

Week7: Assignment 1:- Manage Virtual Machines

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Introduction

This report is your guide to the exciting world of Azure virtual machines (VMs) – how to set them up and make them work seamlessly. We are going to focus on making sure they're super reliable, scalable, and check out cool things like Azure virtual machine scale sets. Plus, we will see how to make things even easier with the nifty Azure Virtual Machine Custom Script extension. We will be doing fun stuff like setting up zone-resilient Azure VMs, tweaking VMs with cool extensions, and making sure we scale up our compute and storage game for both VMs and scale sets.

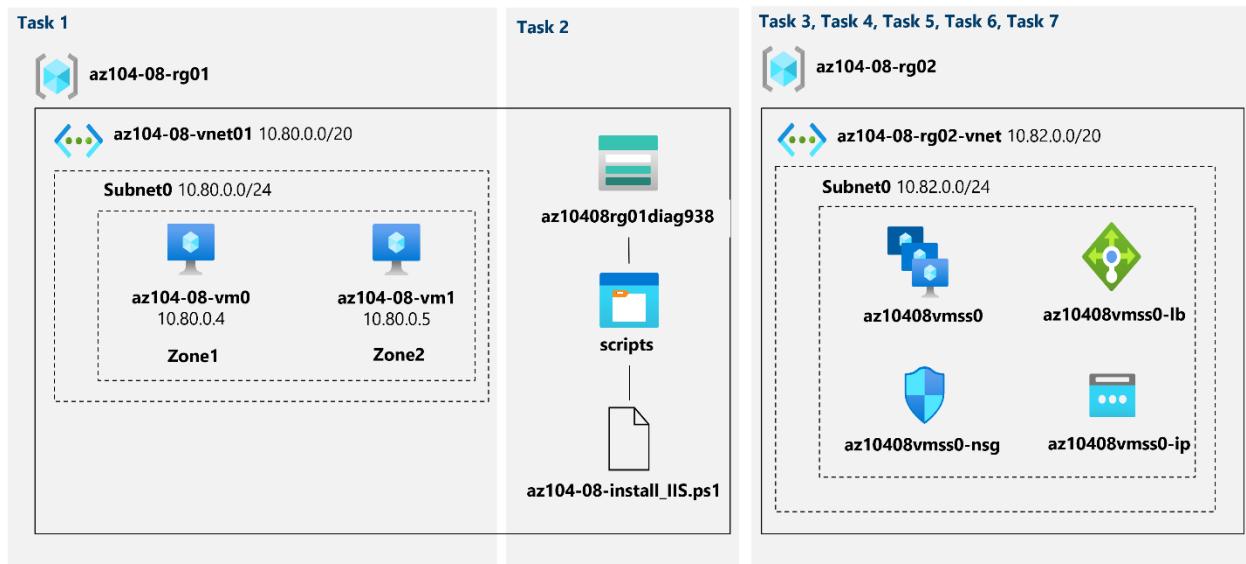
Lab Tasks

Objectives

In this lab, you will:

- ❖ Task 1: Deploy zone-resilient Azure virtual machines by using the Azure portal and an Azure Resource Manager template
- ❖ Task 2: Configure Azure virtual machines by using virtual machine extensions
- ❖ Task 3: Scale compute and storage for Azure virtual machines
- ❖ Task 4: Register the Microsoft.Insights and Microsoft.AlertsManagement resource providers
- ❖ Task 5: Deploy zone-resilient Azure virtual machine scale sets by using the Azure portal
- ❖ Task 6: Configure Azure virtual machine scale sets by using virtual machine extensions
- ❖ Task 7: Scale compute and storage for Azure virtual machine scale sets (optional)

Architecture Diagram



Exercise 1

Task 1: Deploy zone-resilient Azure virtual machines by using the Azure portal and an Azure Resource Manager template

In this task, you will deploy Azure virtual machines into different availability zones by using the Azure portal and an Azure Resource Manager template.

1. Sign in to the [Azure portal](#).
2. In the Azure portal, search for and select **Virtual machines** and, on the **Virtual machines** blade, click **+ Create**, click **+ Azure virtual machine**.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', a search bar, and various icons. The main area is titled 'Virtual machines' under 'Default Directory'. It features a toolbar with filters for 'Subscription equals all', 'Type equals all', 'Resource group equals all', 'Location equals all', and a 'Create' button. Below the toolbar, there are sorting options: 'Name ↑↓', 'Type ↑↓', 'Subscription ↑↓', 'Resource group ↑↓', 'Location ↑↓', 'Status ↑↓', 'Operating system ↑↓', and 'Size ↑↓'. A message 'No virtual machines to display' is centered, accompanied by a small icon of a computer monitor. At the bottom, there's a note: 'Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.' followed by a 'Create' button with the number '1' next to it, and a 'Give feedback' link.

3. On the **Basics** tab of the **Create a virtual machine** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|----------------------|--|
| Subscription | the name of the Azure subscription you will be using in this lab |
| Resource group | the name of a new resource group az104-08-rg01 |
| Virtual machine name | az104-08-vm0 |
| Region | select one of the regions that support availability zones and where you can provision Azure virtual machines |
| Availability options | Availability zone |
| Availability zone | Zone 1 |
| Image | Windows Server 2019 Datacenter - Gen1/Gen2 |
| Azure Spot instance | No |

| Setting | Value |
|---|----------------------------------|
| Size | Standard D2s v3 |
| Username | Student |
| Password | Provide a secure password |
| Public inbound ports | None |
| Would you like to use an existing Windows Server license? | Unchecked |

Microsoft Azure Search resources, services, and docs (G+/-) Home > Virtual machines > Create a virtual machine ...

Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * Azure for Students
Resource group * (New) az104-08-rg01 Create new

Instance details
Virtual machine name * az104-08-vm0
Region * (US) East US
Availability options Availability zone
Availability zone * Zones 1

Review + create < Previous Next : Disks > Give feedback

Microsoft Azure Search resources, services, and docs (G+/-) Home > Virtual machines > Create a virtual machine ...

You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

Security type Trusted launch virtual machines Configure security features
Image * Windows Server 2019 Datacenter - x64 Gen2 See all images | Configure VM generation
VM architecture Arm64 x64 Arm64 is not supported with the selected image.

Run with Azure Spot discount

Size * Standard_DS1_v2 - 1 vcpu, 3.5 GiB memory (\$91.98/month)

Review + create < Previous Next : Disks > Give feedback

4. Click **Next: Disks >** and, on the **Disks** tab of the **Create a virtual machine** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|---------------------------------|--------------------|
| OS disk type | Premium SSD |
| Enable Ultra Disk compatibility | Unchecked |

The screenshot shows the 'Create a virtual machine' blade in the Microsoft Azure portal. The 'Disks' tab is selected. The 'OS disk size' dropdown is set to 'Image default (127 GiB)'. The 'OS disk type' dropdown is set to 'Premium SSD (locally-redundant storage)'. The 'Enable Ultra Disk compatibility' checkbox is unchecked. Other visible settings include 'Delete with VM' checked, 'Key management' set to 'Platform-managed key', and a note that 'Ultra disk is not supported with selected security type.'

5. Click **Next: Networking >** and, on the **Networking** tab of the **Create a virtual machine** blade, click **Create new** below the **Virtual network** textbox.

The screenshot shows the 'Create virtual network' blade in the Microsoft Azure portal. The 'Virtual network' dropdown is set to '(new) az104-08-vm0-vnet' and has a red arrow pointing to the 'Create new' button next to it. Other visible settings include 'Subnet' set to '(new) default (10.0.0.0/2)', 'Public IP' set to '(new) az104-08-vm0-ip' with 'Create new' selected, and 'NIC network security group' set to 'Basic'. The right side of the screen shows the 'Address space' and 'Subnets' configuration.

6. On the **Create virtual network** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|---------------|------------------------|
| Name | az104-08-vnet01 |
| Address range | 10.80.0.0/20 |
| Subnet name | subnet0 |
| Subnet range | 10.80.0.0/24 |

Create virtual network

Name * az104-08-vnet01

Address space

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

| Address range * | Addresses | Overlap |
|-----------------|---|---------|
| 10.0.0.0/16 | 10.0.0.0 - 10.0.255.255 (65536 addresses) | None |
| 10.80.0.0/20 | 10.80.0.0 - 10.80.15.255 (4096 addresses) | None |
| | (0 Addresses) | None |

Subnets

The subnet's address range in CIDR notation. It must be contained by the address space of the virtual network.

| Subnet name | Address range | Addresses |
|-------------|---------------|---|
| default | 10.0.0.0/24 | 10.0.0.0 - 10.0.0.255 (256 addresses) |
| subnet0 | 10.80.0.0/24 | 10.80.0.0 - 10.80.0.255 (256 addresses) |

Review + create < Previous Next : Manage OK Discard

7. Click **OK** and, back on the **Networking** tab of the **Create a virtual machine** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|--|------------------|
| Subnet | subnet0 |
| Public IP | default |
| NIC network security group | basic |
| Public inbound Ports | None |
| Accelerated networking | Off |
| Place this virtual machine behind an existing load balancing solution? | Unchecked |

The screenshot shows the 'Create a virtual machine' blade in the Microsoft Azure portal. The 'Networking' section is visible, containing fields for 'Virtual network', 'Subnet', 'Public IP', 'NIC network security group', and 'Public inbound ports'. The 'Virtual network' dropdown is set to '(new) az104-08-vnet01'. The 'Subnet' dropdown is set to '(new) subnet0 (10.80.0.0/24)'. The 'Public IP' dropdown is set to '(new) az104-08-vm0-ip'. The 'NIC network security group' section has 'Basic' selected. The 'Public inbound ports' section has 'None' selected. A 'Select inbound ports' dropdown is present.

The screenshot shows the 'Create a virtual machine' blade in the Microsoft Azure portal. The 'Advanced networking' section includes checkboxes for 'Delete public IP and NIC when VM is deleted' and 'Enable accelerated networking'. The 'Load balancing' section includes a note about placing the VM in an existing Azure load balancing solution and a 'Load balancing options' dropdown. The 'Load balancing options' dropdown has 'None' selected, with other options like 'Azure load balancer' and 'Application gateway' available. A 'Review + create' button is at the bottom.

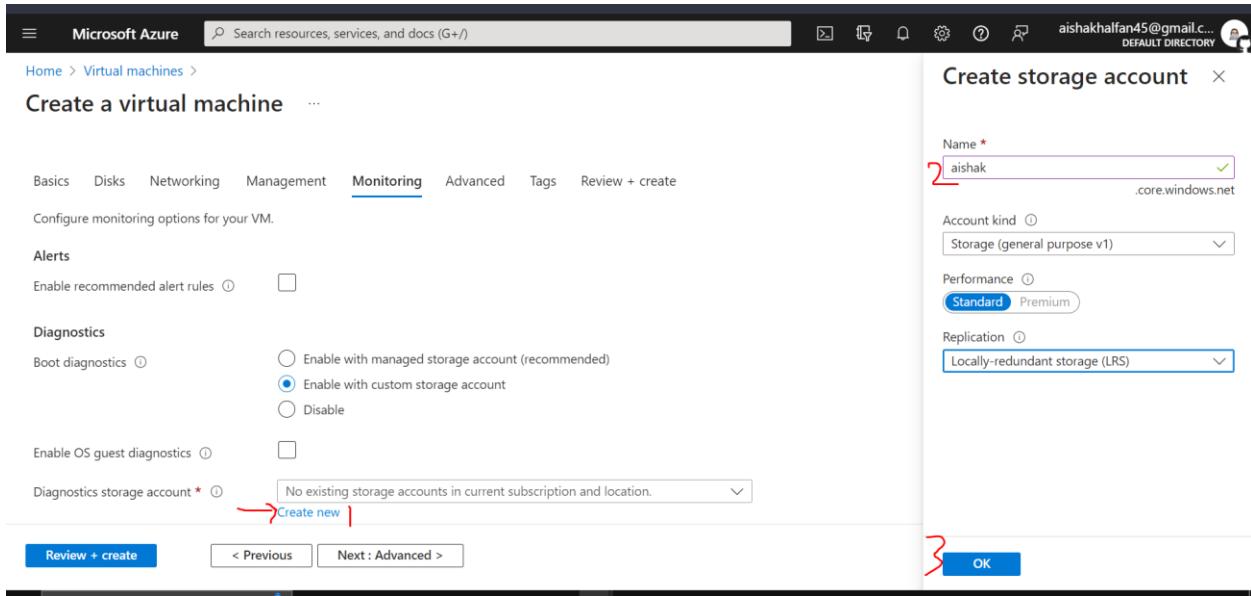
- Click **Next: Management >** and, on the **Management** tab of the **Create a virtual machine** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|-----------------------------|-----------------------|
| Patch orchestration options | Manual updates |

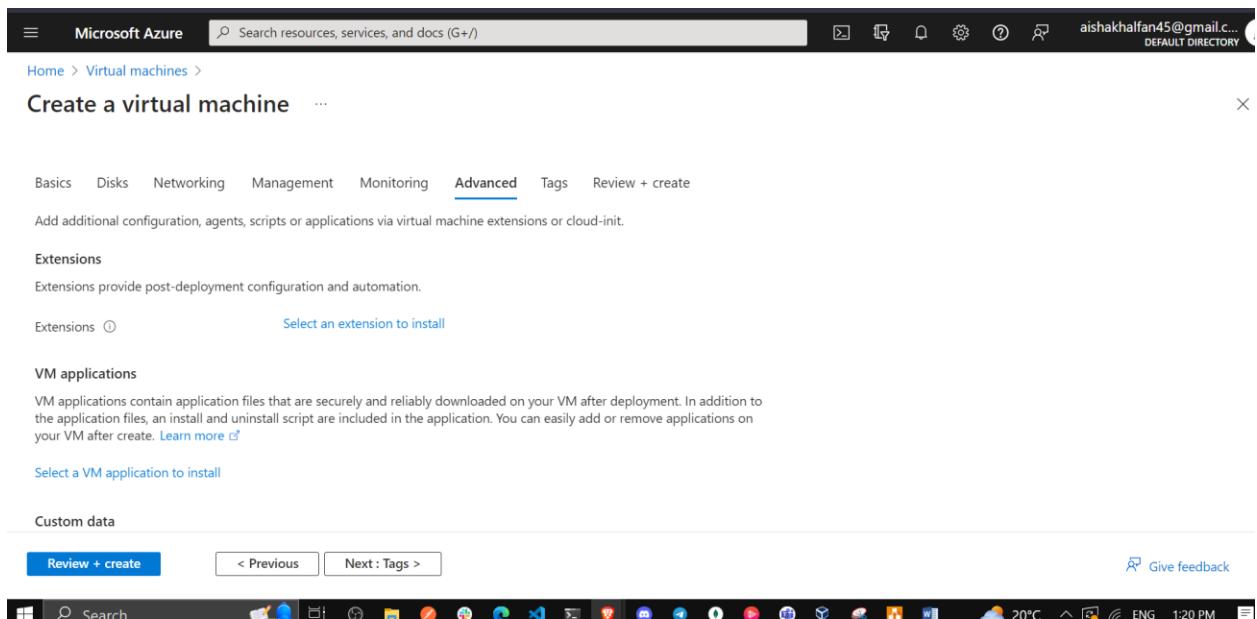
9. Click **Next: Monitoring >** and, on the **Monitoring** tab of the **Create a virtual machine** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|-----------------------------|---|
| Boot diagnostics | Enable with custom storage account |
| Diagnostics storage account | accept the default value |

Note: If necessary, select an existing storage account in the dropdown list or create a new storage account. Record the name of the storage account. You will use it in the next task.



10. Click **Next: Advanced >**, on the **Advanced** tab of the **Create a virtual machine** blade, review the available settings without modifying any of them, and click **Review + Create**.



11. On the **Review + Create** blade, click **Create**.

The screenshot shows two consecutive pages from the Microsoft Azure portal.

Page 1: Create a virtual machine

- Header:** Microsoft Azure, Search resources, services, and docs (G+), aishakhalfan45@gmail.com, DEFAULT DIRECTORY.
- Breadcrumbs:** Home > Virtual machines > Create a virtual machine.
- Section:** Create a virtual machine.
- Status Bar:** Validation passed.
- Tabs:** Basics, Disks, Networking, Management, Monitoring, Advanced, Tags, **Review + create**.
- Note:** Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.
- Price:** 1 X Standard DS1 v2 by Microsoft. Subscription credits apply: 0.1260 USD/hr. Pricing for other VM sizes.
- TERMS:** Create, < Previous, Next >, Download a template for automation, Give feedback.

Page 2: Deployment Overview

- Header:** Microsoft Azure, Search resources, services, and docs (G+), aishakhalfan45@gmail.com, DEFAULT DIRECTORY.
- Breadcrumbs:** Home > CreateVm-MicrosoftWindowsServer.WindowsServer-2021-20231115125813 | Overview.
- Section:** Deployment.
- Blade:** Overview, Inputs, Outputs, Template (selected).
- Message:** Deployment is in progress.
- Details:** Deployment name: CreateVm-MicrosoftWindowsServer.WindowsServer-2021-20231115125813, Start time: 11/15/2023, 1:23:22 PM, Correlation ID: aef9ee29-9d53-4f85-8357.
- Deployment details:** Resource, Type, Status, Operation details. No results.
- Feedback:** Give feedback, Tell us about your experience with deployment.
- Right Panel:** Microsoft Defender for Cloud, Free Microsoft tutorials, Work with an expert.

12. On the deployment blade, click **Template**.

The screenshot shows the Microsoft Azure Virtual Machines dashboard. At the top, there are navigation links like Home, Create, Switch to classic, Reservations, Manage view, Refresh, Export to CSV, Open query, Assign tags, Start, Restart, Stop, and a search bar. Below the header, there are filter options for Subscription, Type, Resource group, and Location. A message says 'Showing 0 to 0 of 0 records.' On the left, there's a table with columns Name, Type, Subscription, and Resource. A red arrow points to the 'Create' button at the bottom of the page. To the right, there's a sidebar with sections for Azure virtual machine, Azure virtual machine with preset configuration, Azure Arc virtual machine, and Azure VMware Solution virtual machine. A red arrow also points to the 'Create' button in the sidebar.

The screenshot shows the 'CreateVm-MicrosoftWindowsServer.WindowsServer-201-20231115125813 | Template' page. It includes tabs for Overview, Inputs, Outputs, and Template (which is selected). The 'Template' tab shows a JSON code editor with a red arrow pointing to the code. The code defines a deployment template with parameters, variables, and resources. The right side of the page shows a deployment status box with a green checkmark and the message 'Deployment succeeded'. Below it, there are 'Go to resource' and 'Pin to dashboard' buttons.

- Review the template representing the deployment in progress and click **Deploy**.

Note: You will use this option to deploy the second virtual machine with matching configuration except for the availability zone.

14. On the **Custom deployment** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|--|----------------------------------|
| Resource Group | az104-08-rg01 |
| Network Interface Name | az104-08-vm1-nic1 |
| Public IP Address Name | az104-08-vm1-ip |
| Virtual Machine Name, Virtual Machine Name1, Virtual Machine Computer Name | az104-08-vm1 |
| Virtual Machine RG | az104-08-rg01 |
| Admin Username | Student |
| Admin Password | Provide a secure password |
| Enable Hotpatching | false |
| Zone | 2 |

Note: You need to modify parameters corresponding to the properties of the distinct resources you are deploying by using the template, including the virtual machine and its network interface.

Microsoft Azure ... aishakhalfan45@gmail.com DEFAULT DIRECTORY

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20231115125813 | Template >

Custom deployment ...

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →
manage all your resources.

Subscription * az104-08-rg01

Resource group *

Instance details

Region *

Location *

Network Interface Name1 *

Network Security Group Name *

Network Security Group Rules *

<https://portal.azure.com/#>

Microsoft Azure ... aishakhalfan45@gmail.com DEFAULT DIRECTORY

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20231115125813 | Template >

Custom deployment ...

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →

Network Security Group Name *

Network Security Group Rules *

Subnet Name *

Virtual Network Name *

Address Prefixes *

Subnets *

Public Ip Address Name1 *

Public Ip Address Type *

Public Ip Address Sku *

<https://portal.azure.com/#>

Pip Delete Option * Detach

Virtual Machine Name * az104-08-vm1

Virtual Machine Name1 * az104-08-vm1

Virtual Machine Computer Name1 * az104-08-vm1

Virtual Machine RG * az104-08-rg01

Os Disk Type * Premium_LRS

Os Disk Delete Option * Delete

Virtual Machine Size * 1x Standard DS1 v2
1 vcpu, 3.5 GB memory [Change size](#)

[Previous](#) [Next](#) [Review + create](#)

<https://portal.azure.com/#>

15. Click **Review + Create**, on the **Review + Create** blade, click **Create**.

Note: Wait for both deployments to complete before you proceed to the next task. This might take about 5 minutes.

Basics [Review + create](#)

Summary

Custom template 6 resources

Terms

[Azure Marketplace Terms](#) | [Azure Marketplace](#)

By clicking "Create," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

Microsoft assumes no responsibility for any actions performed by third-party templates and does not provide rights for third-party products or services. See the [Azure Marketplace Terms](#) for additional terms.

[Previous](#) [Next](#) [Create](#)

The screenshot shows the Microsoft Azure portal with a deployment progress window open. The title bar says "Microsoft Azure" and the search bar says "Search resources, services, and docs (G+/-)". The user's email "aishakhalfan45@gmail.c..." and "DEFAULT DIRECTORY" are visible in the top right. A message box in the center says "Deployment is in progress..." with the note "Deployment to resource group 'az104-08-rg01' is in progress." On the left, there's a sidebar with "Overview", "Inputs", "Outputs", and "Template". The main content area shows deployment details for "Microsoft.Template-20231115134759". It lists the deployment name, subscription ("Azure for Students"), correlation ID, and resource group ("az104-08-rg01"). Below this, a table shows deployment details for five resources: "az104-08-vm1" (Virtual machine, Status: Created), "az104-08-vm1-nic1" (Network interface, Status: Created), "az104-08-vm1-ip" (Public IP address, Status: OK), "aishak" (Storage account, Status: OK), and "az104-08-vnet01" (Virtual network, Status: OK). To the right, there are links for Microsoft Defender for Cloud, Free Microsoft tutorials, Work with an expert, and Find an Azure expert.

Task 2: Configure Azure virtual machines by using virtual machine extensions

In this task, you will install Windows Server Web Server role on the two Azure virtual machines you deployed in the previous task by using the Custom Script virtual machine extension.

1. In the Azure portal, search for and select **Storage accounts** and, on the **Storage accounts** blade, click the entry representing the diagnostics storage account you created in the previous task.

The screenshot shows the Microsoft Azure portal with the "Storage accounts" blade open. The title bar says "Microsoft Azure" and the search bar says "Search resources, services, and docs (G+/-)". The user's email "aishakhalfan45@gmail.c..." and "DEFAULT DIRECTORY" are visible in the top right. The main content area shows a table of storage accounts. The columns are: Name, Type, Kind, Resource group, Location, and Subscription. There are two entries: "aishak" (Storage account, Storage kind, az104-08-rg01 location, East US subscription) and "csb100320003b962555" (Storage account, StorageV2 kind, cloud-shell-storage-weste... location, West Europe subscription). At the bottom, there are navigation buttons for "Page 1 of 1" and "Next >".

The screenshot shows the Microsoft Azure Storage accounts blade. On the left, there's a navigation pane with 'Storage accounts' and a search bar. The main area displays the 'aishak' storage account details. The 'Monitoring (classic)' section includes Metrics (classic), Diagnostic settings (classic), and Usage (classic). The 'Automation' section includes Tasks (preview) and Export template. The 'Help' section includes Resource health, Connectivity check, Recover deleted account, and Support + Troubleshooting. On the right, the 'Essentials' tab is selected, showing detailed information: Resource group (az104-08-rg01), Location (eastus), Subscription (Azure for Students), Subscription ID (3dbbb8d5-1829-48d8-a51d-c7f11b061059), Disk state (Available), and Tags (edit). Below the essentials, there are tabs for Properties, Monitoring, Capabilities (5), Recommendations (0), and Tutorials.

2. On the storage account blade, in the **Data Storage** section, click **Containers** and then click **+ Container**.

The screenshot shows the 'Containers' section of the storage account blade. The left sidebar has a 'Data storage' category with 'Containers' selected. The main area shows a table of existing containers:

| Name | Last modified | Anonymous access | Lease state |
|------------------------------|-------------------------|------------------|-------------|
| bootdiagnostics-az10408vm... | 11/15/2023, 1:24:02 ... | Private | Available |
| bootdiagnostics-az10408vm... | 11/15/2023, 1:48:36 ... | Private | Available |

3. On the **New container** blade, specify the following settings (leave others with their default values) and click **Create**:

| Setting | Value |
|---------------------|--------------------------------------|
| Name | scripts |
| Public access level | Private (no anonymous access) |

The screenshot shows the Microsoft Azure Storage accounts blade for the 'aishak' account. In the center, the 'Containers' section is displayed under the 'Data storage' category. A new container named 'scripts' is being created, as indicated by the 'New container' dialog box on the right. The 'scripts' container is highlighted with a red box.

4. Back on the storage account blade displaying the list of containers, click **scripts**.

The screenshot shows the Microsoft Azure Storage accounts blade for the 'aishak' account. The 'Containers' section is displayed under the 'Data storage' category. The 'scripts' container is selected and highlighted with a red box. The table below shows the list of containers:

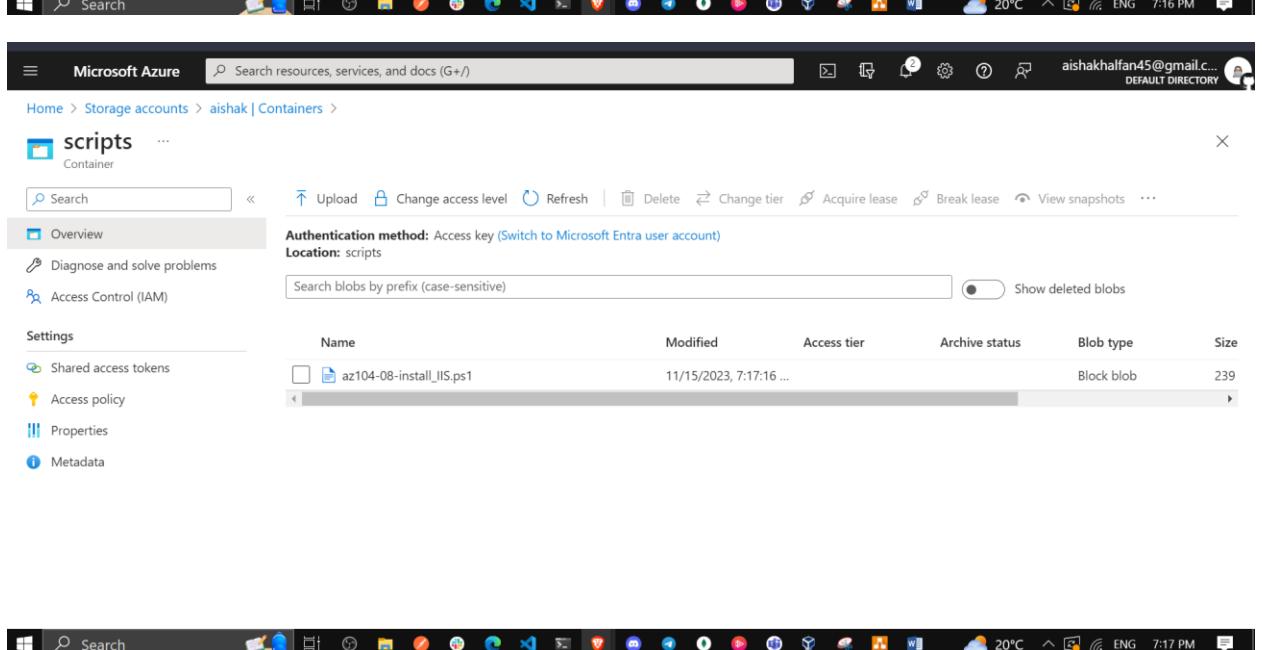
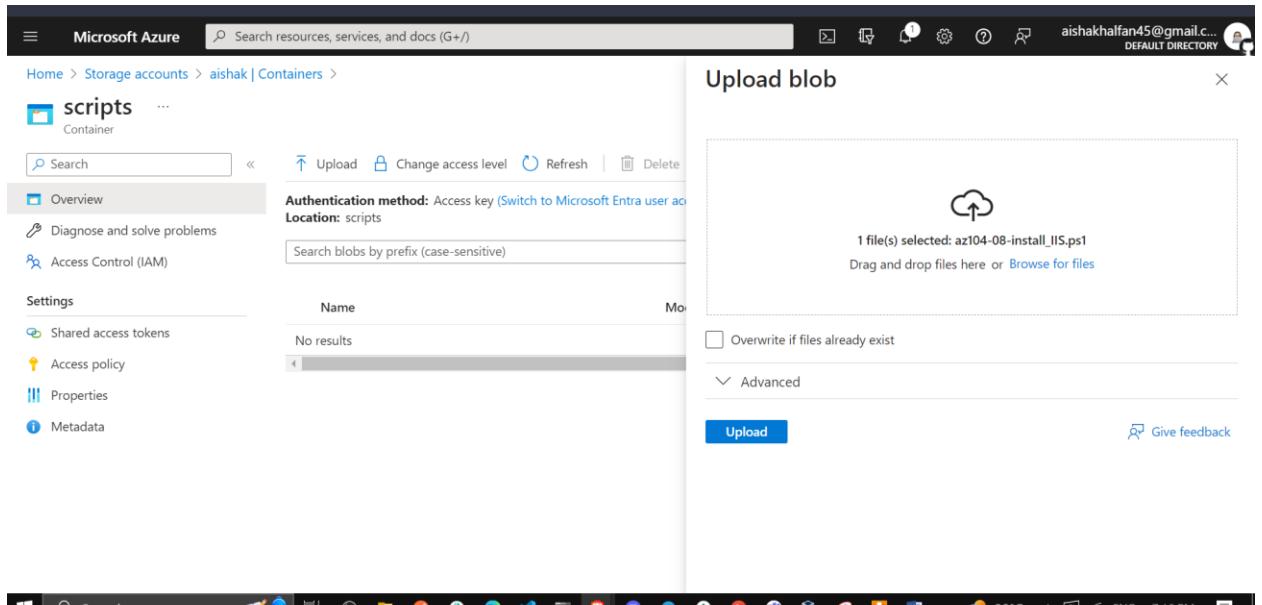
| Name | Last modified | Anonymous access l... | Lease state |
|------------------------------|-------------------------|-----------------------|-------------|
| bootdiagnostics-az10408vm... | 11/15/2023, 1:24:02 ... | Private | Available |
| bootdiagnostics-az10408vm... | 11/15/2023, 1:48:36 ... | Private | Available |
| scripts | 11/15/2023, 7:09:29 ... | Private | Available |

5. On the **scripts** blade, click **Upload**.

The screenshot shows the Microsoft Azure Storage Accounts interface. The top navigation bar includes 'Microsoft Azure', a search bar, and user information 'aishakhalfan45@gmail.com DEFAULT DIRECTORY'. Below the navigation is a breadcrumb trail: Home > Storage accounts > aishak | Containers > scripts. The main area shows a 'Container' named 'scripts'. On the left, there's a sidebar with 'Overview', 'Diagnose and solve problems', 'Access Control (IAM)', 'Settings' (with options like Shared access tokens, Access policy, Properties, and Metadata), and a 'Search' bar. The main content area has tabs for 'Name', 'Modified', 'Access tier', 'Archive status', 'Blob type', and 'Size'. A message at the top says 'Authentication method: Access key (Switch to Microsoft Entra user account)' and 'Location: scripts'. A search bar below it allows searching by prefix. A 'Show deleted blobs' toggle is also present. The central part of the screen displays a table with one row: 'No results'.

6. On the **Upload blob** blade, click the folder icon, in the **Open** dialog box, navigate to the **\Allfiles\Jobs\08** folder, select **az104-08-install_IIS.ps1**, click **Open**, and back on the **Upload blob** blade, click **Upload**.

The screenshot shows the 'Upload blob' blade in the Microsoft Azure portal. The blade has a title 'Upload blob' with a close button. It features a cloud icon and the text 'Drag and drop files here or Browse for files'. Below this is a checkbox for 'Overwrite if files already exist'. At the bottom are 'Advanced' and 'Upload' buttons, with a 'Give feedback' link. To the left of the blade, an 'Open' file dialog is displayed. The dialog shows a file list with several items, including 'az104-08-configure_VMSS_disks', 'az104-08-custom_script_extension', 'az104-08-install_IIS' (which is highlighted with a red arrow and a red wavy underline), and 'lab08diskcode'. The file path in the dialog is '\Allfiles > Labs > 08'. The file name field in the dialog is set to 'az104-08-install_IIS'. The background of the screenshot shows a Windows taskbar with various icons and a system tray indicating the date and time.



7. In the Azure portal, search for and select **Virtual machines** and, on the **Virtual machines** blade, click **az104-08-vm0**.

The screenshot shows the Microsoft Azure portal's Virtual machines page. At the top, there is a search bar and a navigation bar with options like 'Create', 'Switch to classic', 'Reservations', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', 'Assign tags', 'Start', 'Restart', 'Stop', and a 'More' dropdown. Below the search bar, there are filter buttons for 'Subscription equals all', 'Type equals all', 'Resource group equals all', 'Location equals all', and a 'Add filter' button. A message indicates 'Showing 1 to 2 of 2 records.' The main table lists two virtual machines:

| Name | Type | Subscription | Resource group | Location | Status | Operating system | Size |
|--------------|-----------------|--------------------|----------------|----------|---------|------------------|-----------------|
| az104-08-vm0 | Virtual machine | Azure for Students | AZ104-08-RG01 | East US | Running | Windows | Standard_DS1_v2 |
| az104-08-vm1 | Virtual machine | Azure for Students | az104-08-rg01 | East US | Running | Windows | Standard_DS1_v2 |

At the bottom, there are navigation buttons for 'Page 1 of 1' and a 'Give feedback' link.

8. On the **az104-08-vm0** virtual machine blade, in the **Settings** section, click **Extensions + applications**, and then click **+ Add**.

The screenshot shows the details of the 'az104-08-vm0' virtual machine. On the left, there is a sidebar with options like 'Connect', 'Windows Admin Center', 'Disks', 'Size', 'Microsoft Defender for Cloud', 'Advisor recommendations', 'Extensions + applications' (which is highlighted with a red box), 'Availability + scaling', 'Configuration', 'Identity', 'Properties', 'Locks', and 'Operations'. The main pane shows the 'Extensions + applications' section with tabs for 'Extensions' and 'VM Applications'. It includes a search bar, a 'Search to filter items...' bar, and a message 'Showing all 0 items'. A table at the bottom lists extensions with columns for 'Name', 'Type', 'Version', and 'Status'. A note says 'No resource extensions found.'

Microsoft Azure Search resources, services, and docs (G+)

Home > Virtual machines > az104-08-vm0 | Extensions + applications

Install an Extension

Search

Agent for Cloud Workload Protection (Windows) Symantec Corp. Symantec Cloud Workload Protection provides strong security for servers with application protection, intrusion detection/prevention, real-time Anti-

Agent for Windows Server Monitoring Site24x7 Ensure your Windows server and applications are up and running with our performance data and on-time alerts

AMD GPU Driver Extension Microsoft Corp. Microsoft Azure Extension for AMD

APM Insight .NET Agent Site24x7 Get real time, comprehensive data on

Extensions provide post-deployment configuration and automation. Select an extension to start

Next

aishakhalfan45@gmail.com DEFAULT DIRECTORY

9. On the **Install an Extension** blade, click **Custom Script Extension** and then click **Next**.

Microsoft Azure Search resources, services, and docs (G+)

Home > Virtual machines > az104-08-vm0 | Extensions + applications

Install an Extension

Chef Server

Control-M Agent BMC Software, Inc. Deploy a Control-M Agent to manage application workloads running on Azure

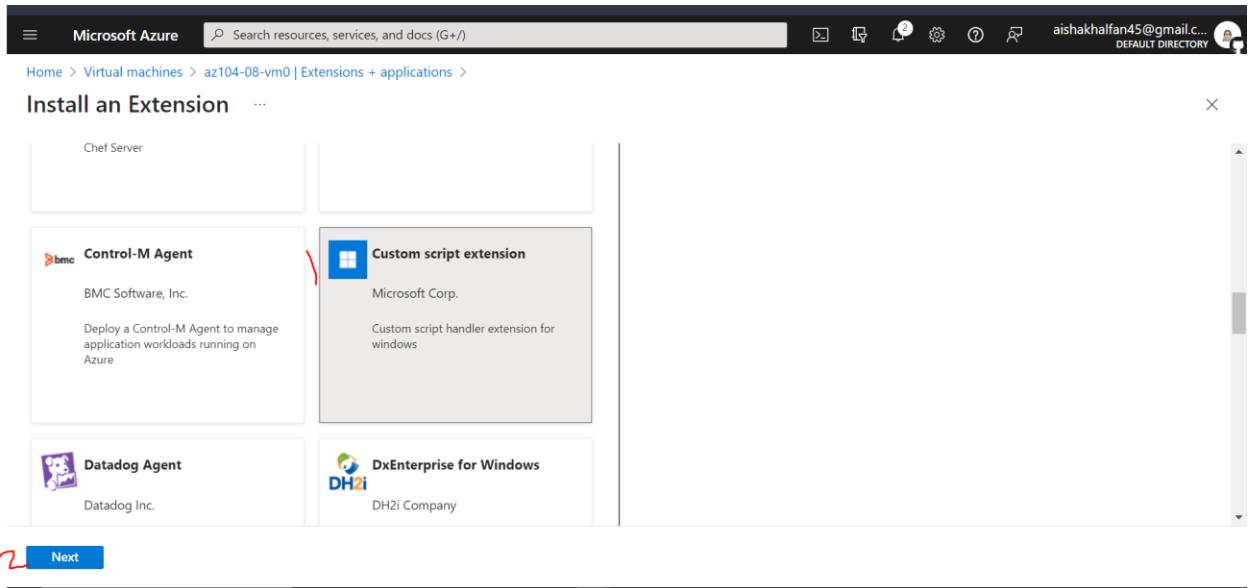
Custom script extension Microsoft Corp. Custom script handler extension for windows

Datadog Agent Datadog Inc.

DxEnterprise for Windows DH2i Company

Next

aishakhalfan45@gmail.com DEFAULT DIRECTORY



10. From the **Configure Custom Script Extension** blade, click **Browse**.

The screenshot shows the 'Configure Custom script extension' blade. A red arrow points to the 'Browse' button next to the 'Script file (Required)' input field. The 'Create' tab is selected. At the bottom, there are 'Previous', 'Next', and 'Review + create' buttons, along with a 'Give feedback' link.

11. On the **Storage accounts** blade, click the name of the storage account into which you uploaded the **az104-08-install_IIS.ps1** script, on the **Containers** blade, click **scripts**, on the **scripts** blade, click **az104-08-install_IIS.ps1**, and then click **Select**.

The screenshot shows two overlapping Microsoft Azure interface windows. The top window is titled 'Storage accounts' and displays a list of storage accounts, with one account named 'aishak' selected. The bottom window is titled 'Containers' and shows a list of containers within the selected storage account. A red '2' is drawn over the 'scripts' container in the list. The taskbar at the bottom of the screen shows various pinned icons and the system status.

Storage accounts

- + Storage account
- Refresh
- ...
- Search storage accounts
- Show classic storage accounts
- Name
- aishak
- csb100320003b962555

Containers

aishak

- + Container
- Refresh
- Give feedback
- Search containers by prefix

| Name | Last modified | Anonymous access level | Lease state |
|---|------------------------|------------------------|-------------|
| bootdiagnostics-az10408vm-2f5c1c5c-5de4-4c66-bdbb-5... | 11/15/2023, 1:24:02 PM | Private | Available |
| bootdiagnostics-az10408vm-4ef33c1d-cfe0-4489-9f77-3d... | 11/15/2023, 1:48:36 PM | Private | Available |
| scripts | 11/15/2023, 7:09:29 PM | Private | Available |

scripts

Container

- Upload
- Refresh
- Give feedback

Authentication method: Access key ([Switch to Microsoft Entra user account](#))
Location: scripts

Search blobs by prefix (case-sensitive)

Show deleted blobs

Add filter

| Name | Modified | Access tier | Archive status | Blob type | Size | Lease state |
|--------------------------|------------------------|-------------|----------------|------------|-------|-------------|
| az104-08-install_IIS.ps1 | 11/15/2023, 7:17:16 PM | | | Block blob | 239 B | Available |

2 Select

- Back on the **Install extension** blade, click **Review + create** and, on the **Review + create** blade click **Create**.

Create **Review + create**

View automation template

Create

Script file (Required) az104-08-install_IIS.ps1

Arguments (Optional)

Previous Next Create **2** Give feedback

Microsoft.CustomScriptExtension-20231115194111 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview **Deployment is in progress**

Deployment name : Microsoft.CustomScriptExtensi... Start time : 11/15/2023, 7:47:00 PM

Subscription : Azure for Students Correlation ID : e297bcd5-f189-4f3e-bc6e-8fb...

Resource group : AZ104-08-RG01

Deployment details

| Resource | Type | Status | Operator |
|------------------|----------------------------------|---------|-----------|
| az104-08-vm0/... | Microsoft.Compute/virtualMachine | Created | Operation |

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Windows taskbar: Search, Start button, Task View, File Explorer, Edge, File Manager, Taskbar settings, Cloud, Weather (20°C), Language (ENG), Date and Time (7:49 PM), Chat icon.

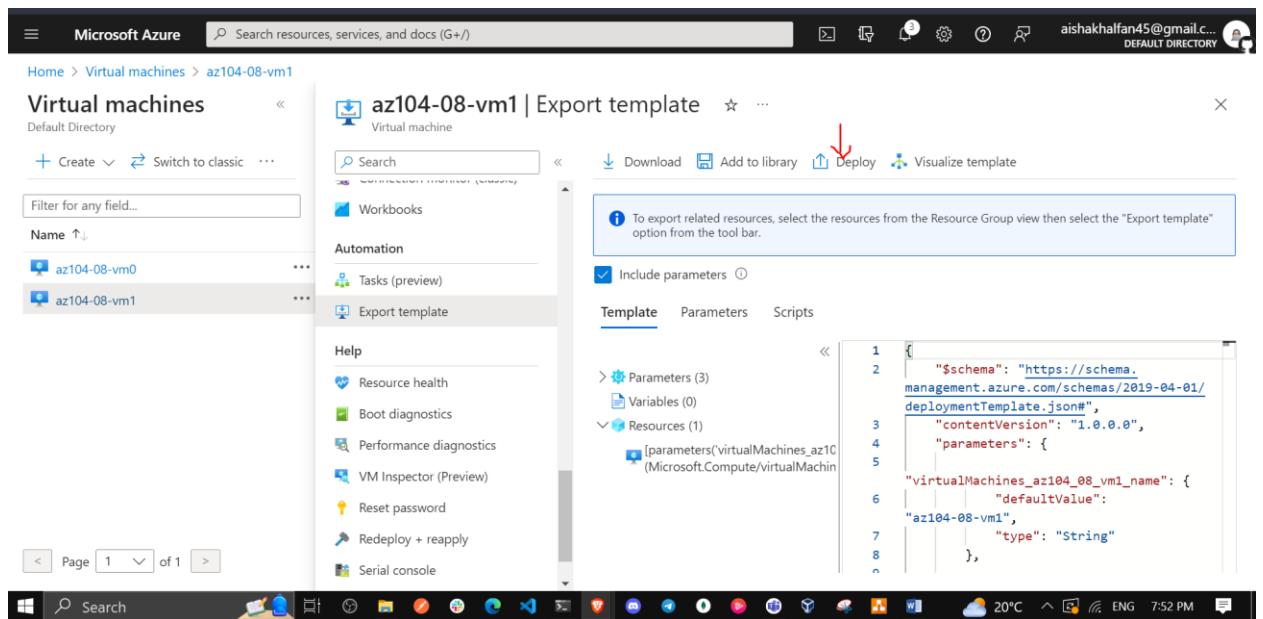
13. In the Azure portal, search for and select **Virtual machines** and, on the **Virtual machines** blade, click **az104-08-vm1**.

The screenshot shows the Microsoft Azure portal's Virtual machines page. At the top, there is a search bar and a navigation bar with links for Home, Virtual machines, and other services. Below the navigation is a toolbar with buttons for Create, Switch to classic, Reservations, Manage view, Refresh, Export to CSV, Open query, Assign tags, Start, Restart, Stop, and more. A filter bar allows filtering by Subscription, Type, Resource group, Location, and adding filters. The main table displays two records, both of which are checked. The columns include Name, Type, Subscription, Resource group, Location, Status, Operating system, and Size. The first record is az104-08-vm0 (Virtual machine, Azure for Students, AZ104-08-RG01, East US, Running, Windows, Standard_DS1_v2). The second record is az104-08-vm1 (Virtual machine, Azure for Students, az104-08-rg01, East US, Running, Windows, Standard_DS1_v2). At the bottom, there are navigation buttons for < Previous, Page 1 of 1, Next >, and a Give feedback link.

14. On the **az104-08-vm1** blade, in the **Automation** section, click **Export template**.

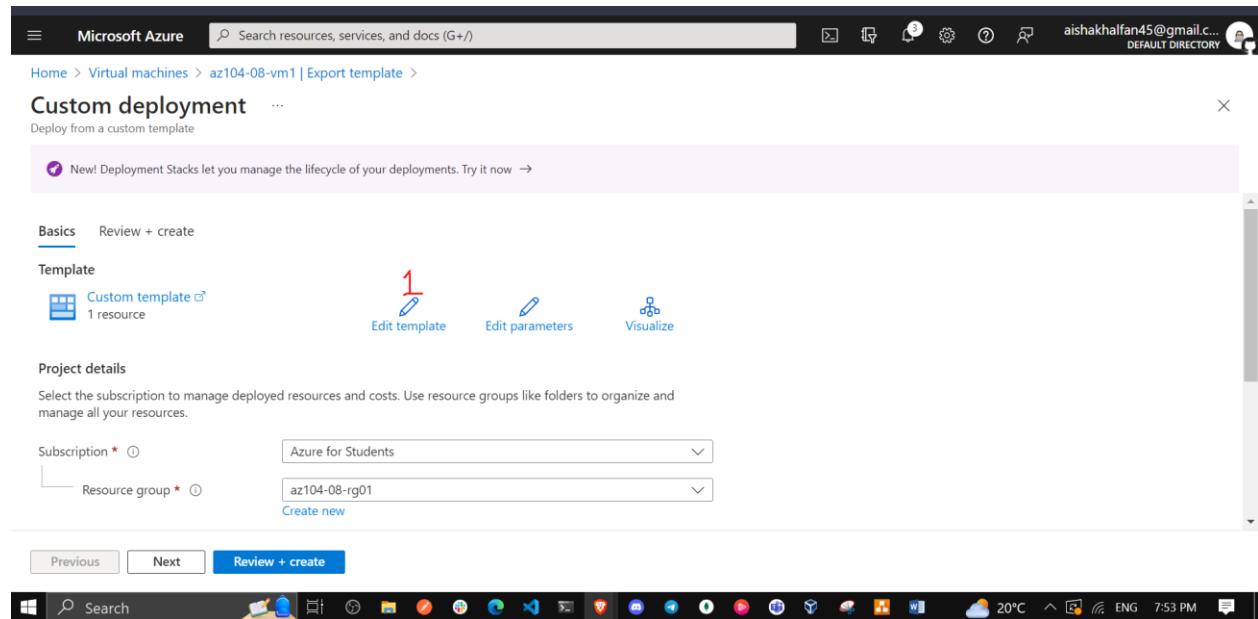
The screenshot shows the Microsoft Azure portal's Virtual machines blade for the vm1 instance. The left sidebar includes links for Home, Virtual machines, Automation, Workbooks, Tasks (preview), and Export template (which is highlighted with a red box). The main content area shows the title "az104-08-vm1 | Export template" and a "Virtual machine" status. It features a search bar, download options (Download, Add to library, Deploy, Visualize template), and a note about selecting resources from the Resource Group view. A checkbox for "Include parameters" is checked. The "Template" tab is selected, displaying a JSON template code. The code defines a schema URL, content version, and a parameter named "virtualMachines_az104_08_vm1_name" with a default value of "az104-08-vm1". The right side of the screen shows a taskbar with various icons.

15. On the **az104-08-vm1 - Export template** blade, click **Deploy**.



16. On the **Custom deployment** blade, click **Edit template**.

Note: Disregard the message stating **The resource group is in a location that is not supported by one or more resources in the template. Please choose a different resource group.** This is expected and can be ignored in this case.



```

1  {
2      "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3      "contentVersion": "1.0.0.0",
4      "parameters": {
5          "virtualMachines_az104_08_vm1_name": {
6              "defaultValue": "az104-08-vm1",
7              "type": "String"
8          },
9          "disks_az104_08_vm1_OsDisk_1_756a98992d86437f828bee35682534d7_externalid": {
10             "defaultValue": "/subscriptions/3dbbb8d5-1829-48d8-a51d-c7f11b061059/resourceGroups/az104-08-rg01/providers/Microsoft.Compute/disks/az104-08-vm1_OsDisk_1_756a98992d86437f828bee35682534d7",
11             "type": "String"
12         },
13         "networkInterfaces_az104_08_vm1_nic1_externalid": {
14             "defaultValue": "/subscriptions/3dbbb8d5-1829-48d8-a51d-c7f11b061059/resourceGroups/az104-08-rg01/providers/Microsoft.Network/networkInterfaces/az104-08-vm1-nic1",
15             "type": "String"
16         }
17     }
18 }

```

Save Discard

17. On the **Edit template** blade, in the section displaying the content of the template, insert the following code starting with line **20** (directly underneath the "*resources*": [line):

Note: If you are using a tool that pastes the code in line by line intellisense may add extra brackets causing validation errors. You may want to paste the code into notepad first and then paste it into line 20.

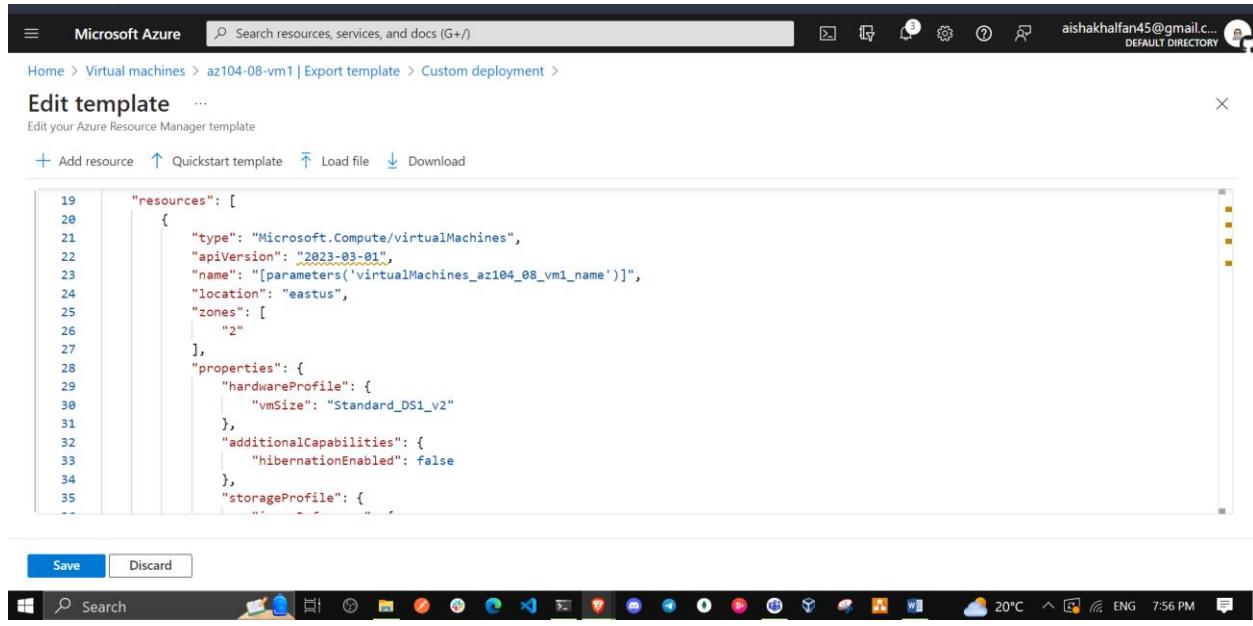
```

{
    "type": "Microsoft.Compute/virtualMachines/extensions",
    "name": "az104-08-vm1/customScriptExtension",
    "apiVersion": "2018-06-01",
    "location": "[resourceGroup().location]",
    "dependsOn": [
        "az104-08-vm1"
    ],
    "properties": {
        "publisher": "Microsoft.Compute",
        "type": "CustomScriptExtension",
        "typeHandlerVersion": "1.7",
        "autoUpgradeMinorVersion": true,
        "settings": {
            "commandToExecute": "powershell.exe Install-Wind
owsFeature -name Web-Server -IncludeManagementTools && powershell
.exe remove-item 'C:\\inetpub\\wwwroot\\iisstart.htm' && powershe
ll.exe Add-Content -Path 'C:\\inetpub\\wwwroot\\iisstart.htm' -Va
lue $($('Hello World from ' + $env:computername))"
        }
    }
}

```

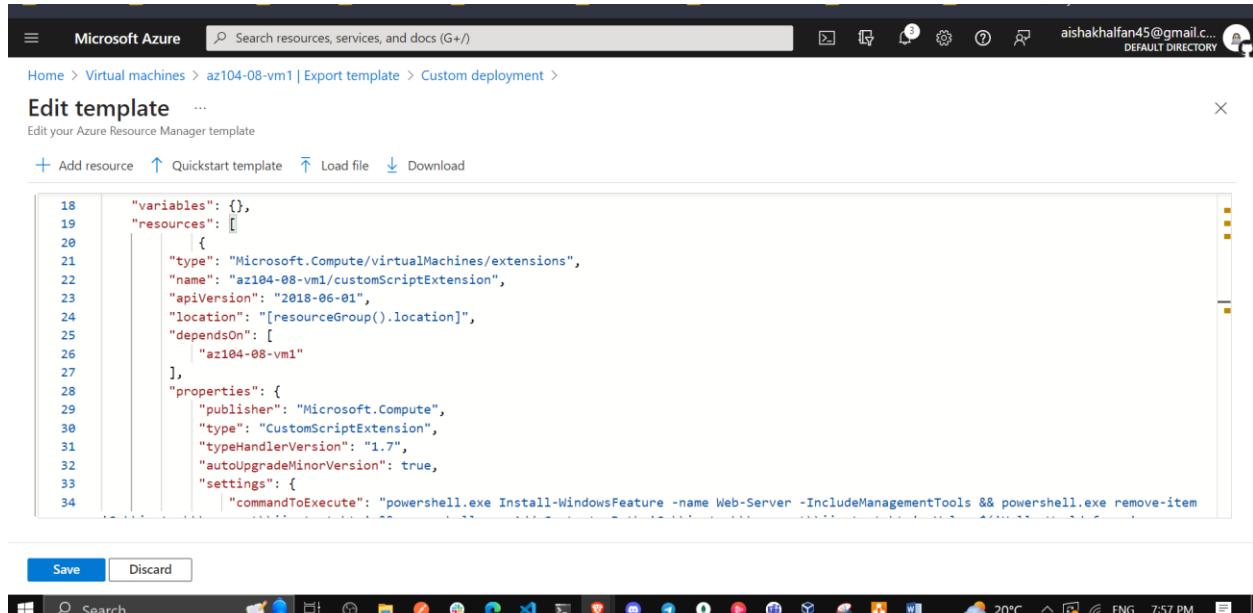
```
    }
},
```

Note: This section of the template defines the same Azure virtual machine custom script extension that you deployed earlier to the first virtual machine via Azure PowerShell.



```
19 "resources": [
20   {
21     "type": "Microsoft.Compute/virtualMachines",
22     "apiVersion": "2023-03-01",
23     "name": "[parameters('virtualMachines_az104_08_vml_name')]",
24     "location": "eastus",
25     "zones": [
26       "2"
27     ],
28     "properties": {
29       "hardwareProfile": {
30         "vmSize": "Standard_DS1_v2"
31       },
32       "additionalCapabilities": {
33         "hibernationEnabled": false
34       },
35       "storageProfile": {
```

Save Discard



```
18   "variables": {},
19   "resources": [
20     {
21       "type": "Microsoft.Compute/virtualMachines/extensions",
22       "name": "az104-08-vm1/customScriptExtension",
23       "apiVersion": "2018-06-01",
24       "location": "[resourceGroup().location]",
25       "dependsOn": [
26         "az104-08-vm1"
27       ],
28       "properties": {
29         "publisher": "Microsoft.Compute",
30         "type": "CustomScriptExtension",
31         "typeHandlerVersion": "1.7",
32         "autoUpgradeMinorVersion": true,
33         "settings": {
34           "commandToExecute": "powershell.exe Install-WindowsFeature -name Web-Server -IncludeManagementTools && powershell.exe remove-item
```

Save Discard

18. Click **Save** and, back on the **Custom template** blade, click **Review + Create** and, on the **Review + Create** blade, click **Create**

Note: Wait for the template deployment to complete. You can monitor its progress from the **Extensions** blade of the **az104-08-vm0** and **az104-08-vm1** virtual machines. This should take no more than 3 minutes.

The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with 'Microsoft Azure', a search bar, and user information 'aishakhalfan45@gmail.c... DEFAULT DIRECTORY'. Below the navigation bar, the URL is 'Home > Virtual machines > az104-08-vm1 | Export template > Custom deployment > Edit template'. The main content area is titled 'Edit template' with a sub-section 'Edit your Azure Resource Manager template'. It contains a code editor with the following JSON template:

```

102     "id": "[parameters('networkInterfaces_az104_08_vm1_nic1_externalid')]",
103     "properties": {
104       "deleteOption": "Detach"
105     }
106   ],
107   "diagnosticsProfile": {
108     "bootDiagnostics": {
109       "enabled": true,
110       "storageUri": "https://aishak.blob.core.windows.net/"
111     }
112   }
113 }
114 }
115 }
116 }
117 }
118 }
119 }

```

Below the code editor are two buttons: 'Save' (highlighted with a red arrow) and 'Discard'. The status bar at the bottom shows system information like '20°C', 'ENG', '7:57 PM', and a battery icon.

The screenshot shows the 'Custom deployment' page for the virtual machine 'az104-08-vm1'. The title is 'Custom deployment' with a '... More' link. Below it, a message says 'Deploy from a custom template'. A notification bar at the top right says 'New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →'. The main section is 'Basics' (selected) and 'Review + create'. It shows a 'Template' section with a 'Customized template' card (2 resources), 'Edit template', 'Edit parameters', and 'Visualize' buttons. The 'Project details' section asks to select a subscription and resource group. The 'Subscription' dropdown is set to 'Azure for Students' and the 'Resource group' dropdown is set to 'az104-08-rg01'. At the bottom, there are 'Previous', 'Next', and 'Review + create' buttons, along with a browser address bar showing 'https://portal.azure.com/#'.

Deployment name : Microsoft.Template-20231115200326 Start time : 11/15/2023, 8:03:42 PM

Subscription : Azure for Students Correlation ID : f339a4b3-d534-4902-9802-dc...

Resource group : az104-08-rg01

| Resource | Type | Status | Operat |
|------------------|-------------------------------|---------|--------|
| az104-08-vm1/... | Microsoft.Compute/virtualMach | Created | Operat |
| az104-08-vm1 | Virtual machine | OK | Operat |

- To verify that the Custom Script extension-based configuration was successful, navigate back on the **az104-08-vm1** blade, in the **Operations** section, click **Run command**, and, in the list of commands, click **RunPowerShellScript**.

| Name | Description |
|----------------------|--|
| RunPowerShellScript | Executes a PowerShell script |
| DisableNLA | Disable Network Level Authentication |
| DisableWindowsUpdate | Disable Windows Update Automatic Updates |
| EnableAdminAccount | Enable administrator account |
| EnableEMS | Enable EMS |
| EnableRemotePS | Enable remote PowerShell |
| EnableWindowsUpdate | Enable Windows Update Automatic Updates |
| IPConfig | List IP configuration |

- On the **Run Command Script** blade, type the following and click **Run** to access the web site hosted on **az104-08-vm1**:

```
Invoke-WebRequest -URI http://10.80.0.4 -UseBasicParsing
```

Note: The **-UseBasicParsing** parameter is necessary to eliminate dependency on Internet Explorer to complete execution of the cmdlet

Microsoft Azure Search resources, services, and docs (G+/-)

Home > Microsoft.Template-20231115200326 | Overview > az104-08-vm1 | Run command

Virtual machine

Run Command Script

RunPowerShellScript

PowerShell Script

```
1
```

Name

- RunPowerShellScript
- DisableNLA
- DisableWindowsUpdate
- EnableAdminAccount
- EnableEMS
- EnableRemotePS
- EnableWindowsUpdate
- IPConfig

Run

This screenshot shows the 'Run Command Script' interface for a virtual machine named 'az104-08-vm1'. The 'RunPowerShellScript' template is selected. A dropdown menu is open, listing several PowerShell script names: RunPowerShellScript, DisableNLA, DisableWindowsUpdate, EnableAdminAccount, EnableEMS, EnableRemotePS, EnableWindowsUpdate, and IPConfig. The 'Run' button is visible at the bottom of the script editor.

Microsoft Azure Search resources, services, and docs (G+/-)

Home > Microsoft.Template-20231115200326 | Overview > az104-08-vm1 | Run command

Virtual machine

Run Command Script

RunPowerShellScript

PowerShell Script

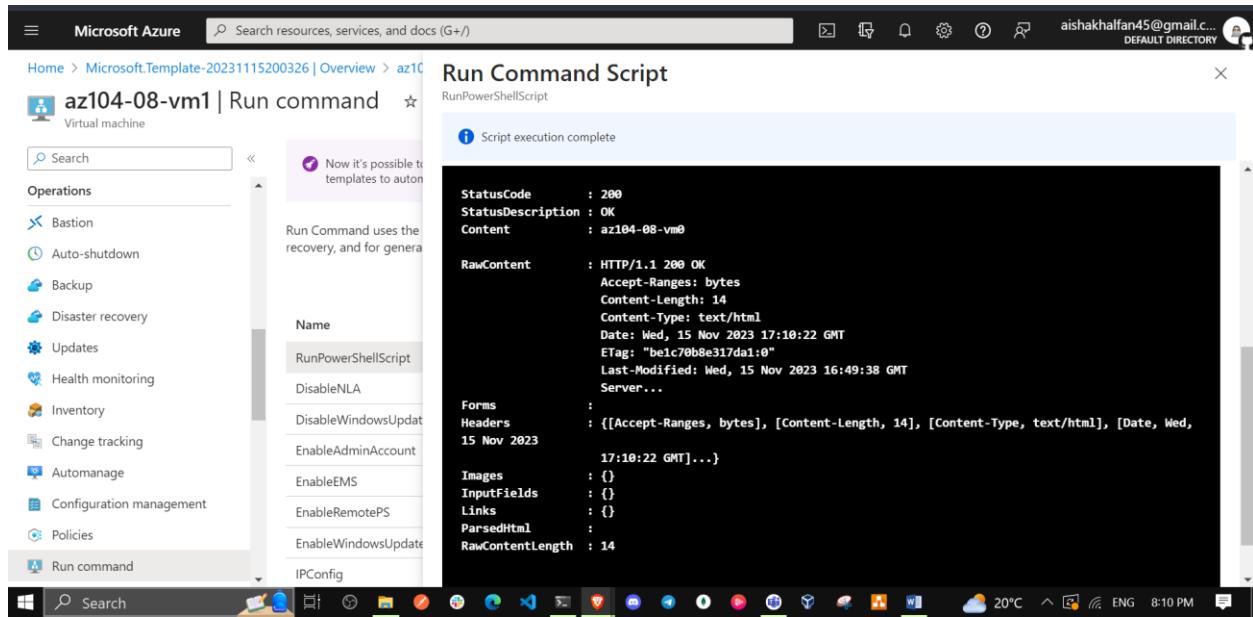
```
1 Invoke-WebRequest -URI http://10.80.0.4 -UseBasicParsing
```

Name

- RunPowerShellScript
- DisableNLA
- DisableWindowsUpdate
- EnableAdminAccount
- EnableEMS
- EnableRemotePS
- EnableWindowsUpdate
- IPConfig

Run

This screenshot shows the 'Run Command Script' interface for the same virtual machine. The PowerShell script content is displayed as a single line: '1 Invoke-WebRequest -URI http://10.80.0.4 -UseBasicParsing'. The 'Run' button is visible at the bottom.



Note: The `-URI` parameter is the **Private IP address** of the VM. Navigate to the **az104-08-vm1** blade, in the **Networking** section, and click **Network settings**

Note: You can also connect to **az104-08-vm0** and run `Invoke-WebRequest -URI http://10.80.0.5 -UseBasicParsing` to access the web site hosted on **az104-08-vm1**.

Task 3: Scale compute and storage for Azure virtual machines

In this task you will scale compute for Azure virtual machines by changing their size and scale their storage by attaching and configuring their data disks.

1. In the Azure portal, search for and select **Virtual machines** and, on the **Virtual machines** blade, click **az104-08-vm0**.

Microsoft Azure

Virtual machines

az104-08-vm0

az104-08-vm1

Essentials

Resource group (move) AZ104-08-RG01

Status Running

Location East US (Zone 1)

Operating system Windows (Windows Server 2019 Datacenter)

Subscription (move) Azure for Students

Subscription ID 3dbbb8d5-1829-48d8-a51d-c7f11b061059

Public IP address 172.206.217.23

Virtual network/subnet az104-08-vnet01/subnet0

DNS name Not configured

Health state -

Tags (edit) Add tags

Properties Monitoring Capabilities (8) Recommendations Tutorials

2. On the **az104-08-vm0** virtual machine blade, click **Size** and set the virtual machine size to **Standard DS1_v2** and click **Resize**

Microsoft Azure

Virtual machines

az104-08-vm0

az104-08-vm1

Size

If the virtual machine is currently running, changing its size will cause it to be restarted. Stopping the virtual machine may reveal additional sizes.

Search by VM size... Display cost: Monthly vCPUs: All RAM (GiB): All Add filter

Showing 267 VM sizes. Subscription: Azure for Students Region: East US Current size: Standard_DS1_v2

Learn more about VM sizes Group by series

| VM Size ↑ | Type ↑ | vCPUs ↑ | RAM (GiB) ↑ | Data: |
|---|--------|---------|-------------|-------|
| Prices presented are estimates in USD that include only Azure infrastructure costs and any discounts for the subscription and location. The prices don't include any applicable software costs. Final charges will appear in your local currency in cost analysis and billing views. View Azure pricing calculator. | | | | |

Resize Give feedback

Note: Choose another size if **Standard DS1_v2** is not available.

az104-08-vm0 Virtual machine

Private IP address (IPv6): az104-08-vnet01/subnet0

DNS name: az104-08-vm0

Size: Standard DS1 v2

vCPUs: 1

RAM: 3.5 GiB

Disk

- OS disk: az104-08-vm0_OsDisk_1_7507850adb564d739cdf70f5aebdb35
- Encryption at host: Disabled
- Azure disk encryption: Not enabled

- On the **az104-08-vm0** virtual machine blade, click **Disks**, Under **Data disks** click **+ Create and attach a new disk**.

az104-08-vm0 | Disks

Data disks

Create and attach a new disk

| LUN | Disk name | Storage type | Size (GiB) | Max IOPS |
|-----|------------------------|-----------------|------------|----------|
| 1 | az104-08-vm0_OsDisk_1_ | Premium SSD LRS | 127 | 500 |

- Create a managed disk with the following settings (leave others with their default values):

| Setting | Value |
|--------------|--------------------------------|
| Disk name | az104-08-vm0-datadisk-0 |
| Storage type | Premium SSD |
| Size (GiB) | 1024 |

az104-08-vm0 | Disks

Data disks

| LUN | Disk name | Storage type | Size (GiB) | Max IOPS |
|-----|---------------------|-------------------|------------|----------|
| 0 | az104-08-vm0-disk-1 | Premium SSD (LRS) | 1024 | 5000 |

Apply Discard changes

5. Back on the **az104-08-vm0 - Disks** blade, Under **Data disks** click **+ Create and attach a new disk**.
6. Create a managed disk with the following settings (leave others with their default values) and Save changes:

| Setting | Value |
|--------------|----------------------------|
| Disk name | az104-08-vm0-disk-1 |
| Storage type | Premium SSD |
| Size (GiB) | 1024 GiB |

az104-08-vm0 | Disks

Data disks

| LUN | Disk name | Storage type | Size (GiB) | Max IOPS |
|-----|---------------------|-------------------|------------|----------|
| 0 | az104-08-vm0-disk-1 | Premium SSD (LRS) | 1024 | 5000 |
| 1 | az104-08-vm0-disk-2 | Premium SSD (LRS) | 1024 | 5000 |

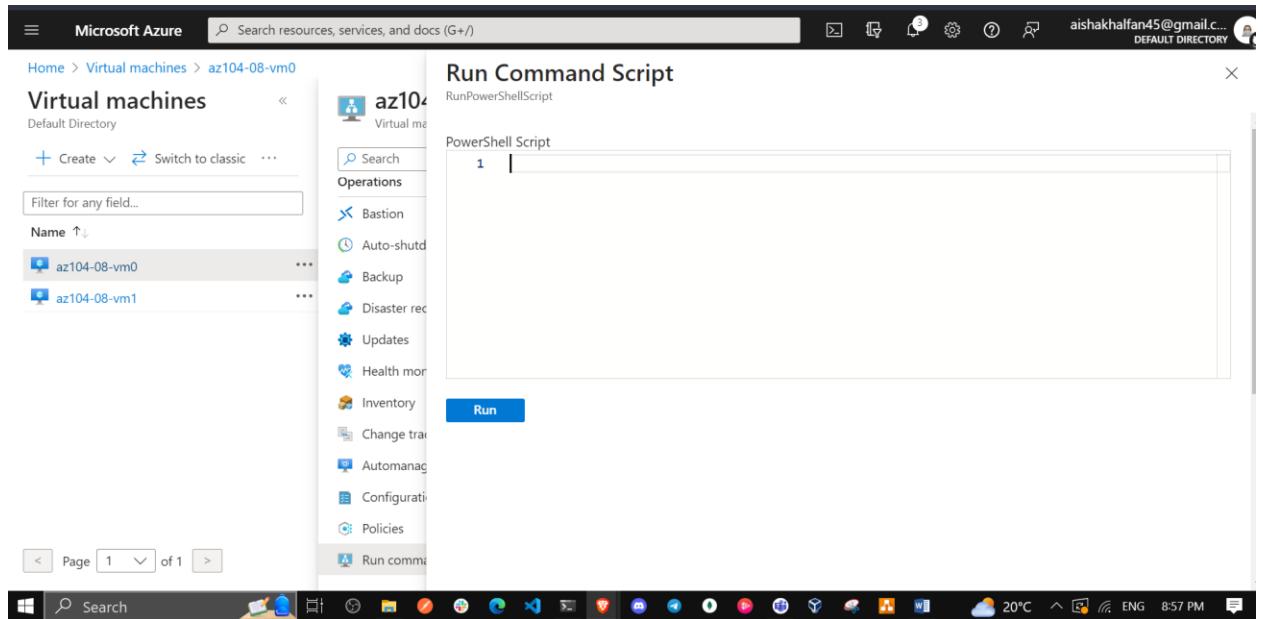
Apply Discard changes

7. Back on the **az104-08-vm0 - Disks** blade, click **Save**.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', a search bar, and user information 'aishakhalfan45@gmail.com DEFAULT DIRECTORY'. Below the navigation bar, the URL 'Home > Virtual machines > az104-08-vm0' is visible. The main content area is titled 'Virtual machines' and shows a list of two virtual machines: 'az104-08-vm0' and 'az104-08-vm1'. On the right side, there is a detailed view for 'az104-08-vm0' under the 'Disks' section. This view shows the OS disk ('az104-08-vm0_OsDisk_1') and two data disks ('az104-08-vm0-data-disk-1' and 'az104-08-vm0-data-disk-2'). Both data disks are listed as Premium SSD LRS with a size of 1024 GiB and 5000 Max IOPS. A 'Monitoring' sidebar on the left provides links to Insights, Alerts, Metrics, Logs, Connection monitor (classic), Workbooks, Tasks (preview), and Export template.

8. On the **az104-08-vm0** blade, in the **Operations** section, click **Run command**, and, in the list of commands, click **RunPowerShellScript**.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', a search bar, and user information 'aishakhalfan45@gmail.com DEFAULT DIRECTORY'. Below the navigation bar, the URL 'Home > Virtual machines > az104-08-vm0' is visible. The main content area is titled 'Virtual machines' and shows a list of two virtual machines: 'az104-08-vm0' and 'az104-08-vm1'. On the right side, there is a detailed view for 'az104-08-vm0' under the 'Run command' section. A callout with a red '2' highlights the 'Run command' option in the sidebar. Another callout with a red '3' highlights the 'RunPowerShellScript' command in the list of available scripts. The list includes other commands like 'DisableNLA', 'DisableWindowsUpdate', 'EnableAdminAccount', etc. A pink info box at the top right of the 'Run command' section states: 'Now it's possible to execute multiple scripts at the same time, manage their progress and persist execution outputs. Scripts and parameters can now be used in ARM templates to automate deployment. Learn more'.



9. On the **Run Command Script** blade, type the following and click **Run** to create a drive Z: consisting of the two newly attached disks with the simple layout and fixed provisioning:

```
New-StoragePool -FriendlyName storagepool1 -StorageSubsystemFriendlyName "Windows Storage*" -PhysicalDisks (Get-PhysicalDisk -CanPool $true)

New-VirtualDisk -StoragePoolFriendlyName storagepool1 -FriendlyName virtualdisk1 -Size 64GB -ResiliencySettingName Simple -ProvisioningType Fixed

Initialize-Disk -VirtualDisk (Get-VirtualDisk -FriendlyName virtualdisk1)

New-Partition -DiskNumber 4 -UseMaximumSize -DriveLetter
```

Note: Wait for the confirmation that the commands completed successfully.

Microsoft Azure Search resources, services, and docs (G+)

Home > Virtual machines > az104-08-vm0

Virtual machines Default Directory

+ Create Switch to classic

Filter for any field...

Name ↑↓

- az104-08-vm0
- az104-08-vm1

Page 1 of 1

Run Command Script

RunPowerShellScript

PowerShell Script

```
1 New-StoragePool -FriendlyName storagepool1 -StorageSubsystemFriendlyName "Windows Storage*" -Ph  
2  
3 New-VirtualDisk -StoragePoolFriendlyName storagepool1 -FriendlyName virtualdisk1 -Size 64GB -Re  
4  
5 Initialize-Disk -VirtualDisk (Get-VirtualDisk -FriendlyName virtualdisk1)  
6  
7 New-Partition -DiskNumber 4 -UseMaximumSize -DriveLetter Z
```

Run

This screenshot shows the Microsoft Azure portal interface for running a PowerShell command on a virtual machine. The left sidebar shows the 'Virtual machines' section with two instances listed: 'az104-08-vm0' and 'az104-08-vm1'. The right pane is titled 'Run Command Script' and contains a 'RunPowerShellScript' section. A PowerShell script is pasted into the 'PowerShell Script' text area, which includes commands to create a storage pool, a virtual disk, initialize it, and create a partition. A red arrow points to the 'Run' button at the bottom of the script editor. The status bar at the bottom indicates the user's email (aishakhalfan45@gmail.com) and the default directory.

Microsoft Azure Search resources, services, and docs (G+)

Home > Virtual machines > az104-08-vm0

Virtual machines Default Directory

+ Create Switch to classic

Filter for any field...

Name ↑↓

- az104-08-vm0
- az104-08-vm1

Page 1 of 1

Run Command Script

RunPowerShellScript

Script execution complete

```
DiskNumber : 4
DriveLetter : Z
GptType : {ebd0a0a2-b9e5-4433-87c0-68b6b72699c7}
Guid : {8007f8f7-4136-4807-9693-59233d26c74c}
IsActive : False
IsBoot : False
IsDAX : False
IsHidden : False
IsOffline : False
IsReadOnly : False
IsShadowCopy : False
IsSystem : False
MbrType :
NoDefaultDriveLetter : False
Offset : 16777216
OperationalStatus : Online
PartitionNumber : 2
Size : 68701650944
TransitionState : 1
PSComputerName :
Type : Basic
DiskPath : \\?\storage#disk#{c31aa817-ed95-4026-bbf8-6a9e558ec850}#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
```

This screenshot shows the results of the PowerShell command execution. A message box at the top indicates 'Script execution complete'. The main pane displays the output of the PowerShell script, which creates a storage pool, a virtual disk, initializes it, and creates a partition. The output includes various properties like DiskNumber, DriveLetter, Guid, and DiskPath. The status bar at the bottom shows the user's email (aishakhalfan45@gmail.com), the default directory, and the current time (9:00 PM).

Microsoft Azure Search resources, services, and docs (G+/-) aishakhalfan45@gmail.c... DEFAULT DIRECTORY

Home > Virtual machines > az104-08-vm0

Virtual machines

Default Directory

+ Create Switch to classic

Filter for any field...

| Name | ... |
|--------------|-----|
| az104-08-vm0 | ... |
| az104-08-vm1 | ... |

Page 1 of 1

Run Command Script RunPowerShellScript

Script execution complete

```
FriendlyName OperationalStatus HealthStatus IsPrimordial IsReadOnly Size AllocatedSize
storagepool0 OK Healthy False False 2 TB 512 MB

ObjectId : {1}\az104-08-vm0\root\Microsoft\Windows\Storage\Providers_v2\SPACE
ObjectID : {24c61a4c-83a1-11ee-af29-806e6f6e6963}:VD:{15f94249-c0bc-4b
5_VirtualDisk.0b
jectId="c31aa817-ed95-4026-bbf8-6a9e558ec850"
18-bb47-824c6df8
033e}{c31aa817-ed95-4026-bbf8-6a9e558ec850"

PassThroughClass :
PassThroughIds :
PassThroughNamespace :
PassThroughServer :
UniqueId :
Access :
AllocatedSize :
AllocationUnitSize :
ColumnIsolation :
DetachedReason :
FaultDomainAwareness :
FootprintOnPool :
FriendlyName :
HealthStatus :
```

Microsoft Azure Search resources, services, and docs (G+/-) aishakhalfan45@gmail.c... DEFAULT DIRECTORY

Home > Virtual machines > az104-08-vm0

Virtual machines

Default Directory

+ Create Switch to classic

Filter for any field...

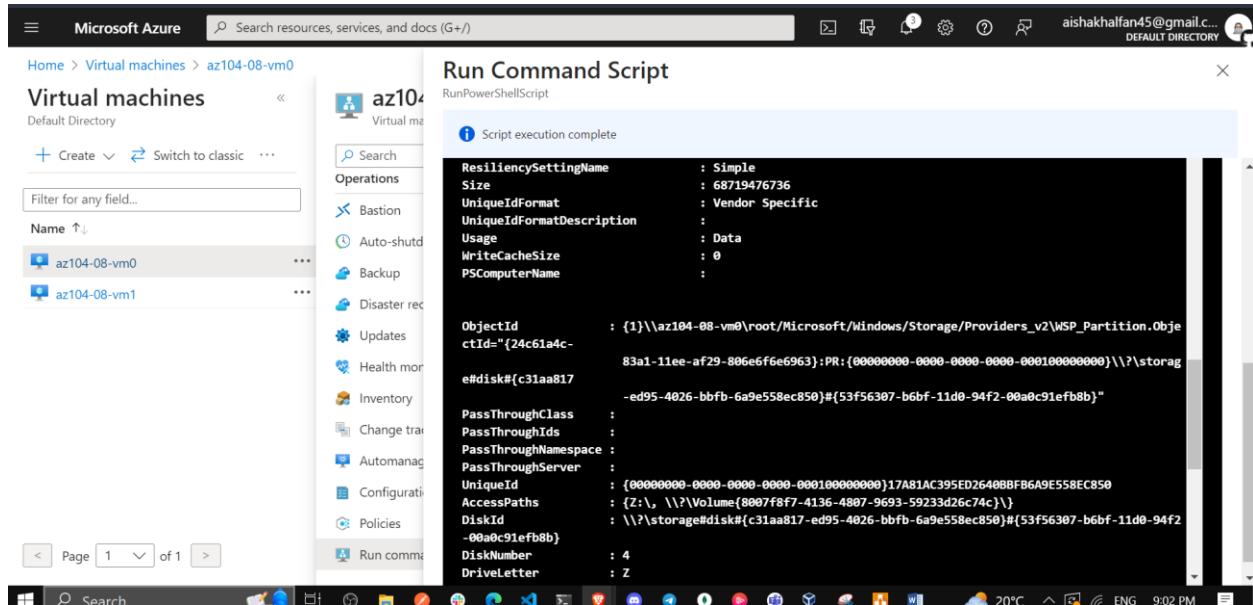
| Name | ... |
|--------------|-----|
| az104-08-vm0 | ... |
| az104-08-vm1 | ... |

Page 1 of 1

Run Command Script RunPowerShellScript

Script execution complete

```
HealthStatus : Healthy
Interleave : 262144
IsDeduplicationEnabled : False
IsEnclosureAware : False
IsManualAttach : False
IsSnapshot : False
IsTiered : False
LogicalSectorSize : 512
MediaType : Unspecified
Name :
NameFormat :
NumberOfAvailableCopies :
NumberOfColumns : 2
NumberOfDataCopies : 1
NumberOfGroups : 1
OperationalStatus : OK
OtherOperationalStatusDescription :
OtherUsageDescription :
ParityLayout :
PhysicalDiskRedundancy : 0
PhysicalSectorSize : 4096
ProvisioningType : Fixed
ReadCacheSize : 0
RequestNoSinglePointOfFailure : False
```



```

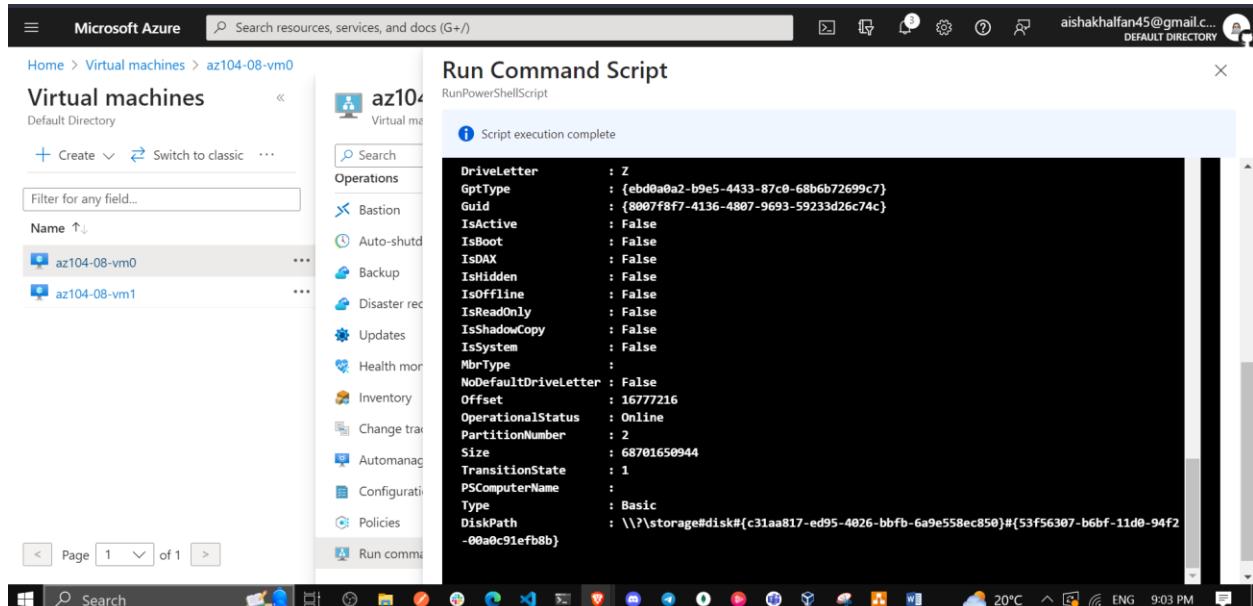
Run Command Script
RunPowerShellScript

Script execution complete

ResiliencySettingName : Simple
Size : 68719476736
UniqueIdFormat : Vendor Specific
UniqueIdFormatDescription :
Usage : Data
WriteCacheSize : 0
PSCoordinateName :

ObjectID : {1}\az104-08-vm0\root\Microsoft\Windows\Storage\Providers_v2\WSP_Partition.Object
ctId="{24c61a4c-83a1-11ee-af29-806e6f6e6963}:PR:{00000000-0000-0000-0000-000100000000}\?\storage\disk#{c31aa817-ed95-4026-bbfb-6a9e558ec850}#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}"
PassThroughClass :
PassThroughIds :
PassThroughNamespace :
PassThroughServer :
UniqueId : {00000000-0000-0000-0000-000100000000}17A81AC395ED26408BF6A9E558EC850
AccessPaths : {Z:\, \?\Volume{8007f8f7-4136-4807-9693-59233d26c74c}\}
DiskId : \\\\storage\\disk#{c31aa817-ed95-4026-bbfb-6a9e558ec850}#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
DiskNumber : 4
DriveLetter : Z

```

```

Run Command Script
RunPowerShellScript

Script execution complete

DriveLetter : Z
GptType : {ebd0a0a2-b9e5-4433-87c0-68b6b72699c7}
Guid : {8007f8f7-4136-4807-9693-59233d26c74c}
IsActive : False
IsBoot : False
IsDAX : False
IsHidden : False
IsOffline : False
IsReadOnly : False
IsShadowCopy : False
IsSystem : False
MbrType :
NoDefaultDriveLetter : False
Offset : 16777216
OperationalStatus : Online
PartitionNumber : 2
Size : 68701650944
TransitionState : 1
PSCoordinateName :
Type : Basic
DiskPath : \?\storage\disk#{c31aa817-ed95-4026-bbfb-6a9e558ec850}#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}

```

10. In the Azure portal, search for and select **Virtual machines** and, on the **Virtual machines** blade, click **az104-08-vm1**.

The screenshot shows the Microsoft Azure portal interface. The left sidebar lists 'Virtual machines' with two items: 'az104-08-vm0' and 'az104-08-vm1'. The right panel is titled 'az104-08-vm1' and displays the 'Virtual machine' blade. The 'Essentials' section provides detailed information about the VM, including its resource group ('az104-08-rg01'), status ('Running'), location ('East US (Zone 2)'), subscription ('Azure for Students'), and network settings ('az104-08-vnet01/subnet0'). A tooltip is visible over the 'Public IP address' field, which contains the value '20.163.176.215'. The bottom of the screen shows the Windows taskbar with various pinned icons.

11. On the **az104-08-vm1** blade, in the **Automation** section, click **Export template**.

The screenshot shows the Microsoft Azure portal interface. The left sidebar lists 'Virtual machines' with two items: 'az104-08-vm0' and 'az104-08-vm1'. The right panel is titled 'az104-08-vm1 | Export template' and displays the 'Export template' blade. The 'Template' tab is selected, showing a JSON template for the virtual machine. The template includes sections for 'Parameters', 'Variables', and 'Resources'. A tooltip is visible over the 'Parameters' link. The bottom of the screen shows the Windows taskbar with various pinned icons.

12. On the **az104-08-vm1 - Export template** blade, click **Deploy**.

The screenshot shows the Microsoft Azure portal interface. On the left, the 'Virtual machines' blade is open, displaying two virtual machines: 'az104-08-vm0' and 'az104-08-vm1'. In the center, the 'az104-08-vm1 | Export template' blade is displayed. At the top right of this blade, there is a 'Deploy' button, which is highlighted with a red arrow. Below the blade, the Windows taskbar is visible.

13. On the **Custom deployment** blade, click **Edit template**.

Note: Disregard the message stating **The resource group is in a location that is not supported by one or more resources in the template. Please choose a different resource group.** This is expected and can be ignored in this case.

The screenshot shows the 'Custom deployment' blade. At the top, it says 'Custom deployment ...' and 'Deploy from a custom template'. Below this, there is a message about 'Deployment Stacks'. Under 'Template', there is a 'Custom template' section with a '2 resources' link. To the right of this are three buttons: 'Edit template' (highlighted with a red arrow), 'Edit parameters', and 'Visualize'. Below these buttons is a 'Project details' section where you can select a subscription and resource group. At the bottom of the blade, there are 'Previous', 'Next', and 'Review + create' buttons.

14. On the **Edit template** blade, in the section displaying the content of the template, replace the line **30 "vmSize": "Standard_D2s_v3"** with the following line):

"vmSize": "Standard_DS1_v2"

Note: This section of the template defines the same Azure virtual machine size as the one you specified for the first virtual machine via the Azure portal.

The screenshot shows the 'Edit template' blade in the Microsoft Azure portal. The left sidebar lists 'Parameters (3)', 'Variables (0)', and 'Resources (2)'. The main area displays a JSON template with several lines of code. A red arrow points to line 30, which contains the 'vmSize' key. Below the code editor are 'Save' and 'Discard' buttons, and a taskbar at the bottom.

- On the **Edit template** blade, in the section displaying the content of the template, replace line **51** (`"dataDisks": []`) with the following code :

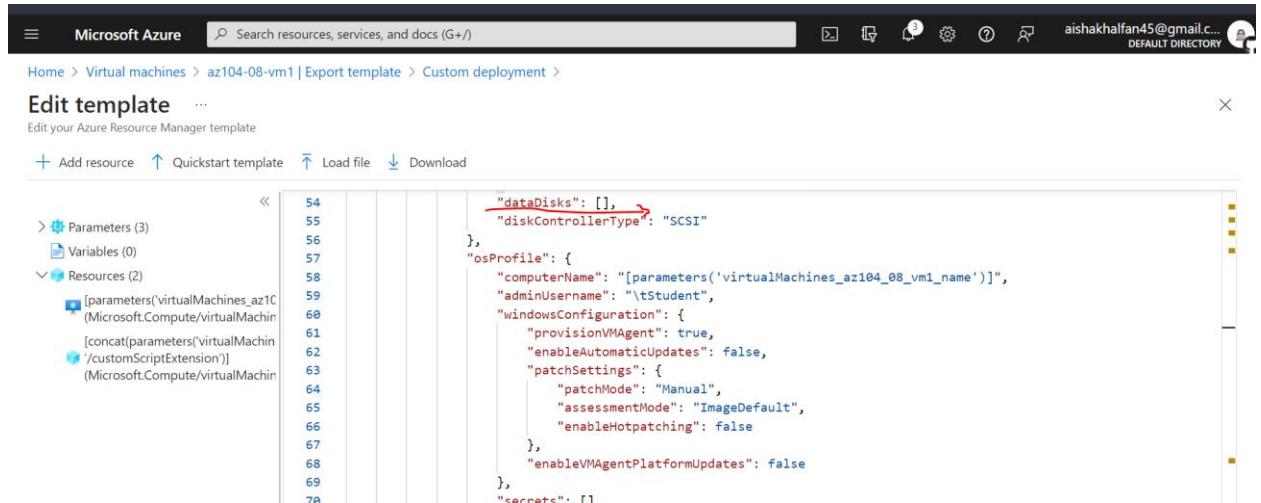
```

"dataDisks": [
{
  "lun": 0,
  "name": "az104-08-vm1-disk0",
  "diskSizeGB": "1024",
  "caching": "ReadOnly",
  "createOption": "Empty"
},
{
  "lun": 1,
  "name": "az104-08-vm1-disk1",
  "diskSizeGB": "1024",
  "caching": "ReadOnly",
  "createOption": "Empty"
}
],

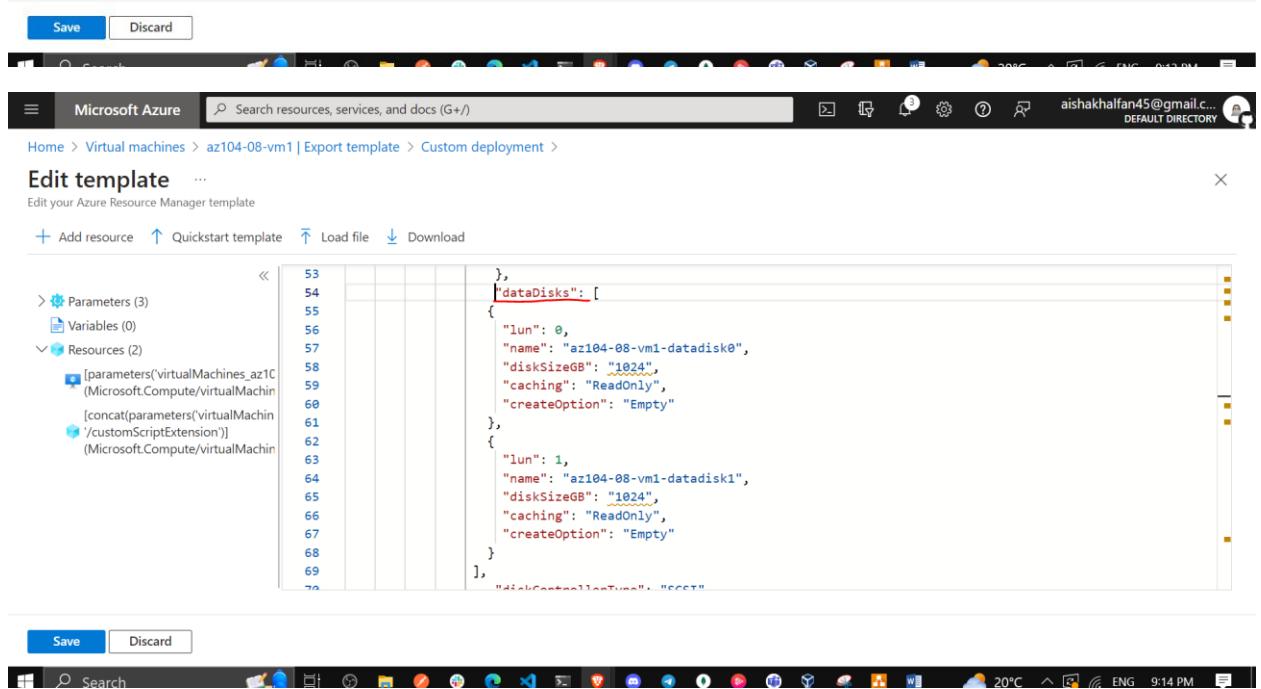
```

Note: If you are using a tool that pastes the code in line by line intellisense may add extra brackets causing validation errors. You may want to paste the code into notepad first and then paste it into line 49.

Note: This section of the template creates two managed disks and attaches them to **az104-08-vm1**, similarly to the storage configuration of the first virtual machine via the Azure portal.



```
54     "dataDisks": [],
55     "diskControllerType": "SCSI"
56   },
57   "osProfile": {
58     "computerName": "[parameters('virtualMachines_az1C_name')]",
59     "adminUsername": "tStudent",
60     "windowsConfiguration": {
61       "provisionVMAgent": true,
62       "enableAutomaticUpdates": false,
63       "patchSettings": {
64         "patchMode": "Manual",
65         "assessmentMode": "ImageDefault",
66         "enableHotpatching": false
67       },
68       "enableVMAgentPlatformUpdates": false
69     },
70     "secrets": []
71   }
72 }
```



```
53   },
54   "dataDisks": [
55     {
56       "lun": 0,
57       "name": "az104-08-vm1-disk0",
58       "diskSizeGB": "1024",
59       "caching": "ReadOnly",
60       "createOption": "Empty"
61     },
62     {
63       "lun": 1,
64       "name": "az104-08-vm1-disk1",
65       "diskSizeGB": "1024",
66       "caching": "ReadOnly",
67       "createOption": "Empty"
68     }
69   ],
70   "diskControllerType": "SCSI"
71 }
```

16. Click **Save** and, back on the **Custom deployment** blade, click **Review + Create** and, on the **Review + Create** blade, click **Create**.

Note: Wait for the template deployment to complete. You can monitor its progress from the **Disks** blade of the **az104-08-vm1** virtual machine. This should take no more than 3 minutes.

Microsoft Azure Search resources, services, and docs (G+)

Home > Virtual machines > az104-08-vm1 | Export template >

Custom deployment

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →

Template

Customized template 2 resources

Edit template Edit parameters Visualize

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * Azure for Students

Resource group * az104-08-rg01

Create new

Instance details

Microsoft Azure Search resources, services, and docs (G+)

Home > Virtual machines > az104-08-vm1 | Export template

Custom deployment

Deploy from a custom template

Basics Review + create

Summary

Customized template
2 resources

Terms

Azure Marketplace Terms | Azure Marketplace

By clicking "Create," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

Microsoft assumes no responsibility for any actions performed by third-party templates and does not provide rights for third-party products or services. See the [Azure Marketplace Terms](#) for additional terms.

Previous Next Create

The screenshot shows the Microsoft Azure Deployment Overview page. At the top right, there is a message: "Deployment succeeded" and "Deployment 'Microsoft.Template-20231115211716' to resource group 'az104-08-rg01' was successful." Below this, there are buttons for "Pin to dashboard..." and "Go to resource group...". On the left, there is a sidebar with "Overview", "Inputs", "Outputs", and "Template" options. The main content area displays deployment details: Deployment name: Microsoft.Template-20231115211716, Start time: 11/15/2023, 9:17:33 PM, Subscription: Azure for Students, Correlation ID: 06c26913-1be9-4541-b1af-8fa..., Resource group: az104-08-rg01. There are sections for "Deployment details" and "Next steps", with a "Go to resource group" button. On the right side, there are promotional links for "Cost management", "Microsoft Defender for Cloud", and "Free Microsoft tutorials". The taskbar at the bottom shows various application icons.

- Back on the **az104-08-vm1** blade, in the **Operations** section, click **Run command**, and, in the list of commands, click **RunPowerShellScript**.

The screenshot shows the "Run Command Script" blade for the virtual machine "az104-08-vm1". The left sidebar lists operations: Auto-shutdown, Backup, Disaster recovery, Updates, Health monitoring, Inventory, Change tracking, Automate, Configuration management, Policies, and Run command (which is selected). The main area shows a PowerShell script editor with the following content:

```
1
```

Below the editor is a "Run" button. A tooltip for "Run Command" explains: "Run Command uses the recovery, and for general maintenance tasks." A list of available scripts includes: RunPowerShellScript, DisableNLA, DisableWindowsUpdate, EnableAdminAccount, EnableEMS, EnableRemotePS, EnableWindowsUpdate, and IPCfg.

- On the **Run Command Script** blade, type the following and click **Run** to create a drive Z: consisting of the two newly attached disks with the simple layout and fixed provisioning:

```
New-StoragePool -FriendlyName storagepool1 -StorageSubsystemFriendlyName "Windows Storage*" -PhysicalDisks (Get-PhysicalDisk -CanPool $true)
```

```
New-VirtualDisk -StoragePoolFriendlyName storagepool1 -FriendlyNa
```

```
me virtualdisk1 -Size 2046GB -ResiliencySettingName Simple -ProvisioningType Fixed
```

```
Initialize-Disk -VirtualDisk (Get-VirtualDisk -FriendlyName virtualdisk1)
```

```
New-Partition -DiskNumber 4 -UseMaximumSize -DriveLetter Z
```

Note: Wait for the confirmation that the commands completed successfully.

The screenshot shows two instances of the Microsoft Azure Run Command Script interface. Both instances are for the same virtual machine, "az104-08-vm1".

Top Instance (Left):

- Script Content:**

```
1 New-StoragePool -FriendlyName storagepool1 -StorageSubsystemFriendlyName "Windows Storage*" -PhysicalVolumeType SSD -AllocationUnitSize 512MB -Size 2046GB
2
3 New-VirtualDisk -StoragePoolFriendlyName storagepool1 -FriendlyName virtualdisk1 -Size 2046GB -ResiliencySettingName Simple
4 Initialize-Disk -VirtualDisk (Get-VirtualDisk -FriendlyName virtualdisk1)
5
6 New-Partition -DiskNumber 4 -UseMaximumSize -DriveLetter Z
```
- Run Button:** A blue "Run" button is located at the bottom of the script editor.

Bottom Instance (Right):

- Script Output:**

Script execution complete

| Name | Value |
|------------------------|--|
| storagepool1 | OK |
| ObjectId | : {1}\az104-08-vm1\root\Microsoft\Windows\Storage\Providers_v2\SPACE |
| S_VirtualDisk.0b | objectId="{905db6cc-83a4-11ee-af29-80e6f6e6963}:VD:{bb1f3ca1-beec-49f39c}{124dfb6a-8fa2-4744-9441-b6dcf6e71405}" |
| 96-80f0-2951df62 | |
| PassThroughClass | : |
| PassThroughIds | : |
| PassThroughNamespace | : |
| PassThroughServer | : |
| UniqueId | : |
| Access | : Read/Write |
| AllocatedSize | : 2196875771904 |
| AllocationUnitSize | : 1073741824 |
| ColumnIsolation | : PhysicalDisk |
| DetachedReason | : None |
| FaultDomainAwareness | : PhysicalDisk |
| FootprintOnPool | : 2196875771904 |
| FriendlyName | : virtualdisk1 |
| HealthStatus | : Healthy |
| Interleave | : 262144 |
| IsDeduplicationEnabled | : False |

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Home > az104-08-vm1

az104-08-vm1 | Run command

Virtual machine

Run Command Script

RunPowerShellScript

Script execution complete

| | | |
|-----------------------------------|---|---------------|
| IsEnclosureAware | : | False |
| IsManualAttach | : | False |
| IsSnapshot | : | False |
| IsTiered | : | False |
| LogicalSectorSize | : | 512 |
| MediaType | : | Unspecified |
| Name | : | |
| NameFormat | : | |
| NumberOfAvailableCopies | : | 2 |
| NumberOfColumns | : | 1 |
| NumberOfDataCopies | : | 1 |
| NumberOfGroups | : | 1 |
| OperationalStatus | : | OK |
| OtherOperationalStatusDescription | : | |
| OtherUsageDescription | : | |
| ParityLayout | : | |
| PhysicalDiskRedundancy | : | 0 |
| PhysicalSectorSize | : | 4096 |
| ProvisioningType | : | Fixed |
| ReadCacheSize | : | 0 |
| RequestNoSinglePointOfFailure | : | False |
| ResiliencySettingName | : | Simple |
| Size | : | 2196875771904 |

Now it's possible to use PowerShell cmdlets and templates to automate tasks.

Run Command uses the Run command feature to run PowerShell scripts, and for general automation, it can be used to run scripts or commands.

Name

- RunPowerShellScript
- DisableNLA
- DisableWindowsUpdate
- EnableAdminAccount
- EnableEMS
- EnableRemotePS
- EnableWindowsUpdate
- IPConfig

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Home > az104-08-vm1

az104-08-vm1 | Run command

Virtual machine

Run Command Script

RunPowerShellScript

Script execution complete

| | | |
|---------------------------|---|--|
| UniqueIdFormat | : | Vendor Specific |
| UniqueIdFormatDescription | : | |
| Usage | : | Data |
| WriteCacheSize | : | 0 |
| PSComputerName | : | |
| | : | |
| ObjectId | : | {1}\az104-08-vm1\root\Microsoft\Windows\Storage\Providers_v2\WSP_Partition.Object |
| ctId="985db6cc- | : | 83a4-11ee-af29-806e6f6ee6963):PR:{00000000-0000-0000-0000-000100000000}\?\storage\#disk#{124dfb6a-8fa2-4744-9441-b6bf-11d0-94f2-00a0c91efb8b}" |
| e#disk#{124dfb6a | : | -8fa2-4744-9441-b6dcf6e71405}#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}" |
| PassThroughClass | : | |
| PassThroughIds | : | |
| PassThroughNamespace | : | |
| PassThroughServer | : | |
| UniqueId | : | {00000000-0000-0000-0000-000100000000}6AFB4D12A28F44479441B6DCF6E71405 |
| AccessPaths | : | {2:\, \?\Volume(eada949d-d758-403f-9a4c-864a86c2817f)\} |
| DiskId | : | \?\storage\#disk#{124dfb6a-8fa2-4744-9441-b6dcf6e71405}#{53f56307-b6bf-11d0-94f2-00a0c91efb8b} |
| -0a0c91efb8b} | : | |
| DiskNumber | : | 4 |
| DriveLetter | : | Z |
| GptType | : | {ebd0a0a2-b9e5-4433-87c0-68b6b72699c7} |

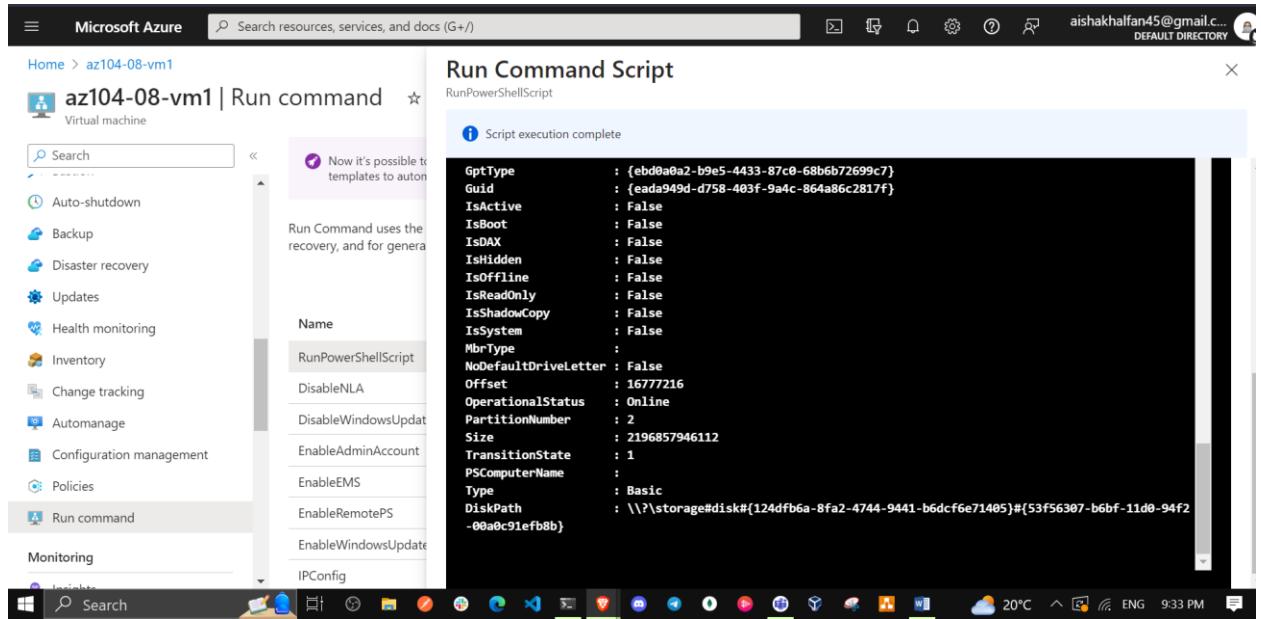
Now it's possible to use PowerShell cmdlets and templates to automate tasks.

Run Command uses the Run command feature to run PowerShell scripts, and for general automation, it can be used to run scripts or commands.

Name

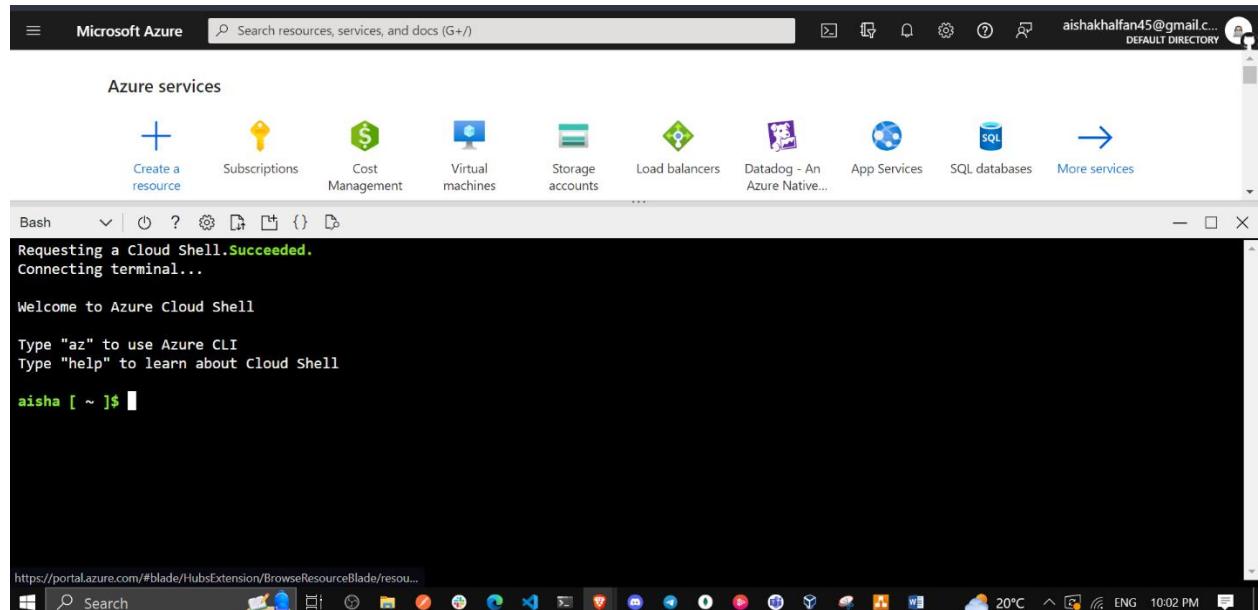
- RunPowerShellScript
- DisableNLA
- DisableWindowsUpdate
- EnableAdminAccount
- EnableEMS
- EnableRemotePS
- EnableWindowsUpdate
- IPConfig

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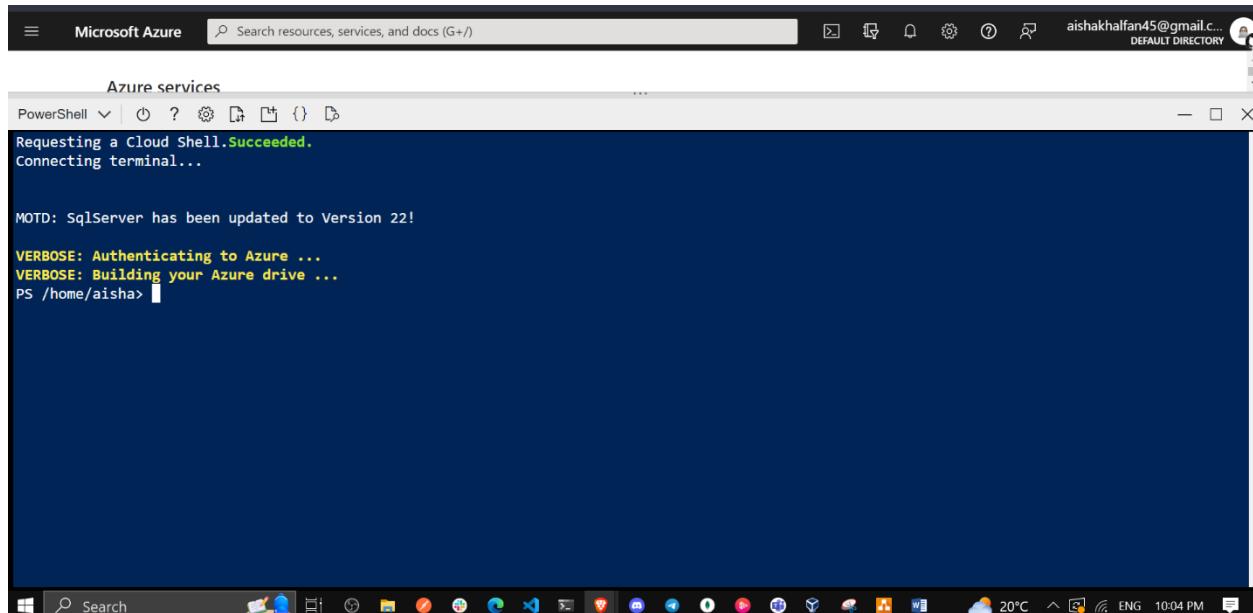
Task 4: Register the Microsoft.Insights and Microsoft.AlertsManagement resource providers

- In the Azure portal, open the **Azure Cloud Shell** by clicking on the icon in the top right of the Azure Portal.



- If prompted to select either **Bash** or **PowerShell**, select **PowerShell**.

Note: If this is the first time you are starting **Cloud Shell** and you are presented with the **You have no storage mounted** message, select the subscription you are using in this lab, and click **Create storage**.



```
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

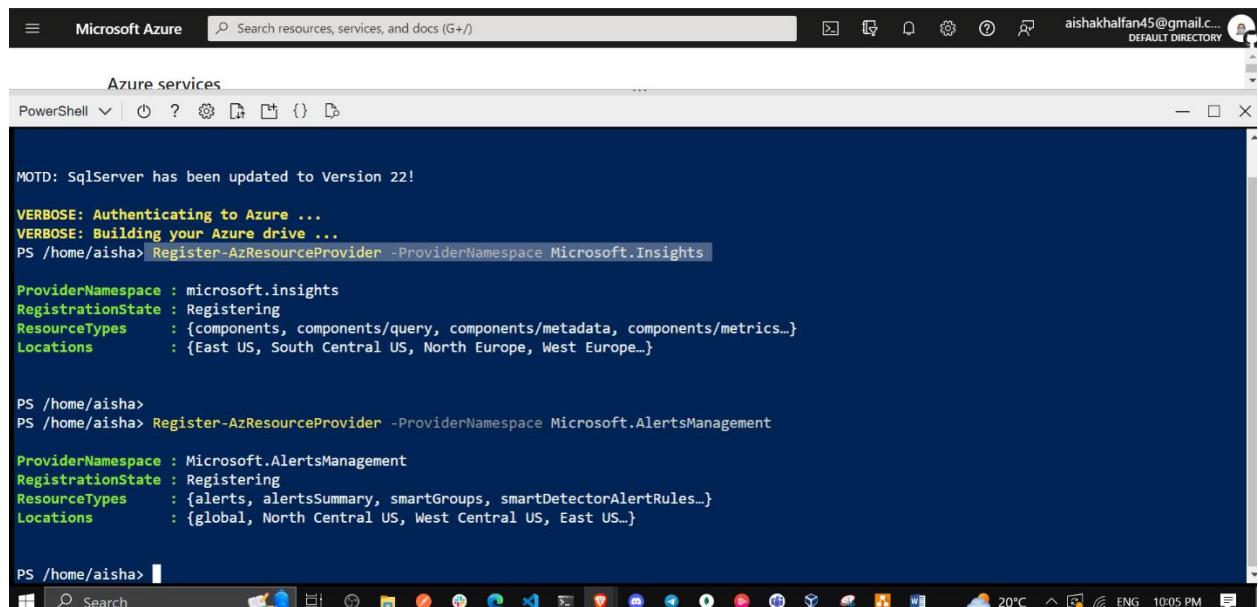
MOTD: SqlServer has been updated to Version 22!

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/aisha>
```

3. From the Cloud Shell pane, run the following to register the Microsoft.Insights and Microsoft.AlertsManagement resource providers.

```
Register-AzResourceProvider -ProviderNamespace Microsoft.Insights
```

```
Register-AzResourceProvider -ProviderNamespace Microsoft.AlertsManagement
```



```
MOTD: SqlServer has been updated to Version 22!

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/aisha> Register-AzResourceProvider -ProviderNamespace Microsoft.Insights

ProviderNamespace : microsoft.insights
RegistrationState : Registering
ResourceTypes    : {components, components/query, components/metadata, components/metrics...}
Locations       : {East US, South Central US, North Europe, West Europe...}

PS /home/aisha> Register-AzResourceProvider -ProviderNamespace Microsoft.AlertsManagement

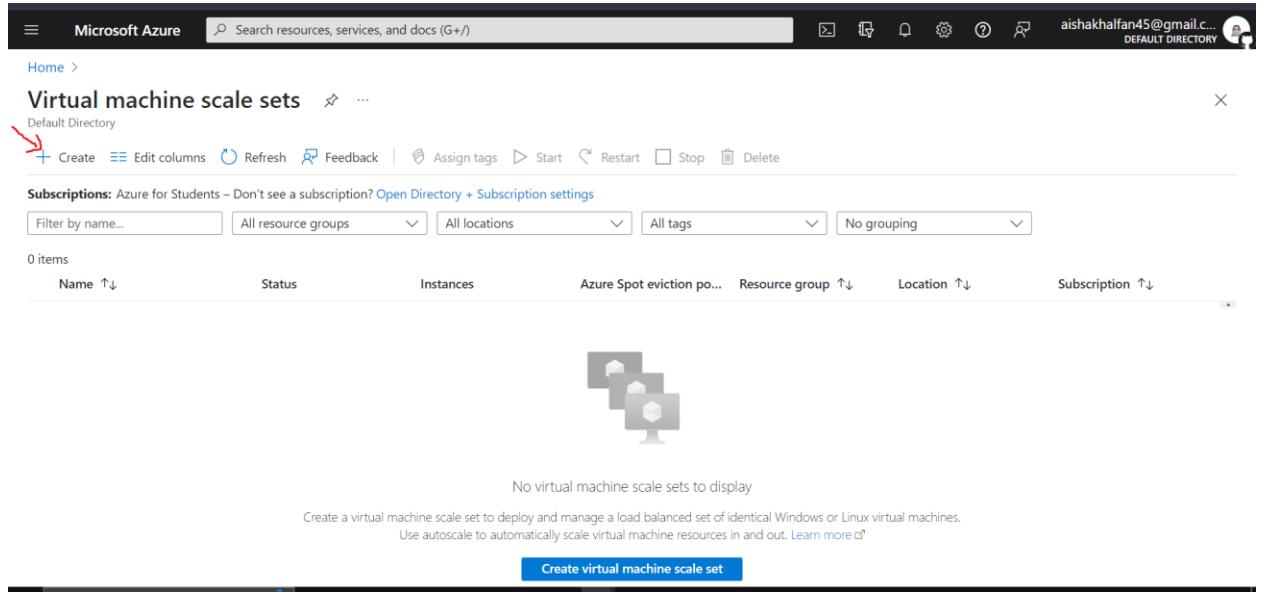
ProviderNamespace : Microsoft.AlertsManagement
RegistrationState : Registering
ResourceTypes    : {alerts, alertsSummary, smartGroups, smartDetectorAlertRules...}
Locations       : {global, North Central US, West Central US, East US...}

PS /home/aisha>
```

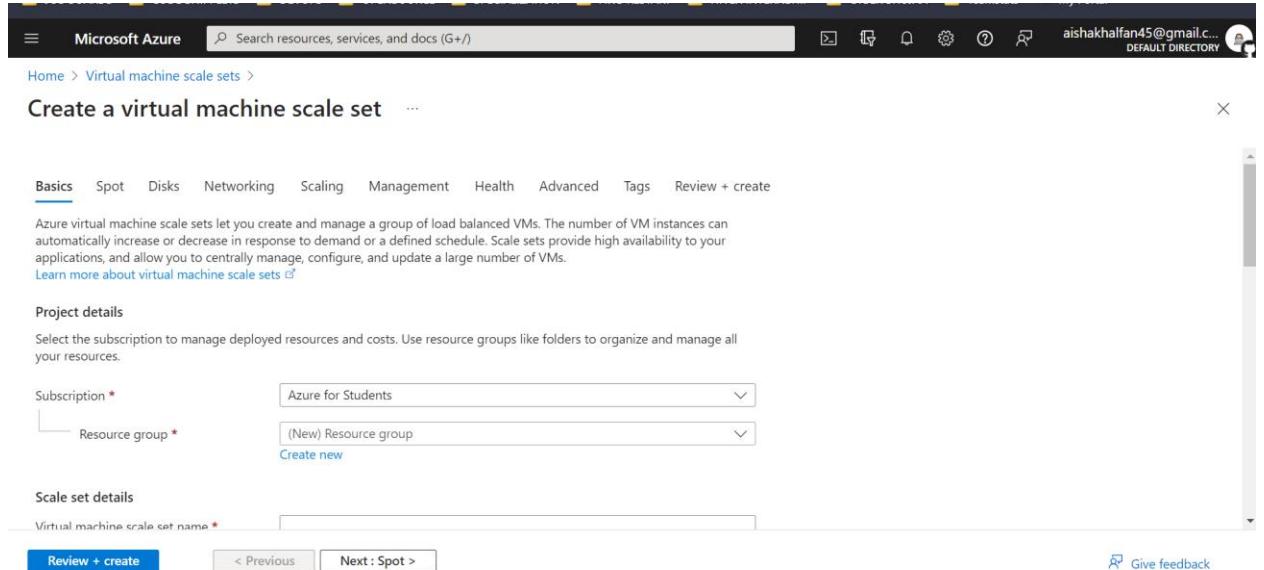
Task 5: Deploy zone-resilient Azure virtual machine scale sets by using the Azure portal

In this task, you will deploy Azure virtual machine scale set across availability zones by using the Azure portal.

1. In the Azure portal, search for and select **Virtual machine scale sets** and, on the **Virtual machine scale sets** blade, click **+ Add** (or **+ Create**).



The screenshot shows the 'Virtual machine scale sets' blade in the Azure portal. At the top, there is a toolbar with various icons and a search bar. Below the toolbar, there is a header with the title 'Virtual machine scale sets'. A red arrow points to the '+ Create' button. The main area displays a message: 'No virtual machine scale sets to display' and 'Create a virtual machine scale set to deploy and manage a load balanced set of identical Windows or Linux virtual machines. Use autoscale to automatically scale virtual machine resources in and out. Learn more'. At the bottom of this section is a blue 'Create virtual machine scale set' button. Below this is another screenshot of the 'Create a virtual machine scale set' blade.



The screenshot shows the 'Create a virtual machine scale set' blade. The 'Basics' tab is selected. At the top, there are tabs for Basics, Spot, Disks, Networking, Scaling, Management, Health, Advanced, Tags, and Review + create. Below the tabs, there is a brief description of what Azure virtual machine scale sets are and a link to learn more. Under the 'Project details' section, there are fields for Subscription (set to 'Azure for Students') and Resource group (set to '(New) Resource group'). There is also a 'Create new' button. At the bottom, there is a 'Virtual machine scale set name' field, a 'Review + create' button, a 'Next : Spot >' button, and a 'Give feedback' link.

2. On the **Basics** tab of the **Create a virtual machine scale set** blade, specify the following settings (leave others with their default values) and click **Next : Disks >**:

| Setting | Value |
|--|---|
| Subscription | the name of the Azure subscription you are using in this lab |
| Resource group | the name of a new resource group az104-08-rg02 |
| Virtual machine scale set name | az10408vmss0 |
| Region | select one of the regions that support availability zones and where you can provision Azure virtual machines different from the one you used to deploy virtual machines earlier in this lab |
| Availability zone | Zones 1, 2, 3 |
| Orchestration mode | Uniform |
| Image | Windows Server 2019 Datacenter - Gen2 |
| Run with Azure Spot discount | No |
| Size | Standard D2s_v3 |
| Username | Student |
| Password | Provide a secure password |
| Already have a Windows Server license? | Unchecked |

Note: For the list of Azure regions which support deployment of Windows virtual machines to availability zones, refer to [What are Availability Zones in Azure?](#)

The screenshot shows the 'Create a virtual machine scale set' wizard in the Microsoft Azure portal. The user has selected the 'az104-08-rg02' resource group and specified the 'az10408vmss0' name for the VMSS. The region is set to '(US) East US' and the availability zone is set to 'Zones 1, 2, 3'. The orchestration mode is chosen as 'Uniform'. The 'Review + create' button is visible at the bottom left.

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Home > Virtual machine scale sets >

Create a virtual machine scale set

Orchestration mode * **Flexible:** achieve high availability at scale with identical or multiple virtual machine types
 Uniform: optimized for large scale stateless workloads with identical instances

Security type Trusted launch virtual machines Configure security features

Instance details

Image * Windows Server 2019 Datacenter - x64 Gen2 See all images | Configure VM generation

VM architecture Arm64 x64

Review + create < Previous Next : Spot > Give feedback

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Home > Virtual machine scale sets >

Create a virtual machine scale set

Run with Azure Spot discount

Size * Standard_D2s_v3 - 2 vcpus, 8 GiB memory (\$137.24/month) See all sizes

Enable Hibernation (preview)
To enable Hibernation, you must register your subscription. [Learn more](#)

Administrator account

Username * ✓

Password * ✓

Confirm password * ✓

Review + create < Previous Next : Spot > Give feedback

3. On the Disks tab of the **Create a virtual machine scale set** blade, accept the default values and click **Next : Networking >**.

- On the **Networking** tab of the **Create a virtual machine scale set** blade, click the **Create virtual network** link below the **Virtual network** textbox and create a new virtual network with the following settings (leave others with their default values).

| Setting | Value |
|---------------|---------------------------|
| Name | az104-08-rg02-vnet |
| Address range | 10.82.0.0/20 |
| Subnet name | subnet0 |
| Subnet range | 10.82.0.0/24 |

Note: Once you create a new virtual network and return to the **Networking** tab of the **Create a virtual machine scale set** blade, the **Virtual network** value will be automatically set to **az104-08-rg02-vnet**.

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Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics Spot Disks **Networking** Scaling Management Health Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution. [Learn more about VMSS networking](#)

Virtual network configuration

Azure Virtual Network (VNet) enables many types of Azure resources to securely communicate with each other, the internet, and on-premises networks. [Learn more about VNets](#)

Virtual network * ⌄ [Create virtual network](#)

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

[Review + create](#) [◀ Previous](#) [Next : Scaling >](#) [Give feedback](#)

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Create a virtual machine scale set

Basics Spot Disks **Networking** Scaling Management

Define network connectivity for your virtual machine by configuring inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution. [Learn more about VMSS networking](#)

Virtual network configuration

Azure Virtual Network (VNet) enables many types of Azure resources to securely communicate with each other in a virtual network which is a logical isolation of the Azure cloud dedicated to your subscription. You can connect virtual networks to other virtual networks, or your on-premises network. [Learn more about virtual networks](#)

Virtual network * ⌄ [Create virtual network](#)

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

Create virtual network

Virtual Network service enables Azure resources to securely communicate with each other in a virtual network which is a logical isolation of the Azure cloud dedicated to your subscription. You can connect virtual networks to other virtual networks, or your on-premises network. [Learn more about virtual networks](#)

Name * ✓

Resource group * ⌄ [Create new](#)

Address space

The virtual network's address space specified as one or more address prefixes in CIDR notation (e.g. 10.0.0.0/16).

| <input type="checkbox"/> Address range | Addresses | Overlap |
|--|---|---------|
| <input type="checkbox"/> 10.1.0.0/16 | 10.1.0.4 - 10.1.255.254 (65531 addresses) | None |
| <input checked="" type="checkbox"/> 10.82.0.0/20 | 10.82.0.4 - 10.82.15.254 (4091 addresses) | None |
| | (0 Addresses) | None |

Subnets

[Review + create](#) [◀ Previous](#) [Next : Scaling >](#) [OK](#) [Discard](#)

5. Back on the **Networking** tab of the **Create a virtual machine scale set** blade, click the **Edit network interface** icon to the right of the network interface entry.
6. On the **Edit network interface** blade, in the **NIC network security group** section, click **Advanced** and click **Create new** under the **Configure network security group** drop-down list.

7. On the **Create network security group** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|---------|-------------------------|
| Name | az10408vmss0-nsg |

Name *
az10408vmss0-nsg

Inbound rules ⓘ
1000: default-allow-ssh
Any
SSH (TCP/22)
+ Add an inbound rule

Outbound rules ⓘ
No results.
+ Add an outbound rule

OK

8. Click **Add an inbound rule** and add an inbound security rule with the following settings (leave others with their default values):

| Setting | Value |
|-------------------------|--------------------------|
| Source | Any |
| Source port ranges | * |
| Destination | Any |
| Destination port ranges | 80 |
| Protocol | TCP |
| Action | Allow |
| Priority | 1010 |
| Name | custom-allow-http |

The screenshot shows the Microsoft Azure portal interface. On the left, the 'Create network security group' blade is displayed with a 'Name' field set to 'az10408vmss0-nsg'. Under 'Inbound rules', it lists a single rule: '1000: default-allow-ssh' (Any, SSH (TCP/22)). Under 'Outbound rules', it says 'No results.' and has a '+ Add an outbound rule' link. At the bottom is an 'OK' button. On the right, a modal window titled 'Add inbound security rule' is open for the resource group 'az10408vmss0-nsg'. It contains fields for 'Source port ranges' (set to '*'), 'Destination' (set to 'Any'), 'Service' (set to 'Custom'), and 'Destination port ranges' (set to '80'). Below these are protocol options: Any (radio button), TCP (selected), UDP, and ICMP. At the bottom of the modal are 'Add' and 'Cancel' buttons, and a 'Give feedback' link.

This screenshot is identical to the one above, showing the 'Create network security group' blade and the 'Add inbound security rule' dialog. The only difference is the time on the taskbar: it changes from '10:42 PM' to '10:43 PM'.

9. Click **Add** and, back on the **Create network security group** blade, click **OK**.

Create network security group

Name * az10408vmss0-nsg

Inbound rules ①

- 1000: default-allow-ssh
- Any
- SSH (TCP/22)
- + Add an inbound rule

Outbound rules ①

No results.

+ Add an outbound rule

Add inbound security rule

az10408vmss0-nsg

Action Allow Deny

Priority * ① 1010

Name * custom-allow-http

Description

OK **Add** **Cancel** **Give feedback**

Create network security group

Name * az10408vmss0-nsg

Inbound rules ①

- 1000: default-allow-ssh
- Any
- SSH (TCP/22)
- 1010: custom-allow-http
- Any
- HTTP (TCP/80)
- + Add an inbound rule

Outbound rules ①

No results.

+ Add an outbound rule

OK

10. Back on the **Edit network interface** blade, in the **Public IP address** section, click **Enabled** and click **OK**.

Subnet *

NIC network security group Advanced

Configure network security group *

Public IP address Enabled

Accelerated networking Enabled

OK **Cancel**

- Back on the **Networking** tab of the **Create a virtual machine scale set** blade, under the **Load balancing** section, specify the following (leave others with their default values).

| Setting | Value |
|------------------------|-------------------------------|
| Load balancing options | Azure load balancer |
| Select a load balancer | Create a load balancer |

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#)

Load balancing options Azure load balancer

Note: To allow traffic from your load balancing product, please update the appropriate port configuration on your network security group associated with your network interface.

Select a load balancer *

Review + create **< Previous** **Next : Scaling >**

- On the **Create a load balancer** page, specify the load balancer name and take the defaults. Click **Create** when you are done then **Next : Scaling >**.

Create a load balancer

Details such as subscription and resource group will be inherited from the virtual machine that you're creating. A default IP, backend pool, and load balancer rule will be created on your behalf, though certain configurations can be changed if desired.

Load balancer name * 2

Type * Public
Provides outbound connections for virtual machines inside your virtual network using public load balancers.

Internal
Used to load balance traffic inside a virtual network. A load balancer frontend can be accessed from an on-premises network in a hybrid scenario.

Protocol * TCP
 UDP

Create 3 Cancel

| Setting | Value |
|--------------------|------------------------|
| Load balancer name | az10408vmss0-lb |

13. On the **Scaling** tab of the **Create a virtual machine scale set** blade, specify the following settings (leave others with their default values) and click **Next : Management >**:

| Setting | Value |
|------------------------|---------------|
| Initial instance count | 2 |
| Scaling policy | Manual |

Create a virtual machine scale set

Basics Spot Disks Networking **Scaling** Management Health Advanced Tags Review + create

An Azure virtual machine scale set can automatically increase or decrease the number of VM instances that run your application. This automated and elastic behavior reduces the management overhead to monitor and optimize the performance of your application. [Learn more about VMSS scaling](#)

Initial instance count * 1

Scaling

Scaling policy Manual 2
 Custom

Scale-In policy

Configure the order in which virtual machines are selected for deletion during a scale-in operation. [Learn more about scale-in policies](#)

Scale-in policy 3

Review + create Previous Next : Management > Give feedback

14. On the **Management** tab of the **Create a virtual machine scale set** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|-----------------------------|---|
| Boot diagnostics | Enable with custom storage account |
| Diagnostics storage account | accept the default value |

Note: You will need the name of this storage account in the next task.

Click **Next : Health >**:

Your subscription is protected by Microsoft Defender for Cloud basic plan.

Upgrade policy
Upgrade mode * ⓘ Manual - Existing instances must be manually upgraded

Monitoring
Boot diagnostics ⓘ
 Enable with managed storage account (recommended)
 Enable with custom storage account
 Disable

Diagnostics storage account * ⓘ **(new) az10408rg02diag243**

Identity
Enable system assigned managed identity ⓘ

Review + create **< Previous** **Next : Health >** **Give feedback**

15. On the **Health** tab of the **Create a virtual machine scale set** blade, review the default settings without making any changes and click **Next : Advanced >**.

Basics **Spot** **Disks** **Networking** **Scaling** **Management** **Health** **Advanced** **Tags** **Review + create**

You can configure health monitoring on an application endpoint to update the status of the application on that instance. This instance status is required to enable platform managed upgrades like automatic OS updates and virtual machine instance upgrades. [Learn more about application health monitoring](#)

Health
Enable application health monitoring

Automatic repair policy
Before enabling the automatic repairs policy, review the requirements for opting in. [Learn more about automatic repair policy](#)

Enable automatic repairs
To enable automatic repairs, you must apply application health monitoring.

Review + create **< Previous** **Next : Advanced >** **Give feedback**

16. On the **Advanced** tab of the **Create a virtual machine scale set** blade, specify the following settings (leave others with their default values) and click **Review + create**.

| Setting | Value |
|---------------------|---|
| Spreading algorithm | Fixed spreading (not recommended with zones) |

Note: The **Max spreading** setting is currently not functional.

The screenshot shows the 'Create a virtual machine scale set' blade in the Azure portal. The 'Advanced' tab is selected. In the 'Spreading algorithm' section, the 'Fixed spreading' radio button is selected. A yellow warning box contains the text: '⚠ Fixed spreading is not recommended when using availability zones'. At the bottom of the blade, there is a 'Review + create' button.

17. On the **Review + create** tab of the **Create a virtual machine scale set** blade, ensure that the validation passed and click **Create**.

Note: Wait for the virtual machine scale set deployment to complete. This should take about 5 minutes.

The screenshot shows the 'Create a virtual machine scale set' blade in the Azure portal. The 'Review + create' tab is selected. A red validation error message box contains the text: '✖ Validation failed. Required information is missing or not valid.'. At the bottom of the blade, there is a 'Review + create' button.

I got this validation error because my azure students account only allowed 3 Public IP addresses. To solve I had to disable the Public IP on the new NIC created

Task 6: Configure Azure virtual machine scale sets by using virtual machine extensions

In this task, you will install Windows Server Web Server role on the instances of the Azure virtual machine scale set you deployed in the previous task by using the Custom Script virtual machine extension.

1. In the Azure portal, search for and select **Storage accounts** and, on the **Storage accounts** blade, click the entry representing the diagnostics storage account you created in the previous task.

The screenshot shows the Microsoft Azure Storage accounts blade. At the top, there's a search bar and a navigation bar with icons for Home, Storage accounts, and a user profile. Below the navigation bar, there are buttons for Create, Restore, Manage view, Refresh, Export to CSV, Open query, Assign tags, and Delete. A filter bar allows filtering by Subscription, Resource group, Location, and Add filter. The main table displays two records, showing columns for Name, Type, Kind, Resource group, Location, and Subscription. The 'aishak' account is selected, indicated by a checked checkbox.

| Name | Type | Kind | Resource group | Location | Subscription |
|---------------------|-----------------|-----------|------------------------------|-------------|--------------------|
| aishak | Storage account | Storage | az104-08-rg01 | East US | Azure for Students |
| csb100320003b962555 | Storage account | StorageV2 | cloud-shell-storage-weste... | West Europe | Azure for Students |

- On the storage account blade, in the **Data Storage** section, click **Containers** and then click **+ Container**.

The screenshot shows the 'aishak | Containers' blade. The left sidebar has a 'Data storage' section with 'Containers' selected, and other options like File shares, Queues, and Tables. The right pane shows a list of containers with columns for Name, Last modified, Anonymous access level, and Lease state. Three containers are listed: 'bootdiagnostics-az10408vm...', 'bootdiagnostics-az10408vm...', and 'scripts'. The 'scripts' container is highlighted with a red box.

| Name | Last modified | Anonymous access l... | Lease state |
|------------------------------|-------------------------|-----------------------|-------------|
| bootdiagnostics-az10408vm... | 11/15/2023, 1:24:02 ... | Private | Available |
| bootdiagnostics-az10408vm... | 11/15/2023, 1:48:36 ... | Private | Available |
| scripts | 11/15/2023, 7:09:29 ... | Private | Available |

- On the **New container** blade, specify the following settings (leave others with their default values) and click **Create**:

| Setting | Value |
|---------------------|--------------------------------------|
| Name | scripts |
| Public access level | Private (no anonymous access) |

The screenshot shows the Microsoft Azure Storage account 'scripts' blade. The 'Overview' tab is selected. A file named 'az104-08-install_IIS.ps1' is listed in the blob table. The table has columns: Name, Modified, Access tier, Archive status, Blob type, and Size. The file 'az104-08-install_IIS.ps1' is selected, showing its details: Modified on 11/15/2023, 7:17:16 ..., Blob type is Block blob, and Size is 239.

4. Back on the storage account blade displaying the list of containers, click **scripts**.
5. On the **scripts** blade, click **Upload**.
6. On the **Upload blob** blade, click the folder icon, in the **Open** dialog box, navigate to the **\Allfiles\Lab\08** folder, select **az104-08-install_IIS.ps1**, click **Open**, and back on the **Upload blob** blade, click **Upload**.
7. In the Azure portal, navigate back to the **Virtual machine scale sets** blade and click **az10408vmss0**.

The screenshot shows the Microsoft Azure Virtual machine scale sets blade. The 'az10408vmss0' blade is selected. The table lists one item: 'az10408vmss0'. The table columns are: Name, Status, Instances, Azure Spot eviction po..., Resource group, Location, and Subscription. The item 'az10408vmss0' has a status of 'Succeeded', 0 instances, is in the 'az104-08-rg02' resource group, located in 'East US', and is part of the 'Azure for Students' subscription.

8. On the **az10408vmss0** blade, in the **Settings** section, click **Extensions and applications**, and the click **+ Add**.

The image shows two screenshots of the Microsoft Azure portal interface.

Screenshot 1: Virtual machine scale sets blade

This screenshot shows the 'Virtual machine scale sets' blade for a resource group named 'az10408-rg02'. The main pane displays the 'az10408vmss0' virtual machine scale set. The left sidebar lists various settings: Activity log, Access control (IAM), Tags, Diagnose and solve problems, Instances, Networking, Scaling, Disks, Operating system, Microsoft Defender for Cloud, Guest + host updates, and Size. The right pane shows the 'Essentials' section with details like Resource group (az104-08-rg02), Status (Standard_DS1_v2 (0 instances)), Location (East US), Subscription (Azure for Students), and Tags (edit, Add tags). A 'Properties' tab is selected.

Screenshot 2: Extensions + applications blade

This screenshot shows the 'Extensions + applications' blade for the same virtual machine scale set. The left sidebar lists Settings, Instances, Networking, Scaling, Disks, Operating system, Microsoft Defender for Cloud, Guest + host updates, Size, Extensions + applications (which is highlighted with a red box and a red number '3'), Configuration, Upgrade policy, and Health and repair. The right pane shows the 'Extensions' tab with a search bar, an 'Add' button, and a table with columns: Name, Type, Version, and Automatic. The table displays the message: 'No resource extensions found.'

9. On the **New resource** blade, click **Custom Script Extension** and then click **Next**.

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Virtual machine scale sets > az10408vmss0 | Extensions + applications

Install an Extension

Control-M Agent

Custom script extension

Datadog Agent

DxEnterprise for Windows

Next 2

- From the **Install extension** blade, **Browse** to and **Select** the **az104-08-install_IIS.ps1** script that was uploaded to the **scripts** container in the storage account earlier in this task, and then click **Create**.

Note: Wait for the installation of the extension to complete before proceeding to the next step.

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Install an Extension > Configure Custom script extension Extension > Storage accounts > Containers >

script

Container

Upload Refresh Give feedback

Authentication method: Access key ([Switch to Microsoft Entra user account](#))

Location: script

Search blobs by prefix (case-sensitive)

Show deleted blobs

Add filter

| Name | Modified | Access tier | Archive status | Blob type | Size | Lease state |
|--------------------------|--------------------------|-------------|----------------|------------|-------|-------------|
| az104-08-install_IIS.ps1 | 11/15/2023, 11:34:09 ... | | | Block blob | 239 B | Available |

Select

Microsoft Azure Search resources, services, and docs (G+/)

Home > Install an Extension > Configure Custom script extension Extension >

Configure Custom script extension Extension

Create

Script file (Required) * az104-08-install_IIS.ps1 Arguments (Optional)

11. In the **Settings** section of the **az10408vmss0** blade, click **Instances**, select the checkboxes next to the two instances of the virtual machine scale set, click **Upgrade**, and then, when prompted for confirmation, click **Yes**.

Note: Wait for the upgrade to complete before proceeding to the next step.

Microsoft Azure Search resources, services, and docs (G+/)

Home > az10408vmss0

az10408vmss0 | Instances

Virtual machine scale set

Settings

- Instances
- Networking
- Scaling
- Disk
- Operating system
- Microsoft Defender for Cloud
- Guest + host updates
- Size
- Extensions + applications
- Configuration
- Upgrade policy

Search virtual machine instances

| Instance | Computer name | Status | Protection policy | Provisioning sta... | Health state | Latest model |
|-------------|---------------|--------|-------------------|---------------------|--------------|--------------|
| No results. | | | | | | |

12. In the Azure portal, search for and select **Load balancers** and, in the list of load balancers, click **az10408vmss0-lb**.

az10408vmss0-lb Load balancer

Essentials

- Resource group ([move](#)) **az104-08-rg02**
- Location **East US**
- Subscription ([move](#)) **Azure for Students**
- Subscription ID **3dbbbb5-1829-48d8-a51d-c7f11b061059**
- SKU **Standard**
- Tags ([edit](#)) [Add tags](#)
- See more

Configure high availability and scalability for your applications

Create highly-available and scalable applications in minutes by using built-in load balancing for cloud services and virtual machines.

- On the **az10408vmss0-lb** blade, note the value of the **Public IP address** assigned to the frontend of the load balancer, open a new browser tab, and navigate to that IP address.

Note: Verify that the browser page displays the name of one of the instances of the Azure virtual machine scale set **az10408vmss0**.

az10408vmss0-lb | Frontend IP configuration

| Name | IP address | Rules count |
|----------------------------------|---|-------------|
| az10408vmss0-lb-frontendconfig01 | 172.178.53.192 (az10408vmss0-lb-publicip) | 1 |

Task 7: Scale compute and storage for Azure virtual machine scale sets

In this task, you will change the size of virtual machine scale set instances, configure their autoscaling settings, and attach disks to them.

- In the Azure portal, search for and select **Virtual machine scale sets** and select the **az10408vmss0** scale set

The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and a navigation bar with icons for Home, Refresh, Feedback, Assign tags, Start, Restart, Stop, and Delete. Below the search bar, it says "Subscriptions: Azure for Students – Don't see a subscription? Open Directory + Subscription settings". There are filters for "Filter by name...", "All resource groups", "All locations", "All tags", and "No grouping". A table lists one item: "az10408vmss0" with status "Succeeded", 0 instances, and located in "East US" under "Azure for Students".

2. In the **az10408vmss0** blade, in the **Settings** section, click **Size**.

The screenshot shows the "az10408vmss0 | Size" blade. On the left, there's a sidebar with options like Instances, Networking, Scaling, Disks, Operating system, Microsoft Defender for Cloud, Guest + host updates, and Size. The "Size" option is selected. The main area shows a message: "Some sizes are not available due to this resource not using a temporary disk. Click here to learn more about resizing from sizes without a temporary disk to sizes with a temporary disk." It includes a search bar, filters for "Display cost: Monthly", "vCPUs: All", "RAM (GiB): All", and a "Add filter" button. It also shows "Showing 792 VM sizes.", "Subscription: Azure for Students", "Region: East US", and "Current size: Standard_DS1_v2". There's a "Learn more about VM sizes" link, a "Group by series" dropdown, and a "Resize" button. At the bottom, there's a note about prices being estimates in USD and a "Give feedback" link.

3. In the list of available sizes, select **Standard DS1_v2** and click **Resize**.

4. In the **Settings** section, click **Instances**, select the checkboxes next to the two instances of the virtual machine scale set, click **Upgrade**, and then, when prompted for confirmation, click **Yes**.
5. In the list of instances, click the entry representing the first instance and, on the scale set instance blade, note its **Location** (it should be one of the zones in the target Azure region into which you deployed the Azure virtual machine scale set).
6. Return to the **az10408vmss0 - Instances** blade, click the entry representing the second instance and, on the scale set instance blade, note its **Location** (it should be one of the other two zones in the target Azure region into which you deployed the Azure virtual machine scale set).
7. Return to the **az10408vmss0 - Instances** blade, and in the **Settings** section, click **Scaling**.

8. On the **az10408vmss0 - Scaling** blade, select the **Custom autoscale** option and configure autoscale with the following settings (leave others with their default values):

| Setting | Value |
|------------|--------------------------------|
| Scale mode | Scale based on a metric |

9. Click the **+ Add a rule** link and, on the **Scale rule** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|--|--|
| Metric source | Current resource (az10480vmss0) |
| Time aggregation | Average |
| Metric namespace | Virtual Machine Host |
| Metric name | Network In Total |
| Operator | Greater than |
| Metric threshold to trigger scale action | 10 |
| Duration (in minutes) | 1 |
| Time grain statistic | Average |
| Operation | Increase count by |
| Instance count | 1 |
| Cool down (minutes) | 5 |

Note: Obviously these values do not represent a realistic configuration, since their purpose is to trigger autoscaling as soon as possible, without extended wait period.

10. Click **Add** and, back on the **az10408vmss0 - Scaling** blade, specify the following settings (leave others with their default values):

| Setting | Value |
|-------------------------|----------|
| Instance limits Minimum | 1 |
| Instance limits Maximum | 3 |
| Instance limits Default | 1 |

11. Click **Save**.
12. In the Azure portal, open the **Azure Cloud Shell** by clicking on the icon in the top right of the Azure Portal.
13. If prompted to select either **Bash** or **PowerShell**, select **PowerShell**.
14. From the Cloud Shell pane, run the following to identify the public IP address of the load balancer in front of the Azure virtual machine scale set **az10408vmss0**.

```
$rgName = 'az104-08-rg02'
```

```

$lbipName           =          'az10408vmss0-lb-publicip'

$PIP = (Get-AzPublicIpAddress -ResourceGroupName $rgName -Name $lbipName).IpAddress

```

15. From the Cloud Shell pane, run the following to start an infinite loop that sends the HTTP requests to the web sites hosted on the instances of Azure virtual machine scale set **az10408vmss0**.

```
while ($true) { Invoke-WebRequest -Uri "http://$PIP" }
```

16. Minimize the Cloud Shell pane but do not close it, switch back to the **az10408vmss0 - Instances** blade and monitor the number of instances.

Note: You might need to wait a couple of minutes and click **Refresh**.

17. Once the third instance is provisioned, navigate to its blade to determine its **Location** (it should be different than the first two zones you identified earlier in this task).
18. Close Cloud Shell pane.
19. On the **az10408vmss0** blade, in the **Settings** section, click **Disks**, click **+ Create and attach a new disk**, and attach a new managed disk with the following settings (leave others with their default values):

| Setting | Value |
|--------------|---------------------|
| LUN | 0 |
| Storage type | Standard HDD |
| Size (GiB) | 32 |

20. Save the change, in the **Settings** section of the **az10408vmss0** blade, click **Instances**, select the checkboxes next to the instances of the virtual machine scale set, click **Upgrade**, and then, when prompted for confirmation, click **Yes**.

Note: The disk attached in the previous step is a raw disk. Before it can be used, it is necessary to create a partition, create a filesystem, and mount it. To accomplish this, you will use Azure virtual machine Custom Script extension. First, you will need to remove the existing Custom Script Extension.

21. In the **Settings** section of the **az10408vmss0** blade, click **Extensions and applications**, click **CustomScriptExtension**, and then click **Uninstall**.

Note: Wait for uninstallation to complete.

22. In the Azure portal, open the **Azure Cloud Shell** by clicking on the icon in the top right of the Azure Portal.
23. If prompted to select either **Bash** or **PowerShell**, select **PowerShell**.
24. In the toolbar of the Cloud Shell pane, click the **Upload/Download files** icon, in the drop-down menu, click **Upload** and upload the file **\Allfiles\Jobs\08\az104-08-configure_VMSS_disks.ps1** into the Cloud Shell home directory.

- From the Cloud Shell pane, run the following to display the content of the script:

```
Set-Location -Path $HOME  
Get-Content -Path ./az104-08-configure_VMSS_disks.ps1
```

Note: The script installs a custom script extension that configures the attached disk.

- From the Cloud Shell pane, run the following to execute the script and configure disks of Azure virtual machine scale set:

```
./az104-08-configure_VMSS_disks.ps1
```

- Close the Cloud Shell pane.
- In the **Settings** section of the **az10408vmss0** blade, click **Instances**, select the checkboxes next to the instances of the virtual machine scale set, click **Upgrade**, and then, when prompted for confirmation, click **Yes**.

Clean up resources

Note: Remember to remove any newly created Azure resources that you no longer use. Removing unused resources ensures you will not see unexpected charges.

Note: Don't worry if the lab resources cannot be immediately removed. Sometimes resources have dependencies and take a longer time to delete. It is a common Administrator task to monitor resource usage, so just periodically review your resources in the Portal to see how the cleanup is going. 1. In the Azure portal, open the **PowerShell** session within the **Cloud Shell** pane.

- Remove az104-08-configure_VMSS_disks.ps1 by running the following command:

```
rm ~\az104-08*
```

- List all resource groups created throughout the labs of this module by running the following command:

```
Get-AzResourceGroup -Name 'az104-08*'
```

- Delete all resource groups you created throughout the labs of this module by running the following command:

```
Get-AzResourceGroup -Name 'az104-08*' | Remove-AzResourceGroup -Force -AsJob
```

Note: The command executes asynchronously (as determined by the **-AsJob** parameter), so while you will be able to run another PowerShell command immediately afterwards within the same PowerShell session, it will take a few minutes before the resource groups are actually removed.

Review

In this lab, you have:

- Deployed zone-resilient Azure virtual machines by using the Azure portal and an Azure Resource Manager template
- Configured Azure virtual machines by using virtual machine extensions
- Scaled compute and storage for Azure virtual machines
- Deployed zone-resilient Azure virtual machine scale sets by using the Azure portal
- Configured Azure virtual machine scale sets by using virtual machine extensions
- Scaled compute and storage for Azure virtual machine scale sets

Conclusion

Failed to update resource 'az10408vmss0'

There was an error updating instance count for resource 'az10408vmss0'. Detail message '{ "error": { "details": [], "code": "PublicIPCountLimitExceededByVMScaleSet", "message": "The requested number of publicIPAddresses 2 for VM Scale Set /subscriptions/3dbbb8d5-1829-48d8-a51d-c7f11b061059/resourceGroups/AZ104-08-

RG02/providers/Microsoft.Compute/virtualMachineScaleSets/az10408vmss0 will exceed the maximum number of publicIPAddresses allowed 3 for subscription 3dbbb8d5-1829-48d8-a51d-c7f11b061059. } }', Please try again in a few moments. This error really prevented me from tackling fully task 7. This is due to my free student subscription which only allows a maximum number of 3 public IP addresses.

The screenshot shows the Microsoft Azure portal's 'Resources' section. At the top, there's a navigation bar with links for 'Create a resource', 'Virtual machine scale sets', 'Cost Management', 'Virtual machines', 'Load balancers', 'Storage accounts', 'Subscriptions', 'Datadog - An Azure Native...', 'App Services', and 'More services'. A search bar is also present. On the left, there's a sidebar with 'Recent' and 'Favorite' tabs, and a 'See all' link. The main area displays a table of resources:

| Name | Type | Last Viewed |
|-----------------|---------------------------|----------------|
| az10408vmss0 | Virtual machine scale set | 19 minutes ago |
| az104-08-rg01 | Resource group | 40 minutes ago |
| az104-08-rg02 | Resource group | 13 hours ago |
| az10408vmss0-lb | Load balancer | 13 hours ago |
| aishak | Storage account | 13 hours ago |
| az104-08-vm1 | Virtual machine | 16 hours ago |
| az104-08-vm0 | Virtual machine | 17 hours ago |

At the bottom, there's a 'Navigate' button.

This report highlights the deployment and management of zone-resilient Azure virtual machines and scale sets. Using the Azure portal and Resource Manager templates, we achieved fault tolerance across multiple availability zones. Virtual machine extensions were employed for efficient configuration, ensuring a customized and easily maintainable environment. The report also emphasizes the scalability of compute

and storage resources, enabling dynamic adaptation to varying workloads. Overall, these implementations align with best practices, establishing a resilient, high-performance cloud infrastructure.