

## **Fundamentals of Cloud Computing**

## **Exercises – Guide for Students**

*Version 2.1*

Author:

Marcin Kubacki IBM Poland

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# **FCC - Exercises**

## **Introduction**

## Introduction

In this lab exercise, you will learn the major features and functions of self-service provisioning of virtual servers and software using IBM® Tivoli® Service Automation Manager. This lab exercise takes you step-by-step through the various tasks. You, as a cloud administrator, request a project with a VMware virtual server using the self-service user interface and manage the virtual servers and resources through the lifecycle of the project. You also learn how to monitor the deployment status with the Tivoli Service Automation Manager administrative user interface (UI), and perform basic cloud administrator tasks, such as customizing the service catalog.

Later in this lab exercise, you learn how to create and restore virtual server backups. You also learn how to install software as part of the virtual server deployment. You learn how to remove servers and cancel projects. You learn about customers and how to customize Tivoli Service Automation Manager for different customers. Finally, you disable automatic approval of requests and view the Tivoli Service Automation Manager reports.

Three systems are provided for each lab session, as described in the following table.

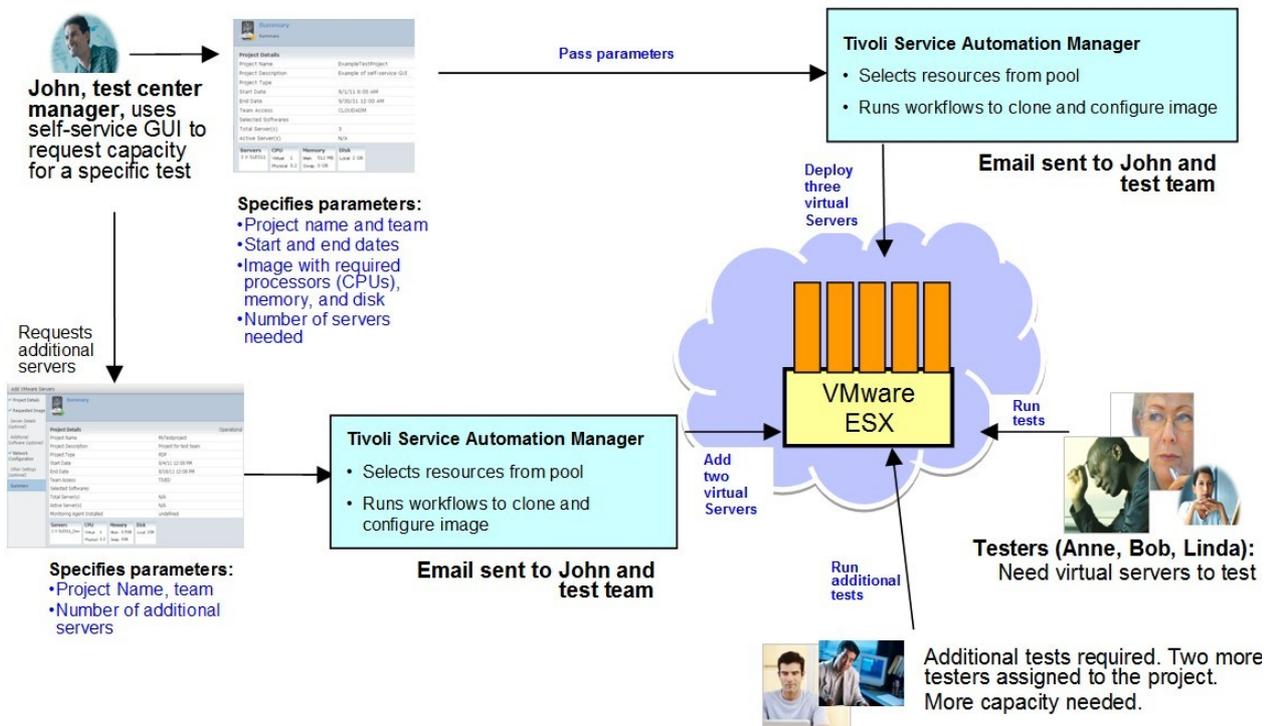
Host name	IP	Description
vm100	192.168.80.100	SUSE 10 SP2: Tivoli Service Automation Manager management server
vm104	192.168.80.104	Windows 2003 STD: VMware vCenter Server, Tivoli Service Automation Manager UIs
vm105	192.168.80.105	VMware ESX Server 4.0

You log in to the **vm104** system, which is your primary user and administrator workstation. From here, you access the Tivoli Service Automation Manager user interfaces and other applications to perform all the exercises.

Refer to the following table for various user names and passwords that are used in the exercises.

User Name	Password	Component	Description
<b>Administrator</b>	object00	OS(vm104)	Administrator user
<b>maxadmin</b>	object00	Tivoli Service Automation Manager	Tivoli Service Automation Manager and Tivoli's process automation engine administrator
<b>cloudadmin</b>	object00	cloud administrator	Self-service UI
<b>tived1dmin</b>	object00	team administrator for TIVED1 customer	Self-service UI

### Simple virtual machines deployment



1. As shown in this slide, John begins by using the self-service UI to define his requirements, thus creating a service request.

2. Tivoli Service Automation Manager selects the appropriate resources, runs the appropriate management plan to install the image, and deploys the image through Tivoli Provisioning Manager.
3. John receives a notification that his request has been completed and the system is ready.
4. John provides the testers with the login information he was given in the email.
5. The testers perform the testing.
6. Later, more testers are added to complete the test.
7. John uses the self-service UI to request additional virtual servers for the new testers, thus creating another service request. John receives another notification when the request is completed.
8. John provides the login information to the new testers, and testing continues.
9. When the testing is complete, John saves a copy of the virtual server in the image catalog and returns the resources to the pool.

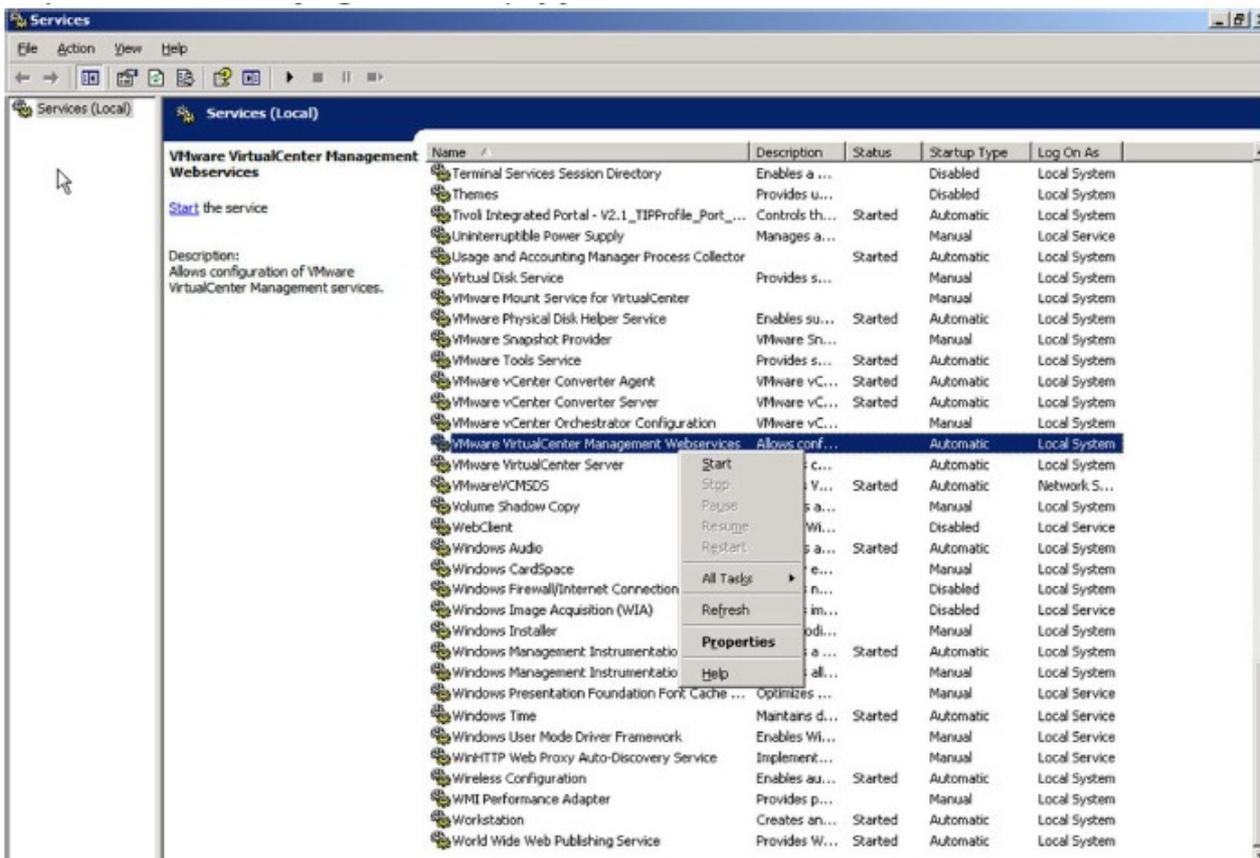
# **FCC - Exercises**

## **Preparation**

## Preparation

Before you will start exercises, you should run the service that allows you to connect with ESXi server.

1. Run the **VM104** virtual machine with login and password from table in introduction (administrator user).
2. Go to “services” view, through **Start -> Run** and entering “**services.msc**”.
3. Press **OK** button.
4. In “services” window mark “**VMware VirtualCenter Server**” position on the right-hand side list.
5. Click on the marked position from the previous step with the right mouse button.
6. Select **Start** option from drop-down menu.



7. Wait for the service to start.
8. Repeat steps 4-6 for “**VMware VirtualCenter Management Webservices**” service.
9. When services will start, their state will be changed for value “**Started**” in column “status”.

# **Fundamentals of Cloud Computing**

## **Exercise 1: Logging on to Tivoli Service Automation Manager UIs**

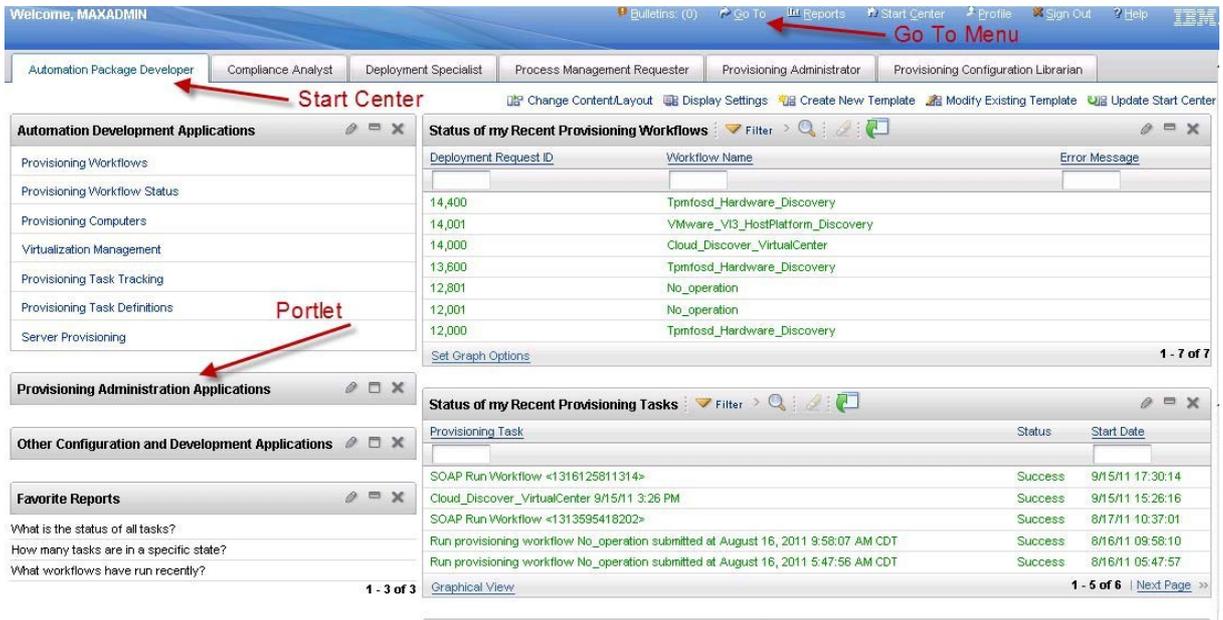
You log in to the **vm104** system to access the Tivoli Service Automation Manager UI environment and VMware.



**Note:** Use different browsers for the administration and user interfaces to eliminate issues that arise with the browser caching the credentials. This action also helps distinguish between administrator and user functions. Use the following browsers:

- **Internet Explorer** for Tivoli Service Automation Manager UI (admin)
- **Firefox** for the self service UI (user)

1. Log in to **vm104** virtual server as **Administrator** with password **object00**.
2. Log in to the Tivoli Service Automation Manager administrative UI.
  - a. Open an Internet Explorer window and browse to the following web address:  
 https://vm100.tivoli.edu:9443/maximo  
 This web address is the home page.
  - b. Log in with user ID **maxadmin** and password **object00**.  
 The Tivoli Service Automation Manager administrative UI opens.



- c. After you have logged in and verified connectivity to the application, log out and close the browser.

3. Log on to the self-service UI as **cloudadmin**. This user is a Tivoli Service Automation Manager cloud level administrator that was created for these exercises after the installation completed. Use this ID initially to log on to the self-service user interface.

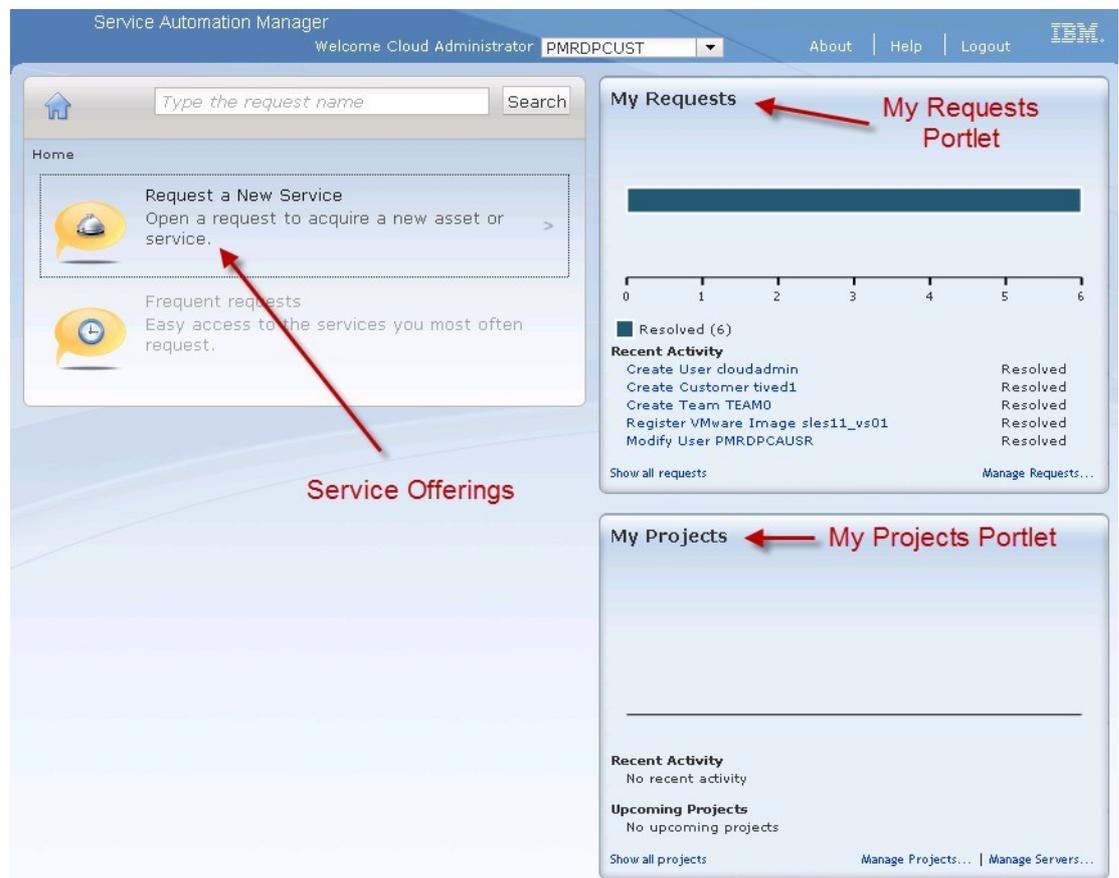
a. Open a Firefox window and browse to the following web address:

https://vm100.tivoli.edu:9443/SimpleSRM/

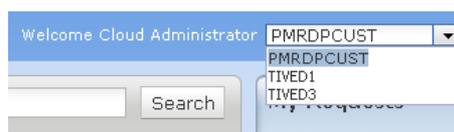
This web address is located on the Bookmarks toolbar as self-service UI.

b. Log in with user ID **cloudadmin** and password **object00**.

The self-service UI opens.



c. Expand the customer drop-down list. Three customers are defined.



User **cloudadmin** can submit requests for each of the customers. PMRDPCUST is the default customer defined with Tivoli Service Automation Manager. TIVED1 and TIVED3 are customers created for the lab exercises.

During almost all lab exercises, you submit requests for the PMRDPCUST customer.

- d. After you log in and verify connectivity to the application, log out and close the browser.

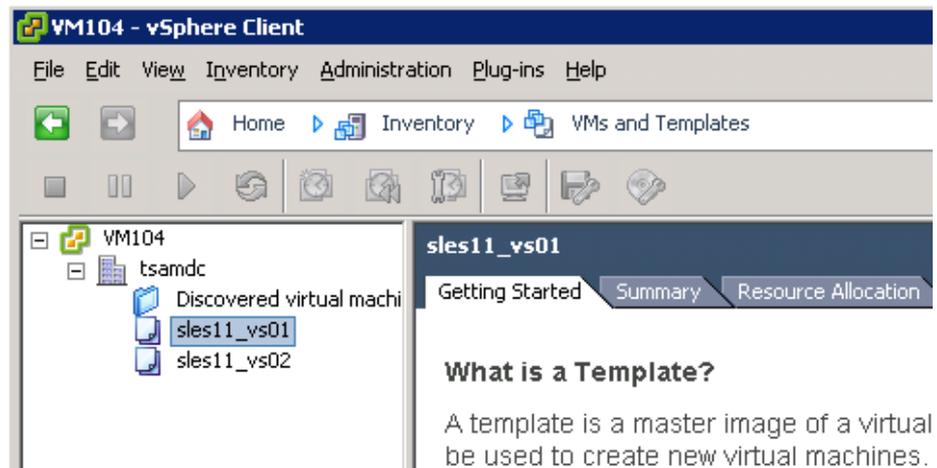
# **Fundamentals of Cloud Computing**

## **Exercise 2: Logging in to VMware vSphere client**

Log in to the VMware vSphere client to verify that VMware is operational and that you have two Linux templates defined:

1. Double-click **VMware vSphere Client** on the **vm104** desktop.
2. In the VMware vSphere Client login window, perform the following steps:
  - a. Specify **localhost** for the **IP address / Name** field.
  - b. Select **Use Windows session credentials**.
  - c. Click **Login**.
3. Select **View > Inventory > VMs and Templates**.

The **sles11\_vs01** and **sles11\_vs02** templates are visible in the left pane. You use these templates to deploy new virtual servers from Tivoli Service Automation Manager.



**Note:** If the templates appears as *sles11\_vs01 (disconnected)* or *sles11\_vs02 (disconnected)*, notify your facilitator.

4. Minimize the VMware vSphere Client window.

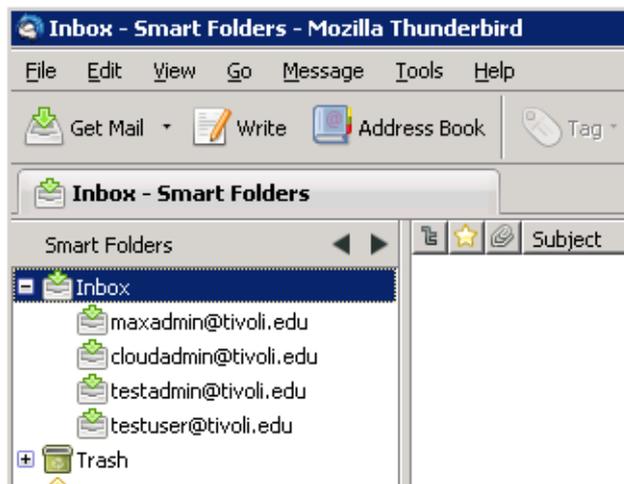
# **Fundamentals of Cloud Computing**

## **Exercise 3: Opening the email application**

As you perform tasks using the self-service UI, you receive email notifications. Your lab system is already set up to run Mozilla Thunderbird.

1. Locate the **Mozilla Thunderbird** icon on the desktop of **vm104**. Double-click the icon to open the application.

A list of users is displayed in the left pane.



As you proceed through the remaining exercises, notifications sent from the Tivoli Service Automation Manager workflows are added to the inbox of **cloudadmin** and **testadmin**. View them as they arrive to become familiar with them.

2. Minimize the **Mozilla Thunderbird** window.

# **Fundamentals of Cloud Computing**

## **Exercise 4: Submitting a new VMware deployment request using the quick path**

After the cloud administrator configures the environment and sets up the applications, users can submit requests for virtual server provisioning. You use the self-service UI to request virtual server deployments.

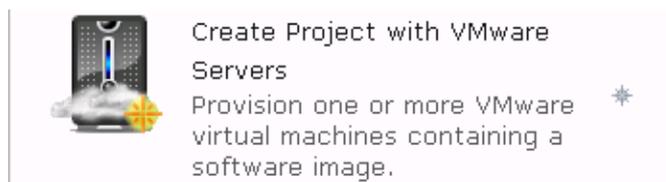
To perform these tasks, you must log in with a user ID that has a role of either Cloud Administrator or Team Administrator, by default. During the first series of these exercises, you use a cloud administrator for simplicity, but you can complete all of the tasks as a team administrator.

Tivoli Service Automation Manager was redesigned so that users can quickly submit requests when the default values are sufficient for their needs. This use case is shown in this exercise.

1. Open a Firefox window and open the self-service UI. Use the **Self-Service UI** bookmark or browse to this location:

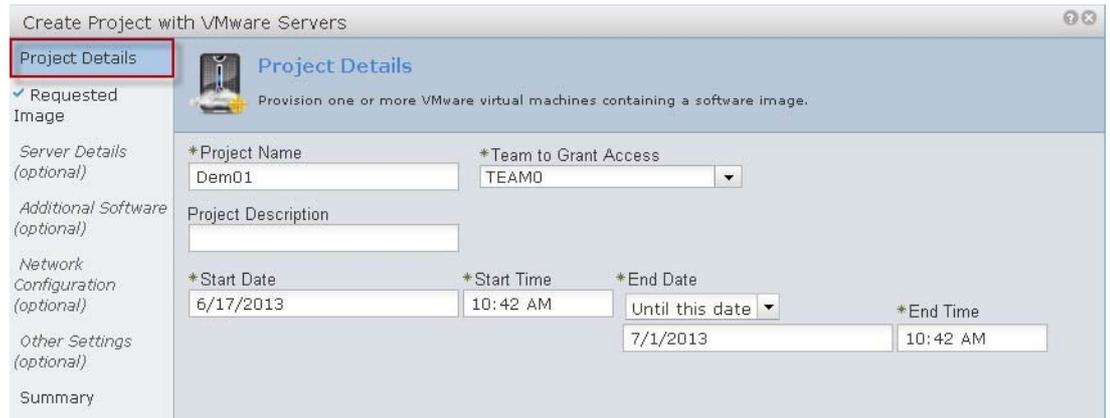
<https://vm100.tivoli.edu:9443/SimpleSRM/>

2. Log in to the self-service UI as **cloudadmin** with password **object00**. Verify that you are working for the PMRDPCUST customer.
3. **Click** Request a New Service > Virtual Server Management > Create Project with VMware Servers.



4. Enter the following information in the Project Details window:

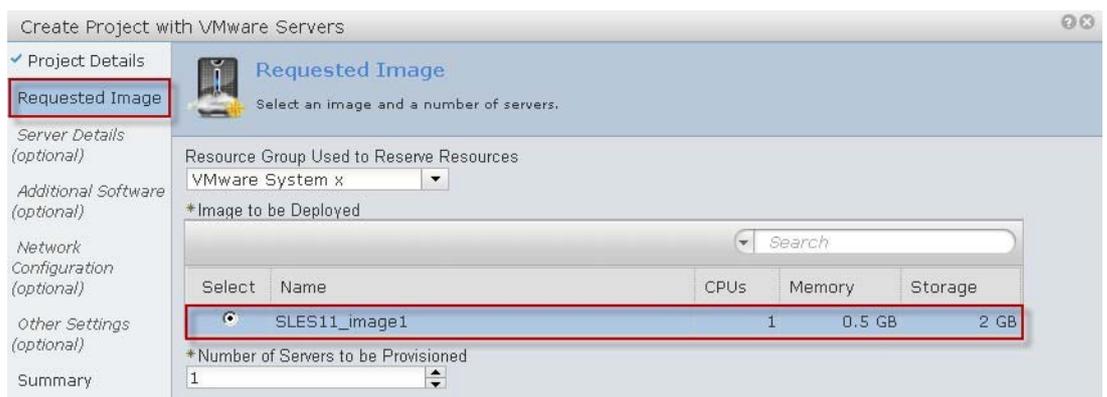
- Project Name: **<your\_initials>01**
- Team to Grant Access: **TEAM0**
- Start Date: *[Use the default value]*
- End Date: *[Use the default value]*



5. Click **Next**.

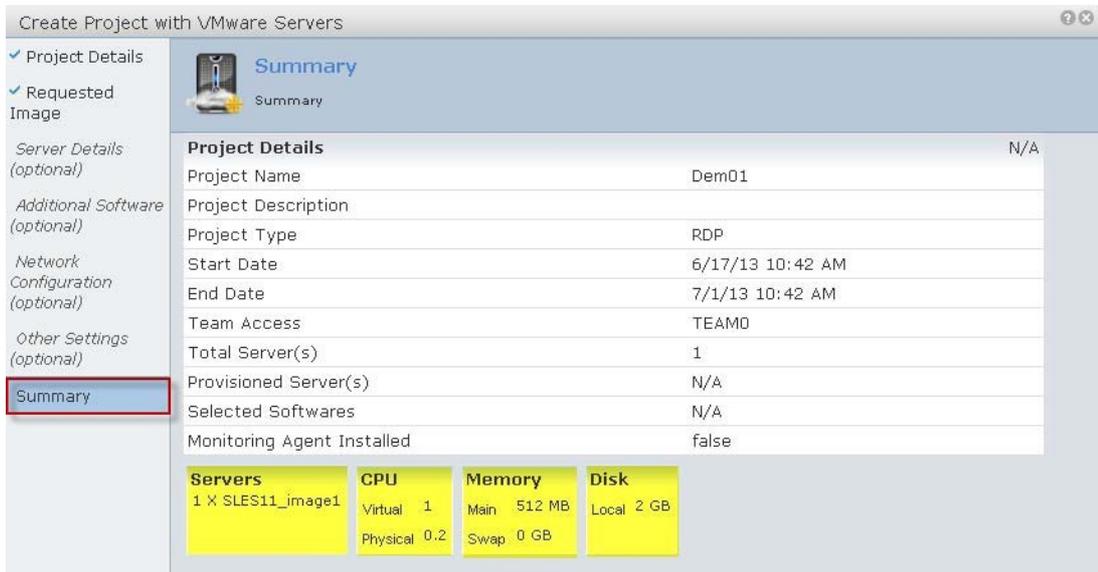
6. Enter the following information in the Requested Image window:

- Resource Group Used to Reserve Resources: **VMware System x**
- Image to be Deployed: **SLES11\_image1**
- Number of Servers to be Provisioned: **1**



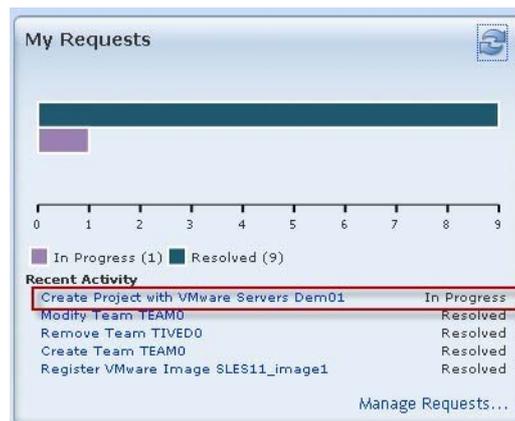
7. Click **Finish** to accept the defaults for the remaining options.

8. Verify that the Summary section is similar to the following screen capture.



9. Click **Finish** to submit your request.

10. Verify that the request in the **My Requests** portlet listed first as **New**, **Queued**, and then **In Progress**. For example, **Demo01** is in progress in the following example.



**Note:** You monitor the status of the deployment request using the administrative interface in the next exercise. Wait until the status of your request shows **In Progress** before you start the next exercise.

# **Fundamentals of Cloud Computing**

## **Exercise 5: Monitoring the deployment status**

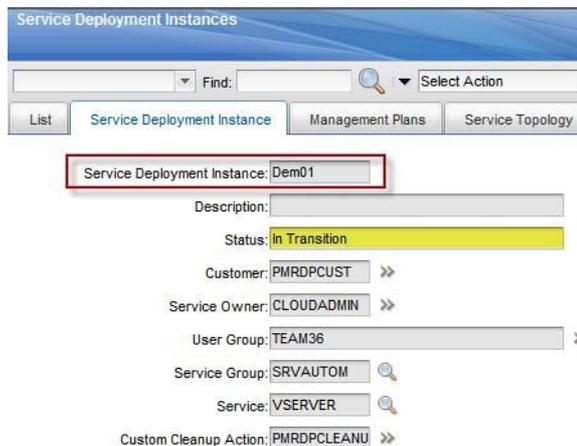
The cloud administrator can log in to the Tivoli Service Automation Manager administrative UI and monitor several operational aspects of the service requests, projects, and the workflows that interface with the hypervisor managers and the virtual machines. In this exercise, you perform some of these monitoring functions.

1. If you are not already logged in, log in to the Tivoli Service Automation Manager administrative UI as **maxadmin** with password **object00**.
2. **Click** Go To > Service Automation > Service Deployment Instances.
3. Press **Enter** to list all instances.
4. Click **<your\_initials>01**.



**Note:** When you create a new project, the application creates a Service Deployment Instance, which you can view in the administrative interface. This instance tracks and manages the service landscape known as the **service topology**. The Service Deployment Instance is exposed to the user as a project in the **My Projects** portlet. Each request to modify this topology is tracked with a unique service request. These service requests are exposed to the user in the **My Requests** portlet.

5. Verify that the status is **In Transition**. This status means that the workflow is currently running to deploy the virtual system.

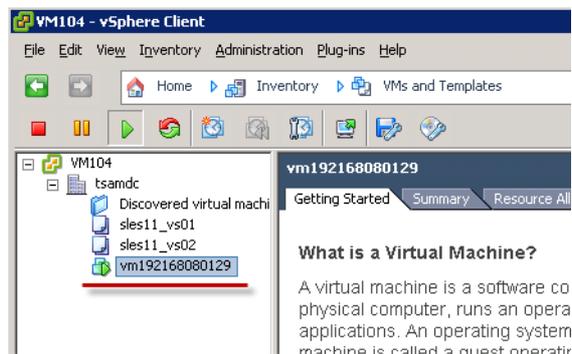


6. Click the **Messages** tab. You can view the messages from deployment; however, there typically are no messages here yet.
7. **Click** Start Center > Automation Package Developer tab > Provisioning Workflow Status.

Two workflows are still in progress.

Deployment Request	Workflow Name	Submit Date	Status
<a href="#">16.020</a>	RP.ClusterProvision	6/17/13 10:55:52	In progress
<a href="#">16.000</a>	Resource_Master	6/17/13 10:55:23	In progress

8. Click the **Refresh** button to update the page. Continue to the next step while the workflow is in progress. You check the status of the workflow later. You see a status of Success when the workflow is completed.
9. Log in to the VMware vSphere client as **Administrator** with password **object00**. Monitor the status to verify that a new virtual server with a name of **vm192168080129** is created.



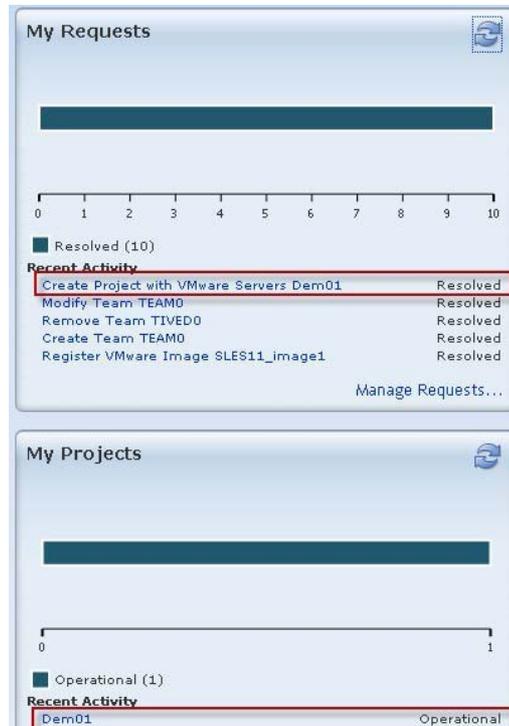
10. Return to the Tivoli Provisioning Manager Workflow Status page to see the progress.

Click **Refresh** to update the page until the workflows complete.

The workflow log contains approximately 700 entries when the workflow completes. *This task might take 10 minutes or more, depending on system load.*

11. Return to the self-service UI.

- Verify that the status of the **<your\_initials>01** deployment request is **Resolved** in the **My Requests** portlet, and that the new project is **Operational** in the **My Projects** portlet.



## **Fundamentals of Cloud Computing**

### **Exercise 6: Logging in to the virtual server (optional)**

In the exercise, you log in to the virtual server that you provisioned using the vSphere client to demonstrate that the virtual server is operational.

1. Open the Mozilla Thunderbird application. Open the email with a subject **Your request to start a new project has been processed** in the **cloudadmin** inbox. The text describes the virtual server, similar to the following example:

Dear Cloud Administrator,

you have started a new project Dem01 with the following topology:

The server vm192168080129 has been added with the following parameters:

Server host name:  
vm192168080129 Number of  
CPU(s): 1

Number of tenths of physical  
CPUs: 2 Amount of Memory:  
512 MB

Swap Size: 0 GB

IPv4 address(es):  
192.168.80.129 IPv6  
address(es):

Disk Space Size:  
2 GB Admin  
Password:  
<password>

2. Write the Admin password here:\_\_\_\_\_.  
Passwords are case- sensitive.
3. Log in to **vm192168080129**. You can use either the VMware vSphere Client or PuTTY to access the virtual server. The instructions for the VMware vSphere Client follow.
  - a. Log in to the VMware vSphere Client as **Administrator** with password **object00**.
  - b. Right-click **vm192168080129**.
  - c. Click **Open Console**.
4. Log in as user **root** with the Admin password that you wrote down.

5. Enter the command **cat /etc/SuSE-release** to verify that your virtual machine is running SUSE Linux Version 11.

```
vm192168080129:~ # cat
/etc/SuSE-release SUSE Linux
Enterprise Server 11 (i586)
VERSION = 11

PATCHLEVEL = 0
```

6. Enter the command **exit** to log off.



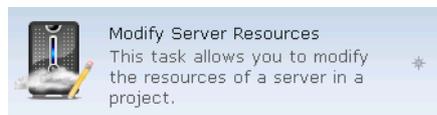
# **Fundamentals of Cloud Computing**

## **Exercise 7: Modifying the virtual server by adding additional memory**

In preparation for installing and running software, you increase the amount of memory on the virtual machine that you provisioned in the previous exercise.

\_\_\_1. If you are not already logged in, log in to the self-service UI as **cloudadmin** with password **object00**. Verify that you are working for the PMRDPCUST customer.

**2. Click** Request a New Service > Virtual Server Management > Modify Server > Modify Server Resources.



\_\_\_3. Enter the following information:

- Select Project Name: **<your\_initials>01**
- Select Server Name: **vm192168080129**
- CPU: *[do not change]*
- Memory: *[enter 1 in the GB field]*
- Disk: *[do not change]*

The memory now shows 512+512 to indicate that the virtual machine currently has 512 MB of memory and that an additional 512 MB of memory will be added.



\_\_\_4. Click **OK** to submit the request.

The request in the **My Requests** portlet is listed first as **New**, **Queued**, and **In Progress**. Wait for the request to be **Resolved**.



**Note:** You can watch the activity in the **Recent Tasks** portlet in the vSphere client. You see the virtual machine being powered off, reconfigured, and then powered on.

- \_\_\_5. When the request completes, you can click **manage servers** in the **My Projects** portlet to view the details for vm192168080129. The memory is now 1 GB.



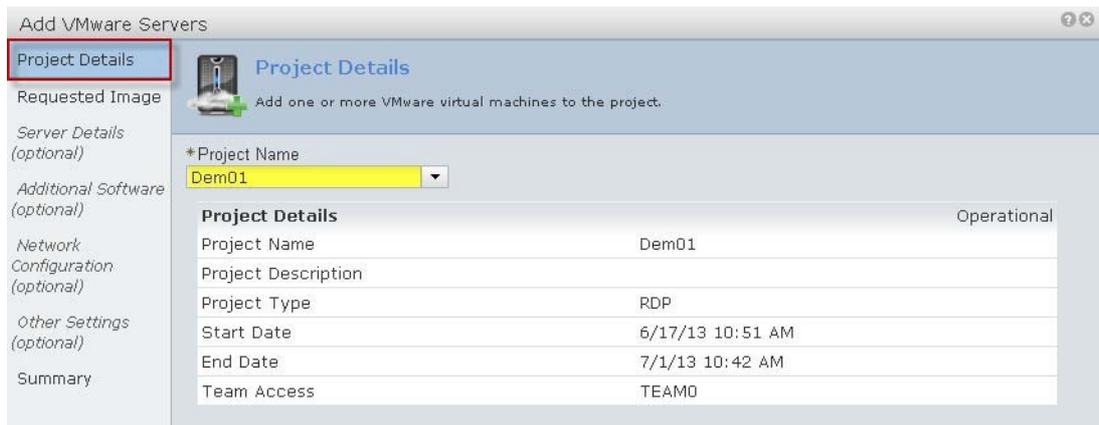
## **Fundamentals of Cloud Computing**

### **Exercise 8: Adding a VMware server with a monitoring agent to an existing project**

- \_\_\_1. If you are not already logged in, log in to the self-service UI as **cloudadmin** with password **object00**. Verify that you are working for the PMRDPCUST customer.
  
2. **Click** Request a New Service > Virtual Server Management > Modify Project > Add VMware Servers.



- \_\_\_3. Enter the following information in the Project Details window: Project Name: **<your\_initials>01**



- \_\_\_4. Click **Next**.

- \_\_\_5. Enter the following information in the Requested Image window:
- Resource Group Used to Reserve Resources: **VMware System x**
  - Image to be Deployed: **SLES11\_image1**
  - Number of Servers to be Provisioned: **1**



- \_\_\_6. Click **Next**. This time, you specify additional details about the server being requested.

- \_\_\_7. Enter the following information in the Server Details window:
- Virtual CPU: **1**
  - Physical CPU: **0.3**
  - Main Memory: **1.0 GB**
  - Swap: **0 GB**
  - Disk: **3 GB**

Add VMware Servers

✓ Project Details  
✓ Requested Image

**Server Details (optional)**

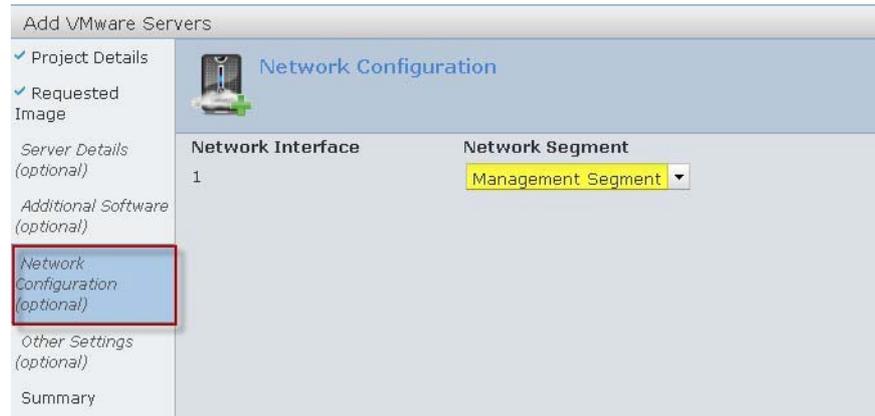
Additional Software (optional)  
Network Configuration (optional)  
Other Settings (optional)  
Summary

**Server Details**  
Click the slider buttons to adjust the settings for the requested resources.

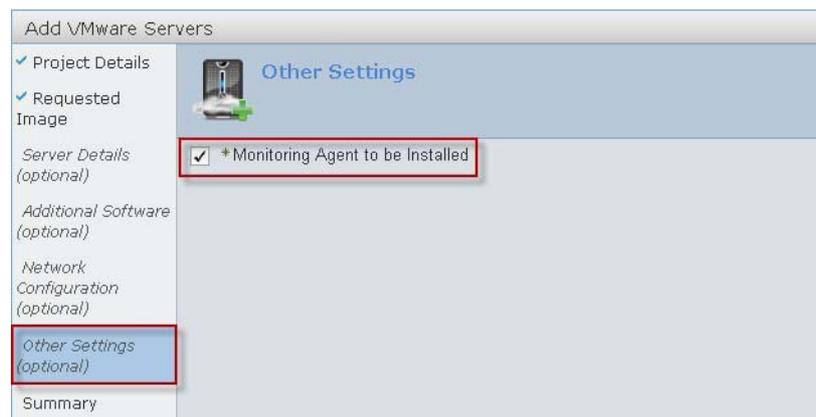
CPUs		Memory		Disk (GB)
Virtual	Physical	Main (GB)	Swap (GB)	
Slider: 1	Slider: 0.3	Slider: 1	Slider: 0	Slider: 3
1	0.3	1 GB	0	3
		1,024 MB		

- \_\_\_8. Click **Next**.
- \_\_\_9. In the Additional Software window, do not make an entry in the **Select Software to Install** field at this time.
- \_\_\_10. Click **Next**.
- \_\_\_1. Make sure that the Network Configuration window lists only one network, the Management Segment.

There is only one network, the Management Segment.

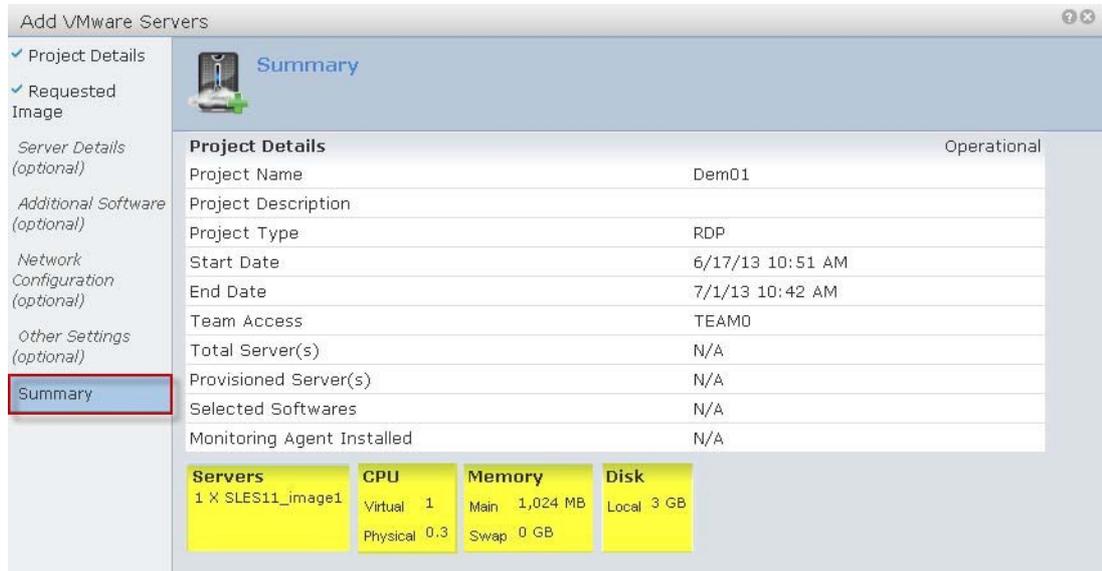


- \_\_\_2. Click **Next**.
- \_\_\_3. Enter the following information in the Other Settings window: Monitoring Agent to be Installed. **[selected]**



- \_\_\_d. Click **Next**.

The Summary section is similar to the following screen capture.



\_\_\_e. Click **Finish** to submit your request.

\_\_\_4. *This task might take 15 minutes or more, depending on system load. While the task is processing, you can continue with the next exercise. This task completes when the status of the <your\_initials>01 deployment request is **Resolved** in the **My Requests** portlet.*

# **Fundamentals of Cloud Computing**

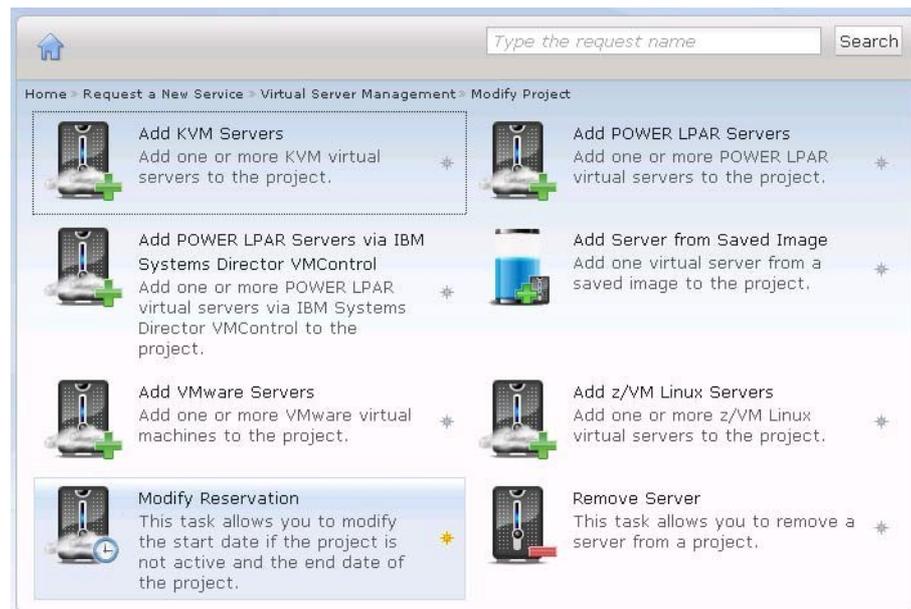
## **Exercise 9: Customizing the service catalog**

The cloud administrator has already made some service catalog customizations to hide the non- VMware services for creating new projects. However, the non-VMware service offerings for adding servers to existing projects are still visible in the catalog. In this exercise, you hide those service offerings because the only cloud pools available in this environment are VMware.

\_\_\_1. If you are not already logged in, log in to the self-service UI as **cloudadmin** with password **object00**. Verify that you are working for the PMRDPCUST customer.

2. **Click** Request a New Service > Virtual Server Management > Modify Project.

Service offerings are available to add servers with non-VMware hypervisors. These service offerings are not configured in this test environment, which is VMware only.



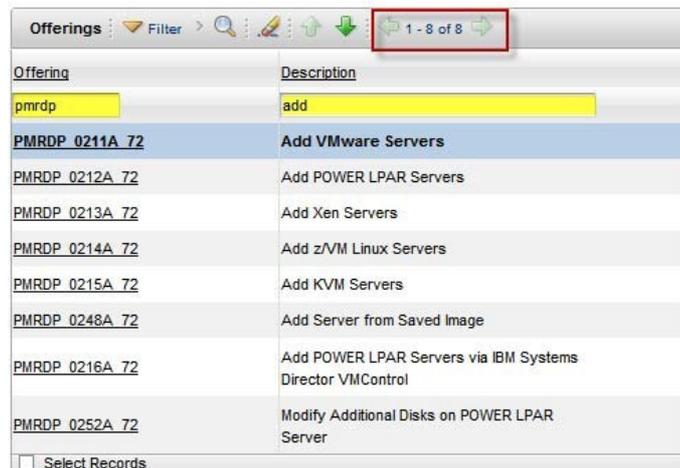
\_\_\_3. Log out and close the browser.

\_\_\_4. If you not already logged in, log in to the Tivoli Service Automation Manager administrative UI as **maxadmin**, with password **object00**.

\_\_\_5. Click **Go To > Service Request Manager Catalog > Offerings**.

\_\_\_6. Filter the offerings based on an offering name of **PMRDP** and the description of **Add**.

Eight offerings meet these criteria.



Offering	Description
pmrdp	add
<b>PMRDP_0211A_72</b>	<b>Add VMware Servers</b>
PMRDP_0212A_72	Add POWER LPAR Servers
PMRDP_0213A_72	Add Xen Servers
PMRDP_0214A_72	Add z/VM Linux Servers
PMRDP_0215A_72	Add KVM Servers
PMRDP_0248A_72	Add Server from Saved Image
PMRDP_0216A_72	Add POWER LPAR Servers via IBM Systems Director VMControl
PMRDP_0252A_72	Modify Additional Disks on POWER LPAR Server

Select Records

\_\_\_7. Check the **Select Records** box below the list of offerings.

\_\_\_8. Select all of the non-VMware offerings that are active. These offerings are items 2, 3, 4, 5, 7, and 8 in the list.

\_\_\_9. Choose **Change Status** from the **Select Action** drop-down list.

\_\_\_10. Set the **New Status** to **Pending** and click **OK**.



**Note:** The method you use here for hiding the non-VMware service offerings is a simple way to remove offerings from all catalogs and all user groups. Another method is to add and remove specific service offerings from the catalogs that are associated with each role-based user group. The cloud administrator can then decide which service offerings to make available to which users based in their role.

- \_\_\_11. Service catalogs are dynamically loaded by the self-service UI. Therefore, log out of any remaining self-service UI instances. Users receive the updated service catalog at the next login.
- \_\_\_12. Log in to the self-service UI as **cloudadmin** with password **object00**. Verify that you are working for the PMRDPCUST customer.
- 13. Click** Request a New Service > Virtual Server Management > Modify Project.

Notice that the service offerings with non-VMware hypervisors have been removed.

