

## Chapter 12

# Multi-Tenant Framework Applications

The PDSA Framework provides the ability to use multiple ‘tenants’ or entities within a single application instance. Examples of tenant/entities might be “Customer”, “Vendor”, “Supplier”, “Dealer”, “Lender”, etc. The PDSA Framework allows you to create the initial entity during application creation, through the application’s web.config settings and later in the application itself. When creating the application you will need to perform a couple steps.

Specify that this will be a multi-tenant application on the **Step 2: Info** tab of the Application Builder as shown in Figure 1.

If it is not already expanded, click on the Multi-Tenant Settings arrow to expand the frame.

Check the ‘**Use Multi-Tenant**’ checkbox and update any entity options for which you do not want to use the default values.

The values set here will be used to populate the web.config file settings for your application and can be updated in that file after the application has been created.

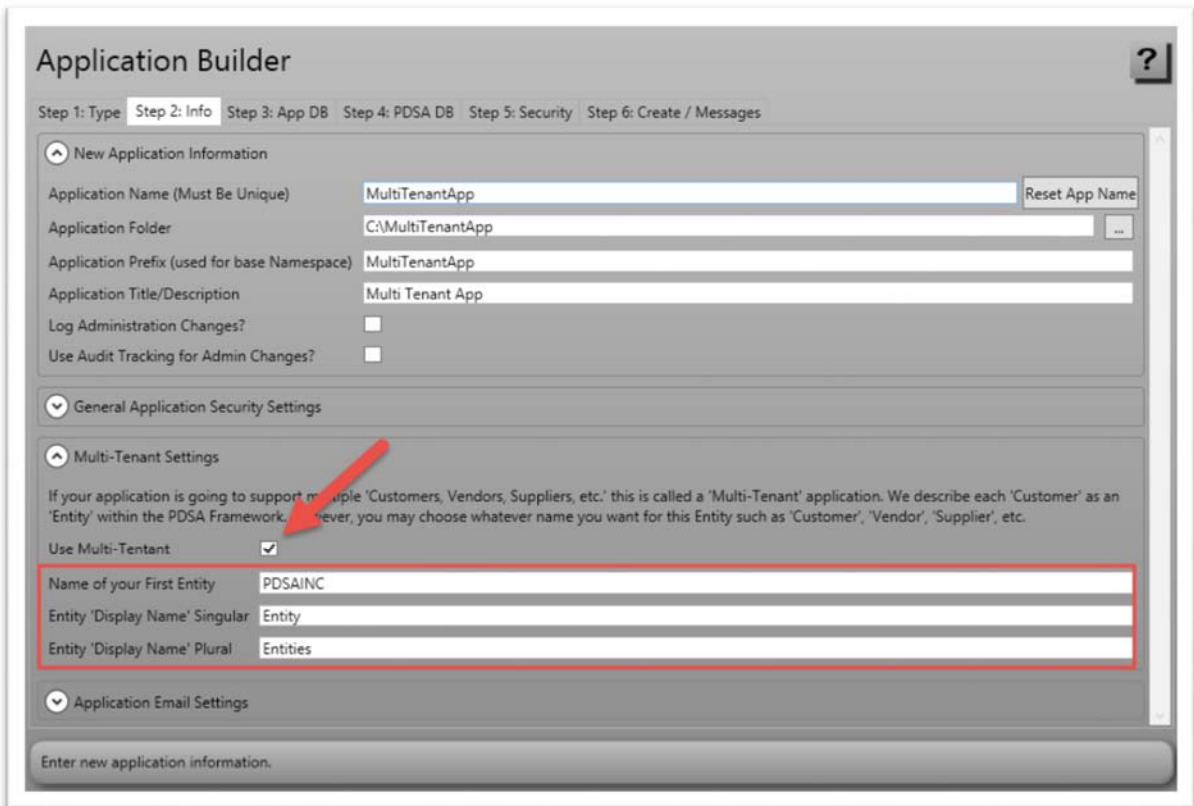


Figure 1: Set the Multi-Tenant Flag

Once the application has been built, the web.config file settings that affect how a multi-tenant application are contained in the **PDSAApplicationConfiguration** and **PDSASecurityConfiguration** sections.

## PDSAApplication Configuration Section

The **PDSAApplicationConfiguration** section contains general information about your application. It contains the 'entities' element which controls whether or not you are using multiple entities in your application. The 'entities' element are described below:

Attribute	Description
defaultEntityId	The primary key value of the entity that is the default for your application.
multipleEntities	Set to true if you wish to use the multi-tenant features of the PDSA Framework (also activate the menu item for Entities in the app)
displayName	Set this to what you want to call an 'entity' in your application. Ex. 'Customer', 'Supplier', 'Vendor' (defaults to what was set for 'Entity Display Name Singular' when creating the application).
displayNamePlural	Set this to what you want to call 'entities' in your application. Ex. 'Customers', 'Suppliers', 'Vendors' (defaults to what was set for 'Entity Display Name Plural' when creating the application).

displayEntityInHeader	Set to true to display current entity name on page header.
selectEntityUrl	The page used to select entity within the application.
selectPublicEntityUrl	The page used to select entity on Login.

## PDSASecurityConfiguration Section

The **PDSASecurityConfiguration** section contains security information for your application. It contains the 'login' element which controls the login page's appearance and behavior. The 'login' element settings that relate to multi-tenant are described below:

Attribute	Description
showEntityList	Display a drop down of all entities for this application on the login page.
entitySelectText	The text to display before the drop down of entities.
isEntitySelectOneDisplayed	Display a line in the drop down of entities using the text in the 'entitySelectOneText' attribute.
entitySelectOneText	The text to display in the drop down before all the entities are listed.
showEntityPage	Display separate page for entity selection. After entering login credentials, users are taken to another page where they can select an entity they are associated with.

## Entities

Once you have created the application and setup the web.config settings, you are ready to login and start creating entities, roles, and users for your application. Run the application and navigate to the Entities Management page by clicking on **Maintenance | Entities** menu. Initially, the only entity listed should be the default that was specified in the 'Name of First Entity' control in the Multi-Tenant Settings section of Step 2 (see Figure 1). In this example, that entity is PDSAINC.

### Create an Entity

You may now add as many entities as you need for your application.

To create a new entity, do the following:

Click on the 'Add New' button

Fill out the Entity Name, Entity Description (optional), and Entity Key fields. Also choose whether or not the entity will be active and if it will be used as a default.

Click on the 'Save' button to save the new entity and return to the list of entities. Boeing and Charter have been added as entities below.

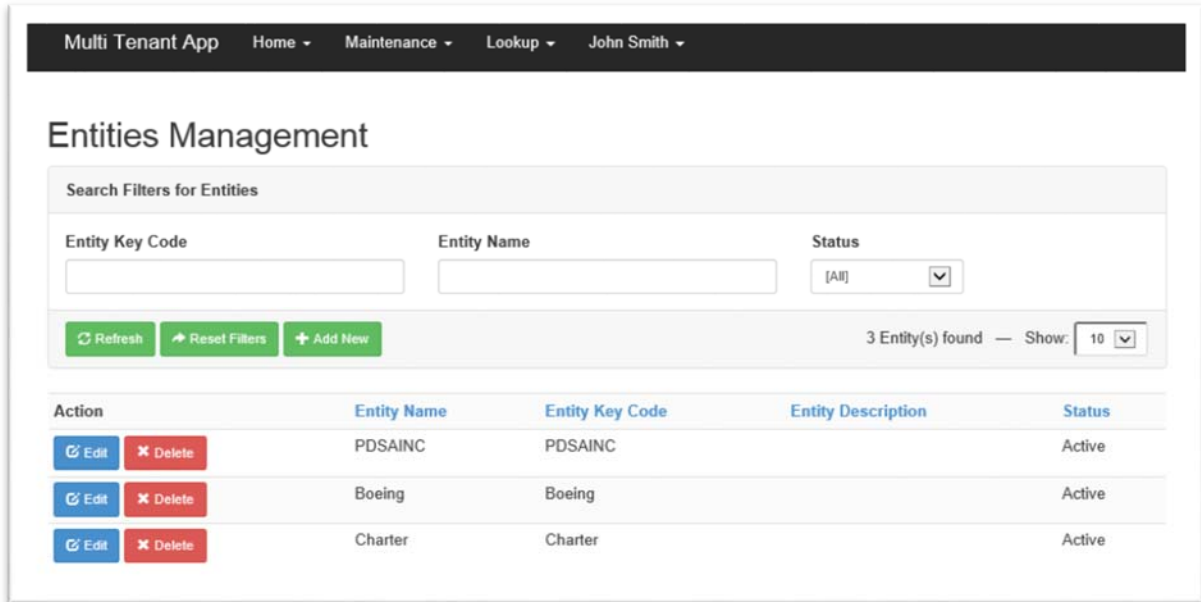


Figure 2: Entities Management Page

## Associate Admin Account with Entities

Once the other entities have been created, associate the Admin account with those entities. You want the Admin account to always see all users created within all Entities. To do this, navigate to the Users Maintenance page (Figure 3) by clicking on **Maintenance | Users** menu.

Multi Tenant App Home Maintenance Lookup John Smith

## Users Management

Search Filters for Users

First Name:  Last Name:  Login Name:

Email Address:  Status: [All] Select Entity Name: [All]

Refresh Reset Filters Add New 3 User(s) found Show: 10

Action	Entity Name	First Name	Last Name	Login Name	Display Name	Email Address	Roles	Status
<a href="#">Edit</a> <a href="#">Delete</a>	Boeing	John	Smith	Admin	System Admin	SteveN984@PDSAINC.com		Active <a href="#">Reset</a>
<a href="#">Edit</a> <a href="#">Delete</a>	Charter	John	Smith	Admin	System Admin	SteveN984@PDSAINC.com		Active <a href="#">Reset</a>
<a href="#">Edit</a> <a href="#">Delete</a>	PDSAINC	John	Smith	Admin	System Admin	SteveN984@PDSAINC.com	System Administrator	Active <a href="#">Reset</a>

Figure 3: Users Management Page

Click on the Edit button next to the Administrator user, check the Boeing and Charter checkboxes (Figure 4), and click Save.

Select Entities for User

Boeing  PDSAINC  
 Charter

Select Attributes for this User

Save Cancel

Figure 4: Associate Admin Account with Entities

## Roles

Roles need to be created for each entity and assigned to an entity. To create a new entity, navigate to the Roles Management page (Figure 5) by clicking on **Maintenance | Roles**. Initially, the only role listed should be System Administrator which is assigned to entity PDSAINC.

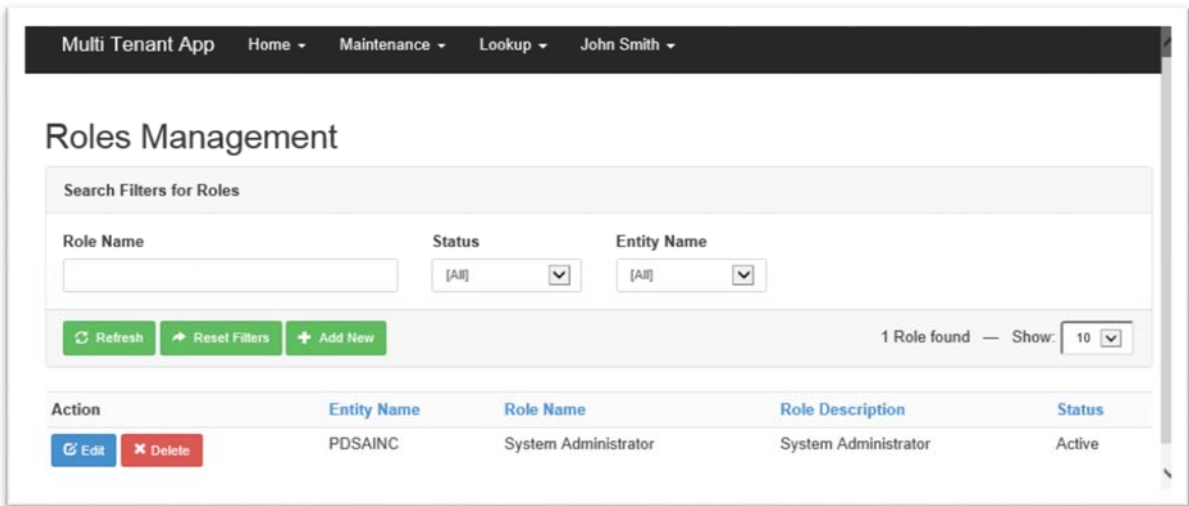


Figure 5: Role Management Page

To create a new role, do the following:

Click on the Add New button

Enter the new role's name, description, whether or not it is active, permissions for the role, if it is a template role, and assign the entity/entities you want associated with this role.

Click on the Save button to save the new role and return to the list of roles. For this example, 4 new roles have been added: Boeing Sys Admin, Test Pilot, Charter Sys Admin, and Installer as shown in Figure 6.

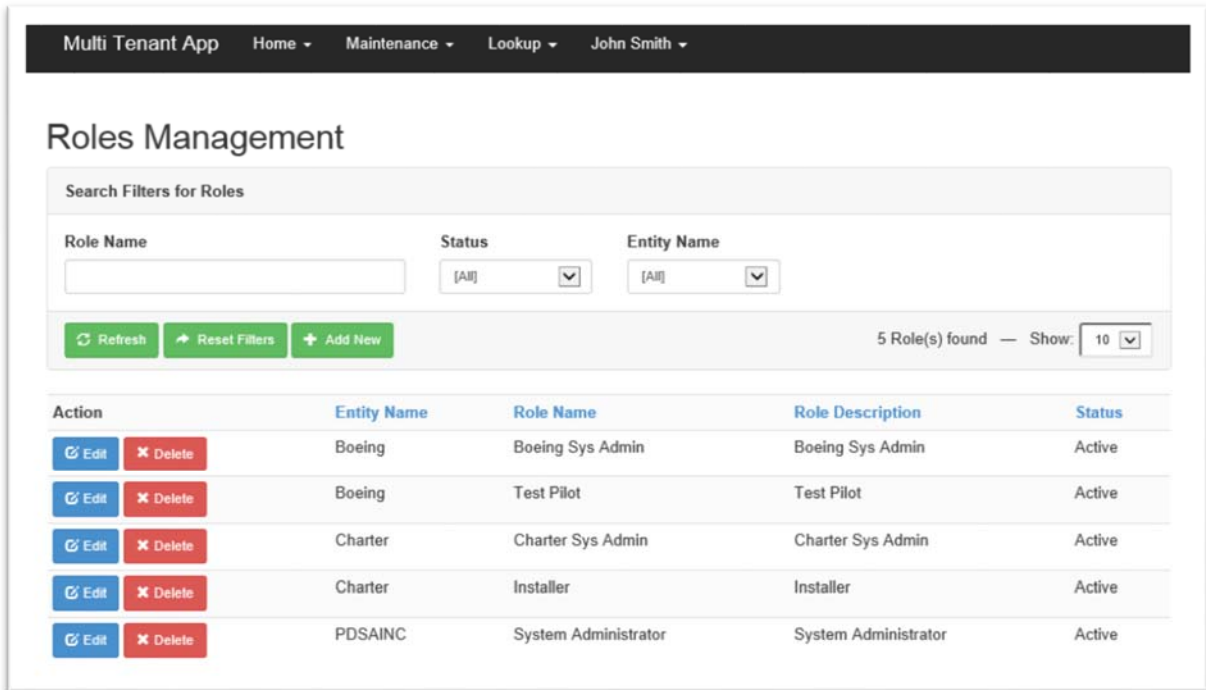


Figure 6: Roles Management Page

# User Roles

Once roles have been created, you may want to go back and assign a role to each entity that your Administrator account has been associated with (you will not be able to login under an entity unless you have been assigned a role with that entity).

To accomplish this, do the following:

Navigate to the User Roles Management page by clicking on **Maintenance | User Roles**. Since the Administrator is currently the only user, we should see the Administrator account associated with all 3 entities, but the account has only been assigned a role in the PDSAINC entity (System Administrator) as shown in Figure 7.

The screenshot shows the 'User Roles Management' page. At the top, there is a navigation bar with 'Multi Tenant App', 'Home', 'Maintenance', 'Lookup', and 'John Smith'. Below the navigation bar is the title 'User Roles Management'. Underneath is a search filter section with fields for 'First Name', 'Last Name', 'Login Name', and 'Entity Name'. There are 'Refresh' and 'Reset Filters' buttons, and a 'Total Records' dropdown set to '10'. Below the search filters is a table with the following data:

Action	Entity Name	Last Name	First Name	Login Name	Roles
<a href="#">Edit</a>	Boeing	Smith	John	Admin	
<a href="#">Edit</a>	Charter	Smith	John	Admin	
<a href="#">Edit</a>	PDSAINC	Smith	John	Admin	System Administrator

Figure 7: User Roles Management Page

Click on the Edit button and check the box next to the role you would like to assign them as shown in Figure 8.

Multi Tenant App Home Maintenance Lookup John Smith

### User Roles Management

Edit User Role

First Name: John Last Name: Smith Entity Name: Boeing

Select Roles for this User

Boeing Sys Admin  Test Pilot

Save Cancel

Figure 8: Associate User with Role(s)

Click on the Save button. After assigning the Administrator account to Boeing Sys Admin and Charter Sys Admin roles, the grid should be populated with the Administrator account being assigned a role for all 3 entities that it is associated with (Figure 9).

Multi Tenant App Home Maintenance Lookup John Smith

### User Roles Management

Search Filters for User Roles

First Name: Last Name: Login Name:

Entity Name: [All]

Refresh Reset Filters 3 User Role(s) found — Show: 10

Action	Entity Name	Last Name	First Name	Login Name	Roles
<a href="#">Edit</a>	Boeing	Smith	John	Admin	Boeing Sys Admin
<a href="#">Edit</a>	Charter	Smith	John	Admin	Charter Sys Admin
<a href="#">Edit</a>	PDSAINC	Smith	John	Admin	System Administrator

Figure 9: User Roles Management Page



# Users

Users can now be created and associated with one or more entities that they belong to and assigned roles within that entity.

To create a new user, do the following:

Navigate to the Users Maintenance page (Figure 3) by clicking on **Maintenance | Users** menu. Initially, the only user should be the default System Admin user.

Click on the Add New button.

Enter the requested information.

Select the entity or entities that the user will be associated with.

Click on the Save button. For this example, Bob Boeing was created as a new user and associated with entity Boeing. Note that when a new users is created, even if they are associated with an entity, they are not assigned a default role (Figure 10).

The screenshot shows the 'User Roles Page' in a 'Multi Tenant App'. At the top, there is a navigation bar with 'Home', 'Maintenance', 'Lookup', and 'John Smith'. Below this is a 'Search Filters for Users' section with input fields for 'First Name', 'Last Name', 'Login Name', 'Email Address', 'Status' (set to '[All]'), and 'Select Entity Name' (set to '[All]'). There are buttons for 'Refresh', 'Reset Filters', and 'Add New'. A summary indicates '4 User(s) found' and a 'Show: 10' dropdown. The main content is a table of users:

Action	Entity Name	First Name	Last Name	Login Name	Display Name	Email Address	Roles	Status
<a href="#">Edit</a> <a href="#">Delete</a>	Boeing	Bob	Boeing	BobB	Bob	BobB@pdsa.com		Active <a href="#">Reset</a>
<a href="#">Edit</a> <a href="#">Delete</a>	Boeing	John	Smith	Admin	System Admin	SteveN984@PDSAINC.com	Boeing Sys Admin	Active <a href="#">Reset</a>
<a href="#">Edit</a> <a href="#">Delete</a>	Charter	John	Smith	Admin	System Admin	SteveN984@PDSAINC.com	Charter Sys Admin	Active <a href="#">Reset</a>
<a href="#">Edit</a> <a href="#">Delete</a>	PDSAINC	John	Smith	Admin	System Admin	SteveN984@PDSAINC.com	System Administrator	Active <a href="#">Reset</a>

Figure 10: User Roles Page

So you will need to go to User Role Maintenance and assign a role to them (the user will not be able to login until at least one role has been assigned to them).

To accomplish this, do the following:

Click on **Maintenance | User Roles** menu. You should see the new user you just created in the list without a role assigned to them (Figure 11).

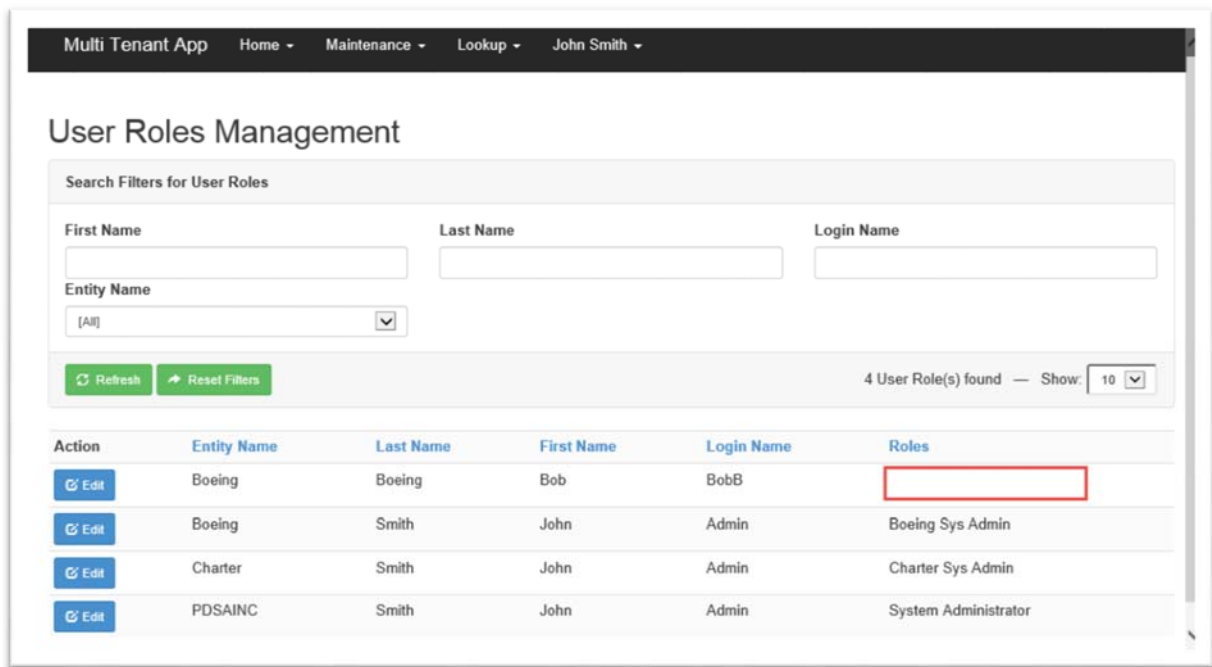


Figure 11: User Roles Management

Click on the edit button next to the user.

Check all of the roles you would like assigned to them (Figure 12).

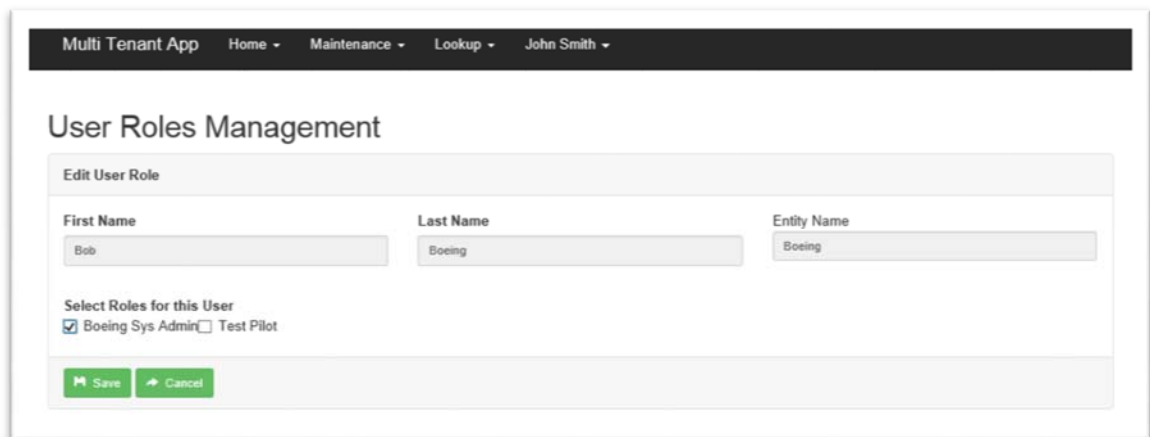


Figure 12: Associate User with Role(s)

Clicking the Save button will take you back to the main User Roles Management page where you should see that your user now has a role/roles assigned to them (Figure 13).

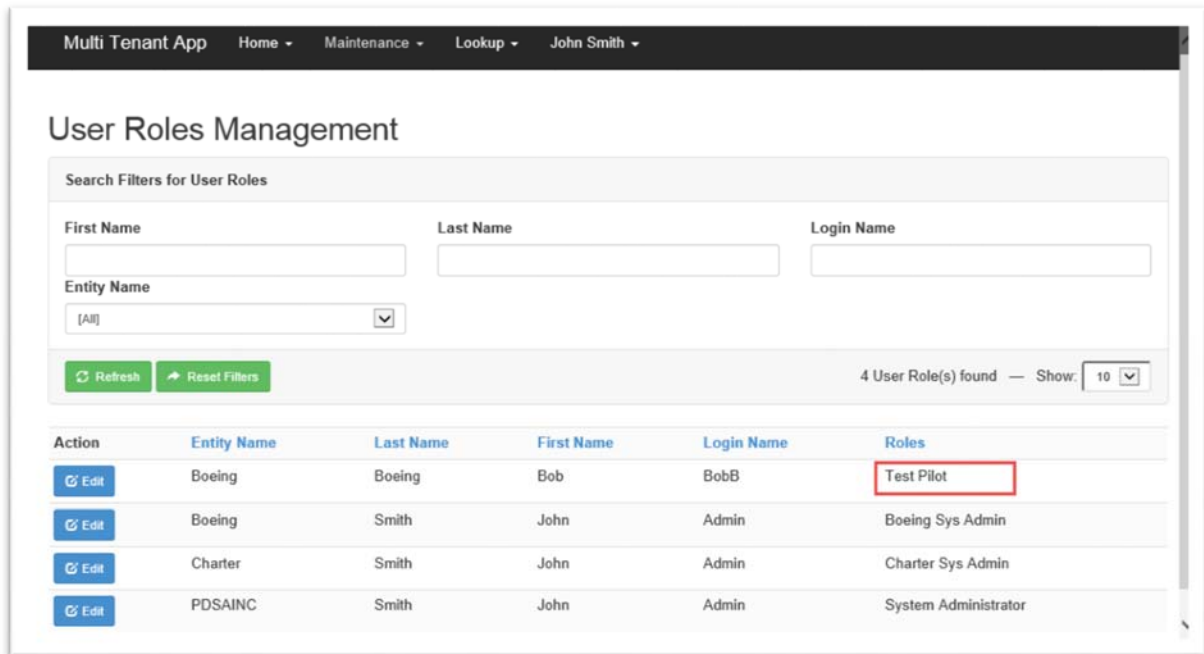


Figure 13: User Roles Management

We now have the Administrator account associated with PDSAINC, Boeing, and Charter with a role assigned for each. We also have a Bob Boeing user that is only associated with the Boeing entity.

## Web.config Settings

This section will review a few of the common web.config settings that are commonly used with multi-tenant applications. These were covered at the beginning of this document but some examples will be given here.

**showEntityList** - Display a drop down of entities for this application on the Login page as shown in Figure 14. If this is set to true, then 'showEntityPage' needs to be set to false.

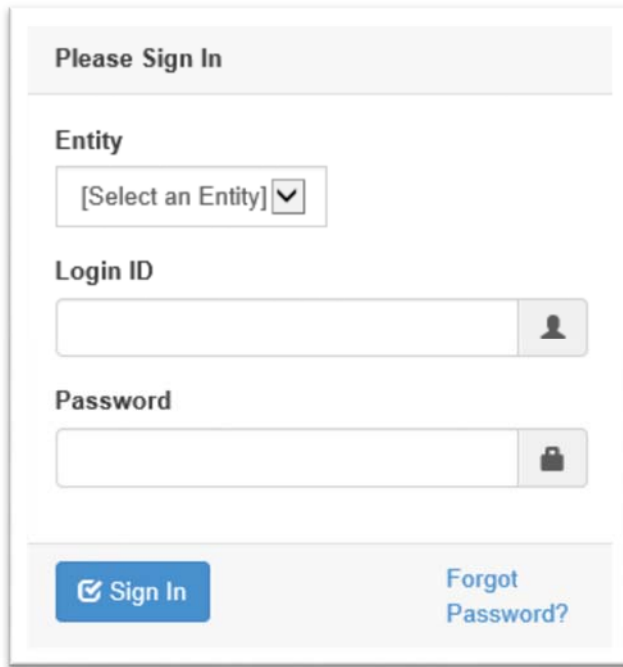


Figure 14: Login Page with Entity Selection

**showEntityPage** – Displays a separate page for entity selection after displaying the login page as shown in Figure 15. If you do not want your users to see all of the entities, then set 'showEntityPage' to true and 'showEntityList' to false. Users will see a normal login page but will be redirected to another page to select which entity they would like to login under if they belong to more than one entity. Users that only belong to one entity will login immediately without choosing an entity.



Figure 15: Select an Entity

**Authentication** – The authentication element needs to have its type attribute set to "Application" (<authentication type="Application">). ActiveDirectory, ActiveDirectoryWithPDSARoles, and ApplicationWithSingleSignIn will not work with multi-tenant applications.

# Summary

In this chapter, you learned how to implement a multi-tenant application using the PDSA Framework.