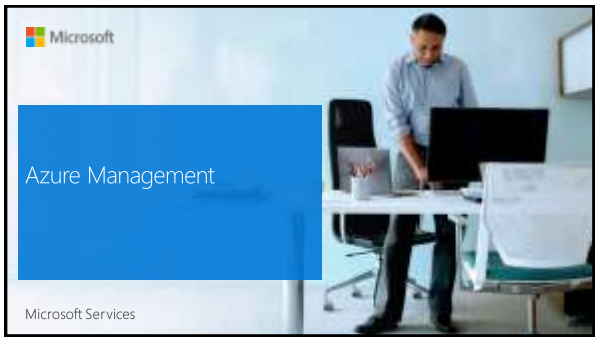



## Agenda

- Prerequisites for PowerShell Management
- Managing Storage Accounts
- Managing Virtual Machines
- Managing Virtual Networks



## What is Azure PowerShell?

- Extension of the Windows PowerShell platform and scripting language
- Provides cmdlets for simplifying and automating the management of Azure services
- Use the cmdlets to create, test, deploy, and manage solutions and services delivered through the Azure platform

## Azure PowerShell benefits

- Benefits to using PowerShell to manage Azure services:
  - Orchestrate various Azure services together
  - Provides great flexibility when interacting with Azure resources
  - Helps in reducing complexity in the code


## Installing Azure PowerShell

- You can install Azure PowerShell:
  - From Microsoft Web Platform (WebPI) Installer
  - From the PowerShell Gallery (ARM)

## Installing from WebPI Installer

- Download WebPI installer and start the install
- The WebPI installer will install the Azure modules in %ProgramFiles(x86)%\Microsoft SDKs\Azure\PowerShell

## Installing from the PowerShell Gallery (ARM)

- Install the Azure Resource Manager modules: `Install-Module AzureRM` Cmdlet will install the Azure modules in %ProgramFiles%\WindowsPowerShell\Modules
- **Note :**
  - You need to use an elevated (Run as Administrator) Windows PowerShell prompt
  - If an error occurs during install, you can manually remove the Azure* folders in your %ProgramFiles%\WindowsPowerShell\Modules folder, and try the installation again
  - Running Cmdlet `Install-Module` requires PackageManagement installation. PackageManagement modules can be installed independently, or they include into Windows Management Framework 5.0 (WMF 5.0). Windows 10 includes this by default.

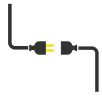
## Check if Azure PowerShell is installed correctly

- Open a standard Windows PowerShell console, or PowerShell Integrated Scripting Environment (PowerShell ISE)
- Once the installation completes, your `$env:PSModulePath` setting should include the directories containing the Azure PowerShell cmdlets
- Azure PowerShell Modules and versions:

```
Get-Module -ListAvailable Azure*
```

## Connecting Your Azure Subscription

- Open up your PowerShell console and type `Login-AzureRMAccount.` Input your credentials to attach your Azure subscription to the Azure PowerShell module.
- `Get-AzureRmSubscription` shows you all of the Azure subscriptions you have setup with PowerShell.
- If you have more than one subscription, you can set the subscription to be default by using the `Select-AzureRmSubscription` cmdlet. This allows you to set both the Azure subscription in your current session as well as all other PowerShell sessions.



## Azure Profile

- `Save-AzureRmProfile -Path C:\AzureProfileFolder\azureprofile.json` will create the file azureprofile.json, which contains some information for your Azure account.

## Azure Profile

- To login with a saved profile use:

```
Select-AzureRmProfile `
-Path C:\AzureProfileFolder\azureprofile.json
```

- When you troubleshoot Azure Profile at some point you would like to remove and/or rewrite default cached profile. You can find it here:
  `"%APPDATA%\Roaming\Windows Azure Powershell\AzureProfile.json"`


## Creating Azure Storage Accounts

- PowerShell Command for creating a storage Account
  `New-AzureRMStorageAccount`
- Command parameters required

- `Resource Group` 
- `SkuName` 
- `Name` 
- `Location` 

## Creating Azure Storage Accounts

Before attempting to create a storage account, you can check to verify the availability of the storage account name in Azure

- Verify the availability of storage account name in Azure
  `Get-AzureRmStorageAccountNameAvailability -Name`
- Example: A new locally redundant ARM storage account

```
New-AzureRMStorageAccount -ResourceGroup ContosoRG1 -Name contosostore1
-SkuName Standard_LRS -Location "East US"
```

## Setting a Default Storage Account

A subscription can have multiple storage accounts. One can be chosen as the default. The default storage account is used as the default for all commands in the same PowerShell session

- PowerShell command to set a default storage account
  `Set-AzureRMCurrentStorageAccount`
- Command parameters required

**- Resource Group** 

**- Name** 

## Creating a Storage Account Context

An Azure storage context is an object in PowerShell to encapsulate the storage account credentials. To create a storage account context, you must obtain the account keys

- PowerShell command for retrieving the storage account keys

```
$storageAccountKey = Get-AzureRmStorageAccountKey
-ResourceGroupName $resourceGroup -Name $storageaccount
```

- PowerShell command for creating storage account context

```
$ctx = New-AzureStorageContext -StorageAccountName $storageaccount
-StorageAccountKey $storageAccountkey.value[0]
```

## Creating a Container

To store blobs/files in Azure storage, you must first create an Azure storage container to store the blobs

To create a storage container with PowerShell you must first do one of the following:

- Choose a desired storage account and set as the default storage account
- Create an Azure storage context for the required storage account

## Creating a Container

- PowerShell command for creating a storage container
  **New-AzureStorageContainer**
- Command parameters required

**Default Storage Account**

- Name 

OR

**Storage Account Context**

-Context 

- Name 

## Uploading VHDs to Azure Storage

- Uploading a VHD to Azure Storage requires you to know the URI of the storage container where the VHD will be stored.
- To gather the URI: Login to the Azure portal and copy the Uri of the storage account and container or use the URI syntax below.

**Container**
Uri Syntax: http://<storage account>.blob.core.windows.net/<container>
Example: http://ContosoStorage1.blob.core.windows.net/VHDUploads

**Blob**
Uri Syntax: http://<storage account>.blob.core.windows.net/<container>/<blob>
Example: http://ContosoStorage1.blob.core.windows.net/VHDUploads/disk1.vhd

## Uploading VHDs to Azure Storage

- PowerShell command for uploading VHDs to storage
  **Add-AzureRMVhd**
- Command parameters required

**- Resource Group** 

**- LocalFilePath** 

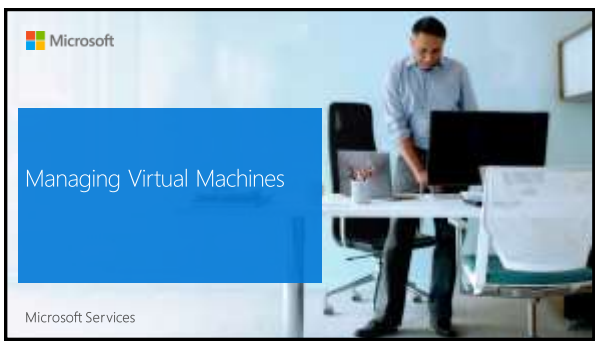
**- Destination** 

## Downloading VHDs from Azure Storage

- PowerShell command for downloading VHD from storage
  **Save-AzureRMVhd**
- Command parameters required
  - **Resource Group** 
  - **LocalFilePath** 
  - **SourceUri** 

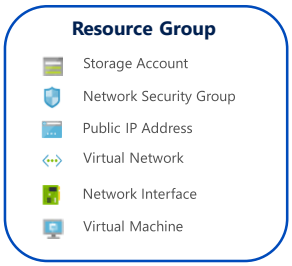
## Removing Azure Storage Accounts

- PowerShell Command for removing a storage Account
  **Remove-AzureRMStorageAccount**
- Command parameters required
  - **Resource Group** 
  - **Name** 



## Creating Azure Virtual Machine

- ✓ Create Resource Group
- ✓ Create Storage Account
- ✓ Create Network Security Group
- ✓ Create Public IP Address
- ✓ Create Virtual Network
- ✓ Create Network Interface
- ✓ Create Virtual Machine Configuration and Virtual Machine




## Creating Azure Virtual Machines

- Step 1: Create Azure Resource Group

```
New-AzureRmResourceGroup -Name -Location
```

- Step 2: Create Azure Storage Account

```
New-AzureRmStorageAccount -ResourceGroupName -Name -SkuName -Kind
 -Location
```

## Creating Azure Virtual Machines

- Step 3: Create Azure Network Security Group

Create network security rule configuration that will be used to create the network security group

```
New-AzureRmNetworkSecurityRuleConfig -Name –Description -Access
-Protocol -SourcePortRange -SourceAddressPrefix
-DestinationPortRange -DestinationAddressPrefix -Direction
-Priority
```

Create network security group using the network security rule configuration

```
New-AzureRmNetworkSecurityGroup -Name -ResourceGroupName
-Location -SecurityRules
```

## Creating Azure Virtual Machines

- Step 4: Create Azure Virtual Network

Create virtual network subnet virtual configuration that will be used to create the virtual network

```
New-AzureRmVirtualNetworkSubnetConfig -Name -AddressPrefix
```

Create Azure Virtual network using the virtual network subnet configuration

```
New-AzureRmVirtualNetwork -Name -ResourceGroupName -Location
-AddressPrefix -Subnet
```

## Creating Azure Virtual Machines

- Step 6: Create Azure Public Address

```
New-AzureRmPublicIpAddress –Name -ResourceGroupName -Location
-AllocationMethod
```

- Step 7: Create Network Interface Card

```
New-AzureRmNetworkInterface -Name –ResourceGroupName
-Location -SubnetId -PublicIpAddressId
```

## Creating Azure Virtual Machines

- Step 8: Get Virtual Machine publisher, Image Offer, Sku and Image

```
Get-AzureRMVMImagePublisher -location
```

```
Get-AzureRMVMImageOffer –location -publisher
```

```
Get-AzureRmVMImageSku –location –publisher -offer
```

```
Get-AzureRmVMImage –location –publisher –offer -sku
```

## Creating Azure Virtual Machines

- Step 9: Create an virtual machine configuration file

This command creates a configurable local virtual machine object for Azure. Store the results as a variable.

```
$VM = New-AzureRmVMConfig -VMName -VMSize
```

Other cmdlets can be used to configure a virtual machine object

- Set the operating system properties - **Set-AzureRmVMOperatingSystem**
- Set the platform image for virtual machine - **Set-AzureRmVMSourceImage**
- Add virtual network interface - **Add-AzureRmVMNetworkInterface**
- Set the operating system disk properties - **Add-AzureRmVMNetworkInterface**

## Creating Azure Virtual Machines

Example: Create an VM configuration file and configure VM object

```
$VM = New-AzureRmVMConfig –VMName $vmname –VMSize “Standard_A1”
$VM = Set-AzureRmVMOperatingSystem -VM $vm -Windows
-ComputerName $compName -Credential $cred -ProvisionVMAgent
-EnableAutoUpdate
$VM = Set-AzureRmVMSourceImage -VM $vm -PublisherName $publisher
-Offer $offer -Skus $sku -Version $image
$VM = Add-AzureRmVMNetworkInterface -VM $vm -Id $nic.Id
$VM = Set-AzureRmVMOSDisk -VM $vm -Name $diskName –VhdUri
$osDiskUri -CreateOption fromImage
```

## Creating Azure Virtual Machines

- Step 10: Create Azure Virtual Machine

This cmdlet creates the virtual machine once all the previous requirements are complete. The –VM parameter accepts the virtual machine configuration that is stored in a variable

```
New-AzureRmVM -ResourceGroupName -Location –VM
```

Example: Creating an Azure Virtual Machine

```
New-AzureRmVM –ResourceGroupName ContosoRG1 –Location “East US”
–VM $VM
```

## Creating Azure Virtual Machines with Generalized Images

- Creating a virtual machine from a generalized image is similar to creating a virtual machine using an Azure image
- The generalized image must be uploaded to an Azure storage account
- No requirement to gather the publisher, offer and sku for virtual machine creation when using a generalized image
- The VM configuration file should point to the generalized Image Uri in storage and not to an Azure VM image

## Creating Azure Virtual Machines with Generalized Images

- Step 1: Upload the generalized image to Azure Storage

```
Add-AzureRMVhd –ResourceGroup –Destination -LocalFilePath
```

## Creating Azure Virtual Machines with Generalized Images

- Step 2: Create Azure Resource Group

```
New-AzureRmResourceGroup -Name -Location
```

- Step 3: Create Azure Storage Account

```
New-AzureRmStorageAccount -ResourceGroupName -Name -SkuName -Kind
 -Location
```

## Creating Azure Virtual Machines with Generalized Images

- Step 4: Create Azure Network Security Group

Create network security rule configuration

```
New-AzureRmNetworkSecurityRuleConfig -Name –Description -Access
-Protocol -SourcePortRange -SourceAddressPrefix
-DestinationPortRange -DestinationAddressPrefix -Direction
-Priority
```

Create network security group using the network security rule configuration

```
New-AzureRmNetworkSecurityGroup -Name -ResourceGroupName
-Location -SecurityRules
```

## Creating Azure Virtual Machines with Generalized Images

- Step 5: Create Azure Virtual Network

Create virtual network subnet virtual configuration

```
New-AzureRmVirtualNetworkSubnetConfig -Name -AddressPrefix
```

Create Azure Virtual network using the virtual network subnet configuration

```
New-AzureRmVirtualNetwork -Name -ResourceGroupName -Location
-AddressPrefix -Subnet
```

## Creating Azure Virtual Machines with Generalized Images

- Step 6: Create Azure Public Address

```
New-AzureRmPublicIpAddress –Name -ResourceGroupName -Location
-AllocationMethod
```

- Step 7: Create Network Interface Card

```
New-AzureRmNetworkInterface -Name –ResourceGroupName
-Location -SubnetId -PublicIpAddressId
```

## Creating Azure Virtual Machines with Generalized Images

- Step 8: Create an virtual machine configuration file

```
$VM = New-AzureRmVMConfig -VMName –VMSize
```

Other cmdlets can be used to configure a virtual machine object

- Set the operating system properties - **Set-AzureRmVMOperatingSystem**
- Set the platform image for virtual machine - **Set-AzureRmVMSourceImage**
- Add virtual network interface - **Add-AzureRmVMNetworkInterface**
- Set the operating system disk properties - **Add-AzureRmVMNetworkInterface**

## Creating Azure Virtual Machines with Generalized Images

**Important:** To Configure the OS disk to be created from the existing VHD image, use the **Set-AzureRMVMOSDIsk** cmdlet

The **–CreateOption** parameter should be set to **fromImage** and the **–SourceImageUri** should point to the Uri of the VHD image

Example:

```
$vm = Set-AzureRmVMOSDisk -VM $vm -Name $osDiskName -VhdUri
$osDiskUri -CreateOption fromImage -SourceImageUri $imageURI
-Windows
```

## Creating Azure Virtual Machines with Generalized Images

- Step 9: Create Azure Virtual Machine

This cmdlet creates the virtual machine once all the previous requirements are complete. The –VM parameter accepts the virtual machine configuration that is stored in a variable

```
New-AzureRmVM -ResourceGroupName -Location –VM
```

## Stopping a Virtual Machine

- PowerShell Command for stopping a virtual machine
  **`Stop-AzureRMVM`**

Use the –StayProvisioned optional parameter to keep VM resources provisioned

- Command parameters required
  - `Resource Group` 
  - `Name` 

## Starting a Virtual Machine

- PowerShell Command for starting a virtual machine
  **`Start-AzureRMVM`**
- Command parameters required
  - `Resource Group` 
  - `Name` 

## Restarting a Virtual Machine

- PowerShell Command for restarting a virtual machine
  **`Restart-AzureRMVM`**
- Command parameters required
  - `Resource Group` 
  - `Name` 

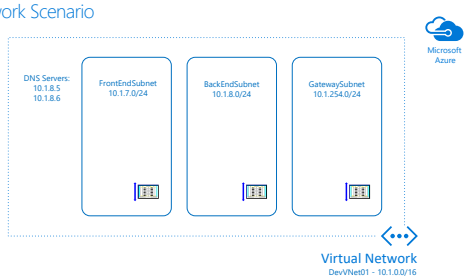
## Deleting a Virtual Machine

- PowerShell Command for deleting a virtual machine
  `Remove-AzureRMVM`
- Command parameters required
  - `Resource Group`
  - `Name`


## Virtual Networks benefits

- Isolation
- Access to the public Internet
- Access to Virtual Machines within the Virtual Network
- Security
- Connectivity

## Network Scenario




## Choose names and locations

- To choose names for Azure objects follow by Naming Rules and Restrictions article
- Run `Get-AzureRMLocation | Select DisplayName` to get a list of available locations.

## Declare variables

- Resource Group name:
  ```
  $RG1 = "TestRG01"
  ```
- Location:
  ```
  $Location = "East US"
  ```
- Virtual Network Name:
  ```
  $VNetName1 = "DevVNet01"
  ```
- Subnets:
  ```
  $SubnetName1 = "FrontEndSubnet"
  $SubnetName2 = "BackEndSubnet"
  $SubnetName3 = "GatewaySubnet"
  ```

## Declare variables

- Virtual Network Prefix:
```
$VNetAddressPrefix = "10.1.0.0/16"
```
- Subnet Prefixes:
```
$SubnetAddressPrefix1 = "10.1.7.0/24"
$SubnetAddressPrefix2 = "10.1.8.0/24"
$SubnetAddressPrefix3 = "10.1.254.0/24"
```
- DNS Servers:
```
$DnsServer = @("10.1.8.5","10.1.8.6")
```

## How to create Virtual Networks

- If necessary, create a Resource Group:

```
New-AzureRmResourceGroup -Name $RG1 -Location $Location `
-Tag @{Dept="IT"; Environment="TestDev"}
```

- Create a new VNet:

```
$vnet01 = New-AzureRmVirtualNetwork -ResourceGroupName $RG1 `
-Name $VNetName1 -AddressPrefix $VNetAddressPrefix `
-Location $location -Tag @{Dept="IT"; Environment="TestDev"}
```

## How to create Virtual Networks

- Add two subnets to the $vnet01 variable:

```
Add-AzureRmVirtualNetworkSubnetConfig -Name FrontEndSubnet `
-VirtualNetwork $vnet01 -AddressPrefix $SubnetAddressPrefix1

Add-AzureRmVirtualNetworkSubnetConfig -Name BackEndSubnet `
-VirtualNetwork $vnet01 -AddressPrefix $SubnetAddressPrefix2
```

## How to create Virtual Networks

- To save the changes to Azure, run:

```
Set-AzureRmVirtualNetwork -VirtualNetwork $vnet01
```

- In an output double check ProvisioningState
  `"ProvisioningState": "Succeeded"`
- To control created VNet:

```
Get-AzureRmVirtualNetwork -ResourceGroupName $RG1 -Name $VNetName1
```

## How to modify VNet configuration

- a) `$vnet01 = Get-…` b) `Add-…` c) `Set-…`
- We will change VNet configuration by adding:
  - Another one subnet object – "GatewaySubnet"
  - Array of DNS servers. Must be an array of up to 10 DNS servers, by IP address

## How to modify VNet configuration

- Read VNet configuration into a variable $vnet01:

```
$vnet01 = Get-AzureRmVirtualNetwork -ResourceGroupName $RG1 `
-Name $VNetName1
```

- Add a new subnet to the $vnet01 variable:

```
Add-AzureRmVirtualNetworkSubnetConfig -Name $SubnetName3 `
-VirtualNetwork $vnet01 -AddressPrefix $SubnetAddressPrefix3
```

## How to modify VNet configuration

- And array of DNS servers to the $vnet01 variable:

```
$vnet01.DhcpOptions.DnsServers = $DnsServer
```

- Save the changes to Azure:

```
Set-AzureRmVirtualNetwork -VirtualNetwork $vnet01
```

## How to delete a Virtual Network

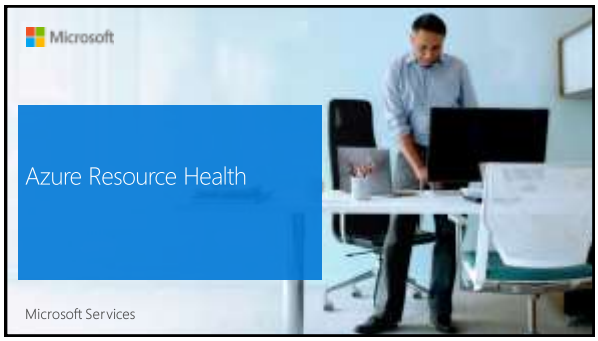
- In order to delete Virtual Network use `Remove-AzureRmVirtualNetwork` cmdlet. By default, the cmdlet prompts you for confirmation. To suppress the prompt, use the `Force` parameter:

```
Remove-AzureRmVirtualNetwork -Name $VNetName1 `
-ResourceGroupName $RG1 -Force
```

- Subnet objects are going to be deleted automatically
- Note, you can delete Resource Group with a VNet object in one cmdlet:

```
Remove-AzureRmResourceGroup -Name $RG1 -Force -Verbose
```

## Demo: Create a Resource Group & Storage Account




## Azure Resource Health

- Azure Resource health helps you diagnose and get support when an Azure issue impacts your resources.
- Provides you with a personalized dashboard of the health of your resources, as opposed to Azure Status which informs you about the global health status of Azure services.
- Shows you all the times your resources were unavailable in the past due to Azure service issues, making it simple for you to understand if an SLA was violated.
- Is a free service.



## Azure Resource Health Statuses

- Available: The service has not detected any events impacting the health of the resource.
- Unavailable: The service has detected an ongoing platform or non-platform event impacting the health of the resource.
  - Platform events: These events are triggered by multiple components of the Azure infrastructure.
  - Non-Platform events: These events are triggered by actions taken by users.
- Access up to 14 days of historical health data in the Resource health blade.

Demo: Azure Resource Health

Microsoft

# Azure Monitor

Microsoft Services

## Azure Monitor

- Azure Monitor is a service that provides a single source for monitoring your Azure resources.
- Visualize, query, route, archive, and take action on the metrics and logs coming from resources in Azure.
- Accessed via Azure portal, PowerShell, Cross-Platform CLI or Azure Monitor REST APIs.

## Azure Monitor Categories

- Activity log: Describes all operations performed on resources in your subscription e.g. who created or deleted a VM.
- Metrics: Provides a single view of all metrics so you can easily understand how your resources are performing.
- Diagnostic logs: Provide data about the operation of a particular resource e.g. NSG Rule Counters.



## Demo: Azure Monitor

Microsoft

## Lab: Automating VM Deployment with PowerShell

Microsoft Services