ORACLE
E-BUSINESS SUITE 12

ORACLE
APPLICATION EXPRESS

An Oracle White Paper
December 2012

Extending Oracle E-Business Suite Release 12 using Oracle Application Express

Revision 1

ORACLE

Disclaimer

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Executive Overview 2
Introduction 2
  Prerequisites 3
Concept Overview 3
Oracle Application Express Architecture 4
  Recommended Deployment Architecture 5
  Installing Oracle Application Express 5
  Oracle Application Express Schemas and Workspaces 6
Accessing Oracle E-Business Suite Data 9
  Updating Oracle E-Business Suite Tables 9
  Downloading and Installing the Sample Code 11
Integrating with the Oracle E-Business Suite 12
  Creating an Oracle Application Express Application 12
  Oracle Application Express Authentication and Authorization 17
  Configuring the Oracle Application Express Login Process 17
  Defining Oracle Application Express Authorizations 21
  Installing the Sample Packaged Application 24
  Defining the Oracle E-Business Suite Profile and Functions 25
  Defining Oracle E-Business Suite Menus and Responsibilities 27
Running the Application Express Extension 30
Conclusion 32
  Acknowledgements 32

Executive Overview

This paper outlines how to extend Oracle E-Business Suite functionality utilizing Oracle Application Express. This paper is a collaboration between both product teams to ensure that any extensions developed following the strategy outlined in this paper are fully supported. Recommended architecture and security considerations are discussed in detail.

Introduction

Oracle E-Business Suite delivers a wide range of functionality to handle core areas of your business processing needs. However, there are situations where you want to extend your information systems beyond the range of Oracle E-Business Suite. Many times these necessary extensions are meant to handle unique industry conventions, specific customer requirements, or perhaps to offer some other competitive edge. Sometimes these change requests are simple enough, but other times more extensive customizations are needed. In these scenarios, Oracle Application Express, also known as Oracle APEX, provides an easy way to create supplemental applications that are easily integrated with your Oracle E-Business Suite and its data.

Oracle Application Express is a rapid web application development tool for the Oracle database. Oracle Application Express combines the qualities of a personal database (productivity, ease of use, and flexibility) with the qualities of an enterprise database (security, integrity, performance, scalability, availability, and built for the web). The browser based interface, declarative programming framework, and simple wizards make Oracle Application Express easy to learn and enable you to quickly build robust applications.

Oracle Application Express offers you a quick and highly productive way to extend your Oracle E-Business Suite environment with almost no impact to your existing implementation. By moving custom behaviors out of Oracle E-Business Suite and into Oracle Application Express, you can make Oracle E-Business Suite patching and upgrading much simpler.

You should be able to easily combine your Oracle Application Express applications with your Oracle E-Business Suite installation using the architecture and techniques described in this white paper.

Prerequisites

The prerequisites for the solution given in this paper are:

- Oracle E-Business Suite 12.1.3 or above
- Oracle E-Business Suite Patch 12316083
  {Go to My Oracle Support Patches & Updates:
  https://updates.oracle.com/Orion/PatchSearch/process_form?bug=12316083}
- Fully Licensed Oracle Database[1], Release 10.2.0.3 or above
- Oracle Application Express 4.0 or above

The examples in this document use Oracle Application Express 4.0.2. The exact steps and screen shots will be different for later versions of Oracle Application Express.

Concept Overview

Oracle Application Express offers you the ability to create reports, charts, and calendars as well as pages to provide for data review and manipulation. To allow you to create Oracle Application Express applications that reference Oracle E-Business Suite data, the desired data is exposed through views that are owned by the APPS schema. 'SELECT' access to those views is then granted to a new schema (for this document, APEX_EBS). Because direct insert/update/delete of Oracle E-Business Suite data is unsupported, applications that manipulate Oracle E-Business Suite data will use the public Oracle E-Business Suite APIs. Reference to these APIs can either be coded into the Oracle Application Express applications or you can define 'INSTEAD OF' triggers against the new views which call the appropriate APIs.

The extensions built in Oracle Application Express will appear seamless to your end users because you can use the same authentication (who can login) and authorization (who can see what) within your Oracle Application Express applications that are used within your Oracle E-Business Suite installation. Your new applications can either be stand-alone or fully integrated. Stand-alone applications are accessed directly but use the same login credentials used for Oracle E-Business Suite access. Fully integrated applications are registered within the Oracle E-Business Suite so they are available from within the Oracle E-Business Suite menus. Oracle Application Express contains a pre-configured Authentication Scheme for Oracle Single Sign-on (OSSO) and also HTTP Header Variable (Oracle Application Express Release 4.1 and above) for use with Oracle Access Manager (OAM).

[1] The limited-use Oracle Database license agreement included with an Oracle E-Business Suite license does not allow for the creation of an additional schema as outlined in this paper below. Please refer to the following license agreement: http://www.oracle.com/us/corporate/pricing/application-licensing-table-070571.pdf. Therefore, to be fully compliant, full-use Oracle Database Enterprise Edition and Oracle Internet Application Server Enterprise Edition licenses are required.

If your Oracle E-Business Suite instance uses OSSO or OAM, setting up authentication will be very simple. If you are using custom authentication for Oracle E-Business Suite, you can still achieve seamless integration but you will need to code a function within the APPS schema that validates the user and then add an authentication scheme to your Oracle Application Express applications that calls that new function.

This document discusses the Oracle Application Express architecture and provides detailed instructions for creating all the components necessary to extend Oracle E-Business Suite. In support of the instructions, scripts and a sample packaged application are available for download to ensure that any developer can quickly replicate the examples.

Oracle Application Express Architecture

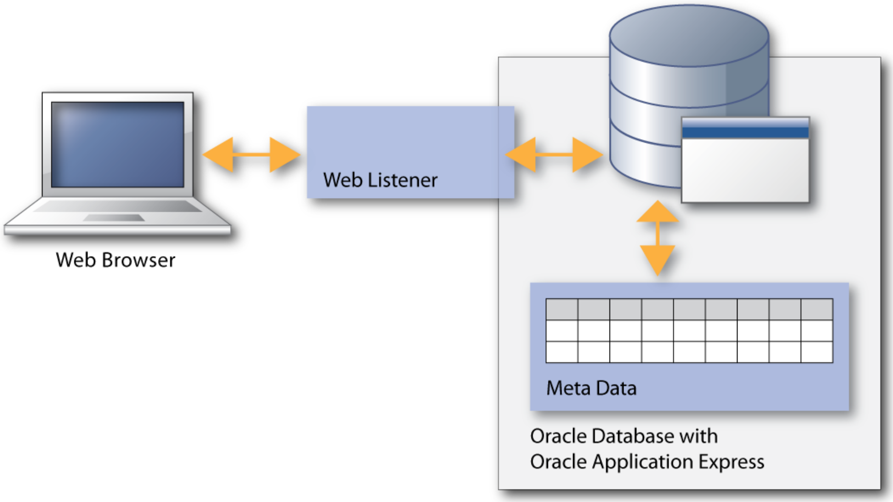


Figure 1. Oracle Application Express Architecture

Oracle Application Express resides completely within the Oracle Database in its own schema and can be installed on any version of the Oracle Database from 10gR2 and above. Runtime, development and deployment require no client software as access is 100% browser based via a Web listener communicating with the Oracle Database. The application definitions are stored as meta-data within the Oracle Application Express schema which is accessed to perform page rendering and processing.

There are currently three Web listeners available for Oracle Application Express – Oracle Application Express Listener, Oracle HTTP Server with mod_plsql, or the Embedded PL/SQL Gateway (EPG) available with Oracle Database 11g. The APEX Listener is a JAVA EE based solution that is certified with Oracle WebLogic Server, and Oracle Glassfish. This is the preferred Web listener for accessing Oracle Application Express.

Note: It is not recommended to use the Embedded PL/SQL Gateway within the E-Business Suite environment as it will add additional load on the Database Server.

Recommended Deployment Architecture

Oracle E-Business Suite Release 12 disables the mod_plsql gateway within the Application Server configured for Oracle E-Business Suite. Enabling mod_plsql for use with Application Express is not supported and will result in your Oracle E-Business Suite configuration not being certified or supportable.   The recommended configuration is to install the APEX Listener within Oracle Glassfish on either the same Application Server configured for Oracle E-Business Suite or a separate Application Server.

Oracle Application Express needs to be installed on the same Oracle Database server as the Oracle E-Business suite database server. Oracle recommends this configuration even if you are using an earlier release of Oracle E-Business Suite.

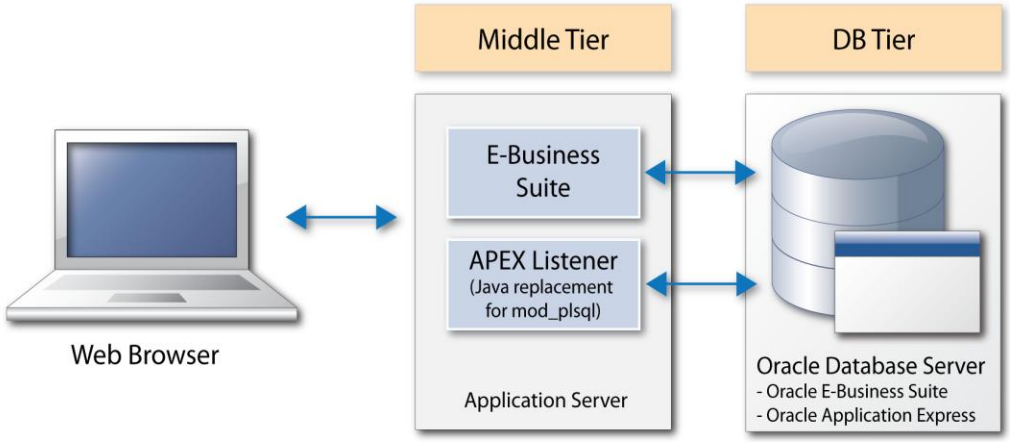
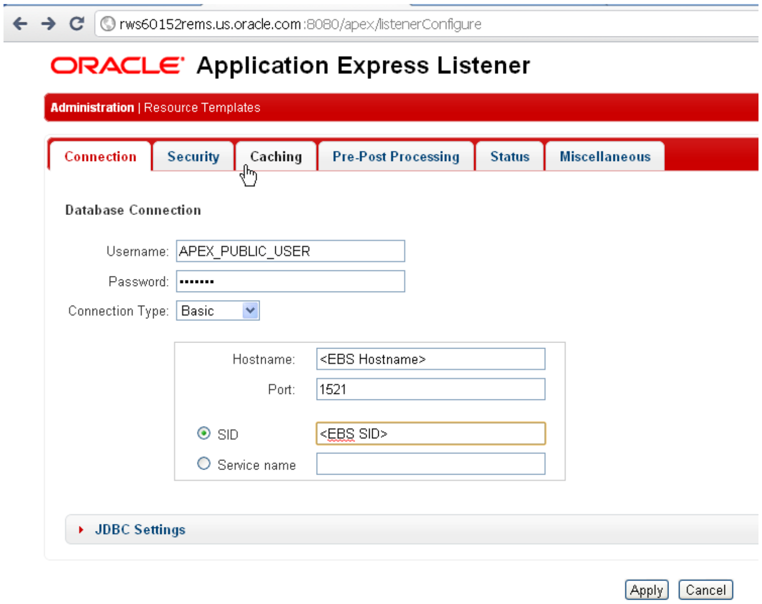


Figure 2. Recommended Environment Configuration

Installing Oracle Application Express

You need to install Oracle Application Express on the Oracle E-Business Suite database server. When installing you should always download the latest version (currently APEX 4.2) from the Oracle Technology Network (http://otn.oracle.com/apex) and follow the Installation Guide – 3.3 Downloading from OTN and Configuring Oracle Application Express Listener (http://docs.oracle.com/cd/E37097_01/doc/install.42/e35123/otn_install.htm#BABJJAGF). If you are using Oracle Database 11g then this will update any older version of Oracle Application Express that is installed by default when the seed database is created.

You will also need to download the latest version of the Oracle APEX Listener (currently 1.1) from Oracle Technology Network (http://www.oracle.com/technetwork/developer-tools/apex-listener/overview/index.html) and follow the installation instructions for the Oracle Glassfish Server. You can utilize the Oracle Glassfish Server incorporated into the Oracle APEX Listener, or download the latest Oracle Glassfish Server from the Oracle Technology Network. The Oracle Glassfish Server will be installed onto the Oracle E-Business Suite application server. Once installed you will need to run **http://<EBS_Hostname>:8080/apex/listenerConfigure** (where EBS_Hostname is the host name used to access the Application Server) to complete the configuration.


rws60152rems.us.oracle.com:8080/apex/listenerConfigure
ORACLE Application Express Listener
Administration | Resource Templates
Connection
Security
Caching
Pre-Post Processing
Status
Miscellaneous
JDBC Settings
Apply
Cancel

Database Connection

Username: APEX_PUBLIC_USER

Password: •••••••

Connection Type: Basic

Hostname: <EBS Hostname>

Port: 1521

● SID <EBS SID>

○ Service name

Figure 3. Oracle APEX Listener Configuration

After completing the installation steps for both Oracle Application Express (including enabling Network Services in Oracle Database 11g if necessary) and Oracle APEX Listener, you create a workspace for your development and then create applications within that workspace. For your production instance it is highly recommended to run Oracle Application Express in runtime-only mode to further harden security [See: About the Oracle Application Express Runtime Environment http://docs.oracle.com/cd/E37097_01/doc/install.42/e35123/overview.htm#CJAFIGFG].

Oracle Application Express Schemas and Workspaces

Workspaces are logical containers within Oracle Application Express that provide functional security. Workspaces can be associated with one or more database schemas. Each schema associated with an Oracle Application Express workspace can be used to parse SQL and PL/SQL requests.

Oracle E-Business Suite uses a schema called APPS. For better security, avoid associating the APPS schema with an Oracle Application Express workspace. Associating the APPS schema allows Oracle Application Express applications full access to all of the underlying Oracle E-Business Suite tables, which is a security risk. Instead, create at least one separate schema in the Oracle E-Business Suite database for developing your Oracle Application Express applications.

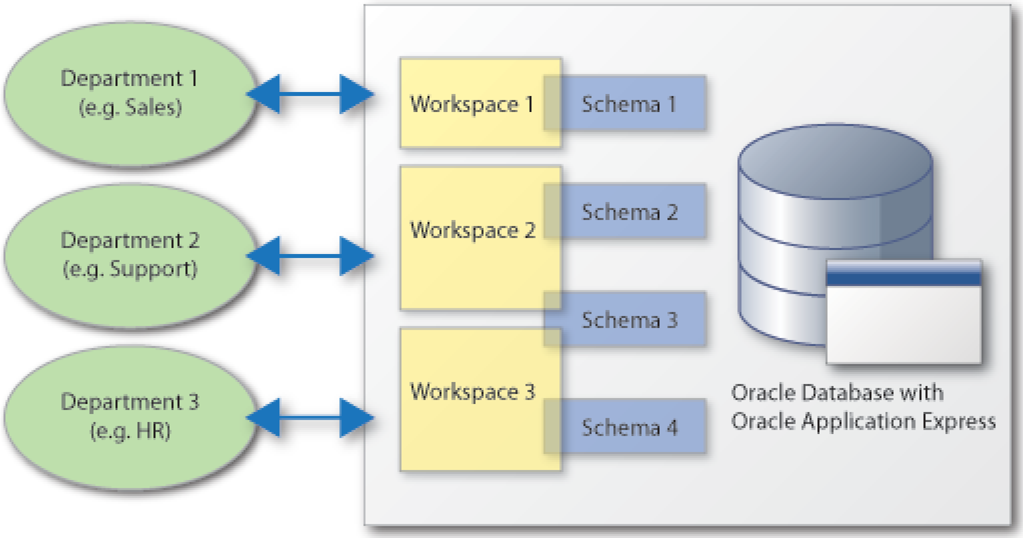
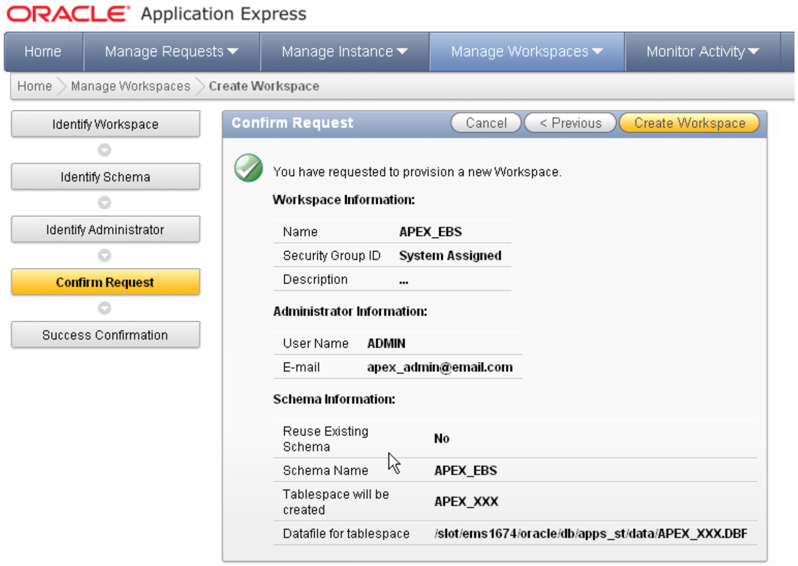


Figure 4. Example of Oracle Application Express Workspaces

For this paper and the included code examples, create a workspace called APEX_EBS and a schema called APEX_EBS by performing the following steps:

1. Log into Oracle Application Express Administration (**http://<EBS_Hostname>:8080/apex/apex_admin**)
2. Enter *Username* **ADMIN**, *Password* (defined during installation by executing @apxchpwd), click Login
3. Navigate to Manage Workspaces > Create Workspace
4. Enter *Workspace Name* **APEX_EBS**, click *Next* >
5. Enter *Schema Name* **APEX_EBS**, and *Password* **APEX_EBS**, click *Next* >
6. Enter *Administrator Username* **ADMIN**, *Administrator Password* **APEX_Password**, and your email address for *Email*, click *Next* >
7. Click Create Workspace, click *Done*



Confirm Request

You have requested to provision a new Workspace.

Workspace Information:

Name	APEX_EBS
Security Group ID	System Assigned
Description	...

Administrator Information:

User Name	ADMIN
E-mail	apex_admin@email.com

Schema Information:

Reuse Existing Schema	No
Schema Name	APEX_EBS
Tablespace will be created	APEX_XXX
Datafile for tablespace	/slot/ems1674/oracle/db/apps_st/data/APEX_XXX.DBF

Figure 5. Oracle Application Express Workspace Provisioning

Now that the workspace has been created, development will be performed within the Application Builder. To log into the Application Builder and create developers, follow these steps:

1. Log into Oracle Application Express Application Builder (**http://<EBS_Hostname>:8080/apex/apex**)

2. Enter *Workspace* **APEX_EBS**, *Administrator Username* **ADMIN** and *Administrator Password* **APEX_Password** entered when creating the workspace, click *Login*

3. You will need to reset the password – enter *Current Password* **APEX_Password**, *New Password* **APEX_Password1**, *Confirm New Password* **APEX_Password1**, click *Apply Changes*, click *Close Window*;

4. Navigate to Administration > Manage Users and Groups

5. Depending on your requirements you can create one or more developers using the Tasks listed on the right

Accessing Oracle E-Business Suite Data

Oracle Application Express provides numerous wizards to rapidly build application components on existing Oracle tables or views. However, a prerequisite of many wizards within Oracle Application Express is that the underlying tables or views contain primary key constraints. Given Oracle E-Business Suite tables and views do not typically include primary key constraints, it is advisable to define additional views that incorporate primary key constraints for the Oracle Applications objects you wish to access. For security purposes, it is recommended Oracle E-Business Suite data is accessed only through these views. The views can incorporate security, joins, etc., and prevent Oracle Application Express applications from making any unauthorized changes to the underlying data.

Below is sample code for creating such a view in the APPS schema –

```
CREATE OR REPLACE VIEW apex_ebs_user
    (  user_id
     , user_name
     , start_date
     , end_date
     , description
     , email_address
    , user_guid
    , person_party_id
    , CONSTRAINT apex_ebs_user_pk
           PRIMARY KEY (user_id)
           RELY DISABLE NOVALIDATE
    )
AS
    SELECT user_id
    ,      user_name
    ,      start_date
    ,      end_date
    ,      description
    ,      email_address
    ,      user_guid          /* Used for Single-Sign On */
    ,      person_party_id    /* FK to party information */
    FROM fnd_user;
```

It is then necessary to grant rights to the new schema (APEX_EBS) from within the APPS schema -

```
GRANT SELECT ON apex_ebs_user TO APEX_EBS;
GRANT SELECT on fnd_responsibility_vl TO APEX_EBS;
```

The final step is to create a corresponding view within the APEX_EBS schema -

```
CREATE OR REPLACE VIEW apex_ebs_user AS
    SELECT * from apps.apex_ebs_user;
```

Updating Oracle E-Business Suite Tables

Although it may be tempting to insert/update/delete records on Oracle E-Business Suite tables directly, this is unsupported and must be avoided. Please keep in mind that direct updates to Oracle E-Business Suite tables is not supported unless explicitly documented. Direct updates will bypass validation, security and business logic which could lead to data corruption or unexpected system behavior. We recommend that all Oracle E-Business Suite updates are made through calls to public APIs. The Oracle E-Business Suite Integration Repository provides a searchable list of public APIs for the system.

Below is sample code for creating a package body within the APPS Schema:

```
CREATE OR REPLACE PACKAGE BODY apex_integration_sample_apis AS

FUNCTION apex_validate_login (  p_username   in  varchar2
                              , p_password   in  varchar2
                             ) RETURN BOOLEAN
IS
BEGIN
    RETURN fnd_user_pkg.validatelogin(p_username, p_password);
END apex_validate_login;

PROCEDURE apex_update_email (  p_username        in varchar2
                             , p_owner           in varchar2
                             , p_email_address   in varchar2
                            )
IS
BEGIN
    wf_event.setdispatchmode('async');
    fnd_user_pkg.updateuser
    (  x_user_name     => p_username
     , x_owner         => p_owner
     , x_email_address => p_email_address);
END apex_update_email;

END apex_integration_sample_apis;
/
```

When utilizing the Oracle Application Express wizards on the new views to define applications, DML automatic row processes will be defined referencing the view specified. These processes can be deleted and alternate processes written which call the appropriate APIs. An alternative is to create 'INSTEAD OF' triggers on these new views which call the API to change the data in the tables. These triggers only need to be defined once against each view and will allow the standard Oracle Application Express page processes that are generated as part of the page creation wizards to be utilized.

Below is sample code for creating such a trigger in the new schema. This code is not included in the sample code provided, as our examples don't update the fnd_flex_values records.

```
CREATE OR REPLACE TRIGGER apex_fnd_flex_values_tr
    INSTEAD OF INSERT OR UPDATE ON apex_fnd_flex_values
DECLARE
    v_storage_value VARCHAR2(32000);
BEGIN
    IF INSERTING THEN
        fnd_flex_val_api.create_independent_vset_value
        (  p_flex_value_set_name => :NEW.flex_value_set_name
         , p_flex_value          => :NEW.flex_value
         , p_description         => :NEW.description
         , x_storage_value       => v_storage_value
        );
    ELSIF UPDATING THEN
        fnd_flex_val_api.update_independent_vset_value
        (  p_flex_value_set_name => :NEW.flex_value_set_name
         , p_flex_value          => :NEW.flex_value
         , p_description         => :NEW.description
         , x_storage_value       => v_storage_value
        );
    ENDIF;
END;
/
```

Downloading and Installing the Sample Code

The code samples given above are available for download from the Oracle Technology Network (OTN). To run these scripts, perform the following steps:

1. Download the APPS schema script file from OTN – http://www.oracle.com/ocom/groups/public/@otn/documents/webcontent/329274.sql

2. Save the file as **apexebs_apps_setup.sql** and upload to your Oracle E-Business Suite Database server

3. Connect to your Oracle E-Business Suite Database server

4. Run SQL*Plus, connect as APPS and run the script, providing the appropriate APEX Schema name and SID for the database:
   sqlplus "apps/apps_password@EBS_SID" @apexebs_apps_setup APEX_EBS

5. Download the APEX schema script file from OTN – http://www.oracle.com/ocom/groups/public/@otn/documents/webcontent/332106.sql

6. Save the file as **apexebs_apex_setup.sql** and upload to your Oracle E-Business Suite Database server

7. Connect to your Oracle E-Business Suite Database server

8. Run SQL*Plus, connect to the APEX schema, and run the script:
   sqlplus "apex_ebs/apex_ebs_password@EBS_SID" @apexebs_apex_setup

Integrating with the Oracle E-Business Suite

In order to connect from Oracle E-Business Suite to your new Oracle Application Express Applications, a secure mechanism is required to hand control from Oracle E-Business Suite to Oracle Application Express. The following steps need to be implemented:

- Create an Oracle Application Express application
- Configure the Oracle Application Express login process
- Define Oracle Application Express authorizations
- Define Oracle E-Business Suite profile and functions
- Link functions to menus and responsibility

Creating an Oracle Application Express Application

Developers define applications within Oracle Application Express as a collection of pages. Pages generally have one or more regions, buttons, items, computations, processes, branches, dynamic actions, tabs, lists, and breadcrumbs. Each application within an Oracle Application Express instance has a unique application ID. For end-users to access an Oracle Application Express application directly they enter a URL of the form:
http://<APEX_Host>:8080/apex/f?p=<Application_Id>:<Home_Page>

To create an Oracle Application Express application, perform the following steps:

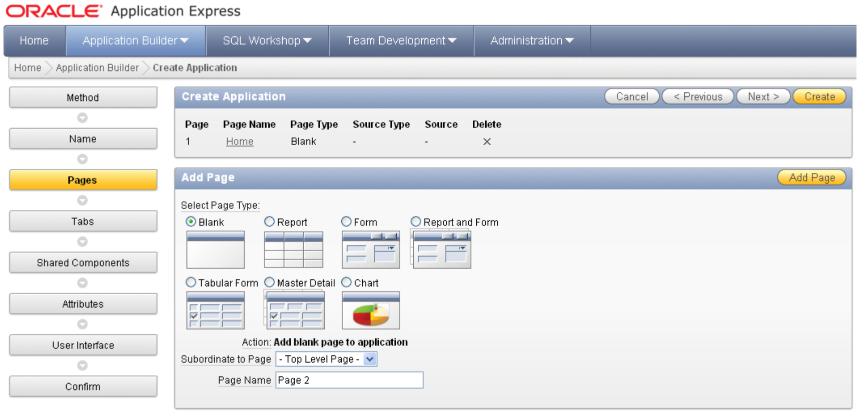
1. Navigate to the *Application Builder*

2. Click *Create*, select *Application Type* **Database**, click *From Scratch*

3. Enter *Name* **APEX EBS DEMO**, click *Next >*

4. Select *Page Type* **Blank**, enter *Page Name* **Home**, click *Add Page*, click *Create*

5. Click *Create*



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

Select Page Type:
● Blank ○ Report ○ Form ○ Report and Form
○ Tabular Form ○ Master Detail ○ Chart

Action: **Add blank page to application**

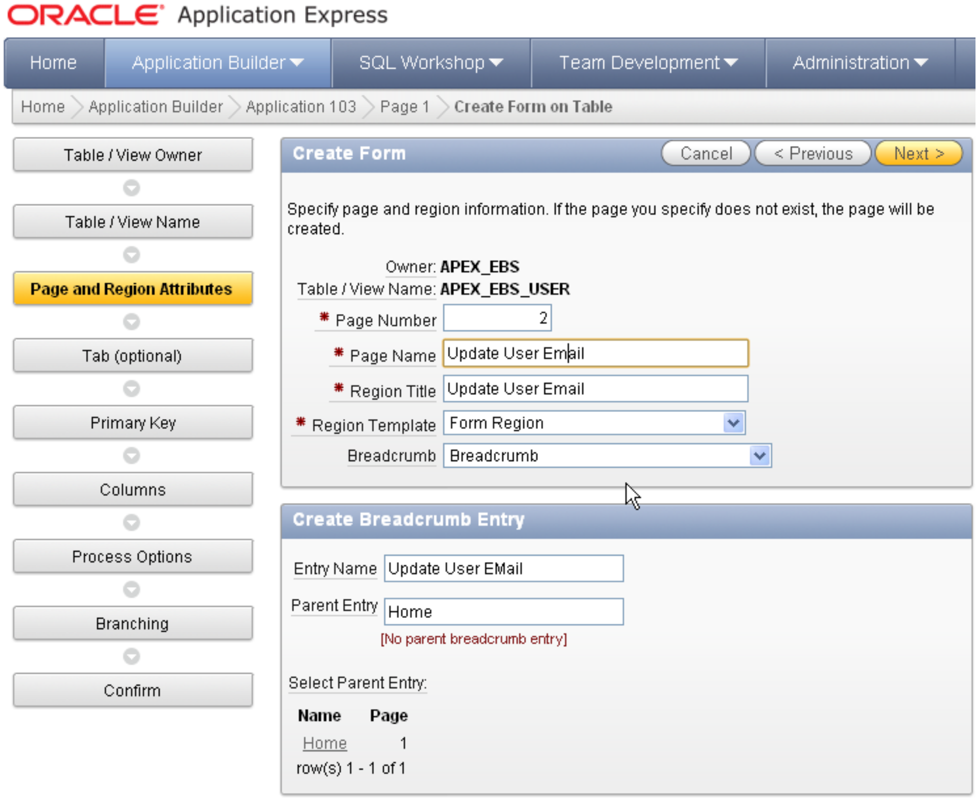
Subordinate to Page: - Top Level Page -

Page Name: Page 2

Figure 6. Creating an Oracle Application Express Application

Now we can add additional pages based on the APEX_EBS_USER view created earlier. We want to add two pages - one to be used for testing without responsibilities, and one for testing with Oracle E-Business Suite responsibilities. To add these pages perform the following steps:

1. Navigate to the Oracle Application Express Application Builder
2. Select the APEX EBS DEMO application
3. Click *Create Page*, select *Form*, select *Form on a Table or View*, click *Next* >
4. Enter/search for *Table/View Name* **APEX_EBS_USER**, click *Next* >
5. Enter *Page Number* **2**, *Page Name* and *Page Title* **Update User Email**, *Breadcrumb* **Breadcrumb**, *Parent Entry* **Home**, click *Next* >
6. Select *Tab Option* Use an existing tab set and create a new tab within the existing tab set, enter *New Tab Label* **Without Responsibility**, click *Next* >
7. Select *Primary Key Column 1* **USER_NAME**, click *Next* >, click *Next* >
8. Choose all *Select Column(s)*, click *Next* >, click *Next* >
9. Enter After Page Submit and When Cancel Button **1**, click Next >
10. Click *Finish*



Specify page and region information. If the page you specify does not exist, the page will be created.

Owner: **APEX_EBS**
Table / View Name: **APEX_EBS_USER**
* Page Number: 2
* Page Name: Update User Email
* Region Title: Update User Email
* Region Template: Form Region
Breadcrumb: Breadcrumb

Entry Name: Update User EMail
Parent Entry: Home
[No parent breadcrumb entry]

Select Parent Entry:

Name	Page
Home	1

row(s) 1 - 1 of 1

Figure 7. Creating an Oracle Application Express Page

Update the generated *Fetch Row from APEX_EBS_USER* process (the process that retrieves the user details) to use the Oracle Application Express user name:

1. From the Application Builder for the APEX EBS Demo application - Edit Page 2

2. Double-click the *Fetch Row from APEX_EBS_USER* process

3. Enter *Item Containing Primary Key Column Value* **APP_USER**, click **Apply Changes**

The items on the page were generated as text items by default. For this example we only want the user to be able to update the Email Address so we need to update the page and change item properties:

1. From the Application Builder for the APEX EBS Demo application - Edit Page 2

2. Double-click the *User Name* item

3. Select *Display As* **Display Only**, click > {Displays P2_START_DATE}

4. Select *Display As* **Display Only**, click > {Displays P2_END_DATE}

5. Select *Display As* **Display Only**, click > {Displays P2_DESCRIPTION}

6. Select *Display As* **Display Only**, click > {Displays P2_EMAIL_ADDRESS}

7. Click > {Displays P2_PERSON_PARTY_ID}

8. Select *Display As* **Display Only**, click *Apply Changes*

Delete the generated *Process Row of APEX_EBS_USER* process (the process that updates the user details) and replace it with a call to the *apex_update_email* procedure defined earlier:

1. From the Application Builder for the APEX EBS Demo application - Edit Page 2

2. Double-click the *Process Row of APEX_EBS_USER* process

3. Click *Delete*, click *Ok*

4. Right-click on *Processes* region, click *Create*

5. Select *Category* **PL/SQL**, click *Next* >

6. Enter *Name* **Update Email**, select *Point* **On Submit – After Computations and Validations**, click *Next* >

7. Enter *PL/SQL Page Process*

```
apps.apex_integration_sample_apis.apex_update_email
(  p_username      => :APP_USER
 , p_owner         => :APP_USER
 , p_email_address => :P2_EMAIL_ADDRESS
);
```

8. Click *Next* >

9. Enter *Success Message* **Email updated successfully**, *Failure Message* **Email not updated**, click *Next* >

10. Select *When Button Pressed* **SAVE (Apply Changes)**, click *Create Process*

Repeat the same steps as above to create another page, Page 3, with the same details except *New Tab Label* **Using Responsibility**. Update the *Fetch Row from APEX_EBS_USER* process, replace the *Process Row of APEX_EBS_USER with* Update Email, and set all Page 3 items to be **Display Only** except for P3_USER_ID (Hidden) and P3_EMAIL_ADDRESS (Text Field).

To show the Oracle E-Business Suite responsibility that is going to be passed to Page 3 you must add a new process, region, and two items, using the following steps:

1. From the Application Builder for the APEX EBS Demo application - Edit Page 3

2. Create a new region – Right click on *Body (3)*, click *Create*

3. Select *Type of Region* **HTML**, click *Next* >

4. Enter *Title* **Responsibility**, click *Next* >, click *Create Region*

5. Create Items – Right click on *Responsibility* region, click *Create Page Item*

6. Select *Item Type* **Display Only**, enter *Item Name* **P3_RESPONSIBILITY_NAME**, click *Next* >, click *Next* >, click *Next* >,click *Create Item*

7. Right click on *Responsibility* region, click *Create Page Item*

8. Select *Item Type* **Display Only**, enter *Item Name* **P3_RESP_DESCRIPTION**, click *Next* >

9. Enter *Label* **Description**, click *Next* >, click *Next* >,click *Create Item*

7. Click on *Create > Page control on this page*, select *Control Type* **Process**, select *Category* **PL/SQL**, click *Next* >

8. Enter *Name* **Fetch Responsibility**, *Point* **On Load – Before Header**, click *Next* >

9. Enter *PL/SQL Page Process*

```
begin
  for c1 in (select responsibility_name
             ,      description
             from apps.fnd_responsibility_vl
             where application_id    = :EBS_APP_ID
             and   responsibility_id = :EBS_RESP_ID
            ) loop
    :P3_RESPONSIBILITY_NAME := c1.responsibility_name;
    :P3_RESP_DESCRIPTION    := c1.description;
  end loop;
exception
  when others then
    null;
end;
```

10. Click *Create Process*

To further aid navigation on the Home page you can add icons to go to each of the pages:

1. From the Application Builder for the APEX EBS Demo application – go to Shared Components

2. Click *Lists*, click *Create*, *Name* **Responsibility**, *List Template* **Horizontal Images with Label List**, click *Next* >

3. Enter two list entries - *List Entry Label* **Without Responsibility**, *Target Page ID* **2**; *List Entry Label* **Using Responsibilities**, *Target Page ID* **3**, click *Next* >, click *Create*

4. Navigate to Page 1 {in Application Builder}

5. Click *Create* > *Region on this page*, select *List*, enter *Title* **Responsibility**, *Region Template* **Region without Title**, click *Next* >

6. Select *List* **Responsibility**, click *Create List Region*

7. Double-click the *Home* region, click *Delete*, click *Delete Region*

8. Click on Shared Components > Lists, double-click Responsibility

9. Click *Without Responsibility*, enter *Image* menu/address_book_bx_128x128.png, click > {Displays *Using Responsibility*}

10. Enter *Image* **menu/addresses_bx_128x128.png**, click *Apply Changes*

At this stage the application is using default Oracle Application Express user credentials. Run the application and enter the user name and password you defined when creating the APEX_EBS Workspace earlier:

1. From the Application Builder for the APEX EBS Demo application – click *Run*

2. Enter *Username* **ADMIN**, *Password* **APEX_Password1**, click *Login*

3. Navigate using the icons and tabs

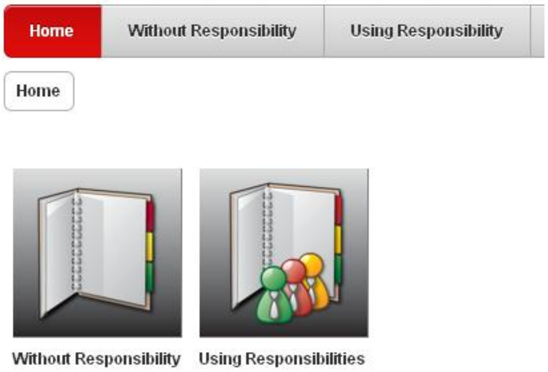


Figure 8. Oracle Application Express application

Note: No data will be displayed on Pages 2 or 3 because user credentials will not be found in the APEX_EBS_USER view (because you are currently using Oracle Application Express credentials instead of Oracle E-Business Suite credentials). Later in the document we will define authentication schemes that allow log in using the E-Business Suite credentials and that user's data will be displayed.

Oracle Application Express Authentication and Authorization

Oracle Application Express provides "out-of-the-box" mechanisms to handle both authentication (Is the user a valid Oracle E-Business Suite user?) and authorization (What privileges / responsibility does the user have within the application?).

Authentication schemes check the user's user name and password credentials before the user is allowed to access the application. Authorization schemes, on the other hand, control display and user access to pages, regions, items, buttons, and processes within an application.

If you are using Oracle Application Express Release 4.1 or above then you can also define plug-in authentications and plug-in authorizations. The benefit of developing such plug-ins is to ensure consistency across different applications. [See: Advanced Programming Techniques – Implementing Plug-Ins
http://docs.oracle.com/cd/E37097_01/doc/doc.42/e35125/advnc_plugins.htm#BACGADAG].

User Authentication

There are several pre-configured authentication schemes defined within Oracle Application Express that can be utilized, specifically Oracle Single Sign-On (OSSO), HTTP Header Variable (available with Oracle Application Express Release 4.1 and above) for use with Oracle Access Manager (OAM), or custom authentication schemes [See: Managing Application Security – Establishing User Identity Through Authentication
http://docs.oracle.com/cd/E37097_01/doc/doc.42/e35125/sec_authentication.htm#BABHIEIA].

Once you have configured OAM, OSSO or a custom authentication, you will be able to log into your Oracle Application Express applications using any valid OAM, OSSO or Oracle E-Business Suite user name and password.

Configuring the Oracle Application Express Login Process

If using custom authentication, users will not automatically log into Oracle Application Express. However, if you are using Oracle Access Manager or Oracle Single Sign-On then users will not be required to enter their user credentials when Oracle Application Express is invoked from the Oracle E-Business Suite menu.

Configuring Oracle Access Manager

Many Oracle E-Business Suite installations use Oracle Access Manager (OAM) or Oracle Single Sign-On (OSSO) to provide a centralized method of authenticating users. The Oracle standard for single user authentication with Oracle E-Business Suite Release 12 is Oracle Access Manager.

If you are using OAM then follow the Integrating Oracle Application Express with Oracle Access Manager white paper available from the Oracle Technology Network (OTN):
http://www.oracle.com/technetwork/developer-tools/apex/learnmore/apex-oam-integration-1375333.pdf. You will need to integrate Oracle Access Manager with Application Express separately from integration with E-Business Suite, but they can both use the same components. Once they are both configured then they can utilize the same user authentication.

Configuring Single Sign-On

If you are using OSSO with your Oracle E-Business Suite, you will have to identify the Oracle Application Express engine as a partner application within the OSSO infrastructure. Once you have configured the OSSO infrastructure, you can simply create an Oracle Application Express authentication scheme using the name given to the OSSO entry to integrate user authentication with your Oracle E-Business Suite environment. An OSSO-based authentication scheme will use the OSSO login page for users of your Oracle Application Express application. This method has the downside that a new session will be established each time Oracle Application Express is called from an Oracle E-Business Suite function, thereby losing any session information previously established. Application developers should keep this in mind when developing applications.

Before configuring Single Sign-On you will need the following:

- Download the appropriate OSSO SDK (Software Development Kit)
- Details regarding the OSSO Server – Site Id, Site Token, Encryption Key, Single Sign-On URL, Single Sign-Off URL
- A copy of **custom_auth_sso_902.sql** and **custom_auth_sso_902.plb** from the Oracle Application Express installation – ***apex/core*** directory

To configure Oracle Application Express as a partner application within OSSO perform the following:

1. Copy the SSO SDK to the Oracle E-Business Suite Database Server
2. Unzip the SSO SDK file
3. Copy **custom_auth_sso_902.sql** and **custom_auth_sso_902.plb** to the ***packages*** directory (created when the SSO SDK file was unzipped)
4. Connect to your Oracle E-Business Suite Database server and navigate to the ***packages*** directory
5. Run SQL*Plus, connect as SYS AS SYSDBA – **sqlplus / AS SYSDBA**
(All following statements will be run from the SQL prompt; Replace all passwords with a case sensitive password which is not the same as the user being altered)
6. **alter user APEX_040000 unlock identified by <APEX_04000_Password>;**
7. **alter user APEX_PUBLIC_USER unlock identified by <APEX_PUBLIC_USER_Password>;**
8. **alter user APEX_EBS identified by <APEX_EBS_Password>;**
9. **connect APEX_EBS/<APEX_EBS_Password>**
10. **@loadsdk.sql**
11. **@regapp.sql** (The Listener Token will be HTML_DB:<EBS_Hostname>:8080 , specify the Partner App Name APEX_EBS_SSO; Use the values determined above for Site Id, Site Token, etc.)
12. **grant execute on wwsec_sso_enabler_private to APEX_040000;**

13. **connect APEX_040000/<APEX_040000_Password>**

14. **@custom_auth_sso_902.sql**

15. **@custom_auth_sso_902.plb**

16. **grant execute on wwv_flow_custom_auth_sso to APEX_PUBLIC_USER;**

17. **connect APEX_PUBLIC_USER/<APEX_PUBLIC_USER_Password>**

18. **create public synonym wwv_flow_custom_auth_sso for apex_040000.wwv_flow_custom_auth_sso**

19. **exit**

Once you have configured the Single Sign-On you will now need to define the authentication scheme within Oracle Application Express. Follow these steps to create your SSO authentication:

1. Log into Oracle Application Express Application Builder (**http://<EBS_Hostname>:8080/apex/apex**)

2. From the Application Builder for the APEX EBS Demo application – go to Shared Components

3. Click *Authentication Schemes*, click *Create*, select **Based on a pre-configured scheme from the gallery**, click *Next* >

4. Select **Oracle Application Server Single Sign-On (My Application as Partner App)**, click *Next* >

5. Enter *Partner Application Name* **APEX_EBS_SSO**, click *Next* >

6. Enter *Name* **EBS SSO Login**, click *Create Scheme*

7. Click Change Current Tab, select Available Authentication Schemes **EBS SSO LOGIN**, click Next >, click Make Current

8. Click Run Application

If correctly configured, when you run the application, you will be redirected to the OSSO Login Page and can enter your Single Sign-on credentials to log into Oracle Application Express.

Configuring Custom Authentication

If your Oracle E-Business Suite installation does not use Oracle Access Manager or Oracle Single Sign-On, you can create a custom authentication scheme which calls a PL/SQL function within Oracle Application Express to validate the identity of the user, based on the password sent.

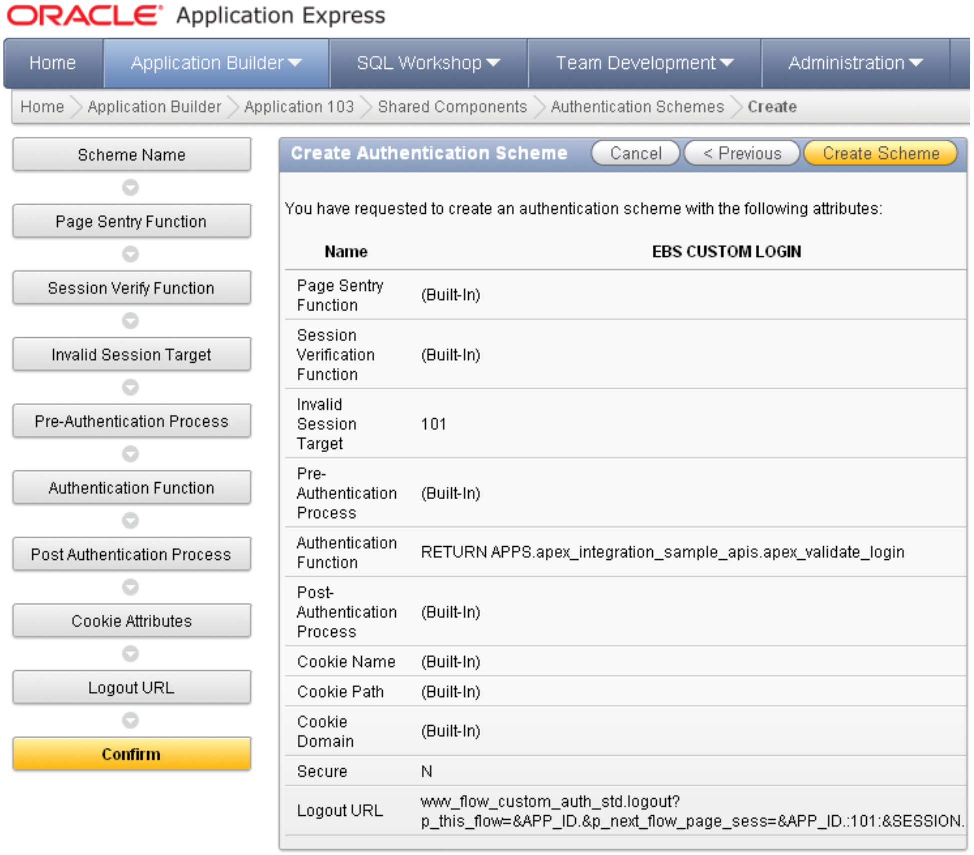
Below is sample code for creating a function to determine if the user if valid –

```
CREATE OR REPLACE FUNCTION apex_validate_login
    (  p_username IN VARCHAR2
     , p_password IN VARCHAR2
    ) RETURN BOOLEAN
AS
BEGIN
    RETURN fnd_user_pkg.validatelogin(p_username, p_password);
END validate_login;
```

Note: This specific code is included in the **apexebs_apps_setup.sql** file you downloaded and installed into the APPS schema earlier in this paper. This code is included within that file in *Package* **apex_integration_sample_apis**, *Function* **apex_validate_login**. This package function is used below when defining a custom authentication.

Once you have created this function in your APPS schema you need to define the authentication scheme within Oracle Application Express. Follow these steps to create your custom authentication:

1. Log into Oracle Application Express Application Builder (**http://<EBS_Hostname>:8080/apex/apex**)
2. From the Application Builder for the APEX EBS Demo application – go to Shared Components
3. Click *Authentication Schemes*, click *Create*, select **From scratch**, click *Next* >
4. Enter *Name* **EBS Custom Login**, click *Next* >, click *Next* >, click *Next* >
5. Select *Invalid Session Target* **Page in this application**, *Page* **101 Login**, click *Next* >, click *Next* >
6. Select *Credentials Verification Method* **Use my custom function to authenticate**, enter *Authentication Function* **RETURN APPS.apex_integration_sample_apis.apex_validate_login**, click *Next* >, click *Next* >, click *Next* >
7. Enter *Logout URL* wwv_flow_custom_auth_std.logout?p_this_flow=&APP_ID.&p_next_flow_page_sess=&APP_ID.:101:&SESSION.:LOGOUT, click *Next* >, click *Create Scheme*
8. Click *Change Current Tab*, select *Available Authentication Schemes* **EBS CUSTOM LOGIN**, click *Next* >, click *Make Current*
9. Click Run Application
10. Enter Oracle E-Business Suite credentials – *Username* **APEX**, *Password* **Welcome1**



You have requested to create an authentication scheme with the following attributes:

Name	EBS CUSTOM LOGIN
Page Sentry Function	(Built-In)
Session Verification Function	(Built-In)
Invalid Session Target	101
Pre-Authentication Process	(Built-In)
Authentication Function	RETURN APPS.apex_integration_sample_apis.apex_validate_login
Post-Authentication Process	(Built-In)
Cookie Name	(Built-In)
Cookie Path	(Built-In)
Cookie Domain	(Built-In)
Secure	N
Logout URL	wwv_flow_custom_auth_std.logout?p_this_flow=&APP_ID.&p_next_flow_page_sess=&APP_ID.:101:&SESSION.

Figure 16. Defining Custom Authentication in Oracle Application Express

Defining Oracle Application Express Authorizations

Authentication schemes only check that the user has a valid Oracle E-Business Suite login, not that the user is authorized to use an application. Oracle Application Express provides the ability to define authorization schemes that can be used on every component within an application (for example pages, regions, buttons, items, validations, etc.) to restrict access [See: Managing Application Security – Providing Security Through Authorization http://docs.oracle.com/cd/E37097_01/doc/doc.42/e35125/sec_authorization.htm#BABEDFGB].

Oracle E-Business Suite includes the concept of responsibilities, which determine what capabilities and data users are allowed to access. The recommended practice is to create Oracle Application Express authorization schemes that mimic the necessary Oracle E-Business Suite responsibilities to define cohesive access plans.

It is very strongly recommended that authorizations are applied to all non-public Oracle Application Express pages (and those limited by Oracle E-Business Suite responsibilities) rather than just to menu items. Session state protection should also be defined for the application to prevent users from accessing pages by manipulating the URL [See: Managing Application Security – Understanding

Session State Protection
http://docs.oracle.com/cd/E37097_01/doc/doc.42/e35125/sec_dev.htm#CDDGIGJH].

Using Oracle E-Business Suite Responsibilities with Integrated Access

By modifying the function call used to invoke Oracle Application Express from Oracle E-Business Suite you can pass the parameters required to test the responsibility directly. By defining an Oracle Application Express authorization scheme which first performs an APPS_INITIALIZE and then returns the result from FND_FUNCTION.TEST you can use this authorization to prevent unauthorized access to pages and processes to users without the correct responsibility.

In order to call APPS procedures and functions from another schema it is necessary to define a package with DEFINER authorization such that the PL/SQL is run with the privileges of the APPS schema rather than the privileges of the Oracle Application Express schema.

Below is sample code for creating such a DEFINER Package in the APPS schema –

```
CREATE OR REPLACE PACKAGE apex_global AUTHID DEFINER AS
  PROCEDURE apps_initialize(
     user_id IN NUMBER,
     resp_id IN NUMBER,
     resp_appl_id IN NUMBER,
     security_group_id IN NUMBER DEFAULT 0,
     server_id IN NUMBER DEFAULT -1);
  FUNCTION function_test(function_name IN VARCHAR2) RETURN BOOLEAN;
end;
/

CREATE OR REPLACE PACKAGE BODY apex_global AS
  PROCEDURE apps_initialize(
    user_id IN NUMBER,
    resp_id IN NUMBER,
    resp_appl_id IN NUMBER,
    security_group_id IN NUMBER DEFAULT 0,
    server_id IN NUMBER DEFAULT -1) IS
  BEGIN
    fnd_global.apps_initialize(user_id, resp_id, resp_appl_id,
                               security_group_id, server_id);
  END;
  -- calls FND_FUNCTION.TEST
  FUNCTION function_test(function_name IN VARCHAR2) RETURN BOOLEAN IS
  BEGIN
    RETURN fnd_function.test(function_name);
  END;
END;
/
```

Note: This specific code is included in the **apexebs_apps_setup.sql** file you downloaded and installed into the APPS schema earlier in this paper.

You need to create three Oracle Application Express - Application Items to hold the Oracle E-Business Suite Responsibility Id, Application Id, and Security Group Id parameters that are being passed by the Oracle E-Business Suite function APEX_DEMO_2. Follow these steps to add Application Items into Oracle Application Express:

1. Log into Oracle Application Express Application Builder (**http://<EBS_Hostname>:8080/apex/apex**)

2. From the Application Builder for the APEX EBS Demo application – go to Shared Components
3. Click *Application Items*, click *Create* >, enter *Name* **EBS_RESP_ID**, click *Create*
4. Click *Create* >, enter *Name* **EBS_APP_ID**, click *Create*
5. Click *Create* >, enter *Name* **EBS_SEC_GROUP**, click *Create*

Below is sample code for defining an Oracle Application Express authorization –

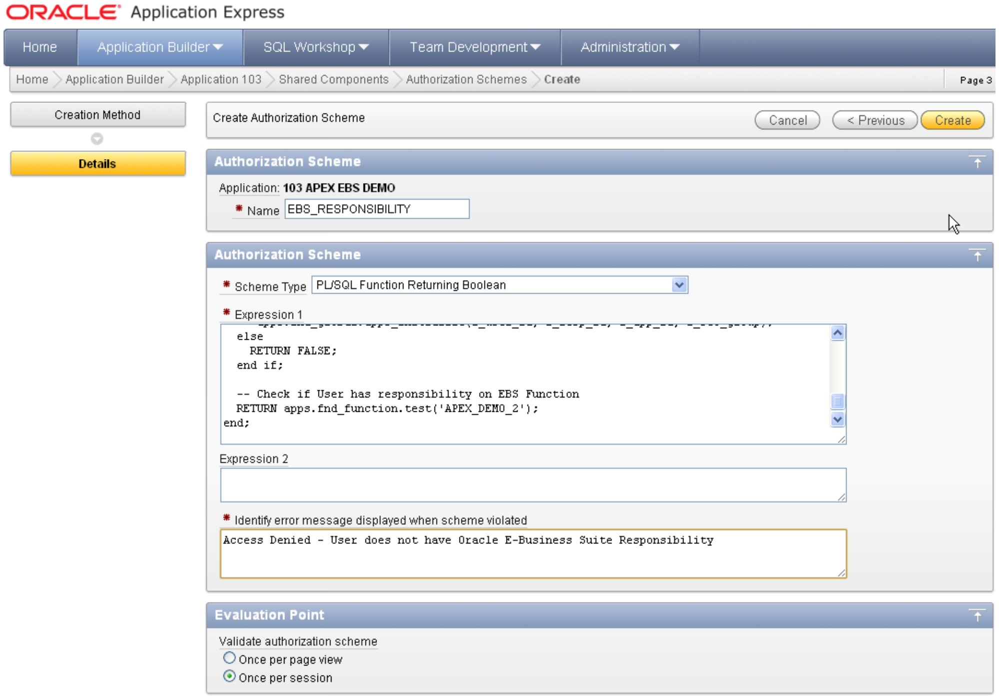
```
DECLARE
  l_user_id   NUMBER DEFAULT 0;
  l_resp_id   NUMBER DEFAULT 0;
  l_app_id    NUMBER DEFAULT 0;
  l_sec_group NUMBER DEFAULT 0;
BEGIN
  for c1 in (select user_id from apex_ebs_user
              where user_name = :APP_USER
                ) loop
      L_user_id := c1.user_id;
  end loop;
  begin
    select nvl(to_number(:EBS_RESP_ID),0) into l_resp_id from dual;
    select nvl(to_number(:EBS_APP_ID),0) into l_app_id from dual;
    select nvl(to_number(:EBS_SEC_GROUP),0) into l_sec_group from dual;
  exception
    when others then
      l_resp_id := 0;
      l_app_id    := 0;
      l_sec_group := 0;
  end;
  -- Call Initialize with the User (based on APEX log in) and the
  -- Responsibility Id, Account Id, and Security Group if passed from EBS
  if l_resp_id <> 0 then
     apps.apex_global.apps_initialize(  l_user_id, l_resp_id
                                      , l_app_id, l_sec_group);
  else
    RETURN FALSE;
  end if;

  -- Check if User has permission on EBS Function
  RETURN apps.apex_global.function.test('APEX_DEMO_2');
END;
```

Follow these instructions to create the Oracle Application Express authentication scheme and restrict Page 3:

1. From the Application Builder for the APEX EBS Demo application – go to Shared Components
2. Click *Authorization Schemes*, click *Create* >, select *Create Authorization Scheme* **From Scratch**, click Next >
3. Enter *Name* EBS_RESPONSIBILITY, select *Schema Type* PL/SQL Function Returning Boolean, copy the SQL code above into *Expression 1*, enter *Identify error message* Access Denied – User does not have Oracle E-Business Suite Responsibility, click *Create*
4. From the Application Builder for the APEX EBS Demo application - Edit Page 3
5. Double-click *Update User Email* {Page Title}
6. Select *Security* > *Authorization Scheme* **EBS_RESPONSIBILITY**, click Apply Changes

7. From the Application Builder for the APEX EBS Demo application – go to Page 1

8. Run Application



Create Authorization Scheme

Application: **103 APEX EBS DEMO**

* Name: EBS_RESPONSIBILITY

* Scheme Type: PL/SQL Function Returning Boolean

* Expression 1

```
  else
    RETURN FALSE;
  end if;

  -- Check if User has responsibility on EBS Function
  RETURN apps.fnd_function.test('APEX_DEMO_2');
end;
```

Expression 2

* Identify error message displayed when scheme violated

```
Access Denied - User does not have Oracle E-Business Suite Responsibility
```

Validate authorization scheme

○ Once per page view
● Once per session

Figure 17. Defining Oracle Application Express Authorization Scheme

Installing the Sample Packaged Application

To quickly configure Oracle Application Express within your Oracle E-Business Suite environment, a sample Oracle Application Express application is available which includes working examples for updating the user's email address based on the steps performed previously in this paper.

To download from Oracle Technology Network (OTN) and install the sample application perform the following steps:

1. Download the Oracle Application Express Sample Application script file from OTN – http://www.oracle.com/ocom/groups/public/@otn/documents/webcontent/332107.sql

2. Save the file as **apexebs_apex_application.sql** on your local desktop

3. Log into Oracle Application Express Application Builder (**http://<EBS_Hostname>:8080/apex/apex**)

4. From the Application Builder – click *Import*

5. Select *Import File* **apexebs_apex_application.sql**, click *Next >*, click *Next >*, click *Install*

6. Click Run Application

Note: This application will produce errors at runtime unless the **apexebs_apex_setup.sql** script has been run in the APEX_EBS schema and the **apexebs_apps_setup.sql** script has been run in the APPS schema as outlined earlier in this paper.

Defining the Oracle E-Business Suite Profile and Functions

With Oracle E-Business Suite 11i you can redirect to Oracle Application Express by creating a web-enabled mod_plsql procedure. However, with Oracle E-Business Suite Release 12 this integration must be implemented on the Oracle E-Business Suite Application Server as a Java Server Page (JSP). Oracle E-Business Suite provides a way of configuring URLs to Oracle Application Express and will create the necessary JSP based on the defined parameters. This configuration requires setting an Oracle E-Business Suite profile option (FND: APEX URL) to contain the APEX Listener host name, and defining Oracle E-Business Suite functions that point to the actual APEX pages.

Update the FND: APEX URL profile option with the correct setting at the site level using the following steps:

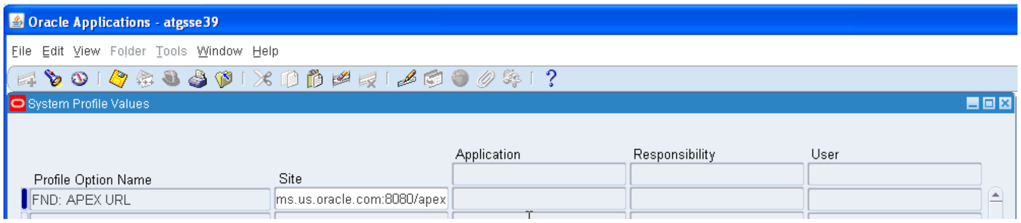
1. Log in to Oracle E-Business Suite with the SYSADMIN user (**http://<EBS_Hostname>:8074/OA_HTML/AppsLogin**)

2. Navigate to the *System Administrator responsibility* > *Profile* > *System* menu option

3. Search for *Profile* **%APEX%**, click *Find*

4. For profile FND: APEX URL enter *Site* **http://<EBS_Hostname>:8080/apex**

5. Save the profile


Oracle Applications - atgsse39
File Edit View Folder Tools Window Help
System Profile Values

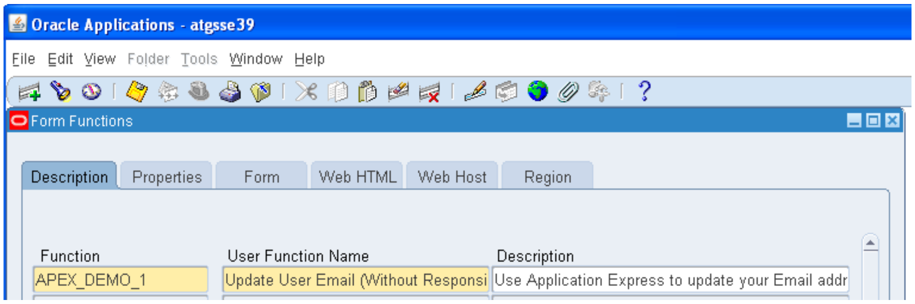
Profile Option Name	Site	Application	Responsibility	User
FND: APEX URL	ms.us.oracle.com:8080/apex			

Figure 9. Updating Oracle E-Business Suite profile

Perform the following steps to define the Oracle E-Business Suite functions:

1. Navigate to the *System Administrator responsibility* > *Application* > *Function* menu option

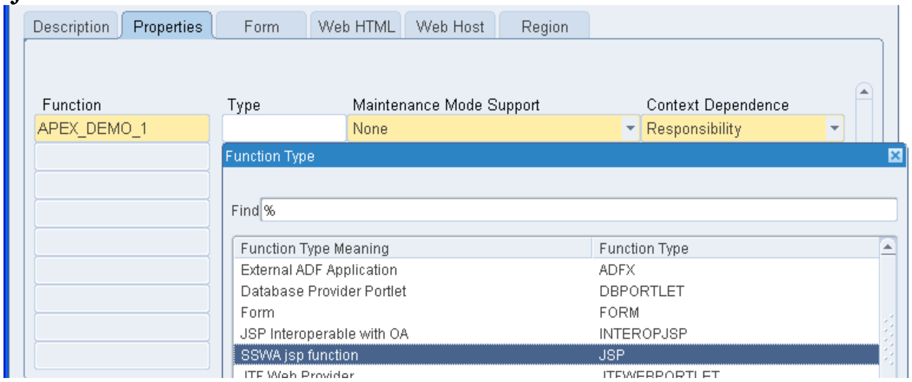
2. For calls to the page without responsibility, create a function with the following details:
   Function: **APEX_DEMO_1**
   User Function Name: **Update User Email (Without Responsibility)**


Oracle Applications - atgsse39
File Edit View Folder Tools Window Help
Form Functions
Description
Properties
Form
Web HTML
Web Host
Region

Function	User Function Name	Description
APEX_DEMO_1	Update User Email (Without Responsi	Use Application Express to update your Email addr

Figure 10. Creating Oracle E-Business Suite Function – Description Tab

Type: **JSP**



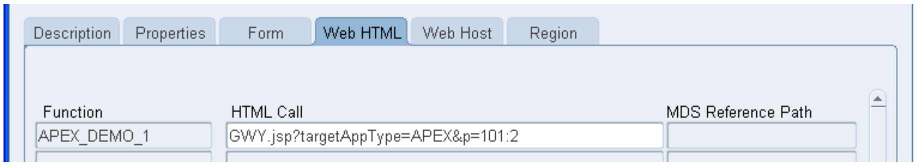
Function	Type	Maintenance Mode Support	Context Dependence
APEX_DEMO_1		None	Responsibility

Find %

Function Type Meaning	Function Type
External ADF Application	ADFX
Database Provider Portlet	DBPORTLET
Form	FORM
JSP Interoperable with OA	INTEROPJSP
SSWA jsp function	JSP
ITF Web Provider	ITFWEBPORTLET

Figure 11. Creating Oracle E-Business Suite Function – Properties Tab

HTML Call: **GWY.jsp?targetAppType=APEX& p=<APEX Application Id>:<APEX Page>:<Session>:<Request>:<Debug>:<Clear Cache>:<Parameter Pairs>**
{For example, to call Oracle Application Express application 109, Page 2 use GWY.jsp?targetAppType=APEX&p=109:2, all other parameters are optional}



Function	HTML Call	MDS Reference Path
APEX_DEMO_1	GWY.jsp?targetAppType=APEX&p=101:2	

Figure 12. Creating Oracle E-Business Suite Function – Web HTML Tab

4. For calls to the page with responsibility create a function with the following details –
   Function: **APEX_DEMO_2**
   User Function Name: **Update User Email (Using Responsibilities)**
   Type: **JSP**
   HTML Call: **GWY.jsp?targetAppType=APEX& p=<APEX Application Id>:<APEX Page>:<Session>:<Request>:<Debug>:<Clear Cache>: EBS_RESP_ID, EBS_APP_ID,EBS_SEC_GROUP:[RESPONSIBILITY_ID],[RESP_APPL_ID],[SECURITY_GROUP_ID]**
   {For example, to call Oracle Application Express application 109, Page 3 use GWY.jsp?targetAppType=APEX&p=109:3::::EBS_RESP_ID,

EBS_APP_ID,EBS_SEC_GROUP:[RESPONSIBILITY_ID],[RESP_APPL_ID],
[SECURITY_GROUP_ID]}

5. Save the functions

Defining Oracle E-Business Suite Menus and Responsibilities

The next step is to define menu options and responsibilities for your Oracle Application Express applications within the Oracle E-Business Suite environment. Once the function is defined you may attach it to appropriate Menus and Responsibilities. Users having access to such responsibilities will be able to see the link in the Oracle E-Business Suite home page. Once they click the link the current browser will launch the targeted APEX page in Oracle Application Express.

Perform the following steps to add an Oracle E-Business Suite menu:

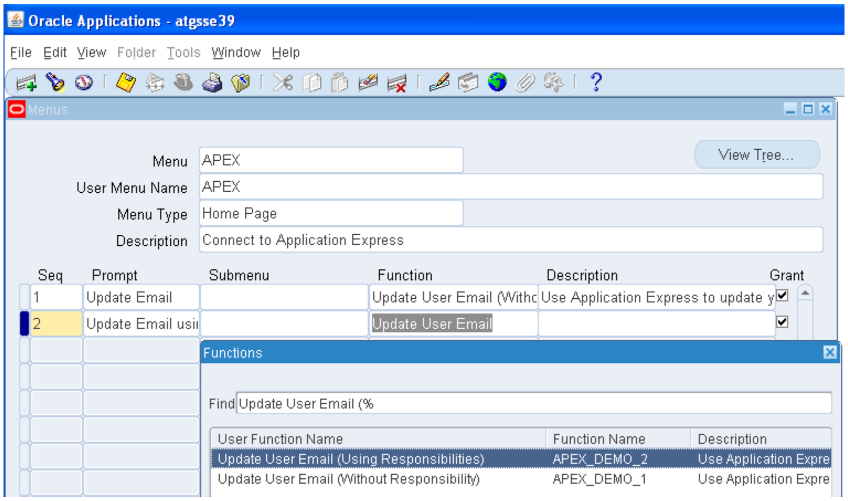
1. Navigate to the *System Administrator responsibility* > *Application* > *Menu* option

2. Create a new menu -
   Name: **APEX**
   User Menu Name: **APEX**
   Menu Type: **Home Page**

3. Create menu component –
   Sequence: **1**
   Prompt: **Email Update (Without Responsibility)**
   Function: **APEX_DEMO_1** {Search for **Update User Email%**}

4. Create menu component –
   Sequence: **2**
   Prompt: **Email Update (Using Responsibilities)**
   Function: **APEX_DEMO_2** {Search for **Update User Email%**}

5. Save the menu


Oracle Applications - atgsse39
File Edit View Folder Tools Window Help
Menus
View Tree...

Menu: APEX
User Menu Name: APEX
Menu Type: Home Page
Description: Connect to Application Express

Seq	Prompt	Submenu	Function	Description	Grant
1	Update Email		Update User Email (Withc	Use Application Express to update y	☑
2	Update Email usi		Update User Email		☑

Functions

Find: Update User Email (%

User Function Name	Function Name	Description
Update User Email (Using Responsibilities)	APEX_DEMO_2	Use Application Expre
Update User Email (Without Responsibility)	APEX_DEMO_1	Use Application Expre

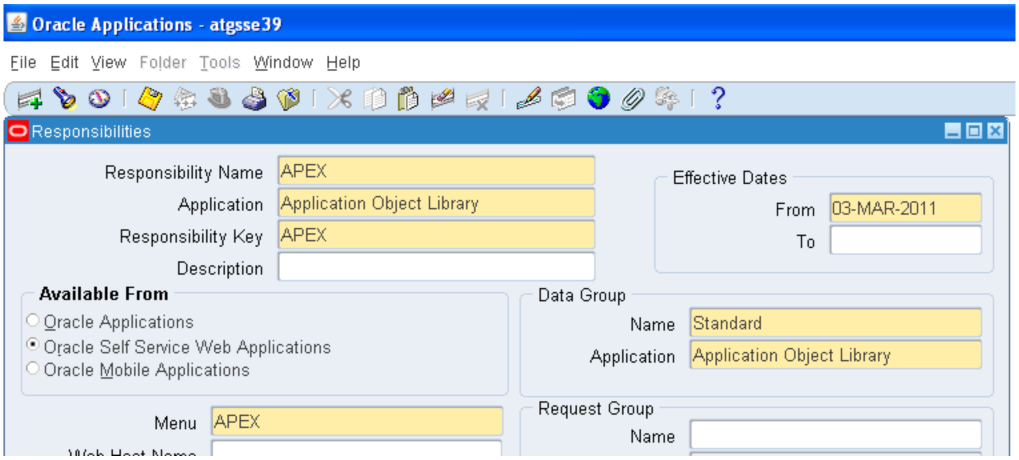
Figure 13. Creating Oracle E-Business Suite Menu

Perform the following steps to add an Oracle E-Business Suite responsibility:

1. Navigate to the *System Administrator responsibility* > *Security* > *Responsibilities* >*Define* option

2. Create a new responsibility -
   Responsibility Name: **APEX**
   Application: **Application Object Library**
   Responsibility Key: **APEX**
   Available From: **Oracle Self Service Web Applications**
   Data Group: **Standard**
   Application: **Application Object Library**
   Menu: **APEX**

3. Save the responsibility


Oracle Applications - atgsse39
File Edit View Folder Tools Window Help
Responsibilities

Responsibility Name: APEX
Application: Application Object Library
Responsibility Key: APEX
Description:

Effective Dates
From: 03-MAR-2011
To:

Available From
○ Oracle Applications
● Oracle Self Service Web Applications
○ Oracle Mobile Applications

Data Group
Name: Standard
Application: Application Object Library

Menu: APEX
Web Host Name

Request Group
Name:

Figure 14. Creating Oracle E-Business Suite Responsibility

Perform the following steps to add a user:

1. Navigate to the *System Administrator responsibility*> *Security* > *User* >*Define* option

2. Create a new user -
   User Name: **APEX**
   Password: **Welcome0**
   Direct Responsibilities:
      Responsibility: **APEX**
      Application: **Application Object Library**
      Security Group: **Standard**

3. Save the user

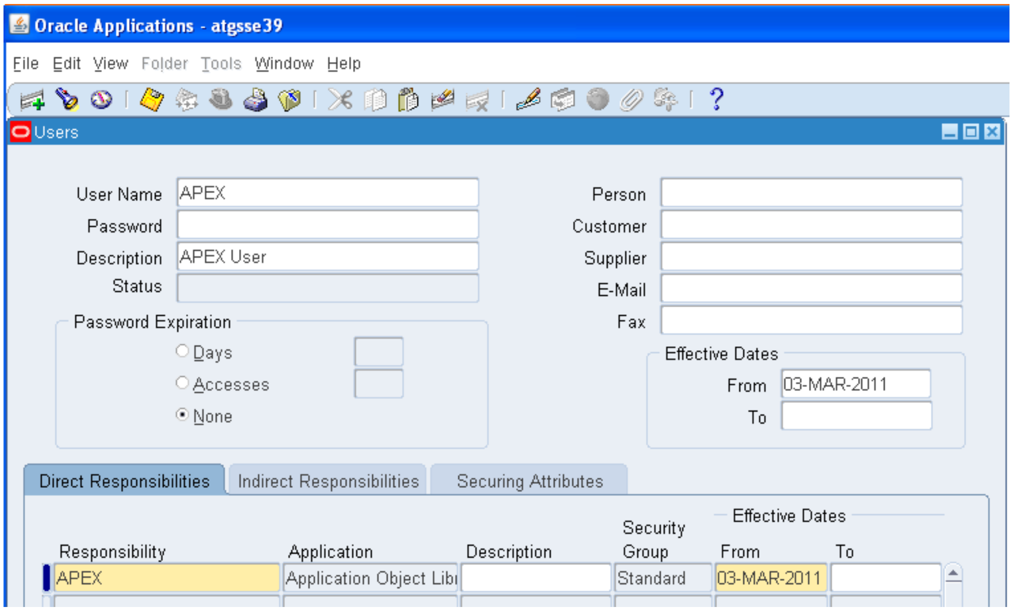
4. Navigate to *System Administrator responsibility* > *Concurrent* > *Requests*, click *Find*, check that the **Compile Security Menu** request has completed successfully

5. Navigate to *Functional Administrator responsibility*> *Core Services* > *Caching Framework*, click *Global Configuration*, click *Clear All Cache*, click *Yes*

6. Log out of Oracle E-Business Suite

7. Log in to Oracle E-Business Suite with the APEX user (**http://<EBS_Hostname>:8074/OA_HTML/AppsLogin**)

8. Reset the APEX password **Welcome1**


Oracle Applications - atgsse39
File Edit View Folder Tools Window Help
Users
Direct Responsibilities
Indirect Responsibilities
Securing Attributes

User Name: APEX
Password:
Description: APEX User
Status:

Password Expiration
○ Days
○ Accesses
● None

Person:
Customer:
Supplier:
E-Mail:
Fax:

Effective Dates
From: 03-MAR-2011
To:

Responsibility	Application	Description	Security Group	Effective Dates From	To
APEX	Application Object Libr		Standard	03-MAR-2011	

Figure 15. Creating Oracle E-Business Suite User

Running the Application Express Extension

Now that you have successfully built the Oracle Application Express extension you can run Oracle E-Business Suite and select your new menu links to access your Oracle Application Express application. Follow these steps to test your application:

1. Log in to Oracle E-Business Suite using APEX / Welcome1 (**http://<EBS_Hostname>:8074/OA_HTML/AppsLogin**)
2. Navigate to the APEX Menu

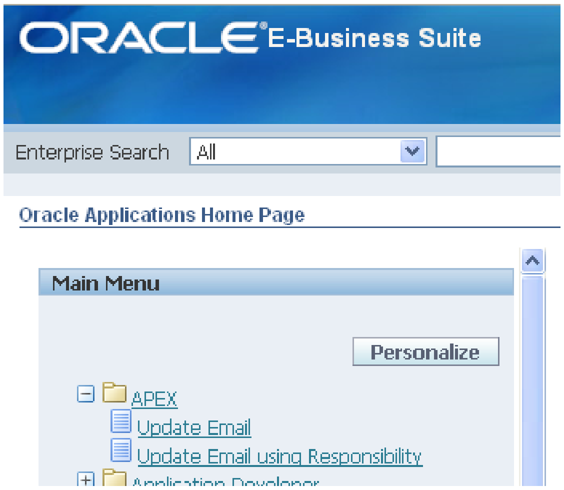
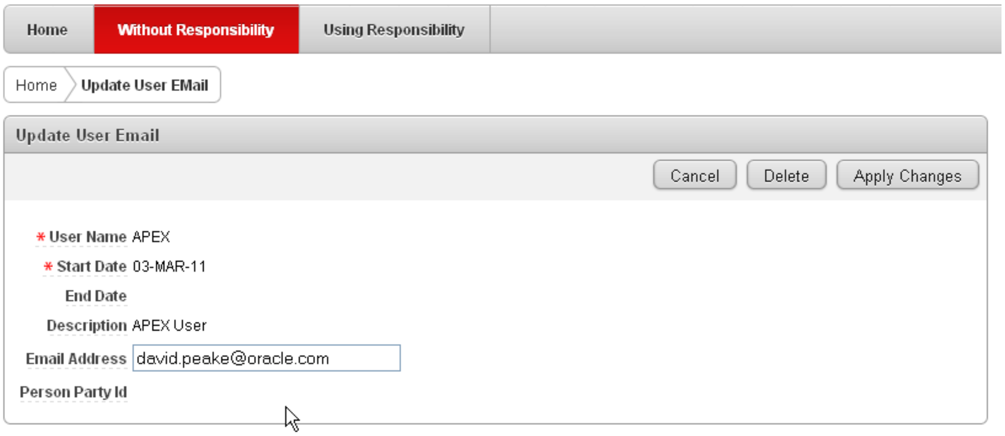


Figure 18. Oracle E-Business Suite runtime menu

3. Select *Update Email* – This will redirect you to the Oracle Application Express login page or to the application depending on if you have configured OSSO above
4. If you need to log into Oracle Application Express - enter *Username* **APEX**, *Password* **Welcome1**, click *Login*
5. Update the email address, click *Apply Changes* – This will return you to the application home page



* User Name APEX

* Start Date 03-MAR-11

End Date

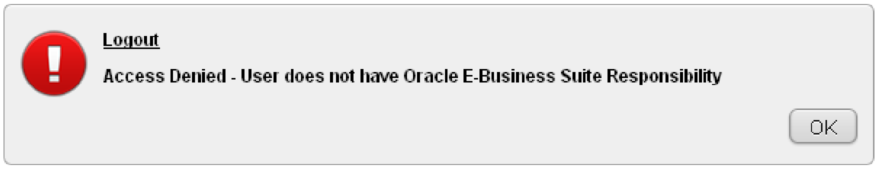
Description APEX User

Email Address david.peake@oracle.com

Person Party Id

Figure 19. Oracle Application Express application page for updating user email

6. Click *Using Responsibility* list item or tab – This will produce an authentication error as you navigated to the application without responsibilities



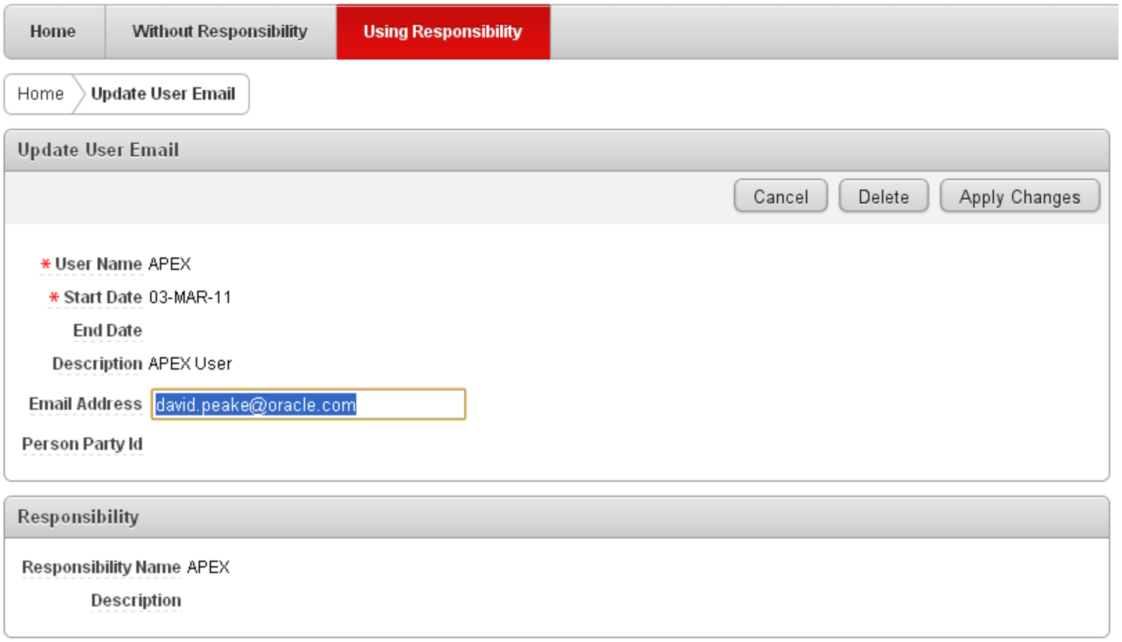
Logout

Access Denied - User does not have Oracle E-Business Suite Responsibility

Figure 20. Oracle Application Express authentication error when no responsibility set

7. Navigate back to Oracle E-Business Suite

8. Select *Update Email using Responsibility*– This will redirect you to the Oracle Application Express application and set your Oracle E-Business Suite responsibility. The responsibility region will display your current responsibility



Update User Email

* User Name	APEX
* Start Date	03-MAR-11
End Date	
Description	APEX User
Email Address	david.peake@oracle.com
Person Party Id	

Responsibility

Responsibility Name	APEX
Description	

Figure 21. Oracle Application Express application page showing responsibility

Conclusion

Oracle Application Express is an excellent complement to Oracle E-Business Suite. As a development framework, Oracle Application Express allows cross-functional teams to easily collaborate and quickly deliver solid custom extensions to Oracle E-Business Suite. The Oracle Application Express footprint on an Oracle E-Business Suite environment is negligible, but allows deeply-integrated extensions using only standard customizations within the Oracle E-Business Suite implementation.

Use of a separate Oracle Application Express schema with only the minimum required privileges for Oracle E-Business Suite objects ensures that Oracle Application Express applications only have access to the interfaces and data required for their operation. This minimizes the security risk to the Oracle E-Business Suite inherent in making any extensions. By integrating with Oracle E-Business Suite Function Security (Authorization), Oracle Application Express extensions utilize a single point of security administration. When a responsibility is added or removed from a user within Oracle E-Business Suite, the user's access to the associated functionality in Oracle Application Express applications is affected likewise.

Further, the advantage of utilizing the Oracle Application Express over building extensions from scratch is that Oracle Application Express provides a hardened declarative framework to minimize security vulnerabilities. Oracle Application Express release procedures include extensive security testing to minimize the threat of security breaches from cross site scripting and SQL injection.

Oracle Application Express gives you the power to quickly create forms, reports and complete applications rapidly, with little or no programming. With the proper deployment architecture, as outlined in this paper, you can use Oracle Application Express to extend the capabilities of your Oracle E-Business Suite, using the same data for both sets of applications, sharing user authentication, and calling applications and components seamlessly.

Acknowledgements

This paper is a collaboration between the Oracle Application Express and Oracle E-Business Suite teams. George Buzsaki, Oracle E-Business Suite Architecture, has provided significant input to ensure the solutions provided meets the Oracle E-Business Suite best practices and presents fully supported configurations.

Content assistance was provided by Rod West from Cabot Consulting (rodwest@cabotconsulting.co.uk) and Wolfgang Moritz from Farwest Steel (wolfgang.moritz@farweststeel.com).

Extending Oracle E-Business Suite Release 12
using Oracle Application Express
Revision 1

December 2012
Author: David Peake
Contributing Authors: Sara Woodhull,
Sharon Kennedy

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200

oracle.com