WorkshopPLUS

Microsoft Azure Infrastructure as a Service (IaaS)

Automating Virtual Machine Deployment with Microsoft Azure PowerShell Cmdlets (ARM)

Student Lab Manual

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# Automating VM Management with Microsoft Azure PowerShell Cmdlets

## Overview

In this hands-on lab you will understand the capabilities of automating the deployment and management of virtual machines in Microsoft Azure.

Note: Rather than typing, you can copy/paste the PowerShell commands from the lab manual to PowerShell ISE, and then execute them.

### Objectives

In this hands-on lab, you will learn how to:

* Create Resource group
* Create Storage Account
* Create availability Set
* Create Azure Load Balancer Set with NAT rules defined
* Provision VM joined to the Azure LB

### Prerequisites

The following is required to complete this hands-on lab:

* Microsoft Azure PowerShell
* A Microsoft Azure subscription - sign up for a free trial (http://aka.ms/WATK-FreeTrial)

## Exercises 1 – Create Load Balancer dependent resources

### Task 1 – Obtain and set your Azure subscription

1. Open PowerShell ISE as an Administrator.
2. In the PowerShell command prompt, log in to your Azure account.

Login-AzureRmAccount

1. Get the available subscriptions by using the following command. If you only have a single subscription, skip to Task 2.

Get-AzureRmSubscription | Sort SubscriptionName | Select SubscriptionName

1. Set your Azure subscription for the current session. Replace everything within the quotes, including the < and > characters, with the correct names.

$subscr="[Your-subscription-name]"  
Get-AzureRmSubscription –SubscriptionName $subscr | Select-AzureRmSubscription

### Task 2 – Create Resource Group

VMs created using the Resource Manager deployment model require a resource group. If needed, create a new resource group for your new virtual machine.

1. Replace everything within the quotes, including the < and > characters, with the correct names.

$rgName="lab5"  
$locName="eastus"  
New-AzureRmResourceGroup -Name $rgName -Location $locName

1. You can use this command to list your existing resource groups.

Get-AzureRmResourceGroup | Sort ResourceGroupName | Select ResourceGroupName

### Task 3 – Create Storage Account

VMs created with the Resource Manager Deployment model require a Resource Manager-based storage account.

1. If needed, create a new storage account for your new virtual machine with these commands. If you copy/paste the commands, be sure to delete “(change the highlighted number…” before executing.

$rgName="lab5"  
$locName="eastus"  
$saName="lab5storage1"

(change the highlighted number if it already exists)

$saType="Standard\_LRS"  
New-AzureRmStorageAccount -Name $saName -ResourceGroupName $rgName –Type $saType -Location $locName

1. You must pick a globally unique name for your storage account that contains only lowercase letters and numbers. You can use this command to list the existing storage accounts.

Get-AzureRmStorageAccount

### Task 4 – Create public domain name label

VMs created with the Resource Manager deployment model can use a public domain name label. The label can contain only letters, numbers, and hyphens. The first and last character must be a letter or number.

1. To test whether a chosen domain name label is globally unique, use these commands.

$domName="lab5ilb"  
$loc="eastus"  
Test-AzureRmDnsAvailability -DomainQualifiedName $domName -Location $locName

If DNSNameAvailability is "True", your proposed name is globally unique. If not, change the name and try again.

### Task 5 – Create Availability set

1. If needed, create a new availability set for the new virtual machine with these commands.

$avName="lab5avset"  
$rgName="lab5"  
$locName="eastus"  
New-AzureRmAvailabilitySet –Name $avName –ResourceGroupName $rgName -Location $locName

1. Use this command to list the existing availability sets.

Get-AzureRmAvailabilitySet –ResourceGroupName $rgName | Sort Name | Select Name

### Task 6 – Create virtual Network

Resource Manager-based virtual machines can be configured with inbound NAT rules to allow incoming traffic from the Internet and be placed in a load balanced set. In both cases, you must specify a load balancer instance and other settings. For more information, see *Create a load balancer using Azure Resource Manager* (https://github.com/Azure/azure-content/blob/master/articles/load-balancer/load-balancer-arm-powershell.md).

VMs created with the Resource Manager deployment model require a Resource Manager virtual network. If needed, create a new Resource Manager-based virtual network with at least one subnet for the new virtual machine.

1. Here is an example for a new virtual network named **TestNet** with two subnets named **frontendSubnet** and **backendSubnet**.

$rgName="lab5"  
$locName="eastus"

$vnetName="lab5Net"

$frontendSubnet=New-AzureRmVirtualNetworkSubnetConfig -Name frontendSubnet -AddressPrefix 10.0.1.0/24

$backendSubnet=New-AzureRmVirtualNetworkSubnetConfig -Name backendSubnet -AddressPrefix 10.0.2.0/24

New-AzureRmVirtualNetwork -Name $vnetName -ResourceGroupName $rgName -Location $locName -AddressPrefix 10.0.0.0/16 -Subnet $frontendSubnet,$backendSubnet

1. Use these commands to list the existing virtual networks.

**$rgName="lab5"**

**$locName="eastus"**

**Get-AzureRmVirtualNetwork -ResourceGroupName $rgName | Sort Name | Select Name**

## Exercise 2 – Create Internet facing Load Balancer

### Task 2 – Create a public IP address

1. Create a public IP address to be used by frontend IP pool:

$rgName="lab5"

$domName="lab5ilb" #use the domain name determined in previous step

$publicipname ="lab5publicip"

$locName="eastus"

$publicIP = New-AzureRmPublicIpAddress -Name $publicipname -ResourceGroupName $rgName -Location $locName –AllocationMethod Dynamic -DomainNameLabel $domName

Get-AzureRMPublicIPAddress –Name $publicipname –ResourceGroupName $rgName

### Task 2 – Create Front end IP pool

1. Using public IP variable ($publicIP), create the front end IP pool.

$frontendIP = New-AzureRmLoadBalancerFrontendIpConfig -Name LB-Frontend -PublicIpAddress $publicIP

### Task 3 – Create back end address pool

1. Set up a back end address pool used to receive incoming traffic from front end IP pool:

$beaddresspool= New-AzureRmLoadBalancerBackendAddressPoolConfig -Name "LB-backend"

### Task 4 – Create NAT Rules

1. Create two inbound NAT rules.

$inboundNATRule1= New-AzureRmLoadBalancerInboundNatRuleConfig -Name "RDP1" -FrontendIpConfiguration $frontendIP -Protocol TCP -FrontendPort 3441 -BackendPort 3389

$inboundNATRule2= New-AzureRmLoadBalancerInboundNatRuleConfig -Name "RDP2" -FrontendIpConfiguration $frontendIP -Protocol TCP -FrontendPort 3442 -BackendPort 3389

### Task 5 – Create health Probe

1. Create a new health probe.

$healthProbe = New-AzureRmLoadBalancerProbeConfig -Name "HealthProbe" -RequestPath "/" -Protocol http -Port 80 -IntervalInSeconds 15 -ProbeCount 2

### Task 6 – Create LB Rules

1. Create a new load balancer rule.

$lbrule = New-AzureRmLoadBalancerRuleConfig -Name "HTTP" -FrontendIpConfiguration $frontendIP -BackendAddressPool $beAddressPool -Probe $healthProbe -Protocol Tcp -FrontendPort 80 -BackendPort 80

### Task 7 – Create Load Balancer

1. Create the load balancer adding all objects (NAT rules, Load balancer rules, probe configurations) together:

$Lab5LB = New-AzureRmLoadBalancer -ResourceGroupName $rgName -Name "lab5-LB" -Location $locName -FrontendIpConfiguration $frontendIP -InboundNatRule $inboundNATRule1,$inboundNatRule2 -LoadBalancingRule $lbrule -BackendAddressPool $beAddressPool -Probe $healthProbe

## Exercise 3 – Create a VM joined to the load balancer

### Task 1 – Build the command set

1. In the **C:\AzureIaaSWS\M7 - Azure Management\Labs\PSManagement-ARM** folder, you will find a **CommandSet.ps1** file. Open this file up in PowerShell ISE.
2. You need to enter the appropriate parameter values in this PS script. Edit the values in lines 2, 3, 4, 7, and 25.

This CommandSet.ps1 file has commands to create the NIC, size and create the VM, add an additional data disk and also set other configuration parameters for the VM.

### Task 2 – Execute the command set to create VMs.

1. Set breakpoint on the first command line by F9 and then execute it line by line by using F10. (Alternatively, select lines 1-9 and press F8.)
2. Execute the remaining lines of the script, providing appropriate values when prompted.

Depending on the region you are deploying to, you may need to modify the command to utilize a different disk size. To determine an available sku, use the following command:

Get-AzureRmComputeResourceSku | where {$\_.Locations -icontains "[region]"}

For additional troubleshooting information, see:

https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-common-deployment-errors

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### Task 3 – Verify the deployment

1. Locate the public IP address of the load balancer lab5-LB (or whatever name you chose).

Get-AzureRmPublicIPAddress -Name “[your-load-balancer-publicIP-name]” -ResourceGroupName $rgName

1. RDP to virtual machine via load balancer by using "mstsc /v:<IP>:3441".

