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KATEDRA ZA OPERACIJSKE SUSTAVE

Virtualizacija IT infrastrukture

Creating and Managing Virtual Machines by Using System Center 2012 R2 Virtual Machine Manager

Exercise 1: Creating a Virtual Machine and Modifying Its Properties

▶ *Task 1: Create a new virtual machine with the VMM console in Microsoft System Center 2012 R2 Virtual Machine Manager*

1. On LON-VMM1, on the taskbar, click the **Virtual Machine Manager Console** icon.
2. On the **Connect to Server** page, click **Connect**.
3. In the Virtual Machine Manager Console, click the **VMs and Services** workspace.
4. In the VMs and Service console tree, expand **All Hosts**, expand **LocalGroup**, and then click **LON-HOST1**.
5. On the ribbon, click the **Home** tab, click the **Create Virtual Machine** drop-down list box, and then click **Create Virtual Machine**.
6. In the Create Virtual Machine Wizard, on the **Select Source** page, click **Create the new virtual machine with a blank virtual hard disk**, and then click **Next**.
7. On the **Identity** page, in the **Virtual machine name** text box, type **Win2012Lab9**.
8. In the **Description** text box, type **Lab 9 exercise, create virtual machine**, and then click **Next**.
9. Under **Network Adapters**, click **Network Adapter1**.
10. In the **Connectivity** section, click **Connected to a VM network**, click **Browse**, in the pop-up window, click **External Network**, click **OK**, and then click **Next**.
11. On the **Select Destinations** page, accept both the default **Place the virtual machine on a host** option, and the **Destination: All Hosts** drop-down list-box selection, and then click **Next**.
12. On the **Select Host** page, give VMM a moment to rate the hosts. Highlight **lon-host2.adatum.com**, and then click **Next**.
13. On the **Configure Settings** page, under **Virtual Machine path**, type **E:\Program Files\Microsoft Learning\20409**, and then click **Next**. (Note that the actual drive letter may differ on your host machine.)
14. On the **Add Properties** page, click **Next**.
15. On the **Summary** page, in the **Confirm the settings** section, click the **View Script** button.
16. Verify that **Notepad** opens and displays the Windows PowerShell script used to create the virtual machine, with cmdlets with parameters for all the options you have chosen.
17. In Notepad, on the **File** menu, click **Save As**.
18. In the Save As pop-up window, name the file **"CreateWin8Lab9.ps1"** in the **Documents** library. Be sure to use the quotation marks, as this will save the extension as it is written, rather than saving it with the .txt extension.
19. In the **Save as type** drop-down list box, click **All Files (*.*)**, and then click the **Save** button.
20. Close Notepad.
21. Click the **Create** button.
22. Verify that the job starts, with multiple steps to create the virtual machine.
23. Verify that a Jobs pop-up window displays.
24. When the last job is completed, close the Jobs pop-up window.
25. In the console tree, under **VMs and Services**, under **All Hosts**, and under **LocalGroup**, click **LON–HOST2**.
26. In the VMs details pane, verify that **Win2012Lab9** displays on this host.

27. Close the Virtual Machine Manager Console. **Results**:

Results: After completing this exercise, you should have created a virtual machine and modified its properties.

Exercise 2: Cloning a virtual machine

Task 1: Clone a virtual machine

1. On the LON-VMM1 desktop, on the taskbar, click the **Virtual Machine Manager Console** icon.
2. In the Virtual Machine Manager Console, on the **Connect to Server** page, click **Connect**.
3. Verify that after a moment, the Virtual Machine Manager Console displays.
4. In the workspace area, in the lower left section, click **VMs and Services**.
5. In the VMs and Services console tree, expand **All Hosts**, expand **LocalGroup**, and then click **LON-HOST1**.
6. In the VMs detail pane, click **20409B- LON-SVR2**. Ensure the **Virtual Machine** tab is also selected.
7. On the ribbon, click the **Create** drop-down list, and then click **Clone**.
8. In the Create Virtual Machine Wizard, on the **Identity** page, in the **Description** box, type **Clone of the LON-SVR2 virtual machine**, and then click **Next**.
9. On the **Configure Hardware** page, click **Next**.
10. On the **Select Destination** page, click **Next**.
11. On the **Select Host** page, notice that VMM rates the hosts. In the Placement window where the two hosts are listed, click **lon-host2.adatum.com**, and then click **Next**.
12. On the **Select Path** page, type **F:\Program Files\Microsoft Learning\20409**, and then click **Next**.
    (Note the actual drive letter may differ on your host machine.)
13. On the **Select Networks** page, click **Next**.
14. On the **Add Properties** page, click **Next**.
15. On the **Summary** page, click **Create**.
16. Verify that a Jobs pop-up window displays, and is populated with several steps detailing the cloning of the virtual machine.
17. After about 10 minutes, verify that the cloned virtual machine is created.
18. Close the Jobs window.
19. In the VMM console, return to the VMs and Services console tree, expand **All Hosts**, expand **LocalGroup**, and then click **LON-HOST2**.
20. In LON-HOST2, verify that **20409B-LON-SVR2** displays. This is the cloned virtual machine.

Task 2: Use Sysprep on the clone of LON-SVR2

1. In the VMs and Services console tree, expand **All Hosts**, expand **LocalGroup**, and then click **LON-HOST2**.
2. In the VMs detail pane, click **20409B-LON-SVR2**, and on the ribbon, click **Power On**.
3. After approximately 60 seconds, right-click **20409B-LON-SVR2**, point to **Connect or View**, and then click **Connect via Console**. If prompted, type **Adatum\Administrator** with the password of **Pa$$w0rd**.
4. In the Virtual Machine Viewer window, click the **Ctrl-Alt-Del** icon, and then sign in as **Adatum\Administrator** with the password **Pa$$w0rd**.
5. On the taskbar, right-click the **Start** button, and then click **Windows PowerShell (Admin)**.

6. In the Administrator: Windows PowerShell window, type **cd c:\Windows\System32\Sysprep**, and then press Enter.
7. Type **.\Sysprep /generalize**, and then press Enter.
8. In the System Preparation Tool 3.14 pop-up window, select the **Generalize** check box.
9. In the **Shutdown Options** drop-down list box, click **Reboot**, and then click **OK**.
10. Verify that the Sysprep is working pop-up window displays. Note that Sysprep will take approximately five minutes to run.
11. When Sysprep finishes, the virtual machine will restart.
12. In the Virtual Machine Viewer window, on the **File** menu, click **Exit**.
13. In the Virtual Machine Manager Console, return to the VMs and Services workspace, and then click **LON-HOST2**.
14. Click **20409B-LON-SVR2**, and on the ribbon, click **Power Off**. Click **Yes**.
15. Click **20409B-LON-SVR2**, and on the ribbon, click **Delete**. Click **Yes**.
16. Close the VMM console, and sign out of LON-VMM1.

Configuring and Managing the Microsoft System Center 2012 R2 Virtual Machine Manager Library and Library Objects

Exercise 1: Configuring and Managing the Virtual Machine Manager Library

▶ *Task 1: Examine the Library workspace defaults, and create the shared folders on the virtualization host computers*

1. Sign in to LON-VMM1 as **Adatum\Administrator** with a password of **Pa$$w0rd**.
2. On the desktop, on the taskbar, click the **Virtual Machine Manager Console** icon.
3. On the **Connect to Server** page, click **Connect**.
4. In the Virtual Machine Manager console, on the lower left, click the **Library** workspace.
5. In the console tree, click and expand the **Library Servers** node. You should see the VMM management server, LON-VMM1.Adatum.com. This is because the VMM management server is always added to a library server when you install Microsoft System Center 2012 R2 Virtual Machine Manager (VMM).
6. On LON-HOST1 and LON-HOST2, perform the following tasks:
    a) On LON-HOST1, on the taskbar, click the **File Explorer** icon.
    b) In the This PC window, click **Local Disk (C:)**.
    c) On the ribbon, on the **Home** tab, click the **New folder** icon. In the text box, type **Host1Library**, and then press Enter.
    d) Right-click **Host1Library**, click **Share with**, and then click **Specific people**.
    e) In the File Sharing window, in the drop-down list, select **Everyone**, click **Add**, and then click **Share**.
    f) In the File Sharing window, click **Done**.
    g) Close File Explorer.
    h) On LON-HOST2, on the taskbar, click the **File Explorer** icon.
    i) In the This PC window, click **Local Disk (C:)**.
    j) On the ribbon, on the **Home** tab, click the **New folder** icon. In the text box, type **Host2Library**, and then press Enter.
    k) Right-click **Host2Library**, click **Share with**, and then click **Specific people**.
    l) In the File Sharing window, in the drop-down list, select **Everyone**, click **Add**, and then click **Share**.
    m) In the File Sharing window, click **Done**.
    n) Close File Explorer.
    o) Switch back to LON-VMM1.

▶ *Task 2: Add LON-HOST1 and LON-HOST2 as Virtual Machine Manager library servers*

1. In the Virtual Machine Manager console, click the **Library Servers** node. On the ribbon, on the **Home** tab, click the **Add Library Server** icon.
2. In the Add Library Server Wizard, on the **Enter Credentials** page, select **Enter a username and password**. In the **User name** text box, type **ADATUM\administrator**, in the **Password** text box, type **Pa$$w0rd**, and then click **Next**.
3. On the **Select Library Servers** page, in the **Computer name** text box, type **Lon-host1**, and then click **Add**. Repeat this for **Lon-Host2**.

4. In the Selected servers window, notice that you see both hosts. At the bottom of the page, click **Next**.
5. On the **Add Library Shares** page, in the Select library shares to add details pane, select the **Host1Library** and **Host2Library** check boxes.
6. On the **Add Library Shares** page, note the **Add Default Resources** check boxes to the right. This adds the ApplicationsFrameworks folder to the share. Also, note the **Show hidden shares** check box at the bottom of the page. By selecting this check box, the shares that were created as hidden will display.
7. Select both the **Add Default Resources** check boxes, and then click **Next**.
8. On the **Summary** page, note the **View Script** button. Clicking it will bring up Notepad with the Windows PowerShell cmdlets linked together in a script that will re-create all the selections that you made in the wizard. This very useful file can help you document your administrative actions and recreate your environment.
9. At the bottom of the **Summary** page, click the **Add Library Servers** button.
10. When the Jobs window opens, notice the two Add library server jobs. It will take about two minutes to complete these jobs. When both jobs complete, close the Jobs window.

▶ *Task 3: Examine the library server shared folder resources, and create an additional subfolder on LON-HOST1*

1. In the Virtual Machine Manager console, return to the Library workspace and review the new library servers that you have added to the **Library Servers** node in the console tree by expanding each library server and its library.
2. In the **ApplicationsFrameworks** node of the Host1Library, in the Physical Library Objects details pane, click **SAV_x86_en-US_** ***string-of-numbers*.cr**. Note that the values found in the string of numbers will vary over time.
3. On the ribbon, on the **Custom Resource** tab, click **Properties**.
4. In the **Properties** dialog box, click **View equivalent resources**. Examine the items in the window, and then click **Cancel**.
5. Click the **Dependencies** page. Notice that no dependencies display, but if this custom resource had dependencies, they would be listed here. This information is useful when determining whether to delete an object to see if it is still dependent or being depended upon by another object.
6. On the **Dependencies** page, click **Cancel**.
7. In the VMM console, in the console tree, right-click **Host1Library**, and then click **Explore**.
8. In the Host1Library window, click the **Home** tab, and then click **New folder**. In the **New folder** text box, type **ISOs**, and then press Enter.
9. Open the **ISOs** folder, and then create a text file named **Test.iso**. In the **Rename** box, click **Yes**.
10. Close the Host1Library window.
11. Return to the Library **workspace** in the VMM console, and examine the Host1Library window again. The ISOs folder should now display. If not, right-click **Host1Libary**, and then click **Refresh**.

Exercise 2: Creating and Managing Profiles and Templates

▶ *Task 1: Create the Guest OS Profile*

1. In the Virtual Machine Manager console, on the lower left, click the **Library** workspace.

2. In the console tree, select and expand the **Profiles** node.
3. In the console tree, click the **Guest OS Profiles** node.
4. On the **Home** tab, click the **Create** icon, and on the shortcut menu, click **Guest OS Profile**.
5. In the New Guest OS Profile Wizard, on the **General** page, in the **Name** text box, type **LabGuestOS**, and then in the **Description** text box, type **Lab creating a GuestOS profile**.
6. In the New Guest OS Profile box, click the **Guest OS Profile** page.
7. On the **Guest OS Profile** page, in the **General Settings** section, under **Operating System**, click the down arrow, and then click **64-bit edition of Windows Server 2012 Standard**.
8. Click the **Identity Information** section, and in the **Computer name** text box, type **WS2012-Core###**.
9. Click the **Admin Password** item, and then in the details pane, click **Specify password of the local administrator account**. In the **Password** and **Confirm** text boxes, type **Pa$$w0rd**.
10. In the New Guest OS Profile Wizard, click **OK**. In the Profiles details pane, LabGuestOS now displays.

Task 2: Create the Hardware Profile

1. In the console tree, click the **Hardware Profiles** node.
2. On the **Home** tab, click the **Create** icon, and then on the shortcut menu, click **Hardware Profile**.
3. In the New Hardware Profile Wizard, on the **General** page, in the **Name** text box, type **LabHWProfile**, and in the **Description** text box, type **Lab creating a hardware profile**.
4. In the **New Hardware Profile** box, select the **Hardware Profile** page.
5. On the **Hardware Profile** page, in the **Compatibility** section, select the **Hyper-V** check box.
6. In the central console tree, click **Memory**. In the Memory details pane, select **Dynamic**, and then in the **Maximum memory** area, overtype the value shown with **1024**.
7. Scroll down in the center console tree, and then click **Network Adapters**, **Network Adapt…**. In the Network Adapter 1 details pane, select **Connected to a VM network**. In the VM network area, click the **Browse** button. In the pop-up window, click **External Network**, and then click **OK**.
8. In the New Hardware Profile Wizard, click **OK**. Notice that the LabHWProfile now displays.

Lab: Managing Clouds in Microsoft System Center 2012 R2 Virtual Machine Manager

Exercise 1: Creating a Private Cloud

Task 1: Create the Development private cloud

1. Sign in to LON-VMM1 as **adatum\administrator** with a password of **Pa$$w0rd**.
2. When the LON-VMM1 desktop displays, on the taskbar, click the **Virtual Machine Manager Console** icon.
3. On the **Connect to Server** page, click **Connect**.
4. In Microsoft System Center 2012 R2 Virtual Machine Manager (VMM), in the Virtual Machine Manager console, in the **Workspace** area, on the lower left, click **VMs and Services**.
5. On the ribbon, click the **Create Cloud** button. This will bring up the Create Cloud Wizard.
6. In the Create Cloud Wizard, on the **General** page, in the **Name** text box, type **DevCloud**, in the **Description** text box, type **Cloud for the Development Department**, and then click **Next**.
7. On the **Resources** page, in the **Select the resources for this cloud** area, select the **LocalGroup** check box, and then click **Next**.
8. On the **Logical Networks** page, note the logical networks that are available. In the Logical networks pane, select the **External Network** check box, and then click **Next**.
9. On the **Load Balancers** page, click **Next**.
10. On the **VIP Templates** page, click **Next**.
11. On the **Port Classifications** page, select the following check boxes, and then click **Next**: **Host management**, **Guest Dynamic IP**, **Medium bandwidth**, **Low bandwidth** and **High bandwidth**
12. **Storage** page, in the Storage classifications pane, select the **Local Storage** check box, and then click **Next**.
13. On the **Library** page, click **Next**.
14. On the **Capacity** page, clear the **Memory (GB):** check box, and then in the **Assigned Capacity** text box, type **8**. Clear the **Storage (GB)** check box, and then in the **Assigned Capacity** text box, type **1000**. Clear the **Virtual machines** check box, in the **Assigned Capacity** text box type **3**, and then click **Next**.
15. On the **Capability Profiles** page, select the **Hyper-V** check box, and then click **Next**.
16. On the **Summary** page, click **Finish**.
17. When the Jobs window displays, wait for it to finish the Create new Cloud task, and then close this window.
18. In the console tree, under **VMs and Services**, under the **Clouds** node, click **DevCloud**.
19. On the ribbon, click the **Overview** button. Review the **Cloud summary** in the details pane, and verify that it contains the capacity values that you just changed.

Task 3: Create the Research private cloud

1. In the Virtual Machine Manager console, in the **Workspace** area, on the lower left, click **VMs and Services**.
2. On the ribbon, click **Create Cloud**. This will bring up the Create Cloud Wizard.
3. In the Create Cloud Wizard, on the **General** page, in the **Name** text box, type **ResCloud**, in the **Description** text box, type **Cloud for the Research Department**, and then click **Next**.

4. On the **Resources** page, in the **Select the resources for this cloud** area, select the **LocalGroup** check box, and then click **Next**.
5. On the **Logical Networks** page, In the Logical networks pane, select the **External Network** check box, and then click **Next**.
6. On the **Load Balancers** page, click **Next**.
7. On the **VIP Templates** page, click **Next**.
8. On the **Port Classifications** page, select the following check boxes, and then click **Next**: **Host management**, **Guest Dynamic IP**, **Medium bandwidth**, **Low bandwidth** and **High bandwidth**.
9. On the **Storage** page, in the Storage classifications pane, select the **Local Storage** check box, and then click **Next**.
10. On the **Library** page, click **Next**.
11. On the **Capacity** page, clear the **Virtual CPUs**: check box, and then in the **Assigned Capacity** text box, type **2**. Clear the **Memory (GB)** check box, and then in the **Assigned Capacity** text box, type **8**. Clear the **Storage (GB)** check box, and then in the **Assigned Capacity** text box, type **1000**. Clear the **Virtual machines** check box, in the **Assigned Capacity** text box, type **3**, and then click **Next**.
12. On the **Capability Profiles** page, select the **Hyper-V** check box, and then click **Next**.
13. On the **Summary** page, at the bottom of the page, click the **Finish** button.
14. When the Jobs window displays, wait for the Create New Cloud task to finish, and then click **Close**.

15. In the console tree, under **VMs and Services**, under the **Clouds** node, click **ResCloud**. On the ribbon, click the **Overview** button.
16. In the details pane, in the **Cloud summary** area, verify that the values for ResCloud contain the capacity values that you changed.

Exercise 2: Working With User Roles

▶ *Task 1: Create the Development department user role*

1. In the Virtual Machine Manager console, in the workspace area in the lower left, click **Settings**.
2. In the Settings console tree, expand the **Security** node, and then click **User Roles**.
3. On the **Home** tab, click the **Create User Role** button.
4. In the Create User Role Wizard, on the **Name and description** page, in the **Name** text box, type **DevRole**, in the **Description** text box, type **User role created for the Development Department**, and then click **Next**.
5. On the **Profile** page, select the **Application Administrator (Self-Service User)** radio button, and then click **Next**.
6. On the **Members** page, click the **Add** button.
7. In the **Select Users, Computers, or Groups** pop-up, in the **Enter the object names to select (examples)** text box, type **Development**, and then click **OK**.
8. Verify that on the **Members** page, in the Members window pane, **ADATUM\Development** displays, and then click **Next**.
9. On the **Scope** page, in the Scope: pane, select the **DevCloud** check box, and then click **Next**.
10. On the **Quotas for the DevCloud cloud** page, at the bottom of the page, in the **Member level quotas** section, in the **Virtual Machines** row, clear the **Use Maximum** column check box. In the **Assigned Quota** column, type **1**, and then click **Next**.

11. On the **Networking** page, click the **Add** button.
12. In the **Select VM Networks** pop-up, select the **External network**, click **OK**, and then, click **Next**.
13. On the **Resources** page, at the bottom of the page, in the **Specify user role data path**, click the **Browse** button.
14. In the **Select Destination Folder** pop-up, click the **MSSCVMMLibrary** node, click **OK**, and then click **Next**.
15. On the **Permissions** page, in the **Select the permitted actions for this user role** section, under the **Name** column, select all of the check boxes, clear the **Receive** and **Share** check boxes, and then click **Next**.
16. On the **Run As accounts** page, click **Next**.
17. **Summary** page, in the **Confirm the settings** section, review the selections, and then click **Finish**.
18. When the Jobs pop-up window displays, wait for all of the jobs to complete, and then close the window.
19. In the Settings console tree, in the **Security** node, under **User Roles**, in the User Roles details pane, click the **DevRole** object. On the ribbon, click the **Properties** button.
20. In the **DevRole Properties** dialog box, review the various properties, and then click **Cancel**.

Task 2: Create the Research department user role

1. In the Virtual Machine Manager console, in the workspace area, in the lower left, click **Settings**.
2. In the Settings console tree, expand the **Security** node, and then click **User Roles**.
3. On the **Home** tab, click **Create User Role**.
4. In the Create User Role Wizard, on the **Name and description** page, in the **Name** text box, type **ResearchRole**, in the **Description** text box, type **User role created for the Research Department**, and then click **Next**.
5. On the **Profile** page, verify that the **Application Administrator (Self-Service User)** radio button is selected, and then click **Next**.
6. On the **Members** page, click the **Add** button.
7. In the **Select Users, Computers, or Groups** pop-up, in the **Enter the object names to select (examples)** text box, type **Research**, and then click **OK**.
8. On the **Members** page, in the Members pane, verify that **ADATUM\Research** displays, and then click **Next**.
9. On the **Scope** page, in the Scope pane, select the **ResCloud** check box, and then click **Next**.
10. On the **Quotas for the ResCloud cloud** page, in the **Member level quotas** section, in the **Virtual Machines**: row, clear the **Use Maximum** column check box, in the **Assigned Quota** column, type **1**, and then click **Next**.
11. On the **Networking** page, click **Add**.
12. In the **Select VM Networks** pop-up, click **External network**, click **OK**, and then click **Next**.
13. On the **Resources** page, click the **Browse** button.
14. In the **Select Destination Folder** pop-up, click the **Host1Library** node, click **OK**, and then click **Next**.
15. On the **Permissions** page, in the **Select the permitted actions for this user role** section, under the **Name** column, select all the check boxes, clear the **Receive** and **Share** check boxes, and then click **Next**.
16. On the **Run As accounts** page, click **Next**.

17. On the **Summary** page, observe the **Confirm the settings** section, review the selections, and then click **Finish**.
18. When the Jobs pop-up window displays, wait for all the jobs to complete and then close the window.
19. In the Settings console tree, in the **Security** node, under **User Roles**, verify that the **ResearchRole** object displays in the User Roles details pane. Click **ResearchRole**, and then on the ribbon, click the **Properties** button.

20. In the **ResearchRole Properties** dialog box, review the various properties, and then click **Cancel**.

Exercise 3: Deploying Virtual Machines to a Private Cloud

▶ *Task 1: Use the Virtual Machine Manager console on LON-CL1 to create virtual machines as a Development department User*

1. Sign in to LON-CL1 as **adatum\ben** with a password of **Pa$$w0rd**. (You may have to wait a moment while the user's profile is created.)
2. On the Start screen, move the mouse pointer directly under the **Desktop** tile. When a round white circle with a white down arrow in it displays, click it.
3. In the Apps by name start screen, scroll to the right until you see the **Microsoft System Center 2012** tile area. Select and then right-click the **Virtual Machine Manager Console** tile. In the Command bar at the bottom of the page, click **Pin to Taskbar**.
4. On the keyboard, tap the **Windows** key.
5. On the Start screen page, click the **Desktop** tile.
6. On the desktop, on the taskbar click the **Virtual Machine Manager Console** icon.
7. In the **Connect to Server** pop-up, in the **Server name** text box, type **LON-VMM1.adatum.com:8100**, and then click **Connect**.
8. When the **Virtual Machine Manager** console displays, maximize it, if it is not already maximized.
9. Note that throughout the console, the objects available to select are very different, or are missing entirely. This is because Ben is only an Application Administrator.
10. In the **Workspace** area, in the lower left, click **VMs and Services**, expand **Clouds**, and then click **DevCloud**.
11. In the Virtual Machine Manager console, on the ribbon click the **Create Virtual Machine** button, and then select **Create Virtual Machine** from the menu.
12. In the Create Virtual Machine Wizard, on the **Select Source** page, select the **Create the new virtual machine with a blank virtual hard disk** radio button, and then, click **Next**.
13. On the **Identity** page, in the **Virtual machine name** text box, type **1stDevCloudVM**. In the description text box, type **First virtual machine in the DevCloud**, and then click **Next**.
14. On the **Configure Hardware** page, in the **Compatibility** section, select the **Hyper-V** check box, and then click **Next**.
15. On the **Select Destinations** page, accept the default **Deploy the virtual machine to a private cloud** radio button, and then click **Next**.
16. On the **Select Cloud** page, wait a moment for VMM to select a destination. Using the mouse, highlight **DevCloud**, and then click **Next**.
17. On the **Add Properties** page, click **Next**.

18. **Summary** page, click the **Create** button.
19. When the job starts, notice that there are multiple steps to create the virtual machine.
20. When the Jobs pop-up window displays, wait until the last job completes, and then close the Jobs pop-up.
21. In the console tree, under **VMs and Services**, under **Clouds**, under **DevCloud**, in the VM's details pane, verify that **1stDevCloudVM** is the only virtual machine on this host.
22. Attempt to make another virtual machine, using the steps above, but change the name to **2ndDevCloudVM** and the description to **Second virtual machine in the DevCloud**.
23. When you reach the **Select Cloud** page in the Create Virtual Machine Wizard, the task will fail.
24. Review the **Details** area below. Click the **Ratings Explanation** tab, and note the line that says, "**The operation results in a violation of the virtual machine count quota for the private cloud.**"
25. Click the **Cancel** button. In the Create Virtual Machine Wizard pop-up, click **Yes**.
26. With the **DevCloud** selected, right-click **1stDevCloudVM**, and then click **Delete**. In the confirmation pop-up, click **Yes**.
27. Close the Virtual Machine Manager console.
28. Sign out of LON-CL1.

▶ *Task 2: Use the Virtual Machine Manager console on LON-CL1 to create virtual machines as a Research department user*

1. Sign in to LON-CL1 as **adatum\hani** with a password of **Pa$$w0rd**. You may have to wait a moment while the user's profile is created.
2. On the Start screen, move the mouse pointer directly under the **Desktop** tile. When a round white circle with a white down arrow in it displays, click it.
3. In the Apps by name start screen, scroll to the right until you see the **Microsoft System Center 2012** tile area. Select and then right-click the **Virtual Machine Manager console** tile. In the **Command bar** at the bottom of the page, click **Pin to Taskbar**.
4. On the keyboard, tap the **Windows** key.
5. On the **Start screen** page, click the **Desktop** tile.
6. On the desktop, on the taskbar click the **Virtual Machine Manager Console** icon.
7. In the **Connect to Server** pop-up, in the **Server name** text box, type **LON-VMM1.adatum.com:8100**, and then click **Connect**.
8. When the Virtual Machine Manager console displays, maximize it, if it is not already maximized.
9. Note that in the Virtual Machine Manager console, the objects available to select are very different, or missing entirely. That is because Hani is only an Application Administrator.
10. In the **Workspace** area in the lower left, click **VMs and Services**, expand **Clouds**, and select **ResCloud**.
11. In the VMM console, on the ribbon, click the **Create Virtual Machine** button and then select **Create Virtual Machine** from the menu.
12. In the Create Virtual Machine Wizard, on the **Select Source** page, select the **Create the new virtual machine with a blank virtual hard disk** radio button, and then click **Next**.
13. On the **Identity** page, in the **Virtual machine name** text box, type **1stResCloudVM**. In the description text box, type **First virtual machine in the ResCloud**, and then click **Next**.
14. On the **Configure Hardware** page, in the **Compatibility** section, select the **Hyper-V** check box, and then click **Next**.

15. On the **Select Destinations** page, accept the default **Deploy the virtual machine to a private cloud** radio button, and then click **Next**.
16. On the **Select Cloud** page, give VMM a moment to select a destination. Using the mouse, highlight **ResCloud**, and then click **Next**.
17. On the **Add Properties** page, click **Next**.
18. On the **Summary** page, click the **Create** button.
19. When the Jobs pop-up window displays, wait for the job to complete, and then close the Jobs pop-up window.
20. In the console tree, under **VMs and Services**, under **Clouds**, and under **ResCloud**, in the VM's details pane, verify that **1stResCloudVM** is the only virtual machine on this host.
21. Attempt to make another virtual machine, using the steps above, but change the name to **2ndResCloudVM** and the description to **Second virtual machine in the ResCloud**.
22. When you reach the **Select Cloud** page in the Create Virtual Machine Wizard, the task will fail. Review the **Details** area on this page, and click the **Ratings Explanation** tab. Note the line that says, "**The operation results in a violation of the virtual machine count quota for the private cloud.**"
23. Click the **Cancel** button. In the Create Virtual Machine Wizard pop-up, click **Yes**.
24. With **ResCloud** selected, right-click **1stResCloudVM**, and then click **Delete**. When the confirmation pop-up displays, click **Yes**.
25. Close the Virtual Machine Manager console.
26. Sign out of LON-CL1.

Managing Services in Microsoft System Center 2012 R2 Virtual Machine Manager and App Controller

Exercise 1: Creating a Service Template

▶ *Task 1: Open the Virtual Machine Manager Service Template Designer with a new service template*

1. Sign in to LON-VMM1 as **adatum\administrator** with the password **Pa$$w0rd**.
2. On the desktop, on the taskbar, click the **Virtual Machine Manage Console** icon.
3. On the **Connect to Server** page, click **Connect**.
4. In Microsoft System Center 2012 R2 Virtual Machine Manager (VMM), in the Virtual Machine Manager console, on the lower left, click the **Library** workspace.
5. On the ribbon, on the **Home** tab, click **Create Service Template**.
6. In the **New Service Template** dialog box, in the **Name** field, type **Lab 12 Service Template**, and then in the **Release** text box, type **1**. In the **Patterns** section, click **Single Machine**, and then click **OK**.
7. In the Virtual Machine Manager Service Template Designer console, note the name selected. Note that **Lab 12 Service Template** is part of the overall name, because this is what you are currently designing, and the numeral 1 is the release version.
8. Note the **Designer canvas** area, which is the central part of the console. Note that this part of the console has the various blocks connected to each other. The text that appears dimmed, highlighted with a large down arrow, gives advice on how you can drag-and-drop various virtual machine templates into the designer. You can do this either in the blank canvas area to make a new tier or onto the existing template to replace its tier.

▶ *Task 2: Use the Service Template Designer to modify a single tier virtual machine*

1. In the Virtual Machine Manager Service Template Designer, click the **Single Tier** box, highlighted with a red circle with an exclamation mark. Note the text below that explains why it has this warning, which is because the template does not include a virtual hard disk or virtual machine network.
2. Right-click the **Single Tier** name text and then from the drop-down list box, click **Properties**.
3. In the **Single Tier properties** dialog box, configure the various pages in the properties, as follows:
    a) On the **General** page, in the Name text window, type **Lab12ServiceVM**. Provide the name and description; prevent the virtual machine from migrating automatically; allow it to be scaled out; and create and availability set for the tier.
    b) On the **Hardware Configuration** page, use the following settings:
        i. In the Compatibility section, select the **Hyper-V** check box.
        ii. In the console tree, directly under **Bus Configuration**, click **IDE Devices**. Click the green plus sign entitled **New**, click **Disk**, and then in the **Virtual Hard Disk details** area, click **Browse**.
        iii. In the **Select a virtual hard disk** pop-up dialog box, click **SmallCore.vhd**, and then click **OK**.
        iv. In the Hardware Configuration console tree, scroll down, and then in the **Network Adapters** section, click **Network Adapt… Not connected**.
        v. In the **Network Adapter 1 (Legacy)** details pane, click the **Connected to a VM network** option, and then click **Browse**.
        vi. In the pop-up window, click **External Network**, and then click **OK**.

Use the **Hardware page** to set the various hardware configurations that you would configure for any new virtual machine in the VMM console.

c) On the **OS Configuration** page, in the **Operating system** drop-down list, click **64-bit edition of Windows Server 2012 Standard**. Note that you can configure the name of the computer, the local administrator password, the product key, and a time zone. Note the **Roles and Features** area. Add roles and features here that can be run on a Windows Server. Also, note that you can join a domain, and that it shows you are in a workgroup currently. Note the **Scripts** area, where you can provide **Answer File** and even **Run Once** commands.

d) On the **Application Configuration** page, note that the **Application profile** list has three sections under it: OS Compatibility, Applications, and Scripts. In the Compatible operating systems available details pane, in the **OS Compatibility** area, note that you can select **none**, **one**, **some**, or **all** check boxes. Select the **64-bit edition of Windows Server 2012 Standard** check box. In the console tree of the **Application Configuration** page, click **Applications**. In the **Application profile** list at the top of the page, click **None – do not install any applications**. Note that clicking this make all previously viewed items on the page appear dimmed.

You use the **Application Configuration** page to add applications and scripts that will run on the virtual machine.

e) On the **SQL Server Configuration** page, note that by default, the SQL Server profile list is set to **None – no SQL Server configuration settings**.

f) On the **Custom Properties** page, note that you can add various custom properties.

g) On the **Settings** page, note that you can specify the number of points to apply towards an owner's virtual machine quota, when a virtual machine is assigned to a self-service user.

h) On the **Dependencies** page, because this is a default template, note that no dependencies have been found.

i) On the **Validation Errors** page, note that any errors would be listed.

j) At the bottom of the **Single Tier Properties** dialog box, click **OK**.

4. In the Service Template Designer canvas area, use the mouse to drag the **External Network** box down beside the **NIC 1** box.
5. Do not close the VMM Service Template Designer.

Exercise 2: Deploying a Service and Updating a Service Template

▶ *Task 1: Deploy the service*

1. In the Service Template Designer, on the **Home** tab, click the **Save and Validate** icon, and then click the **Configure Deployment** icon next to it.
2. In the **Select name and destination** pop-up dialog box, in the **Name** text box, type **Lab 12 Service**, in the **Destination** drop-down list box, ensure that **DevCloud** is selected, and then click **OK**.
3. When the Deploy Service – Lab 12 Service console displays, if you see a pink shaded area in the middle of the screen that indicates that it could not find a host, then click **Refresh Preview** on the ribbon.
4. Verify that the Designer pane in the center window shows that the service starts in **DevCloud**. Under the **Service Tier** icon, click the random name, and then in the bottom center window, in the **VM name** and **Computer Name** boxes, type **Lab12ServiceVM**.
5. On the ribbon, click the **Deploy Service** icon.
6. In the Deploy service pop-up window, click **Deploy**.

7. In the Jobs window, verify that the **Create Service Instance** job displays and is running. This will take approximately 30 minutes to complete.
8. When the job completes, close the Jobs window.
9. In the **VMs and Services** workspace, in the VMs and Services console tree, expand **Clouds**, and then select **DevCloud**.
10. In the ribbon, in the **Show** tab, select **VMs**. In the **VMs** details pane, note that the **Lab12ServiceVM** virtual machine is running, and then leave it running.

Task 2: Create an update for the service template

1. In the Virtual Machine Manager console, open the **Library** workspace.
2. In the console tree, expand **Templates**, and then click **Service Templates**.
3. In the Templates details pane, right-click the **Lab 12 Service Template** service template, and then click **Properties**.
4. On the **Lab 12 Service Template Properties** page, click the **Access** page in the console tree, and then in the Access details pane, click **Add**.
5. In the **Select Users** pop-up, select the **DevRole** check box, and then click **OK** twice.

Task 3: Update the service template

1. In the **VMs and Service** workspace, on the **Home** tab, click **Services**.
2. In the Services details pane, click **Lab 12 Service Template**. You may have to expand the size of the **Template Name** column to see the full name of the items listed.
3. On the **Service** tab of the ribbon, click **Set Template**.
4. In the Change Service Template for Lab 12 Service window, on the **Updated Service Template** page, under **Select how to update the service**, click **Replace the current template with an updated template for the service**, and then click **Browse**.
5. In the Select a Service Template Wizard, click **Lab 12 Service Template, Release 1**, click **OK**, and then click **Next**.
6. In the **Settings** page, verify that **No settings to configure** displays, and then click **Next**.
7. On the **Update Method** page, in the drop-down list box, ensure that **Apply updates to existing virtual machines in-place** is selected, and then click **Next**.
8. On the **Updates review** page, select the **Apply the updates to the service immediately after this wizard completes** check box, and then click **Next**.
9. On the **Summary** page, click **Finish**.
10. When the Jobs window displays, wait until the servicing job completes, and then close the Jobs window.

Exercise 3: Configuring App Controller

Task 1: Connect App Controller to VMM

1. On LON-VMM1, click to the Start screen, and then click **App Controller**.
2. In Windows Internet Explorer, on the **App Controller sign-in** webpage, type
3. **Adatum\Administrator** as the User name and **Pa$$w0rd** as the Password, and then click **Sign In**.
4. On the **Overview** page, under **Private Clouds**, click **Connect a Virtual Machine**.
5. On the **Add a new VMM connection** page, provide the following settings, and then click **OK**:
   - Connection name: **Adatum**
   - Server name: **LON-VMM1.adatum.com**
6. Verify that the **App Controller** webpage loads with data displaying under the **Private Clouds** section.

Task 2: Load App Controller on LON-CL1

1. Sign in to **LON-CL1** as **adatum\administrator** with the password **Pa$$w0rd**.
2. On the Start screen, click the **Desktop** tile.

3. In the Taskbar, click the **File Explorer** icon.
4. In File Explorer, right-click **This PC** in the console tree, and then select **Properties**.
5. In the console tree of the System window, click **Remote settings**.
6. In System Properties, ensure that you are in the **Remote** tab, and then in the **Remote** tab, click the **Select Users** button.
7. In the Remote Desktop Users pop-up window, click the **Add** button.
8. In the Select Users and Groups pop-up window, in the text box, type **adatum\ben; adatum\hani**, and then click the **Check names** button.
9. In the Multiple Names Found pop-up window, select **Ben Martens**, and then click **OK** four times.
10. Close the System window, and then sign out of **LON-CL1**.
11. Sign in to **LON-CL1** as **adatum\ben** with the password **Pa$$w0rd**.
12. On the Start screen, click the **Desktop** tile, and then on the taskbar, click the **Internet Explorer** icon.
13. Maximize the Internet Explorer window, and in the address bar, type **https://lon-vmm1.adatum.com/**and then press Enter.
14. In the **There is a problem with this websites security** certificate, click the **Continue to this website** hyperlink.
15. On the bar on the bottom that specifies Microsoft Silverlight is not compatible, click **Run Control**, and then click **Continue to this website**.
16. On the **App Controller** web portal page, in the **User name** text box, type **adatum\ben**, and in the **Password** text box, type **Pa$$w0rd**, and then click **Sign In**.

► *Task 3: Explore the functionality of the App Controller web page*

1. On the App Controller Overview web portal page, in the Status area, under Private Clouds, click the 1 Virtual Machine Manager cloud hyperlink.
2. In the Clouds area of the console tree, verify that DevCloud displays.
3. Click the Internet Explorer back arrow.
4. On the App Controller Overview web portal page, in the Status area, under Private Clouds, click the X (where X is a number 0-n) Virtual Machine hyperlink.
5. If a virtual machine exists, perform the following steps:
   a) Write down the name of the virtual machine.
   b) Return to LON-VMM1.
   c) In the VMM manager console, remain signed on as **Adatum\administrator**, and then click the **VM and Services** workspace.
   d) In the VMs details pane, find and right-click the virtual machine from step a.
   e) Click **Delete**, and then click **Yes** two times in the Virtual Machine Manager pop-up windows.
   f) Return to LON-CL1, where you are signed on as **Adatum\Ben**.
   g) In the Virtual Machines detail pane of App Controller, click the **Refresh** icon, which is highlighted with a green circular arrow. The virtual machine should not appear in the list.
6. In the console tree, click the **Library** node. Review the additional console tree that now displays in the middle of the screen. Verify that the details pane to the right displays the Lab 12 Service Template that you created in Exercise 1.
7. In the main console tree, click the **Jobs** item that shows the different jobs that have been run in the **App Controller**. If no jobs have been performed, the details pane will be empty.
8. Do not close or sign out of the **App Controller** page.

Exercise 4: Deploying a Virtual Machine in App Controller

▶ *Task 1: Deploy the Lab 12 Service Template*

1. On the **App Controller Overview** web portal page, in the console tree, click **Library**.
2. In the middle console tree that appears, click the **Templates** node. In the details pane to the right, right-click **Lab 12 Service Template**, and in the drop-down list box, click **Deploy**.
3. In the New Deployment design view window, in the **Cloud** box, click the **Configure** hyperlink.
4. In the Select a cloud for this deployment window, notice that **DevCloud** is the only cloud to display, and then click **OK**.
5. Notice that in the design view, two more boxes are added: **Service**, and **Machine Tier** with an **Instance** box in it. Note that both the **Service** and **Instance** box have a **Configure** hyperlink. In the **Service** box, click the **Configure** hyperlink.
6. In the Properties of Lab 12 Service Template window, in the **Service name** box, type **AppCServiceDevCloud**, and then click **OK**.
7. In the **Instance** box, click the **Configure** hyperlink.
8. In the Properties of new virtual machine window, note that you cannot change the virtual machine name, and then click **OK**. The computer name will be generated randomly.
9. In the New Deployment window, in the lower-right corner, click **Deploy**. Click the **VMM service deployment started** hyperlink
10. In the **Jobs** node, wait for the job to finish. It may take approximately 15 to 20 minutes to finish the deployment. If the service instance takes longer than 15 minutes, switch to the host machine that is hosting the new service, and then in the Hyper-V console, view the virtual machine.
11. While you are waiting for the job to finish, open the LON-VMM1 virtual machine, and then in the VMM console, click the **Jobs** workspace.
12. In the console tree, click the **Running** node. Verify that you see a **Create Service Instance** that is running. Because this job takes a long time to finish, do not wait for it to finish, but proceed to the next step.
13. Switch back to **LON-CL1**, and in the **App Controller** console tree, click the **Virtual Machines** node. After several minutes, you will see a new virtual machine with a name of a long string of letters and numbers, which is the randomly generated name. Verify that the virtual machine has a status of **Running**.
14. On the **App Controller** web portal page, on the upper right, click the **Sign out** hyperlink.
15. Close Internet Explorer, and then sign out of LON-CL1.
16. On LON-VMM1, close all open windows, and then sign out of LON-VMM1.