all columns, select **All Columns**.
- **Text area** - Enter case insensitive search criteria (wild card characters are implied) and then click **Go**.
- **Go button** - Executes a search or applies a filter.
- **Actions menu** - Use this menu to customize an interactive report.

To learn more, see "Customizing Interactive Reports" in *Oracle Application Express Application Builder User's Guide*.

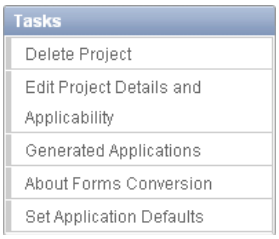
About the Upload File, Create Application, and Run Application Buttons Three buttons display to the right of the Search Bar:

- Click **Upload File** to add files to your conversion project. See "Uploading Additional Files" on page 4-15.
- Click **Create Application** to create an Oracle Application Express application based on the components included in your conversion project. See "Step 6: Generate the Oracle Application Express Application" on page 4-25.
- Click **Run Application** to submit the pages within your Oracle Application Express application to the Oracle Application Express and render viewable HTML. Note this button only appears after you generate an application.

About Associated Application The Associated Application only displays after you create an application. This box displays application name, number of application pages, last update date, and the user who performed the updates. Click the application name to link to the Application home page within Application Builder.



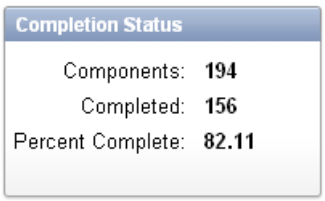
About the Tasks List The Tasks list displays on the right side of the page.



The Tasks list contains the following links:

- **Delete Project** deletes the current project.
- **Edit Project Details and Applicability** links to the Project Details page. See "Editing Project Details" on page 4-15.
- **About Forms Conversion** links to a page that explains how to convert Oracle Forms applications.
- **Set Application Defaults** links to the Set Application Defaults page. See "Setting Up Application Defaults" on page 4-25.

About the Completion Status Box A Completion Status box displays on the right side of the page listing the total number of components, completed components, and percent complete.



Uploading Additional Files

To add files to your conversion project:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

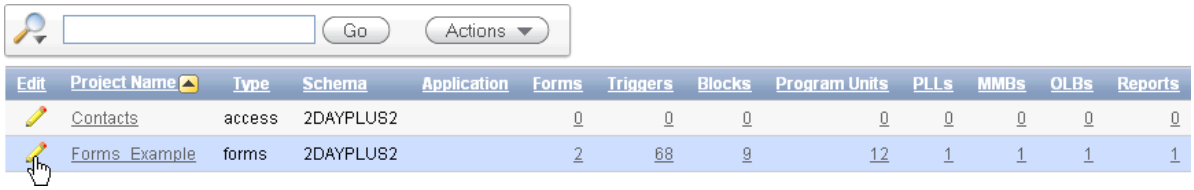
      The Project page appears.
2. On the Project page, click **Upload File**.
3. For File Type, select one of the following:
   - **Forms Module** - Upload a FormModule in XML format (*myForm*_fmb.xml). Use the Forms2XML conversion tool to convert Oracle FormModule .FMB files to .XML format.
   - **PL/SQL Library** - Upload a PL/SQL Library associated with your Oracle Forms application (*myLibrary*.PLD). The library must be in text format. Use the File > Convert option in Oracle Forms Builder to convert PL/SQL library .PLLs to .PLD text files.
   - **Oracle Report** - Upload an Oracle Report in XML format (*myReport*.XML). Use the File Conversion option in Oracle Reports Builder to convert binary(.RDF), ASCII (.REX), and .JSP Reports to XML format.
   - **Object Library** - Upload an Object Library in XML format (*myObjects*_olb.XML). Use the Forms2XML conversion tool to convert Object Library .OLB files to .XML format.
   - **Forms Menu** - Upload an Oracle Form Menu in XML format (*myMenu*_mmb.XML). Use the Forms2XML conversion tool to convert FormsMenu .MMB file to .XML format.
4. File - Click **Browse** and locate the file your want to upload.
5. Click **Upload**.

   The Confirm page appears.
6. To add more files, click **Upload and Upload Another** and repeat the previous step until all files appear on the Confirm page.
7. Review the file details, and click **Finish**.

   The Project page appears.

Editing Project Details

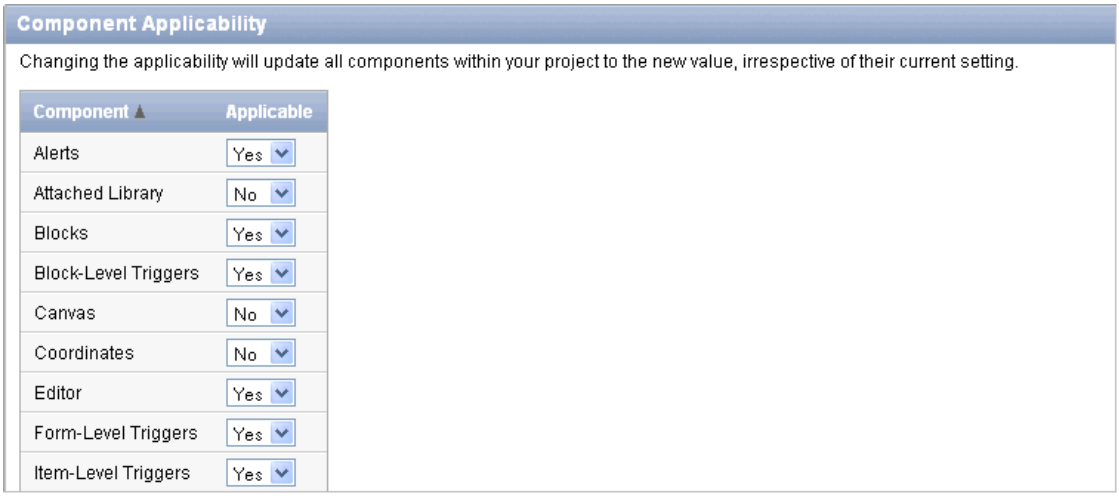
Click the **Edit** icon on the Project page to access the Project Details page. The Edit icon resembles a small yellow pencil.



Use the Project Details page to edit project details and specify what components to include in your conversion project.

Modifying Component Applicability Defaults

Use the Applicability section to specify whether to include specific components in your conversation project. Select **Yes** or **No** adjacent to a component type.



See Also: "Using Annotations to Track the Conversion Process" on page 4-24

Reviewing Forms Modules

From the Project page you can browse the objects included in your uploaded Oracle FormModule XML file (for example, *myForm*_fmb.xml).

Topics

- Viewing an Imported FormModule
- Viewing Object Metadata and Selecting Specific Objects
- Viewing and Selecting Blocks
- Viewing and Selecting Items

See Also: "Oracle Forms Generation Capabilities and Workarounds" on page A-1

Viewing an Imported FormModule

To view an imported FormModule:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

      The Project page appears.

2. Click the Edit icon to the left of the `XML` file name (for example, *`myForm_`*`fmb.xml`).

   The Form Details page appears.

3. To delete an imported FormModule, click **Delete**.

4. To download the files associated with this project, click **Download**.

About Annotations Use Annotations to track the overall status of form components within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

Viewing Object Metadata and Selecting Specific Objects

To review object metadata:

1. Go to the Project page:

   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.

   b. Click the **Application Builder** icon.

   c. Click **Migrations** on the right side of the page.

   d. Click a project name.

      The Project page appears.

2. Click the number under the column for the appropriate object type. Alternately, click the File Name to view a report describing the component.

   Clicking a number displays a listing of the object type.

3. To include blocks, items, and LOVs select the **Include** check box adjacent to the object name and click **Apply Changes**.

4. To view details about a specific object, click the object name or Edit icon.

Viewing and Selecting Blocks

To review blocks:

1. Go to the Project page:

   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.

   b. Click the **Application Builder** icon.

   c. Click **Migrations** on the right side of the page.

   d. Click a project name.

      The Project page appears.

2. Click the link under the Blocks column.

   A listing of blocks appears. To columns not displayed by default, click the **Actions** menu and select **Select Columns**.

3. To view block details information, click the Name link.

   The Block Details page appears.

4. To edit a block name, enter a new name in the Title field and click **Apply Changes**.

5. To include a specific object in your conversion select the **Include** check box adjacent to the object name and click **Apply Changes**.
6. To view details about a specific object, click the Name link.

   The Block Details page appears. The sections that follow describe each section of the Block Details page.

About Block Details Lists the details about the block.

About Annotations Tracks the overall status of the object within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

About Application Express Page Query Oracle Forms can be based on database blocks which correspond to database tables or views. The enhanced query builds a query based on the database block and database item meta data, and extends it with block level post-query trigger source to show derived columns

Enhanced Query is the original query with the `POST-QUERY` logic included. **Original Query** is generated from the data source item (table) underlying the block and the columns that are referenced on that block

To specify the type of query to use:

1. Select one of the following from the User Query list:
   - Custom Query
   - Enhanced Query
   - Original Query
2. If you select **Custom Query**, enter the appropriate syntax in the Custom Query field.
3. Click **Apply Changes**.

Relation Details Only displays if a relationship was identified for the block in the `XML` file. This section displays the information on that relationship.

Block Items Displays the items in the block. Click the **Edit** icon associated with the item to view item details.

Block Triggers Lists the block-level and item-level triggers associated with the block. Click **Edit** icon to view additional trigger details.

About Audit Display or hide the Audit section to view details about the object creation and last update dates.

Viewing and Selecting Items

To review items:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

The Project page appears.

2. Click the link under the Items column.

   A listing of items appears. Click the **Actions** icon on the Search bar to view additional information which is not visible in the default report.

3. To edit an item label, enter a new name in the Item Prompt field and click **Apply Changes**.

4. To include a specific object in your conversion select the **Include** check box adjacent to the object name and click **Apply Changes**.

5. To view details about a specific item, click the Item Name link.

   The Item Details page appears. The sections that follow describe each section of the Item Details page.

About Item Details Lists the details about the item.

About Annotations Tracks the overall status of the object within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

About Audit Display or hide the Audit section to view details about the object creation and last update dates.

Reviewing Oracle Reports

From the Project page you can browse uploaded Oracle Report `XML` files (for example, *`myReport`*`.XML`).

Topics

- Viewing Reports
- Selecting Reports to Include

Viewing Reports

Use the Report Details page to view details about the imported report.

To view the Report Details page:

1. Go to the Project page:

   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.

   b. Click the **Application Builder** icon.

   c. Click **Migrations** on the right side of the page.

   d. Click a project name.

      The Project page appears.

2. Click the Oracle Reports `XML` file name (for example, *`myReport`*`.XML`).

   The Report Details page appears.

3. To delete the report, click **Delete**.

4. To download the report, click the **Download** link.

   The sections that follow describe the Report Details page.

Report Details Lists details about the current report.

About Annotations Use Annotations to track the overall status of the object within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

About SQL Query Displays the SQL query associated with the Oracle Report. Note that this SQL statement is used to generate an Oracle Application Express Interactive report.

About Data Items Lists each item in the report. Click the **Edit** icon adjacent to a specific item to display the Data Item Details page.

About Summary Items Lists the summary columns associated with the report. These columns perform a computation on another column's data (for example, sum, average, count, minimum, maximum, and percent total).

To learn more about Oracle Reports, see the following hosted Help file:

`http://www.oracle.com/webapps/online-help/reports`

About Audit Display or hide the Audit section to view details about the creation and last update dates.

Selecting Reports to Include

Use the Reports page to select reports for inclusion in the conversion process.

To view the Report page:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

      The Project page appears.
2. Click the **Edit** icon to the right of the Oracle Reports XML file name (for example, myReport.XML).

   The Reports page appears.
3. To include a report, select the check box and click **Apply Changes**.

Reviewing PL/SQL Libraries

From the Project page you can browse uploaded PL/SQL libraries associated with your Oracle Forms application (for example, *myLibrary*`.PLD`) and update annotations. Note that PL/SQL libraries are not generated within Oracle Application Express. However, the files are imported to enable you to review and track them.

To view the PL/SQL Library Details page:

1. Go to the Project page:

a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.

b. Click the **Application Builder** icon.

c. Click **Migrations** on the right side of the page.

d. Click a project name.

The Project page appears.

2. Click the PL/SQL library `XML` file name (for example, *`myLibrary`*`.PLD`).

The PL/SQL Library Details page appears.

3. To delete the library, click **Delete**.

4. To download the library, click the **Download** link.

About Annotations

Use Annotations to track the overall status of the object within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

About Audit

Display or hide the Audit section to view details about the object creation and last update dates.

Reviewing Forms Menus

From the Project page you can browse the objects included in your uploaded MenuModule `XML` file (for example, *`myMenu`*`_mmb.XML`) and update annotations. Note that Forms Menus are not generated within Oracle Application Express. However, the files are imported to enable you to review and track them.

Topics

- Viewing Form Menus
- Viewing a Summary of Forms Menus
- Viewing Form Menu and Program Unit Details

Viewing Form Menus

To track an imported MenuModule:

1. Go to the Project page:

a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.

b. Click the ***Application Builder*** icon.

c. Click **Migrations** on the right side of the page.

d. Click a project name.

The Project page appears.

2. Click the Edit icon to the left of MenuModule `XML` file name (for example, *`myMenu`*`_mmb.XML`).

The Edit Imported Form Menu page appears.

3. To delete the MenuModule, click **Delete**.

4. To download the MenuModule, click the **Download** link.

About Annotations Use Annotations to track the overall status of form within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

Viewing a Summary of Forms Menus

Use the Forms Menus page to view details about specific modules.

To view the Forms Menus page:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

      The Project page appears.
2. Click the MenuModule `XML` file name (for example, *`myMenu`*`_mmb.XML`).

   The Forms Menus page appears and displays the following information:
   - **Edit icon** - Depending on the Module Type, clicking this icon displays a details page describing the selected menu or program unit.
   - **Name** - Display the name of the menu module.
   - **Module Type** - Lists the type of module (that is, either Menu or Program Unit).
   - **File Size** - Displays the `XML` file size in kilobytes (KB).
   - **Module Name** - Displays the name of the module.
   - **Main Menu** - Specifies the name of the individual menu in the Forms Menu that functioned as the main or starting menu at runtime.
   - **Assignee** - Displays the person responsible for an object as specified within the Annotations for the object.
   - **Tags** - Lists tags created to describe the object as specified within the Annotations for the object.
   - **Notes Snippet** - Displays a snippet of the Notes specified within the Annotations for the object.t
   - **File Name** - Displays the MenuModule `XML` file name.
3. To view module details, click the **Edit** icon adjacent to the menu name.

   A details page appears. See the next section, "Viewing Form Menu and Program Unit Details" on page 4-22.

Viewing Form Menu and Program Unit Details

Clicking the **Edit** icon on the Forms Menus page displays a details page. The format of the page that displays depends upon the Module Type (either Menu or Program Unit).

About Form Menu Details The top of the page lists details about the menu, including

- Name
- Parent Module
- Parent Name
- Parent Type
- DirtyInfo
- Tear Off Menu
- Comment

Under Menu Items, click the **Edit** icon to view details or track the status of a specific menu item.

> **See Also:** To learn more about Oracle Forms, see the following hosted Help file:
>
> `http://www.oracle.com/webapps/online-help/forms/`

About Annotations Use Annotations to track the overall status of an object within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

About Program Unit Details The top of the page displays the program unit name, type, and the actual program unit text (if applicable).

About Audit Display or hide the Audit section to view details about the object creation and last update dates.

Reviewing Object Libraries

From the Project page you can browse uploaded Object Libraries associated with your Oracle Forms application (for example, *myObjects*_olb.XML) and update the annotations. Note that Object Libraries are not generated within Oracle Application Express. However the files are imported to enable you to review and track them.

To view the Forms Object Library page:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

      The Project page appears.
2. Click the **Edit** icon to the left of the Object Library XML file name (for example, *myObjects*_olb.XML).

   The Object Library Details page appears.

About Annotations

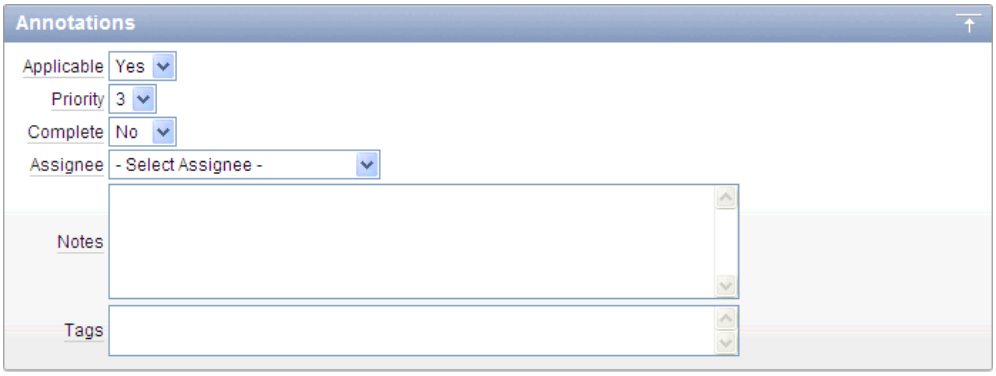
Use Annotations to track the overall status of the object within the conversion process. To learn more, see "Using Annotations to Track the Conversion Process" on page 4-24.

About Audit

Display or hide the Audit section to view details about the creation and last update dates.

Using Annotations to Track the Conversion Process

Use Annotations to track the overall status of an object within the conversion process. Most detail pages that describe a specific object include an Annotations section.



Use these fields to determine whether an object should be included in the conversion, assign a priority, track status, assign the object to specific individual, or create notes and tags.

Options include:

- Applicable - Tracks whether the object is applicable within the context of the generated Oracle Application Express application. Select **Yes** or **No**.

  The initial value is determined by the applicability default settings for that component or trigger defined on the Project Details page.
- Priority - Assign a numeric priority to the object.
- Complete - Track if the conversion is complete. Select **Yes** or **No**.
- Assignee - Assign the object to a specific user.
- Notes - Enter notes regarding the object.
- Tags - Assign tags to the object.

The values defined in Applicable and Complete are used in determining the percentage complete. All the Applicable and Complete values can be changed for a block at one time from the Bulk Changes page.

Why Use Annotations?

Because Oracle Forms have many separate components, it is important to evaluate whether functionality in the original application is either not required or has been replicated in the Oracle Application Express application. Given that the initial design only incorporates a percentage of the required functionality, you can use these fields as a reminder of what must be implemented post-generation.

Step 6: Generate the Oracle Application Express Application

After you have reviewed and updated the Oracle Forms metadata within your conversion project, you now need to generate the application in Oracle Application Express.

When creating an application, a home page is defined by default. You have the option to create additional blank pages so that you can include blank pages or reports and forms on other tables as part of your application.

You can then choose which user interface theme your application should be based on. By default, the application uses one level of tabs.

As a shortcut, you can also set some application defaults. These defaults are used whenever you create new applications.

Topics

- Setting Up Application Defaults
- Creating an Application

Setting Up Application Defaults

To set up application defaults (optional):

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

      The Project page appears.
2. On the right side of the Project page, click **Set Application Defaults** in the Tasks list.
3. Select the options you want to use as defaults.

   For information, click **Help** or click the item label. Clicking the item label opens a separate window describing the item and its options.
4. Click **Apply Changes**.

   The Project page appears.

Creating an Application

To create an application:

1. Go to the Project page:
   a. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
   b. Click the **Application Builder** icon.
   c. Click **Migrations** on the right side of the page.
   d. Click a project name.

      The Project page appears.

2. On the Project page, click **Create Application**.
3. In Name, specify the following:
   a. Name - Enter a name for this application. The default name is based on the project name.
   b. Create Application - Choose a creation method. Select **Based on Migration Project**.

      Tip: Selecting **Based on existing application design model** enables you to reuse a model from a previously generated Oracle Application Express application.

   c. Click **Next**.
4. In the Selected Application Objects section, you can customize specific pages. For example:
   - Rename a page. Click the Page Name link and enter the new name on the New Page Definition page that appears.
   - Select home page navigation. Click the **Home** link. The Page Definition appears. Under Navigation, select one of the following:
     – Vertical Unordered List with Bullets
     – Vertical Images List
     – Horizontal Images List (default)
   - To display an image on a parent page, click the Page Name link. The Page Definition appears. Scroll down to Page Icon. Select and image from the list list or click the **Find** icon (flashlight) to view additional options.

     Repeat this step for each parent page. If you do not explicitly select an image for a page, the default image displays for that page.

     Note that for the image to appear in your application, you must have selected either Vertical Images List or Horizontal Images List for the Home page navigation.
5. To add additional pages to the application, scroll down to the Add page section. Select a page type and click **Add Page**. To learn more about each page type, click item Help.

   Note that the new page appears at the bottom of the list in the Selected Application Objects section.
6. Click **Next**.
7. Select a theme for the application and click **Next**.

   A **theme** is a collection of templates that define the layout and style of an application, including buttons and pages.
8. Confirm your selections and click **Create**.
9. To preview the application, click **Run Application**. Then, log in using your Oracle Application Express workspace credentials.

   Your application now appears as a separate application in Oracle Application Express.
10. To customize your application, scroll down to the Developer toolbar and click **Edit Application**.

You might want to do the following customizations immediately after you generate your application:

- Rename the application. Each application has a unique ID, but the conversion project name becomes the application name by default. To more easily identify an application, you might want to change its name to something more meaningful by editing the application attributes.
- Change the authentication scheme. By default, the authentication scheme is Application Express authentication. You can change this by editing the application attributes.

See Also: For further details on why the model shows the given pages based on your Forms, see "Block to Page Region Mappings" on page A-4. For information on editing application attributes, adding pages, deploying your application see the *Oracle Application Express Application Builder User's Guide* or online Help.

Deleting a Migration Project

When you delete a migration project, you delete only the metadata associated with the migration project. Deleting a migration project does *not* delete or impact applications you have generated from the project or any objects, such as tables or views, in the schemas associated with your workspaces.

To delete a migration project:

1. Log in the workspace you created for your conversion project as described in "Logging in to Your Oracle Application Express Workspace" on page 4-8.
2. Click the **Application Builder** icon.
3. Click **Migrations** on the right side of the page.
4. On the Application Migrations page, click the project you want to delete.
5. On the Project page, click **Delete Project** from the Tasks list.
6. Click the **Delete Project** button and confirm the deletion.

A

Oracle Forms Generation Capabilities and Workarounds

This appendix lists how objects are generated during the conversion process, or alternatively how the same functionality can be implemented post-generation if necessary.

Topics:

- Oracle Forms Modules
- Oracle Reports
- PL/SQL Libraries
- Forms Menus
- Object Libraries

Oracle Forms Modules

This section describes various Oracle Forms components and offers a brief overview of how they are mapped to similar objects within an Oracle Application Express application or explains how they can be implemented manually post generation.

Topics:

- Overview of Oracle Forms Components
- About Generated Applications
- Block to Page Region Mappings
- List of Values Implementation
- Implementing Business Logic

Overview of Oracle Forms Components

This section provides an overview of Oracle Forms components and the corresponding Oracle Application Express generation capabilities or workarounds.

Alerts

Alert messages are not generated. However, you can store an alert message as a text message in Shared Components in Oracle Application Express application. Text messages can be used to build translatable text strings with substitution variables that

can be called from PL/SQL packages, procedures, and functions. See "Working with Shared Components" in *Oracle Application Express Application Builder User's Guide*.

Blocks

A single block can be mapped to a region in Oracle Application Express. Based upon the block type and data source type (that is, table or view) identified in the Forms `XML` file, some default mappings are defined. For example, a report block based upon an Oracle view, is mapped to an Interactive report in Oracle Application Express. A form block based upon a table, is mapped to an Interactive report and form in Oracle Application Express. For more information see "Block to Page Region Mappings" on page A-4.

Canvases

In Oracle Forms, the canvas is the object on which the graphical user interface (GUI) is drawn, or the background of the form. In Oracle Application Express, the Application Express engine constructs the appearance of each page in an application using templates. Templates define how pages, page controls, and page components display. Canvases are ignored when generating pages for an Oracle Application Express application.

Coordinates

Depending on the coordinate system used in an Oracle Forms application, coordinates can be expressed in real units such as inches, centimeters, and pixels. The coordinate values cannot be automatically applied to the generated application. One unit in an Oracle Application Express item width might not be equal to one physical pixel in an Oracle Forms application. While Oracle Forms enables specific placement of individual fields by specifying coordinates, Oracle Application Express uses standard HTML tables and all items are positioned relative to other elements and columns within the HTML table.

Editors

In Oracle Forms, editors provide standard editing features, including search and replace and cut, copy, and paste for text items. For a selected text item, an editor is mapped to a HTML editor in Oracle Application Express.

List of Values

A list of values (LOV) can be mapped to an equivalent list of values in Oracle Application Express. When LOVs are selected for inclusion in the conversion to Oracle Application Express their associated record group is included in the conversion. For more information, see the "List of Values Implementation" on page A-6.

Program Units

In the post-generation phase of the Forms Conversion process, program units can be incorporated into your Oracle Application Express application as a PL/SQL package, page process, computation or validation. For more information, see "Implementing Business Logic" on page A-6.

Property Classes

In Oracle Forms, a property class is a named object that contains a list of properties and their settings. An object based on a property class can inherit the settings of any property in that class. Similarly, in Oracle Application Express, a theme is a named

collection of templates used to define the user interface of an application. Oracle Application Express has a repository of 20 themes, and you can also create your own custom themes. Property classes are not used within the generation of Oracle Application Express applications.

Record Groups

In Oracle Forms, LOV values are derived from a record group. When a record group is defined, it is associated with a SQL query. When a LOV is generated in Oracle Application Express, the associated record group is used to determine the SQL Query for that LOV. For more information, see "List of Values Implementation" on page A-6.

Triggers

An Oracle Forms trigger is an event-handler written in PL/SQL to augment the default processing behavior. The trigger logic can be incorporated into an Oracle Application Express application as a computation, validation, or PL/SQL process in the post-generation phase. Where feasible, `POST-QUERY` block trigger logic is automatically incorporated in the generated Oracle Application Express application, as part of the Enhanced Query generation. For more information refer to "Implementing Business Logic" on page A-6.

Visual Attributes

Visual attributes are the font, color, and pattern properties that you can set for form and menu objects that appear in an Oracle Forms application's interface. Using the default cascading style sheets (CSS) installed with Oracle Application Express, or by uploading your own CSS files, style can be applied to your Oracle Application Express application. See "Using Custom Cascading Style Sheets" in *Oracle Application Express Application Builder User's Guide*.

Windows

A window is the container for all visual objects that comprise an Oracle Forms application, including canvases. In Oracle Application Express, a page holds all of the visual objects for an application. Due to the block mapping resulting in multiple pages, the windows are not used in the conversion process.

About Generated Applications

Oracle Application Express applications generated from a project conform to standard out-of-the-box application capabilities. These generated applications do not contain non-standard functionality such as JavaScript or Advanced JavaScript and XML (AJAX). However, you can readily extend the Oracle Application Express framework to include functionality such as JavaScript and AJAX to enhance the user interaction. However, such enhancements must be implemented manually post-generation.

Generated forms for inserting, updating, or deleting records include automatic row fetch processes to load existing records and automatic row processes to commit changes to the Oracle Database table. Forms also include generated validations for mandatory columns, and column types of number or date.

Primary Key Assumptions

The generation process assumes that the primary key for an Oracle table is non-updatable, maintained using a database trigger, and has a maximum of two parts.

If the primary key is updatable then the generated application must be modified post-generation. You must modify the item attributes for the primary key. By default,

these attributes are generated but displayed as hidden and protected. If there is no database trigger defined to automatically fetch the primary key when inserting a record, then the application will fail when attempting to insert a record. To avoid this error either define a database trigger or modify the generated application post-generation to populate the primary key value before processing the record. To populate the primary key value within the application you can use the item default, create a computation, or create a process. If creating a computation or process it is important to include a condition so that execution only occurs when inserting a record (for example, when the primary key item is `NULL`).

Oracle Application Express does not support cascading multiple part keys where the key for a child is defined as the primary key of the parent with a counter for each child within that parent key. In such cases, you must define a distinct primary key for the child table with an appropriate means of populating the primary key.

Block to Page Region Mappings

When an Oracle Form is loaded into an Oracle Application Express project, the various blocks are analyzed to determine how they will be generated. The conversion process uses information such as block relations, the number of records displayed, and whether insert or update are allowed. There are inherent differences between Oracle Forms and Oracle Application Express that have a direct bearing on the resulting pages that are generated.

Except for specific master-detail relationships, each block is generated onto a separate Oracle Application Express page. Furthermore, the canvases specified in Oracle Forms are ignored as multiple blocks are not generated as separate regions on the same page within Oracle Application Express. The sections that follow explains different Oracle Forms block types and how they are mapped into an Oracle Application Express application.

Single Record Block

In Oracle Forms a single record block can be used for both querying data and updating the records returned. Within Oracle Application Express, standard updatable regions cannot also be used as query regions. When an Oracle Forms block is defined as being insertable, updatable, and has a primary key, then the generation mapping defines an interactive report with a form. The interactive report enables you to query the records and the generated Edit link provides navigation to an individual record for update or deletion. A Create Record button enables you to insert records.

If not all the conditions are satisfied then only an interactive report is generated for a single record block. Therefore, only an interactive report is generated and not the corresponding form if one of the following conditions exist:

- the number of records displayed is greater than one
- `INSERT` allowed is set to false
- `UPDATE` allowed is set to false
- there is no primary key defined for the underlying table
- the block is based on a view

The interactive report uses the original query, enhanced query, or custom query defined within the project for the block. However, the form is based only on the underlying table. Items characteristics such as radio groups, check boxes, date pickers, editors and list of values will be generated where possible.

Tabular Form

A tabular form defined in Oracle Forms is generated as a tabular form in Oracle Application Expresss providing the number of records displayed is greater than one. Implementing item characteristics, such as select lists, needs to be performed manually post-generation. Non-database items specified in Oracle Forms are not be generated into the tabular form generated by Oracle Application Express, even if they have been included. Implementing non-database items in a tabular form needs to be performed manually post-generation. For more information, see "How to Create a Tabular Form" in *Oracle Application Express Advanced Tutorials*.

Currently adding non-database items on a tabular form is non-declarative and is covered in the Oracle Application Express Advanced Workshop course. An alternative is to manually create a report and form to replace the tabular form post-generation where it is much easier to add validations and add items without a source of database.

Master Detail Blocks

Within Oracle Forms, master detail forms are defined using block relations. There are several additional criteria that must be examined in order to determine what will be generated for an Oracle Forms master detail relationship. The master block is generated as one of the following:

- An interactive report and a master-detail form
- An interactive report and a form only
- Only an interactive report

The detail blocks are generated independently as either a single record block or a tabular form based on the mappings provided.

An interactive report and master-detail form is only be generated if all the following criteria are satisfied:

- The master and detail blocks are both based on tables, but not the same table, and both have primary keys.
- There is only one detail block.
- There is a valid foreign key relationship between the master and detail blocks.
- The block relations are correctly defined with the Oracle Forms file.

When a master detail form is generated, the detail page is also created within Oracle Application Express. You can manually remove the detail page when reviewing the pages to be generated prior to creating the Oracle Application Express application, or you can delete it manually post-generation.

Alternatively, if both the master and the single detail block are based on the same table and that table has a primary key, then two interactive reports and forms are generated for each block. It is recommended that you manually modify one of the resulting forms post-generation to combine the functionality into a single form and delete the second interactive report and form. However, if the table does not have a primary key or is based on a view then only reports are generated.

Oracle Application Express cannot include more than one tabular form on a page. Therefore, when a file with a master and multiple detail blocks is loaded, the relations are ignored and the master block and each detail block are treated independently as either a single record block or a tabular form based on each blocks properties.

If there is no valid foreign key relationship and the table has a primary key, then the master block is generated as an interactive report and form. Otherwise, it is generated as an interactive report.

Non-Database Block

If a block is not associated with a database table or view then the block is not included for generation. These blocks typically hold menus, navigation bars, and buttons. Given that such components are handled and defined very differently within Oracle Application Express it is not appropriate to generate separate pages for these. However, such blocks can be included if required and will be generated as blank pages.

List of Values Implementation

Oracle Application Express dynamic list of values (LOVs) enable one display value and one return value to be defined within an SQL. You can specify LOVs individually for an item or define as a named shared component which can be used with any item throughout the application.

Oracle Forms record groups define the query for each list of values. These record groups are analyzed to determine whether the corresponding LOV can be generated. A named shared component LOV is created utilizing the query from the record group and then specified on the corresponding Oracle Application Express item. The implementation style used in Oracle Forms determines whether the item is implemented as a select list or pop-up list of values.

Where there are multiple display columns in the record group only one is used in the resulting Oracle Application Express LOV query. If the record group uses bind variables as parameters, Oracle Application Express application items are defined and referenced within the resulting LOV query.

Implementing Business Logic

Within Oracle Forms applications, business logic is often interspersed with Oracle Forms user interface functionality. The Oracle Forms user interface functionality used to manipulate the screen (for example, `go_block`, `go_item`, `set_item_property` and so on) are often not appropriate within Oracle Application Express due to the inherent differences in the user interface.

Business logic can be found in Oracle Forms triggers and program units, or in PL/SQL libraries. The business logic can be written directly into the objects as SQL or PL/SQL. This code may in turn call database packages, procedures, or functions. The underlying tables may also have database triggers defined which implement business logic.

Because database triggers operate on the underlying tables regardless of the user interface, they do not need to be altered when converting an application to Oracle Application Express. You can call database packages, procedures, or functions from Oracle Application Express because it also uses SQL and PL/SQL. Note that these database objects do not need to be altered when used within the Oracle Application Express development environment.

In order to re-implement the business logic defined within Oracle Forms you must analyze the triggers, program units, and PL/SQL libraries and manually write corresponding logic within Oracle Application Express. Note that Oracle Forms triggers, program units, and PL/SQL library code are not automatically generated except for `POST-QUERY` triggers. `POST-QUERY` triggers can be incorporated into

Enhanced Queries as part of the block definition and subsequently included in the Oracle Application Express application.

Oracle Application Express uses processes, computations, and validations to implement such business logic. Before undertaking the post-generation task of re-implementing business logic, it is important to understand how and when to invoke the various types of processes, computations, and validations. It is also important to understand how conditional processing can be applied to these types of components to customize the circumstances under which they execute. For more information, see *Oracle Application Express Application Builder User's Guide*.

Processes

Processes are logic controls used to execute data manipulation language (DML) or PL/SQL. A process performs an action at a specified point during the rendering or submission of the page. For example, you can create a process to execute logic or to make a call to the Application Express engine. A process is a unit of logic that runs when a specific event occurs, such as loading or submitting a page. For more information, see "Understanding Page Processes" in *Oracle Application Express Application Builder User's Guide*.

Processes can be defined as either an application-level process or a page-level process. From a functional perspective, there is no difference between page-level and application-level processes. Application-level processes can be called form any page within the application and may be called On Demand which is especially useful when you have PL/SQL logic that you would like to run from different execution points across multiple pages. Page-level processes can only be called from the page on which they are defined.

Computations

Computations are units of logic used to assign a value to an identified item when a page is submitted or displayed.

Computations can be defined as either an application-level computation or a page-level computation. Most application-level computations are performed for every page in an application. In contrast, computations created at the page-level only execute when that page is rendered or processed. For more information, see "Understanding Page Computations" and "Understanding Application Computation in *Oracle Application Express Application Builder User's Guide*.

Validations

Validations enable you to create logic controls to verify whether user input is valid. For example, a validation can check whether a value has been entered into a mandatory field. When a validation fails then an error message is displayed and subsequent page processes and computations will not occur. For more information, see "Understanding Validations" in *Oracle Application Express Application Builder User's Guide*.

There are two distinct types of validations:

- Item-level validations which are specific to a single item.
- Page-level validations which do not apply to any single item, but apply to an entire page.

There are several validation methods:

- SQL - Compares item values to data in the database.
- PL/SQL - Enables you to enter complex logic to validate entered data.

- Item Level Null - Checks if an item's value in session state is `NULL`.
- Item String Comparison - Compares the value of an item to a specific string.
- Regular Expression - Provides a method to describe text patterns.

Oracle Reports

The underlying SQL query used to define an Oracle Report is used within Oracle Application Express when generating an interactive report. When one or more Oracle Report files are loaded, an additional Reports page is generated with links to each of the generated interactive report pages. You will need to manually implement additional logic defined within the Oracle Report post-generation. Oracle Application Express supports the creation of printable reports utilizing Oracle Bi Publisher, Apache FOP, or another standard XSL-FO report processing engine. To learn more, see:

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

PL/SQL Libraries

PL/SQL libraries contain logic which can be called from any of the Forms Modules to which it is linked. Such libraries are primarily used to define commonly used business logic that must be manually re-implemented post-generation. See "Implementing Business Logic" on page A-6. Generally such logic should be implemented as application-level processes so that they can be called from any generated page.

Forms Menus

Oracle Forms menus are not automatically generated within Oracle Application Express. Oracle Application Express uses lists displayed in a region to replicate a menu structure. The default generation process creates a Home page with a list of horizontal images as the basis for a menu within your Oracle Application Express application. This list can be manually updated post-generation to incorporate conditional logic to implement the business logic defined within the Forms Menu. For information, see "Creating Lists" in *Oracle Application Express Application Builder User's Guide*.

Object Libraries

Object Libraries contain common visual elements used to define Oracle Form layouts for specified components. These visual elements are not used within the Oracle Application Express generation process. You must manually create these visual attributes contained within these libraries post-generation. Depending on the visual attribute there are different ways of implementing such features including customizing templates, shared list of values, item types, item attributes and so on.

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