Migrating a Virtual Machine to Azure

Lab Visualization
The following diagram illustrates what we will build in this lab.

![Diagram of Hyper-V and Azure integration](image)

### Lab Overview
In this lab, you will walk through the process of migrating a Hyper-V based virtual machine to Azure. This will be a four-step process where you will first convert the virtual disk format to the proper type. Then you will prepare the virtual machine by running a series of commands on it as well as by installing the Azure VM Agent. Next you will upload the virtual machine disk to Azure blob storage. Finally, you will build a virtual machine using the uploaded disk, power on the virtual machine, and validate that it is functional.

### Objectives
- Gain familiarity with the requirements for virtual machines in Azure
- Understand the manual migration process
- Learn about tool that can aid in migration to Azure

### Prerequisites
- You must have access to a Hyper-V host and administrative rights on the host. This host will require access to the Internet.

### Time Estimate
2 hours and 30 minutes
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Exercise 0: Creating the Lab VM

Overview
In this exercise, you will create a Virtual Machine in Azure that will be used to complete several of the exercises in this lab.

Prerequisites
- RDP port (TCP/UDP 3389) open outbound to the Internet (or to the public IP address of LABVM, created later in this exercise).

Time Estimate
30 minutes

Task 1: Create a Virtual Machine using the Azure Portal
1. Launch a browser and navigate to [https://portal.azure.com](https://portal.azure.com). Once prompted, login with your Microsoft Azure credentials. If prompted, choose whether your account is an organization account or just a Microsoft Account.

   Note: You may need to launch an “in-private” session in your browser if you have multiple Microsoft Accounts.

2. Click on +NEW, and in the search box type in **Visual Studio Community 2017 on Windows Server 2016 (x64)** and press enter. Click the Visual Studio Community 2017 image running on Windows Server 2016 and with the latest update.

3. In the returned search results click the image name.

   ![Search Result](image)

4. In the Marketplace solution blade, at the bottom of the page keep the deployment model set to **Resource Manager** and click Create.
5. Set the following configuration on the Basics tab and click **OK**.

- **Name**: LABVM
- **VM disk type**: SSD
- **User name**: demouser
- **Password**: demo@pass123
- **Subscription**: If you have multiple subscriptions choose the subscription to execute your labs in.
- **Resource Group**: LABRG
- **Location**: Choose the closest Azure region to you.

6. Choose the **DS1_V2 Standard** instance size on the Size blade.

**Note:** You may have to click the View All link to see the instance sizes.
Note: We could use one of the recommended configurations, but if you are using a trial Azure subscription there is a restriction of 4 cores per region. Hence we are choosing a lower configuration. Make sure to not chose a VM from a different family. Use the DS1_V2 Standard as directed.

7. On the Settings blade, enter the following, then click **OK**.
Storage:
Use managed disks: **Yes**

Network:
Virtual network: <Default Setting>
Subnet: <Default Setting>
Public IP address: <Default Setting>
Network security group (firewall): <Default Setting>

Extensions:
Extensions: <Default Setting>

High availability:
Availability set: <Default Setting>

Monitoring:
Boot diagnostics: **Disabled**
Guest OS diagnostics: <Default Setting>

8. On the Summary page click **OK**. The deployment should begin provisioning. It may take 10+ minutes for the virtual machine to complete provisioning.
9. Once the deployment is complete move on to the next exercise.

**Task 2: Prepare LABVM**

1. Move back to the Portal page on your local machine and wait for **LABVM** to show the Status of **Running**. Click **Connect** to establish a new Remote Desktop Session.

   ![Connect button]

   - Resource group (change): OPSLABRG
   - Status: Running
   - Subscription name (change): 
   - Subscription ID: 
   - Computer name: LABVM
   - Operating system: Windows
   - Size: Standard DS1 v2 (1 core, 3.5 GB memory)
   - Public IP address/DNS name label: 13.85.14.63/<none>
   - Virtual network/subnet: OPSLABRG-vnet/default

2. Depending on your remote desktop protocol client and browser configuration you will either be prompted to open an RDP file or you will need to download it and then open it separately to connect. You may also be required to click, **Use a different account**.
3. Login with the credentials specified during creation:
   
a. User: demouser

b. Password: demo@pass123

4. You will be presented with a Remote Desktop Connection warning because of a certificate trust issue. Click, **Don’t ask me again for connections to this computer** and then click **Yes** to continue with the connection.
5. When logging on for the first time you will see a prompt on the right asking about network discovery. Click **No**.

6. Notice that Server Manager opens by default. On the left, click **Local Server**.
7. On the right side of the pane, click **On** by **IE Enhanced Security Configuration**.

8. Change to **Off** for Administrators and click **OK**.

9. In the lower left corner, click Internet Explorer to open it. On first use you will be prompted about security settings. Accept the defaults by clicking **OK**.
10. If prompted, click Don’t show this again regarding protected mode.

**Task 3: Configure the Azure PowerShell cmdlets for your Subscription**

Note: The LABVM you created already has the Azure PowerShell cmdlets installed but we will update the version to ensure the labs work well.

*Note:* Carry out these steps while connected to LABVM via RDP.

1. In Internet Explorer navigate to [https://azure.microsoft.com/en-us/downloads/](https://azure.microsoft.com/en-us/downloads/). In the **PowerShell** section click **Windows install** and choose **Run**.
2. A Web Platform Installer dialog box will open showing the latest version of the Azure PowerShell modules. Click **Install**.

3. On the next dialog, click **I Accept** to accept the license terms for Azure PowerShell.

4. When the install is completed, click **Finish**.
5. Once the installations for Azure PowerShell is complete, click **Exit** and **restart the LABVM**. After **LABVM** has restarted, sign back into it via RDP.
Exercise 1: Create a Virtual Network

Overview
In this exercise, you will create a virtual network in Azure that will provide the core networking of a migrated virtual machine.

Prerequisites
- RDP port (TCP/UDP 3389) open outbound to the Internet (or to the public IP address of LABVM, created later in this exercise).

Time Estimate
15 minutes

NOTE: Accomplish this exercise from either your personal machine or while signed on to LABVM via an RDP session

Task 1: Create a Virtual Network
1. Click the +NEW button in the bottom left of the portal.
2. Click Networking, then Virtual Network.
3. On the Virtual network marketplace page, ensure the deployment model is set to Resource Manager, then click Create.
4. Complete the **Create virtual network** blade with the following information, then click **Create**:
5. Click on **Notifications** (bell icon at the top of the portal, beside **Search resources**) to monitor the status. When complete, move to the next step.
Exercise 2: Create an Azure Storage Account

Overview
In this exercise, you will create an Azure storage account. This storage account will be used to upload your specialized virtual machine disk to, later in this lab.

Prerequisites
- RDP port (TCP/UDP 3389) open outbound to the Internet (or to the public IP address of LABVM, created later in this exercise).

Time Estimate
15 minutes

NOTE: Accomplish this exercise from either your personal machine or while signed on to LABVM via an RDP session

Task 1: Create an Azure Storage Account
1. Click New as before. Then click Storage, and Storage account – blob, file, table, queue.

2. In the Create storage account blade, enter the following, then click Create:

   NOTE: The Name must be unique in all of Azure. To help ensure uniqueness, try entering a meaningful string (like migrationsa) then add several numbers to the end, such as the last 4 digits of your telephone number. When you have entered a name, hit the Tab key and ensure you see a green checkmark beside the name, which validates it is unique.
3. Click on **Notifications** (bell icon at the top of the portal, beside **Search resources**) to monitor the status. When complete, move to the next step.
4. Click on **More services** and in the search dialog, enter **storage**. Then click **Storage accounts**.

5. Click the name of the storage account we just created to open its properties and settings.

6. Under **Settings**, click on **Access keys**. Copy the value in **key1** by clicking the copy button.
7. Open a text editor, such as Notepad, and paste the storage account key there. Also, copy and paste the storage account name into the text editor. We will use this information later in this lab.
Exercise 3: Create a Hyper-V Virtual Machine

Overview
In this exercise, you will create a virtual machine on Hyper-V. This VM will be called WebVM1, and it will have IIS installed. The default IIS site will be customized to show the web server’s name on the page.

Prerequisites
- Access to a Hyper-V host and administrator rights on that host. The Hyper-V host must have access to the Internet.

Time Estimate
60 minutes

NOTE: Accomplish this exercise while signed on to your server or client with the Hyper-V role added

Task 1: Download Evaluation Media

NOTE: If you already have access to a Windows Server 2016 ISO and a product key, then this task can be skipped.

2. Under Windows Server 2016 click Sign In.

3. Once you have signed in, click on Register to continue.
4. Fill out the required sections of the registration, then click Continue.
5. Choose **ISO** then click **Continue**.

6. Choose your product language, then click **Download**.

The download should start automatically. It is approximately 6.5 GB, so it will take some time, depending on your Internet bandwidth. Once the download is complete, ensure the ISO file is either on local storage for your Hyper-V server, or is accessible on the network.
Task 2: Create a Hyper-V VM

1. Open Hyper-V Manager, right-click on your Hyper-V server, and choose New > Virtual Machine...

2. On the Before You Begin page, click Next.

3. On the Specify Name and Location page, enter the name WebVM1, and click Next.
4. On the Specify Generation page, choose Generation 1, and click Next.

5. On the Assign Memory page, choose at least 1024 MB. Uncheck the Use Dynamic Memory… dialog. Click Next.
6. On the Configure Networking page, choose the Connection that will allow to have Internet connectivity. Click Next.

7. On the Connect Virtual Hard Disk page, leave the default settings, and click Next.
NOTE: These settings (*.vhdx and dynamically expanding) will not work in Azure, but part of this course is to learn how to address these incompatibilities where possible.

8. On the **Installation Options** page, choose **Install an operating system from a bootable CD/DVD-ROM**, then select **Image file (.iso)**. Click **Browse** and locate the Windows Server 2016 media you downloaded earlier. Finally, Click **Next**.
9. On the **Completing the New Virtual Machine Wizard** page, click **Finish**.

10. Right-click the new VM in Hyper-V Manager and choose **Connect**.

11. Click to power on the virtual machine.
12. Setup of Windows Server 2016 should start automatically. On the first setup screen, accept the defaults and click **Next**.

13. On the next setup screen, click **Install now**.
14. On the **Select the operating system you want to install** page, choose **Windows Server 2016 Datacenter Evaluation (Desktop Experience)**, and click **Next**.

15. On the **Applicable notices and license terms** page, read the license terms carefully, then check the box beside **I accept the license terms**.
16. On the **Which type of installation do you want** page, choose **Custom: Install Windows only (advanced)**.

17. On the **Where do you want to install Windows** dialog, accept the default and click **Next**.

The install process begins. Once complete, move on to the next section.
Task 3: Install IIS and Customize the Web Site

1. On your newly created Hyper-V VM, set the password, then sign on.

NOTE: Be certain to record the username and password you set in step 1.

1. Open PowerShell by clicking on the Windows button then clicking Windows PowerShell.

2. Run the command `hostname`. Record the name, but do not change it.

3. Server Manager will open automatically. On the left, click Local Server.
4. On the right side of the pane, click **On** by **IE Enhanced Security Configuration**.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last installed updates</td>
<td>Never</td>
</tr>
<tr>
<td>Windows Update</td>
<td>Install updates automatically using Windows Update</td>
</tr>
<tr>
<td>Last checked for updates</td>
<td>Never</td>
</tr>
<tr>
<td>Windows Error Reporting</td>
<td>Off</td>
</tr>
<tr>
<td>Customer Experience Improvement Program</td>
<td>Not participating</td>
</tr>
<tr>
<td>IE Enhanced Security Configuration</td>
<td>On</td>
</tr>
<tr>
<td>Time zone</td>
<td>(UTC) Coordinated Universal Time</td>
</tr>
<tr>
<td>Product ID</td>
<td>00253-50000-00000-AA006 (activated)</td>
</tr>
</tbody>
</table>

5. Change to **Off** for Administrators and click **OK**.

6. To the upper-right, click on **Manage**, then **Add Roles and Features**.
7. Continue through the wizard, accepting defaults, until you come to the **Select server roles** page. Locate and check the box beside **Web Server (IIS)**.

8. A new dialog pops up, showing the role features that are required. Accept the default selections and click **Add Features**.
9. Back on the **Select server roles** page, click **Next**.

10. Continue through the wizard, accepting the defaults, then click **Install**.
11. Wait for the installation to complete, then click **Close** to close the wizard.

12. Click on **File Explorer** on the task bar, then navigate to \C:\inetpub\wwwroot\.

13. Right-click on the HTML document called **iisstart**, and choose **Open with**, then **Notepad**.
14. Within Notepad, click Edit, then Find and enter `<div id="container">`

15. Place your cursor at the end of that line, and hit Enter.

16. On the new line, enter the following: `<h1> WebVM1 </h1> </br>`

17. When the edits are complete, this section of the file should look like the following:

```
```  

18. Save the file and close it.

19. Double-click the file you just edited and saved (iisstart). A browser should open and you should see an Internet Information Services sample page with the server name at the top.
Exercise 4: Prepare the VM for Upload to Azure

Overview
In this exercise, you will prepare the Hyper-V virtual machine to be uploaded to Azure, starting with the conversion of the VM disk from *.vhdx to *.vhd, as well as setting it to static, verses dynamically growing. Then additional preparation will be accomplished on the VM prior to it being uploaded to Azure.

Prerequisites
- Must have completed the previous exercises.

Time Estimate
30 minutes

Task 1: Convert the VM Disk
2. On the Hyper-V server, open PowerShell as an administrator.
3. Convert the *.VHDX dynamic disk to *.VHD with a fixed disk type. Run the following command:

```
convert-vhd -Path <SourcePath> -DestinationPath <DestinationPath> -VHDType Fixed -Verbose
```

For example:

```
convert-vhd -Path 'C:\Users\Public\Documents\Hyper-V\Virtual hard disks\WebVM1.vhdx' -DestinationPath 'C:\Users\Public\Documents\Hyper-V\Virtual hard disks\WebVM1.vhd' -VHDType Fixed -Verbose
```

This command will take some time to run as it must write out the entire size of the virtual disk.

Task 2: Repoint WebVM1 to the VHD
1. Within Hyper-V Manager, right-click WebVM1 and select Settings.

2. Under the Hardware list, click on the Hard Drive. On the right, the path to the virtual hard disk is displayed. Click Browse and choose the new .vhd file that was created in the last task. Then click OK.
1. Select the Hard Drive in the Hardware panel.
2. Click on the Virtual Hard Disk to open the file browser.
3. Select the virtual hard disk file (WebVM1.vhd).
4. Click on Open to select the file.
3. Right-click on WebVM1 and select **Connect**.
4. Within WebVM1’s console, click the power button to power on the VM.

5. Sign on to WebVM1

**Task 3: Prepare WebVM for Upload to Azure**

There are quite a few tasks to complete to prepare our VM for uploading into Azure.

1. Run a command prompt as an administrator, and run the `route print` command. Remove any static persistent routes with the `route delete` command.
2. Remove the WinHTTP proxy by running the command `netsh winhttp reset proxy`.

3. Set the disk SAN policy to Onlineall, by running these commands:

   ```
   diskpart
   san policy=onlineall
   exit
   ```

4. Set Coordinated Universal Time (UTC) time for Windows and the startup type of the Windows Time (w32time) service to Automatically.

   ```
   REG ADD HKLM\SYSTEM\CurrentControlSet\Control\TimeZoneInformation /v RealTimeIsUniversal /t REG_DWORD /d 1
   ```

   ```
   sc config w32time start= auto
   ```

5. Set services startup to Windows default values.

   ```
   sc config bfe start= auto
   sc config dcomlaunch start= auto
   sc config dhcp start= auto
   sc config dnscache start= auto
   sc config IKEEXT start= auto
   sc config iphlpsvc start= auto
   sc config PolicyAgent start= demand
   sc config LSM start= auto
   sc config netlogon start= demand
   sc config netman start= demand
   sc config NcaSvc start= demand
   sc config netprofm start= demand
   sc config NlaSvc start= auto
   sc config nsi start= auto
   sc config RpcSs start= auto
   sc config RpcEptMapper start= auto
   ```

```bash
REG DELETE "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp\SSLCertificateSHA1Hash"
```

7. Configure the KeepAlive values for RDP service.

```bash
REG ADD "HKLM\SOFTWARE\Policies\Microsoft\Windows NT\Terminal Services" /v KeepAliveEnable /t REG_DWORD /d 1 /f

REG ADD "HKLM\SOFTWARE\Policies\Microsoft\Windows NT\Terminal Services" /v KeepAliveInterval /t REG_DWORD /d 1 /f

REG ADD "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v KeepAliveTimeout /t REG_DWORD /d 1 /f
```

8. Configure the authentication mode for the RDP service.

```bash
REG ADD "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v UserAuthentication /t REG_DWORD /d 1 /f

REG ADD "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v SecurityLayer /t REG_DWORD /d 1 /f
```

9. Enable RDP service by adding the following subkeys to the registry.

```bash
sc config termService start= demand
sc config MpsSvc start= auto
sc config WinHttpAutoProxySvc start= demand
sc config LanmanWorkstation start= auto
sc config RemoteRegistry start= auto
```
10. Open a PowerShell console as Administrator (but don’t close the command prompt!)

11. Enable WinRM on the VM.

   `Enable-PSRemoting -force`

12. Back in the command prompt, run the following commands to ensure appropriate firewall rules are in place.

   **Inbound**

   ```powershell
   netsh advfirewall firewall set rule dir=in name="File and Printer Sharing (Echo Request - ICMPv4-In)" new enable=yes
   netsh advfirewall firewall set rule dir=in name="Network Discovery (LLMNR-UDP-In)" new enable=yes
   netsh advfirewall firewall set rule dir=in name="Network Discovery (NB-Datagram-In)" new enable=yes
   netsh advfirewall firewall set rule dir=in name="Network Discovery (NB-Name-In)" new enable=yes
   ```
<table>
<thead>
<tr>
<th>Inbound and Outbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>netsh advfirewall firewall set rule dir=in name=&quot;Network Discovery (Pub-WSD-In)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=in name=&quot;Network Discovery (SSDP-In)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=in name=&quot;Network Discovery (UPnP-In)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=in name=&quot;Network Discovery (WSD EventsSecure-In)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=in name=&quot;Windows Remote Management (HTTP-In)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=in name=&quot;Windows Remote Management (HTTP-In)&quot; new enable=yes</td>
</tr>
<tr>
<td>Outbound</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (LLMNR-UDP-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (NB-Datagram-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (NB-Name-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (Pub-WSD-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (SSDP-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (UPnPHost-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (UPnP-Out)&quot; new enable=yes</td>
</tr>
<tr>
<td>netsh advfirewall firewall set rule dir=out name=&quot;Network Discovery (WSD Events-Out)&quot; new enable=yes</td>
</tr>
</tbody>
</table>
13. Ensure Windows Management Instrumentation (WMI) repository is consistent.

```bash
winmgmt /verifyrepository
```

```
C:\Users\Administrator>winmgmt /verifyrepository
WMI repository is consistent
```

14. Set the Boot Configuration Data (BCD) settings.

```bash
bcdedit /set {bootmgr} integrityservices enable
bcdedit /set {default} device partition=C:
bcdedit /set {default} integrityservices enable
bcdedit /set {default} recoveryenabled Off
bcdedit /set {default} osdevice partition=C:
bcdedit /set {default} bootstatuspolicy IgnoreAllFailures
```

15. Remove any extra Transport Driver Interface filters, such as software that analyzes TCP packets. An example would be WireShark.

16. Ensure the VM disk is healthy

```bash
CHKDSK /f
```

17. Uninstall any other third-party software and driver related to physical components or any other virtualization technology.

18. Make sure that a third-party application is not using Port 3389. Run the following command and review the output carefully.

```bash
netstat -anob
```

19. Install the latest Windows Updates

20. Reboot the VM to make sure that Windows is still healthy can be reached by using the RDP connection.

21. Install the Azure Virtual Machine Agent, accepting all defaults during installation.

   http://go.microsoft.com/fwlink/?LinkId=394789&clcid=0x409

**NOTE:** We did not run SysPrep because this is a **Specialized** image, meaning we are moving a VM into Azure that maintains the user accounts, applications and other state data from your original VM. If this was a **Generalized** image, we would also need to run SysPrep to generalize the operating system.
22. Shut down WebVM1.
23. Within Hyper-V Manager, right-click WebVM1 and choose **Delete**.

**NOTE:** This does not delete the virtual machine disk.

24. Confirm the deletion.
Exercise 5: Upload the VHD and Create an Azure VM

Overview
In this exercise, we will use Azure Storage Explorer to upload the VHD from WebVM1 into the Azure storage account we created in Exercise 3. We will then conclude the lab by creating a virtual machine using this uploaded disk.

Prerequisites
- Must have completed the previous exercises.

Time Estimate
30 minutes

Task 1: Install Storage Explorer and Connect to Storage Account
This task walks through the installation of Storage Explorer and connecting to your storage account.

1. From the Hyper-V server, navigate to http://storageexplorer.com/
2. Choose the version for your platform and install Storage Explorer, accepting all the defaults.
3. Storage Explorer should open after the installation. Click on the green plug icon in the interface.
4. In the Connect to Azure Storage dialog, choose Use a storage account name and key. Click Next.
5. On the **Attach External Storage** page, enter the values you recorded at the end of Exercise 3 (Storage account name and key). Click **Next**.

6. On the **Connection Summary** page, click **Connect**.
7. Under (Local and Attached), expand **Storage Accounts** then expand the storage account we added earlier in this task.

8. Right-click on **Blob Containers** and click **Create Blob Container**.
9. Enter the name **vmdisks** (all lower case) and hit **Enter**.

10. While focused on the new **vmdisks** container, click on **Upload**, then on **Upload Files**.

11. Browse to where the VHD file for WebVM1 is, then click **Open**.
12. Choose a **Blob type of Page Blob**. Then click **Upload**. The default Hyper-V virtual machine is 127 GB, so this will take some time depending on your upload Internet bandwidth. Fortunately, Storage Explorer detects empty blocks and does not upload them, reducing the time significantly.

**Task 2: Create Virtual Machine Using Uploaded Disk**

In this task, we will conclude our lab by creating a virtual machine using the disk we uploaded, and validating that the sample web site is functional, and displays the customizations we added earlier.

1. Launch a browser and navigate to [https://portal.azure.com](https://portal.azure.com). Once prompted, login with your Microsoft Azure credentials. If prompted, choose whether your account is an organization account or just a Microsoft Account.
2. Within the portal, on the left menu, click on **Virtual Machines**. Then click on **LABVM**.
3. Within the properties of **LABVM**, click **Connect**.

4. Depending on your remote desktop protocol client and browser configuration you will either be prompted to open an RDP file or you will need to download it and then open it separately to connect. You may also be required to click, **Use a different account**.
5. Login with the credentials specified during creation:
   
   c. User: **demouser**
   
   d. Password: **demo@pass123**

6. Once the Windows desktop is displayed, click the search button (beside the Windows button), enter in **powershell_ise**, then click the resulting **Windows PowerShell ISE**.
7. Once PowerShell ISE is opened, click the Script dropdown to reveal the script pane.

8. Copy the below PowerShell script code into the script pane (above the blue console pane) of PowerShell ISE.

```powershell
# Login to Azure and choose the correct subscription
Login-AzureRmAccount

# Be sure to replace <UPDATE_LOCATION> with the Azure region you have
# been using in the lab, but retain the double quotes. For example, if
# your the region you have been using was South Central US, then line 20
# should look like this: $location = "South Central US"

$subscriptionId = (Get-AzureRmSubscription | Out-GridView -Title "Select an Azure Subscription and click OK..." -PassThru).SubscriptionId

Get-AzureRmSubscription -SubscriptionId $subscriptionId | Select-AzureRmSubscription

# If you have followed the naming patterns used in the lab guide then no
# further changes should be required.

$location = "<UPDATE_LOCATION>"
$rgName = "WebRG"
$vnetName = "MigrationTrainingVNET"
$vmName = "WebVM1"

# Instantiate the previously created virtual network
```
$vnet = Get-AzureRmVirtualNetwork -Name $vnetName -ResourceGroupName $rgName

# Create Public IP for WebVM1
$ipName = "WebVM1PIP"
$pip = New-AzureRmPublicIpAddress -Name $ipName -ResourceGroupName $rgName -Location $location ` -AllocationMethod Dynamic

# Create NIC for WebVM1
$nicName = "WebVMNic1"
$nic = New-AzureRmNetworkInterface -Name $nicName -ResourceGroupName $rgName -Location $location -SubnetId $vnet.Subnets[0].Id -PublicIpAddressId $pip.Id

# Create Netowrk Security Group for WebVM1, and populate with 2 rules
$nisName = "WebVM1-NSG"

$rdsRule = New-AzureRmNetworkSecurityRuleConfig -Name AllowRDP -Description "Allow RDP" ` -Access Allow -Protocol Tcp -Direction Inbound -Priority 110 ` -SourceAddressPrefix Internet -SourcePortRange * ` -DestinationAddressPrefix * -DestinationPortRange 3389

$hpRule = New-AzureRmNetworkSecurityRuleConfig -Name AllowHTTP -Description "Allow HTTP" ` -Access Allow -Protocol Tcp -Direction Inbound -Priority 120 ` -SourceAddressPrefix Internet -SourcePortRange * ` -DestinationAddressPrefix * -DestinationPortRange 80

$nsg = New-AzureRmNetworkSecurityGroup -ResourceGroupName $rgName -Location $location ` -Name $nisName -SecurityRules $rdsRule,$hpRule

# Set VM name and series/size
$vmConfig = New-AzureRmVMConfig -VMName $vmName -VMSize "Standard_D1_V2"

# Add the NIC to the VM
$vm = Add-AzureRmVMNetworkInterface -VM $vmConfig -Id $nic.Id

# Create a managed disk from the uploaded specialized VHD
$osDisk = New-AzureRmDisk -DiskName "WebVM1OSDisk1" -Disk (New-AzureRmDiskConfig ` -AccountType StandardLRS -Location $location -CreateOption Import ` -SourceUri https://migrationsa0432.blob.core.windows.net/vmdisks/WebVM1.vhd) ` -ResourceGroupName $rgName

# Add the OS Disk to the VM configuration
$vm = Set-AzureRmVMOSDisk -VM $vm -ManagedDiskId $osDisk.Id -StorageAccountType StandardLRS ` -DiskSizeInGB 128 -CreateOption Attach -Windows

# Create the VM
New-AzureRmVM -ResourceGroupName $rgName -Location $location -VM $vm

9. Update line 20 with the Azure region you have been using. This will be the same region where the MigrationTrainingVNET virtual network was created in Exercise 1 of this LAB. For example, if the Azure region used for MigrationTrainingVNET was South Central US then after editing, line 20 should like this:

$location = "South Central US"
10. Read through the script and observe the steps that are being accomplished to create the virtual machine. Notice lines 63 – 67, where a managed disk is created for the Azure VM from the uploaded VHD.

11. Click the **Run Script** button.

12. You will be prompted to sign in. Use the same Microsoft or Organizational account you have used throughout this lab.
13. If prompted, specify whether the account is a Microsoft account or an Organizational account.

14. Select the Azure subscription you are working with, then click **OK**.

**NOTE:** Be careful to select the correct Azure subscription
15. Monitor the progress of the script. It should take approximately 10 minutes to run. You may see warnings. This is fine, if there are no errors.

Task 3: Validate the Functionality of the New VM

In this task, you will validate that the web site is working and that it has the same customizations made in Exercise 3, Task 3. You will also sign into the new VM via RDP.

2. Navigate back to the Azure portal, and click on Resource Groups from the left menu. Then click on the WebRG resource group.
3. Notice there are several new objects in the resource group, including a Network Security Group, a Managed Disk, a virtual machine, etc.

4. Click on the **WebVM1** virtual machine. Locate the **Public IP address** section in the **Essentials** area. Click on the **copy** button to the right of the IP address to, copy it.
5. Open a web browser, and paste the public IP address into the URL section, then hit **Enter**. You should see the customization we made to the Hyper-V VM in Exercise 3, Task 3.  

![Image of Internet Information Services](image)

This validates that this Azure VM is the same VM we had running on-premises, now migrated into Azure.

6. Back in the Azure portal, and still focused on the **Essentials** area of **WebVM1**, click on **Connect**. This will download a pre-configured RDP session. Use this to sign into **WebVM1** using the credentials you recorded in Exercise 3, Task 3, Step 1.
7. Open PowerShell by clicking on the **Windows** button then clicking **Windows PowerShell**.
20. Run the command `hostname`. Notice the name is the same as it was when running on Hyper-V on-premises.

This further validates that this Azure VM is the same VM we had running on-premises, now migrated into Azure.
Exercise 6: Cleanup Azure Resources

Overview
In this exercise, you will clean up the Azure Resources that were created during this lab.

Prerequisites
• None

Time Estimate
15 minutes

Note: Only carry out these steps when you are finished with the lab and no longer desire to review any outcomes from the lab.

Task 1: Delete Azure Resources
1. Within the Azure portal, in the left menu click on Resource Groups. All the resources created during this lab are in the resource groups LABRG and WebRG. Right-click each resource group in turn, and choose Delete.

2. You must confirm the deletion by entering in the name of the resource group you are deleting. Enter the name and click Delete.

Note: This operation cannot be undone.
In this lab, you:

- created a Hyper-V based virtual machine
- customized that virtual machine so that it hosted a sample web site
- prepared the virtual machine for migration to Azure
- migrated the virtual machine to Azure
- validated the virtual machine’s functionality