



Installing vThunder ADC using ARM Templates

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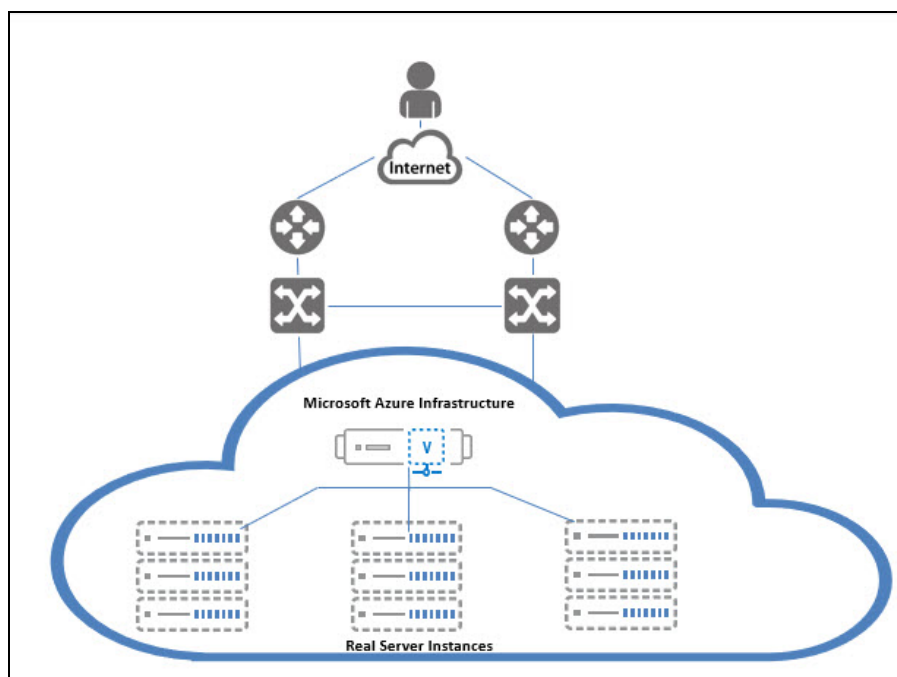
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Introduction

vThunder is a fully operational, software-based Application Delivery Controller (ADC) solution that can run on Microsoft Azure cloud. vThunder provides a robust, flexible, and easy-to-deploy application delivery and server load balancing service.

[Figure 1](#) shows how vThunder can be deployed on Microsoft Azure infrastructure.

Figure 1 : vThunder for Microsoft Azure



ACOS uses the Azure Resource Manager (ARM) templates to quickly deploy the vThunder instance on the Azure cloud. [Table 1](#) lists the available ARM templates for deploying vThunder ADC on Azure cloud:

Table 1 : Available ARM Templates

Template	Description	Configuration
A10-vThunder_ADC-2NIC-1VM	- Creates one vThunder instance with two Network Interface Cards (NICs). - Deploys a Certificate	2 NICs (1 Management + 1 Data) - BYOL (Bring Your Own License)

Template	Description	Configuration
	Authority SSL Certificate and Server Load Balancer (SLB).	1 VM (vThunder Virtual Instance) - SLB (vThunder Server Load Balancer) - SSL (Apply SSL Certificate)
A10-vThunder_ADC-2NIC-1VM-GLM	- Creates one vThunder instance with two Network Interface Cards and A10 Global License Manager (GLM) integration. - Deploys a Certificate Authority SSL Certificate and Server Load Balancer.	2 NICs (1 Management + 1 Data) - BYOL (Bring Your Own License) 1 VM (vThunder Virtual Instance) - SLB (vThunder Server Load Balancer) - SSL (Apply SSL Certificate) - GLM (Auto apply A10 license)
A10-vThunder_ADC-3NIC-2VM-HA	- Creates two vThunder instances with High Availability (HA) setup, each vThunder contains three Network Interface Cards. - Deploys a Certificate Authority SSL Certificate and Server Load Balancer.	3 NICs (1 Management + 2 Data) - BYOL (Bring Your Own License) 2 VMs (vThunder Virtual Instances) - SLB (vThunder Server Load Balancer) - SSL (Apply SSL Certificate) - HA (High Availability with auto switchover with next available vThunder VM using VRRP)
A10-vThunder_	Creates two vThunder	3 NICs (1 Management + 2

Template	Description	Configuration
ADC-3NIC-2VM-HA-GLM-PVTVIP	instances with High Availability setup and an A10 Global License Manager integration, each vThunder has three Network Interface Cards. • Deploys a Certificate Authority SSL Certificate, and a Server Load Balancer.	Data) • BYOL (Bring Your Own License) • 2 VMs (vThunder Virtual Instances) • SLB (vThunder Server Load Balancer) • SSL (Apply SSL Certificate) • GLM (Auto apply A10 license) • HA (High Availability with auto switchover with available VM using VRRP) • VIP (Private Interface)
A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO	• Creates two vThunder instances with High Availability (HA) setup and GLM integration, each vThunder contains three Network Interface Cards. • Deploys a Certificate Authority SSL Certificate, Server Load Balancer, and backend server autoscaling support.	• 3 NICs (1 Management + 2 Data) • BYOL (Bring Your Own License) • 2 VMs (vThunder Virtual Instances) • SLB (vThunder Server Load Balancer) • SSL (Apply SSL Certificate) • GLM (Auto apply A10 license) • HA (High Availability with auto switchover for the available VM using VRRP) • VIP (Public Interface) • BACKAUTO (Webhook URL)

Template	Description	Configuration
		to apply SLB config into vThunder for newly added/deleted web/app servers via server VMSS)
A10-vThunder_ADC-3NIC-VMSS	- Creates multiple vThunder instances in a Virtual Machine scale set using CPU Matrix-based autoscaling with GLM integration. Each vThunder contains three Network Interface Cards. - Deploys a Certificate Authority SSL Certificate, Server Load Balancer, Log Analysis using Azure Log Analytics integration, and Azure Application Insight integration.	3 NICs (1 Management + 2 Data) - BYOL (Bring Your Own License) - Multiple VMs (vThunder Virtual Instances) - SLB (vThunder Server Load Balancer) - SSL (Apply SSL Certificate) - GLM (Auto apply for A10 license) - VMSS (vThunder virtual machine auto-scale set. Autoscaling on data CPU threshold.) - MONITOR (Azure monitor services for vThunder Syslog and data CPU metric monitoring)
A10-vThunder_ADC-3NIC-6VM-2RG-GSLB	- Creates two Global Server Load Balancer (GSLB) regions, one GSLB controller and two site devices in each of the two regions. - Creates two real servers (Ubuntu 16.04.0-LTS) in each region.	3 NICs (1 Management + 2 Data) - BYOL (Bring Your Own License) 6 VMs (Three vThunder Virtual Instances in each Region) 2 RGs (Regions)

Template	Description	Configuration
		GSLB (vThunder SLB in multiple regions)

This documentation helps you to deploy vThunder instance on Azure cloud after downloading the required template from GitHub on your local machine, configuring the vThunder installation parameters in the template and executing Azure CLI commands in Windows PowerShell.

Azure Cloud Terminology

- **Azure account** — The Azure account created has different support plans for different regions. For more information on different Azure regions and availability of types of virtual machines in these regions, see <https://docs.microsoft.com/en-us/azure/virtual-machines/linux/overview>.
- **Resource group** — A resource group is a logical group of all the resources related to an Azure solution. Azure offers flexibility in the allocation of resources to resource groups. For more information, see <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-overview>.
- **Availability set** — An availability set is a logical grouping of Azure VM resources so that each VM resource is isolated from other resources when deployed. This hardware isolation ensures that a minimum number of VMs are impacted during a failure. For more information, see <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-overview>.
- **Virtual network** — The Microsoft Azure Virtual Network service enables resources to securely communicate with other resources in an Azure network in the cloud. A virtual network is hence logical isolation of the Azure cloud for an Azure account. You can connect different virtual networks and to on-premises networks. For more information, see <https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-availability-sets>.
- **Network security group (NSG)** — A network security group (NSG) contains a list of security rules that allow or deny network traffic to resources connected to Azure virtual networks (VNet). The NSGs can be associated with subnets or individual

NICs attached to the VMs. When an NSG is associated with a subnet, the rules apply to all the resources connected to the subnet.

- **Azure Resource Manager (ARM) Template** — A JavaScript Object Notation (JSON) file used to specify the resources and its properties which are deployed on the Azure cloud.
- **Virtual Machine Scale Set (VMSS)** — A virtual machine scale set is used to manage and deploy multiple identical virtual machine instances.
- **Azure Automation** — Azure automation is a cloud-based solution to automate recurring and manual tasks. For more information, see <https://learn.microsoft.com/en-us/azure/automation/>
- **Azure Automation Account** — An automation account is a logical group of all the resources related to Azure automation within a resource group.
- **Azure Service Application Access Key** — An access key is used to automate scale set creation and configuration.
- **Azure Runbook** — A runbook is a PowerShell script used to start the automation jobs in Azure.
- **Azure Automation Webhook** — A webhook is a custom URL that is sent to Azure automation with a runbook-specific data payload.
- **Azure Log Analytics Workspace** — A log analytics workspace is a custom workspace to collect system logs from virtual machine instances.
- **Azure Application Insights** — The application insights are custom metrics used to analyze CPU utilization and configure alerts.
- **Azure Load Balancer Rule** — A load balancer rule is used to define the distribution method of the incoming traffic to all the virtual machine instances within the backend pool.
- **Backend Pool** — A backend pool is used to define the group of resources that serves traffic for a given load-balancing rule.
- **Health Probe** — A health probe is used to determine the health status of the virtual machine instances in the backend pool.

Prerequisites

To deploy vThunder on Azure cloud using any of the supported ARM template, you must ensure the following prerequisites are met:

- Azure account and a valid subscription (Required)
 - Download the following Azure tools to create and manage resources:
 - [Azure Portal](#) — A web console to create and monitor Azure resources.
 - Azure CLI [[2.39.0](#)] — An interface that can be launched using a browser or installed on a system to start a local CLI session.
 - [Azure PowerShell](#) — A set of lightweight PowerShell commands called cmdlets used to manage Azure resources from the command line.
 - Azure User
 - A user with Contributor Role permission.
- [Windows PowerShell](#) [7.0.6 LTS or 7.1.3, 7.2.2 (recommended) or any higher version] — A task automation solution used to install the Az module.

```
PowerShell 7.2.2
Copyright (c) Microsoft Corporation.
https://aka.ms/powershell
Type 'help' to get help.
PS C:\Users\TestUser>
```

- Valid [SSL certificate](#) to apply on vThunder (Optional).
- Text editor (Notepad++, Notepad or any other text editor application).
- [A10 GLM account](#) access and valid licenses.
This access is required for the templates using GLM. For more information, see [Global License Manager User Guide](#).
- ARM Templates
Go to [GitHub](#) [Branch: release/v1.0.0] and download the required ARM template folder to your local machine. The template folder contains the json parameter files and PowerShell scripts for the deployment of the respective template. For example, the downloaded folder path is C:\Users\TestUser\Templates.

- A10 vThunder default user credentials
Send a request to [A10 Networks Support](#) for A10 vThunder login default user credentials.

Image Repository

ARM templates support the following Azure Marketplace A10 vThunder images:

- [A10 vThunder ADC 520 BYOL for Microsoft Azure - Microsoft Azure](#)
Tested with 64-bit Advanced Core OS (ACOS) version 5.2.0, build 155 (Aug-10-2020,14:34)
- [A10 vThunder ADC 521 BYOL for Microsoft Azure - Microsoft Azure](#)
Tested with 64-bit Advanced Core OS (ACOS) version 5.2.1-P6, build 74 (Oct -09-2022,09:24)
- Tested with 64-bit Advanced Core OS (ACOS) version 6.0.0, build 419

Get Started

After the recommended version of PowerShell application is installed, perform the following steps using it:

1. Start a CLI session.

```
PS C:\Users\TestUser> az login
```

Once the authorization is complete and you can access the Azure Portal, the session details appear in the PowerShell prompt.

```
A web browser has been opened at  
https://login.microsoftonline.com/organizations/oauth2/v2.0/authorize.  
Please continue the login in the web browser. If no web browser is  
available or if the web browser fails to open, use device code flow  
with `az login --use-device-code`.
```

```
[  
  {  
    "cloudName": "AzureCloud",  
    "homeTenantId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",  
    "id": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx",  
    "isDefault": true,
```

```
"managedByTenants": [],
"name": "Eng Azure",
"state": "Enabled",
"tenantId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
"user": {
  "name": "TUser@a10networks.com",
  "type": "user"
}
}
]
PS C:\Users\TestUser>
```

2. Install Az Module.

```
PS C:\Users\TestUser> Install-Module Az
```

3. Navigate to the downloaded ARM template folder and set the execution policy for this folder.

```
PS C:\Users\TestUser\Templates> Set-ExecutionPolicy -Scope Process -
ExecutionPolicy Bypass
```

ARM Templates

To implement infrastructure as a code for your Azure solutions, use ARM templates. The template is a json native file that defines the infrastructure and configuration for your project. The template uses declarative syntax to specify the resources that are to be deployed and the properties for those resources without having to write the sequence of programming commands to create it.

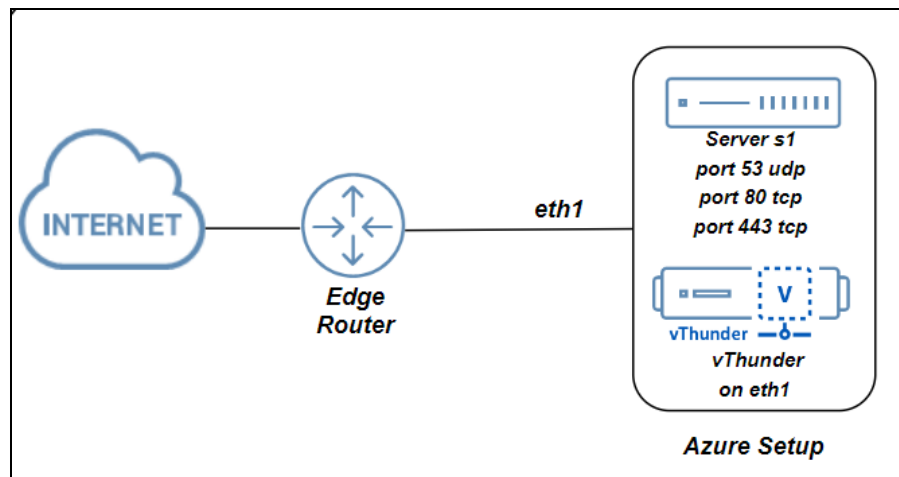
The following templates are available:

- [Deploy ARM A10-vThunder_ADC-2NIC-1VM](#)
- [Deploy ARM A10-vThunder_ADC-2NIC-1VM-GLM](#)
- [Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA](#)
- [Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)
- [Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PVTVIP](#)
- [Deploy ARM A10-vThunder_ADC-3NIC-VMSS](#)
- [Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB](#)

Deploy ARM A10-vThunder_ADC-2NIC-1VM

[Figure 2](#) shows the 2NIC-1VM deployment topology. Using the ARM template, one vThunder instance containing one management interface and one data interface can be deployed.

Figure 2 : 2NIC-1VM Topology



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System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following to deploy vThunder on the Azure cloud:

Table 2 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	A resource group with the specified name and location is created if it doesn't exist. All the resources required for this template is created under the resource group.	Here, the Azure resource group name used is <code>vth-rg1</code> .
Azure Storage Account	A storage account is created inside the resource group if it doesn't exist. If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription". Performance: Standard Replication: Read-access geo-redundant storage (RA-GRS) Account kind: Storagev2 (general purpose v2)	<code>vthunderstorage</code>
Virtual Machine (VM) Instance	A virtual machine instance is created for vThunder. Product: A10 vThunder	<code>vth-inst1</code>

Resource Name	Description	Default Value
	Operating system: Linux Default Size: Standard_DS2v2 (4 vCPUs, 16 GiB Memory) NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic. Table 3 lists the supported VM sizes.	
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	vth-vnet Address prefix for virtual network: 10.0.0.0/16
Subnet	Two subnets are created with an address prefix each.	Subnet1: 10.0.1.0/24 Subnet2: 10.0.2.0/24
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: - Management Interface with public IP - Data Interface with primary private IP [Ethernet 1]	vth-inst1-mgmt-nic1 10.0.1.47 vth-inst1-data-nic2 10.0.2.47 [Primary IP]
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	vth-nsg1

Supported VM Sizes

Table 3 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A2	Standard_A2
	Standard A2v2	Standard_A2_v2
	Standard A2mv2	Standard_A2m_v2
	Standard A4v2	Standard_A4_v2
	Standard A4mv2	Standard_A4m_v2
	Standard A3	Standard_A3
	Standard A4	Standard_A4
	Standard A8v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D2v2	Standard_D2_v2
	Standard DS2v2	Standard_DS2_v2
	Standard D4v3	Standard_D4_v3
	Standard D4sv3	Standard_D4s_v3
	Standard D3v2	Standard_D3_v2
	Standard Ds3v2	Standard_Ds3_v2
	Standard D5v2	Standard_D5_v2
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

Azure is going to retire a few of the above listed VM sizes soon. For the latest updates, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

Create vThunder Instance

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_2NIC_1VM_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {  
  "value": "vth-user"  
},  
"adminPassword": {  
  "value": "vth-Password"  
},
```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure a storage account name.

```
"storageAccountName": {
  "value": "vthunderstorage"
},
```

If the storage account already exists, the following error is displayed, “The storage account named is already taken”.

4. Configure a virtual network.

```
"virtualNetworkName": {
  "value": "vth-vnet"
},
```

5. Configure a DNS label prefix.

```
"dnsLabelPrefix": {
  "value": "vth-inst1"
},
```

6. Configure a vThunder name.

```
"vthunderName": {
  "value": "vth-inst1"
}
```

7. Set a VM Size for vThunder.

```
"vthunderSize": {
  "value": "Standard_DS2_v2"
},
```

Use a suitable VM size that supports at least 2 NICs. For VM sizes, see [Supported VM Sizes](#) section.

8. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage": {
  "value": "vthunder_520_byol"
},
```

```
"publisherName": {  
  "value": "a10networks"  
},  
"productName": {  
  "value": "a10-vthunder-adc-520-for-microsoft-azure"  
},
```

NOTE: Do not change the publisher name.

9. Configure two network interface cards.

```
"nic1Name": {  
  "value": "vth-inst1-mgmt-nic1"  
},  
"nic2Name": {  
  "value": "vth-inst1-data-nic2"  
},
```

10. Configure an address prefix and subnet values for each management interface and data interface.

```
"addressPrefixValue": {  
  "value": "10.0.0.0/16"  
},  
"mgmtIntfPrivatePrefix": {  
  "value": "10.0.1.0/24"  
},  
"mgmtIntfPrivateAddress": {  
  "value": "10.0.1.47"  
},  
"eth1PrivatePrefix": {  
  "value": "10.0.2.0/24"  
},  
"eth1PrivateAddress": {  
  "value": "10.0.2.47"  
},
```

11. Configure a public IP address.

```
"publicIPAddressName": {  
  "value": "vth-vm-ip"  
},
```

12. Configure a Network Security Group.

```
"networkSecurityGroupName": {
  "value": "vth-nsg1"
},
```

13. Configure authentication type.

```
"authenticationType": {
  "value": "password"
},
```

14. Verify if all the configurations in the ARM_TMPL_2NIC_1VM_PARAM.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a Azure resource group:

```
PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> az group create --name vth-rg1 --location "south central us"
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",
  "location": "southcentralus",
  "managedBy": null,
  "name": "vth-rg1",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

3. Run the following command to create a Azure deployment group.

```
PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>
```

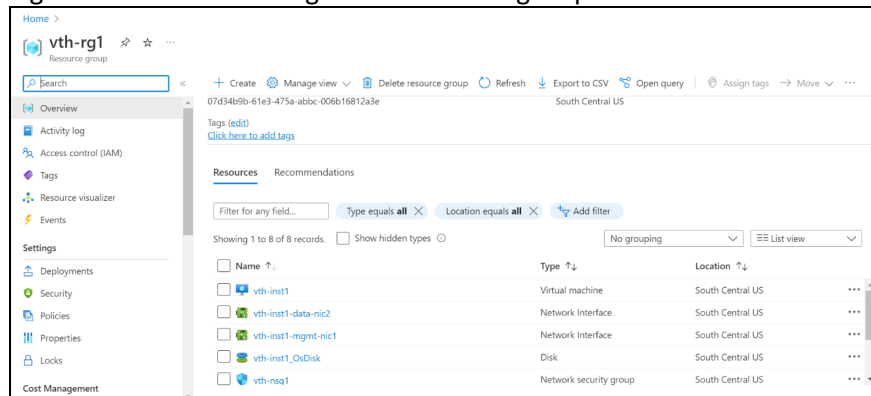
Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
--template-file ARM_TMPL_2NIC_1VM_1.json --parameters ARM_TMPL_2NIC_1VM_
PARAM.json
```

Here, **vth-rg1** resource group is created.

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource_group_name>**.

Figure 3 : Resource listing in the resource group



Configure Server and Client Machine

The following topics are covered:

- [Create a Server Machine](#)
- [Create a Client Machine](#)

Create a Server Machine

To create a Server machine, perform the following steps:

1. From **Home**, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Server machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 4 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Item(s) availability based on policy assignment(s) for the selected scope.
Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

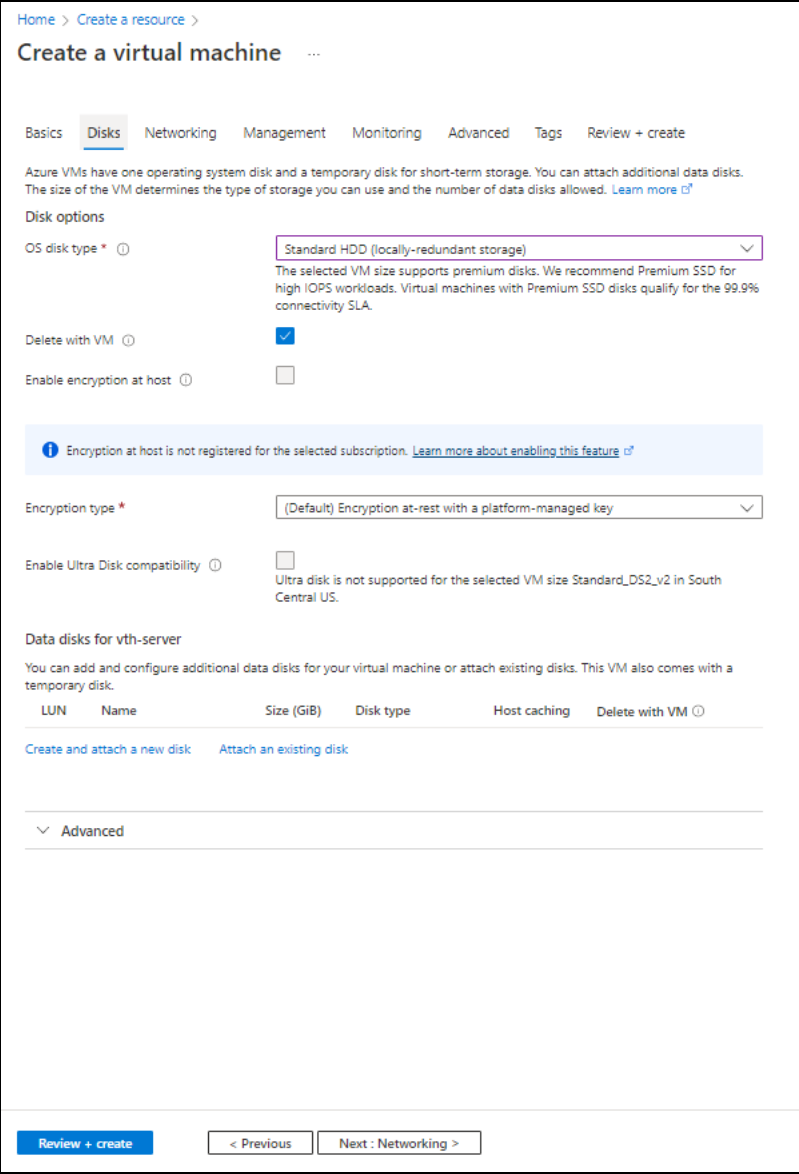
3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 5 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

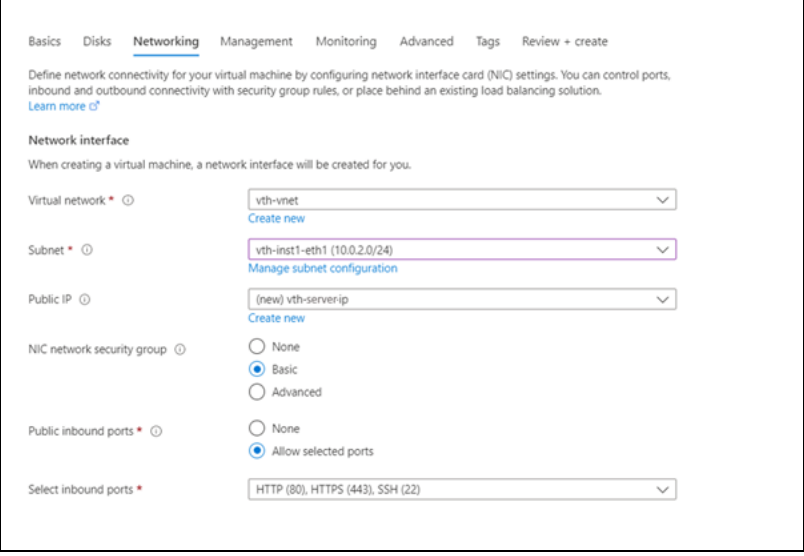
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet (Ethernet 1)
- Select inbound ports

Figure 6 : Create a virtual machine window - Networking tab

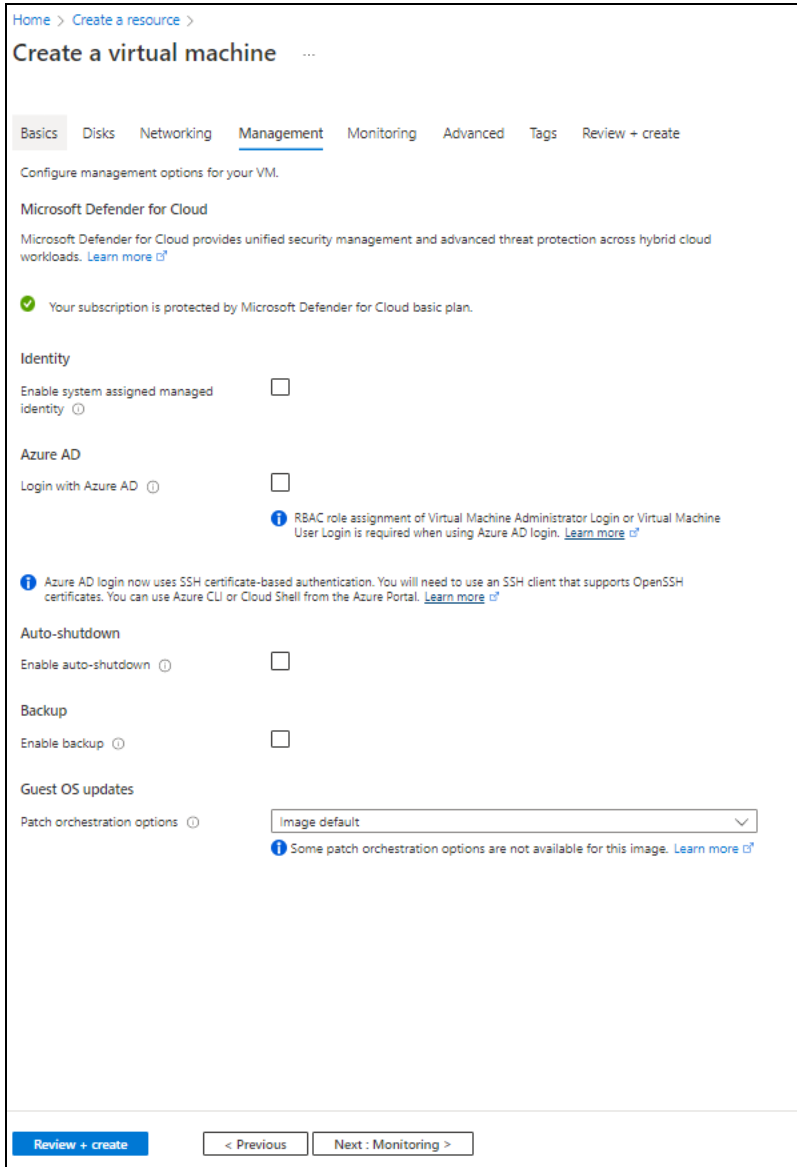


The screenshot shows the 'Networking' tab in the Azure portal. At the top, there are tabs for 'Basics', 'Disks', 'Networking' (selected), 'Management', 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. Below the tabs, a description states: 'Define network connectivity for your virtual machine 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](#)'. The 'Network interface' section follows, with a note: 'When creating a virtual machine, a network interface will be created for you.' The configuration fields are: 'Virtual network' (dropdown with 'vth-vnet' selected and a 'Create new' link), 'Subnet' (dropdown with 'vth-inst1-eth1 (10.0.2.0/24)' selected and a 'Manage subnet configuration' link), 'Public IP' (dropdown with '(new) vth-server-ip' selected and a 'Create new' link), 'NIC network security group' (radio buttons for 'None', 'Basic' (selected), and 'Advanced'), 'Public inbound ports' (radio buttons for 'None' and 'Allow selected ports' (selected)), and 'Select inbound ports' (dropdown with 'HTTP (80), HTTPS (443), SSH (22)' selected).

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 7 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine' with a three-dot menu. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity
Enable system assigned managed identity ☐

Azure AD
Login with Azure AD ☐
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CLI or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown
Enable auto-shutdown ☐

Backup
Enable backup ☐

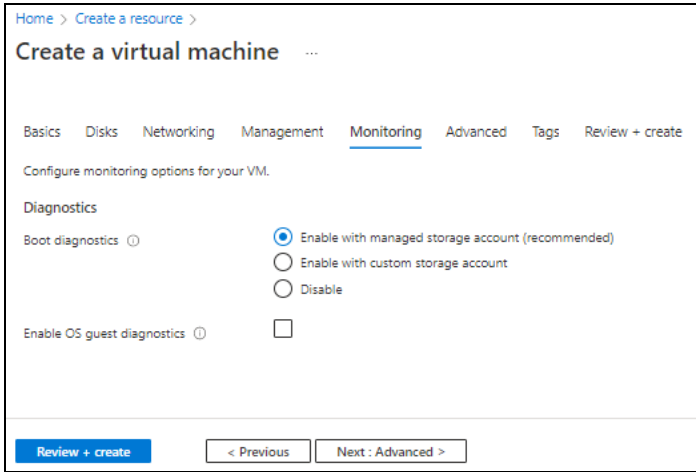
Guest OS updates
Patch orchestration options Some patch orchestration options are not available for this image. [Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select the monitoring options in the **Monitoring** tab as needed.

Figure 8 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

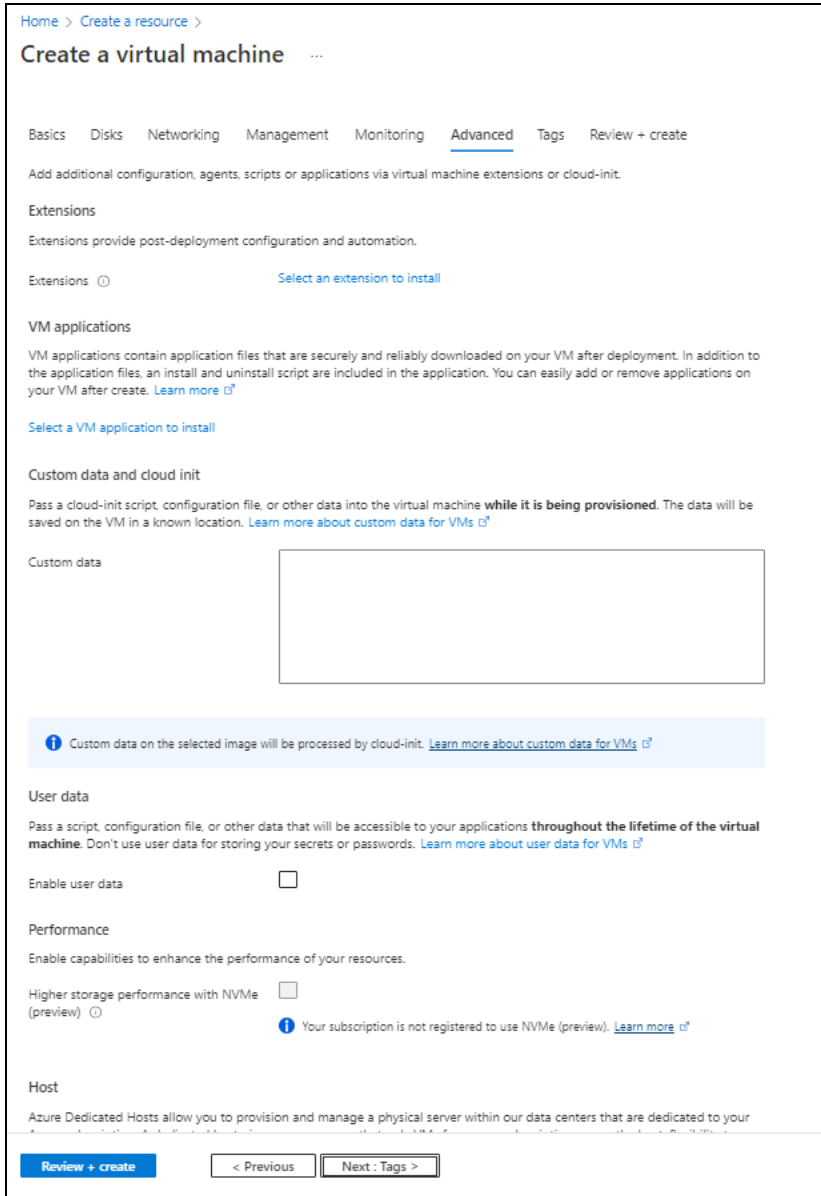
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the additional configuration in the **Advanced** tab as needed.

Figure 9 : Create a virtual machine window - Advanced tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring **Advanced** Tags Review + create

Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

Extensions

Extensions provide post-deployment configuration and automation.

Extensions ⓘ [Select an extension to install](#)

VM applications

VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#) ⓘ

[Select a VM application to install](#)

Custom data and cloud init

Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#) ⓘ

Custom data

i Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#) ⓘ

User data

Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#) ⓘ

Enable user data ☐

Performance

Enable capabilities to enhance the performance of your resources.

Higher storage performance with NVMe (preview) ⓘ ☐

i Your subscription is not registered to use NVMe (preview). [Learn more](#) ⓘ

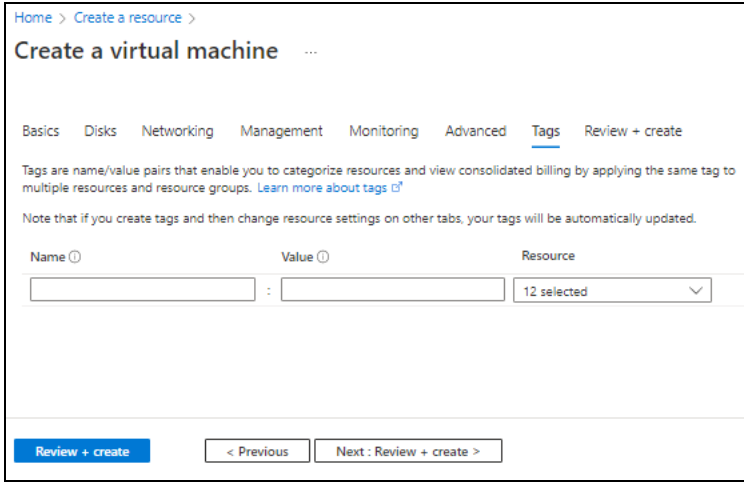
Host

Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your

[Review + create](#) [< Previous](#) [Next : Tags >](#)

13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 10 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
	:	12 selected

Review + create < Previous Next : Review + create >

15. Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 11 : Create a virtual machine window - Review + create tab

Home > Create a resource >

Create a virtual machine

Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard DS2 v2
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.1270 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Preferred phone number

⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics

Subscription	Eng Azure
Resource group	(new) vth-rg1
Virtual machine name	vth-server
Region	South Central US
Availability options	No infrastructure redundancy required
Security type	Standard
Image	Ubuntu Server 20.04 LTS - Gen2
VM architecture	x64
Size	Standard DS2 v2 (2 vcpus, 7 GiB memory)
Authentication type	Password
Username	azureuser

Create < Previous Next > [Download a template for automation](#)

Select inbound ports *

Review + create < Previous Next : Disks >

- Click **Create** at the bottom of the window.
The Server virtual machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

17. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Client machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 12 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)
 Item(s) availability based on policy assignment(s) for the selected scope.
 Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

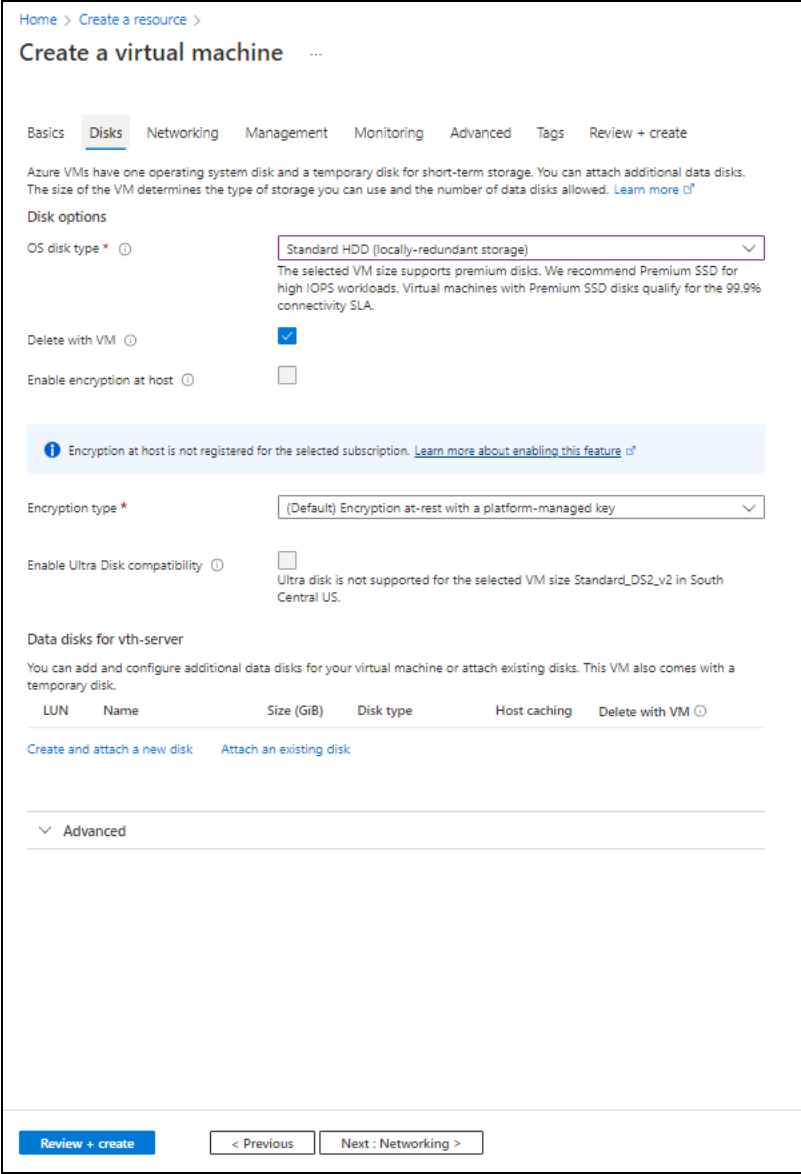
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 13 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

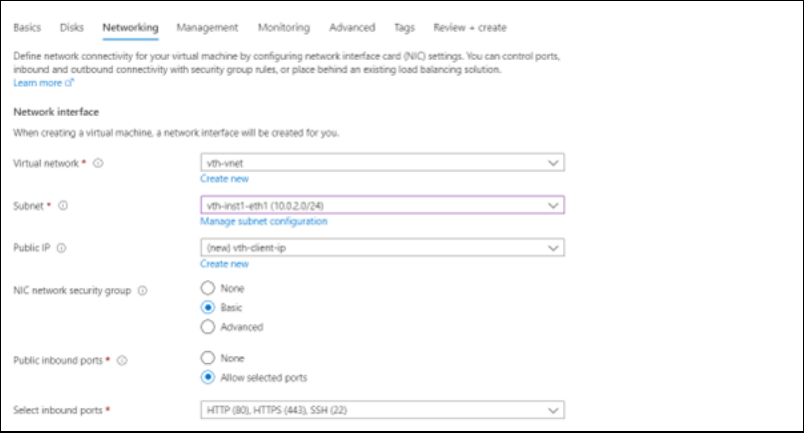
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet (Ethernet 1)
- Select inbound ports

Figure 14 : Create a virtual machine window - Networking tab



Basics Disks **Networking** Management Monitoring 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](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Manage subnet configuration](#)

Public IP * [Create new](#)

NIC network security group * ☐ None ☒ Basic ☐ Advanced

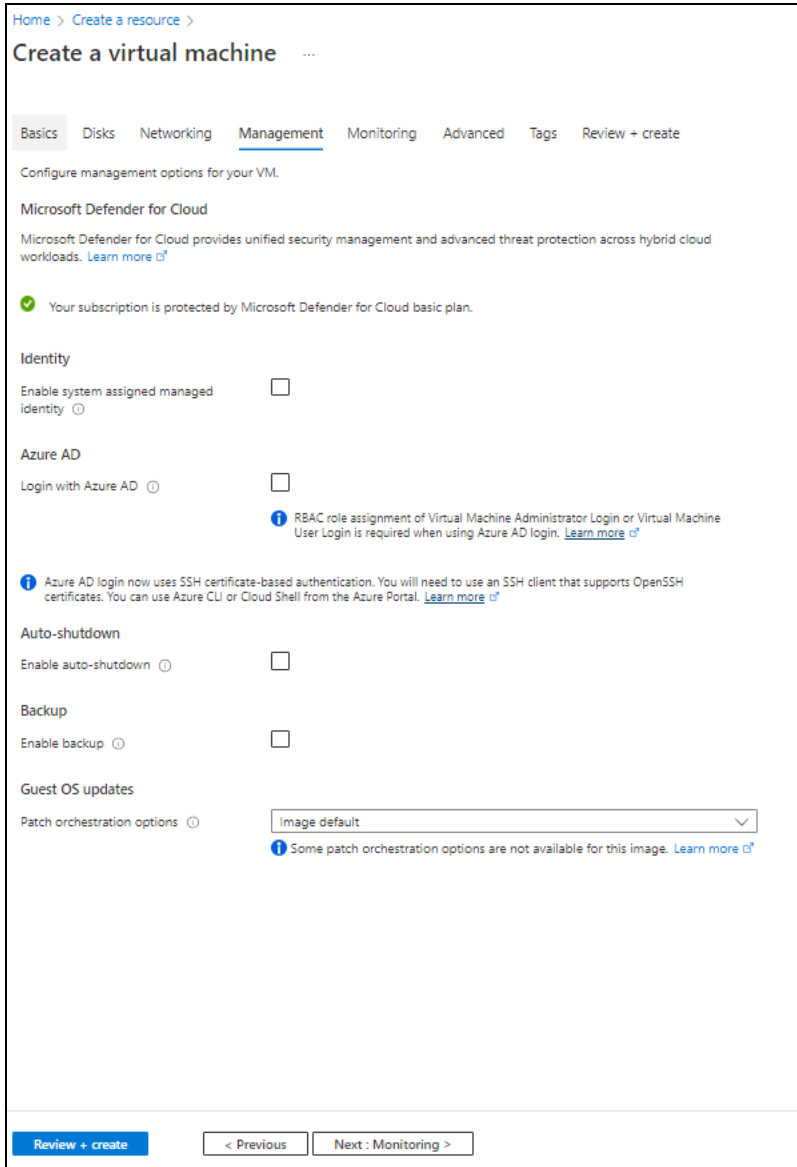
Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 15 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine'. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity
Enable system assigned managed identity ☐

Azure AD
Login with Azure AD ☐
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

✓ Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CLI or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown
Enable auto-shutdown ☐

Backup
Enable backup ☐

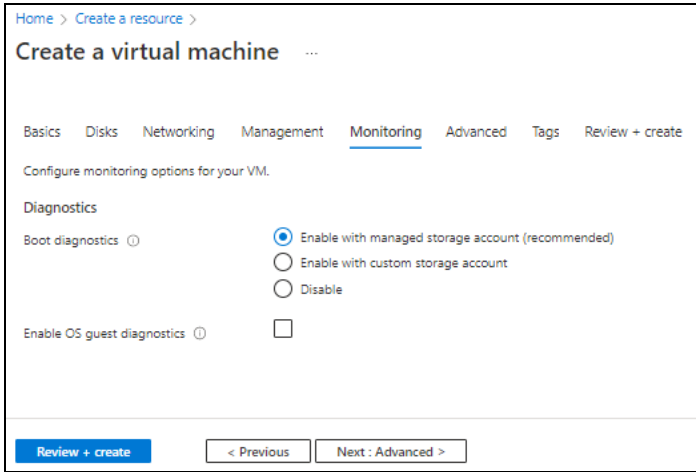
Guest OS updates
Patch orchestration options [Some patch orchestration options are not available for this image. Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select the monitoring options in the **Monitoring** tab as needed.

Figure 16 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

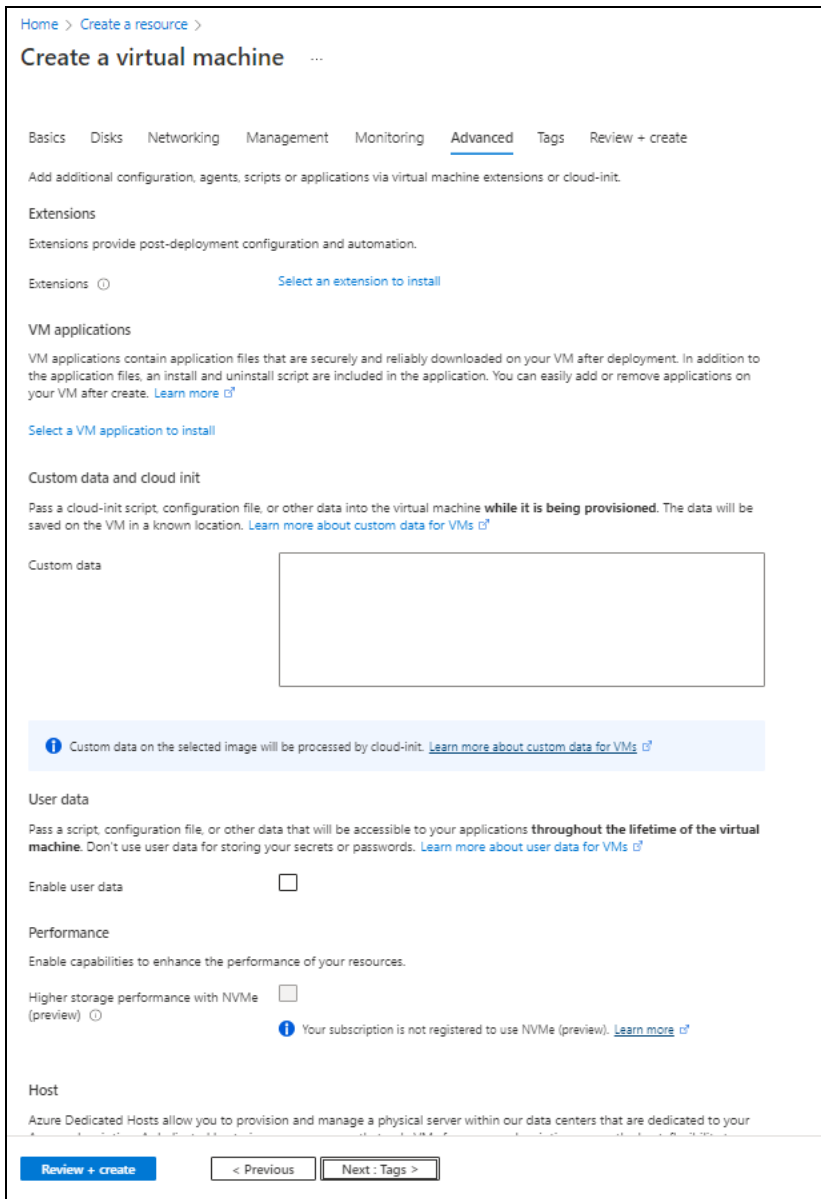
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the additional configuration in the **Advanced** tab as needed.

Figure 17 : Create a virtual machine window - Advanced tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring **Advanced** Tags Review + create

Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

Extensions

Extensions provide post-deployment configuration and automation.

Extensions ⓘ [Select an extension to install](#)

VM applications

VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#) ⓘ

[Select a VM application to install](#)

Custom data and cloud init

Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#) ⓘ

Custom data

i Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#) ⓘ

User data

Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#) ⓘ

Enable user data ☐

Performance

Enable capabilities to enhance the performance of your resources.

Higher storage performance with NVMe (preview) ⓘ ☐

i Your subscription is not registered to use NVMe (preview). [Learn more](#) ⓘ

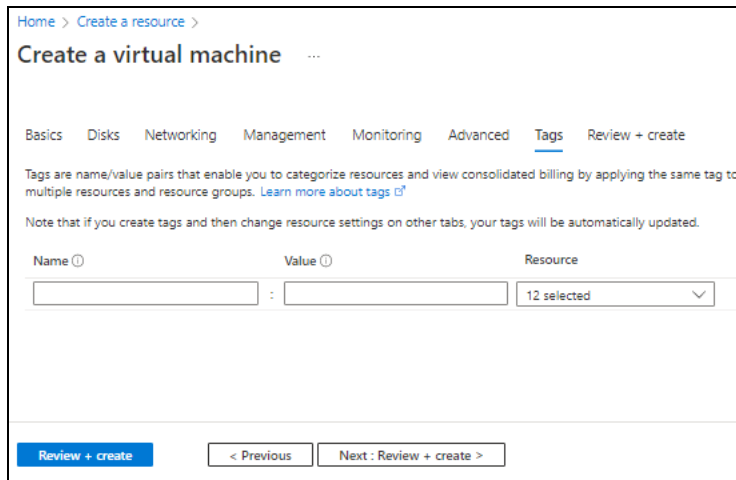
Host

Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your

[Review + create](#) [< Previous](#) [Next : Tags >](#)

13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 18 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

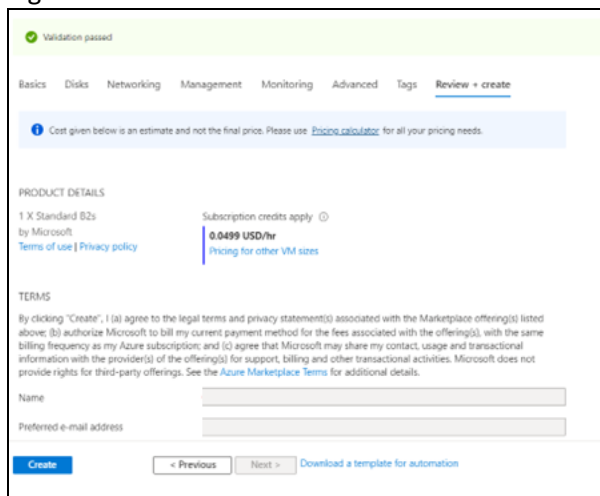
Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
		12 selected

Review + create < Previous Next : Review + create >

- Click **Next : Review + create** at the bottom of the window. The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 19 : Create a virtual machine window - Review + create tab



Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard B2s
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply
0.0499 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Create < Previous Next > [Download a template for automation](#)

- Click **Create** at the bottom of the window. The Client machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

Configure vThunder as an SLB

The following topics are covered:

- [Initial Setup](#)
- [Change Password](#)
- [Deploy vThunder as an SLB](#)

Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_2NIC_1VM_SLB_CONFIG_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure a SLB server host or domain.

The SLB server host value is the data NIC's private IP address instance acting as the server.

Instead of a host, you can also use a domain name. To do so, replace the key 'host' with 'fqdn-name' and provide a domain name instead of the IP address.

```
"slbServerHostOrDomain": {
  "server-name": "s1",
  "host": "10.0.2.8",
  "metadata": {
    "description": "SLB server host/fqdn-name. To use domain name
replace host with fqdn-name and ip address with domain name"
  }
},
```

3. Configure SLB server ports.

```
"slbServerPortList": {
  "value": [
    {
      "port-number": 53,
      "protocol": "udp"
    },
    {
      "port-number": 80,
```

```
        "protocol": "tcp"
      },
      {
        "port-number": 443,
        "protocol": "tcp"
      }
    ]
  },
```

4. Configure Service Group List ports.

```
"serviceGroupList": {
  "value": [
    {
      "name": "sg443",
      "protocol": "tcp",
      "member-list": [
        {
          "name": "s1",
          "port": 443
        }
      ]
    },
    {
      "name": "sg53",
      "protocol": "udp",
      "member-list": [
        {
          "name": "s1",
          "port": 53
        }
      ]
    },
    {
      "name": "sg80",
      "protocol": "tcp",
      "member-list": [
        {
          "name": "s1",
```

```

        "port":80
      }
    ]
  }
]
},

```

5. Configure a Virtual Server.

The virtual server default name is “vs1”.

```

"virtualServerList": {
  "virtual-server-name": "vs1",
  "metadata": {
    "description": "virtual server is using ethernet 1 ip
address"
  },
  "value": [
    {
      "port-number":53,
      "protocol":"udp",
      "auto":1,
      "service-group":"sg53"
    },
    {
      "port-number":80,
      "protocol":"http",
      "auto":1,
      "service-group":"sg80"
    },
    {
      "port-number":443,
      "protocol":"https",
      "auto":1,
      "service-group":"sg443"
    }
  ]
},

```

6. Configure SSL.

```
"sslConfig": {
  "requestTimeout": 40,
  "Path": "<absolute path of the ssl certificate file>",
  "File": "<certificate-name>",
  "CertificationType": "pem"
}
```

NOTE: By default, SSL configuration is disabled i.e. no SSL configuration is applied.

Example The sample values for the SSL certificate are as shown below:

```
"sslConfig": {
  "requestTimeout": 40,
  "Path": "C://Users//...//...//server.pem" or
  "C:\\Users\\...\\...\\certs\\server.pem",
  "File": "server",
  "CertificationType": "pem"
}
```

7. Provide the resource group name.

```
"resourceGroupName": "vth-rg1"
"vThUsername": "admin"
```

NOTE: Do not change the vThunder instance username.

8. Verify if all the configurations in the ARM_TMPL_2NIC_1VM_SLB_CONFIG_PARAM.json file are correct and save the changes.

Change Password

To change the password, perform the following steps:

1. Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_CHANGE_PASSWORD_2.ps1
```

NOTE: It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```
Enter Default Password:***
Enter New Password:***
Confirm New Password:***
```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_SLB_CONFIG_3.ps1 -
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_SLB_CONFIG_3.ps1 -
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate
Do you want to upload ssl certificate ?
[Y] Yes [No] No [?] Help (default is "N"): Y
Public IP Name: vth-inst1-mgmt-nic1-ip
Ethernet-1 Private IP: 10.0.2.47
SLB Server Host IP: 10.0.2.8
Virtual Server Name: vs1
Resource Group Name: vth-rg1
Instance Public IP: 20.165.38.180
```

```
configured ethernet 1 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
```

If you want to upload SSL certificate, enter 'Y'. The certificate available in the sslConfig path is uploaded.

3. If the SSL Certificate upload is successful, a message 'SSL Configured' is displayed.

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance
Here, Public IP of `vth-inst1`.
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->
Using keyboard-interactive authentication.
Password: xxxx <---Enter your password--->
```

```
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

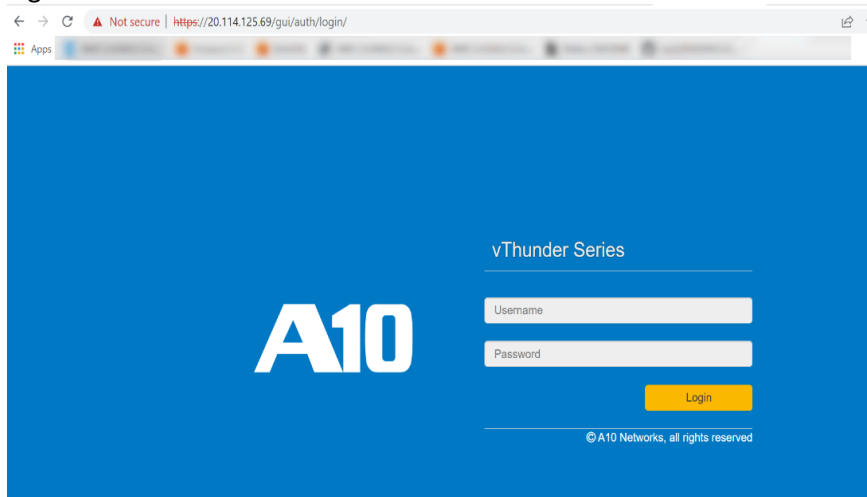
vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

1. Open any browser.
2. Enter *https://<vthunder_public_IP>/gui/auth/login/* in the address bar.

Figure 20 : vThunder GUI



3. Enter the recently configured user credentials.
The home page gets displayed.

Verify Deployment

To verify vThunder SLB deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:

```
vThunder(config)#show running-config
```

If the deployment is successful, the following slb configuration is displayed:

```
interface management
  ip address dhcp
!
interface ethernet 1
  enable
  ip address 10.0.2.47 255.255.255.0
!
!
slb server s1 10.0.2.8
  port 53 udp
  port 80 tcp
  port 443 tcp
!
slb service-group sg443 tcp
  member s1 443
!
slb service-group sg53 udp
  member s1 53
!
slb service-group sg80 tcp
  member s1 80
!
slb virtual-server vs1 use-if-ip ethernet 1
  port 53 udp
    source-nat auto
    service-group sg53
  port 80 http
    source-nat auto
    service-group sg80
  port 443 https
    source-nat auto
    service-group sg443
!
```



```
!
end
```

2. Run the following command on vThunder:

```
vThunder(config)#show pki cert
```

If the deployment is successful, the following SSL configuration is displayed:

Name	Type	Expiration	Status
server certificate	Jan 28 12:00:00 2028 GMT	[Unexpired, Bound]	

Verify Traffic Flow

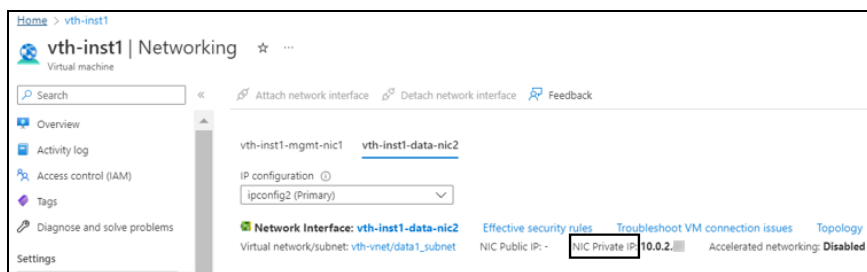
To verify the traffic flow from client machine to server machine via vThunder, perform the following:

1. From **Azure Portal** > **Azure Services** > **Resource Group** > <resource_group_name> > <virtual_machine_instance> > **Settings** > **Networking**.

Here, **vth-inst1** is the vThunder instance name.

2. Copy the Private IP address of the data subnet.

Figure 21 : vThunder instance Data Subnet Private IP



3. Select your client instance from the **Virtual machine** list.
Here, **vth-client** is the client instance name.
4. SSH your client machine and run the following command to verify the traffic flow:
`curl <vThunder_instance_data_private_IPv4_Address>`

Example

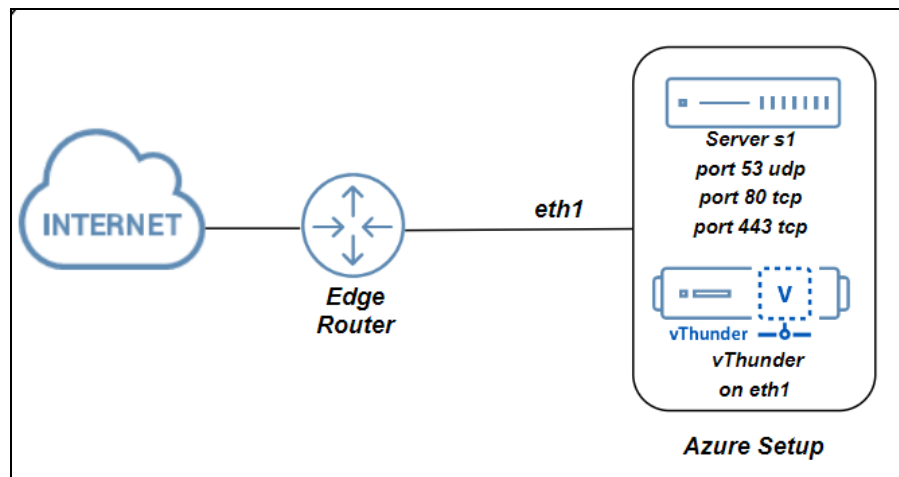
```
curl 10.0.2.47
```

Verify if a response is received.

Deploy ARM A10-vThunder_ADC-2NIC-1VM-GLM

[Figure 22](#) shows the 2NIC-1VM-GLM deployment topology. Using the ARM template, one vThunder instance containing one management interface and one data interface with GLM integration can be deployed.

Figure 22 : 2NIC-1VM-GLM Topology



The following topics are covered:

System Requirements	55
Create vThunder Instance	58
Configure Server and Client Machine	62
Configure vThunder as an SLB	79
Configure vThunder GLM	85
Access vThunder using CLI or GUI	86
Verify Deployment	88
Verify Traffic Flow	90

System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following to deploy vThunder on the Azure cloud:

Table 4 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	A resource group with the specified name and location is created, if it doesn't exist. All the resources required for this template is created under the resource group.	Here, the Azure resource group name used is <code>vth-rg1</code> .
Azure Storage Account	A storage account is created inside the resource group, if it doesn't exist. If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription". Performance: Standard Replication: Read-access geo-redundant storage (RA-GRS) Account kind: Storagev2 (general purpose v2)	<code>vthunderstorage</code>
Virtual Machine (VM) Instance	A virtual machine instance is created for vThunder. Product: A10 vThunder	<code>vth-inst1</code>

Resource Name	Description	Default Value
	Operating system: Linux Default Size: Standard_DS2v2 (4 vCPUs, 16 GiB Memory) NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic. Table 5 lists the supported VM sizes.	
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	vth-vnet Address prefix for virtual network: 10.0.0.0/16
Subnet	Two subnets are created with an address prefix each.	Subnet1: 10.0.1.0/24 Subnet2: 10.0.2.0/24
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: • Management Interface with public IP • Data Interface with primary private IP [Ethernet 1]	vth-inst1-mgmt-nic1 10.0.1.47 vth-inst1-data-nic2 10.0.2.47 [Primary IP]
Network Security Group	A security group is created for all the associated default interfaces.	vth-nsg

Resource Name	Description	Default Value
[NSG]		

Supported VM Sizes

Table 5 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A2	Standard_A2
	Standard A2v2	Standard_A2_v2
	Standard A2mv2	Standard_A2m_v2
	Standard A4v2	Standard_A4_v2
	Standard A4mv2	Standard_A4m_v2
	Standard A3	Standard_A3
	Standard A4	Standard_A4
	Standard A8v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D2v2	Standard_D2_v2
	Standard DS2v2	Standard_DS2_v2
	Standard D4v3	Standard_D4_v3
	Standard D4sv3	Standard_D4s_v3
	Standard D3v2	Standard_D3_v2

Series	Size	Qualified Name
	Standard Ds3v2	Standard_Ds3_v2
	Standard D5v2	Standard_D5_v2
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

Azure is going to retire a few of the above listed VM sizes soon. For the latest updates, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

Create vThunder Instance

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_2NIC_1VM_GLM_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {  
  "value": "vth-user"  
},  
"adminPassword": {  
  "value": "vth-Password"  
},
```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure a storage account name.

```
"storageAccountName": {  
  "value": "vthunderstorage"  
},
```

If the storage account already exists, the following error is displayed, “The storage account named is already taken”.

4. Configure a virtual network.

```
"virtualNetworkName": {  
  "value": "vth-vnet"  
},
```

5. Configure a DNS label prefix.

```
"dnsLabelPrefix": {  
  "value": "vth-inst1"  
},
```

6. Configure a vThunder name.

```
"vthunderName": {  
  "value": "vth-inst1"  
}
```

7. Set a VM Size for vThunder.

```
"vthunderSize": {  
  "value": "Standard_DS2_v2"  
},
```

Use a suitable VM size that supports at least 2 NICs. For VM sizes, see [Supported VM Sizes](#) section.

- Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage": {
  "value": "vthunder_520_byol"
},
"publisherName": {
  "value": "a10networks"
},
"productName": {
  "value": "a10-vthunder-adc-520-for-microsoft-azure"
},
```

NOTE: Do not change the publisher name.

- Configure two network interface cards.

```
"nic1Name": {
  "value": "vth-inst1-mgmt-nic1"
},
"nic2Name": {
  "value": "vth-inst1-data-nic2"
},
```

- Configure an address prefix and subnet values for each management interface and data interface.

```
"addressPrefixValue": {
  "value": "10.0.0.0/16"
},
"mgmtIntfPrivatePrefix": {
  "value": "10.0.1.0/24"
},
"mgmtIntfPrivateAddress": {
  "value": "10.0.1.47"
},
"eth1PrivatePrefix": {
  "value": "10.0.2.0/24"
},
```



```

},
"eth1PrivateAddress": {
  "value": "10.0.2.47"
},

```

11. Configure a public IP address.

```

"publicIPAddressName": {
  "value": "vth-vm-ip"
},

```

12. Configure a Network Security Group.

```

"networkSecurityGroupName": {
  "value": "vth-nsg1"
},

```

13. Configure authentication type.

```

"authenticationType": {
  "value": "password"
},

```

14. Verify if all the configurations in the ARM_TMPL_2NIC_1VM_GLM_PARAM.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a Azure resource group:

```
PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> az group create --name vth-rg1 --location "south central us"
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",
  "location": "southcentralus",

```

```

    "managedBy": null,
    "name": "vth-rg1",
    "properties": {
      "provisioningState": "Succeeded"
    },
    "tags": null,
    "type": "Microsoft.Resources/resourceGroups"
  }

```

3. Run the following command to create a Azure deployment group.

```

PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>

```

Example:

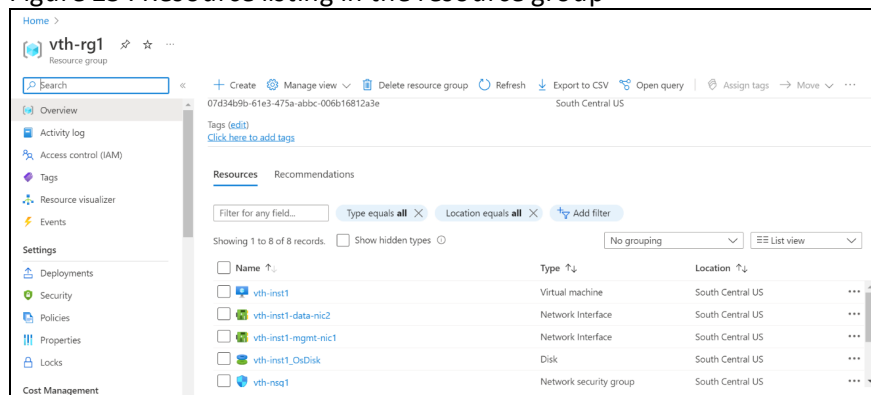
```

PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
--template-file ARM_TMPL_2NIC_1VM_GLM_1.json --parameters ARM_TMPL_2NIC_
1VM_GLM_PARAM.json

```

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource_group_name>**.

Figure 23 : Resource listing in the resource group



Configure Server and Client Machine

The following topics are covered:

- [Create a Server Machine](#)
- [Create a Client Machine](#)

Create a Server Machine

To create a Server machine, perform the following steps:

1. From **Home**, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Server machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 24 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics | Disks | Networking | Management | Monitoring | Advanced | Tags | Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Item(s) availability based on policy assignment(s) for the selected scope.
Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

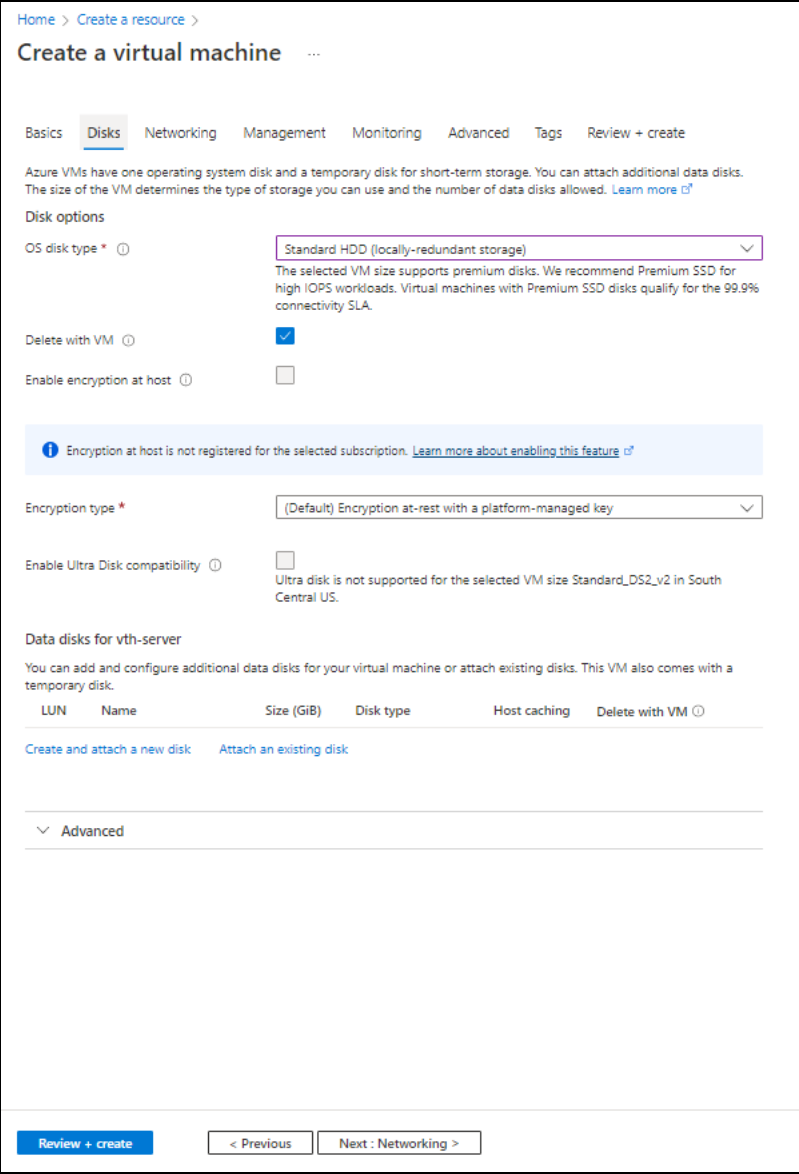
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 25 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

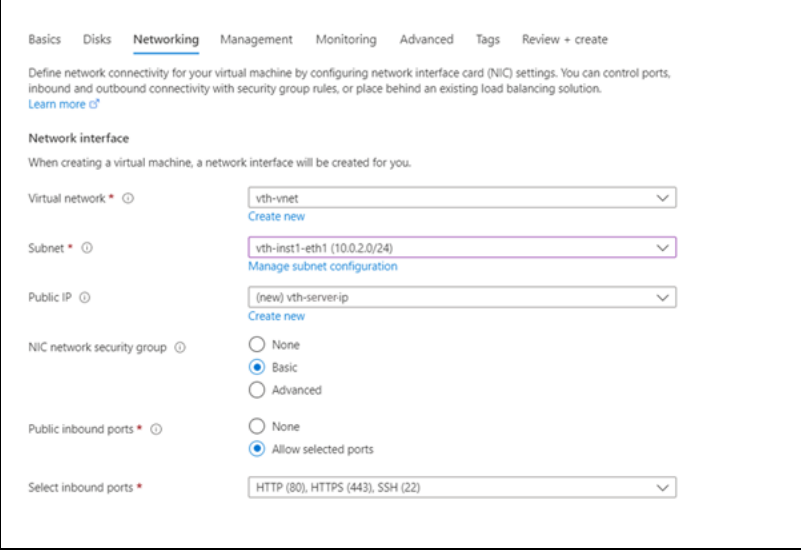
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet (Ethernet 1)
- Select inbound ports

Figure 26 : Create a virtual machine window - Networking tab

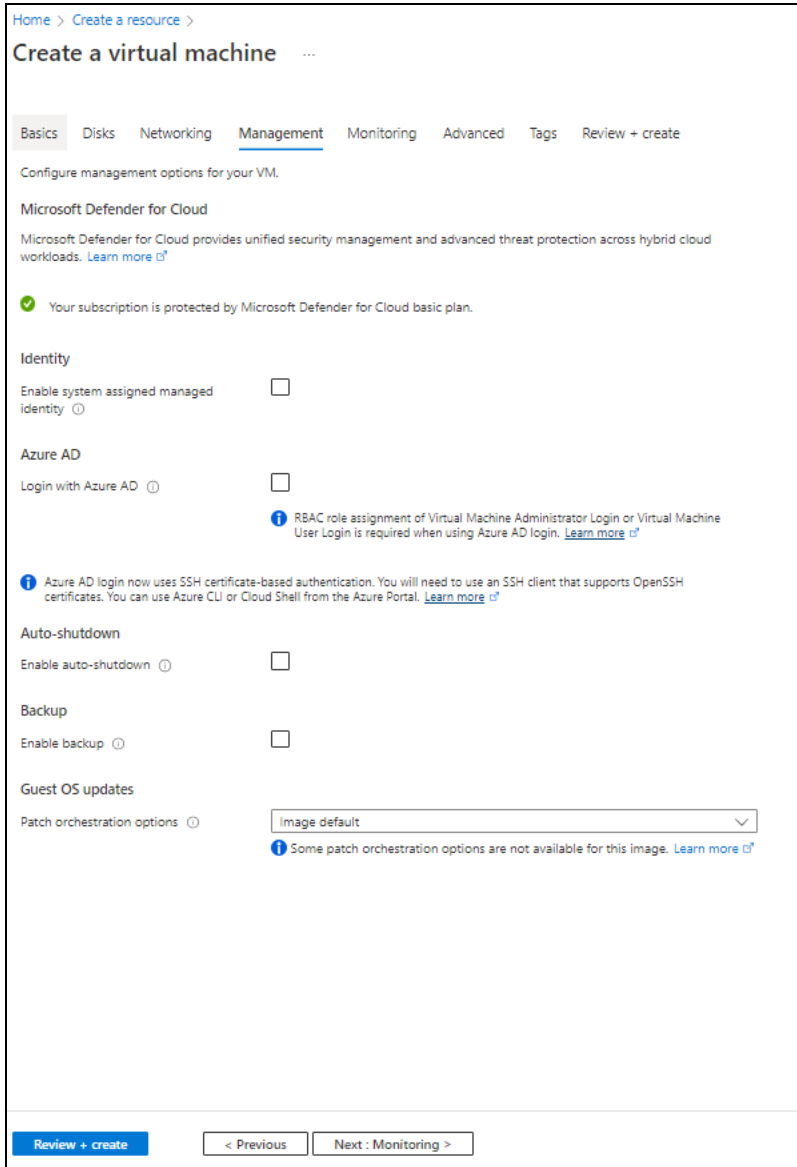


The screenshot shows the 'Networking' tab in the Azure portal. At the top, there are tabs for 'Basics', 'Disks', 'Networking' (selected), 'Management', 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. Below the tabs, a description states: 'Define network connectivity for your virtual machine 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](#)'. The 'Network interface' section follows, with a note: 'When creating a virtual machine, a network interface will be created for you.' The configuration fields are: 'Virtual network' (dropdown menu showing 'vth-vnet' with a 'Create new' link), 'Subnet' (dropdown menu showing 'vth-inst1-eth1 (10.0.2.0/24)' with a 'Manage subnet configuration' link), 'Public IP' (dropdown menu showing '(new) vth-server-ip' with a 'Create new' link), 'NIC network security group' (radio buttons for 'None', 'Basic' (selected), and 'Advanced'), 'Public inbound ports' (radio buttons for 'None' and 'Allow selected ports' (selected)), and 'Select inbound ports' (dropdown menu showing 'HTTP (80), HTTPS (443), SSH (22)').

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 27 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine'. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity
Enable system assigned managed identity ☐

Azure AD
Login with Azure AD ☐
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

✓ Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CLI or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown
Enable auto-shutdown ☐

Backup
Enable backup ☐

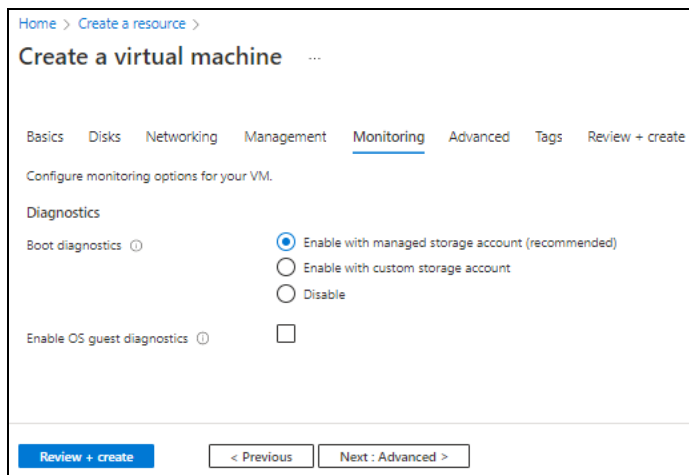
Guest OS updates
Patch orchestration options
Some patch orchestration options are not available for this image. [Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select the monitoring options in the **Monitoring** tab as needed.

Figure 28 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

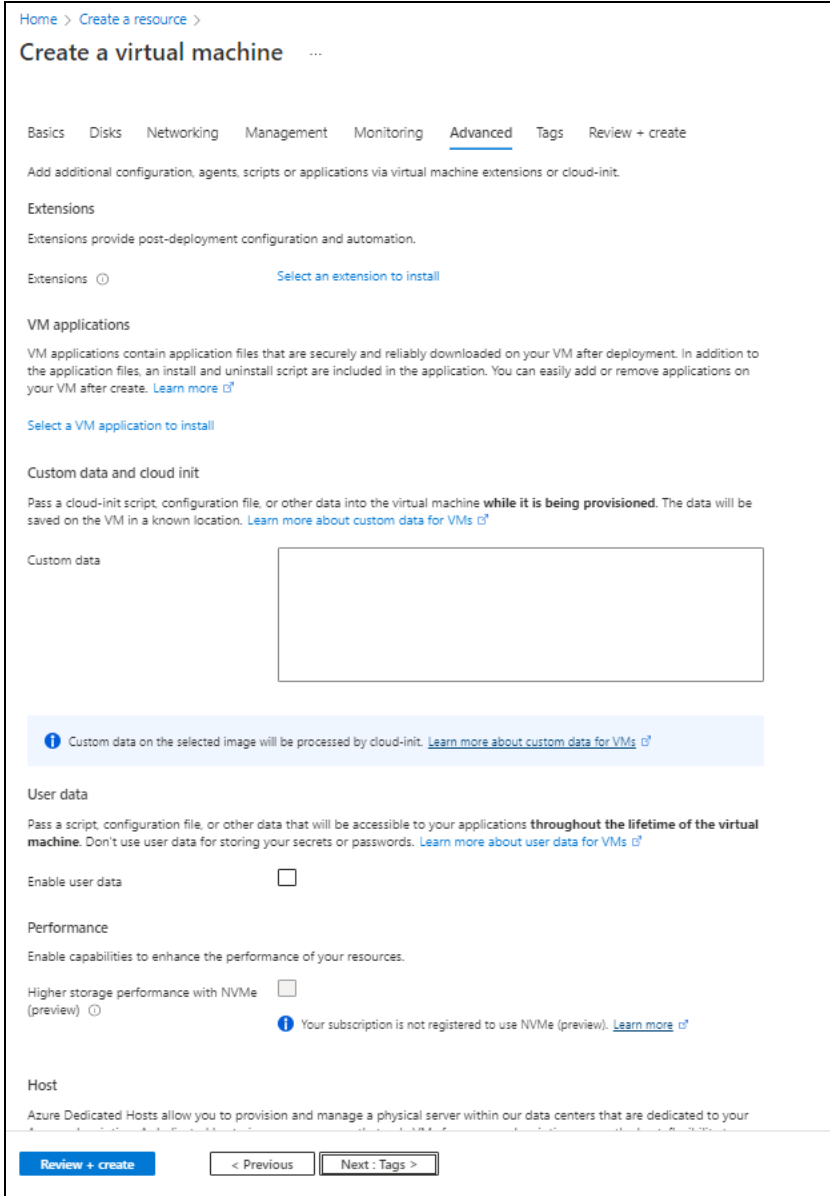
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the additional configuration in the **Advanced** tab as needed.

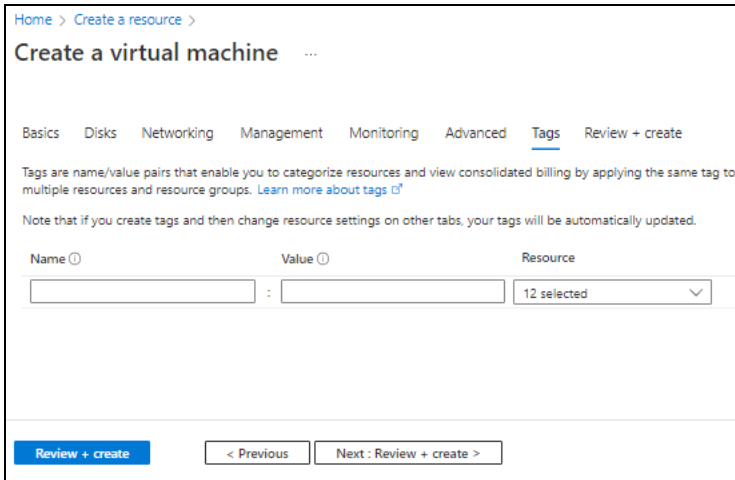
Figure 29 : Create a virtual machine window - Advanced tab



The screenshot shows the 'Create a virtual machine' window in the Advanced tab. The breadcrumb trail is 'Home > Create a resource >'. The title is 'Create a virtual machine ...'. The tabs are 'Basics', 'Disks', 'Networking', 'Management', 'Monitoring', 'Advanced' (selected), 'Tags', and 'Review + create'. Below the tabs, there is a description: 'Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.' The 'Extensions' section has a heading 'Extensions' and a sub-heading 'Extensions provide post-deployment configuration and automation.' Below this is a link 'Select an extension to install'. The 'VM applications' section has a heading 'VM applications' and a sub-heading 'VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#)'. Below this is a link 'Select a VM application to install'. The 'Custom data and cloud init' section has a heading 'Custom data and cloud init' and a sub-heading 'Pass a cloud-init script, configuration file, or other data into the virtual machine while it is being provisioned. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#)'. Below this is a text area for 'Custom data'. A blue information bar states: 'Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#)'. The 'User data' section has a heading 'User data' and a sub-heading 'Pass a script, configuration file, or other data that will be accessible to your applications throughout the lifetime of the virtual machine. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#)'. Below this is a checkbox for 'Enable user data'. The 'Performance' section has a heading 'Performance' and a sub-heading 'Enable capabilities to enhance the performance of your resources.' Below this is a checkbox for 'Higher storage performance with NVMe (preview)'. A blue information bar states: 'Your subscription is not registered to use NVMe (preview). [Learn more](#)'. The 'Host' section has a heading 'Host' and a sub-heading 'Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your'. At the bottom, there are three buttons: 'Review + create', '< Previous', and 'Next : Tags >'.

13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 30 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

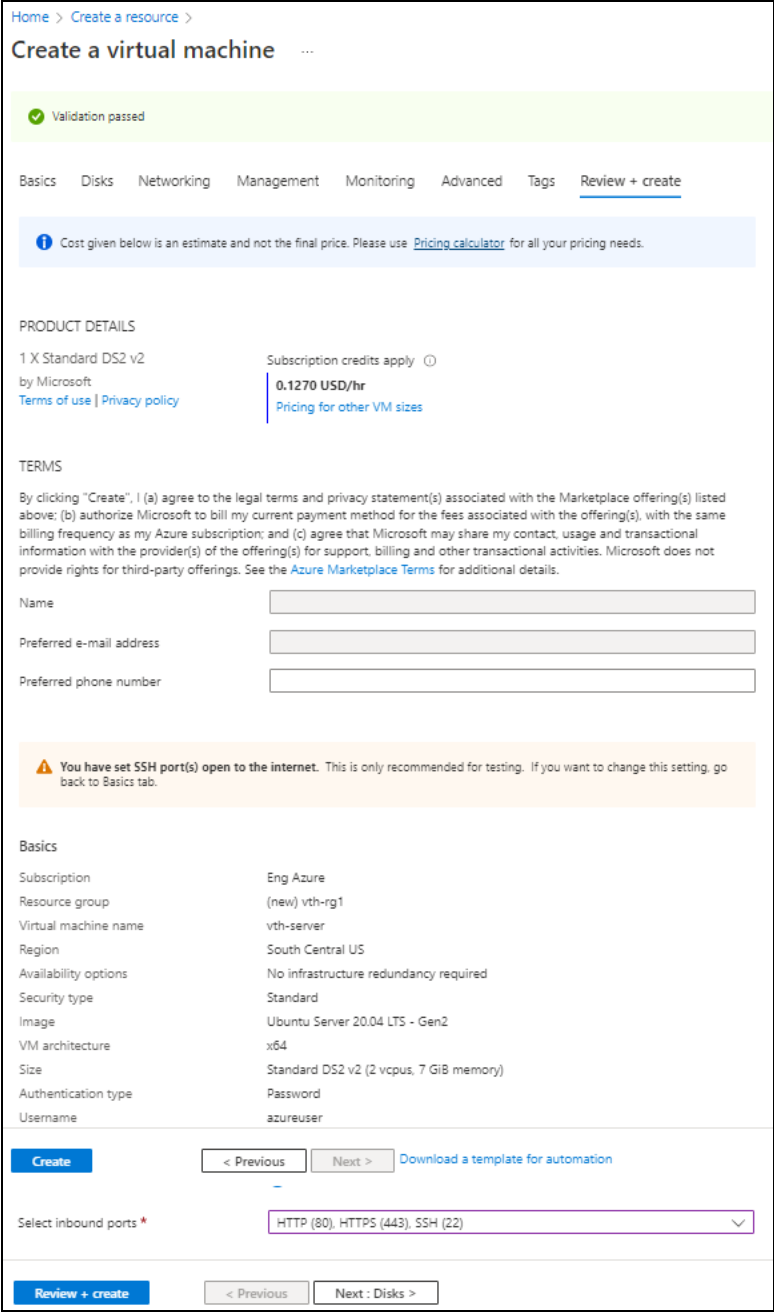
Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
		12 selected

Review + create < Previous Next : Review + create >

- Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 31 : Create a virtual machine window - Review + create tab



Home > Create a resource >

Create a virtual machine

Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard DS2 v2
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.1270 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Preferred phone number

You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics

Subscription	Eng Azure
Resource group	(new) vth-rg1
Virtual machine name	vth-server
Region	South Central US
Availability options	No infrastructure redundancy required
Security type	Standard
Image	Ubuntu Server 20.04 LTS - Gen2
VM architecture	x64
Size	Standard DS2 v2 (2 vcpus, 7 GiB memory)
Authentication type	Password
Username	azureuser

Create < Previous Next > [Download a template for automation](#)

Select inbound ports * HTTP (80), HTTPS (443), SSH (22)

Review + create < Previous Next : Disks >

- Click **Create** at the bottom of the window.
The Server virtual machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

17. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Client machine
- Region
- Image
- Size

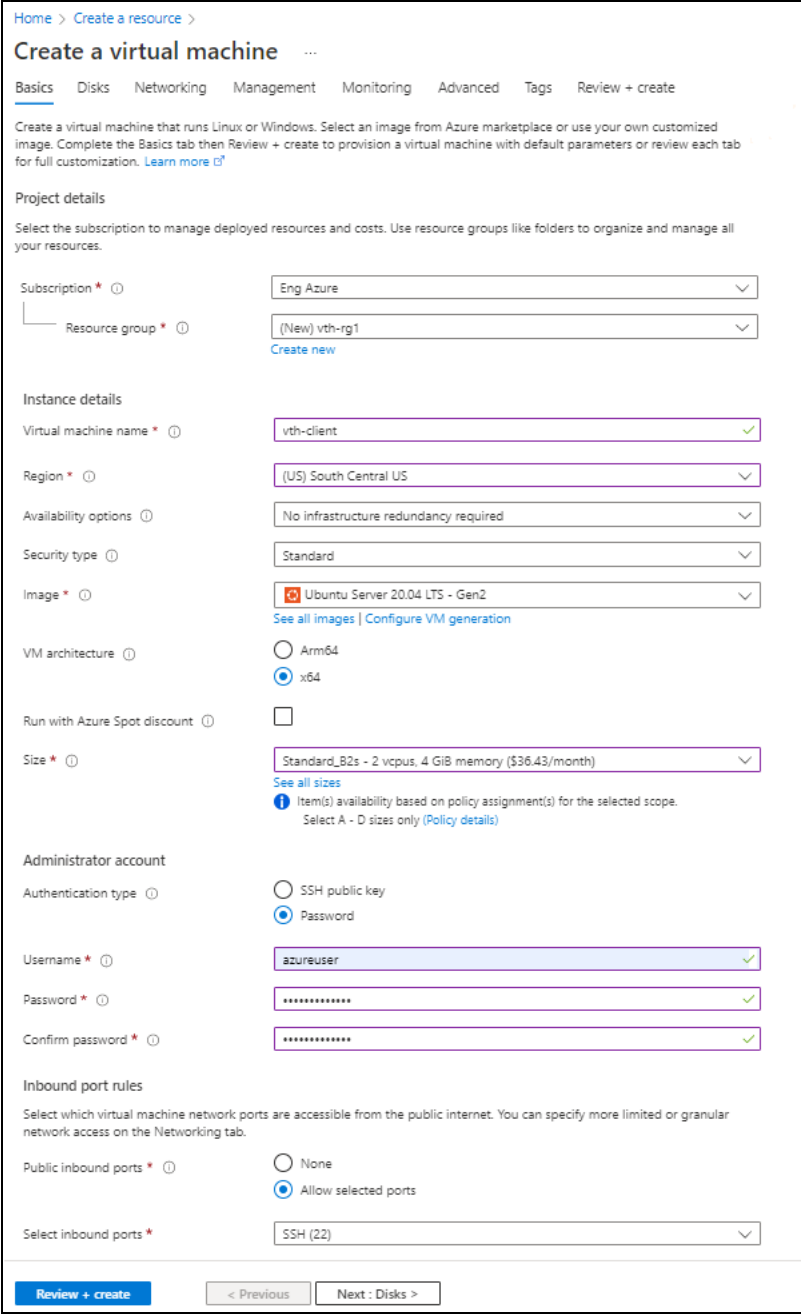
Administrator account

- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 32 : Create a virtual machine window - Basics tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)
Item(s) availability based on policy assignment(s) for the selected scope.
Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

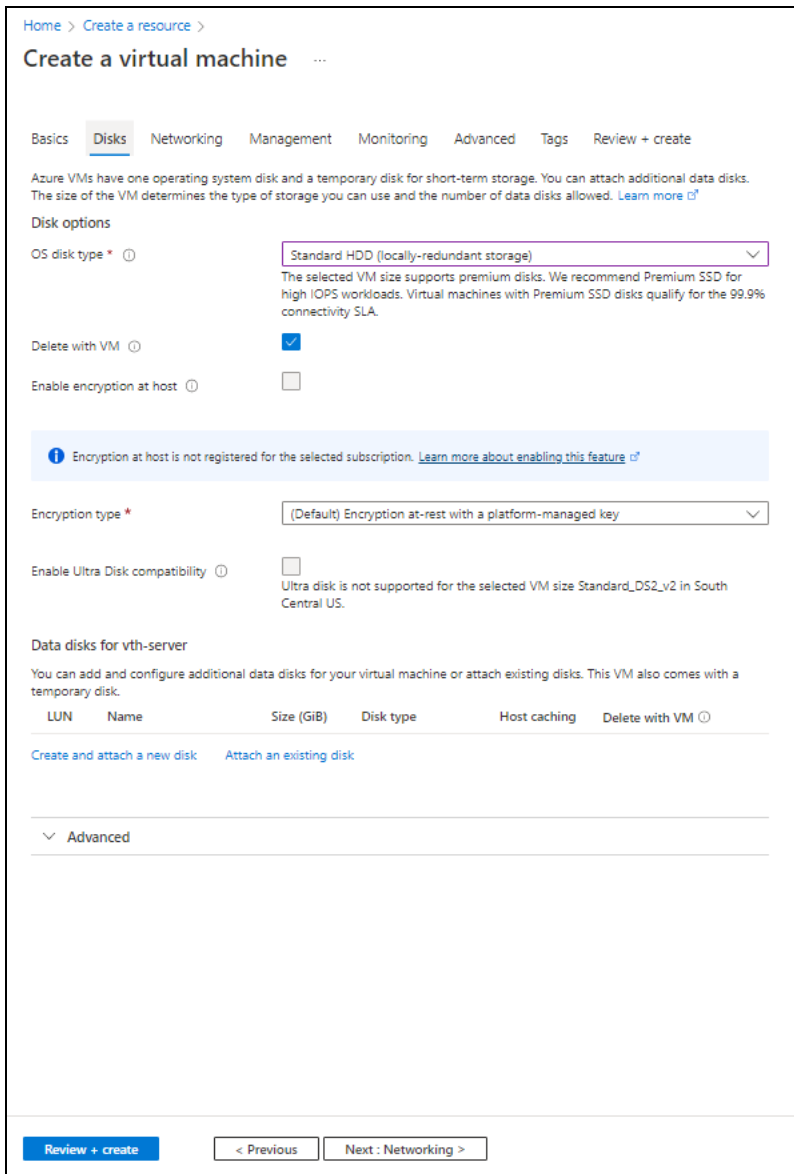
3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 33 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

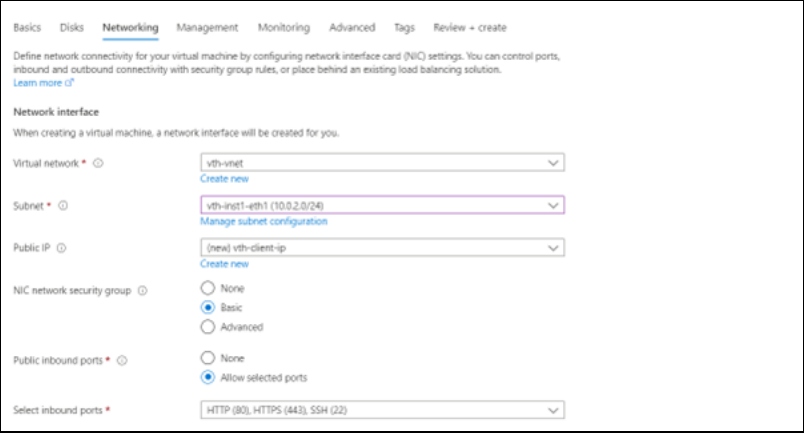
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet (Ethernet 1)
- Select inbound ports

Figure 34 : Create a virtual machine window - Networking tab



Basics Disks **Networking** Management Monitoring 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 >](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Manage subnet configuration](#)

Public IP * [Create new](#)

NIC network security group * ☐ None ☒ Basic ☐ Advanced

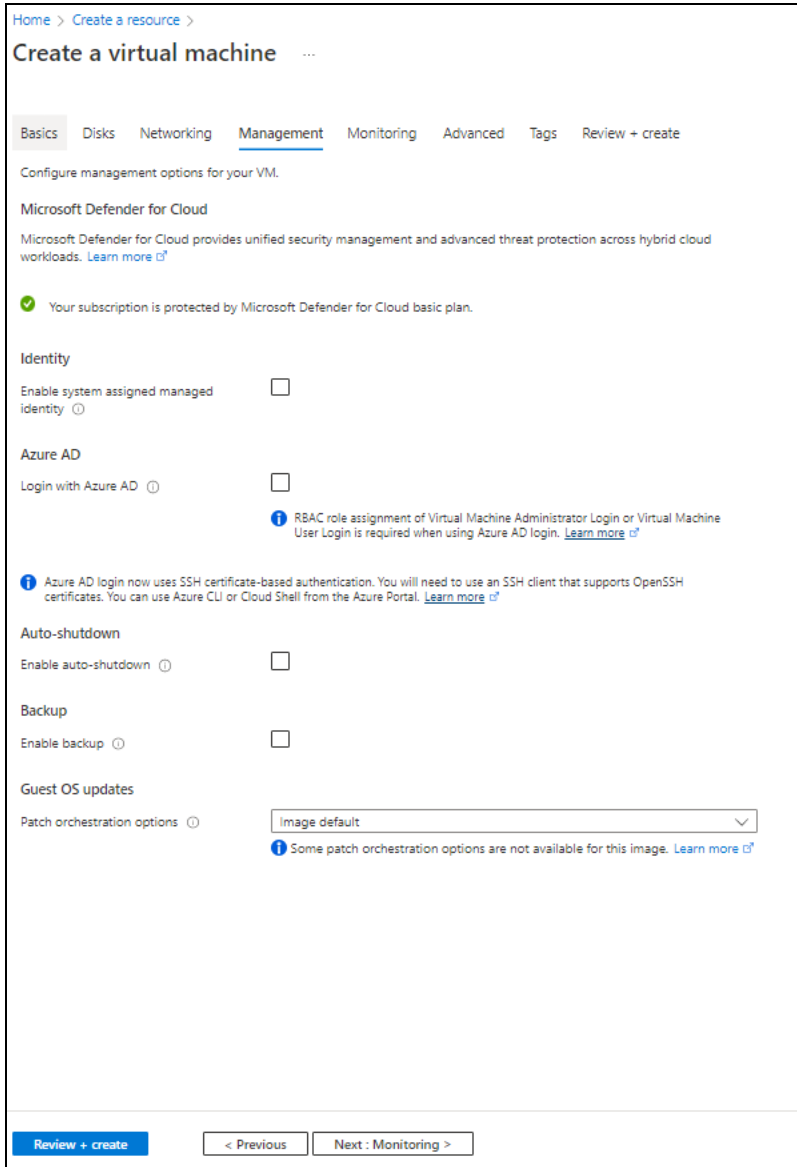
Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 35 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine'. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity
Enable system assigned managed identity ☐

Azure AD
Login with Azure AD ☐
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CLI or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown
Enable auto-shutdown ☐

Backup
Enable backup ☐

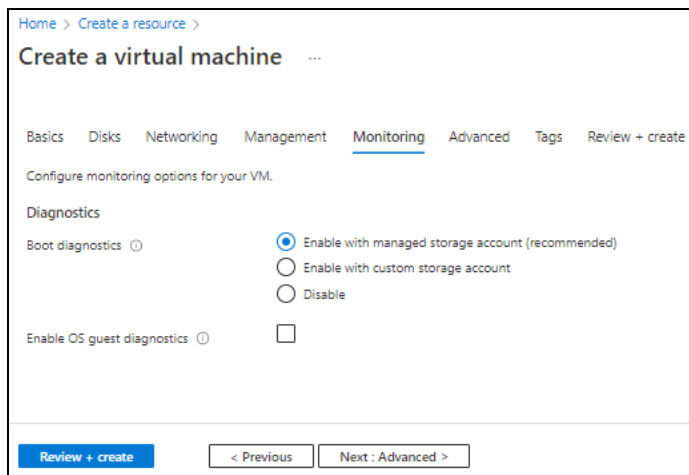
Guest OS updates
Patch orchestration options
Some patch orchestration options are not available for this image. [Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select the monitoring options in the **Monitoring** tab as needed.

Figure 36 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

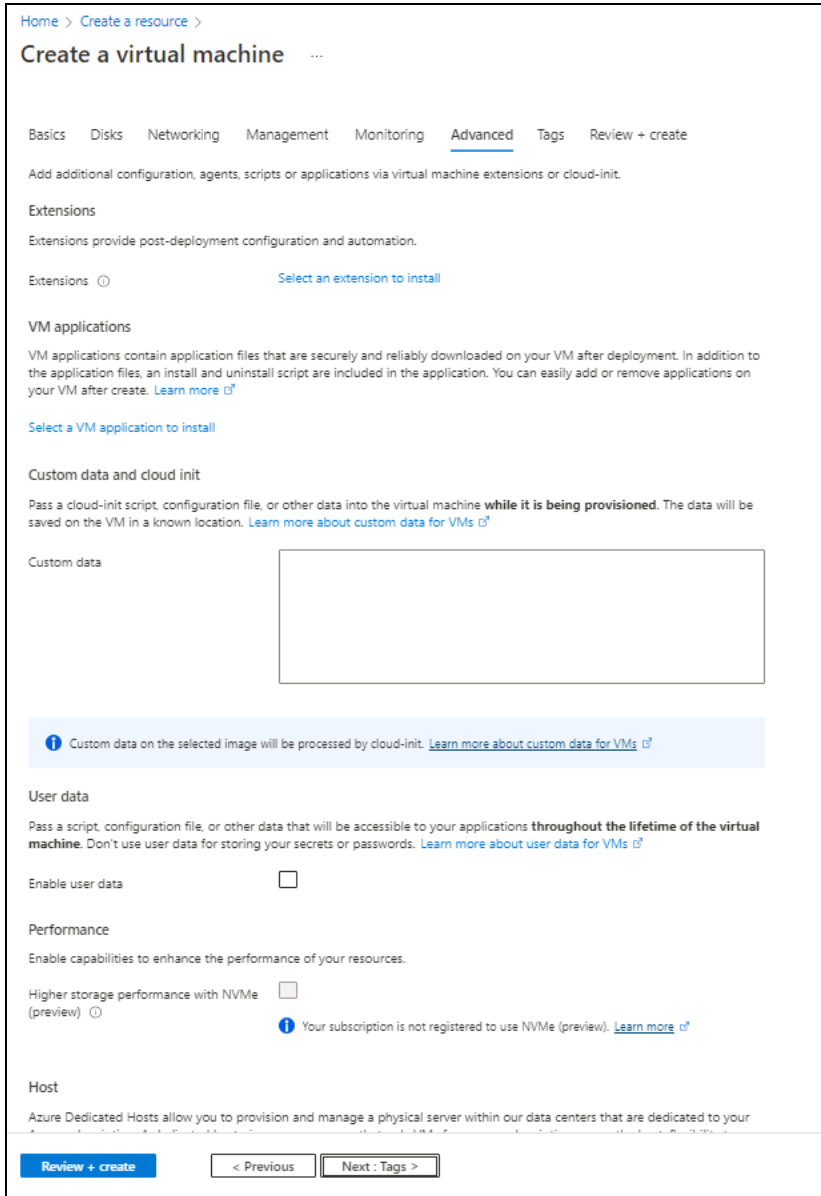
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the additional configuration in the **Advanced** tab as needed.

Figure 37 : Create a virtual machine window - Advanced tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring **Advanced** Tags Review + create

Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

Extensions

Extensions provide post-deployment configuration and automation.

Extensions ⓘ [Select an extension to install](#)

VM applications

VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#) ⓘ

[Select a VM application to install](#)

Custom data and cloud init

Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#) ⓘ

Custom data

i Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#) ⓘ

User data

Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#) ⓘ

Enable user data ☐

Performance

Enable capabilities to enhance the performance of your resources.

Higher storage performance with NVMe (preview) ⓘ ☐

i Your subscription is not registered to use NVMe (preview). [Learn more](#) ⓘ

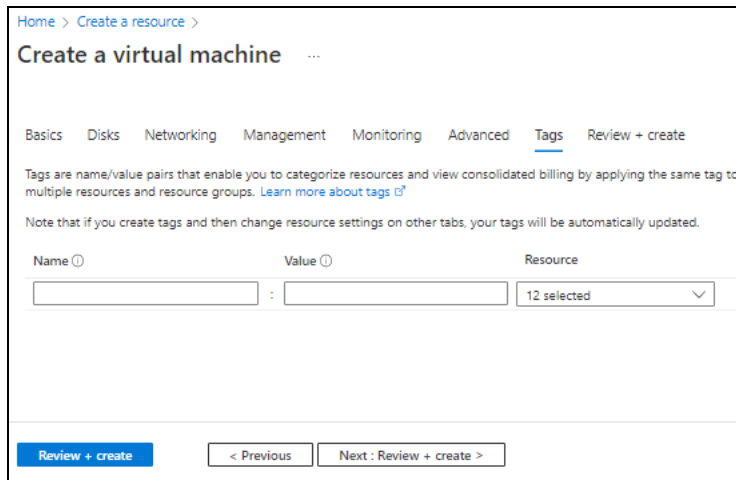
Host

Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your

[Review + create](#) [< Previous](#) [Next : Tags >](#)

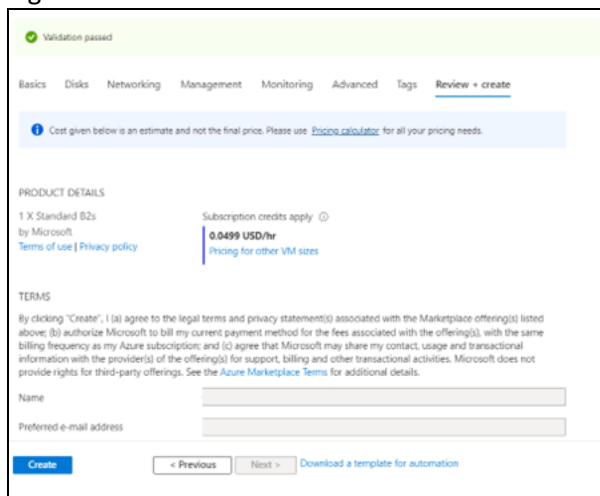
13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 38 : Create a virtual machine window - Tags tab



15. Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 39 : Create a virtual machine window - Review + create tab



16. Click **Create** at the bottom of the window.
The Client machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

Configure vThunder as an SLB

The following topics are covered:

- [Initial Setup](#)
- [Change Password](#)
- [Deploy vThunder as an SLB](#)

Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_2NIC_1VM_GLM_SLB_CONFIG_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure a SLB server host or domain.

The SLB server host value is the data NIC's private IP address instance acting as the server.

Instead of a host, you can also use a domain name. To do so, replace the key 'host' with 'fqdn-name' and provide a domain name instead of the IP address.

```
"slbServerHostOrDomain": {  
  "server-name": "s1",  
  "host": "10.0.2.8",  
  "metadata": {  
    "description": "SLB server host/fqdn-name. To use domain name  
replace host with fqdn-name and ip address with domain name"  
  }  
},
```

3. Configure SLB server ports.

```
"slbServerPortList": {  
  "value": [  
    {  
      "port-number": 53,  
      "protocol": "udp"  
    },  
    {
```

```
        "port-number": 80,  
        "protocol": "tcp"  
    },  
    {  
        "port-number": 443,  
        "protocol": "tcp"  
    }  
]  
},
```

4. Configure service group list ports.

```
"serviceGroupList": {  
    "value": [  
        {  
            "name": "sg443",  
            "protocol": "tcp",  
            "member-list": [  
                {  
                    "name": "s1",  
                    "port": 443  
                }  
            ]  
        },  
        {  
            "name": "sg53",  
            "protocol": "udp",  
            "member-list": [  
                {  
                    "name": "s1",  
                    "port": 53  
                }  
            ]  
        },  
        {  
            "name": "sg80",  
            "protocol": "tcp",  
            "member-list": [  
                {
```

```

        "name": "s1",
        "port": 80
    }
]
}
]
},

```

5. Configure a virtual server.

The virtual server default name is “vs1”.

```

    "virtualServerList": {
        "virtual-server-name": "vs1",
        "metadata": {
            "description": "virtual server is using ethernet 1 ip
address"
        },
        "value": [
            {
                "port-number": 53,
                "protocol": "udp",
                "auto": 1,
                "service-group": "sg53"
            },
            {
                "port-number": 80,
                "protocol": "http",
                "auto": 1,
                "service-group": "sg80"
            },
            {
                "port-number": 443,
                "protocol": "https",
                "auto": 1,
                "service-group": "sg443"
            }
        ]
    },

```

6. Configure SSL.

```
"sslConfig": {  
  "requestTimeout": 40,  
  "Path": "<absolute path of the ssl certificate file>",  
  "File": "<certificate-name>",  
  "CertificationType": "pem"  
}
```

NOTE: By default, SSL configuration is disabled i.e. no SSL configuration is applied.

Example The sample values for the SSL certificate are as shown below:

```
"sslConfig": {  
  "requestTimeout": 40,  
  "Path": "C://Users//...//...//server.pem" or  
  "C:\\Users\\...\\.\\.\\.\\.\\.\\certs\\server.pem",  
  "File": "server",  
  "CertificationType": "pem"  
}
```

7. Provide the resource group name.

```
"resourceGroupName": "vth-rg1"  
"vThUsername": "admin"
```

NOTE: Do not change the vThunder instance username.

8. Verify if all the configurations in the ARM_TMPL_2NIC_1VM_GLM_SLB_CONFIG_PARAM.json file are correct and then save the changes.

Change Password

To change the password, perform the following steps:

1. Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_GLM_CHANGE_  
PASSWORD_2.ps1
```

NOTE: It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```
Enter Default Password:***
Enter New Password:***
Confirm New Password:***
```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_GLM_SLB_CONFIG_3.ps1 -resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_GLM_SLB_CONFIG_3.ps1 -resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate
Do you want to upload ssl certificate ?
[Y] Yes [No] No [?] Help (default is "N"): Y
Public IP Name: vth-inst1-mgmt-nic1-ip
Ethernet-1 Private IP: 10.0.2.47
SLB Server Host IP: 10.0.2.8
Virtual Server Name: vs1
Resource Group Name: vth-rg1
Instance Public IP: 20.165.38.180
```



```
configured ethernet 1 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
```

If you want to upload SSL certificate, enter 'Y'. The certificate available in the sslConfig path is uploaded.

3. If the SSL Certificate upload is successful, a message 'SSL Configured' is displayed.

Configure vThunder GLM

The following topics are covered:

- [Initial Setup](#)
- [Apply GLM License](#)

Initial Setup

To configure vThunder GLM using the ARM template, perform the following steps:

1. Open the ARM_TMPL_2NIC_1VM_GLM_CONFIG_PARAM.json with a text editor.
2. Configure GLM account details.

```
{
  "parameters": {
    "user_name": {
      "value": "<user_email_address>"
    },
    "user_password": {
      "value": "<user_password>"
    },
    "entitlement_token": {
      "value": "<license_entitlement_token>"
    }
  }
}
```

```
}  
}
```

3. Verify if the configurations in the ARM_TMPL_2NIC_1VM_GLM_CONFIG_PARAM.json file are correct and then save the changes.

Apply GLM License

To apply GLM license, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to apply GLM on vThunder:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_GLM_CONFIG_4.ps1
```

3. If the GLM license is applied successfully, a message is displayed.

```
ConfigureGlm  
{  
  "response": {  
    "status": "OK",  
    "msg": "BASE License successfully updated, please log out and log back  
in to access license featurebA1070459ec380000\n"  
  }  
}  
GlmRequestSend  
Configurations are saved on partition: shared  
WriteMemory
```

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance
Here, Public IP of `vth-inst1`.
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->
Using keyboard-interactive authentication.
Password: xxxx <---Enter your password--->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

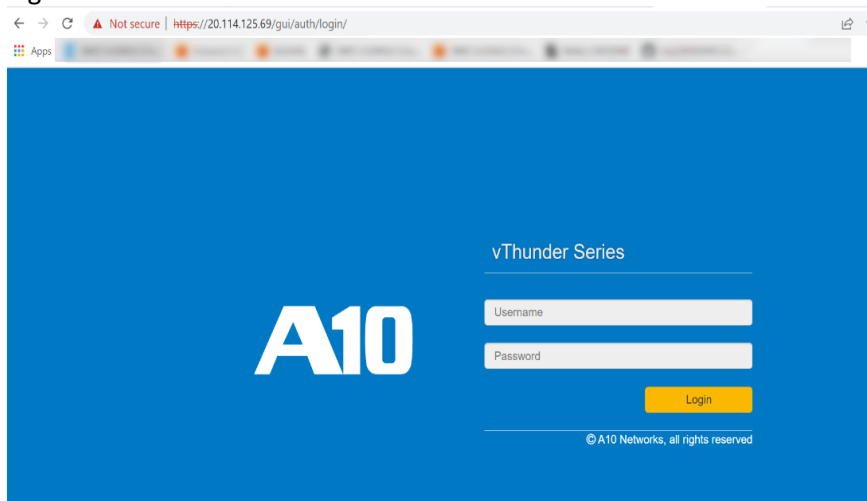
Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

1. Open any browser.

2. Enter `https://<vthunder_public_IP>/gui/auth/login/` in the address bar.

Figure 40 : vThunder GUI



3. Enter the recently configured user credentials.
The home page gets displayed.

Verify Deployment

To verify vThunder SLB deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:

```
vThunder(config)#show running-config
```

If the deployment is successful, the following SLB configuration is displayed:

```
interface management
  ip address dhcp
!
interface ethernet 1
  enable
  ip address 10.0.2.47 255.255.255.0
!
!
slb server s1 10.0.2.8
  port 53 udp
```

```
port 80 tcp
port 443 tcp
!
slb service-group sg443 tcp
member s1 443
!
slb service-group sg53 udp
member s1 53
!
slb service-group sg80 tcp
member s1 80
!
slb virtual-server vs1 use-if-ip ethernet 1
port 53 udp
source-nat auto
service-group sg53
port 80 http
source-nat auto
service-group sg80
port 443 https
source-nat auto
service-group sg443
!
!
end
```

2. Run the following command on vThunder:

```
vThunder(config)#show license-info
```

If the GLM is successfully applied on vThunder, the following GLM configuration is displayed:

```
Host ID       : 5DCB01EC264BECCCFECB3C2ED42E02384EE8C527
USB ID        : Not Available
Billing Serials: A10f771cecbe0000
Token         : A10f771cecbe
Product       : ADC
Platform      : vThunder
Burst         : Disabled
```

```
GLM Ping Interval In Hours : 24
```

Enabled Licenses	Expiry Date	Notes
SLB	None	
CGN	None	
GSLB	None	
RC	None	
DAF	None	
WAF	None	
AAM	None	
FP	None	
WEBROOT	N/A	Requires an additional Webroot license.
THREATSTOP	N/A	Requires an additional ThreatSTOP license.
QOSMOS	N/A	Requires an additional QOSMOS license.
WEBROOT_TI	N/A	Requires an additional Webroot Threat Intel license.
CYLANCE	N/A	Requires an additional Cylance license.
IPSEC_VPN	N/A	Requires an additional IPsec VPN license.
25 Mbps Bandwidth 21-December-2022		

3. Run the following command on vThunder:

```
vThunder(config)#show pki cert
```

If the deployment is successful, the following SSL configuration is displayed:

Name	Type	Expiration	Status
server certificate	Jan 28 12:00:00 2028 GMT	[Unexpired, Bound]	

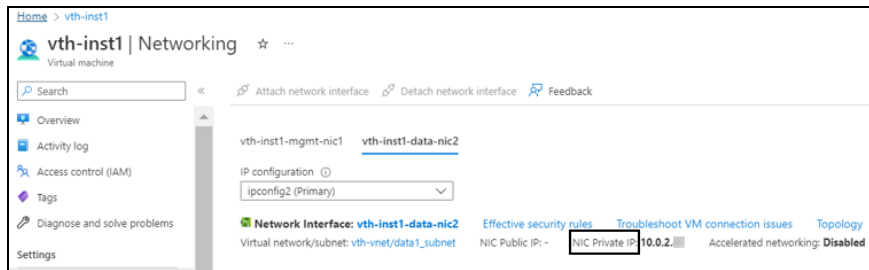
Verify Traffic Flow

To verify the traffic flow from client machine to server machine via vThunder, perform the following:

- From **Azure Portal** > **Azure Services** > **Resource Group** > <resource_group_name> > <virtual_machine_instance> > **Settings** > **Networking**. Here, `vth-inst1` is the vThunder instance name.

2. Copy the Private IP address of the data subnet.

Figure 41 : vThunder instance Data Subnet Private IP



3. Select your client instance from the **Virtual machine** list.

Here, **vth-client** is the client instance name.

4. SSH your client machine and run the following command to verify the traffic flow:

```
curl <vThunder_instance_data_private_IPv4_Address>
```

Example

```
curl 10.0.2.47
```

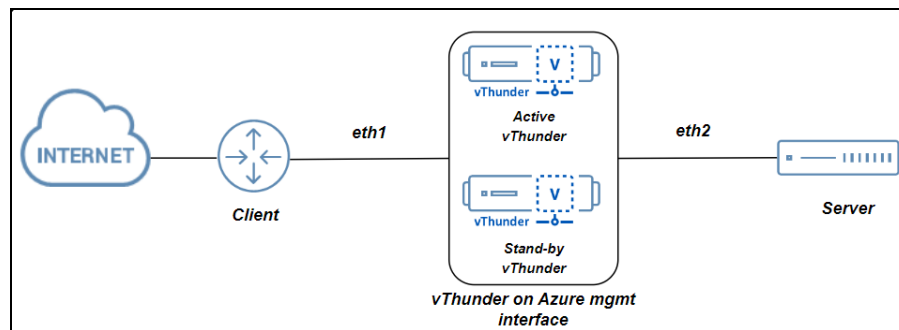
Verify if a response is received.

Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA

[Figure 42](#) shows the 3NIC-2VM-HA deployment topology. Using this template, two vThunder instances can be deployed containing:

- One management interface and two data interfaces each
- HA support
- GLM integration

Figure 42 : 3NIC-2VM-HA Topology



The following topics are covered:

System Requirements	92
Create vThunder Instances	96
Configure Server and Client Machine	102
Configure vThunder as an SLB	119
Access vThunder using CLI or GUI	129
Verify Deployment	130
Verify Traffic Flow	133

System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following resources to deploy vThunder on the Azure cloud:

Table 6 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	A resource group with the specified name and location is created, if it doesn't exist. All the resources required for this template is created under the resource group.	Here, the Azure resource group name used is <code>vth-rg1</code> .
Azure Storage Account	A storage account is created inside the resource group, if it doesn't exist. If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription". Performance: Standard Replication: Read-access geo-redundant storage (RA-GRS) Account kind: Storagev2 (general purpose v2)	<code>vthunderstorage</code>
Virtual Machine (VM) Instance	Two virtual machine instances are created for vThunder. Product: A10 vThunder Operating system: Linux Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory)	<code>vth-inst1</code> <code>vth-inst2</code>

Resource Name	Description	Default Value	
	NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic. Table 7 lists the supported VM sizes.		
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	vth-vnet Address prefix for virtual network: 10.0.0.0/16	
Subnet	Three subnets are created with an address prefix each.	Subnet1: 10.0.1.0/24 Subnet2: 10.0.2.0/24 Subnet3: 10.0.3.0/24	
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: • Management Interface with public IP • Data Interface with primary private IP [Ethernet 1, Ethernet 2] NOTE: The secondary IP of data interface is taken from DHCP server.	vth-inst1-mgmt-nic1 vth-inst1-data-nic2 vth-inst1-data-nic3	10.0.1.35 10.0.2.35 [Primary IP] 10.0.2.X [Secondary IP] 10.0.3.35 [Primary IP] 10.0.3.X [Secondary IP]

Resource Name	Description	Default Value	
		vth-inst2-mgmt-nic1	10.0.1.36
		vth-inst2-data-nic2	10.0.2.36 [Primary IP]
			10.0.2.X [Secondary IP]
		vth-inst2-data-nic3	10.0.3.36 [Primary IP]
			10.0.3.X [Secondary IP]
Public IP	Each vThunder instance is assigned a public IP address to its management interface as a primary IP configuration.	vth-inst1-mgmt-nic1-ip vth-inst2-mgmt-nic1-ip	
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	vth-inst1-nsg vth-inst2-nsg	
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer Azure Service Application Access Key .		

Supported VM Sizes

Table 7 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A4v2	Standard_A4_v2
	Standard A4mv2	Standard_A4m_v2
	Standard/Basic A4	Standard_A4

Series	Size	Qualified Name
	Standard A8v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D3v2	Standard_D3_v2
	Standard DS3v2	Standard_DS3_v2
	Standard D5v2	Standard_D5_v2
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

Azure is going to retire few of the above listed VM sizes soon, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_3NIC_2VM_HA_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {  
  "value": "vth-user"  
},  
"adminPassword": {  
  "value": "vth-Password"  
},
```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure a storage account name.

```
"storageAccountName": {  
  "value": "vthunderstorage"  
},
```

If the storage account already exists, the following error is displayed, "The storage account named is already taken".

4. Configure a virtual network.

```
"virtualNetworkName": {  
  "value": "vth-vnet"  
},
```

5. Configure DNS label prefixes.

```
"dnsLabelPrefix_vthunder11": {
  "value": "vth-inst1-prefix1"
},
"dnsLabelPrefix_vthunder21": {
  "value": "vth-inst2-prefix1"
},
```

6. Configure a vThunder instance names.

```
"vmName_vthunder1": {
  "value": "vth-inst1"
},
"vmName_vthunder2": {
  "value": "vth-inst2"
},
```

7. Set VM size for vThunder.

```
"vthunderSize": {
  "value": "Standard_B4ms"
},
```

Use a suitable VM size that supports at least 3 NICs. For VM sizes, see [System Requirements](#) section.

8. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage": {
  "value": "vthunder_520_byol"
},
"publisherName": {
  "value": "a10networks"
},
"productName": {
  "value": "a10-vthunder-adc-520-for-microsoft-azure"
},
```

NOTE: Do not change the publisher name.

9. Configure three network interface cards for two vThunder instances.

```
"nic1Name_vthunder1": {
  "value": "vth-inst1-mgmt-nic1"
},
"nic2Name_vthunder1": {
  "value": "vth-inst1-data-nic2"
},
"nic3Name_vthunder1": {
  "value": "vth-inst1-data-nic3"
},
"nic1Name_vthunder2": {
  "value": "vth-inst2-mgmt-nic1"
},
"nic2Name_vthunder2": {
  "value": "vth-inst2-data-nic2"
},
"nic3Name_vthunder2": {
  "value": "vth-inst2-data-nic3"
},
```

10. Configure an address prefix and subnet values for one management interface and two data interface.

```
"addressPrefixValue": {
  "value": "10.0.0.0/16"
},
"mgmtIntfPrivatePrefix_vthunder1": {
  "value": "10.0.1.0/24"
},
"eth1PrivatePrefix_vthunder1": {
  "value": "10.0.2.0/24"
},
"eth2PrivatePrefix_vthunder1": {
  "value": "10.0.3.0/24"
},
"mgmtIntfPrivateAddress_vthunder1": {
  "value": "10.0.1.35"
},
"eth1PrivateAddress_vthunder1": {
```

```

    "value": "10.0.2.35"
  },
  "eth2PrivateAddress_vthunder1": {
    "value": "10.0.3.35"
  },
  "mgmtIntfPrivateAddress_vthunder2": {
    "value": "10.0.1.36"
  },
  "eth1PrivateAddress_vthunder2": {
    "value": "10.0.2.36"
  },
  "eth2PrivateAddress_vthunder2": {
    "value": "10.0.3.36"
  },

```

11. Configure public IP address for two vThunder instances.

```

"publicIPAddressName_vthunder1_mgmt": {
  "value": "vth-inst1-mgmt-nic1-ip"
},
"publicIPAddressName_vthunder2_mgmt": {
  "value": "vth-inst2-mgmt-nic1-ip"
},

```

12. Configure network security group for two vThunder instances.

```

"networkSecurityGroupName_vthunder1": {
  "value": "vth-inst1-nsg"
},
"networkSecurityGroupName_vthunder2": {
  "value": "vth-inst2-nsg"
}

```

13. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_HA_PARAM.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a Azure resource group:

```
PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> az group create --name vth-rg1 -
location "south central us"
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-
xxxxxxxxxxxx/resourceGroups/vth-rg1",
  "location": "southcentralus",
  "managedBy": null,
  "name": "vth-rg1",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

3. Run the following command to create a Azure deployment group.

```
PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>
```

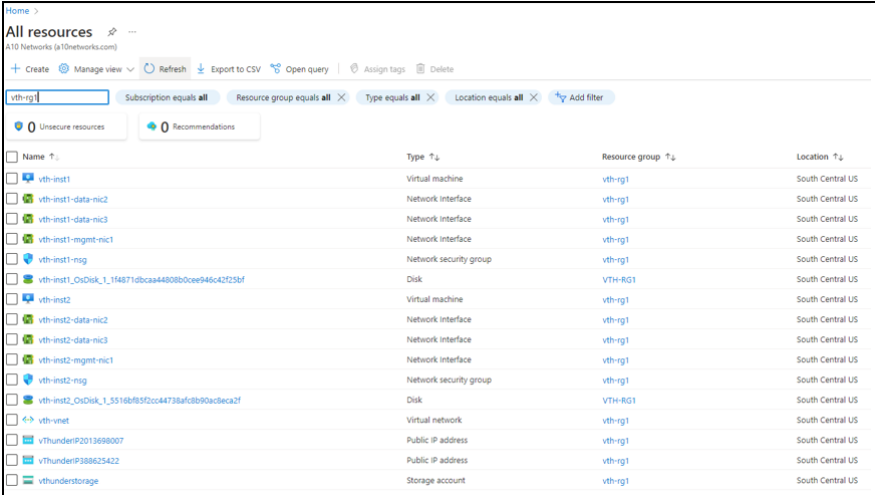
Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
-template-file ARM_TMPL_3NIC_2VM_HA_1.json --parameters ARM_TMPL_3NIC_
2VM_HA_PARAM.json
```

Here, **vth-rg1** resource group is created.

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource_group_name>**.

Figure 43 : Resource listing in the resource group



Name	Type	Resource group	Location
vth-inst1	Virtual machine	vth-rgr1	South Central US
vth-inst1-data-nic2	Network interface	vth-rgr1	South Central US
vth-inst1-data-nic3	Network interface	vth-rgr1	South Central US
vth-inst1-mgmt-nic1	Network interface	vth-rgr1	South Central US
vth-inst1-nsg	Network security group	vth-rgr1	South Central US
vth-inst1_OsDisk_1_1f4871dbcaa4400b0ce946a42725bf	Disk	VTH-RG1	South Central US
vth-inst2	Virtual machine	vth-rgr1	South Central US
vth-inst2-data-nic2	Network interface	vth-rgr1	South Central US
vth-inst2-data-nic3	Network interface	vth-rgr1	South Central US
vth-inst2-mgmt-nic1	Network interface	vth-rgr1	South Central US
vth-inst2-nsg	Network security group	vth-rgr1	South Central US
vth-inst2_OsDisk_1_5516b8f52cc44738fcd890ac8eca2f	Disk	VTH-RG1	South Central US
vth-vnet	Virtual network	vth-rgr1	South Central US
vThunderP201369007	Public IP address	vth-rgr1	South Central US
vThunderP38625422	Public IP address	vth-rgr1	South Central US
vthunderstorage	Storage account	vth-rgr1	South Central US

Configure Server and Client Machine

The following topics are covered:

- [Create a Server Machine](#)
- [Create a Client Machine](#)

Create a Server Machine

To create a Server machine, perform the following steps:

1. From **Home**, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Server machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 44 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics | Disks | Networking | Management | Monitoring | Advanced | Tags | Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Item(s) availability based on policy assignment(s) for the selected scope.
Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

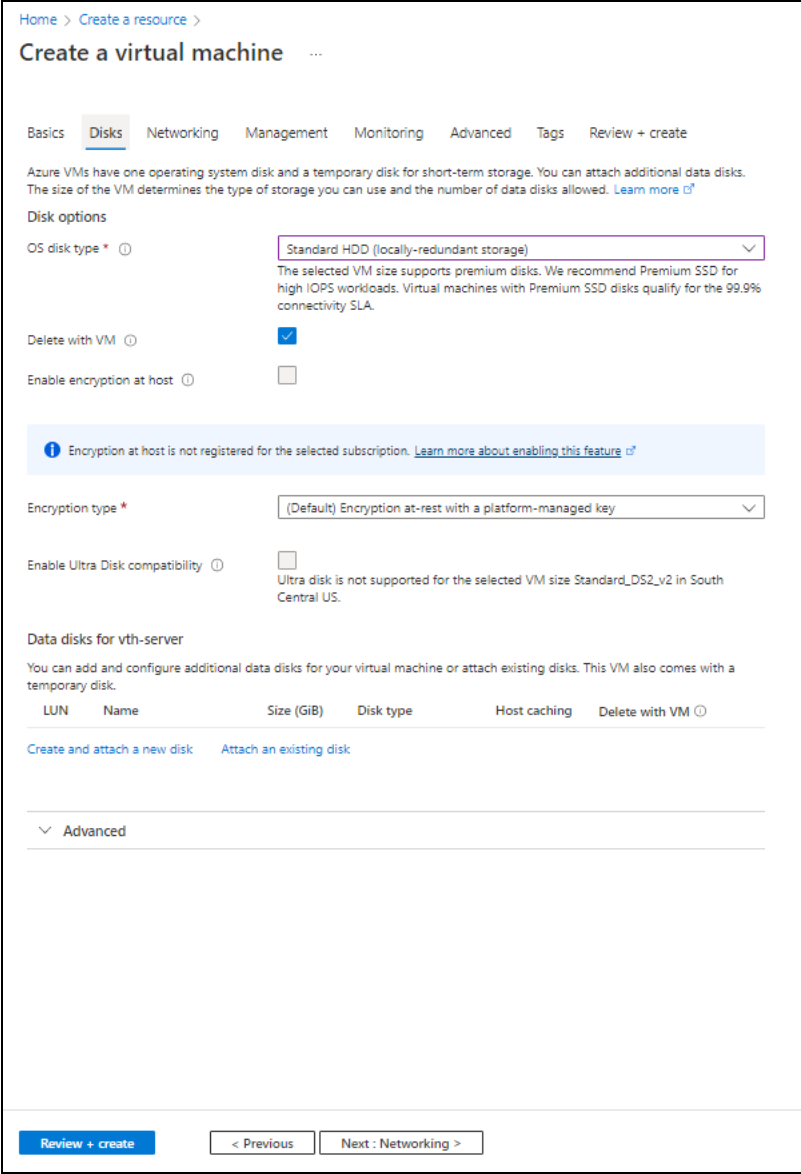
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 45 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet 2 (Ethernet 2)
- Select inbound ports

Figure 46 : Create a virtual machine window - Networking tab

Home > Create a resource >

Create a virtual machine ...

Basics Disks **Networking** Management Monitoring 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](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Manage subnet configuration](#)

Public IP [Create new](#)

NIC network security group ☐ None ☒ Basic ☐ Advanced

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Delete public IP and NIC when VM is deleted ☐

Enable accelerated networking ☒

Load balancing

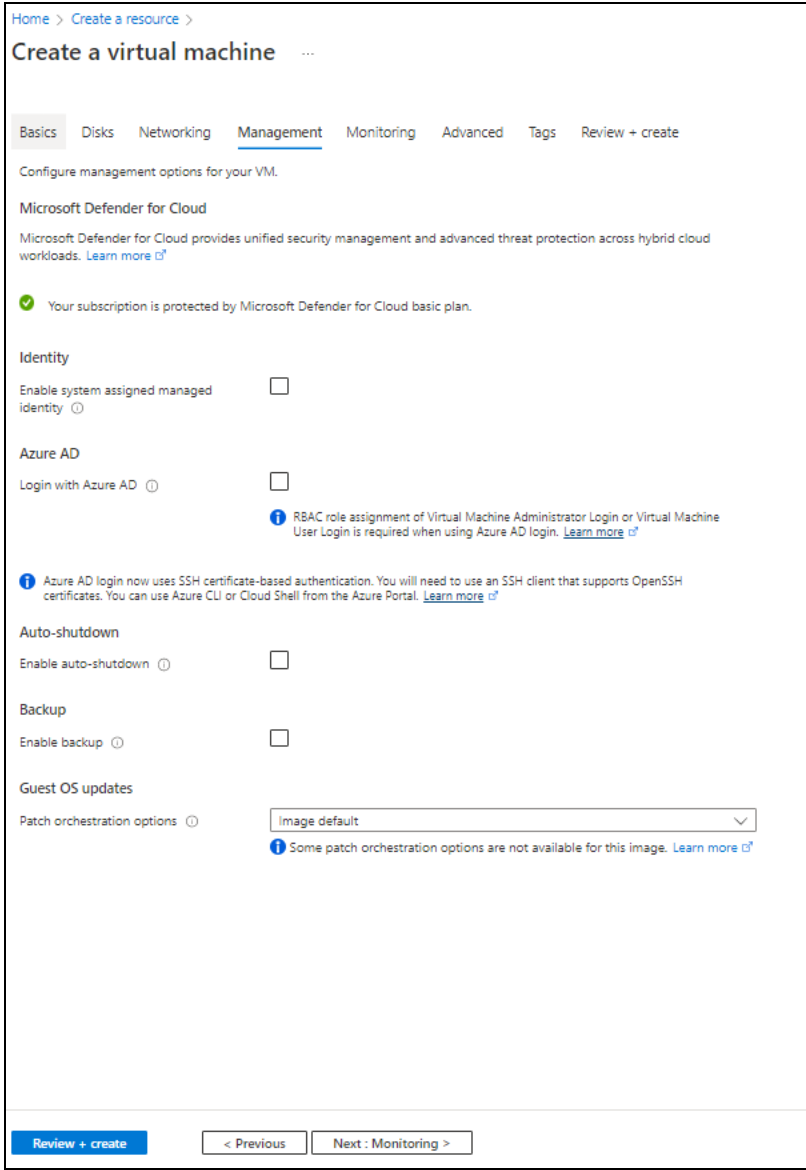
You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#)

Place this virtual machine behind an existing load balancing solution? ☐

[Review + create](#) [< Previous](#) [Next : Management >](#)

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.
8. Select or enter the information in the **Management** tab as needed.

Figure 47 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine ...'. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity

Enable system assigned managed identity ☐

Azure AD

Login with Azure AD ☐

RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CU or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown

Enable auto-shutdown ☐

Backup

Enable backup ☐

Guest OS updates

Patch orchestration options

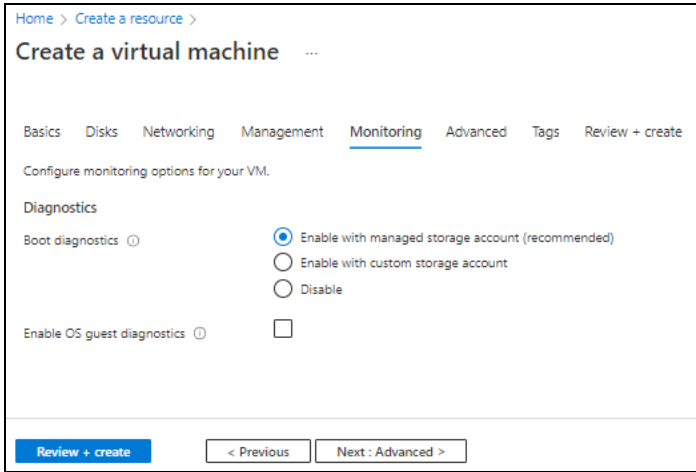
Some patch orchestration options are not available for this image. [Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select the monitoring options in the **Monitoring** tab as needed.

Figure 48 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

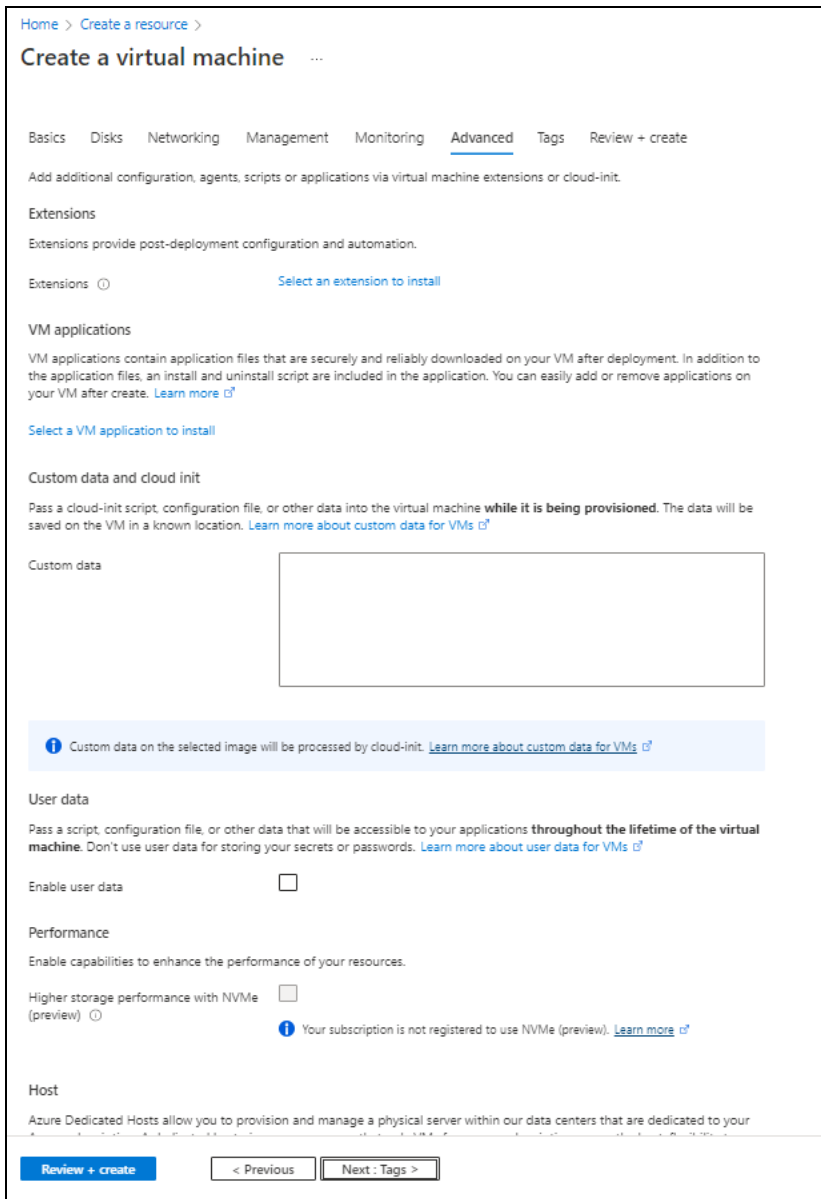
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the additional configuration in the **Advanced** tab as needed.

Figure 49 : Create a virtual machine window - Advanced tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring **Advanced** Tags Review + create

Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

Extensions

Extensions provide post-deployment configuration and automation.

Extensions ⓘ [Select an extension to install](#)

VM applications

VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#) ⓘ

[Select a VM application to install](#)

Custom data and cloud init

Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#) ⓘ

Custom data

Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#) ⓘ

User data

Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#) ⓘ

Enable user data ☐

Performance

Enable capabilities to enhance the performance of your resources.

Higher storage performance with NVMe (preview) ⓘ ☐

ⓘ Your subscription is not registered to use NVMe (preview). [Learn more](#) ⓘ

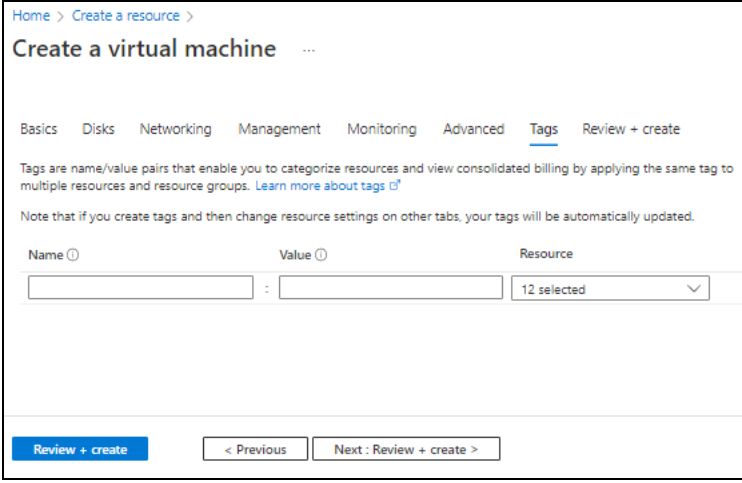
Host

Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your

[Review + create](#) [< Previous](#) [Next : Tags >](#)

13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 50 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
		12 selected

Review + create < Previous Next : Review + create >

15. Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 51 : Create a virtual machine window - Review + create tab

Home > Create a resource >

Create a virtual machine

Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard DS2 v2
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.1270 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Preferred phone number

⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics

Subscription	Eng Azure
Resource group	(new) vth-rg1
Virtual machine name	vth-server
Region	South Central US
Availability options	No infrastructure redundancy required
Security type	Standard
Image	Ubuntu Server 20.04 LTS - Gen2
VM architecture	x64
Size	Standard DS2 v2 (2 vcpus, 7 GiB memory)
Authentication type	Password
Username	azureuser

Create < Previous Next > [Download a template for automation](#)

Select inbound ports * HTTP (80), HTTPS (443), SSH (22) ▼

Review + create < Previous Next : Disks >

- Click **Create** at the bottom of the window.
The Server virtual machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

17. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Client machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 52 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)
 Item(s) availability based on policy assignment(s) for the selected scope.
 Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

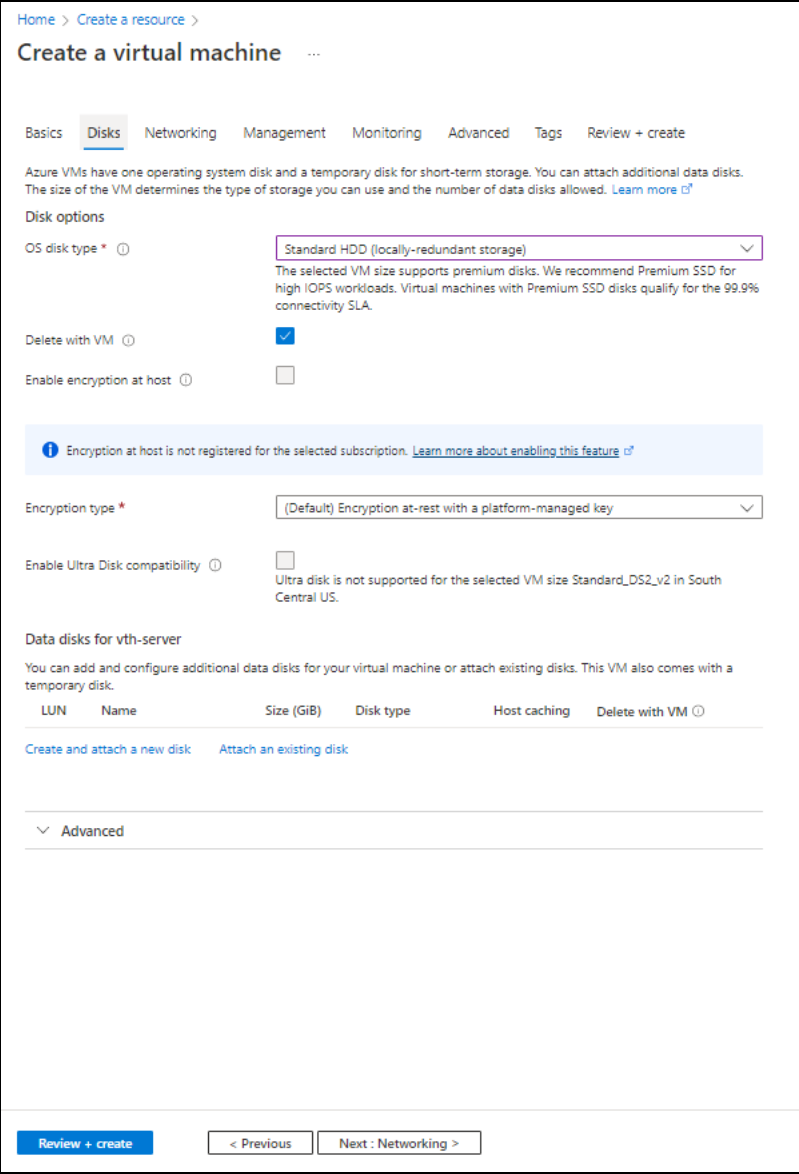
3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 53 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

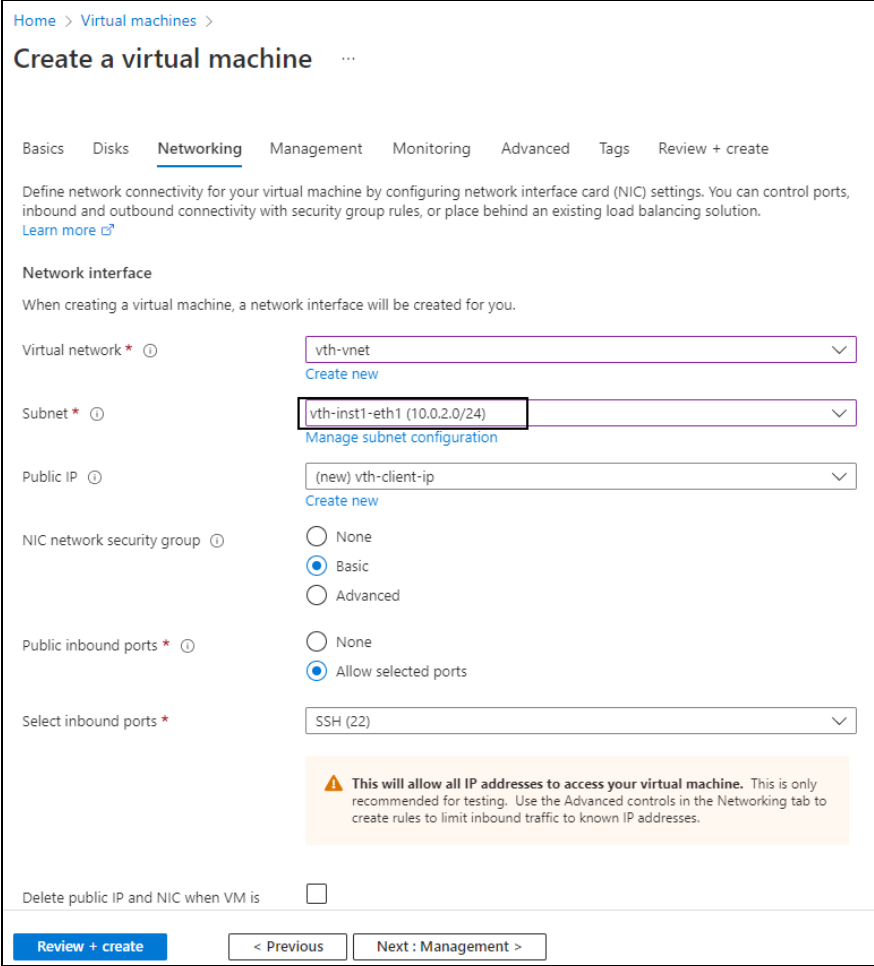
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet 1 (Ethernet 1)
- Select inbound ports

Figure 54 : Create a virtual machine window - Networking tab



Home > Virtual machines >

Create a virtual machine

Basics Disks **Networking** Management Monitoring 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](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Manage subnet configuration](#)

Public IP [Create new](#)

NIC network security group ☐ None ☒ Basic ☐ Advanced

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

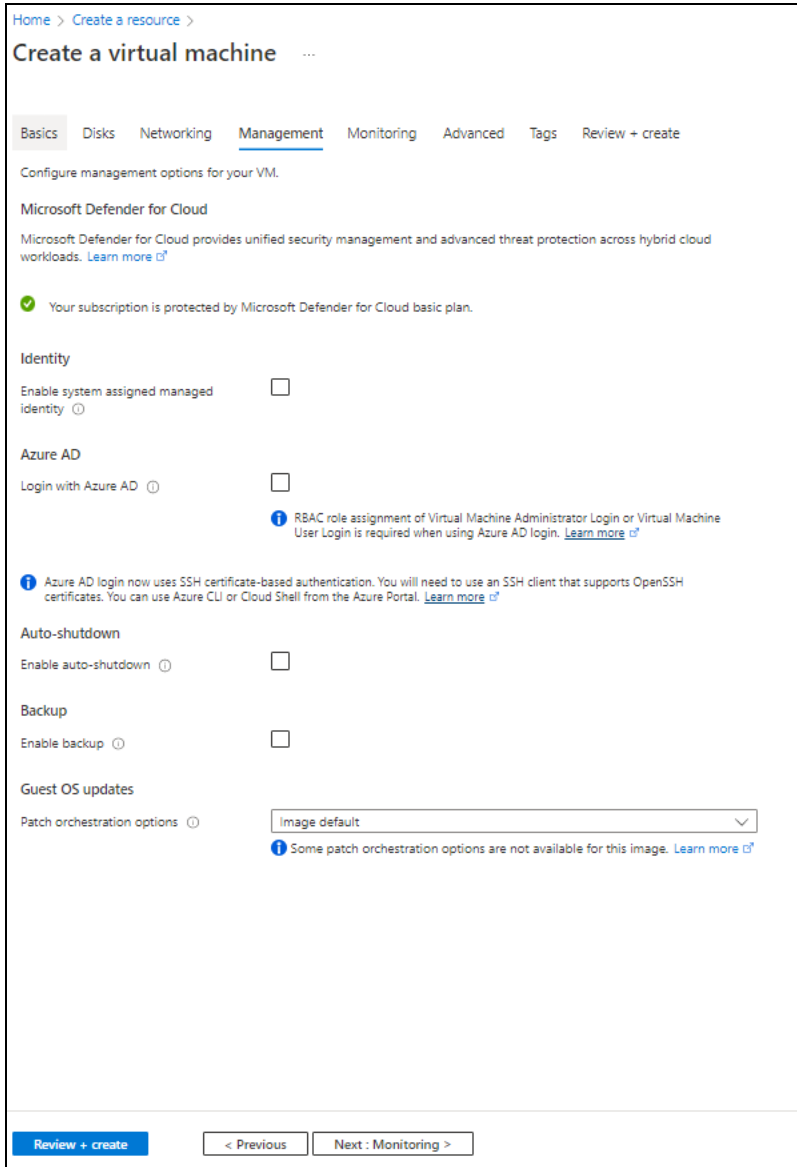
Delete public IP and NIC when VM is ☐

[Review + create](#) [< Previous](#) [Next : Management >](#)

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 55 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine'. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity
Enable system assigned managed identity ☐

Azure AD
Login with Azure AD ☐
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CLI or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown
Enable auto-shutdown ☐

Backup
Enable backup ☐

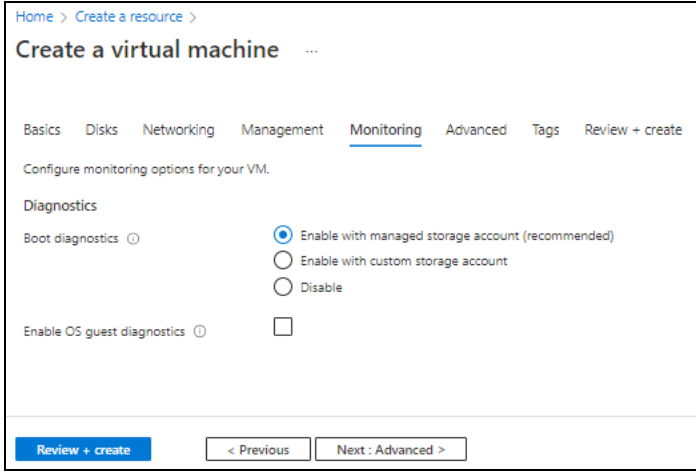
Guest OS updates
Patch orchestration options
Some patch orchestration options are not available for this image. [Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select the monitoring options in the **Monitoring** tab as needed.

Figure 56 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

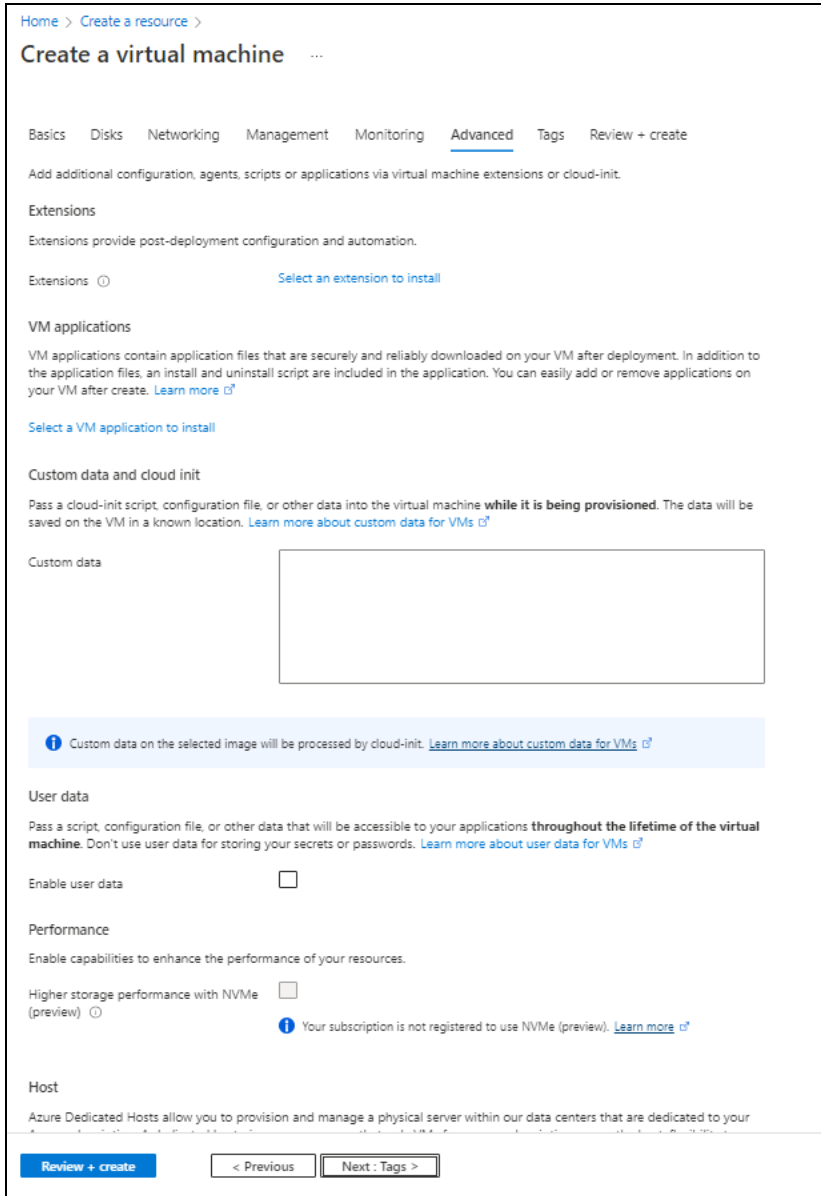
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the additional configuration in the **Advanced** tab as needed.

Figure 57 : Create a virtual machine window - Advanced tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring **Advanced** Tags Review + create

Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

Extensions

Extensions provide post-deployment configuration and automation.

Extensions ⓘ [Select an extension to install](#)

VM applications

VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#) ⓘ

[Select a VM application to install](#)

Custom data and cloud init

Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#) ⓘ

Custom data

Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#) ⓘ

User data

Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#) ⓘ

Enable user data ☐

Performance

Enable capabilities to enhance the performance of your resources.

Higher storage performance with NVMe (preview) ⓘ ☐

ⓘ Your subscription is not registered to use NVMe (preview). [Learn more](#) ⓘ

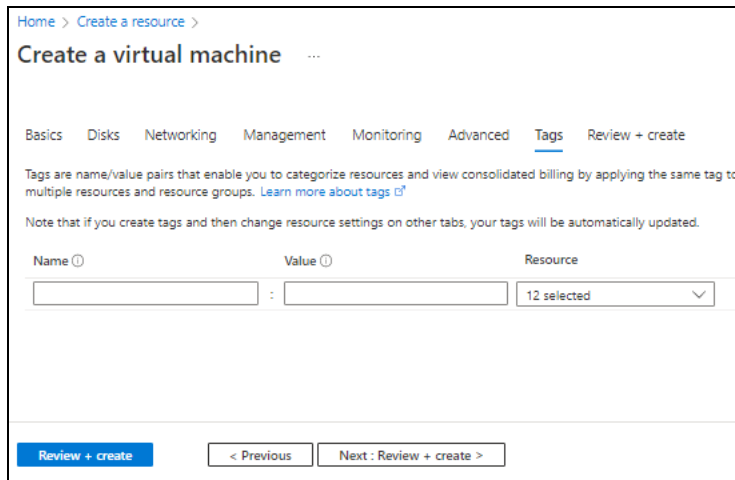
Host

Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your

[Review + create](#) [< Previous](#) [Next : Tags >](#)

13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 58 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

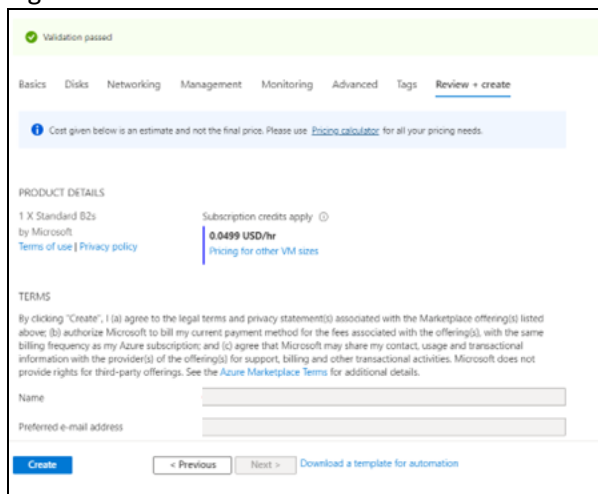
Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
		12 selected

Review + create < Previous Next : Review + create >

- Click **Next : Review + create** at the bottom of the window. The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 59 : Create a virtual machine window - Review + create tab



Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard B2s
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply
0.0499 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Create < Previous Next > [Download a template for automation](#)

- Click **Create** at the bottom of the window. The Client machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

Configure vThunder as an SLB

The following topics are covered:

- [Initial Setup](#)
- [Change Password](#)
- [Deploy vThunder as an SLB](#)

Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_HA_SLB_CONFIG_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure a SLB server host or domain.

The SLB server host value is the data NIC's private IP address instance acting as the server.

Instead of a host, you can also use a domain name. To do so, replace the key 'host' with 'fqdn-name' and provide a domain name instead of the IP address.

```
"slbServerHostOrDomain": {
  "server-name": "s1",
  "host": "10.0.3.7",
  "metadata": {
    "description": "SLB server host/fqdn-name. To use domain name
replace host with fqdn-name and ip address with domain name"
  }
},
```

3. Configure SLB server ports.

```
"slbServerPortList": {
  "value": [
    {
      "port-number": 53,
      "protocol": "udp",
      "health-check-disable": 1
    }
  ],
}
```

```
{
  "port-number": 80,
  "protocol": "tcp",
  "health-check-disable":1
},
{
  "port-number": 443,
  "protocol": "tcp",
  "health-check-disable":1
}
],
},
```

4. Configure service group list ports.

```
"serviceGroupList": {
  "value": [
    {
      "name":"sg443",
      "protocol":"tcp",
      "health-check-disable":1
      "member-list": [
        {
          "name":"s1",
          "port":443
        }
      ]
    },
    {
      "name":"sg53",
      "protocol":"udp",
      "health-check-disable":1
      "member-list": [
        {
          "name":"s1",
          "port":53
        }
      ]
    }
  ],
},
```

```

    {
      "name": "sg80",
      "protocol": "tcp",
      "health-check-disable": 1
      "member-list": [
        {
          "name": "s1",
          "port": 80
        }
      ]
    }
  ],
},

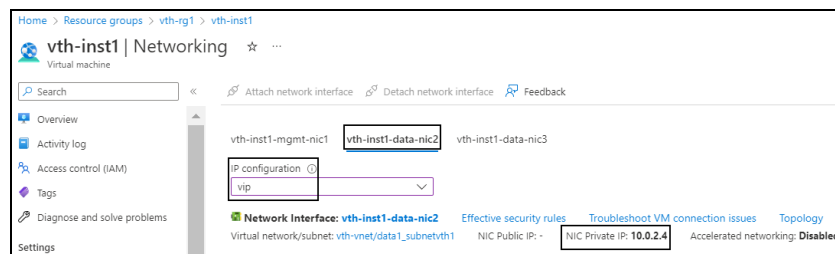
```

5. Configure a virtual server.

The virtual server default name is “vip”. The vip address is generated dynamically after deploying the ARM template. Therefore, its default value under **virtualServerList** should be replaced. To get the vip address, perform the following steps:

- From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- Go to the first virtual machine instance. Here, first virtual machine instance is **vth-inst1**.
- Select **Networking** from the left **Settings** panel.
- Select the Data NIC 2 tab > **IP configuration** > **vip**. Here, Data NIC 2 is **vth-inst1-data-nic2**.

Figure 60 : Virtual machine - Networking window - Data NIC 2 tab



- Select the **NIC Private IP**.

f. Replace the **ip-address** value under **virtualServerList** with this **vip**.

```

    "virtualServerList": {
      "virtual-server-name": "vip",
      "ip-address": "10.0.2.4",
      "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 subnet"
      },
      "value": [
        {
          "port-number": 53,
          "protocol": "udp",
          "ha-conn-mirror": 1,
          "auto": 1,
          "service-group": "sg53"
        },
        {
          "port-number": 80,
          "protocol": "http",
          "auto": 1,
          "service-group": "sg80"
        },
        {
          "port-number": 443,
          "protocol": "https",
          "auto": 1,
          "service-group": "sg443"
        }
      ]
    },

```

CAUTION:

Do not configure **ha-conn-mirror** with port 80 and port 443 as it does not work with these ports.

6. Configure SSL.

```

    "sslConfig": {
      "requestTimeout": 40,

```

```

    "Path": "<absolute path of the ssl certificate file>",
    "File": "<certificate-name>",
    "CertificationType": "pem"
  }

```

NOTE: By default, SSL configuration is disabled i.e. no SSL configuration is applied.

Example The sample values for the SSL certificate are as shown below:

```

    "sslConfig": {
      "requestTimeout": 40,
      "Path": "C://Users//...//...//server.pem" or
      "C:\\Users\\...\\...\\certs\\server.pem",
      "File": "server",
      "CertificationType": "pem"
    }

```

7. Provide the resource group name.

```

    "resourceGroupName": "vth-rg1"
    "vThUsername": "admin"

```

NOTE: Do not change the vThunder instance username.

8. Verify if the vip address and all other configurations in the ARM_TMPL_3NIC_2VM_HA_SLB_CONFIG_PARAM.json file are correct and then save the changes.

Change Password

To change the password, perform the following steps:

1. Run the following command to change password:

```

PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CHANGE_PASSWORD_2.ps1

```

NOTE: It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```
Enter Default Password:***
Enter New Password:***
Confirm New Password:***
```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_SLB_CONFIG_3.ps1
-resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_SLB_CONFIG_3.ps1
-resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate
Do you want to upload ssl certificate ?
[Y] Yes [No] No [?] Help (default is "N"): Y
SLB Server Host IP: 10.0.3.7
Virtual Server Name: vip
Resource Group Name: vth-rg1
vThunder1 Public IP: 13.85.81.137
vThunder2 Public IP: 13.85.81.113
Configuring vm: vth-inst1
configured ethernet- 1 ip
```

```
configured ethernet- 2 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 1
Configuring vm: vth-inst2
configured ethernet- 1 ip
configured ethernet- 2 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 2
```

3. If the SSL Certificate upload is successful, a message 'SSL Configured' is displayed.

Configure High Availability for vThunder

The following topics are covered:

- [Initial Setup](#)
- [Create High Availability for vThunder](#)

Initial Setup

Before configuring high availability for vThunder, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure DNS.

```
"dns": {
  "value": "8.8.8.8"
},
```

3. Configure a Network Gateway IP.

The default value of network gateway IP address is 10.0.1.1 as this is the first IP address of the data subnet 1 configuration.

```
"rib-list": [
  {
    "ip-dest-addr": "0.0.0.0",
    "ip-mask": "/0",
    "ip-nexthop-ipv4": [
      {
        "ip-next-hop": "10.0.2.1"
      }
    ]
  }
],
```

4. Set VRRP-A.

```
"vrrp-a": {
  "set-id": 1
},
```

5. Set a Terminal Idle Timeout.

```
"terminal": {
  "idle-timeout": 0
},
```

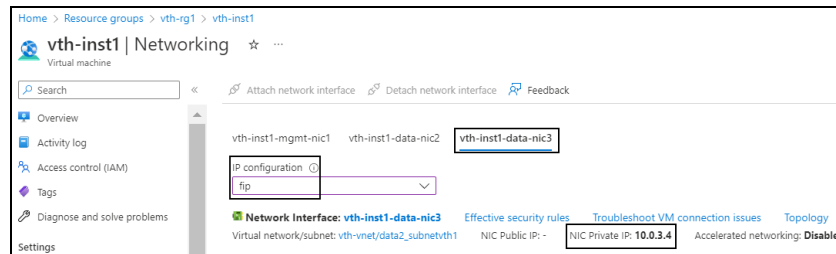
6. Configure the VRID details.

The default value of vrid is 0. The default priority for vThunder-1 is 100, and for vThunder-2 is 99 (100-1). The floating ip address value is generated dynamically after deploying the ARM template. Therefore, its default value under `vrid-list` should be replaced. To get the fip address, perform the following steps:

- From the **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- Go to the first virtual machine instance. Here, first virtual machine instance is `vth-inst1`.

- c. Select **Networking** from the left **Settings** panel.
- d. Select the Data NIC 3 tab > **IP configuration**. Here, **vth-inst1-data-nic3**.

Figure 61 : Virtual machine - Networking window - Data NIC 3 tab



- e. Select the **NIC Private IP**.
- f. Replace the **ip-address** value under **vrid-list** with this **fip**.

```
"vrid-list": [
  {
    "vrid-val": 0,
    "blade-parameters": {
      "priority": 100
    },
    "floating-ip": {
      "ip-address-cfg": [
        {
          "ip-address": "10.0.3.4"
        }
      ]
    }
  }
]
```

7. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json file are correct and then save the changes.

Create High Availability for vThunder

To create High Availability for vThunder, perform the following steps:

1. Import Azure access key on both the vThunder instances. For more information, refer [Import Azure Access Key](#).

2. Run the following command to configure both VM in HA mode.

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_4.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_4.ps1 -  
resourceGroup vth-rg1
```

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access the vThunder instance using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance
Here, Public IP of `vth-inst1`, `vth-inst2`
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->  
Using keyboard-interactive authentication.  
Password: xxxx <---Enter your password-->  
Last login: Day MM DD HH:MM:SS from a.b.c.d  
  
System is ready now.
```

```
[type ? for help]

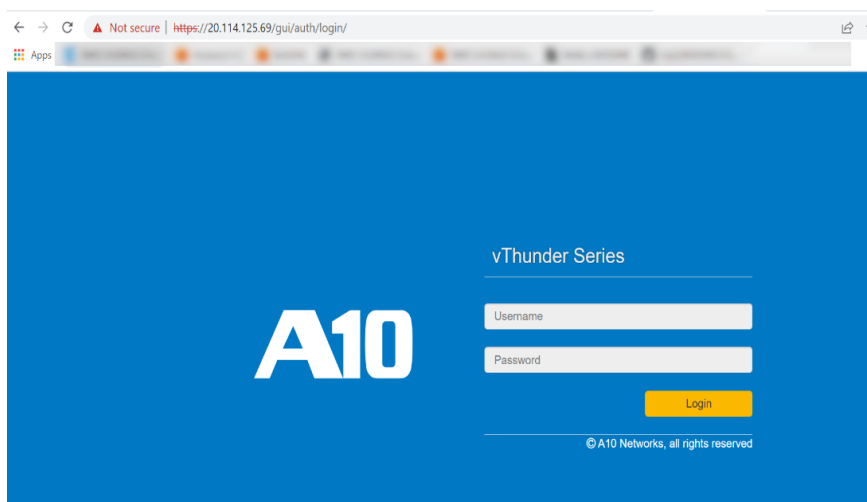
vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

Access vThunder using GUI

To access the vThunder instance using GUI, perform the following steps:

1. Open any browser.
2. Enter `https://<vthunder_public_IP>/gui/auth/login/` in the address bar.

Figure 62 : vThunder GUI



3. Enter the recently configured user credentials.
The home page gets displayed.

Verify Deployment

To verify vThunder SLB deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:

```
vThunder(config)#show running-config slb
```

If the deployment is successful, the following SLB configuration is displayed on vThunder:

```
!Section configuration: 602 bytes
!
slb server s1 10.0.3.7
    port 53 udp
        health-check-disable
    port 80 tcp
        health-check-disable
    port 443 tcp
        health-check-disable
!
slb service-group sg443 tcp
    health-check-disable
    member s1 443
!
slb service-group sg53 udp
    health-check-disable
    member s1 53
!
slb service-group sg80 tcp
    health-check-disable
    member s1 80
!
slb virtual-server vip 10.0.2.4
    port 53 udp
        ha-conn-mirror
        source-nat auto
        service-group sg53
    port 80 http
        source-nat auto
        service-group sg80
    port 443 https
        source-nat auto
        service-group sg443
!
```

2. Run the following command on vThunder to verify the SSL Certificate configuration:

```
vThunder(config)#show pki cert
```

If the deployment is successful, the following SSL configuration is displayed:

Name	Type	Expiration	Status

server certificate	Jan 28 12:00:00 2028 GMT	[Unexpired, Bound]	

3. Run the following command on vThunder to verify HA:

```
vThunder(config)#show running-config
```

If the deployment is successful, the following configuration is displayed:

```
!Current configuration: 291 bytes
!Configuration last updated at 17:36:35 IST Mon Sep 5 14 2022
!Configuration last saved at 17:35:40 IST Wed Sep 5 14 2022
!64-bit Advanced Core OS (ACOS) version 5.2.0, build 155 (Aug-10-2020,14:34)

!
vrrp-a common
  device-id 1
  set-id 1
  enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
interface management
  ip address dhcp
!
interface ethernet 1
  enable
  ip address dhcp
!
```



```

interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.1.1
!

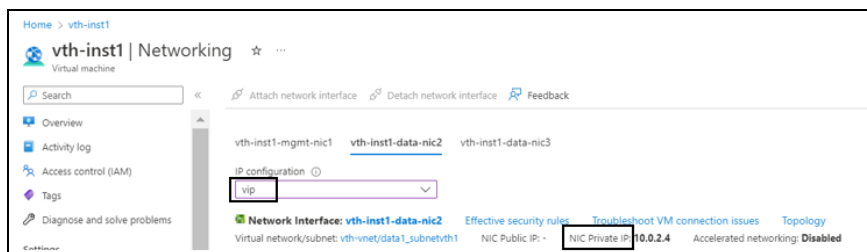
```

Verify Traffic Flow

To verify the traffic flow from client machine to server machine via vThunder, perform the following:

1. From **Azure Portal** > **Azure Services** > **Resource Group** > <resource_group_name> > <active_virtual_machine_instance> > **Settings** > **Networking**. Here, **vth-inst1** is the active vThunder instance name.
2. Copy the VIP address of the active vThunder instance.

Figure 63 : Active vThunder instance 1 VIP



3. Select your client instance from the **Virtual machine** list. Here, **vth-client** is the client instance name.

- SSH your client machine and run the following command to verify the traffic flow:

```
curl <VIP>
```

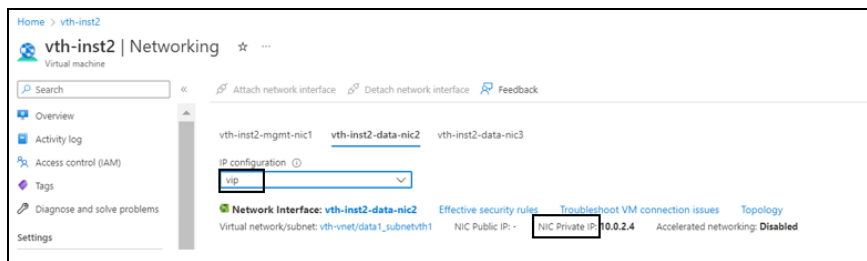
Example

```
curl 10.0.2.4
```

Verify if a response is received.

- After the switchover, vThunder instance 2 is active, so copy the VIP address of the vThunder instance 2.

Figure 64 : Active vThunder instance 2 VIP



- SSH your client machine and run the following command to verify the traffic flow:

```
curl <VIP>
```

Example

```
curl 10.0.2.4
```

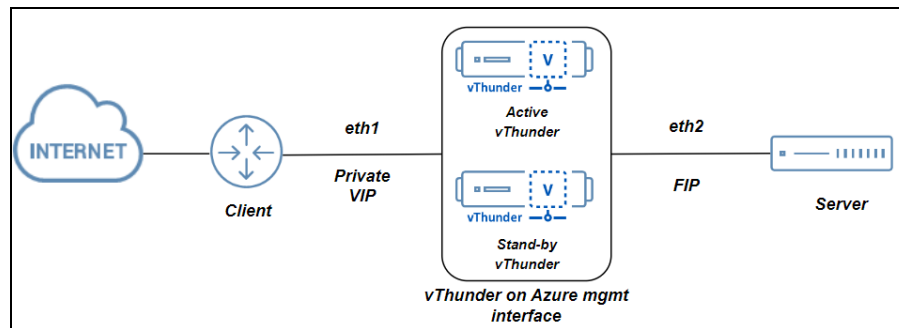
Verify if a response is received.

Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PVTVIP

[Figure 65](#) shows the 3NIC-2VM-HA-GLM-PVTVIP deployment topology. Using this template, two vThunder instances can be deployed containing:

- One management interface and two data interfaces each
- HA support
- GLM integration

Figure 65 : 3NIC-2VM-HA-GLM-PVTVIP Topology



The following topics are covered:

System Requirements	136
Create vThunder Instances	140
Configure Server and Client Machine	146
Configure vThunder as an SLB	162
Configure vThunder using GLM	172
Verify Deployment	175
Verify Traffic Flow	179

System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following resources to deploy vThunder on the Azure cloud:

Table 8 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	A resource group with the specified name and location is created, if it doesn't exist. All the resources required for this template is created under the resource group.	Here, the Azure resource group name used is <code>vth-rg1</code> .
Azure Storage Account	A storage account is created inside the resource group, if it doesn't exist. If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription". Performance: Standard Replication: Read-	<code>vthunderstorage</code>

Resource Name	Description	Default Value
	access geo-redundant storage (RA-GRS) Account kind: Storagev2 (general purpose v2)	
Virtual Machine (VM) Instance	Two virtual machine instances are created for vThunder. Product: A10 vThunder Operating system: Linux Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory) NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic. Table 9 lists the supported VM sizes.	vth-inst1 vth-inst2
Virtual Cloud Net-	A virtual network is assigned to the virtual	vth-vnet

Resource Name	Description	Default Value	
work [VCN]	machine instance.	Address prefix for virtual network: 10.0.0.0/16	
Subnet	Three subnets are created with an address prefix each.	Subnet1: vth-vnet1-mgmt-sub1 10.0.1.0/24 Subnet2: vth-vnet1-data-sub2 10.0.2.0/24 Subnet3: vth-vnet1-data-sub3 10.0.3.0/24	
Public IP	A public IP address is assigned to the management interface of each vThunder instance.	vth-inst1-mgmt-nic1-ip vth-inst2-mgmt-nic1-ip	
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: • Management Interface with public IP • Data Interface with primary private IP [Ethernet 1, Ethernet 2] NOTE: The secondary IP of data interface is taken from DHCP server.	vth-inst1-mgmt-nic1	10.0.1.35
		vth-inst1-data-nic2	10.0.2.35 [Primary IP]
			10.0.2.X [Secondary IP]
		vth-inst1-data-nic3	10.0.3.35 [Primary IP]
			10.0.3.X [Secondary IP]
		vth-inst2-mgmt-nic1	10.0.1.36
		vth-inst2-data-nic2	10.0.2.36 [Primary IP]
			10.0.2.X [Secondary IP]
		vth-inst2-	10.0.3.36

Resource Name	Description	Default Value	
		data-nic3	[Primary IP]
			10.0.3.X [Secondary IP]
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	vth-inst1-nsg vth-inst2-nsg	
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer Azure Service Application Access Key .		

Supported VM Sizes

Table 9 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A4v2	Standard_A4_v2
	Standard A4mv2	Standard_A4m_v2
	Standard/Basic A4	Standard_A4
	Standard A8v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D3v2	Standard_D3_v2
	Standard DS3v2	Standard_DS3_v2

Series	Size	Qualified Name
	Standard D5v2	Standard_D5_v2
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

Azure is going to retire few of the above listed VM sizes soon, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM_TMPL_3M_HA_GLM_PVTVIP_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {
  "value": "vth-user"
},
"adminPassword": {
  "value": "vth-Password"
},
```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure a storage account name.

```
"storageAccountName": {
  "value": "vthunderstorage"
},
```

If the storage account already exists, the following error is displayed, “The storage account named is already taken”.

4. Configure a virtual network.

```
"virtualNetworkName": {
  "value": "vth-vnet"
},
```

5. Configure DNS label prefixes.

```
"dnsLabelPrefix_vthunder11": {
  "value": "vth-inst1-prefix1"
},
"dnsLabelPrefix_vthunder21": {
  "value": "vth-inst2-prefix1"
},
```

6. Configure vThunder instance names.

```
"vmName_vthunder1": {
  "value": "vth-inst1"
},
"vmName_vthunder2": {
```

```
    "value": "vth-inst2"
  },
```

7. Set VM size for vThunder.

```
  "vthunderSize": {
    "value": "Standard_B4ms"
  },
```

Use a suitable VM size that supports at least 3 NICs. For VM sizes, see [System Requirements](#) section.

8. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage": {
  "value": "vthunder_520_byol"
},
"publisherName": {
  "value": "a10networks"
},
"productName": {
  "value": "a10-vthunder-adc-520-for-microsoft-azure"
},
```

NOTE: Do not change the publisher name.

9. Configure three network interface cards for two vThunder instances.

```
"nic1Name_vthunder1": {
  "value": "vth-inst1-mgmt-nic1"
},
"nic2Name_vthunder1": {
  "value": "vth-inst1-data-nic2"
},
"nic3Name_vthunder1": {
  "value": "vth-inst1-data-nic3"
},
"nic1Name_vthunder2": {
  "value": "vth-inst2-mgmt-nic1"
},
```

```
"nic2Name_vthunder2": {  
  "value": "vth-inst2-data-nic2"  
},  
"nic3Name_vthunder2": {  
  "value": "vth-inst2-data-nic3"  
},
```

10. Configure an address prefix and subnet values for one management interface and two data interface.

```
"addressPrefixValue": {  
  "value": "10.0.0.0/16"  
},  
"mgmtIntfPrivatePrefix_vthunder1": {  
  "value": "10.0.1.0/24"  
},  
"eth1PrivatePrefix_vthunder1": {  
  "value": "10.0.2.0/24"  
},  
"eth2PrivatePrefix_vthunder1": {  
  "value": "10.0.3.0/24"  
},  
"mgmtIntfPrivateAddress_vthunder1": {  
  "value": "10.0.1.35"  
},  
"eth1PrivateAddress_vthunder1": {  
  "value": "10.0.2.35"  
},  
"eth2PrivateAddress_vthunder1": {  
  "value": "10.0.3.35"  
},  
"mgmtIntfPrivateAddress_vthunder2": {  
  "value": "10.0.1.36"  
},  
"eth1PrivateAddress_vthunder2": {  
  "value": "10.0.2.36"  
},  
"eth2PrivateAddress_vthunder2": {
```

```
"value": "10.0.3.36"
},
```

11. Configure public IP address for each vThunder instances.

```
"publicIPAddressName_vthunder1_mgmt": {
  "value": "vth-inst1-mgmt-nic1-ip"
},
"publicIPAddressName_vthunder2_mgmt": {
  "value": "vth-inst2-mgmt-nic1-ip"
},
```

12. Configure network security group for two vThunder instances.

```
"networkSecurityGroupName_vthunder1": {
  "value": "vth-inst1-nsg"
},
"networkSecurityGroupName_vthunder2": {
  "value": "vth-inst2-nsg"
}
```

13. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_HA_GLM_PVTVIP_PARAM.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a Azure resource group:

```
PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> az group create --name vth-rg1 --location "south central us"
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",
  "location": "southcentralus",
```

```

    "managedBy": null,
    "name": "vth-rg1",
    "properties": {
      "provisioningState": "Succeeded"
    },
    "tags": null,
    "type": "Microsoft.Resources/resourceGroups"
  }

```

3. Run the following command to create a Azure deployment group.

```

PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>

```

Example:

```

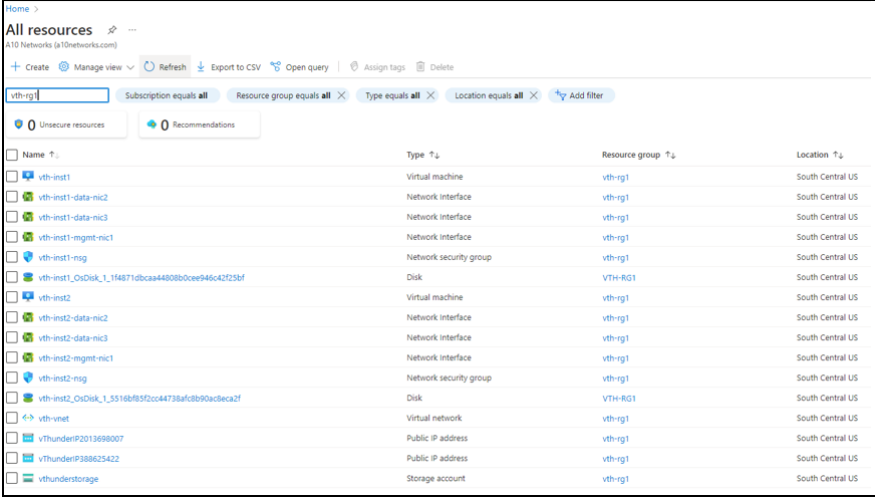
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
--template-file ARM_TMPL_3NIC_2VM_HA_GLM_PVTVIP_1.json --parameters ARM_
TMPL_3NIC_2VM_HA_GLM_PVTVIP_PARAM.json

```

Here, **vth-rg1** resource group is created.

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource_group_name>**.

Figure 66 : Resource listing in the resource group



Name	Type	Resource group	Location
vth-inst1	Virtual machine	vth-rg1	South Central US
vth-inst1-data-nic2	Network interface	vth-rg1	South Central US
vth-inst1-data-nic3	Network interface	vth-rg1	South Central US
vth-inst1-mgmt-nic1	Network interface	vth-rg1	South Central US
vth-inst1-nsg	Network security group	vth-rg1	South Central US
vth-inst1_OsDisk_1_1f4871dcaa4480b0ce948643252bf	Disk	VTH-RG1	South Central US
vth-inst2	Virtual machine	vth-rg1	South Central US
vth-inst2-data-nic2	Network interface	vth-rg1	South Central US
vth-inst2-data-nic3	Network interface	vth-rg1	South Central US
vth-inst2-mgmt-nic1	Network interface	vth-rg1	South Central US
vth-inst2-nsg	Network security group	vth-rg1	South Central US
vth-inst2_OsDisk_1_5516b8f52cc44738afc8b90ac8eca2f	Disk	VTH-RG1	South Central US
vth-vnet	Virtual network	vth-rg1	South Central US
vThunderP2013698007	Public IP address	vth-rg1	South Central US
vThunderP388629422	Public IP address	vth-rg1	South Central US
vthunderstorage	Storage account	vth-rg1	South Central US

Configure Server and Client Machine

The following topics are covered:

- [Create a Server Machine](#)
- [Create a Client Machine](#)

Create a Server Machine

To create a Server machine, perform the following steps:

1. From Home, navigate to **Azure Services** > **Create a resource** > **Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Server machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 67 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Item(s) availability based on policy assignment(s) for the selected scope.
Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

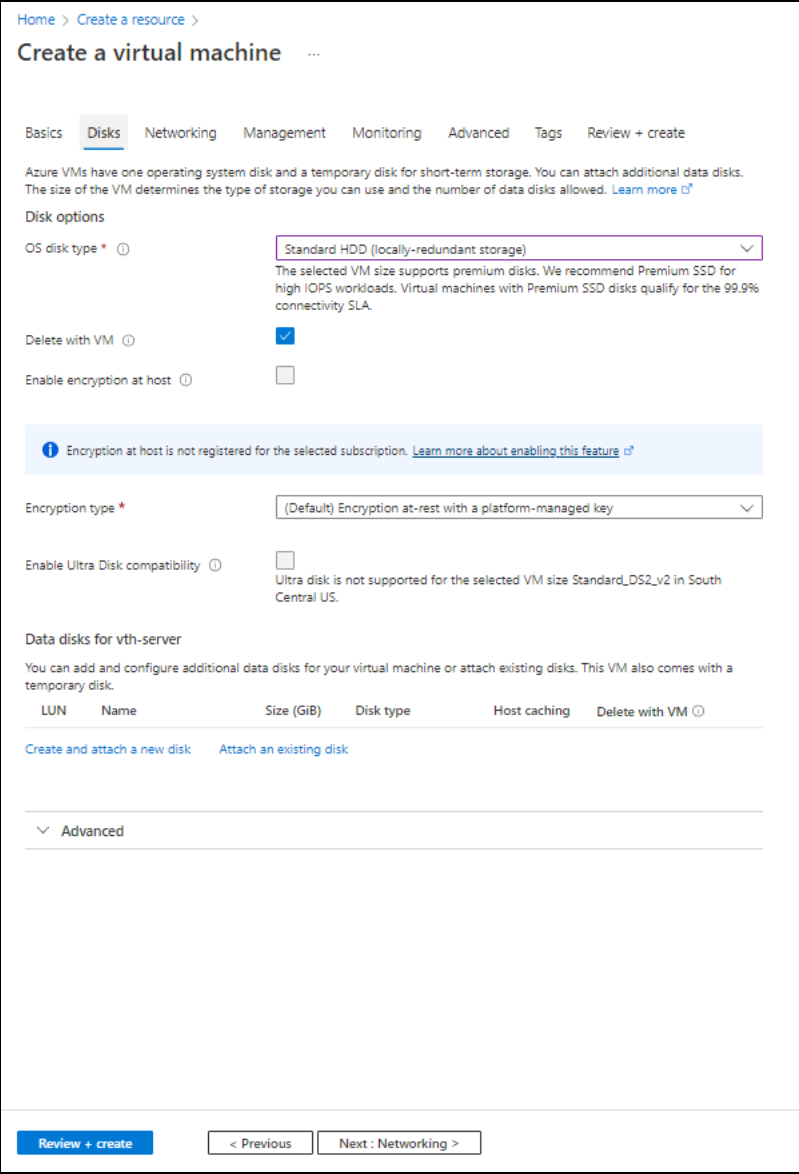
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 68 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

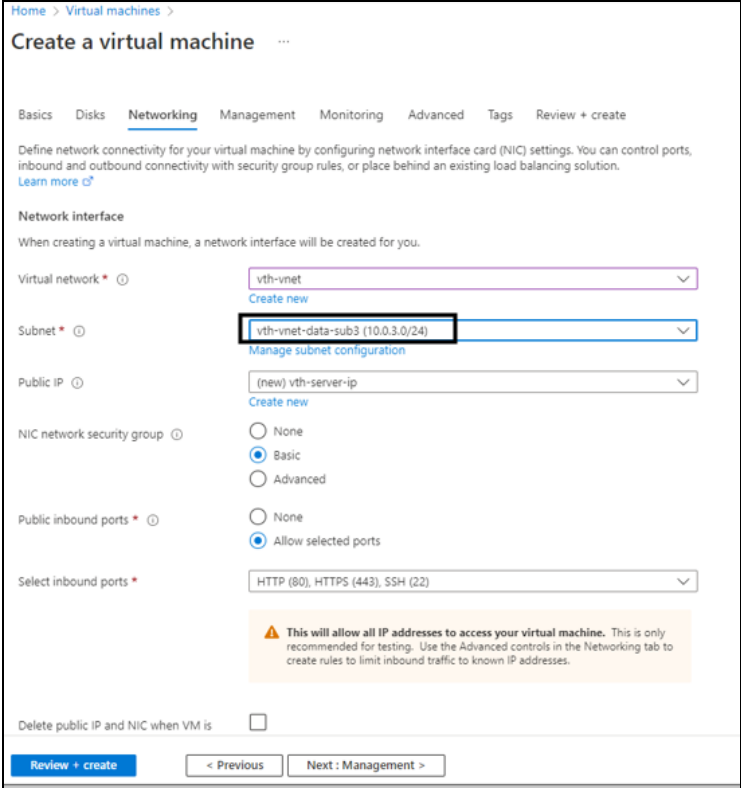
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet 2 (Ethernet 2)
- Select inbound ports

Figure 69 : Create a virtual machine window - Networking tab



Home > Virtual machines >

Create a virtual machine

Basics Disks **Networking** Management Monitoring 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](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Manage subnet configuration](#)

Public IP [Create new](#)

NIC network security group ☐ None ☒ Basic ☐ Advanced

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

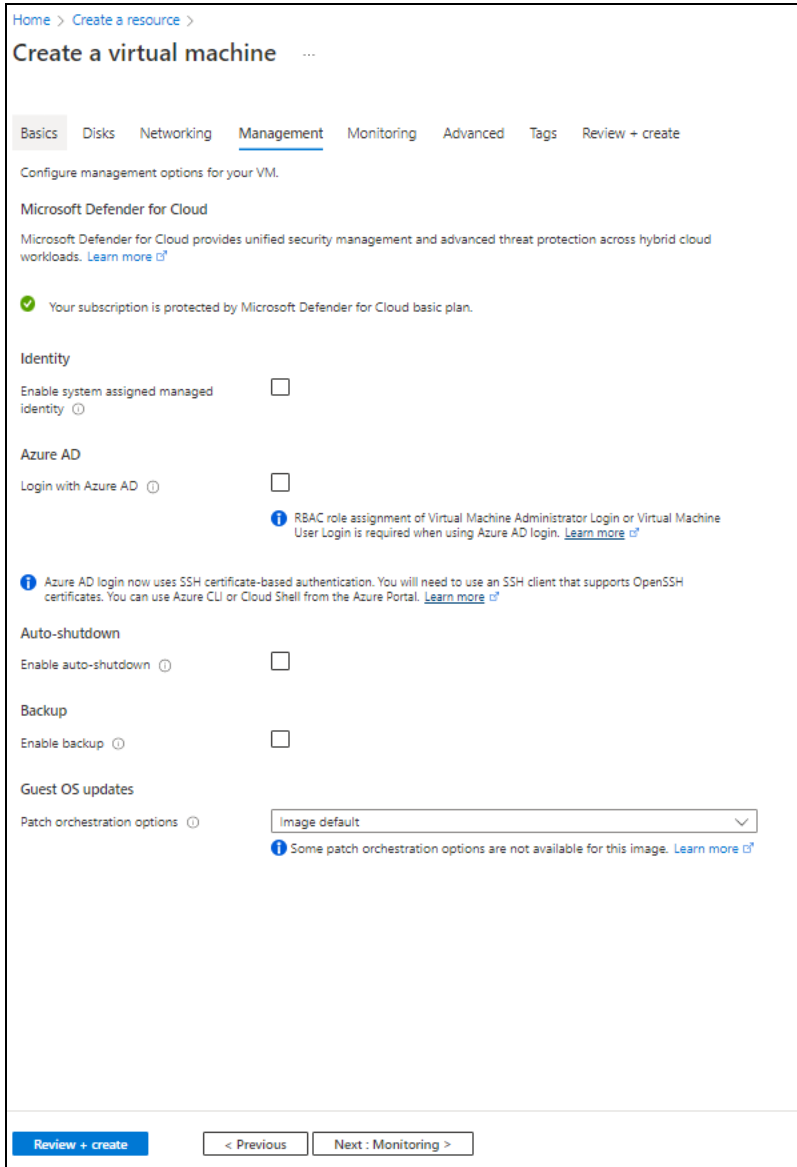
Delete public IP and NIC when VM is ☐

[Review + create](#) [< Previous](#) [Next : Management >](#)

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 70 : Create a virtual machine window - Management tab



The screenshot shows the 'Create a virtual machine' window in the Management tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine'. The tabs are 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The sub-header is 'Configure management options for your VM.'.

Microsoft Defender for Cloud
Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

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

Identity
Enable system assigned managed identity ☐

Azure AD
Login with Azure AD ☐
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Azure AD login. [Learn more](#)

✓ Azure AD login now uses SSH certificate-based authentication. You will need to use an SSH client that supports OpenSSH certificates. You can use Azure CLI or Cloud Shell from the Azure Portal. [Learn more](#)

Auto-shutdown
Enable auto-shutdown ☐

Backup
Enable backup ☐

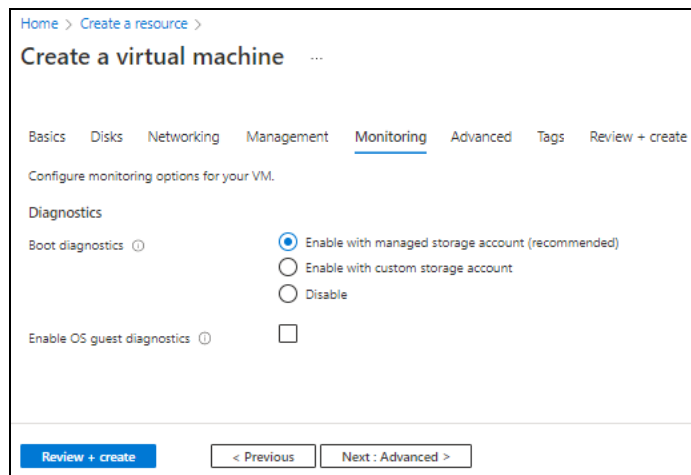
Guest OS updates
Patch orchestration options [Some patch orchestration options are not available for this image. Learn more](#)

At the bottom, there are three buttons: 'Review + create' (blue), '< Previous' (disabled), and 'Next : Monitoring >' (disabled).

9. Click **Next : Monitoring** at the bottom of the window.

10. Select or enter the information in the **Monitoring** tab as needed.

Figure 71 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

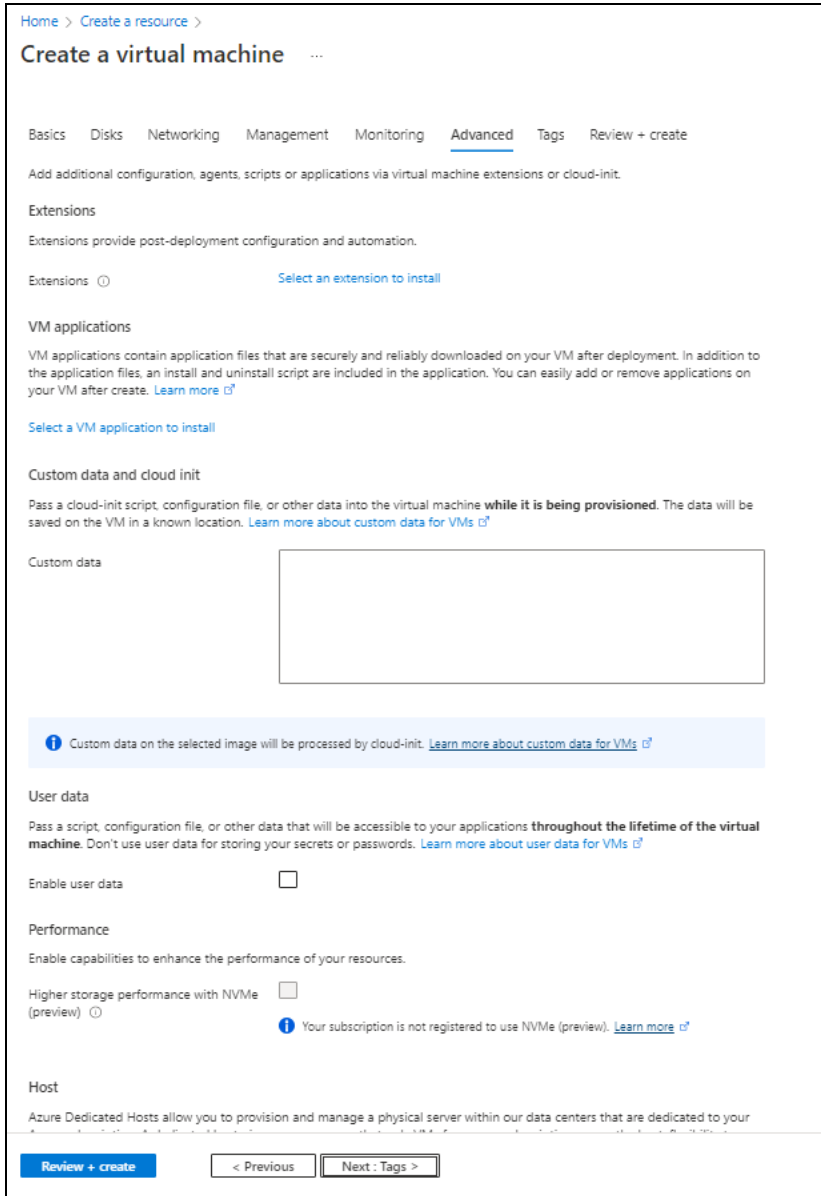
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the information in the **Advanced** tab as needed.

Figure 72 : Create a virtual machine window - Advanced tab

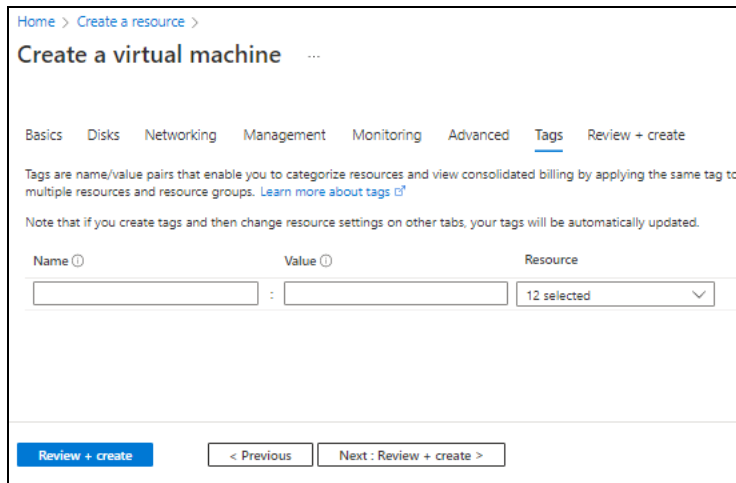


The screenshot shows the 'Create a virtual machine' window in the Advanced tab. The breadcrumb trail is 'Home > Create a resource >'. The title is 'Create a virtual machine ...'. The tabs are 'Basics', 'Disks', 'Networking', 'Management', 'Monitoring', 'Advanced' (selected), 'Tags', and 'Review + create'. Below the tabs, there is a description: 'Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.' The 'Extensions' section states: 'Extensions provide post-deployment configuration and automation.' Below this is a link 'Select an extension to install'. The 'VM applications' section states: 'VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#)'. Below this is a link 'Select a VM application to install'. The 'Custom data and cloud init' section states: 'Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#)'. Below this is a text area for 'Custom data'. A blue information box states: 'Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#)'. The 'User data' section states: 'Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#)'. Below this is a checkbox for 'Enable user data'. The 'Performance' section states: 'Enable capabilities to enhance the performance of your resources.' Below this is a checkbox for 'Higher storage performance with NVMe (preview)'. A blue information box states: 'Your subscription is not registered to use NVMe (preview). [Learn more](#)'. The 'Host' section states: 'Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your'. At the bottom, there are three buttons: 'Review + create', '< Previous', and 'Next : Tags >'.

13. Click **Next : Tags** at the bottom of the window.

14. Select or enter the information in the **Tags** tab as needed.

Figure 73 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags >](#)

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
		12 selected

Review + create < Previous Next : Review + create >

15. Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 74 : Create a virtual machine window - Review + create tab

Home > Create a resource >

Create a virtual machine

Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard DS2 v2
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.1270 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Preferred phone number

⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics

Subscription	Eng Azure
Resource group	(new) vth-rg1
Virtual machine name	vth-server
Region	South Central US
Availability options	No infrastructure redundancy required
Security type	Standard
Image	Ubuntu Server 20.04 LTS - Gen2
VM architecture	x64
Size	Standard DS2 v2 (2 vcpus, 7 GiB memory)
Authentication type	Password
Username	azureuser

Create < Previous Next > [Download a template for automation](#)

Select inbound ports * HTTP (80), HTTPS (443), SSH (22) ▼

Review + create < Previous Next : Disks >

- Click **Create** at the bottom of the window.
The Server machine gets created.
- SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Client machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 75 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)
 Item(s) availability based on policy assignment(s) for the selected scope.
 Select A - D sizes only ([Policy details](#))

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

[Review + create](#) < Previous Next : Disks >

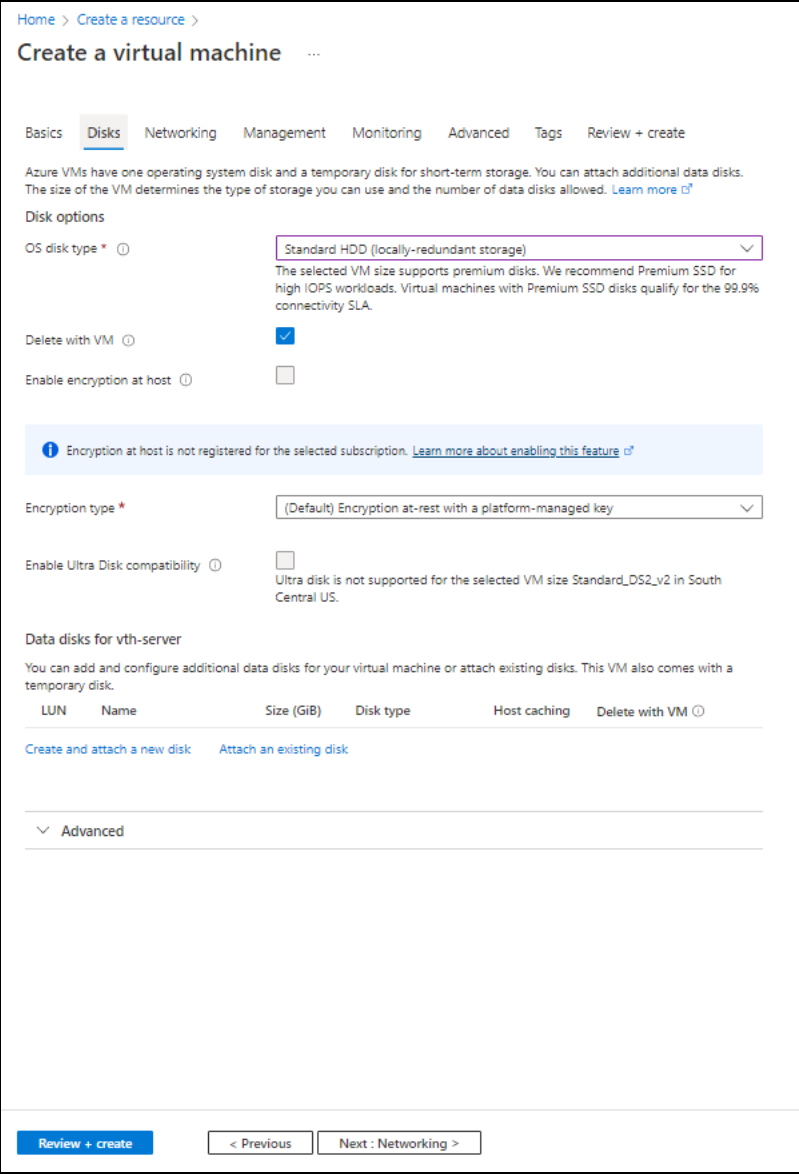
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 76 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

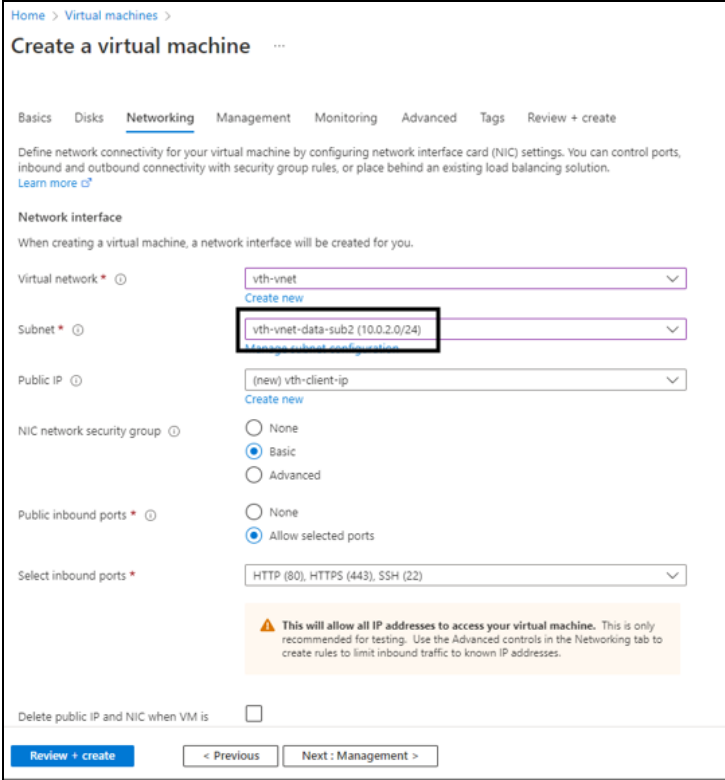
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet 1 (Ethernet 1)
- Select inbound ports

Figure 77 : Create a virtual machine window - Networking tab



Home > Virtual machines >

Create a virtual machine

Basics Disks **Networking** Management Monitoring 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](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Manage subnet configuration](#)

Public IP [Create new](#)

NIC network security group ☐ None ☒ Basic ☐ Advanced

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

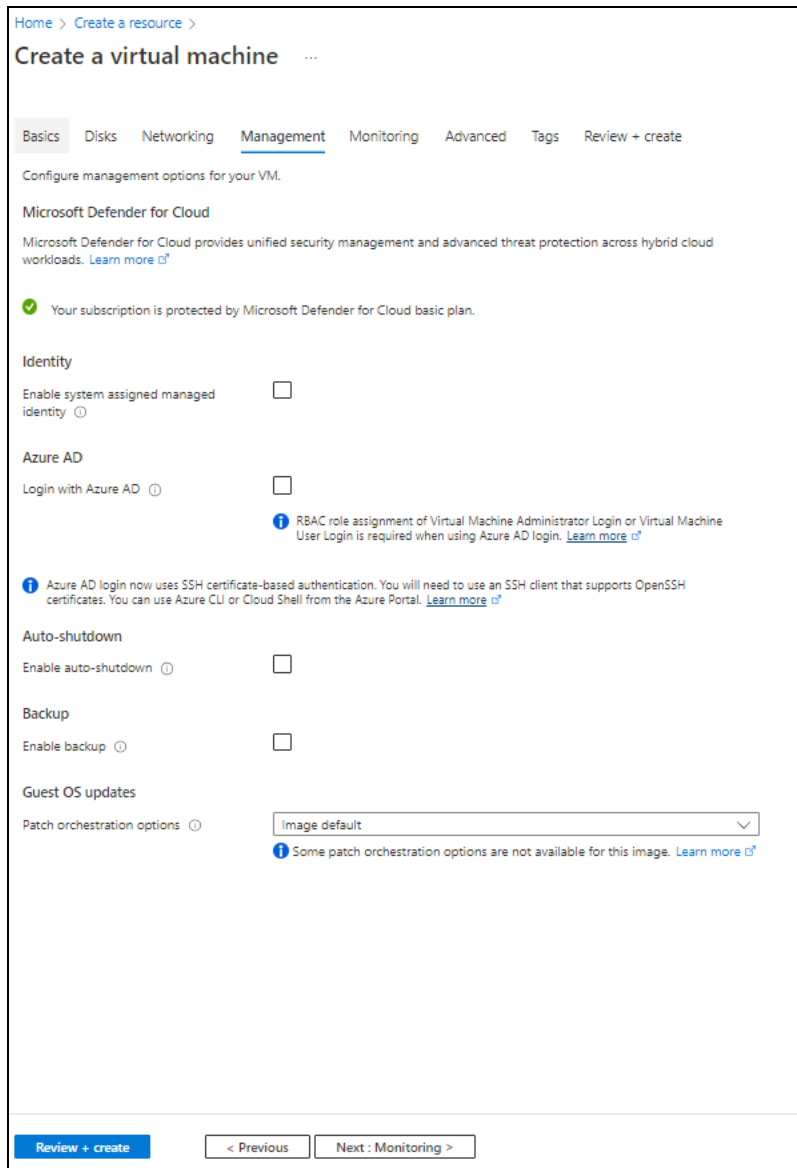
Delete public IP and NIC when VM is ☐

[Review + create](#) < Previous Next : Management >

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 78 : Create a virtual machine window - Management tab

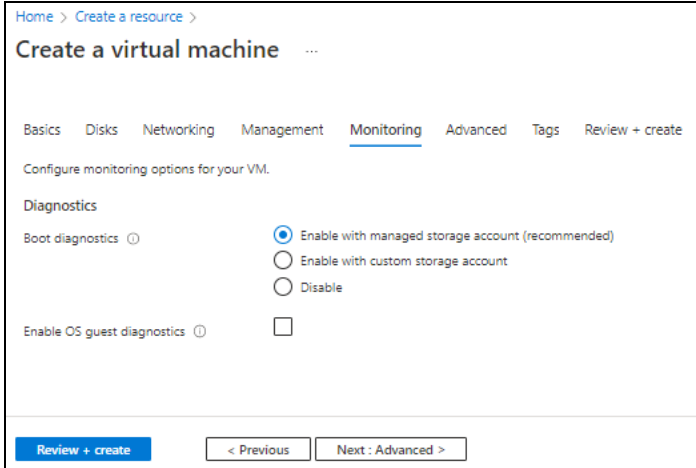


The screenshot shows the 'Create a virtual machine' window in the Management tab. The window has a breadcrumb trail 'Home > Create a resource >' and a title 'Create a virtual machine'. Below the title are tabs for 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The 'Management' tab is active, showing configuration options for the VM. It includes a section for 'Microsoft Defender for Cloud' with a status message: 'Your subscription is protected by Microsoft Defender for Cloud basic plan.' Below this are sections for 'Identity' (with 'Enable system assigned managed identity' checkbox), 'Azure AD' (with 'Login with Azure AD' checkbox and a note about RBAC role assignment), 'Auto-shutdown' (with 'Enable auto-shutdown' checkbox), 'Backup' (with 'Enable backup' checkbox), and 'Guest OS updates' (with 'Patch orchestration options' dropdown set to 'Image default' and a note about unavailable options). At the bottom are buttons for 'Review + create', '< Previous', and 'Next : Monitoring >'.

9. Click **Next : Monitoring** at the bottom of the window.

10. Select or enter the information in the **Monitoring** tab as needed.

Figure 79 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

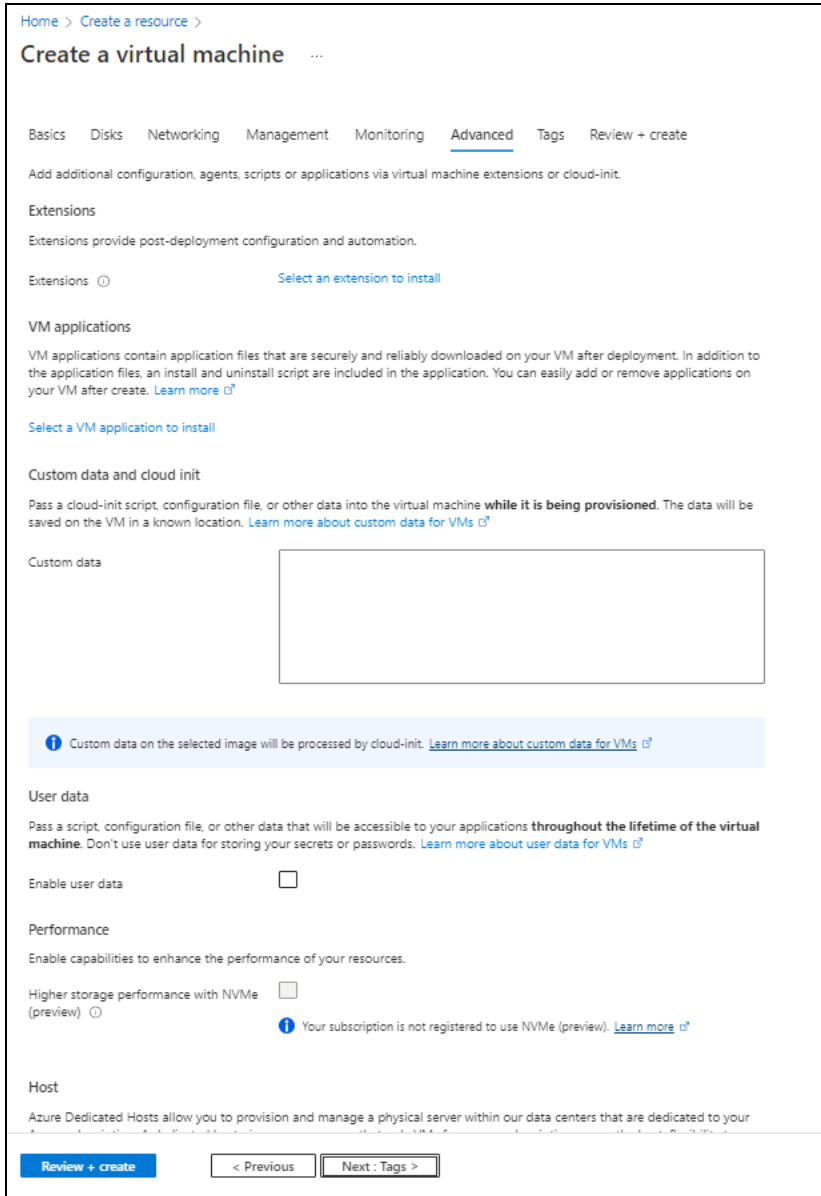
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the information in the **Advanced** tab as needed.

Figure 80 : Create a virtual machine window - Advanced tab

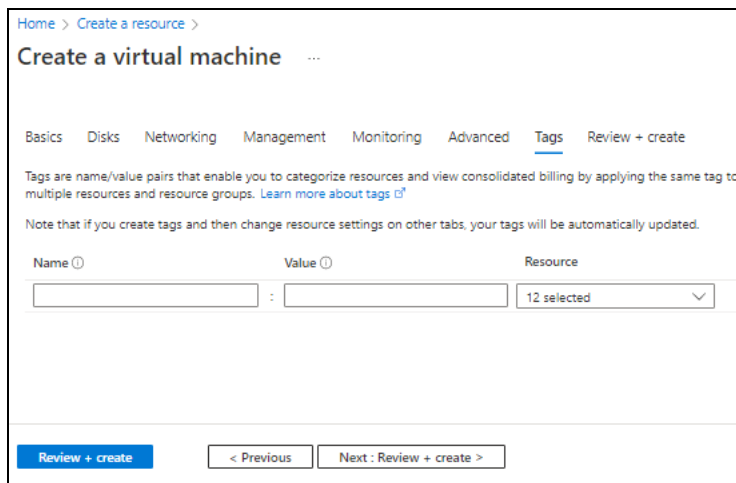


The screenshot shows the 'Create a virtual machine' window in the Advanced tab. The breadcrumb trail is 'Home > Create a resource >'. The title is 'Create a virtual machine ...'. The tabs are 'Basics', 'Disks', 'Networking', 'Management', 'Monitoring', 'Advanced' (selected), 'Tags', and 'Review + create'. Below the tabs, there is a description: 'Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.' The 'Extensions' section states: 'Extensions provide post-deployment configuration and automation.' Below this, there is a link 'Select an extension to install'. The 'VM applications' section states: 'VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#)'. Below this, there is a link 'Select a VM application to install'. The 'Custom data and cloud init' section states: 'Pass a cloud-init script, configuration file, or other data into the virtual machine while it is being provisioned. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#)'. Below this, there is a text area for 'Custom data'. Below the text area, there is a blue box with an information icon and the text: 'Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#)'. The 'User data' section states: 'Pass a script, configuration file, or other data that will be accessible to your applications throughout the lifetime of the virtual machine. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#)'. Below this, there is a checkbox for 'Enable user data'. The 'Performance' section states: 'Enable capabilities to enhance the performance of your resources.' Below this, there is a checkbox for 'Higher storage performance with NVMe (preview)'. Below the checkbox, there is a blue box with an information icon and the text: 'Your subscription is not registered to use NVMe (preview). [Learn more](#)'. The 'Host' section states: 'Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your'. At the bottom, there are three buttons: 'Review + create', '< Previous', and 'Next : Tags >'.

13. Click **Next : Tags** at the bottom of the window.

14. Select or enter the information in the **Tags** tab as needed.

Figure 81 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

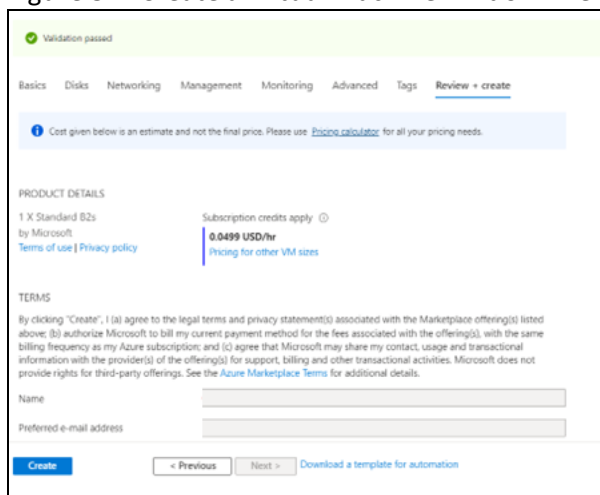
Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
	:	12 selected

Review + create < Previous Next: Review + create >

15. Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 82 : Create a virtual machine window - Review + create tab



Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard B2s
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.0499 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Create < Previous Next > [Download a template for automation](#)

16. Click **Create** at the bottom of the window.
The Client machine gets created.

Configure vThunder as an SLB

The following topics are covered:

- [Initial Setup](#)
- [Change Password](#)
- [Deploy vThunder as an SLB](#)

Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_SLB_CONFIG_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure SLB server host or domain.

The SLB server host value is the data NIC's private IP address instance acting as the server.

Instead of a host, you can also use a domain name. To do so, replace the key 'host' with 'fqdn-name' and provide a domain name instead of the IP address.

```
"slbServerHostOrDomain": {
  "server-name": "s1",
  "host": "10.0.3.7",
  "metadata": {
    "description": "SLB server host/fqdn-name. To use domain name
replace host with fqdn-name and ip address with domain name"
  }
},
```

3. Configure SLB server ports.

```
"slbServerPortList": {
  "value": [
    {
      "port-number": 53,
      "protocol": "udp",
      "health-check-disable": 1
    },
    {
```

```
        "port-number": 80,  
        "protocol": "tcp",  
        "health-check-disable":1  
    },  
    {  
        "port-number": 443,  
        "protocol": "tcp",  
        "health-check-disable":1  
    }  
]  
},
```

4. Configure service group list ports.

```
"serviceGroupList": {  
    "value": [  
        {  
            "name":"sg443",  
            "protocol":"tcp",  
            "health-check-disable":1  
            "member-list": [  
                {  
                    "name":"s1",  
                    "port":443  
                }  
            ]  
        },  
        {  
            "name":"sg53",  
            "protocol":"udp",  
            "health-check-disable":1  
            "member-list": [  
                {  
                    "name":"s1",  
                    "port":53  
                }  
            ]  
        },  
        {  

```



```

        "name": "sg80",
        "protocol": "tcp",
        "health-check-disable": 1
        "member-list": [
            {
                "name": "s1",
                "port": 80
            }
        ]
    }
]
},

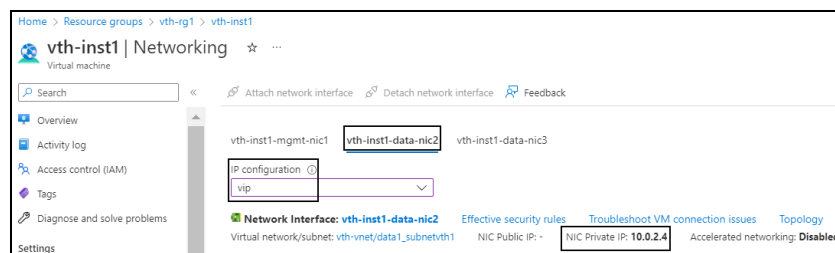
```

5. Configure virtual server.

The virtual server default name is “vip”. The vip address is generated dynamically after deploying the ARM template. Therefore, its default value under **virtualServerList** should be replaced. To get the vip address, perform the following steps:

- From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- Go to the first virtual machine instance. Here, first virtual machine instance is **vth-inst1**.
- Select **Networking** from the left **Settings** panel.
- Select the Data NIC 2 tab > **IP configuration** > **vip**. Here, Data NIC 2 is **vth-inst1-data-nic2**.

Figure 83 : Virtual machine - Networking window - Data NIC 2 tab



- Select the **NIC Private IP**.

f. Replace the **ip-address** value under **virtualServerList** with this **vip**.

```
"virtualServerList": {
  "virtual-server-name": "vip",
  "ip-address": "10.0.2.4",
  "metadata": {
    "description": "virtual server is using VIP from
ethernet 1 subnet"
  },
  "value": [
    {
      "port-number": 53,
      "protocol": "udp",
      "ha-conn-mirror": 1,
      "auto": 1,
      "service-group": "sg53"
    },
    {
      "port-number": 80,
      "protocol": "http",
      "auto": 1,
      "service-group": "sg80"
    },
    {
      "port-number": 443,
      "protocol": "https",
      "auto": 1,
      "service-group": "sg443"
    }
  ]
},
```

NOTE: **ha-conn-mirror** does not work on port 80 and 443.

6. Configure SSL.

```
"sslConfig": {
  "requestTimeout": 40,
  "Path": "<absolute path of the ssl certificate file>",
```

```

    "File": "<certificate-name>",
    "CertificationType": "pem"
  }

```

NOTE: By default, SSL configuration is disabled i.e. no SSL configuration is applied.

Example The sample values for the SSL certificate are as shown below:

```

"sslConfig": {
  "requestTimeout": 40,
  "Path": "C://Users//...//...//...//server.pem" or
  "C:\\Users\\...\\...\\...\\certs\\server.pem",
  "File": "server",
  "CertificationType": "pem"
}

```

7. Provide the resource group name.

```

"resourceGroupName": "vth-rg1"
"vThUsername": "admin"

```

NOTE: Do not change the vThunder instance username.

8. Verify if the vip address and all other configurations in the ARM_TMPL_3NIC_2VM_SLB_CONFIG_PARAM.json file are correct and then save the changes.

Change Password

To change the password, perform the following steps:

1. Run the following command to change password:

```

PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_GLM_CHANGE_
PASSWORD_2.ps1

```

NOTE: It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```
Enter Default Password:***  
Enter New Password:***  
Confirm New Password:***
```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_3.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_3.ps1 -  
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate  
Do you want to upload ssl certificate ?  
[Y] Yes [No] No [?] Help (default is "N"): Y  
SLB Server Host IP: 10.0.3.7  
Virtual Server Name: vip  
Resource Group Name: vth-rg1  
vThunder1 Public IP: 13.85.81.137  
vThunder2 Public IP: 13.85.81.113  
Configuring vm: vth-inst1  
configured ethernet- 1 ip  
configured ethernet- 2 ip  
Configured server  
Configured service group
```

```
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 1
Configuring vm: vth-inst2
configured ethernet- 1 ip
configured ethernet- 2 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 2
```

3. If the SSL Certificate upload is successful, a message 'SSL Configured' is displayed.

Configure High Availability for vThunder

The following topics are covered:

- [Initial Setup](#)
- [Create High Availability for vThunder](#)

Initial Setup

Before configuring high availability for vThunder, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json with a text editor.

NOTE:	Each parameter has a default value mentioned in the parameter file.
--------------	---

2. Configure DNS.

```
"dns": {
  "value": "8.8.8.8"
},
```

3. Configure a Network Gateway IP.

The default value of network gateway IP address is 10.0.1.1 as this is the first IP address of the data subnet 1 configuration.

```
"rib-list": [
  {
    "ip-dest-addr": "0.0.0.0",
    "ip-mask": "/0",
    "ip-nexthop-ipv4": [
      {
        "ip-next-hop": "10.0.2.1"
      }
    ]
  }
],
```

4. Set VRRP-A.

```
"vrrp-a": {
  "set-id": 1
},
```

5. Set a Terminal Idle Timeout.

```
"terminal": {
  "idle-timeout": 0
},
```

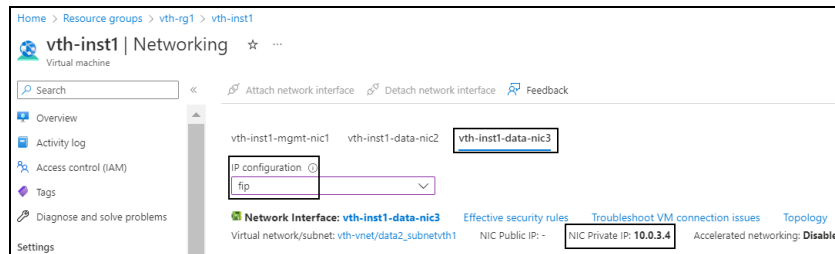
6. Configure the VRID details.

The default value of vrid is 0. The default priority for vThunder-1 is 100, and for vThunder-2 is 99 (100-1). The floating ip address value is generated dynamically after deploying the ARM template. Therefore, its default value under `vrid-list` should be replaced. To get the fip address, perform the following steps:

- From the **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- Go to the first virtual machine instance. Here, first virtual machine instance is `vth-inst1`.

- c. Select **Networking** from the left **Settings** panel.
- d. Select the Data NIC 3 tab > **IP configuration**. Here, **vth-inst1-data-nic3**.

Figure 84 : Virtual machine - Networking window - Data NIC 3 tab



- e. Select the **NIC Private IP**.
- f. Replace the **ip-address** value under **vrid-list** with this **fip**.

```
"vrid-list": [
  {
    "vrid-val": 0,
    "blade-parameters": {
      "priority": 100
    },
    "floating-ip": {
      "ip-address-cfg": [
        {
          "ip-address": "10.0.3.4"
        }
      ]
    }
  }
]
```

7. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json file are correct and then save the changes.

Create High Availability for vThunder

To create High Availability for vThunder, perform the following steps:

1. Import Azure access key on both the vThunder instances. For more information, refer [Import Azure Access Key](#).

2. Run the following command to configure both VM in HA mode.

```
S C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_4.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_4.ps1 -  
resourceGroup vth-rg1
```

Configure vThunder using GLM

The following topics are covered:

- [Initial Setup](#)
- [Apply GLM License](#)

Initial Setup

Before configuring vThunder with GLM, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json with a text editor.
2. Configure GLM account details.

```
{  
  "parameters": {  
    "user_name": {  
      "value": "user_name"  
    },  
    "user_password": {  
      "value": "user_password"  
    },  
    "entitlement_token": {  
      "value": "token"  
    }  
  }  
}
```


3. Verify if the configurations in the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json file are correct and then save the changes.

Apply GLM License

To apply GLM License, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to apply SLB on vThunder:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_5.ps1 -
resourceGroupName <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_5.ps1 -
resourceGroup vth-rg1
```

3. If the GLM License is applied successfully, a message is displayed.

```
ConfigureGlm
{
  "response": {
    "status": "OK",
    "msg": "BASE License successfully updated, please log out and
log back in to access license featurebA1070459ec380000\n"
  }
}
GlmRequestSend
Configurations are saved on partition: shared
WriteMemory
```

Access vThunder using Console/CLI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance 1
Here, Public IP of `vth-inst1`.
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->
Using keyboard-interactive authentication.
Password: xxxx <---Enter your password--->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

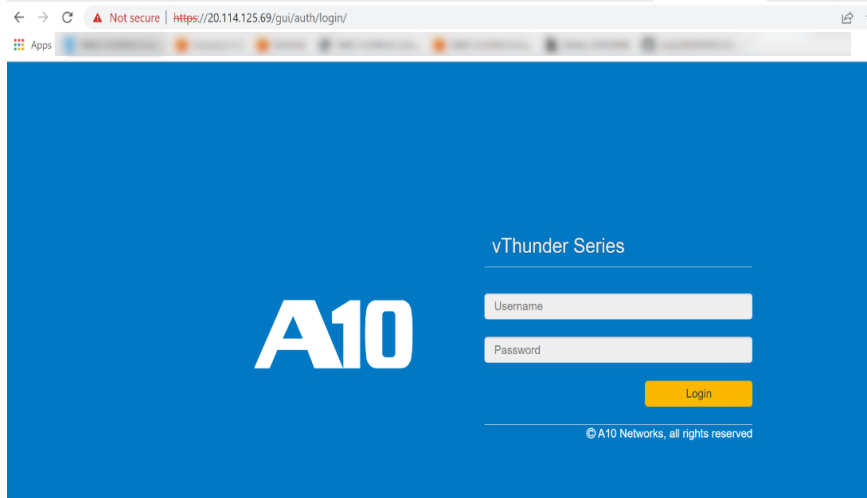
[type ? for help]

vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

1. Open any browser.
2. Enter `https://<vthunder_public_IP>/gui/auth/login/` in the address bar.



3. Enter the recently configured user credentials.
The home page gets displayed.

Verify Deployment

To verify vThunder SLB deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:
`vThunder(config)#show running-config slb`

If the deployment is successful, the following slb configuration is displayed:

```
!Section configuration: 602 bytes
!
slb server s1 10.0.3.7
  port 53 udp
    health-check-disable
  port 80 tcp
    health-check-disable
  port 443 tcp
    health-check-disable
!
```

```

slb service-group sg443 tcp
    health-check-disable
    member s1 443
!
slb service-group sg53 udp
    health-check-disable
    member s1 53
!
slb service-group sg80 tcp
    health-check-disable
    member s1 80
!
slb virtual-server vip 10.0.2.4
    port 53 udp
        ha-conn-mirror
        source-nat auto
        service-group sg53
    port 80 http
        source-nat auto
        service-group sg80
    port 443 https
        source-nat auto
        service-group sg443
!

```

2. Run the following command to verify the SSL Certificate configuration:

```
vThunder(config)#show pki cert
```

If the deployment is successful, the following SSL configuration is displayed:

Name	Type	Expiration	Status

server certificate	Jan 28 12:00:00 2028 GMT	[Unexpired, Bound]	

3. Run the following command to verify HA:

```
vThunder(config)#show running-config
```

If the deployment is successful, the following SSL configuration is displayed:

```
!Current configuration: 291 bytes
!Configuration last updated at 17:36:35 IST Mon Sep 5 14 2022
!Configuration last saved at 17:35:40 IST Wed Sep 5 14 2022
!64-bit Advanced Core OS (ACOS) version 5.2.0, build 155 (Aug-10-
2020,14:34)

!
vrrp-a common
    device-id 1
    set-id 1
    enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
glm use-mgmt-port
glm enable-requests
glm token A10f771cecbe
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
```

```

!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.1.1
!

```

4. Run the following command to verify the GLM License Provision configuration:

```
vThunder(config)#show license-info
```

If the GLM is successfully applied on vThunder, the following GLM configuration is displayed:

```

Host ID      : 5DCB01EC264BECCCFECB3C2ED42E02384EE8C527
USB ID       : Not Available
Billing Serials: A10f771cecbe0000
Token        : A10f771cecbe
Product      : ADC
Platform     : vThunder
Burst        : Disabled
GLM Ping Interval In Hours : 24

```

Enabled Licenses	Expiry Date	Notes
SLB	None	
CGN	None	
GSLB	None	
RC	None	
DAF	None	
WAF	None	
AAM	None	
FP	None	
WEBROOT	N/A	Requires an additional Webroot license.
THREATSTOP	N/A	Requires an additional ThreatSTOP license.
QOSMOS	N/A	Requires an additional QOSMOS license.
WEBROOT_TI	N/A	Requires an additional Webroot Threat Intel license.
CYLANCE	N/A	Requires an additional Cylance license.

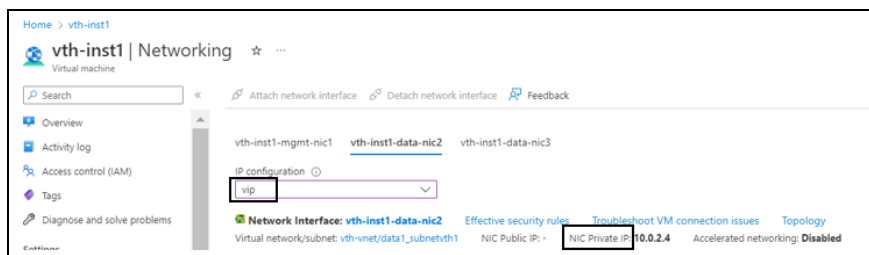
IPSEC_VPN	N/A	Requires an additional IPsec VPN license.
25 Mbps Bandwidth	21-December-2022	

Verify Traffic Flow

To verify the traffic flow from client machine to server machine via vThunder, perform the following:

1. From **Azure Portal** > **Azure Services** > **Resource Group** > <resource_group_name> > <active_virtual_machine_instance> > **Settings** > **Networking**.
Here, `vth-inst1` is the active vThunder instance name.
2. Copy the VIP address of the active vThunder instance.

Figure 85 : Active vThunder instance 1 VIP



3. Select your client instance from the **Virtual machine** list.
Here, `vth-client` is the client instance name.
4. SSH your client machine and run the following command to verify the traffic flow:
`curl <VIP>`

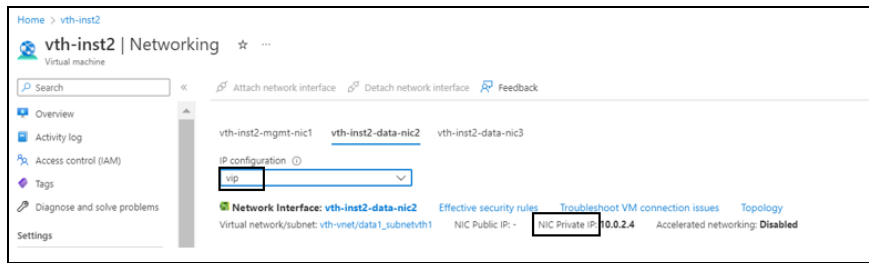
Example

```
curl 10.0.2.4
```

Verify if a response is received.

5. After the switchover, vThunder instance 2 is active, so copy the VIP address of the vThunder instance 2.

Figure 86 : Active vThunder instance 2 VIP



6. SSH your client machine and run the following command to verify the traffic flow:

```
curl <VIP>
```

Example

```
curl 10.0.2.4
```

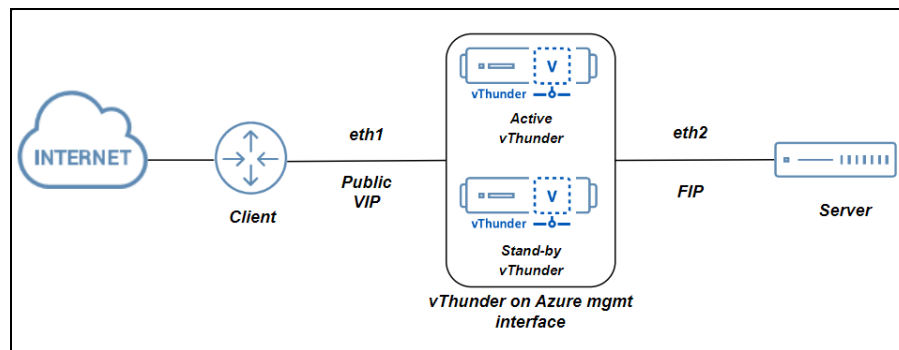
Verify if a response is received.

Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO

[Figure 87](#) shows the 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO deployment topology. Using this template, two vThunder instances can be deployed containing:

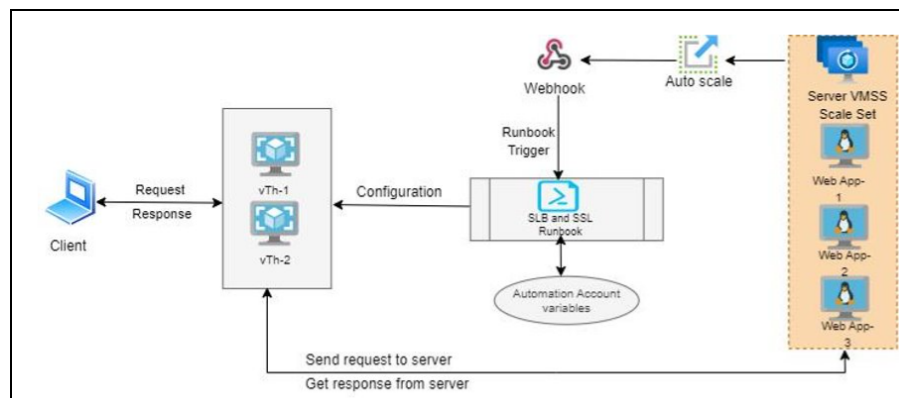
- One management interface and two data interfaces each
- HA support
- GLM integration
- Backend server autoscaling support.

Figure 87 : 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO Topology



[Figure 88](#) shows the process flow when different Azure resources and system components are connected to each other in the 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO topology.

Figure 88 : 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO Process Flow



The following topics are covered:

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Configure Client Machine	201
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System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following resources to deploy vThunder on the Azure cloud:

Table 10 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	A resource group with the specified name and location is created, if it doesn't exist. All the resources required for this template is created under the resource group.	Here, the Azure resource group name used is vth-rg1 .
Azure Stor-	A storage account is	vthunderstorage

Resource Name	Description	Default Value
Storage Account	created inside the resource group, if it doesn't exist. If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription". Performance: Standard Replication: Read-access geo-redundant storage (RA-GRS) Account kind: Storagev2 (general purpose v2)	
Virtual Machine (VM) Instance	Two virtual machine instances are created for vThunder. Product: A10 vThunder Operating system: Linux Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory)	vth-inst1 vth-inst2

Resource Name	Description	Default Value
	NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic. Table 11 lists the supported VM sizes.	
Azure Automation Account	An automation account is created under the resource group.	<code>vth-amt-acc</code>
Azure Runbook with Webhook	A custom runbook is created under the automation account: SLB-Config A webhook is created for SLB.	
Virtual Machine Scale Set [VMSS]	A virtual machine scale set is created.	<code>vth-server-vmss</code>
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<code>vth-vmss-vnet</code> Address prefix for virtual network:

Resource Name	Description	Default Value	
		10.0.0.0/16	
Subnet	Three subnets are created with an address prefix each.	Subnet1: <code>vth-vnet1-mgmt-sub1 10.0.1.0/24</code> Subnet2: <code>vth-vnet1-data-sub2 10.0.2.0/24</code> Subnet3: <code>vth-vnet1-data-sub3 10.0.3.0/24</code>	
Public IP	A public IP address is assigned to the management interface of each vThunder instance.	<code>vth-inst1-mgmt-nic1-ip</code> <code>vth-inst2-mgmt-nic1-ip</code>	
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: - Management Interface with public IP - Data Interface with primary private IP [Ethernet 1, Ethernet 2] NOTE: The secondary IP of data interface is taken from DHCP server.	<code>vth-inst1-mgmt-nic1</code>	10.0.1.35
		<code>vth-inst1-data-nic2</code>	10.0.2.35 [Primary IP]
			10.0.2.X [Secondary IP]
		<code>vth-inst1-data-nic3</code>	10.0.3.35 [Primary IP]
			10.0.3.X [Secondary IP]
		<code>vth-inst2-mgmt-nic1</code>	10.0.1.36
		<code>vth-inst2-data-nic2</code>	10.0.2.36 [Primary IP]
			10.0.2.X [Secondary IP]
		<code>vth-inst2-</code>	10.0.3.36

Resource Name	Description	Default Value	
		<code>data-nic3</code>	[Primary IP]
			10.0.3.X [Secondary IP]
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	<code>vth-nsg1</code> <code>vth-nsg2</code>	
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer Azure Service Application Access Key .		

Supported VM Sizes

Table 11 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A4v2	Standard_A4_v2
	Standard A4mv2	Standard_A4m_v2
	Standard/Basic A4	Standard_A4
	Standard A8v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D3v2	Standard_D3_v2
	Standard DS3v2	Standard_DS3_v2
	Standard D5v2	Standard_D5_v2

Series	Size	Qualified Name
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

Azure is going to retire few of the above listed VM sizes soon, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_3NIC_2VM_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {  
  "value": "vth-user"
```

```

    },
    "adminPassword": {
      "value": "vth-Password"
    },
  },

```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure a storage account name.

```

    "storageAccountName": {
      "value": "vthunderstorage"
    },
  },

```

If the storage account already exists, the following error is displayed, “The storage account named is already taken”.

4. Configure a virtual network.

```

    "virtualNetworkName": {
      "value": "vth-vnet"
    },
  },

```

5. Configure DNS label prefixes.

```

    "dnsLabelPrefix_vthunder11": {
      "value": "vth-inst1"
    },
    "dnsLabelPrefix_vthunder21": {
      "value": "vth-inst2"
    },
  },

```

6. Configure vThunder instance names.

```

    "vmName_vthunder1": {
      "value": "vth-inst1"
    },
    "vmName_vthunder2": {
      "value": "vth-inst2"
    },
  },

```

7. Set VM size for vThunder.


```
"vthunderSize": {
  "value": "Standard_DS3_v2"
},
```

Use a suitable VM size that supports at least 3 NICs. For VM sizes, see [Supported VM Sizes](#) section.

8. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage": {
  "value": "vthunder_520_byol"
},
"publisherName": {
  "value": "a10networks"
},
"productName": {
  "value": "a10-vthunder-adc-520-for-microsoft-azure"
},
```

NOTE: Do not change the publisher name.

9. Configure three network interface cards for two vThunder instances.

```
"nic1Name_vthunder1": {
  "value": "vth-inst1-mgmt-nic1"
},
"nic2Name_vthunder1": {
  "value": "vth-inst1-data-nic2"
},
"nic3Name_vthunder1": {
  "value": "vth-inst1-data-nic3"
},
"nic1Name_vthunder2": {
  "value": "vth-inst2-mgmt-nic1"
},
"nic2Name_vthunder2": {
  "value": "vth-inst2-data-nic2"
},
"nic3Name_vthunder2": {
```

```
"value": "vth-inst2-data-nic3"
},
```

10. Configure an address prefix and subnet values for one management interface and two data interface.

```
"addressPrefixValue": {
  "value": "10.0.0.0/16"
},
"mgmtIntfPrivatePrefix_vthunder1": {
  "value": "10.0.1.0/24"
},
"eth1PrivatePrefix_vthunder1": {
  "value": "10.0.2.0/24"
},
"eth2PrivatePrefix_vthunder1": {
  "value": "10.0.3.0/24"
},
"mgmtIntfPrivateAddress_vthunder1": {
  "value": "10.0.1.35"
},
"eth1PrivateAddress_vthunder1": {
  "value": "10.0.2.35"
},
"eth2PrivateAddress_vthunder1": {
  "value": "10.0.3.35"
},
"mgmtIntfPrivateAddress_vthunder2": {
  "value": "10.0.1.36"
},
"eth1PrivateAddress_vthunder2": {
  "value": "10.0.2.36"
},
"eth2PrivateAddress_vthunder2": {
  "value": "10.0.3.36"
},
},
```

11. Configure public IP address for each vThunder instances.

```
"publicIPAddressName_vthunder1_mgmt": {
  "value": "vth-inst1-mgmt-nic1-ip"
```

```

    },
    "publicIPAddressName_vthunder2_mgmt": {
      "value": "vth-inst2-mgmt-nic1-ip"
    },
  },

```

12. Configure network security group for two vThunder instances.

```

    "networkSecurityGroupName_vthunderm1": {
      "value": "vth-inst1-nsg"
    },
    "networkSecurityGroupName_vthunderm2": {
      "value": "vth-inst2-nsg"
    }
  }

```

13. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_PARAM.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create an Azure resource group:

```
PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"
```

Example:

```

PS C:\Users\TestUser\Templates> az group create --name vth-rg1 --location "south central us"
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",
  "location": "southcentralus",
  "managedBy": null,
  "name": "vth-rg1",
  "properties": {
    "provisioningState": "Succeeded"
  },

```

```
"tags": null,
"type": "Microsoft.Resources/resourceGroups"
}
```

3. Run the following command to create a Azure deployment group.

```
PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>
```

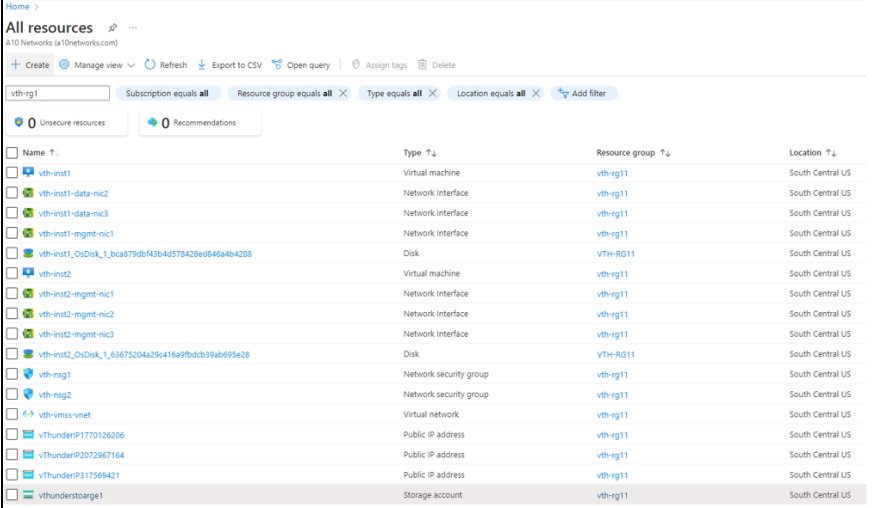
Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
--template-file ARM_TMPL_3NIC_2VM_1.json --parameters ARM_TMPL_3NIC_2VM_
PARAM.json
```

Here, **vth-rg1** resource group is created.

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource_group_name>**.

Figure 89 : Resource listing in the resource group



Name	Type	Resource group	Location
vth-inst1	Virtual machine	vth-rg1	South Central US
vth-inst1-data-nic2	Network interface	vth-rg1	South Central US
vth-inst1-data-nic3	Network interface	vth-rg1	South Central US
vth-inst1-mgmt-nic1	Network interface	vth-rg1	South Central US
vth-inst1_OsDisk_1_bca879dbf43b4d578428e0846a4b4288	Disk	VTH-RG11	South Central US
vth-inst2	Virtual machine	vth-rg1	South Central US
vth-inst2-mgmt-nic1	Network interface	vth-rg1	South Central US
vth-inst2-mgmt-nic2	Network interface	vth-rg1	South Central US
vth-inst2-mgmt-nic3	Network interface	vth-rg1	South Central US
vth-inst2_OsDisk_1_63675204a29c416a9bdc39ab695a28	Disk	VTH-RG11	South Central US
vth-nsg1	Network security group	vth-rg1	South Central US
vth-nsg2	Network security group	vth-rg1	South Central US
vth-vms-vnet	Virtual network	vth-rg1	South Central US
vThunderIP1770126206	Public IP address	vth-rg1	South Central US
vThunderIP2072967164	Public IP address	vth-rg1	South Central US
vThunderIP317569421	Public IP address	vth-rg1	South Central US
vthunderstorage1	Storage account	vth-rg1	South Central US

Configure Server VMSS

The following topics are covered:

- [Create a Server Machine](#)
- [Verify the Server VMSS Creation](#)

Create a Server Machine

To create a Server machine, perform the following steps:

1. From Home, navigate to **Azure Services > Virtual machine scale sets** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Scale set details

- Virtual machine scale set name - Server machine
- Region

Orchestration

- Orchestration mode

Instance details

- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Figure 90 : Create a virtual machine scale set window - Basics tab

All services > Virtual machine scale sets >

Create a virtual machine scale set

Basics Disks Networking Scaling Management Health Advanced Tags Review + create

Azure virtual machine scale sets let you create and manage a group of load balanced VMs. The number of VM instances can automatically increase or decrease in response to demand or a defined schedule. Scale sets provide high availability to your applications, and allow you to centrally manage, configure, and update a large number of VMs.
[Learn more about virtual machine scale sets](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Scale set details

Virtual machine scale set name *

Region *

Availability zone

Orchestration

A scale set has a "scale set model" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set model.
[Learn more about the scale set model](#)

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

Security type

Instance details

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Administrator account

Authentication type ☐ Password ☒ SSH public key

Username *

SSH public key source

Key pair name *

[Review + create](#) < Previous Next: Disks >

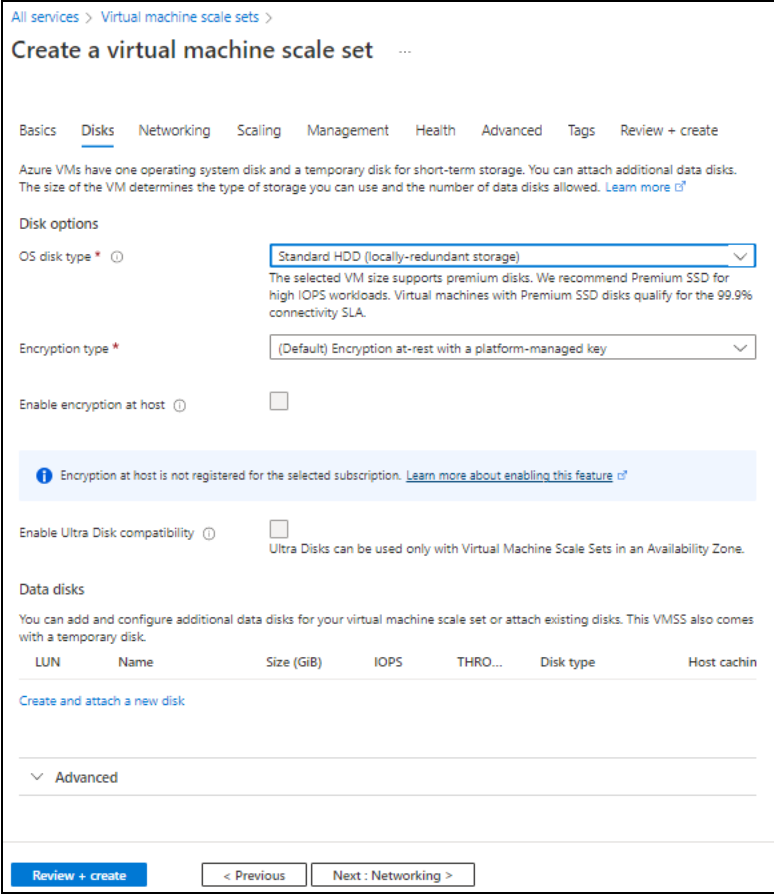
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 91 : Create a virtual machine scale set window - Disks tab



All services > Virtual machine scale sets >

Create a virtual machine scale set ...

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

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type * ⓘ Standard HDD (locally-redundant storage) ▼

The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Encryption type * (Default) Encryption at-rest with a platform-managed key ▼

Enable encryption at host ⓘ ☐

❗ Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Enable Ultra Disk compatibility ⓘ ☐ Ultra Disks can be used only with Virtual Machine Scale Sets in an Availability Zone.

Data disks

You can add and configure additional data disks for your virtual machine scale set or attach existing disks. This VMSS also comes with a temporary disk.

LUN	Name	Size (GiB)	IOPS	THRO...	Disk type	Host cachin
Create and attach a new disk						

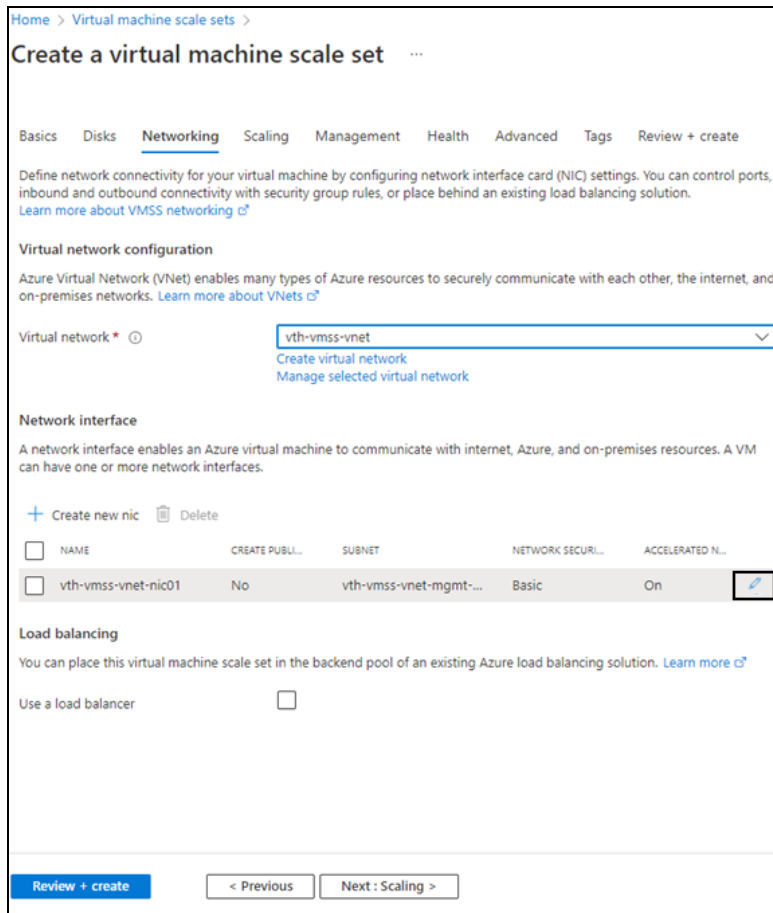
▼ Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select the Virtual network in the **Networking** tab.

Figure 92 : Create a virtual machine scale set window - Networking tab



Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics 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](#)
[Manage selected 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 new nic  Delete

NAME	CREATE PUBLIC...	SUBNET	NETWORK SECU...	ACCELERATED N...
☐ vth-vmss-vnet-nic01	No	vth-vmss-vnet-mgmt-...	Basic	On 

Load balancing

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

Use a load balancer ☐

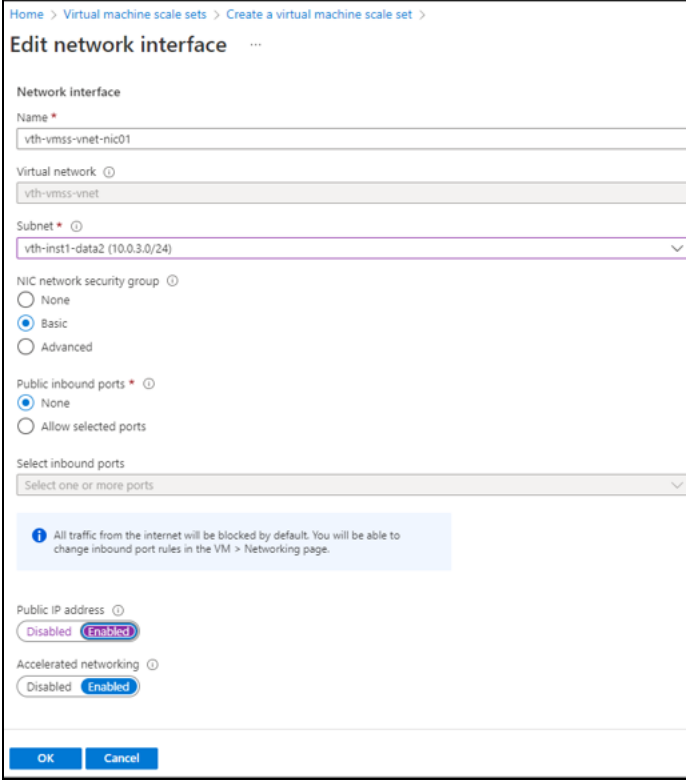
[Review + create](#) [< Previous](#) [Next : Scaling >](#)

7. If Data subnet 2 (Ethernet 2) value is not assigned to management NIC 1, click the edit button corresponding to it.

The **Edit Network Interface** window appears.

8. Select Data subnet 2 value in the **Subnet** field and then click **OK**. Here, the Subnet 3 value is 10.0.3.0/24.

Figure 93 : Edit network interface window



Home > Virtual machine scale sets > Create a virtual machine scale set >

Edit network interface

Network interface

Name *
vth-vmss-vnet-nic01

Virtual network ⓘ
vth-vmss-vnet

Subnet * ⓘ
vth-inst1-data2 (10.0.3.0/24)

NIC network security group ⓘ
☐ None
☒ Basic
☐ Advanced

Public inbound ports * ⓘ
☒ None
☐ Allow selected ports

Select inbound ports
Select one or more ports

i All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Public IP address ⓘ
☐ Disabled ☒ Enabled

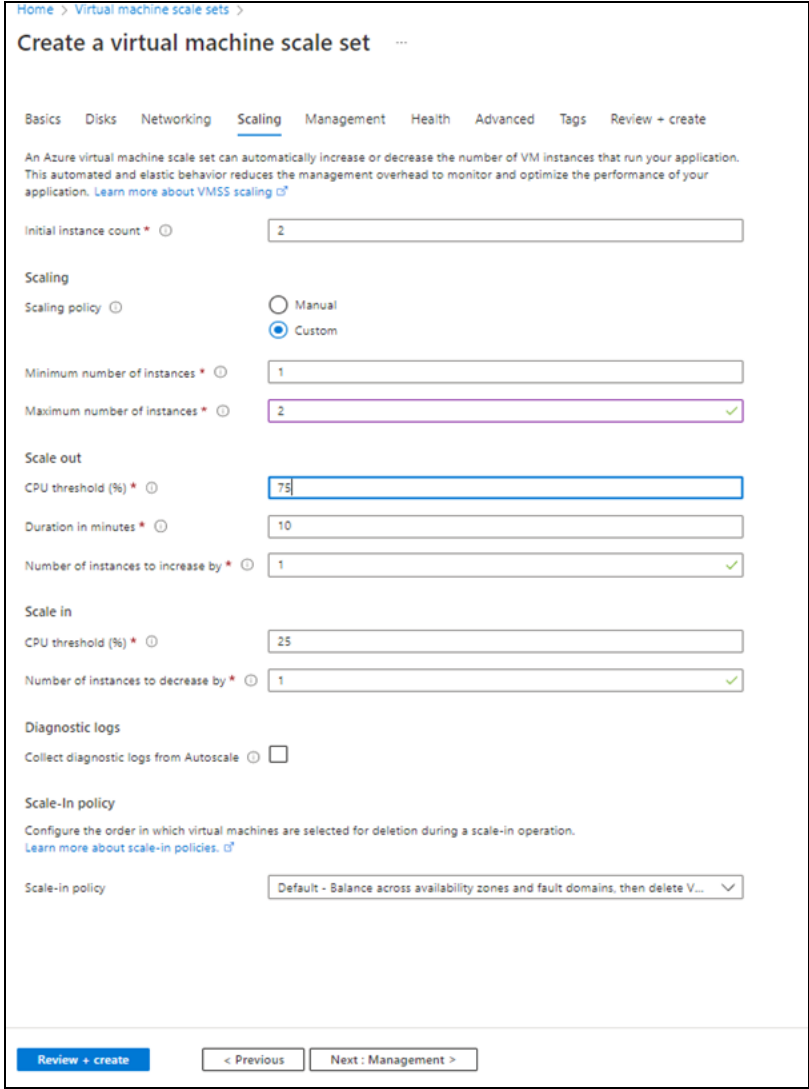
Accelerated networking ⓘ
☐ Disabled ☒ Enabled

OK Cancel

9. Leave the remaining fields as is in the **Networking** tab and click **Next : Scaling** at the bottom of the window.

10. Select or enter the information in the **Scaling** tab as shown below.

Figure 94 : Create a virtual machine scale set window - Scaling tab



Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics 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 * ⓘ

Scaling

Scaling policy ⓘ ☐ Manual ☒ Custom

Minimum number of instances * ⓘ

Maximum number of instances * ⓘ ✓

Scale out

CPU threshold (%) * ⓘ

Duration in minutes * ⓘ

Number of instances to increase by * ⓘ ✓

Scale in

CPU threshold (%) * ⓘ

Number of instances to decrease by * ⓘ ✓

Diagnostic logs

Collect diagnostic logs from Autoscale ⓘ ☐

Scale-In policy

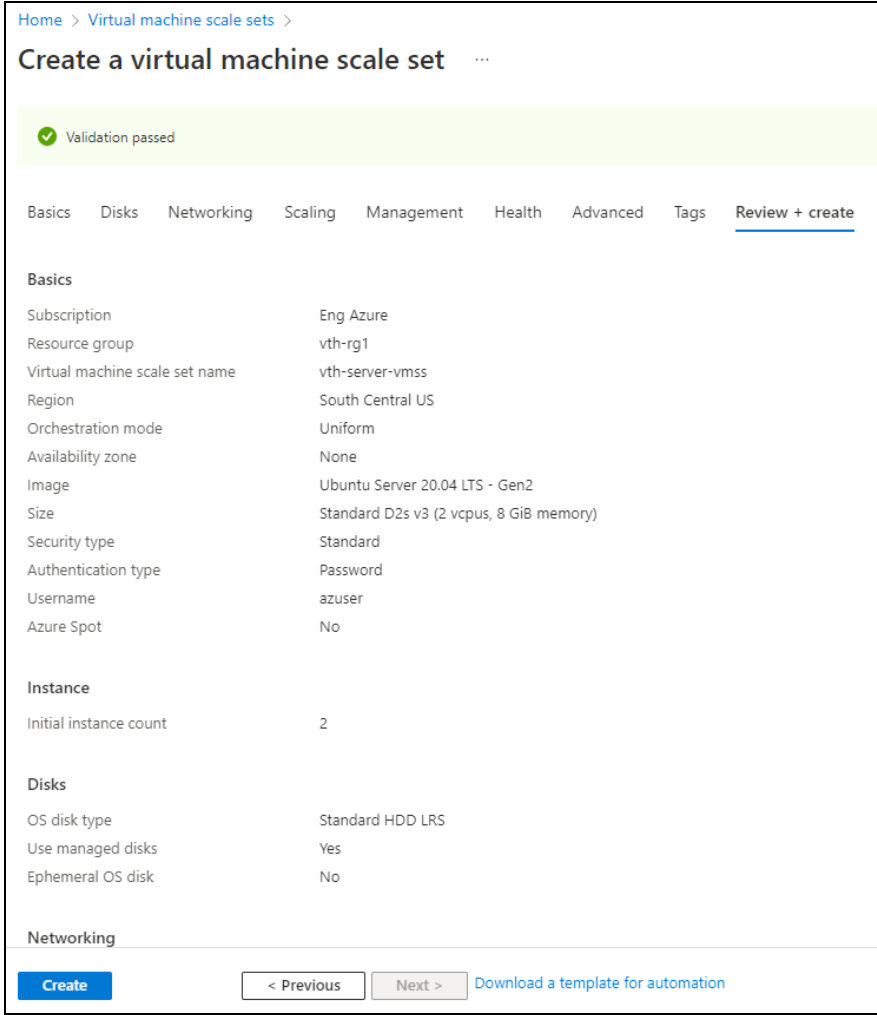
Configure the order in which virtual machines are selected for deletion during a scale-in operation. [Learn more about scale-in policies](#)

Scale-in policy ▼

[Review + create](#) < Previous Next : Management >

- Click **Review + create** at the bottom of the window to skip the other tabs.

Figure 95 : Create a virtual machine scale set window - Review + create tab



Home > Virtual machine scale sets >

Create a virtual machine scale set ...

✓ Validation passed

Basics Disks Networking Scaling Management Health Advanced Tags Review + create

Basics

Subscription	Eng Azure
Resource group	vth-rg1
Virtual machine scale set name	vth-server-vmss
Region	South Central US
Orchestration mode	Uniform
Availability zone	None
Image	Ubuntu Server 20.04 LTS - Gen2
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Security type	Standard
Authentication type	Password
Username	azuser
Azure Spot	No

Instance

Initial instance count	2
------------------------	---

Disks

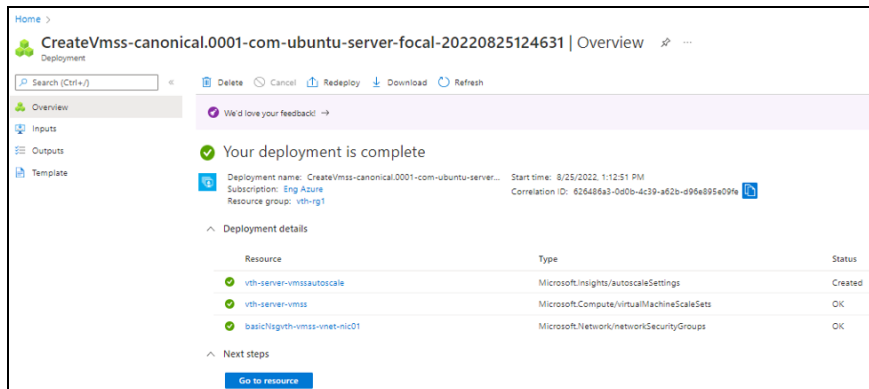
OS disk type	Standard HDD LRS
Use managed disks	Yes
Ephemeral OS disk	No

Networking

[Create](#) [< Previous](#) [Next >](#) [Download a template for automation](#)

- Click **Create** at the bottom of the window.
When the VMSS is created, a message "Your deployment is complete" is displayed in the Create VMSS window.

Figure 96 : Create VMSS window



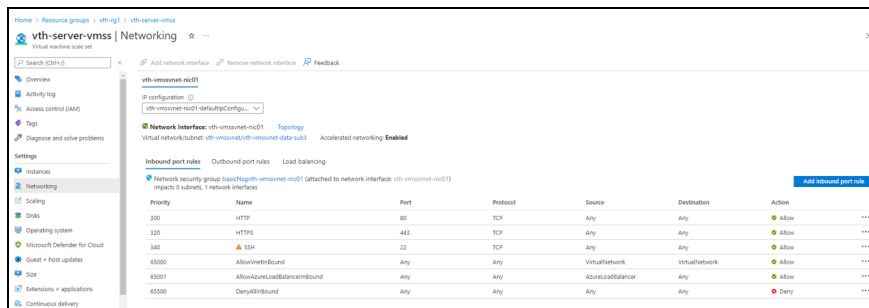
NOTE: It may take the system several minutes to display your resources.

Verify the Server VMSS Creation

To verify the creation of server VMSS, perform the following steps:

1. In the Create VMSS > **Deployment details** section, click the server VMSS resource. Here, the VMSS resource is **vth-server-vmss**. The VMSS resource details window is displayed.
2. Select **Networking** from the left **Settings** panel. VMSS has only one interface. The ports 80 and 443 are available in the **Inbound port rules** tab.

Figure 97 : VMSS > Inbound port rules



3. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

Configure Client Machine

The following topics are covered:

- [Create a Client Machine](#)

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

- Virtual machine name - Client machine
- Region
- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 98 : Create a virtual machine window - Basics tab

Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

Virtual machine name *

Region *

Availability options

Security type

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Administrator account

Authentication type ☐ SSH public key ☒ Password

Username *

Password *

Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

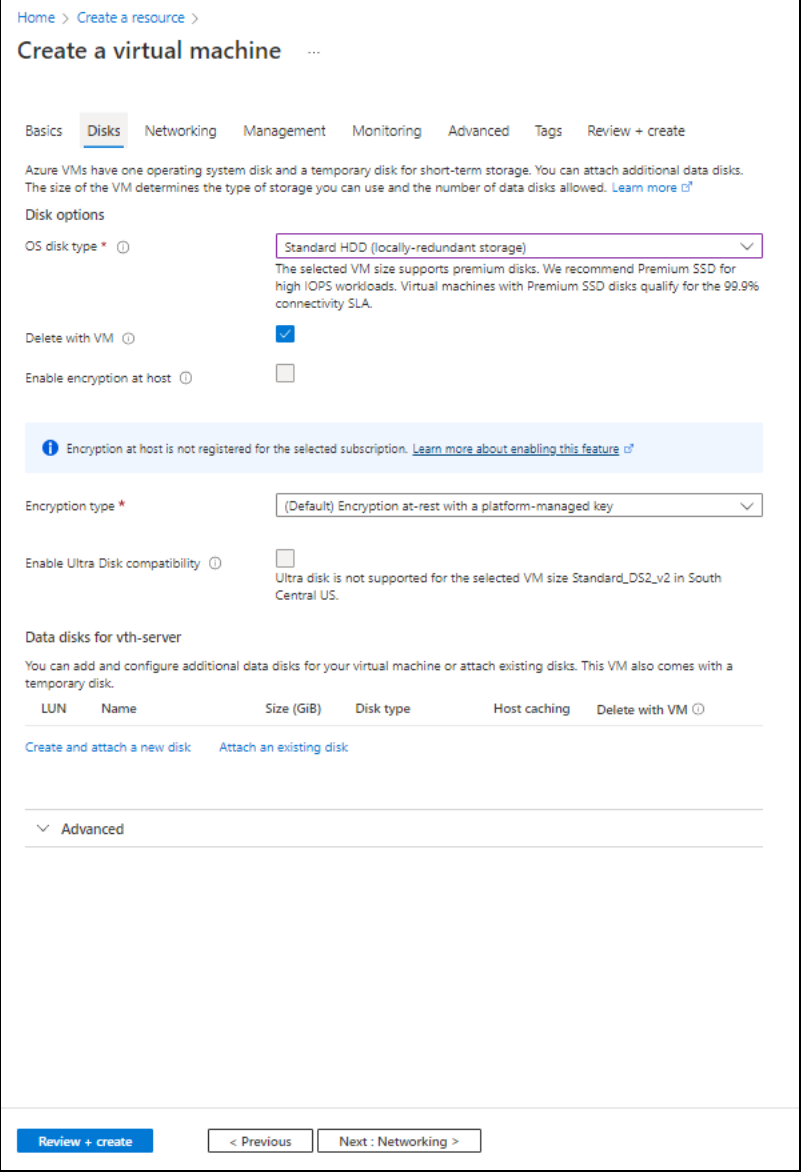
[Review + create](#) [< Previous](#) [Next : Disks >](#)

3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.
4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 99 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☒

Enable encryption at host ☐

i Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Encryption type

Enable Ultra Disk compatibility ☐
Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.

Data disks for vth-server

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
Create and attach a new disk Attach an existing disk					

Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

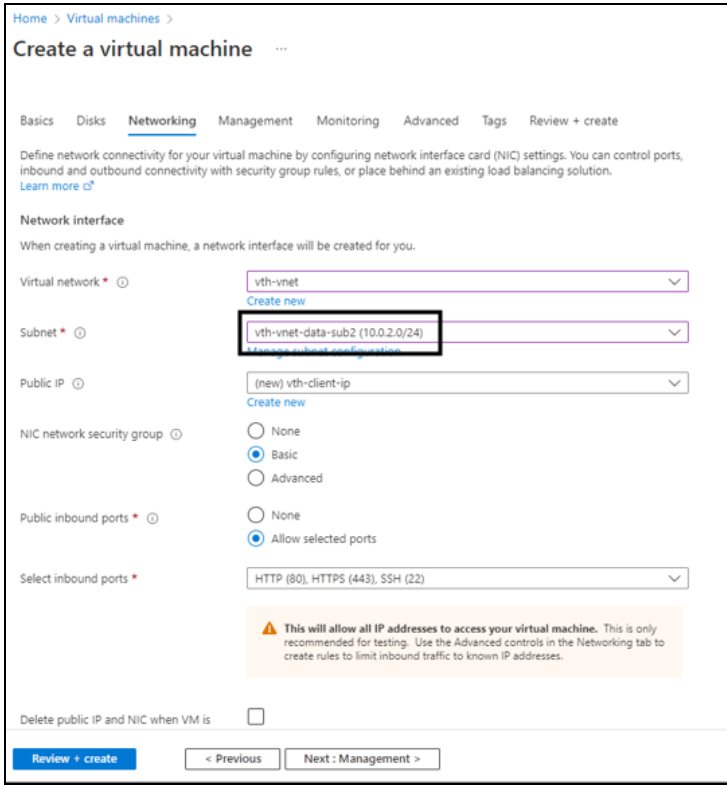
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

- Virtual network
- Subnet: Data subnet 1 (Ethernet 1)
- Select inbound ports

Figure 100 : Create a virtual machine window - Networking tab



Home > Virtual machines >

Create a virtual machine

Basics Disks **Networking** Management Monitoring 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](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * [Create new](#)

Subnet * [Create new](#)

Public IP [Create new](#)

NIC network security group ☐ None ☒ Basic ☐ Advanced

Public inbound ports * ☐ None ☒ Allow selected ports

Select inbound ports *

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

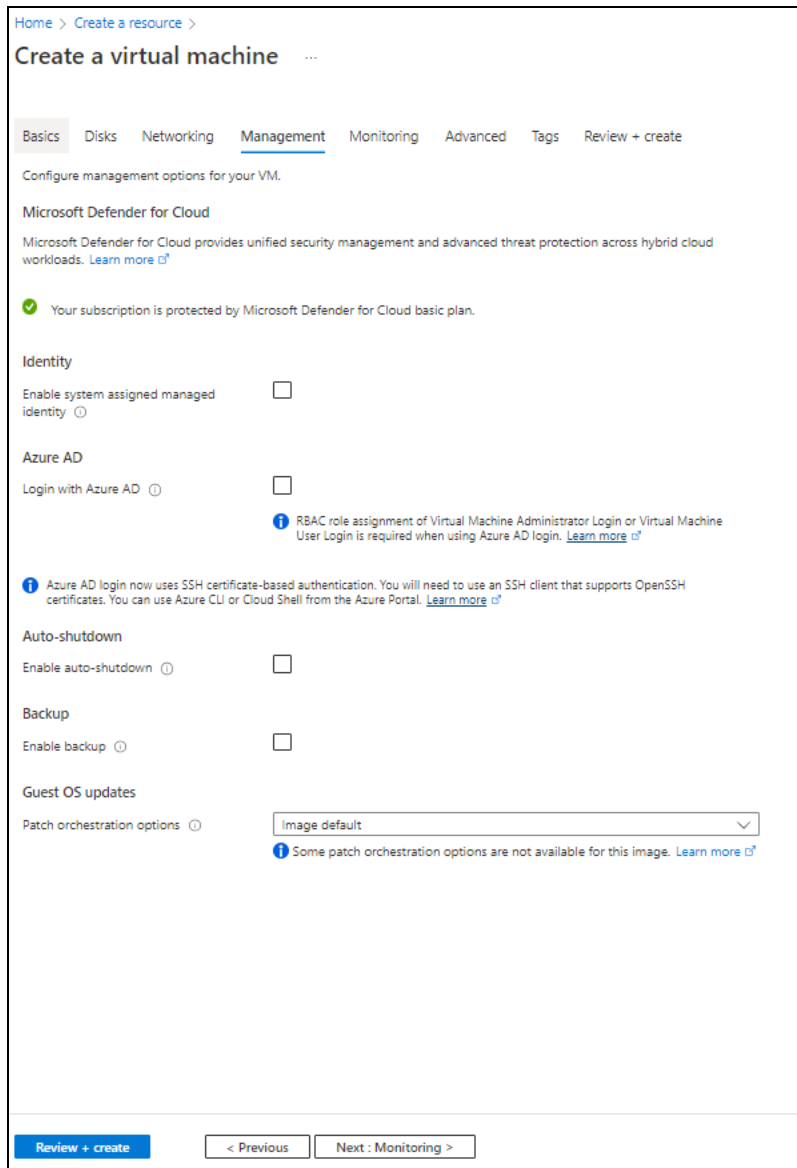
Delete public IP and NIC when VM is ☐

[Review + create](#) < Previous Next : Management >

7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

8. Select or enter the information in the **Management** tab as needed.

Figure 101 : Create a virtual machine window - Management tab

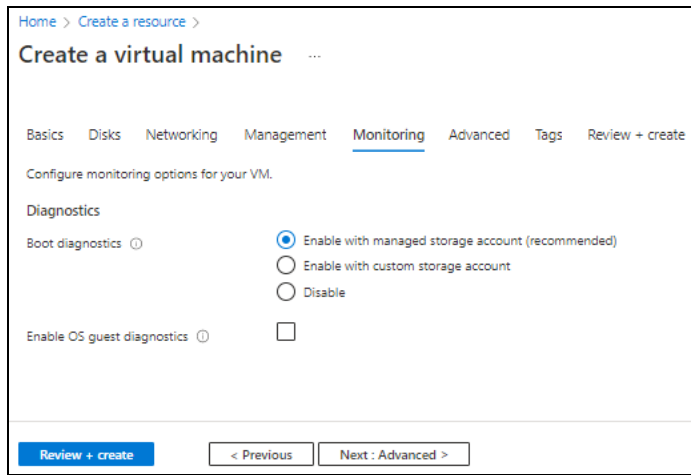


The screenshot shows the 'Create a virtual machine' window in the Management tab. The window has a breadcrumb trail 'Home > Create a resource >' and a title 'Create a virtual machine'. Below the title are tabs for 'Basics', 'Disks', 'Networking', 'Management' (selected), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The 'Management' tab is active, showing options for configuring management for the VM. It includes a section for 'Microsoft Defender for Cloud' with a status message: 'Your subscription is protected by Microsoft Defender for Cloud basic plan.' Below this are sections for 'Identity' (with 'Enable system assigned managed identity' checkbox), 'Azure AD' (with 'Login with Azure AD' checkbox and a note about RBAC role assignment), 'Auto-shutdown' (with 'Enable auto-shutdown' checkbox), 'Backup' (with 'Enable backup' checkbox), and 'Guest OS updates' (with 'Patch orchestration options' dropdown set to 'Image default' and a note about unavailable options). At the bottom are buttons for 'Review + create', '< Previous', and 'Next : Monitoring >'.

9. Click **Next : Monitoring** at the bottom of the window.

10. Select or enter the information in the **Monitoring** tab as needed.

Figure 102 : Create a virtual machine window - Monitoring tab



Home > Create a resource >

Create a virtual machine

Basics Disks Networking Management **Monitoring** Advanced Tags Review + create

Configure monitoring options for your VM.

Diagnostics

Boot diagnostics ⓘ

☒ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☐ Disable

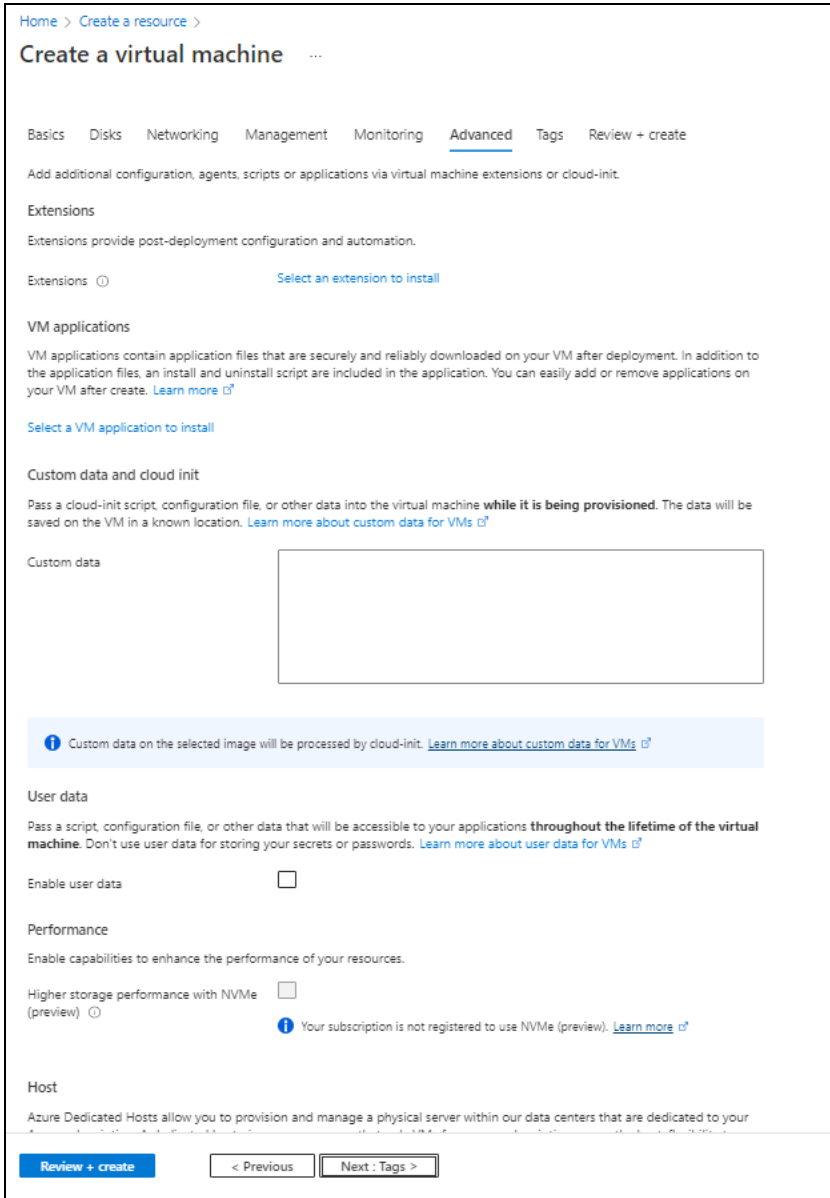
Enable OS guest diagnostics ⓘ ☐

[Review + create](#) [< Previous](#) [Next : Advanced >](#)

11. Click **Next : Advanced** at the bottom of the window.

12. Select or enter the information in the **Advanced** tab as needed.

Figure 103 : Create a virtual machine window - Advanced tab

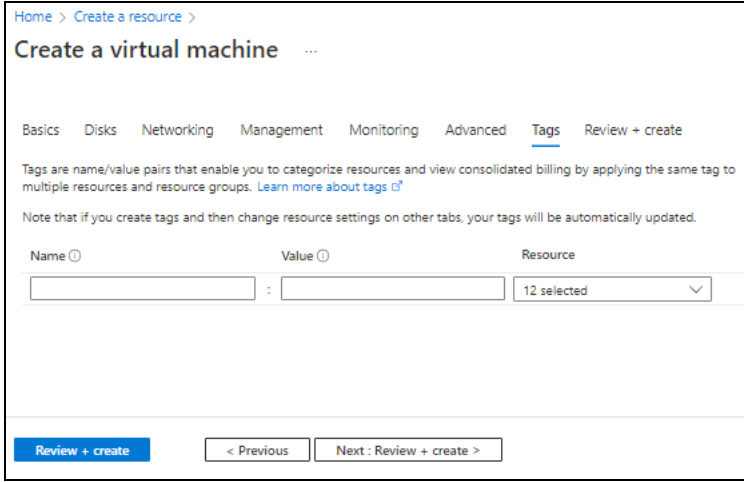


The screenshot shows the 'Create a virtual machine' window in the Advanced tab. The breadcrumb navigation is 'Home > Create a resource >'. The title is 'Create a virtual machine ...'. The tabs are 'Basics', 'Disks', 'Networking', 'Management', 'Monitoring', 'Advanced' (selected), 'Tags', and 'Review + create'. Below the tabs, there is a description: 'Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.' The 'Extensions' section states: 'Extensions provide post-deployment configuration and automation.' and includes a link 'Select an extension to install'. The 'VM applications' section states: 'VM applications contain application files that are securely and reliably downloaded on your VM after deployment. In addition to the application files, an install and uninstall script are included in the application. You can easily add or remove applications on your VM after create. [Learn more](#)' and includes a link 'Select a VM application to install'. The 'Custom data and cloud init' section states: 'Pass a cloud-init script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#)'. Below this is a text area for 'Custom data'. A blue information box states: 'Custom data on the selected image will be processed by cloud-init. [Learn more about custom data for VMs](#)'. The 'User data' section states: 'Pass a script, configuration file, or other data that will be accessible to your applications **throughout the lifetime of the virtual machine**. Don't use user data for storing your secrets or passwords. [Learn more about user data for VMs](#)'. Below this is a checkbox for 'Enable user data'. The 'Performance' section states: 'Enable capabilities to enhance the performance of your resources.' and includes a checkbox for 'Higher storage performance with NVMe (preview)'. A blue information box states: 'Your subscription is not registered to use NVMe (preview). [Learn more](#)'. The 'Host' section states: 'Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your'. At the bottom, there are three buttons: 'Review + create', '< Previous', and 'Next : Tags >'.

13. Click **Next : Tags** at the bottom of the window.

14. Select or enter the information in the **Tags** tab as needed.

Figure 104 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

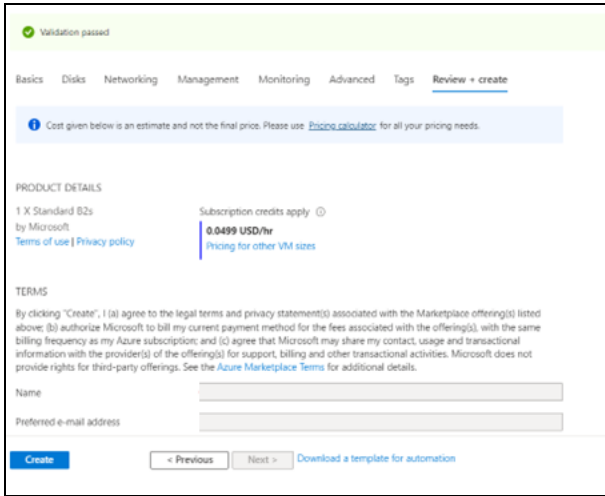
Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
	:	12 selected

Review + create < Previous Next: Review + create >

15. Click **Next : Review + create** at the bottom of the window.
The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

Figure 105 : Create a virtual machine window - Review + create tab



Validation passed

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

Cost given below is an estimate and not the final price. Please use [pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard B2s
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ
0.0499 USD/hr
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name: _____

Preferred e-mail address: _____

Create < Previous Next > [Download a template for automation](#)

16. Click **Create** at the bottom of the window.
The Client machine gets created.

Create Automation Account

The following topics are covered:

- [Initial Setup](#)
- [Create an Automation Account](#)
- [Verify the Automation Account creation](#)
- [Change Password](#)

Initial Setup

Before creating an automation account, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_PARAM.json with a text editor.
2. Configure Automation Account.
If the automation account does not exist, then a new automation account gets created inside resource group. If automation account already exists, then template gets auto-updated.

If the automation account variable does not exist, then a new automation account variable gets created inside the automation account. If an automation account variable already exists, an error "The variable already exists" is prompted.

```
"automationAccountName": "vth-amt-acc",
```

3. Configure location.

```
"location": "South Central US",
```

4. Provide the client secret ID, application ID, and tenant ID from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application_name>**.

```
"clientSecret": "<client-secret-id>",  
"appId": "<application-id>",  
"tenantId": "<tenant-id>",
```

5. Configure VMSS.

```
"vmssName": "vth-server-vmss",
```

6. Configure network interface cards.

```
"mgmtInterface1": "vth-inst1-mgmt-nic1",
"mgmtInterface2": "vth-inst2-mgmt-nic1",
```

7. Configure resource group name. It is the resource group where virtual machine scale set having vThunder servers and resources created by the ARM template are available.

```
"resourceGroupName": "vth-rg1",
```

8. Provide the vThunder instance username.

```
"vThUsername": "admin",
```

NOTE: Do not change the vThunder instance username.

9. Configure ports.

```
"portList":{
  "value": [
    {
      "port-number": 53,
      "protocol": "udp",
      "health-check-disable":1
    },
    {
      "port-number": 80,
      "protocol": "tcp",
      "health-check-disable":1
    },
    {
      "port-number": 443,
      "protocol": "tcp",
      "health-check-disable":1
    }
  ]
}
```

10. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_PARAM.json file are correct and then save the changes.

Create an Automation Account

To create an automation account, run the following command:

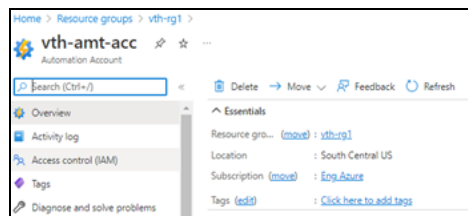
```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_2.ps1
```

Verify the Automation Account creation

To verify the creation of an automation account, perform the following steps:

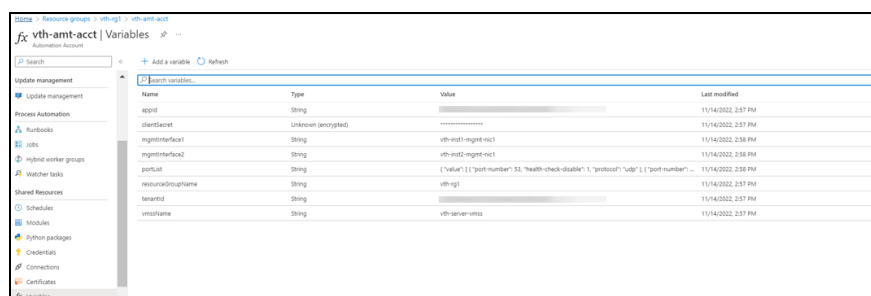
1. From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
The selected resource group - Overview window is displayed.
2. Under **Resources** tab, group the resources based on the resource type.
3. Verify if the recently created automation account is listed under **Automation Accounts** type.
4. Select the recently created automation account.
The selected automation account - Overview window is displayed.

Figure 106 : Selected automation account - Overview window



5. Click **Variables** from the left **Shared Resources** panel.
The selected automation account - Variables window is displayed.

Figure 107 : Selected automation account - Variables window



6. Verify if all the variables associated with the automation account are listed.

Change Password

To change the vThunder instance password for the first-time, perform the following steps:

1. Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_GLM_CHANGE_PASSWORD_3.ps1
```

NOTE: It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```
Enter Default Password:***
Enter New Password:***
Confirm New Password:***
```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Figure 108 : Updated Variables window



Name	Type	Value	Last modified
appid	String	Available for client access with vth-amt-acc	2/7/2023, 9:53 PM
clientSecret	Unknown (encrypted)		2/7/2023, 9:53 PM
mgmtInterface1	String	vth-mgmt-mgmt-nic1	2/7/2023, 9:53 PM
mgmtInterface2	String	vth-mgmt-mgmt-nic2	2/7/2023, 9:53 PM
portList	String	["value"] [{"port-number": 55, "protocol": "udp", "health-check-enabled": 1}, {"port-number": ...	2/7/2023, 9:53 PM
resourceGroupname	String	vth-rg	2/7/2023, 9:53 PM
tenantId	String	Available for client access with vth-amt-acc	2/7/2023, 9:53 PM
vmName	String	vth-server-vm01	2/7/2023, 9:53 PM
vthLastPass	Unknown (encrypted)		2/7/2023, 9:54 PM
vthPassword	Unknown (encrypted)		2/7/2023, 9:54 PM
vthUsername	String	admin	2/7/2023, 9:53 PM

To change the password subsequently, perform the following steps:

1. Change the password in vThunder instance.
2. Update the same password in the **Azure Services > Resource Group > <resource_group_name> > <automation_account> Variables > vThPassword** variable manually.

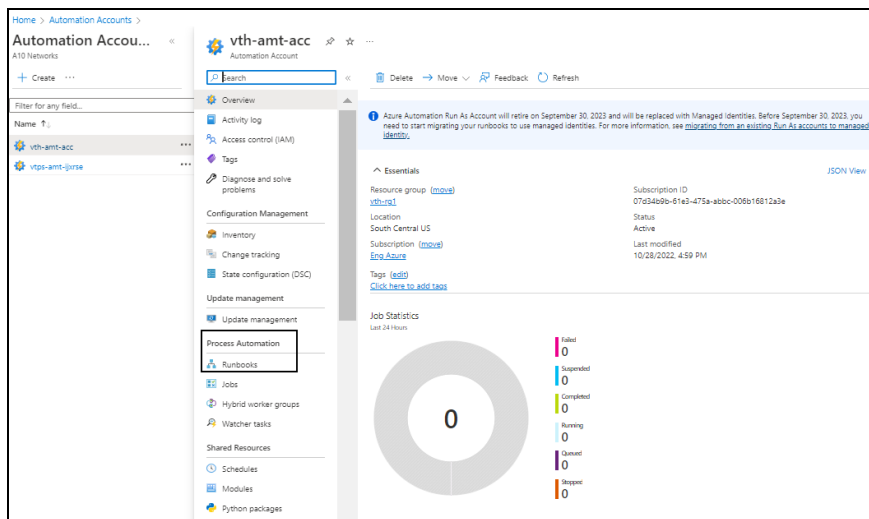
Create Runbook

To create the SLB-Config runbook, perform the following steps:

1. From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.

The selected automation account window is displayed.

Figure 109 : Selected automation account window



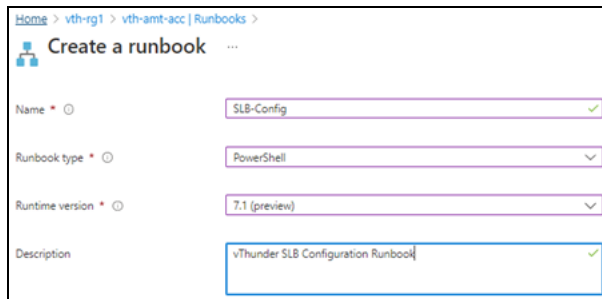
2. Select **Runbooks** from left **Process Automation** panel. The <automation_account_name> - Runbooks window is displayed.

Figure 110 : Selected automation account - Runbooks window



3. Click **Create a runbook**. The **Create a runbook** window is displayed.

Figure 111 : Create a runbook window



Home > vth-rg1 > vth-amt-acc | Runbooks > Create a runbook

Create a runbook

Name: SLB-Config ✓

Runbook type: PowerShell ✓

Runtime version: 7.1 (preview) ✓

Description: vThunder SLB Configuration Runbook ✓

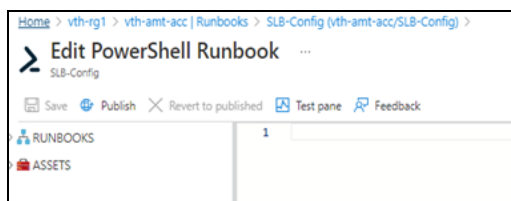
4. Select or enter the following information:

- Name: SLB-Config
- Runbook type: PowerShell
- Runtime version: 7.1
- Description

5. Click **Create**.

The **Edit PowerShell Runbook** is displayed.

Figure 112 : Edit PowerShell Runbook window



Home > vth-rg1 > vth-amt-acc | Runbooks > SLB-Config (vth-amt-acc/SLB-Config) > Edit PowerShell Runbook

Edit PowerShell Runbook

SLB-Config

Save Publish Revert to published Test pane Feedback

RUNBOOKS

ASSETS

NOTE: It may take the system a few minutes to display the edit window.

6. From the downloaded template folder, open **ARM_TMPL_3NIC_2VM_SLB_SERVER_RUNBOOK.ps1** with a text editor and copy the entire content of the runbook.
7. Paste this content in the right panel of the **Edit PowerShell Runbook** window.
8. Click **Save** and then click **Publish**.
The runbook gets created for the selected automation account.

Create Automation Account Webhook

The following topics are covered:

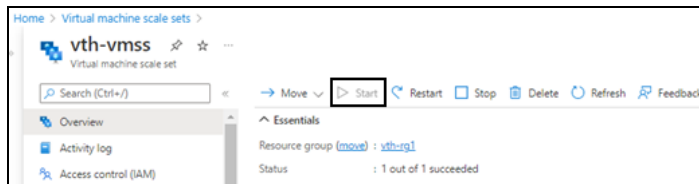
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the Runbook Job creation](#)

Initial Setup

To verify that the virtual machine instances are running, perform the following steps:

1. From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
The selected resource group - Overview window is displayed.
2. Under **Resources** tab, group the resources based on the resource type.
3. Select the virtual machine scale set instance under **Virtual machine scale set** type and verify that the instance is in **Start** mode.

Figure 113 : VMSS window



Create a Webhook

To create a webhook, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create the webhook:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_WEBHOOK_4.ps1 -
runBookName "<runbook_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_WEBHOOK_4.ps1 -
runBookName "SLB-Config"
```

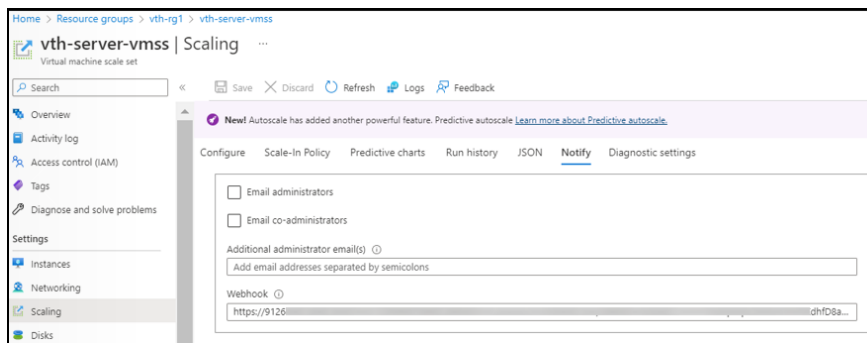
After the webhook installation is complete, the webhook url is displayed.

Save this URL :

```
https://fa72c8e5-xxxx-xxxx-9dc5-b4a71eec0a95.webhook.scus.azure-automation.net/webhooks?token=Q*****pG4UEOScfqdEGEAkqJPgdK%2bOpusoUAWk*****%3d
```

3. Save this webhook url for future purpose.
4. From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.
The selected VMSS - Overview window is displayed. Here, the VMSS name is **vth-server-vmss**.
5. Click **Scaling** from the left **Settings** panel.
The selected VMSS - Scaling window is displayed.

Figure 114 : VMSS-Scaling - Notify tab



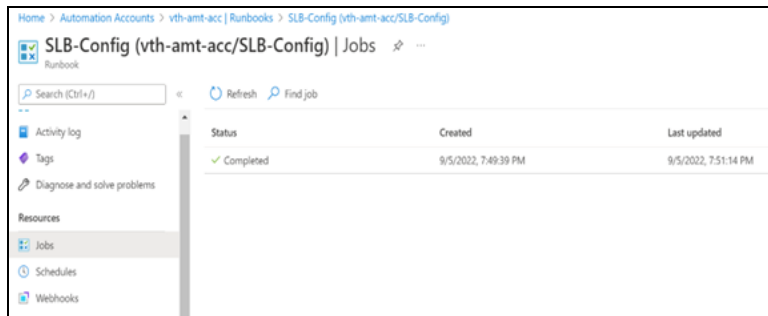
6. Select **Notify** tab.
7. Copy the saved webhook url and paste it in the **Webhook** field.
8. Click **Save** to save the changes.

Verify the Runbook Job creation

To verify the creation of runbook job, perform the following steps:

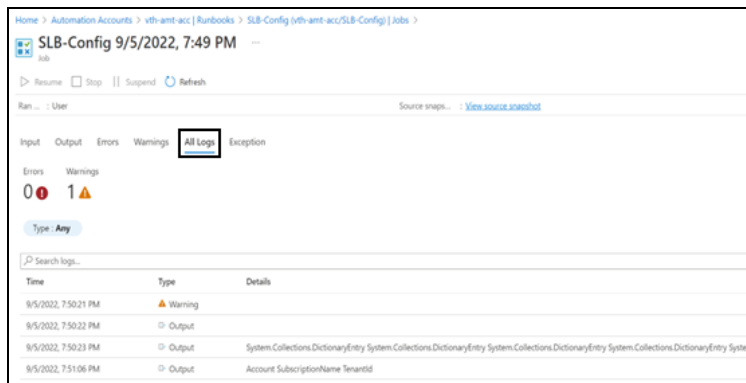
1. From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.
The selected automation account - Overview window is displayed.
2. Click **Jobs** from the left **Process Automation** panel.
The selected automation account - Jobs window is displayed. Here, the job is **SLB-Config**.

Figure 115 : Selected automation account - Jobs window



3. Verify if the runbook job has completed status.
4. Select the runbook job > **All Logs** tab to verify the logs.
The selected automation account - selected job - Jobs window is displayed.

Figure 116 : Selected runbook job window



Configure vThunder as an SLB

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder as an SLB](#)

Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_SLB_CONFIG_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure service group list ports.

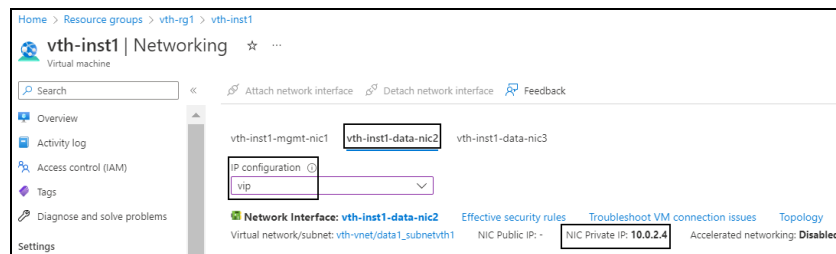
```
"serviceGroupList": {  
  "value": [  
    {  
      "name": "sg443",  
      "protocol": "tcp",  
      "health-check-disable": 1  
    },  
    {  
      "name": "sg53",  
      "protocol": "udp",  
      "health-check-disable": 1  
    },  
    {  
      "name": "sg80",  
      "protocol": "tcp",  
      "health-check-disable": 1  
    }  
  ]  
},
```

3. Configure virtual server.

The virtual server default name is “vip”. The vip address is generated dynamically after deploying the ARM template. Therefore, its default value under **virtualServerList** should be replaced. To get the vip address, perform the following steps:

- From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- Go to the first virtual machine instance. Here, first virtual machine instance is **vth-inst1**.
- Select the Data NIC 2 tab > **IP configuration > vip**. Here, Data NIC 2 is **vth-inst1-data-nic2**.

Figure 117 : Virtual machine - Networking window - Data NIC 2 tab



- Select **Networking** from the left **Settings** panel.
- Select the **NIC Private IP**.
- Replace **ip-address** value under **virtualServerList** with this **vip**.

```

"virtualServerList": {
  "virtual-server-name": "vip",
  "ip-address": "10.0.2.4",
  "metadata": {
    "description": "virtual server is using VIP from
ethernet 1 subnet"
  },
  "value": [
    {
      "port-number": 53,
      "protocol": "udp",
      "ha-conn-mirror": 1,
      "auto": 1,
      "service-group": "sg53"
    },
    {
      "port-number": 80,
      "protocol": "http",

```

```

        "auto":1,
        "service-group":"sg80"
    },
    {
        "port-number":443,
        "protocol":"https",
        "auto":1,
        "service-group":"sg443"
    }
]
},

```

NOTE: **ha-conn-mirror** does not work on port 80 and 443.

4. Configure SSL.

```

"sslConfig": {
    "requestTimeout": 40,
    "Path": "<absolute path of the ssl certificate file>",
    "File": "<certificate-name>",
    "CertificationType": "pem"
}

```

NOTE: By default, SSL configuration is disabled i.e. no SSL configuration is applied.

Example The sample values for the SSL certificate are as shown below:

```

"sslConfig": {
    "requestTimeout": 40,
    "Path": "C://Users//...//...//server.pem" or
    "C:\Users\...\..\certs\server.pem",
    "File": "server",
    "CertificationType": "pem"
}

```

5. Verify if the vip address and all other configurations in the ARM_TMPL_3NIC_2VM_SLB_CONFIG_PARAM.json file are correct and then save the changes.

Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to deploy vThunder as an SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_5.ps1 - resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_5.ps1 - resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate
Do you want to upload ssl certificate ?
[Y] Yes [No] No [?] Help (default is "N"): Y
SLB Server Host IP: 10.0.3.7
Virtual Server Name: vip
Resource Group Name: vth-rg1
vThunder1 Public IP: 13.85.81.137
vThunder2 Public IP: 13.85.81.113
Configuring vm: vth-inst1
configured ethernet- 1 ip
configured ethernet- 2 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 1
Configuring vm: vth-inst2
configured ethernet- 1 ip
configured ethernet- 2 ip
```

```
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 2
```

3. If the SSL Certificate upload is successful, a message 'SSL Configured' is displayed.

Configure High Availability for vThunder

The following topics are covered:

- [Initial Setup](#)
- [Create High Availability for vThunder](#)

Initial Setup

Before configuring high availability for vThunder, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json with a text editor.
2. Configure DNS.

```
"dns": {
  "value": "8.8.8.8"
},
```

3. Configure a Network Gateway IP.

The default value of network gateway IP address is the first IP address of data subnet 1 configuration.

```
"rib-list": [
  {
    "ip-dest-addr": "0.0.0.0",
    "ip-mask": "/0",
```

```

        "ip-nexthop-ipv4": [
            {
                "ip-next-hop": "10.0.2.1"
            }
        ]
    }
},

```

4. Set a VRRP-A.

```

    "vrrp-a": {
        "set-id": 1
    },

```

5. Set a Terminal Idle Timeout.

```

    "terminal": {
        "idle-timeout": 0
    },

```

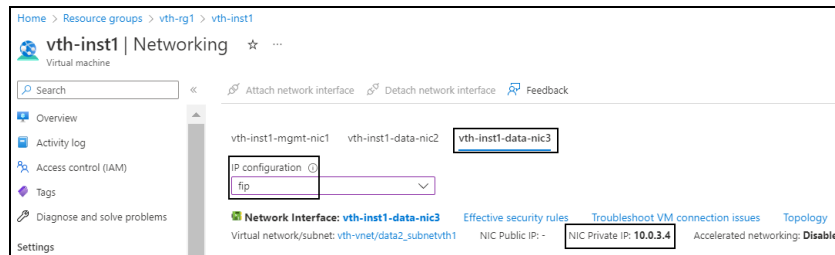
6. Configure VRID details.

The default value of vrid is 0. The default priority for vThunder-1 is 100, and for vThunder-2 is 99 (100-1). The floating ip (fip) address value is generated dynamically after deploying the ARM template. Therefore, its default value under `vrid-list` should be replaced. To get the fip address, perform the following steps:

- a. From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- b. Go to the first virtual machine instance. Here, first virtual machine instance is `vth-inst1`.
- c. Select **Networking** from the left **Settings** panel.

- d. Select the Data NIC 3 tab > **IP configuration**. Here, `vth-inst1-data-nic3`.

Figure 118 : Virtual machine - Networking tab - Data NIC 3 tab



- e. Select the **NIC Private IP**.
- f. Replace the `ip-address` value under `vrid-list` with this `fip`.

```
"vrid-list": [
  {
    "vrid-val": 0,
    "blade-parameters": {
      "priority": 100
    },
    "floating-ip": {
      "ip-address-cfg": [
        {
          "ip-address": "10.0.3.4"
        }
      ]
    }
  }
]
```

7. Verify if all the configurations in the `ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json` file are correct and then save the changes.

Create High Availability for vThunder

To create High Availability for vThunder, perform the following steps:

1. Import Azure access key on both the vThunder instances. For more information, refer [Import Azure Access Key](#).

2. Run the following command to configure both vThunder instances in HA mode.

```
S C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_6.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_6.ps1 -  
resourceGroup vth-rg1
```

Configure vThunder using GLM

The following topics are covered:

- [Initial Setup](#)
- [Apply GLM License](#)

Initial Setup

Before configuring vThunder with GLM, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. From the downloaded ARM template folder, open the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json with a text editor.
2. Configure GLM account details.

```
{  
  "parameters": {  
    "user_name": {  
      "value": "user_name"  
    },  
    "user_password": {  
      "value": "user_password"  
    },  
    "entitlement_token": {  
      "value": "token"  
    }  
  }  
}
```

```
}
}
```

3. Verify if the configurations in the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json file are correct and then save the changes.

Apply GLM License

To apply GLM License, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to apply SLB on vThunder:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_7.ps1 -
resourceGroupName <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_7.ps1 -
resourceGroup vth-rg1
```

3. If the GLM License is applied successfully, a message is displayed.

```
ConfigureGlm
{
  "response": {
    "status": "OK",
    "msg": "BASE License successfully updated, please log out and log back
in to access license featurebA1070459ec380000\n"
  }
}
GlmRequestSend
Configurations are saved on partition: shared
WriteMemory
```

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access the two vThunder instances using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance
Here, Public IP of `vth-inst1`, `vth-inst2`
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->
Using keyboard-interactive authentication.
Password: xxxx <---Enter password provided by A10 Networks Support-->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

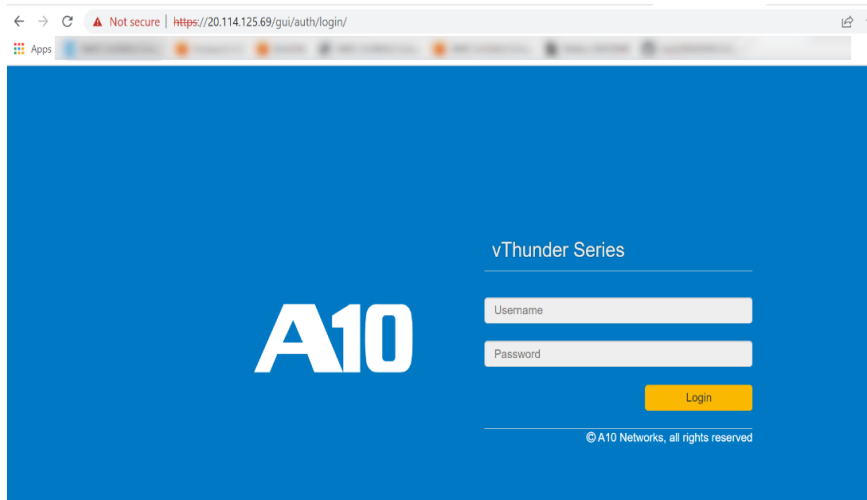
vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

Access vThunder using GUI

To access the two vThunder instances using GUI, perform the following steps:

1. Open any browser.
2. Enter *https://<vthunder_public_IP>/gui/auth/login/* in the address bar.

Figure 119 : vThunder GUI



3. Enter the recently configured user credentials.
The home page gets displayed.

Verify Deployment

To verify deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:

```
vThunder-Active(config)#show running-config slb
```

If the deployment is successful, the following SLB configuration is displayed:

```
slb service-group sg443 tcp
  health-check-disable
!
slb service-group sg53 udp
  health-check-disable
!
slb service-group sg80 tcp
  health-check-disable
!
```



```
slb virtual-server vip 10.0.2.4
  port 53 udp
    ha-conn-mirror
    source-nat auto
    service-group sg53
  port 80 http
    source-nat auto
    service-group sg80
  port 443 https
    source-nat auto
    service-group sg443
!
```

2. Run the following command to verify HA:

```
vThunder-Active(config)#show running-config
```

If the deployment is successful, the following configuration is displayed:

```
!Current configuration: 536 bytes
!Configuration last updated at 17:36:35 IST Mon Sep 5 14 2022
!Configuration last saved at 17:35:40 IST Wed Sep 5 14 2022
!64-bit Advanced Core OS (ACOS) version 5.2.0, build 155 (Aug-10-2020,14:34)

!
vrrp-a common
  device-id 1
  set-id 1
  enable
!
multi-config enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
glm use-mgmt-port
```

```

glm enable-requests
glm token vTh11e089e10
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.2.1
!

```

3. Run the following command to verify the SSL Certificate configuration:

```
vThunder-Active(config)#show pki cert
```

If the deployment is successful, the following SSL configuration is displayed:

Name	Type	Expiration	Status

server certificate		Jan 28 12:00:00 2028 GMT	[Unexpired, Bound]

4. Run the following command to force stop the active vThunder and make standby vThunder as active device:

```
vThunder-Active(config)#vrrp-a force-self-standby enable
```

```
vThunder-ForcedStandby(config) #
```

5. Run the following command to disable the active standby vThunder:

```
vThunder-ForcedStandby(config) #vrrp-a force-self-standby disable
vThunder-Active(config) #
```

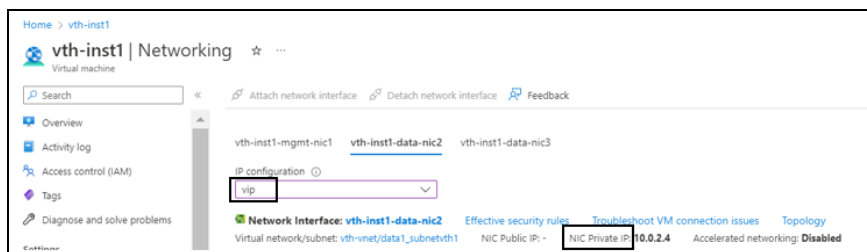
Verify Traffic Flow

To verify the traffic flow from client machine to server machine via vThunder, perform the following:

1. From **Azure Portal** > **Azure Services** > **Resource Group** > <resource_group_name> > <active_virtual_machine_instance> > **Settings** > **Networking**. Here, **vth-inst1** is the active vThunder instance name.

2. Copy the VIP address of the active vThunder instance.

Figure 120 : Active vThunder instance 1 VIP



3. Select your client instance from the **Virtual machine** list. Here, **vth-client** is the client instance name.
4. SSH your client machine and run the following command to verify the traffic flow:

```
curl <VIP>
```

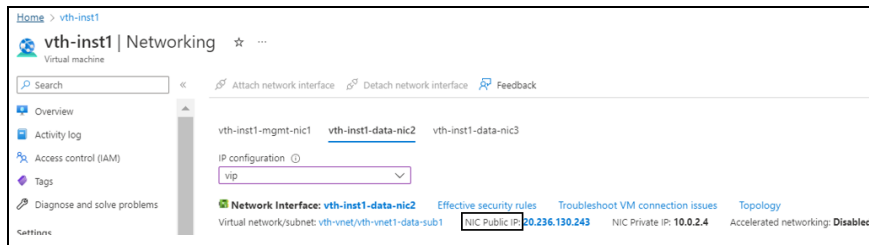
Example

```
curl 10.0.2.4
```

Verify if a response is received.

5. Copy the Public IP address of the active vThunder instance 1 data subnet 1.

Figure 121 : Active vThunder instance 1 Public IP address



6. Run the following command from the client machine to verify the traffic flow:

```
curl <public_ip_of_data_nic2>
```

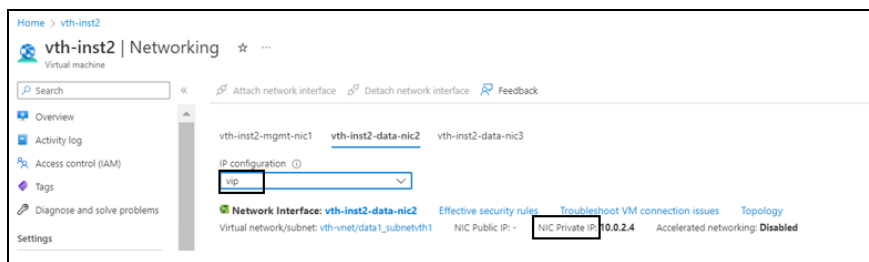
Example

```
curl 20.236.130.243
```

Verify if a response is received.

7. After the switchover, vThunder instance 2 is active, so copy the VIP address of the vThunder instance 2.

Figure 122 : Active vThunder instance 2 VIP



8. SSH your client machine and run the following command to verify the traffic flow:

```
curl <VIP>
```

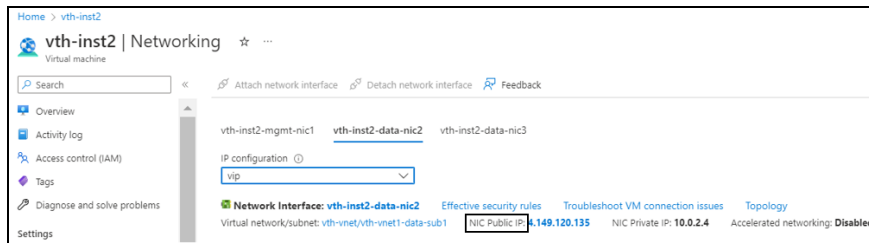
Example

```
curl 10.0.2.4
```

Verify if a response is received.

9. Copy the Public IP address of the active vThunder instance 2 data subnet 1.

Figure 123 : Active vThunder instance 2 Public IP address



1. Run the following command from the client machine to verify the traffic flow:

```
curl <public_ip_of_data_nic2>
```

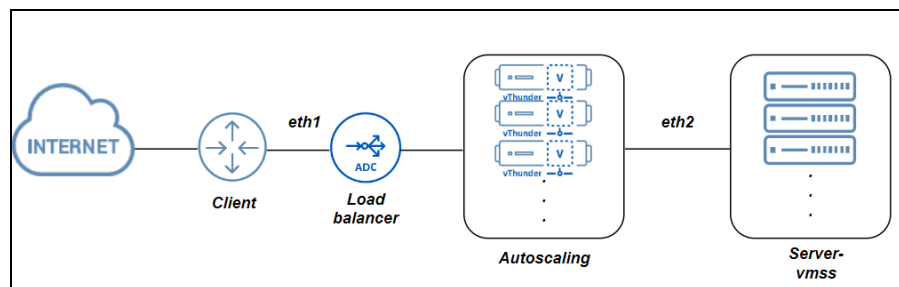
Verify if a response is received.

Deploy ARM A10-vThunder_ADC-3NIC-VMSS

[Figure 124](#) shows the 3NIC-NVM-VMSS deployment topology. Using this template, multiple vThunder instances in a Virtual Machine scale set using CPU Matrix-based autoscaling can be deployed containing:

- One management interface and two data interfaces each
- GLM integration
- SSL Certificate support
- Server Load Balancer
- Log Analysis using Azure Log Analytics integration
- Azure Application Insight integration

Figure 124 : 3NIC-NVM-VMSS Topology



The following topics are covered:

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On-demand Password Change	303
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System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following resources to deploy vThunder on the Azure cloud:

Table 12 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	A resource group with the specified name and location is created if it doesn't exist. All the resources required for this template is created under the resource group.	Here, the Azure resource group name used is <code>vth-rg1</code> .
Azure Storage Account	A storage account is created inside the resource group, if it doesn't exist. If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription". Performance: Standard Replication: Read-access geo-redundant storage (RA-GRS) Account kind: Storagev2 (general purpose v2)	Azure Storage Account: <code>vthunderstorage</code> SSL Container: <code>ssl</code> Log Agent Container: <code>vth-agent-cont</code>
Virtual Machine (VM) Instance	Two virtual machine instances are created, vThunder and monitoring agent.	A10 vThunder instance: <code>vth-vmss_0</code> A10 Monitoring Agent: <code>vth-</code>

Resource Name	Description	Default Value
	Product: A10 vThunder Operating system: Linux Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory) Product: A10 Monitoring Agent Operating system: Linux Default Size: Standard_DS2_V2 (2 vCPUs, 7 GiB Memory) NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic. Table 13 lists the supported VM sizes.	agent-ins1
Azure Automation Account	An automation account is created under the resource group.	vth-amt-acc
Azure Runbook with Webhook	Multiple custom runbooks are created under the automation account: - Change-Password-Config - Event-Config	

Resource Name	Description	Default Value
	• GLM-Config • GLM-Revoke-Config • Master-Runbook • SLB-Config • SSL-Config A webhook is created under the Master-Runbook.	
Azure Log Analytics Workspace	A log analytics workspace is created. A custom agent, fluentbit, sends all logs to log analytics.	vth-vmss-log-workspace
Azure Application Insights	The custom metrics are created. Depending upon the configured threshold values, it is considered for autoscaling.	Default application insight name: vth-vmss-app-insights Default custom metrics name: vth-cpu-metrics Default threshold for autoscale-in is 25%. Default threshold for autoscale-out is 80%.
Azure Load Balancer [LB]	A load balancer with an interface is created under the automation account if it does not exist. The creation of LB is optional, and it can be skipped during the execution. One backend pool is created, and it gets attached to the Network Interface Card 2 (NIC2). Three default LB rules are	Azure Load Balancer: vth-lb1 Backend Pool: vth-lb1-bck-pool1 Three default rules are created: • rulePort80 • rulePort443 • rulePort53 Three default probes are created:

Resource Name	Description	Default Value
	created. Three default health probes are created.	• HealthProbe80 • HealthProbe443 • HealthProbe53
Virtual Machine Scale Set [VMSS]	A virtual machine scale set is created.	<code>vth-vmss</code>
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<code>vth-vmss-vnet</code> Address prefix for virtual network: 10.0.0.0/16
Subnet	Three subnets are created with an address prefix each.	Subnet1: <code>10.0.1.0/24</code> Subnet2: <code>10.0.2.0/24</code> Subnet3: <code>10.0.3.0/24</code>
Public and Private IP address	Single frontend static public IP is created and attached to LB interface.	Public IP address: <code>vth-lb1-ip</code> Private IP address: <code>vth-lb1-frnt-ip</code>
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: • Management Interface with public IP • Data Interface with primary private IP [Ethernet 1, Ethernet 2]	<code>vth-inst1-mgmt-nic1</code> <code>vth-inst1-data-nic2</code> <code>vth-inst1-data-nic3</code>

Resource Name	Description	Default Value
	NOTE: The secondary IP of data interface is taken from DHCP server.	
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	vth-nsg1
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer Azure Service Application Access Key .	

Supported VM Sizes

Table 13 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A4_v2	Standard_A4_v2
	Standard A4m_v2	Standard_A4m_v2
	Standard/Basic A4	Standard_A4
	Standard A8_v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D3_v2	Standard_D3_v2
	Standard DS3_v2	Standard_DS3_v2
	Standard D5_v2	Standard_D5_v2

Series	Size	Qualified Name
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

Azure is going to retire few of the above listed VM sizes soon, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>

Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)
- [Verify Resource Creation](#)

Initial Setup

Before deploying vThunder instances on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_3NIC_NVM_VMSS_PARAM.json with a text editor.

NOTE:	Each parameter has a default value mentioned in the parameter file.
--------------	---

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {
  "value": "vth-user"
},
"adminPassword": {
  "value": "vth-Password"
},
```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure DNS label prefixes for vThunder host name and vThunder agent host name.

```
"dnsLabelPrefix": {
  "value": "vth-inst1"
},
"dnsLabelPrefix1": {
  "value": "vth-inst2"
},
```

4. Configure a virtual network scale set.

```
"vmssName": {
  "value": "vth-vmss"
},
```

5. Set a VMSS size for vThunder.

```
"vmssSku": {
  "value": "Standard_B4ms"
},
```

6. Set a VM size for Agent.

```
"vmSku": {
  "value": "Standard_DS2_V2"
},
```

Use a suitable VM size that supports at least 3 NICs. For VM sizes, see [System Requirements](#) section.

7. Set an instance count.

```
"instanceCount":{
  "value":1
},
```

NOTE: The instance count cannot be less than 1.

8. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage":{
  "value":"vthunder_520_byol"
},
"publisherName":{
  "value":"a10networks"
},
"productName":{
  "value":"a10-vthunder-adc-520-for-microsoft-azure"
},
```

NOTE: Do not change the publisher name.

9. Configure an address prefix and subnet values for each vThunder instances' management interface and data interfaces.

```
"mgmtIntfPrivatePrefix":{
  "value":"10.0.1.0/24"
},
"eth1PrivatePrefix":{
  "value":"10.0.2.0/24"
},
"eth2PrivatePrefix":{
  "value":"10.0.3.0/24"
},
```

10. Configure network interface cards for each vThunder instances.

```
"nic1Name":{
  "value":"vth-inst1-mgmt-nic1"
},
"nic2Name":{
```

```

        "value": "vth-inst1-data-nic2"
    },
    "nic3Name": {
        "value": "vth-inst1-data-nic3"
    },

```

11. Configure NIC1 public IP name for vThunder.

```

    "nic1PublicIPName": {
        "value": "vth-inst1-mgmt-nic1-ip"
    },

```

12. Configure a network security group.

```

    "networkSecurityGroupName": {
        "value": "vth-nsg1"
    },

```

13. Configure a storage account name.

```

    "storageAccountName": {
        "value": "vthunderstorage"
    },

```

If the storage account already exists, the following error is displayed, “The storage account named is already taken”.

14. Configure SSL container name.

```

    "sslContainerName": {
        "value": "ssl"
    },

```

NOTE: Do not change the SSL container name.

15. Configure storage account type.

```

    "storageAccountType": {
        "value": "Standard_GRS"
    },

```

16. Configure load balancer name, public IP name, backend IP name, and frontend pool name.

```

    "lbPublicIPName": {
        "value": "vth-lb1-ip"
    },

```

```

    "lbName": {
      "value": "vth-lb1"
    },
    "lbBackEndPoolName": {
      "value": "vth-lb1-bck-pool1"
    },
    "lbFrontEndName": {
      "value": "vth-lb1-frnt-ip"
    },
  },

```

17. Configure vThunder monitoring VM name.

```

    "vmName": {
      "value": "vth-agent-ins1"
    },
  },

```

18. Configure log agent container name.

```

    "logAgentContainerName": {
      "value": "vth-agent-cont"
    }
  }

```

19. Verify if all the configurations in the ARM_TMPL_3NIC_NVM_VMSS_PARAM.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a resource group in Azure:

```

PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"

```

Example:

```

PS C:\Users\TestUser\Templates> az group create --name vth-rg1 --location "south central us"
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",

```



```
"location": "southcentralus",
"managedBy": null,
"name": "vth-rg1",
"properties": {
  "provisioningState": "Succeeded"
},
"tags": null,
"type": "Microsoft.Resources/resourceGroups"
}
```

3. Run the following command to create a deployment group in Azure.

```
PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>
```

Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
--template-file ARM_TMPL_3NIC_NVM_VMSS_1.json --parameters ARM_TMPL_
3NIC_NVM_VMSS_PARAM.json
```

Here, **vth-rg1** resource group is created.

Verify Resource Creation

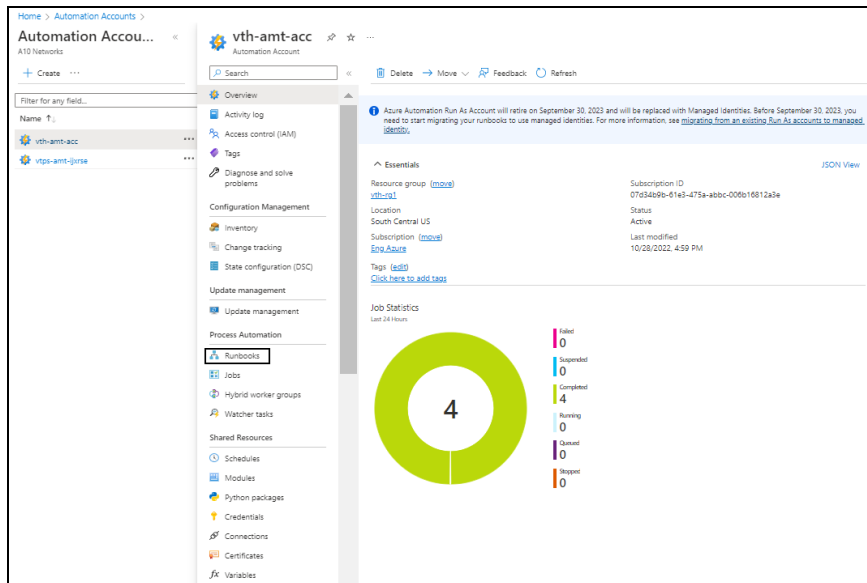
Runbook

To verify the creation of runbooks, perform the following steps:

1. From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.

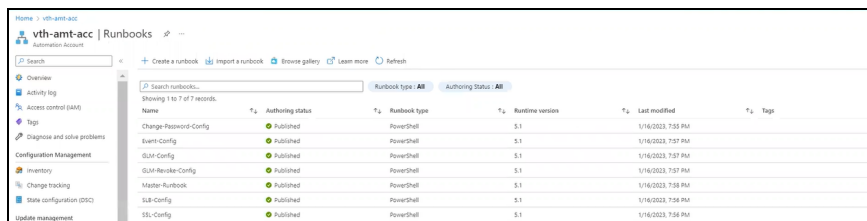
The selected automation account - Overview window is displayed.

Figure 125 : Selected automation account - Overview window



2. Click **Runbooks** from the left **Process Automation** panel.
The selected automation account - Jobs window is displayed.

Figure 126 : Selected automation account - Runbooks window



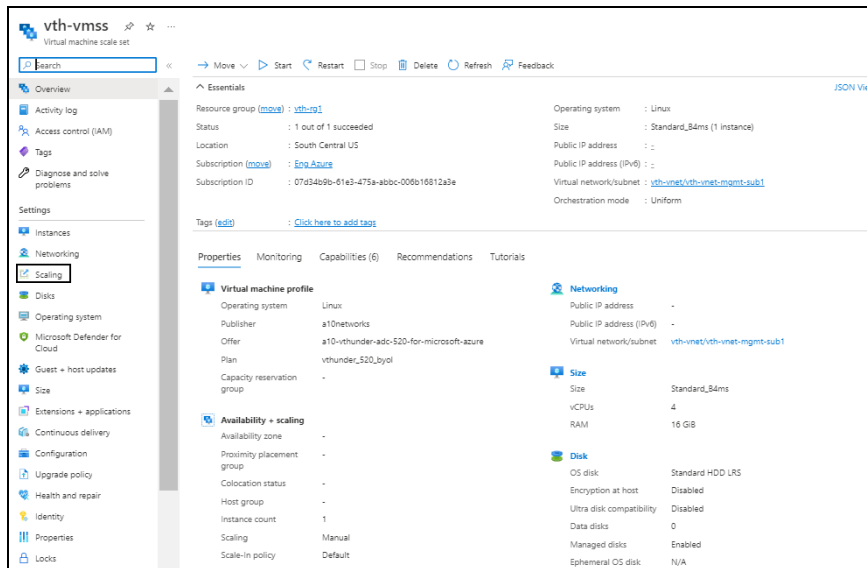
Instance Count

To verify the instance count, perform the following steps:

1. From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.

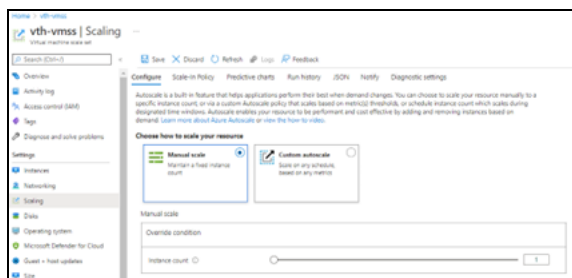
The selected VMSS - Overview window is displayed. Here, the VMSS name is **vth-vmss**.

Figure 127 : Virtual machine scale set - Overview window



2. Click **Scaling** from the left **Settings** panel.
The selected VMSS - Scaling window is displayed.

Figure 128 : Virtual machine scale set - Scaling window - Configure tab



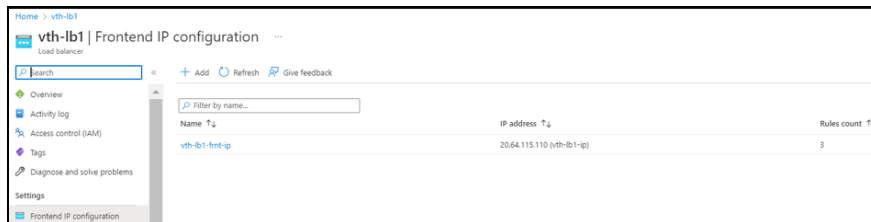
3. Verify the configured instance count.
If the instance gets deleted either manually or automatically, VMSS creates a new instance.

LB creation

To verify LB resource creation, perform the following steps:

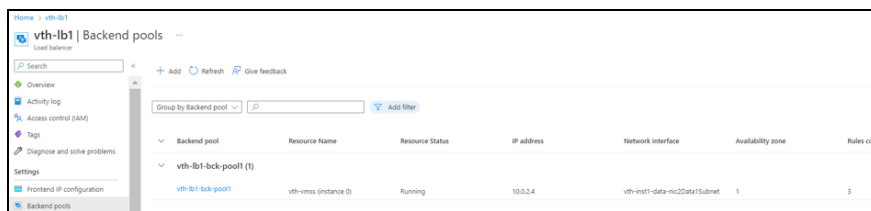
- a. From **Home**, navigate to **Azure Services > Load balancer > <lb_name>**.
The selected LB - Overview window is displayed. Here, the LB name is **vth-1b1**.
- b. Click **Frontend IP configuration** from the left **Settings** panel to verify if the LB frontend IP is created.

Figure 129 : Selected Frontend IP configuration window



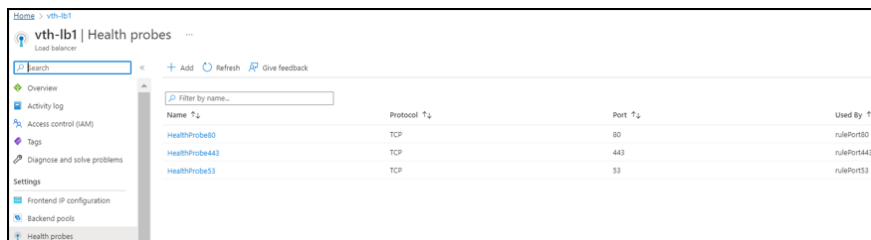
- c. Click **Backend pools** from the left **Settings** panel to verify if the backend pools are created.

Figure 130 : Selected Backend pools window



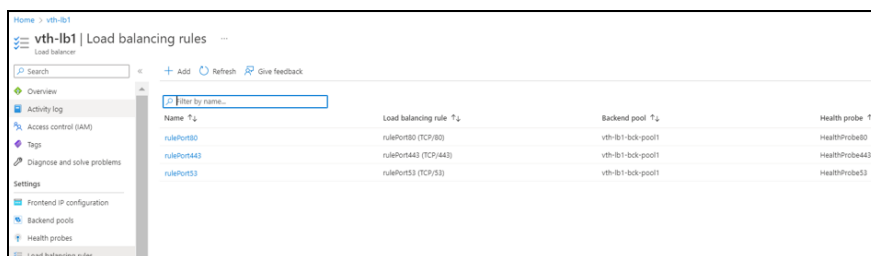
- d. Click **Health probes** from the left **Settings** panel to verify if the health probes are created.

Figure 131 : Selected Health Probes window



- e. Click **Load balancing rules** from the left **Settings** panel to verify if the load balancing rules are created.

Figure 132 : Selected load balancing rules window



Storage Account Container

To verify storage account container, perform the following steps:

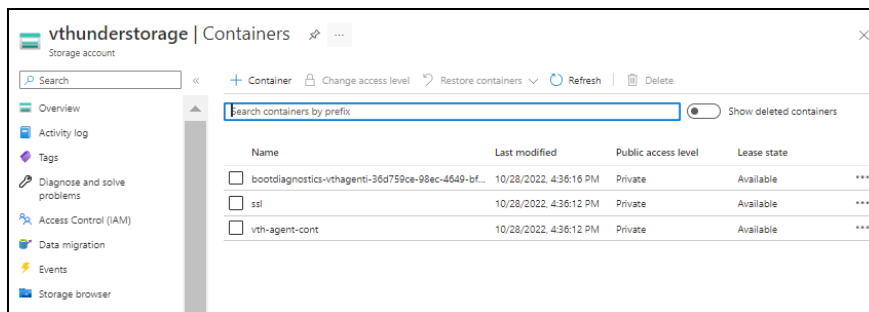
- a. From **Home**, navigate to **Azure Services > Storage account > <storage_account_name>**.

The selected storage account - Overview window is displayed. Here, the storage account name is **vtthunderstorage**.

- b. Click **Containers** from the left **Data storage** panel.

The selected storage account - Containers window is displayed.

Figure 133 : Selected storage account - Containers window



Configure Server VMSS

The following topics are covered:

- [Create a Server Machine](#)
- [Verify the Server VMSS Creation](#)

Create a Server Machine

To create a Server machine, perform the following steps:

1. From Home, navigate to **Azure Services > Virtual machine scale sets** and click **Create**.

The **Create a virtual machine** window is displayed.

2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Scale set details

- Virtual machine scale set name - Server machine
- Region

Orchestration

- Orchestration mode

Instance details

- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Figure 134 : Create a virtual machine scale set window - Basics tab

All services > Virtual machine scale sets >

Create a virtual machine scale set

Basics Disks Networking Scaling Management Health Advanced Tags Review + create

Azure virtual machine scale sets let you create and manage a group of load balanced VMs. The number of VM instances can automatically increase or decrease in response to demand or a defined schedule. Scale sets provide high availability to your applications, and allow you to centrally manage, configure, and update a large number of VMs.
[Learn more about virtual machine scale sets](#)

Project details

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

Subscription *

Resource group * [Create new](#)

Scale set details

Virtual machine scale set name *

Region *

Availability zone

Orchestration

A scale set has a "scale set model" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set model.
[Learn more about the scale set model](#)

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

Security type

Instance details

Image * [See all images](#) | [Configure VM generation](#)

VM architecture ☐ Arm64 ☒ x64

Run with Azure Spot discount ☐

Size * [See all sizes](#)

Administrator account

Authentication type ☐ Password ☒ SSH public key

Username *

SSH public key source

Key pair name *

[Review + create](#) < Previous Next : Disks >

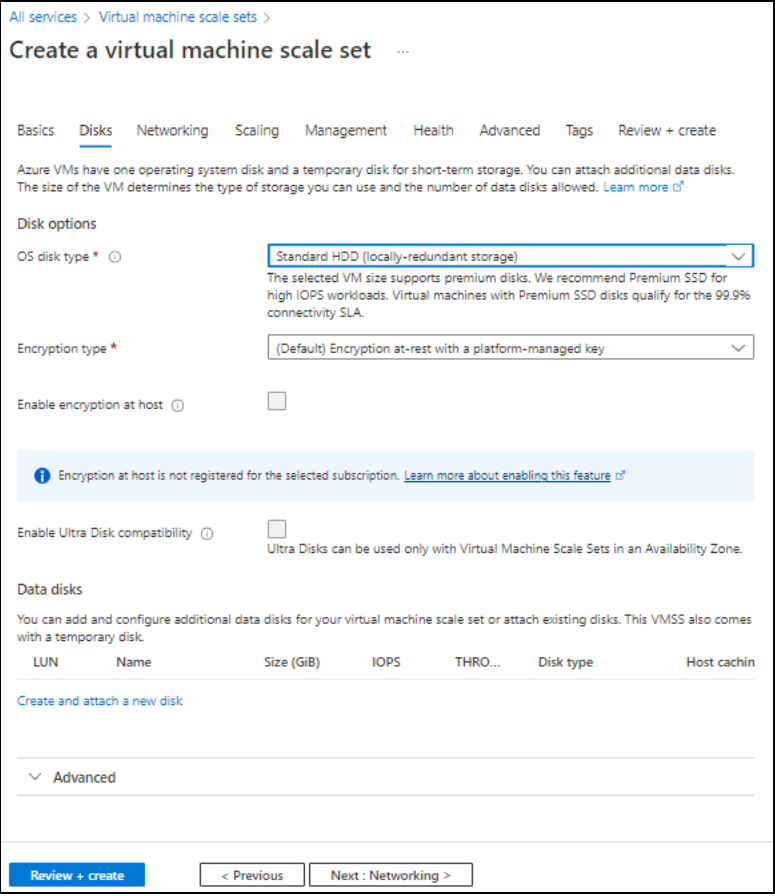
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

4. Select or enter the following mandatory information in the **Disks** tab:

Disk options

- OS disk type
- Encryption type

Figure 135 : Create a virtual machine scale set window - Disks tab



All services > Virtual machine scale sets >

Create a virtual machine scale set ...

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

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type *  Standard HDD (locally-redundant storage) 

The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Encryption type * (Default) Encryption at-rest with a platform-managed key 

Enable encryption at host  ☐

 Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

Enable Ultra Disk compatibility  ☐

Ultra Disks can be used only with Virtual Machine Scale Sets in an Availability Zone.

Data disks

You can add and configure additional data disks for your virtual machine scale set or attach existing disks. This VMSS also comes with a temporary disk.

LUN	Name	Size (GiB)	IOPS	THRO...	Disk type	Host cachin
Create and attach a new disk						

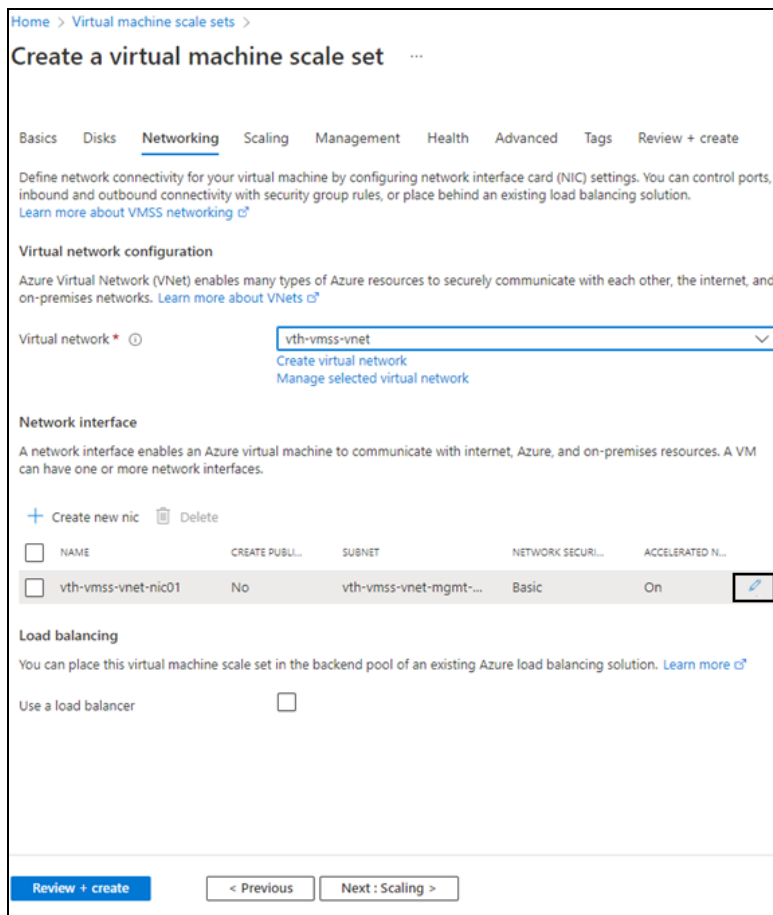
 Advanced

[Review + create](#) [< Previous](#) [Next : Networking >](#)

5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

6. Select the Virtual network in the **Networking** tab.

Figure 136 : Create a virtual machine scale set window - Networking tab



Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics 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](#)
[Manage selected 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 new nic  Delete

☐	NAME	CREATE PUBL...	SUBNET	NETWORK SECU...	ACCELERATED N...	
☐	vth-vmss-vnet-nic01	No	vth-vmss-vnet-mgmt-...	Basic	On	

Load balancing

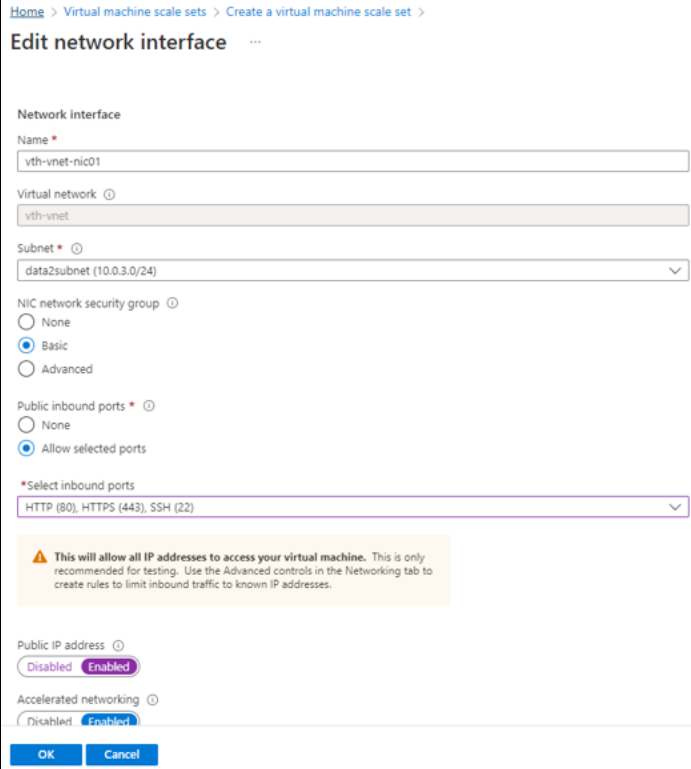
You can place this virtual machine scale set in the backend pool of an existing Azure load balancing solution. [Learn more](#)

Use a load balancer ☐

[Review + create](#) [< Previous](#) [Next : Scaling >](#)

7. If Data subnet 2 value is not assigned to management NIC 1, click the edit button corresponding to it.
The **Edit Network Interface** window appears.
8. Select Data subnet 2 value in the **Subnet** field and then click **OK**. Here, the Subnet 2 value is 10.0.3.0/24.

Figure 137 : Edit network interface window



Home > Virtual machine scale sets > Create a virtual machine scale set >

Edit network interface

Network interface

Name *
vth-vnet-nic01

Virtual network ⓘ
vth-vnet

Subnet * ⓘ
data2subnet (10.0.3.0/24)

NIC network security group ⓘ
☐ None
☒ Basic
☐ Advanced

Public inbound ports * ⓘ
☐ None
☒ Allow selected ports

*Select inbound ports
HTTP (80), HTTPS (443), SSH (22)

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

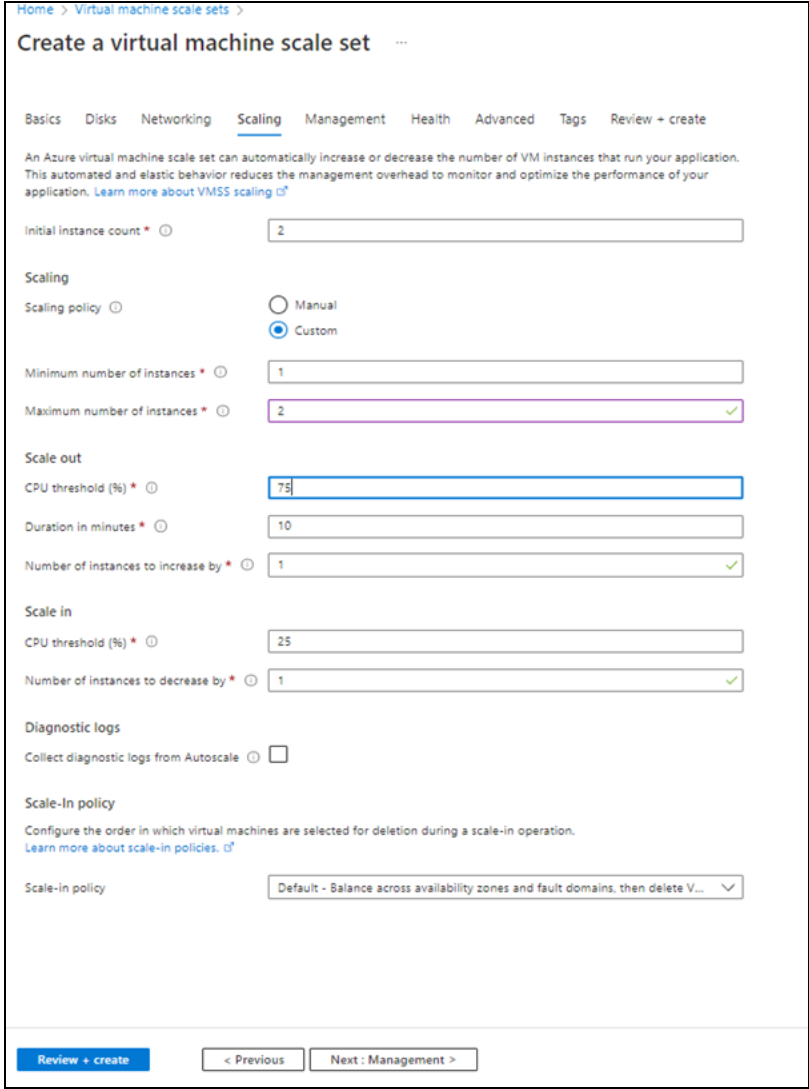
Public IP address ⓘ

Accelerated networking ⓘ

9. Leave the remaining fields as is in the **Networking** tab and click **Next : Scaling** at the bottom of the window

10. Select or enter the information in the **Scaling** tab as shown below.

Figure 138 : Create a virtual machine scale set window - Scaling tab



Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics 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 * ⓘ

Scaling

Scaling policy ⓘ ☐ Manual ☒ Custom

Minimum number of instances * ⓘ

Maximum number of instances * ⓘ ✓

Scale out

CPU threshold (%) * ⓘ

Duration in minutes ⓘ

Number of instances to increase by * ⓘ ✓

Scale in

CPU threshold (%) * ⓘ

Number of instances to decrease by * ⓘ ✓

Diagnostic logs

Collect diagnostic logs from Autoscale ⓘ ☐

Scale-In policy

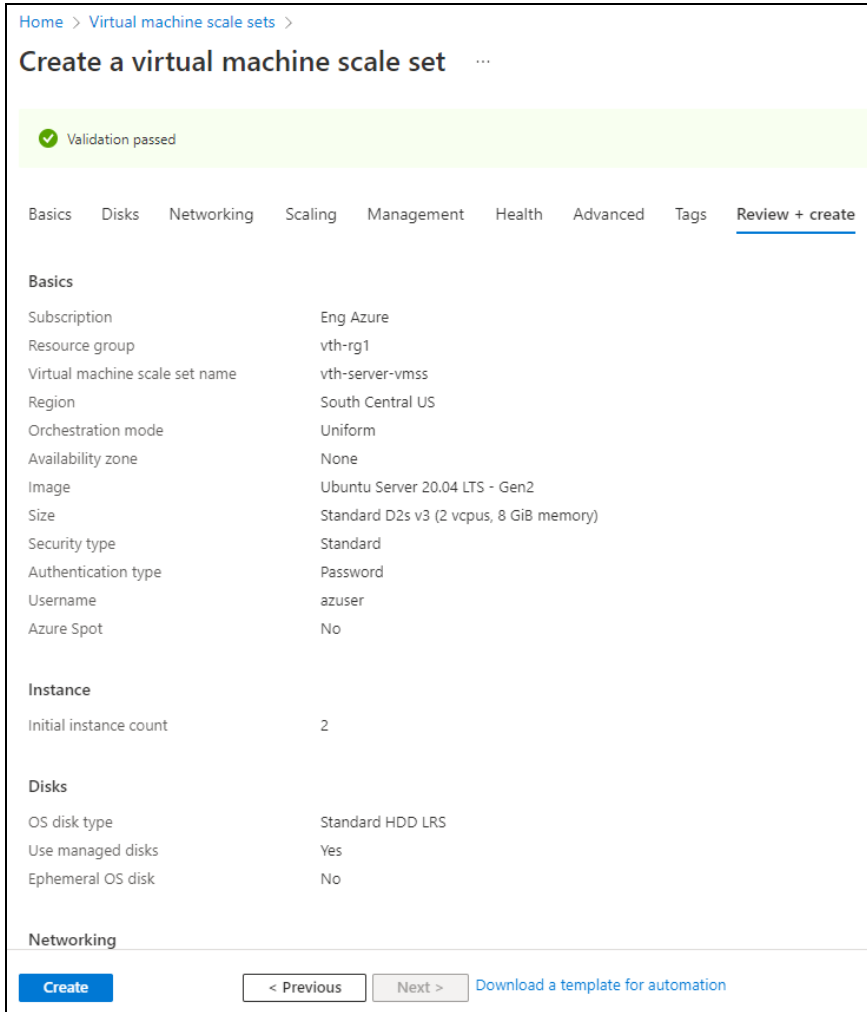
Configure the order in which virtual machines are selected for deletion during a scale-in operation. [Learn more about scale-in policies](#)

Scale-in policy ▼

[Review + create](#) < Previous Next : Management >

11. Click **Review + create** at the bottom of the window to skip the other tabs.

Figure 139 : Create a virtual machine scale set window - Review + create tab



Home > Virtual machine scale sets >

Create a virtual machine scale set

✓ Validation passed

Basics Disks Networking Scaling Management Health Advanced Tags Review + create

Basics

Subscription	Eng Azure
Resource group	vth-rg1
Virtual machine scale set name	vth-server-vmss
Region	South Central US
Orchestration mode	Uniform
Availability zone	None
Image	Ubuntu Server 20.04 LTS - Gen2
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Security type	Standard
Authentication type	Password
Username	azuser
Azure Spot	No

Instance

Initial instance count	2
------------------------	---

Disks

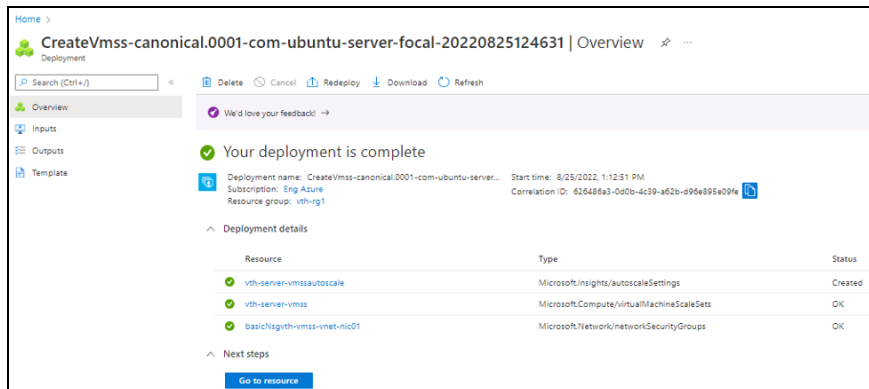
OS disk type	Standard HDD LRS
Use managed disks	Yes
Ephemeral OS disk	No

Networking

[Create](#) [< Previous](#) [Next >](#) [Download a template for automation](#)

12. Click **Create** at the bottom of the window.
When the VMSS is created, a message "Your deployment is complete" is displayed in the Create VMSS window.

Figure 140 : Create VMSS window



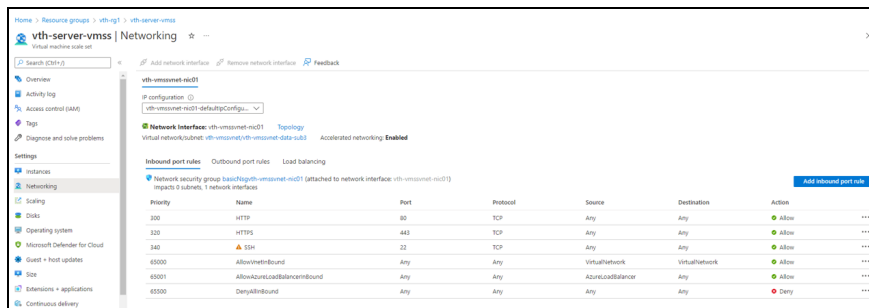
NOTE: It may take the system several minutes to display your resources.

Verify the Server VMSS Creation

To verify the creation of server VMSS, perform the following steps:

1. In the Create VMSS > **Deployment details** section, click the server VMSS resource. Here, the VMSS resource is **vth-server-vmss**. The VMSS resource details window is displayed.
2. Select **Networking** from the left panel. VMSS has only one interface. The ports 80 and 443 are available in the **Inbound port rules** tab.

Figure 141 : VMSS > Inbound port rules



3. SSH the Server virtual machine and run the following command to install Apache:
- ```
sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

## Configure Automation Account

The following topics are covered:

- [Configure Azure Access Key](#)
- [Create Automation Account](#)
- [Create Automation Account Webhook](#)

## Create Automation Account

---

The following topics are covered:

- [Initial Setup](#)
- [Create an Automation Account](#)
- [Verify the Automation Account Creation](#)

### Initial Setup

Before creating an automation account, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_NVM\_VMSS\_RUNBOOK\_VARIABLES.json with a text editor.
2. Configure the Azure autoscale resources.

If the automation account does not exist, then a new automation account gets created inside resource group. If automation account already exists, then template gets auto-updated.

If the automation account variable does not exist, then a new automation

account variable gets created inside the automation account. If an automation account variable already exists, an error is displayed "The variable already exists".

Provide the application/client ID and tenant ID saved in the [Collect Azure Access Key](#) step or you can get these values from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application\_name>**.

```
"azureAutoScaleResources": {
 "resourceGroupName": "vth-rg1",
 "automationAccountName": "vth-amt-acc",
 "vThunderScaleSetName": "vth-vmss",
 "serverScaleSetName": "vth-server-vmss",
 "storageAccountName": "vthunderstorage",
 "appId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
 "tenantId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
 "masterWebhookUrl": "<master-runbook-webhook-url>",
 "location": "South Central US"
},
```

---

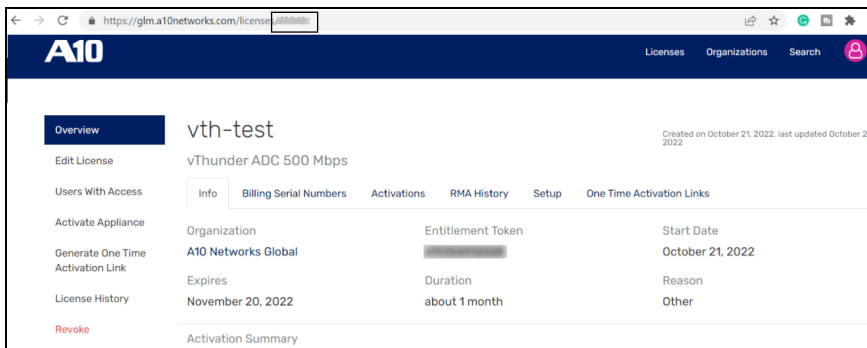
**NOTE:** Do not change the **Master Webhook url**. It gets updated automatically.

---

### 3. Configure the GLM parameters.

```
"glmParam": {
 "userName": "youremail@a10networks.com",
 "userPassword": "your_password",
 "entitlementToken": "A10xxa2fxxxx",
 "licenseId": "59xxx"
},
```

You can get the license ID from [GLM Portal](#). Select your license and go to the URL. The license ID is at the end of the URL. For example, [glm.a10networks.com/license/12345](http://glm.a10networks.com/license/12345)



#### 4. Configure SSL parameters.

```
"sslParam": {
 "requestTimeout": 40,
 "path": "server.pem",
 "file": "server",
 "certificationType": "pem",
 "containerName": "ssl",

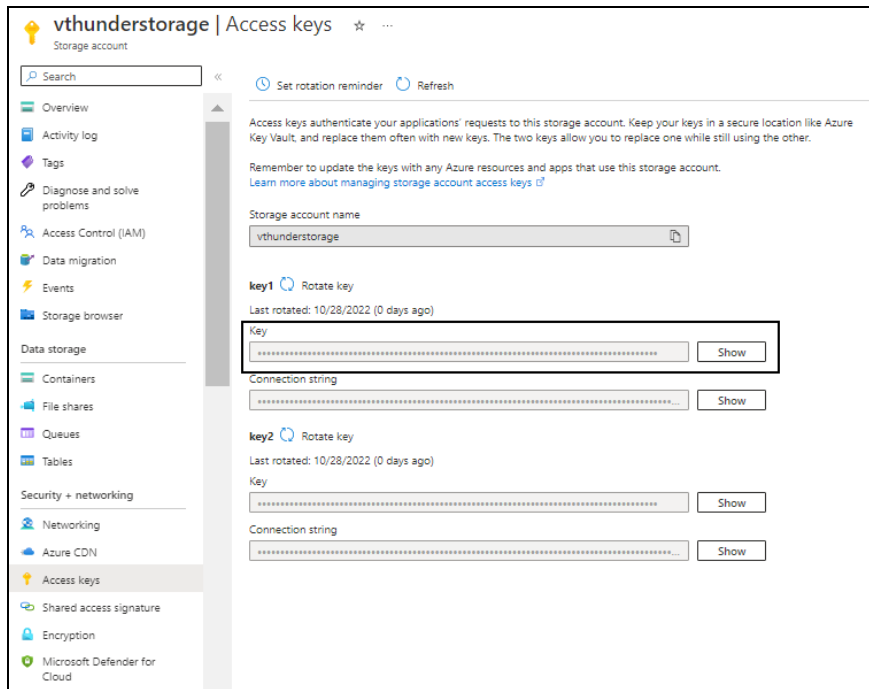
 "storageAccountKey": "LX6z8xxxxxxehXx0xxxv7xxxx/xxxOfzxxxxxROxxx5gXzxxx
xfhxcx0gxxxxx9rxxASxxxxsx=="
},
```

**NOTE:** The **server.pem** file should be placed in the same downloaded folder from which you are executing the scripts. For example, the **server.pem** should be placed in 'C:\Users\TestUser\Templates\' folder.

You can get the storage account key from **Azure Portal > Azure Services > Storage accounts > <storage\_account\_name> > Access Keys > Key1 > Key**.



Figure 142 : Selected storage account - Access keys window



## 5. Configure SLB parameters.

```
"slbParam":{
 "slb_port":{
 "value":[
 {
 "port-number": 53,
 "protocol": "udp",
 "health-check-disable":1
 },
 {
 "port-number": 80,
 "protocol": "tcp",
 "health-check-disable":1
 },
 {
 "port-number": 443,
 "protocol": "tcp",
 "health-check-disable":1
 }
]
 }
}
```

```
 }
]
},
"vip_port":{
 "value": [
 {
 "port-number":53,
 "protocol":"udp",
 "ha-conn-mirror":1,
 "auto":1,
 "service-group":"sg53"
 },
 {
 "port-number":80,
 "protocol":"http",
 "auto":1,
 "service-group":"sg80"
 },
 {
 "port-number":443,
 "protocol":"https",
 "auto":1,
 "service-group":"sg443"
 }
]
},
"rib_list": [
 {
 "ip-dest-addr":"0.0.0.0",
 "ip-mask":"/0",
 "ip-nexthop-ipv4": [
 {
 "ip-next-hop":"10.0.2.1"
 }
]
 }
]
```

```
},
```

## 6. Configure AutoScale parameters.

```
"autoScaleParam": {
 "maxScaleOutLimit": 10,
 "minScaleInLimit": 1,
 "scaleInThreshold": 25,
 "scaleOutThreshold": 80
},
```

**NOTE:** These parameters are applied only for the function-based autoscaling. Skip these parameters for Agent-based autoscaling.

## 7. Provide the client secret ID from **Azure Portal > Azure Services > Azure Active Directory > App Registration > Owned applications > <application\_name> > Certificates & secrets.**

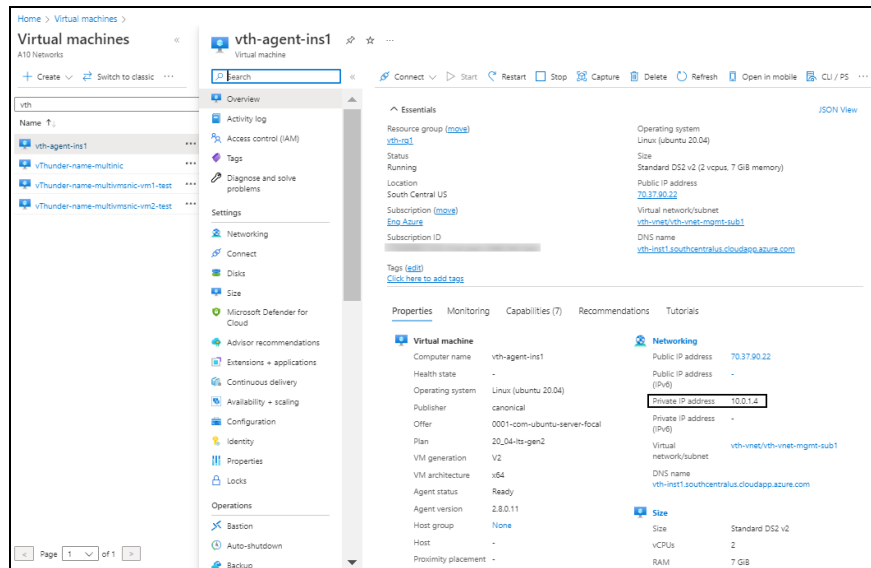
```
"clientSecret": "9-xxx~jIxxxEVyxxxxHNxxxOwv_xxxxZLxxxTM",
```

## 8. Configure private IP of agent VM.

```
"agentPrivateIP": "10.0.1.4"
```

You get this value from **Azure Portal > Azure Services > Virtual machine > <virtual\_machine> > Overview > Properties > Private IP address.**

Figure 143 : Selected virtual machine - Overview window



## 9. Verify the vThunder instance username.

```
"vThUsername": "admin"
```

**NOTE:** Do not change the vThunder instance username.

## 10. Retain the vThunder new password application flag initially as 'False'.

```
"vThNewPassApplyFlag": "False"
```

## 11. Verify if all the configurations in the ARM\_TMPL\_3NIC\_NVM\_VMSS\_RUNBOOK\_VARIABLES.json file are correct and then save the changes.

## Create an Automation Account

To create an automation account, perform the following steps:

### 1. Run the following command:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_AUTOMATION_ACCOUNT_2.ps1
```

### 2. Provide the default and new password when prompted:

```
Enter Default Password:***
Enter New Password:***
Confirm New Password:***
```

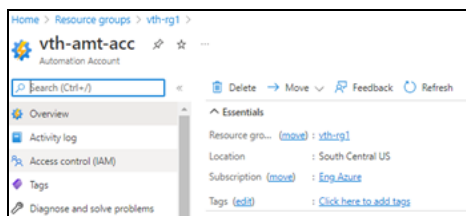
The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

## Verify the Automation Account Creation

To verify the creation of an automation account, perform the following steps:

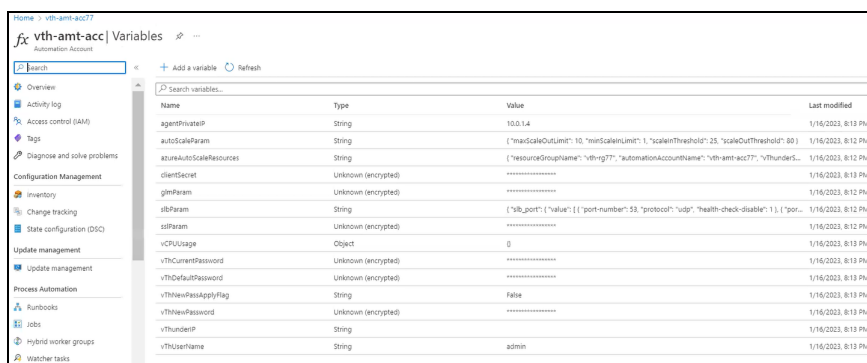
1. From the **Home**, navigate to **Azure Services > Resource Group > <resource\_group\_name>**.  
The selected resource group - Overview window is displayed.
2. Under **Resources** tab, group the resources based on the resource type.
3. Verify if the recently created automation account is listed under **Automation Accounts** type.
4. Select the required automation account.  
The selected automation account - Overview window is displayed.

Figure 144 : Selected automation account - Overview window



5. Click **Variables** from the left **Shared Resources** panel.  
The selected automation account - Variables window is displayed

Figure 145 : Selected automation account - Variables window



The screenshot shows the 'Variables' window for the 'vth-amt-acc' automation account. The left sidebar contains navigation links: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Configuration Management, Inventory, Change tracking, State configuration (DSC), Update management, Update management, Process Automation, Funbooks, Jobs, Hybrid worker groups, and Watcher tasks. The main pane displays a table of variables.

| Name                    | Type                | Value                                                                                                | Last modified      |
|-------------------------|---------------------|------------------------------------------------------------------------------------------------------|--------------------|
| agentvratel             | String              | 10.0.1.4                                                                                             | 1/16/2023, 8:13 PM |
| autoScaleParam          | String              | ({"maxScaleOutLimit": 10, "minScaleInLimit": 1, "scaleThreshold": 25, "scaleOutThreshold": 80})      | 1/16/2023, 8:12 PM |
| azureAutoScaleResources | String              | ("resourceGroupName": "vth-rg1", "automationAccountName": "vth-amt-acc", "vthThunder...              | 1/16/2023, 8:12 PM |
| clientSecret            | Unknown (encrypted) | *****                                                                                                | 1/16/2023, 8:12 PM |
| glbParam                | Unknown (encrypted) | *****                                                                                                | 1/16/2023, 8:12 PM |
| slbParam                | String              | ({"slb_port": {"value": [{"port-number": 55, "protocol": "udp", "health-check-disable": 1}], "pos... | 1/16/2023, 8:12 PM |
| stParam                 | Unknown (encrypted) | *****                                                                                                | 1/16/2023, 8:12 PM |
| vCPUUsage               | Object              | 0                                                                                                    | 1/16/2023, 8:13 PM |
| vthCurrentPassword      | Unknown (encrypted) | *****                                                                                                | 1/16/2023, 8:13 PM |
| vthDefaultPassword      | Unknown (encrypted) | *****                                                                                                | 1/16/2023, 8:13 PM |
| vthNewPassApplyFlag     | String              | false                                                                                                | 1/16/2023, 8:13 PM |
| vthNewPassword          | Unknown (encrypted) | *****                                                                                                | 1/16/2023, 8:13 PM |
| vthThunderIP            | String              | *****                                                                                                | 1/16/2023, 8:13 PM |
| vthUsername             | String              | admin                                                                                                | 1/16/2023, 8:13 PM |

6. Verify if all the variables associated with the automation account are listed.

## Create Automation Account Webhook

The following topics are covered:

- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the AutoScale Resource Variable creation](#)
- [Verify the SSL File availability](#)
- [Verify the Runbook Jobs creation](#)

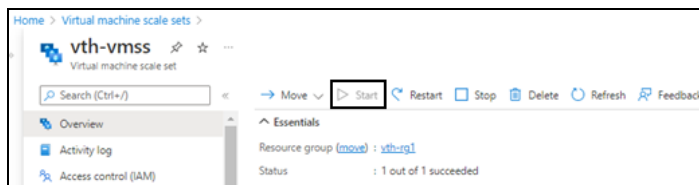
### Initial Setup

To verify that the virtual machine scale set resources are running, perform the following steps:

1. From **Home**, navigate to **Azure Services > Resource Group > <resource\_group\_name>**.

The selected resource group - Overview window is displayed.

Figure 146 : VMSS window



2. Under **Resources** tab, group the resources based on the resource type.
3. Select the virtual machine scale set instance under **Virtual machine scale set** type and verify that the instance is in **Start** mode.

### Create a Webhook

To create a webhook, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create the webhook:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_WEBHOOK_3.ps1
```

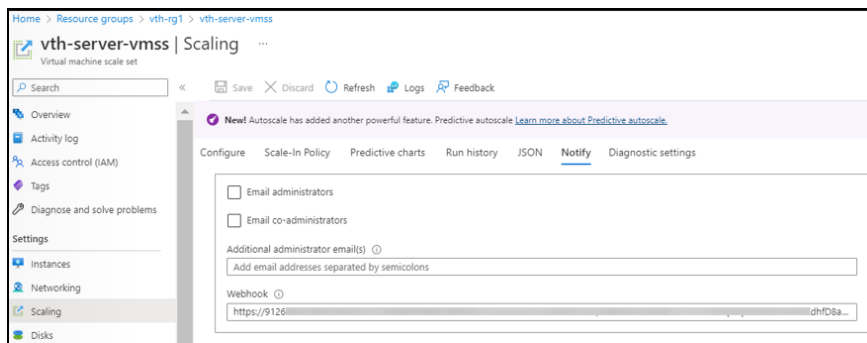
- After the webhook installation is complete, the webhook url is displayed.

Save this URL :

```
https://fa72c8e5-xxxx-xxxx-9dc5-b4a71eec0a95.webhook.scus.azure-automation.net/webhooks?token=Q*****pG4UEOScfqdEGEAkqJPgdK%2bOpusoUAWk*****%3d
```

- Save this webhook url for future purpose.
- From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss\_name>**.  
The selected VMSS - Overview window is displayed. Here, the VMSS name is **vth-server-vmss**.
- Click **Scaling** from the left **Settings** panel.  
The selected VMSS - Scaling window is displayed.

Figure 147 : VMSS-Scaling - Notify tab



- Select **Notify** tab.
- Copy the saved webhook url and paste it in the **Webhook** field.
- Click **Save** to save the changes.

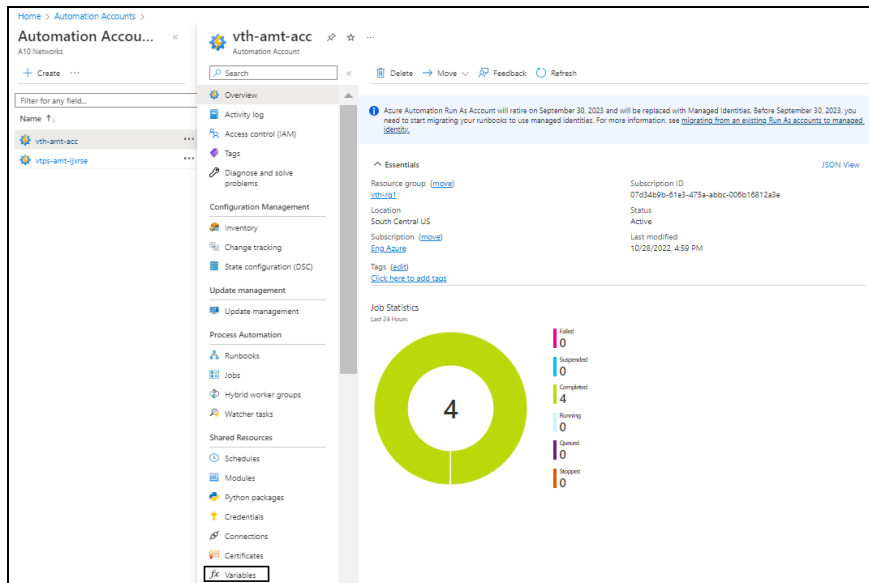
## Verify the AutoScale Resource Variable creation

To verify the creation of an autoscale resource variable, perform the following steps:

- From **Home**, navigate to **Azure Services > Automation Accounts > <automation\_account\_name>**.

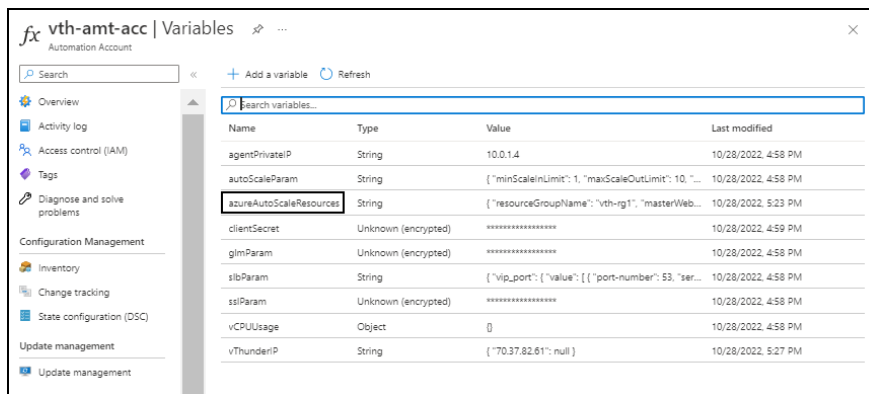
The selected automation account - Overview window is displayed.

Figure 148 : Selected automation account - Overview window



- Click **Variables** from the left **Shared Resources** panel.  
The selected automation account - Variables window is displayed.

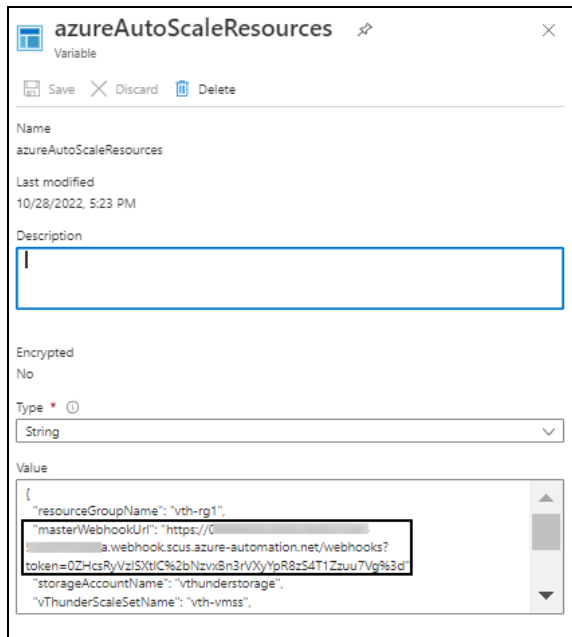
Figure 149 : Selected automation account - Variables window



- Select the **azureAutoScaleResources** variable.  
The azureAutoScaleResources variable window is displayed.



Figure 150 : AzureAutoScaleResources variable window



**azureAutoScaleResources** Variable

Save Discard Delete

Name  
azureAutoScaleResources

Last modified  
10/28/2022, 5:23 PM

Description

Encrypted  
No

Type \* ⓘ  
String

Value  

```
{
 "resourceGroupName": "vth-rg1",
 "masterWebhookUrl": "https://a.webhook.scus.azure-automation.net/webhooks?token=0ZHcsRyVzISXtIC%2bNzvi8n3rVYpR8zS4T1Zzuu7Vg%3d",
 "storageAccountName": "vthunderstorage",
 "vThunderScaleSetName": "vth-vmss"
}
```

4. Verify the master webhook URL in the **Value** field.

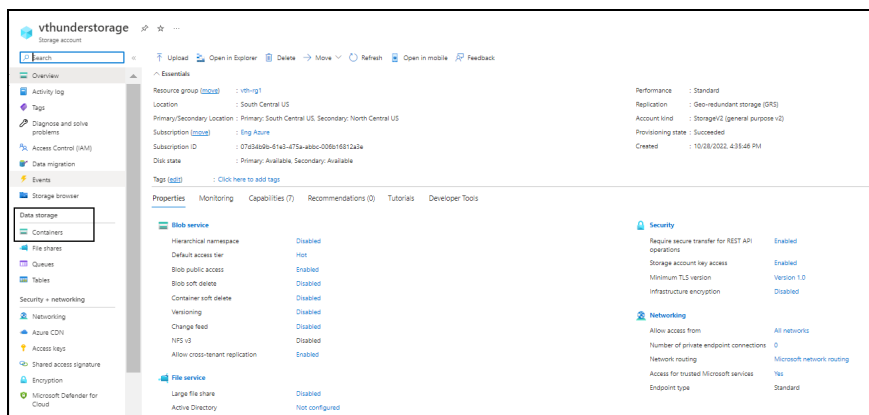
## Verify the SSL File availability

To verify the availability of SSL file, perform the following steps:

1. From **Home**, navigate to **Azure Services > Storage Accounts > <storage\_account\_name>**.

The selected storage account - Overview window is displayed.

Figure 151 : Selected storage account - Overview window



**vthunderstorage** Storage account

Overview

Activity log Tags Diagnose and solve problems Access Control (IAM) Data migration Events Storage browser Data storage Containers File shares Quotas Snapshots Security > networking Networking Azure CDN Access keys Shared access signature Encryption Microsoft Defender for Cloud

Essentials

Resource group [vth-rg1](#)

Location [South Central US](#)

Primary/Secondary Location [Primary: South Central US, Secondary: North Central US](#)

Subscription [Eng Azure](#)

Subscription ID [07d8b0b6-61a3-475a-ab0c-0061d812a2a](#)

Disk state [Primary Available, Secondary Available](#)

Tags [Add](#) [Click here to add tags](#)

Properties Monitoring Capabilities (7) Recommendations (0) Tutorials Developer Tools

**Blob service**

|                                |          |
|--------------------------------|----------|
| Hierarchical namespace         | Disabled |
| Default access tier            | Hot      |
| Blob public access             | Enabled  |
| Blob soft delete               | Disabled |
| Container soft delete          | Disabled |
| Versioning                     | Disabled |
| Change feed                    | Disabled |
| NFS v3                         | Disabled |
| Allow cross-tenant replication | Enabled  |

**File service**

|                  |                |
|------------------|----------------|
| Large file share | Disabled       |
| Active Directory | Not configured |

**Security**

|                                                 |             |
|-------------------------------------------------|-------------|
| Require secure transfer for REST API operations | Enabled     |
| Storage account key access                      | Enabled     |
| Minimum TLS version                             | Version 1.0 |
| Infrastructure encryption                       | Disabled    |

**Networking**

|                                        |                           |
|----------------------------------------|---------------------------|
| Allow access from                      | All networks              |
| Number of private endpoint connections | 0                         |
| Network routing                        | Microsoft network routing |
| Access for trusted Microsoft services  | Yes                       |
| Endpoint type                          | Standard                  |

Performance : Standard

Replication : Geo-redundant storage (GRS)

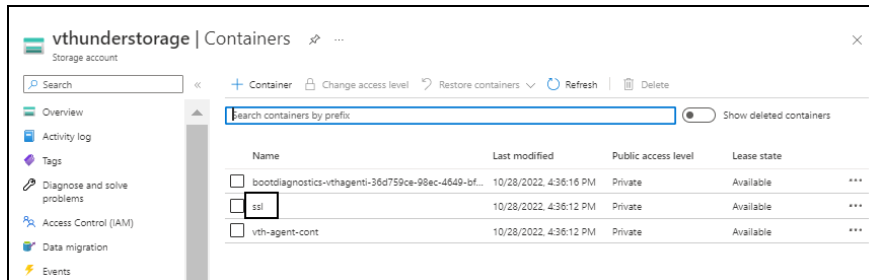
Account kind : StorageV2 (general purpose v2)

Provisioning state : Succeeded

Created : 10/28/2022, 4:35:48 PM

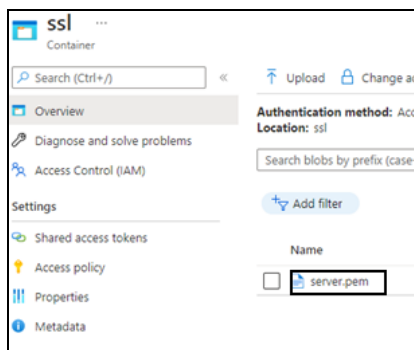
2. Click **Containers** from the left **Data Storage** panel.  
The selected storage account - Containers window is displayed.

Figure 152 : Selected storage account - Containers window



3. Select the SSL container.  
The SSL container window is displayed.

Figure 153 : SSL Container window



4. Verify if the SSL config file is listed. Here, the SSL config file is **server.pem**.

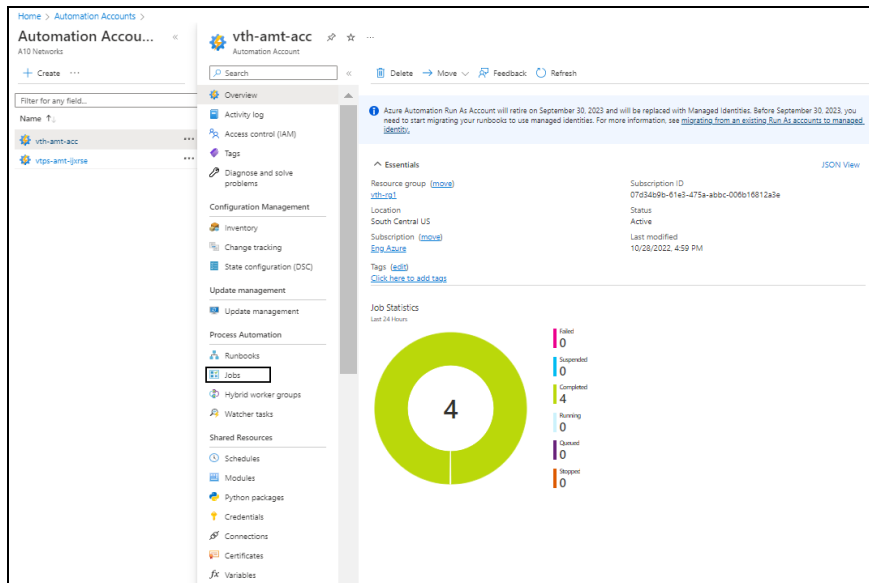
## Verify the Runbook Jobs creation

To verify the creation of runbook jobs, perform the following steps:

1. From **Home**, navigate to **Azure Services > Automation Accounts > <automation\_account\_name>**.

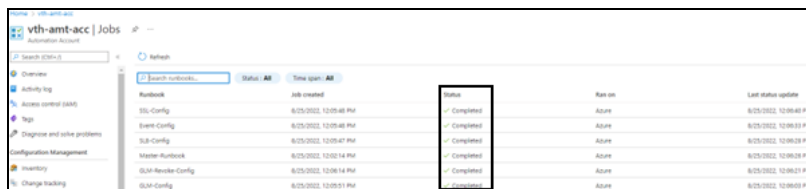
The selected automation account - Overview window is displayed.

Figure 154 : Selected automation account - Overview window



2. Click **Jobs** from the left **Process Automation** panel.  
The selected automation account - Jobs window is displayed.

Figure 155 : Selected automation account - Jobs window



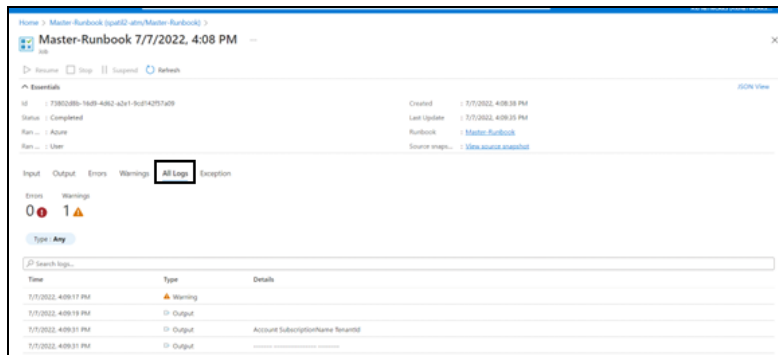
3. Verify if all the runbook jobs have completed status.  
The master runbook automatically triggers all the jobs one-by-one.

**NOTE:** It may take the system a few minutes to display the completed status.

If any job has failed or if it is not working, refer [Common Errors](#).

4. Select each runbook job > **All Logs** tab to verify the logs.  
The selected automation account - selected job - Jobs window is displayed.

Figure 156 : Selected runbook job window



## Enable Autoscaling

An Azure virtual machine scale set can automatically increase or decrease the number of vThunder VM instances to meet the changing demand.

To enable autoscaling, use any of the following two options:

### 1. AutoScaling and Log Monitoring using Agent Setup

Using this option:

- Custom metrics of vThunder can be collected and published into Azure application insight service and same metrics can be used along with vmss rule for autoscaling.
- CPU utilization alerts can be scheduled using vmss alert rule.
- CPU utilization of vThunder can be viewed in Azure application insight console.
- vThunder logs can be viewed in Azure log analytics workspace.

---

**NOTE:** ACOS supports and recommends **AutoScaling and Log Monitoring using Agent Setup** option.

---

### 2. AutoScaling using Azure Function Setup

Using this option:

- CPU utilization metrics can be collected by the Custom Azure functions. The function periodically maintains vThunder CPU Utilization.

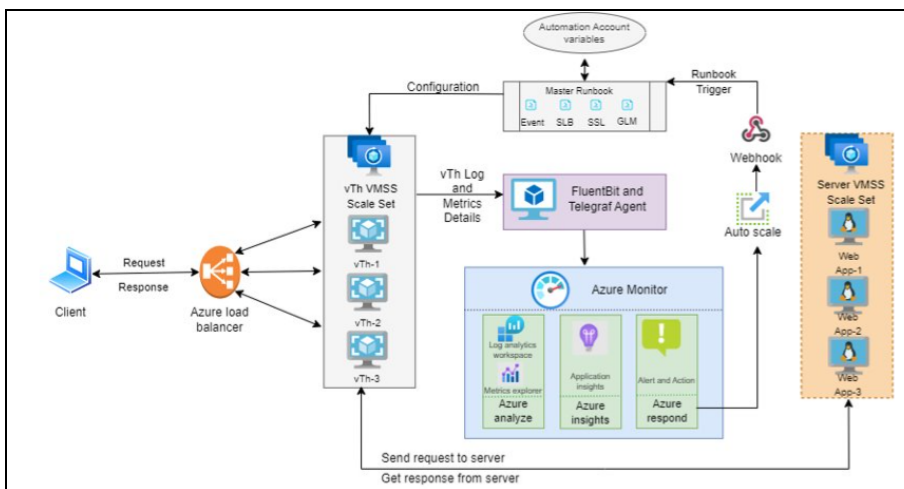
- AutoScaling can be done as per the automation account threshold configuration with variable name **ThresholdForScaleOut** and **ThresholdForScaleIn** for Scale Out and Scale In respectively.
- vThunder logs cannot be viewed in Azure log analytics workspace. For more information, see [Azure Log Function](#).
- CPU utilization of vThunder cannot be viewed in Azure application insight console.

## Autoscaling Options

### Configure Autoscaling and Log Monitoring using Agent Setup

[Figure 157](#) shows the process flow when different Azure resources and system components are connected to each other in the 3NIC-NVM-VMSS Autoscaling and Log Monitoring using Agent Setup.

Figure 157 : 3NIC-NVM-VMSS Autoscaling and Log Monitoring using Agent Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Fluentbit and Telegraf Agent](#)
- [Verify Log Agent file upload](#)
- [Access vThunder Agent using CLI](#)

- [Create Autoscale Rule](#)
- [Create Autoscale Alert](#)
- [Verify Logs in Log Analytics Workspace](#)
- [Verify Metrics in Application Insights](#)

## Initial Setup

To configure autoscaling and log monitoring using the ARM template, perform the following steps:

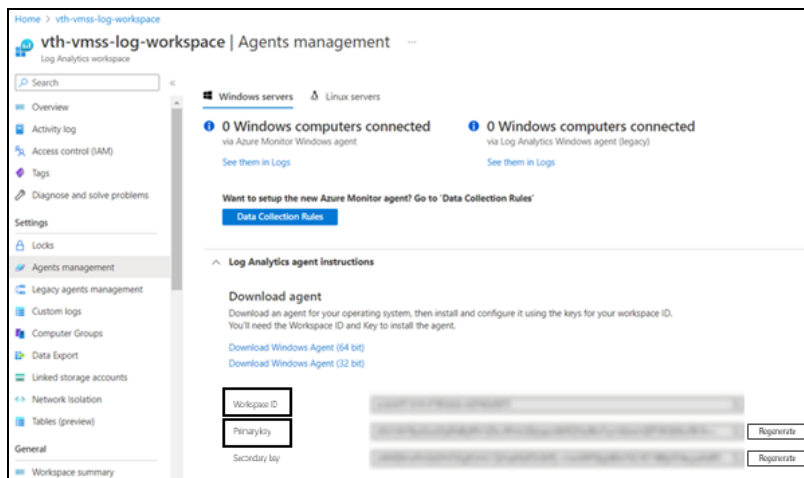
1. Navigate to the folder where you have downloaded the ARM template and open ARM\_TMPL\_3NIC\_NVM\_VMSS\_LOG\_AGENT\_SHELL\_SCRIPT.sh with a text editor.
2. Update the customer ID with the workspace ID and shared key with primary key.

```
azure log workspace id
customer_id="d1c8985b-xxxx-xxxx-xxxx-12868ad9d740"

azure log Primary Key
shared_key="tewPsyMYkdGOThrjEyl*****F8CzJ49ZRgw=="
```

You can get these values from **Home > Azure Services > Log Analytics workspaces > <log\_analytics\_workspace> Settings > Agents management**.

Figure 158 : Agents management window



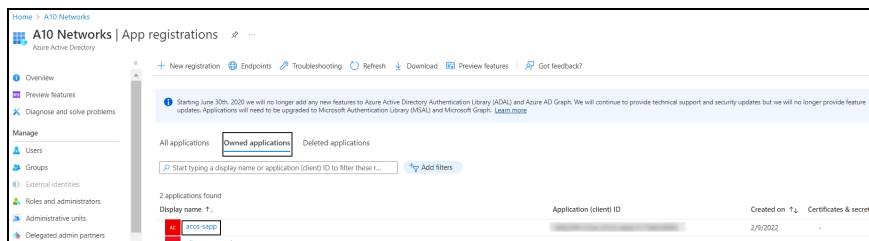
3. Update client ID, tenant ID, and client secret.

```
(cat /etc/environment; echo "AZURE_CLIENT_ID=10724xxx-xxxx-xxxx-xxxx-xxxxxc14726d"; echo "AZURE_TENANT_ID=91d27xxx-xxxx-xxxx-xxxx-
```

```
xxxbf81fcb2f"; echo "AZURE_CLIENT_SECRET=9-xxx~jxxOREVYxxxxxHNxxxOwv_
xxxxxZLIYxxx"
```

You can get these values from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application\_name>**.

Figure 159 : Azure active directory - App registrations window

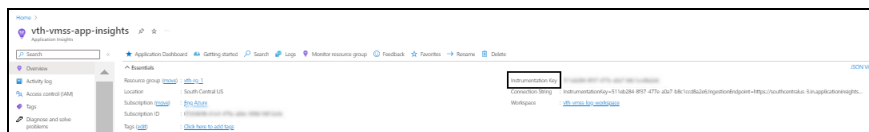


#### 4. Update app insights key with instrumentation key.

```
app_insights_Key="37b1aea5-xxxx-xxxx-xxxx-f2c012bccd93"
```

You can get this value from **Home > Azure Services > Application Insights > <application\_insight> > Overview**.

Figure 160 : Selected application insight - Overview window

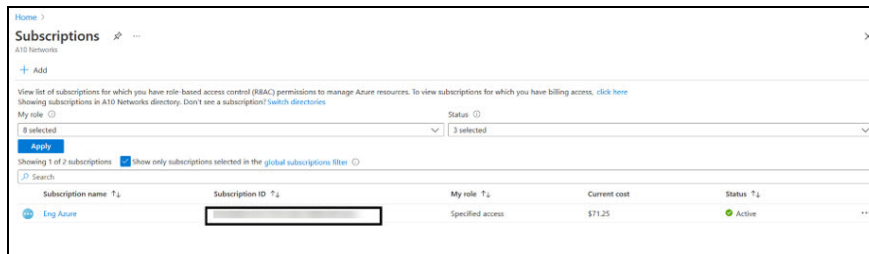


#### 5. Navigate to the folder where you have downloaded the ARM template > plugins > telegraf > plugins > inputs > customplugin and open **get\_cpu\_param.json** file with a text editor to configure the CPU parameters.

```
{
 "Subscription_Id": "07d3xxxx-xxxx-xxxx-xxxx-xxxxx6812a3e",
 "ResourceGroupName": "vth-rg1",
 "VmssName": "vth-vmss"
}
```

You can get the Subscription ID value from **Home > Azure Services > Subscriptions > <subscription\_name>**.

Figure 161 : Subscriptions window



6. Verify if all the configurations in the ARM\_TMPL\_3NIC\_NVM\_VMSS\_LOG\_AGENT\_SHELL\_SCRIPT.sh file are correct and then save the changes.

## Create Fluentbit and Telegraf Agent

To create fluentbit and telegraf agent in virtual machine, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create fluentbit and telegraf agents in VM:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_LOG_AGENT_VM_5.ps1
```

**NOTE:** It may take the system a few minutes to display the resources.

The fluentbit [2.0.3] and telegraf [1.23.4] agents are created.

## Verify Log Agent file upload

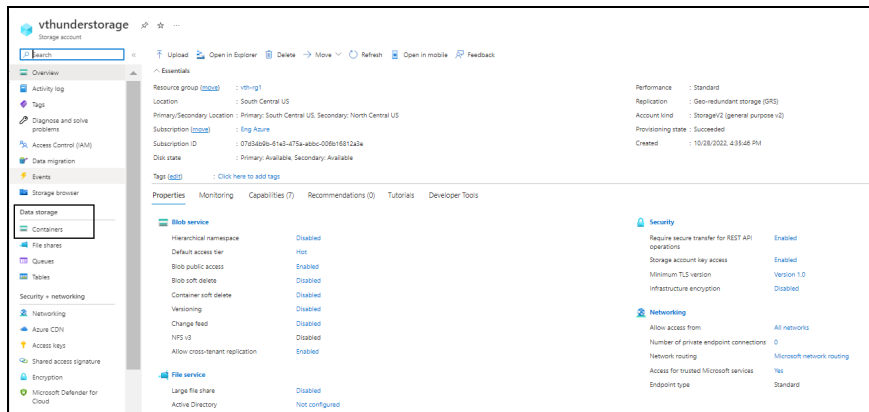
To verify if the log agent file is uploaded, perform the following steps:

1. From **Home**, navigate to **Azure Services > Storage Accounts > <storage\_account\_name>**.

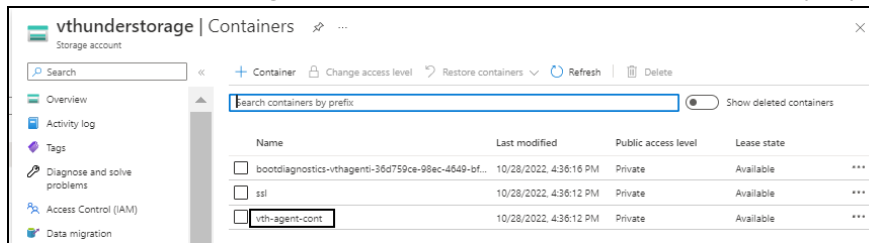
The selected storage account - Overview window is displayed.



Figure 162 : Selected storage account - Overview window

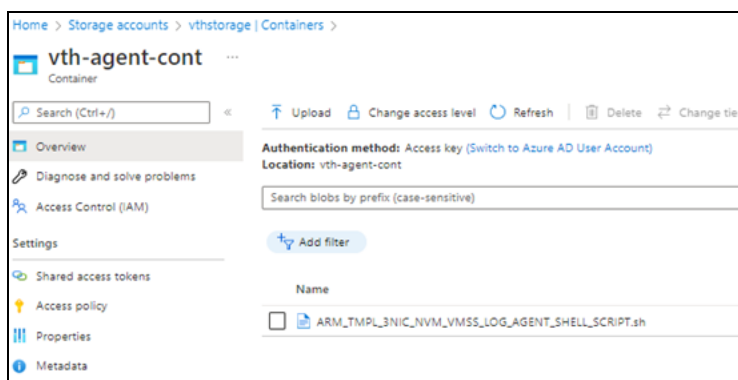


2. Click **Containers** from the left **Data Storage** panel.  
The selected storage account - Containers window is displayed.



3. Select the agent container.  
The agent container window is displayed.

Figure 163 : Agent container window



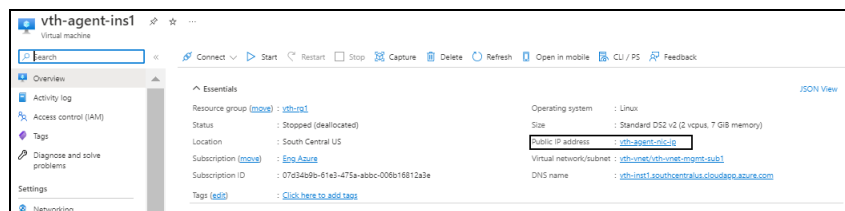
4. Verify if ARM\_TMPL\_3NIC\_NVM\_VMSS\_LOG\_AGENT\_SHELL\_SCRIPT.sh file is uploaded.

## Access vThunder Agent using CLI

To access the vThunder agent instance using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
  - Hostname: Public IP of the agent virtual machine instance
  - Connection Type: SSH

Figure 164 : Virtual machine - Agent instance window



3. Click **Open**.
4. In the active PuTTY session, enter the following:

```
login as: vth-user <---adminUsername value configured in ARM_TMPL_3NIC_
NVM_VMSS_PARAM.json-->
Using keyboard-interactive authentication.
Password: vth-Password <---adminPassword value configured in ARM_TMPL_
3NIC_NVM_VMSS_PARAM.json-->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vth-agent-inst> enable <---Execute command-->
Password:<---just press Enter key-->
vth-agent-inst#config <---Configuration mode-->
vth-agent-inst(config)#
```

5. Run the following command to check the status of the agent service.

```
vth-agent-inst(config)# systemctl status telegraf.service
```

The following output is displayed.

```
• telegraf.service - The plugin-driven server agent for reporting
metrics into InfluxDB
 Loaded: loaded (/lib/systemd/system/telegraf.service; enabled;
vendor preset: enabled)
 Active: active (running) since Thu 2022-08-25 10:24:26 UTC; 18min
ago
 Docs: https://github.com/influxdata/telegraf
 Main PID: 17855 (telegraf)
 Tasks: 9 (limit: 8321)
 Memory: 43.6M
 CGroup: /system.slice/telegraf.service
 └─17855 /usr/bin/telegraf - config /etc/telegraf/telegraf.conf
-config-directory /etc/telegraf/telegraf.d

Aug 25 10:42:16 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:16 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:26 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:26 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:36 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:36 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:46 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:46 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
```

```

address
Aug 25 10:42:56 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:56 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address

```

There is a possibility that the command might return few errors. The errors displayed in the above output can be ignored.

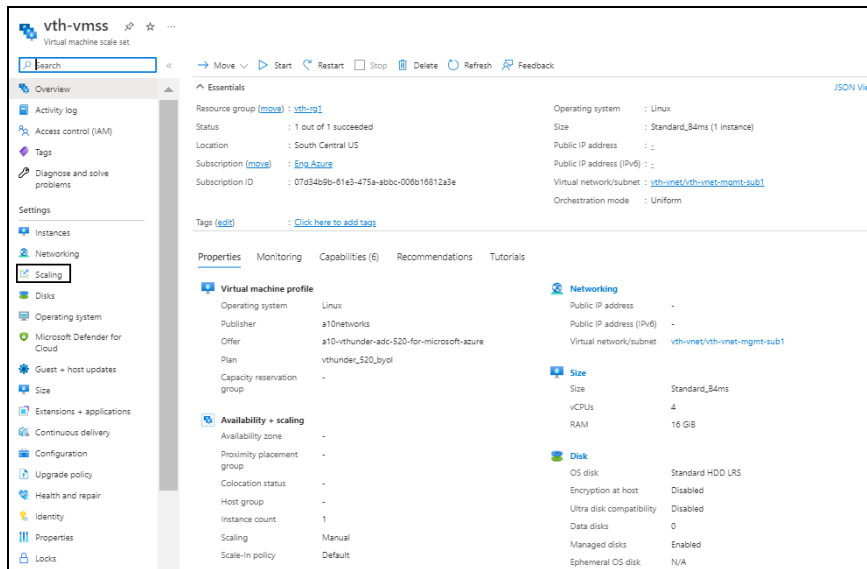
## Create Autoscale Rule

To create autoscale rule, perform the following steps:

1. From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss\_name>**.

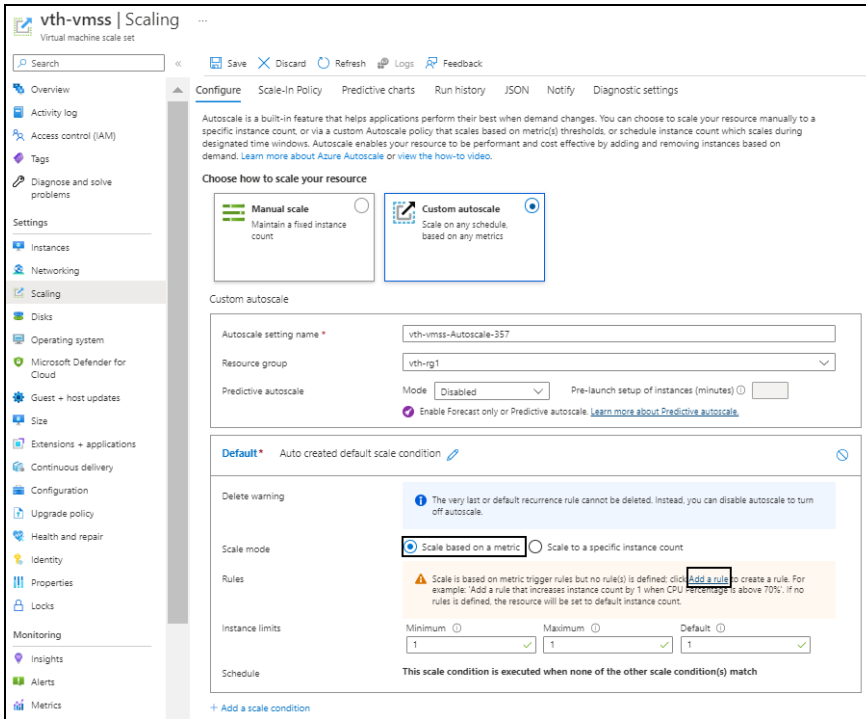
The selected vmss - Overview window is displayed.

Figure 165 : Selected VMSS - Overview window



2. Click **Scaling** from the left **Settings** panel.  
The selected vmss - Scaling window is displayed.

Figure 166 : Selected VMSS - Scaling window



**vth-vmss | Scaling**

Virtual machine scale set

Search << Save Discard Refresh Logs Feedback

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Settings

Instances Networking **Scaling** Disks Operating system Microsoft Defender for Cloud Guest + host updates Size Extensions + applications Continuous delivery Configuration Upgrade policy Health and repair Identity Properties Locks Monitoring Insights Alerts Metrics

**Configure** Scale-In Policy Predictive charts Run history JSON Notify Diagnostic settings

Autoscale is a built-in feature that helps applications perform their best when demand changes. You can choose to scale your resource manually to a specific instance count, or via a custom Autoscale policy that scales based on metric(s) thresholds, or schedule instance count which scales during designated time windows. Autoscale enables your resource to be performant and cost effective by adding and removing instances based on demand. [Learn more about Azure Autoscale](#) or [view the how-to video](#).

**Choose how to scale your resource**

**Manual scale** ☐ Maintain a fixed instance count

**Custom autoscale** ☒ Scale on any schedule, based on any metrics

**Custom autoscale**

Autoscale setting name \* vth-vmss-Autoscale-357

Resource group vth-rg1

Predictive autoscale Mode Disabled Pre-launch setup of instances (minutes)

☒ Enable Forecast only or Predictive autoscale. [Learn more about Predictive autoscale](#)

**Default** Auto created default scale condition

Delete warning **The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.**

Scale mode ☒ Scale based on a metric ☐ Scale to a specific instance count

Rules **Scale is based on metric trigger rules but no rule(s) is defined: click [add a rule](#) to create a rule. For example: Add a rule that increases instance count by 1 when CPU Percentage is above 70%. If no rules is defined, the resource will be set to default instance count.**

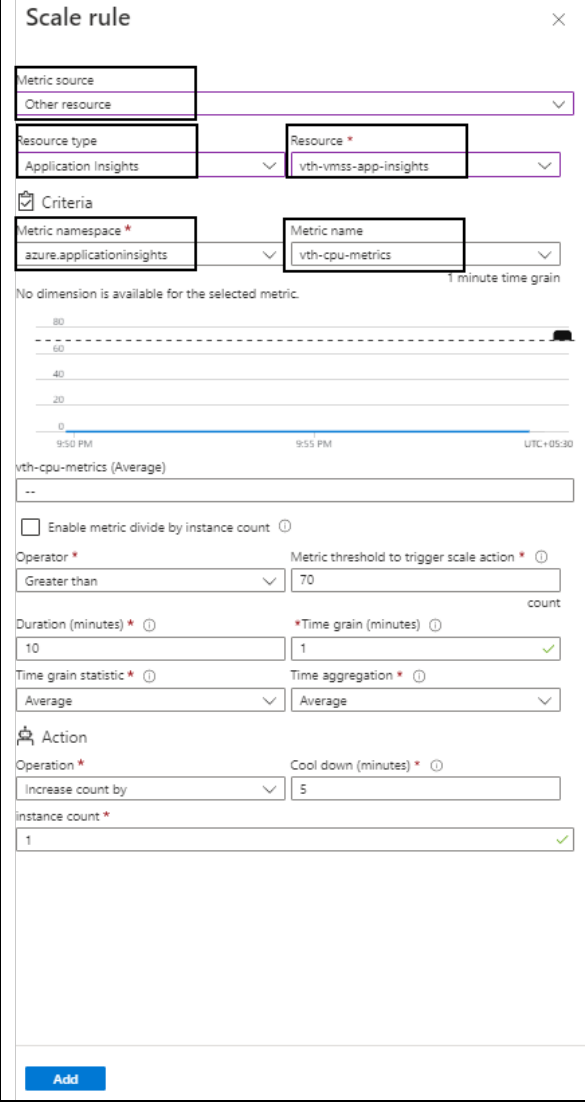
Instance limits Minimum  Maximum  Default

Schedule **This scale condition is executed when none of the other scale condition(s) match**

[+ Add a scale condition](#)

3. Under **Configure** tab, select **Custom autoscale** option.  
The fields relevant to this option are displayed.
4. Select the **Scale mode** as **Scale based on a metric**.
5. Click **Add a rule**.  
The **Scale rule** window is displayed.

Figure 167 : Scale rule window



**Scale rule**

Metric source: Other resource

Resource type: Application Insights, Resource: vth-vmss-app-insights

☒ Criteria

Metric namespace: azure.applicationinsights, Metric name: vth-cpu-metrics

No dimension is available for the selected metric.

1 minute time grain

vth-cpu-metrics (Average)

--

☐ Enable metric divide by instance count

Operator: Greater than, Metric threshold to trigger scale action: 70

Duration (minutes): 10, Time grain (minutes): 1

Time grain statistic: Average, Time aggregation: Average

☒ Action

Operation: Increase count by, Cool down (minutes): 5

Instance count: 1

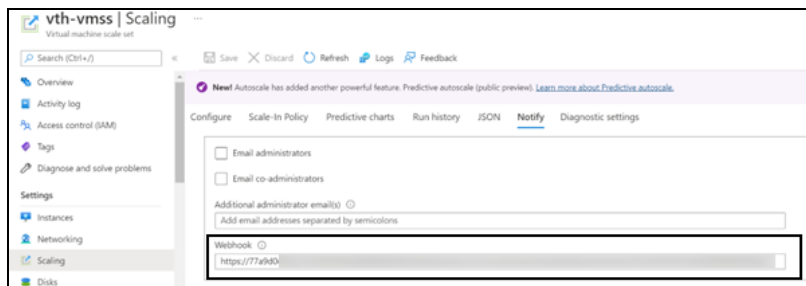
Add

6. Select or enter the information in the following fields:

- Metric source: Other resource
- Resource type: Application Insights
- Resource
- Time aggregation
- Metric namespace
- Metric name

7. Click **Add** to add the scale rule.  
The selected vmss - Scaling window is displayed.
8. Click **Save** in the **Configure** tab to save the changes.
9. Select **Notify** tab, enter the webhook url saved in the [Create Automation Account Webhook](#) step or you can get the url from **Home > Azure Services > Automation Accounts > <automation\_account\_name> > Shared Resources > Variables > azureAutoScaleResources > Value > masterWebhook\_url**.

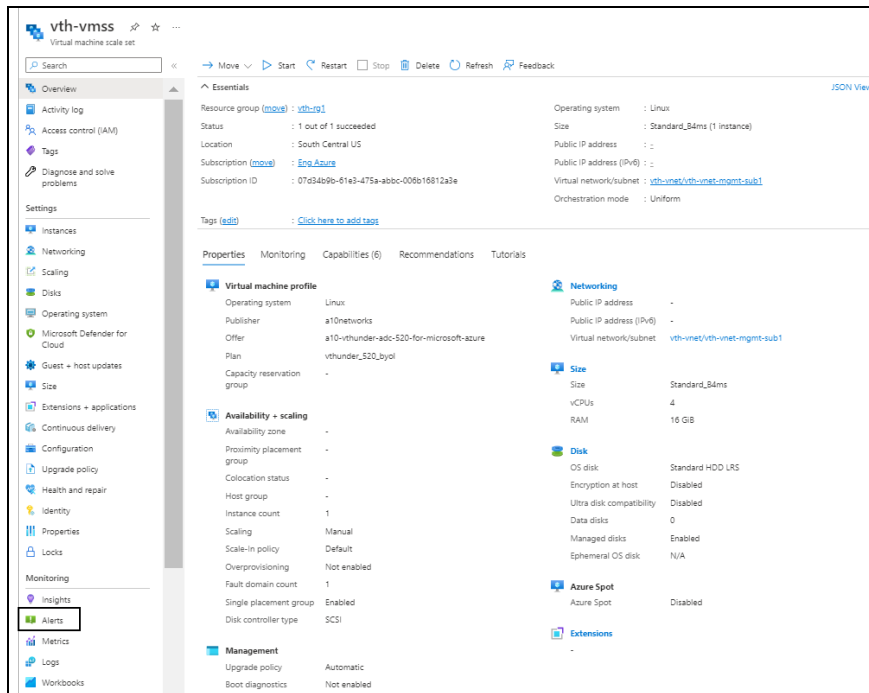
Figure 168 : Selected VMSS - Scaling window - Notify tab



## Create Autoscale Alert

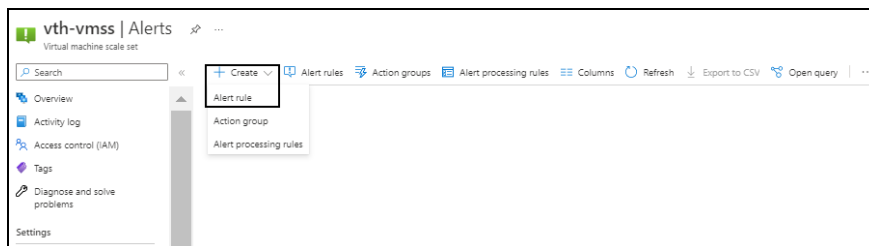
1. From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss\_name>**.  
The selected vmss - Overview window is displayed.

Figure 169 : Selected VMSS - Overview window



2. Click **Alerts** from the left **Monitoring** panel.  
The selected vmss - Alerts window is displayed.

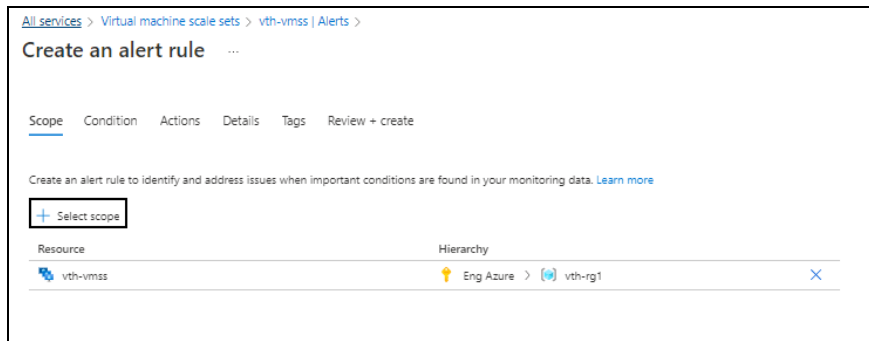
Figure 170 : Selected VMSS - Alerts window



3. Click **Create > Alert rule**.  
The Create an alert rule - Scope window is displayed.

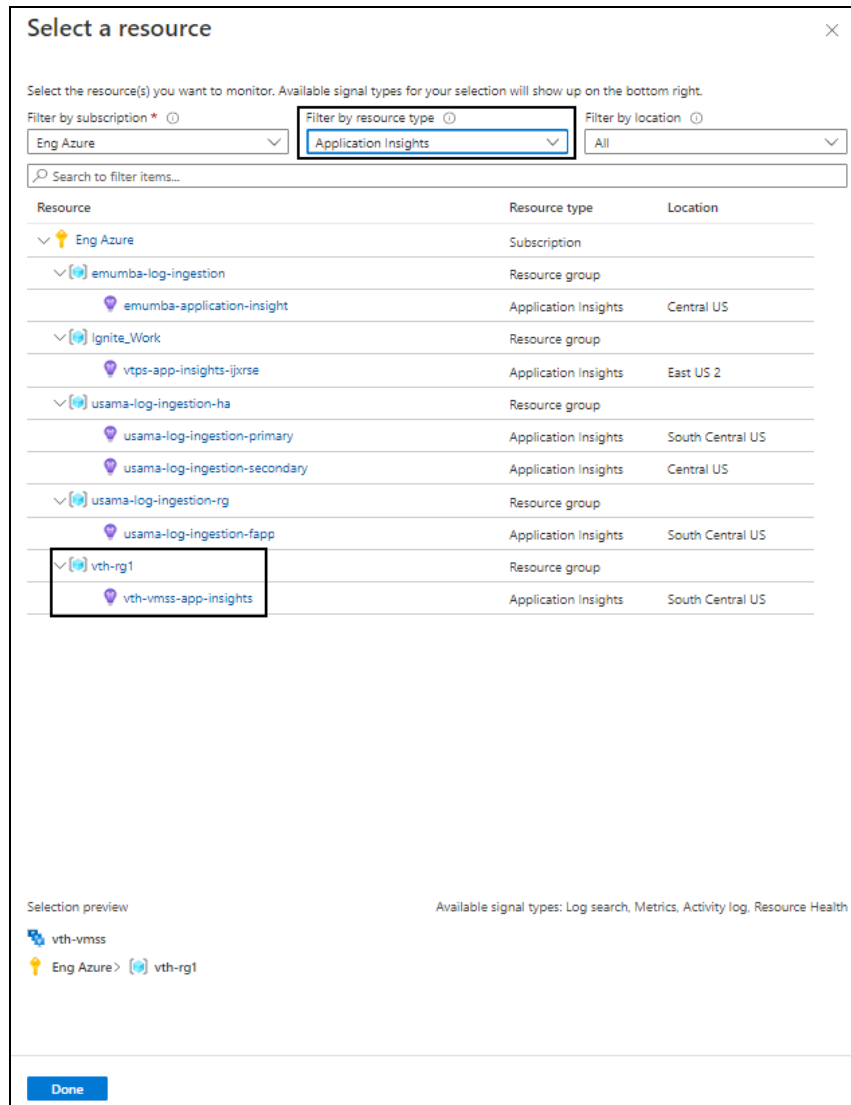


Figure 171 : Create an alert rule window - Scope tab



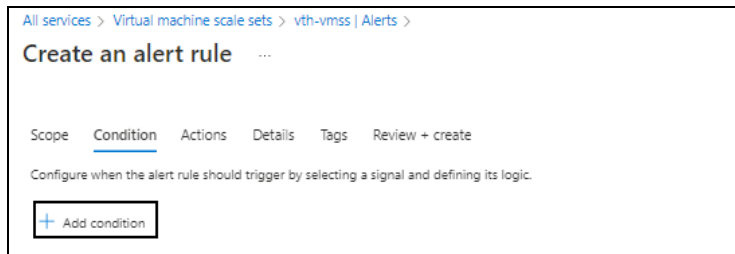
4. Click **Select scope** in the **Scope** tab.  
The **Select a resource** window is displayed.

Figure 172 : Select a resource window



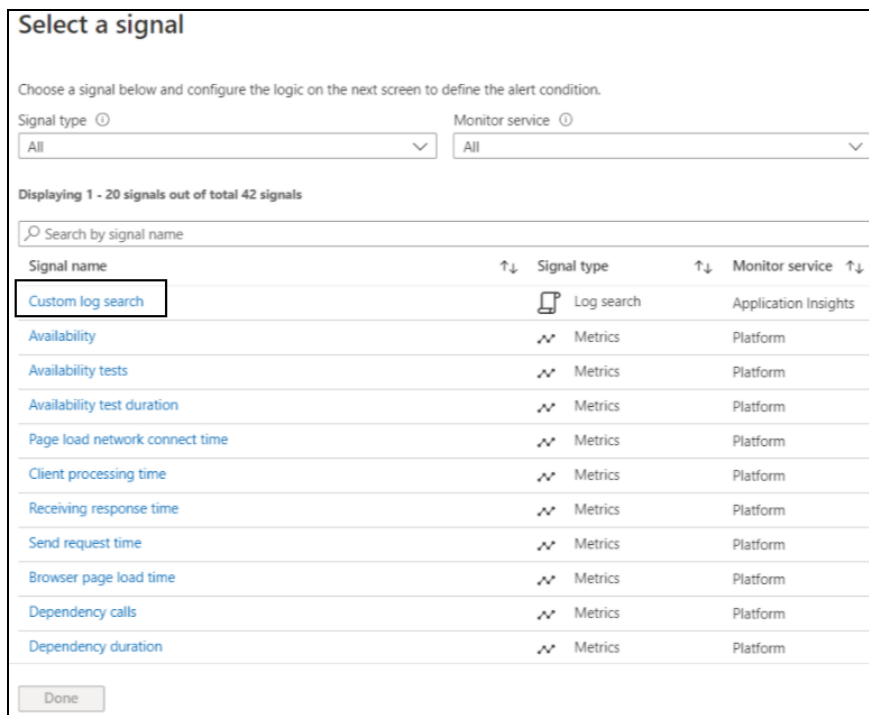
- From **Filter by resource type**, select **Application Insights**.  
The resource group having application insight resources are displayed.
- Select the required application insight resource and click **Done**.  
The selected application insight resource is listed under the alert rule scope.
- Click **Next : Condition** at the bottom of the window.  
The **Create an alert rule - Condition** tab window is displayed.

Figure 173 : Create an alert rule window - Condition tab



8. Click **Add condition** in the **Condition** tab.  
The **Select a signal** window is displayed.

Figure 174 : Select a signal window

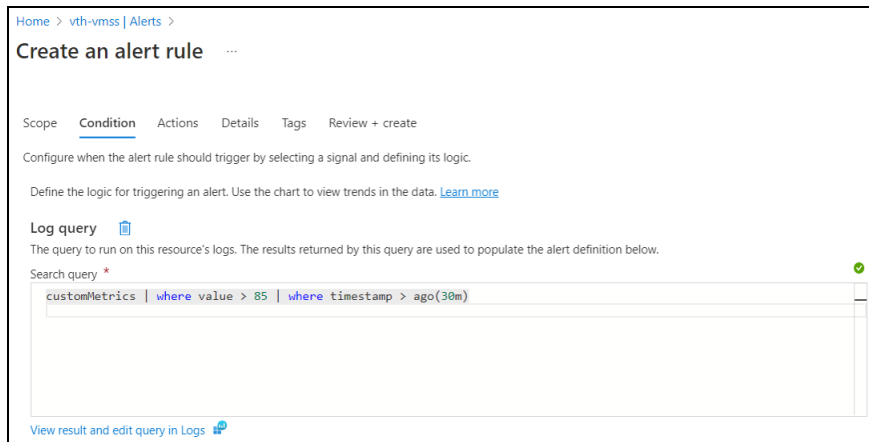


9. Select **Custom log search** as the signal.  
The window to define the signal's logic is displayed in the alert rule condition.
10. Enter any of the following query to fetch the data in the **Search query** field:

```
customMetrics | where value > 85 | where timestamp > ago(30m)
customMetrics | where value > 85 | where timestamp > ago(24h)
customMetrics | where value > 85 | where timestamp > ago(7d)
```

The above query specifies the frequency for alert data.

Figure 175 : Create an alert rule window - Condition tab



Home > vth-vmss | Alerts >

## Create an alert rule

Scope **Condition** Actions Details Tags Review + create

Configure when the alert rule should trigger by selecting a signal and defining its logic.

Define the logic for triggering an alert. Use the chart to view trends in the data. [Learn more](#)

**Log query** 

The query to run on this resource's logs. The results returned by this query are used to populate the alert definition below.

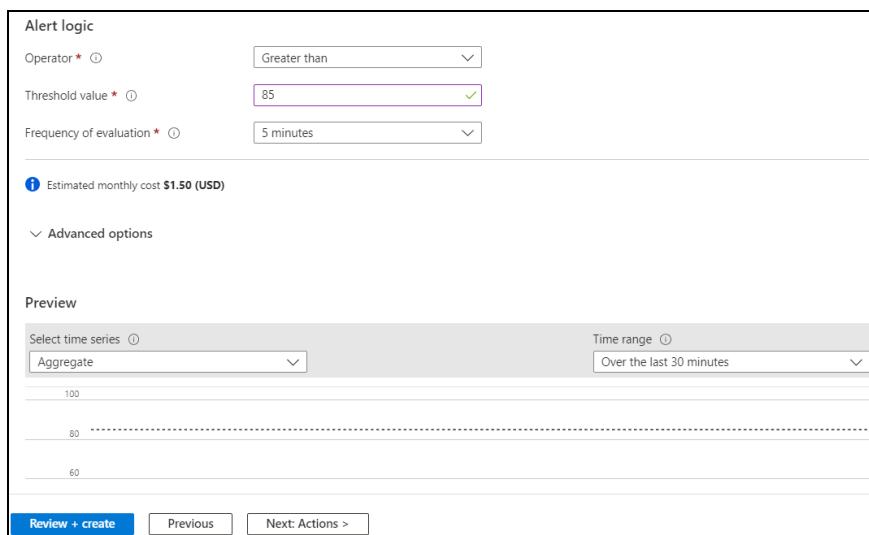
Search query \*

customMetrics | where value > 85 | where timestamp > ago(30m)

[View result and edit query in Logs](#) 

## 11. Configure alert logic in the **Alert logic** section.

Figure 176 : Alert logic section



**Alert logic**

Operator \*  Greater than

Threshold value \*  85

Frequency of evaluation \*  5 minutes

 Estimated monthly cost **\$1.50 (USD)**

Advanced options

**Preview**

Select time series  Aggregate

Time range  Over the last 30 minutes

100

80

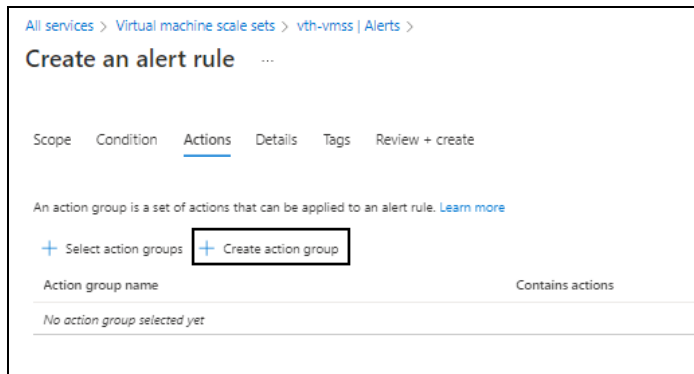
60

[Review + create](#) [Previous](#) [Next: Actions >](#)

Depending upon the signal logic configuration, the monthly cost for the alert is displayed.

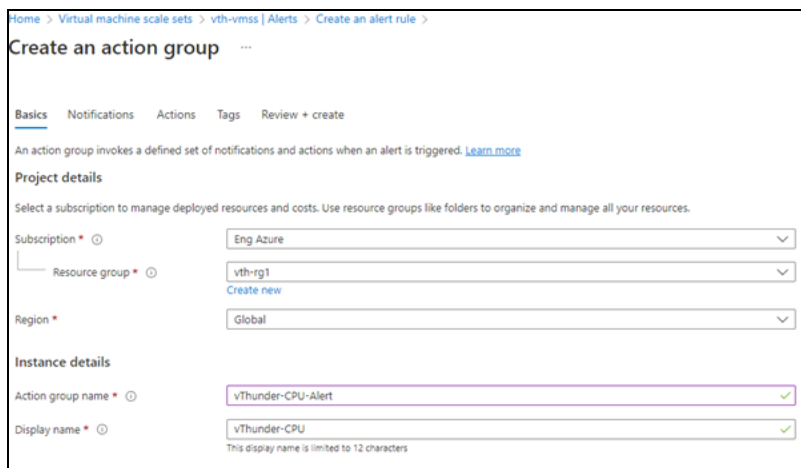
## 12. Click **Next : Actions** at the bottom of the window. The **Create an alert rule - Actions** window is displayed.

Figure 177 : Create an alert rule window - Actions tab


13. Click **Create action group**.

The **Create an action group - Basics** window is displayed.

Figure 178 : Create an action group window - Basics tab


a. Select or enter the following mandatory information in the **Basics** tab:

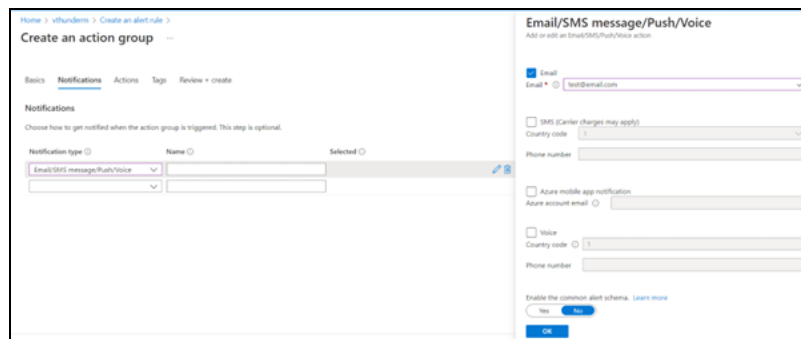
## Project details

- Subscription
- Resource group
- Region

## Instance details

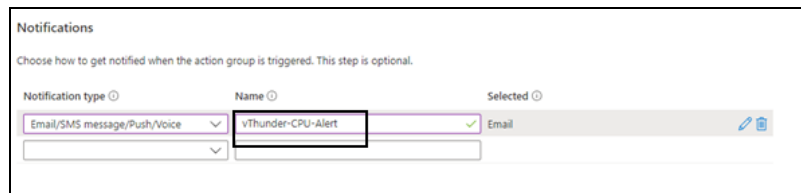
- Action group name
  - Display name
- b. Click **Next : Notifications** at the bottom of the window.  
The **Create an action group - Notifications** window is displayed.
- c. Select the **Notification type**.  
The corresponding window to configure the notification type is displayed.

Figure 179 : Create an action group window - Notifications tab - Type



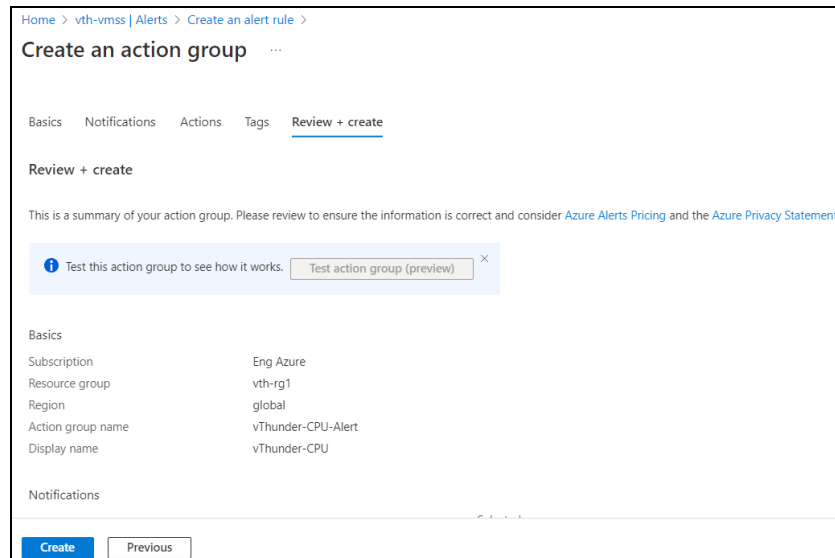
- d. Select the **Email** option and provide the correct email ID in the **Email** field and then click **OK**.
- e. Enter a unique name for the notification in the **Name** field.

Figure 180 : Create an action group window - Notifications tab



- f. Skip the other tabs and click **Review + create** at the bottom of the window.  
The **Create an action group - Review + create** window is displayed.

Figure 181 : Create an action group window - Review + create tab



Home > vth-vmss | Alerts > Create an alert rule >

### Create an action group

Basics Notifications Actions Tags **Review + create**

**Review + create**

This is a summary of your action group. Please review to ensure the information is correct and consider [Azure Alerts Pricing](#) and the [Azure Privacy Statement](#).

**i** Test this action group to see how it works. Test action group (preview) ×

**Basics**

|                   |                    |
|-------------------|--------------------|
| Subscription      | Eng Azure          |
| Resource group    | vth-rg1            |
| Region            | global             |
| Action group name | vThunder-CPU-Alert |
| Display name      | vThunder-CPU       |

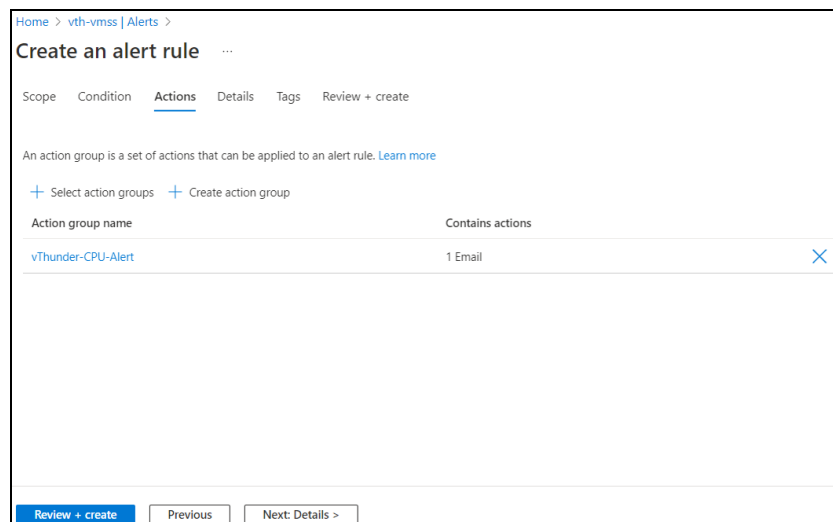
**Notifications**

**Create** Previous

g. Click **Create**.

The action group is listed under **Actions** tab.

Figure 182 : Create an alert rule window - Actions tab



Home > vth-vmss | Alerts >

### Create an alert rule

Scope Condition **Actions** Details Tags Review + create

An action group is a set of actions that can be applied to an alert rule. [Learn more](#)

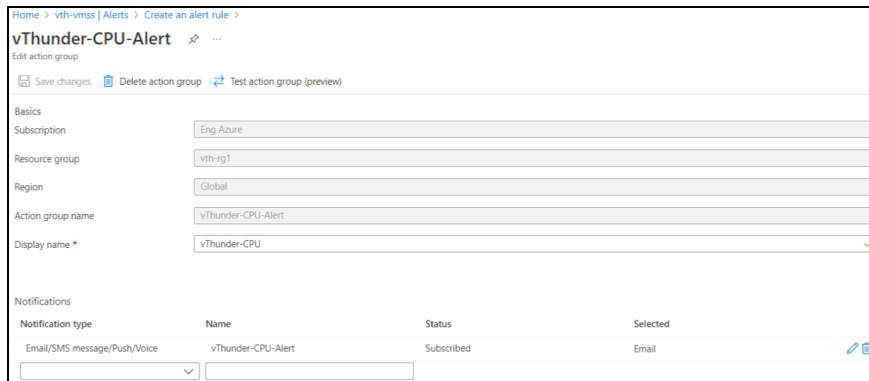
+ Select action groups + Create action group

| Action group name  | Contains actions |
|--------------------|------------------|
| vThunder-CPU-Alert | 1 Email          |

**Review + create** Previous Next: Details >

14. Select the recently created action group.  
The selected action group is displayed.

Figure 183 : Selected action group



Home > vth-vmss | Alerts > Create an alert rule >

**vThunder-CPU-Alert** ✕ ...

Edit action group

Save changes Delete action group Test action group (preview)

**Basics**

Subscription: Eng Azure

Resource group: vth-rg1

Region: Global

Action group name: vThunder-CPU-Alert

Display name \*: vThunder-CPU ✓

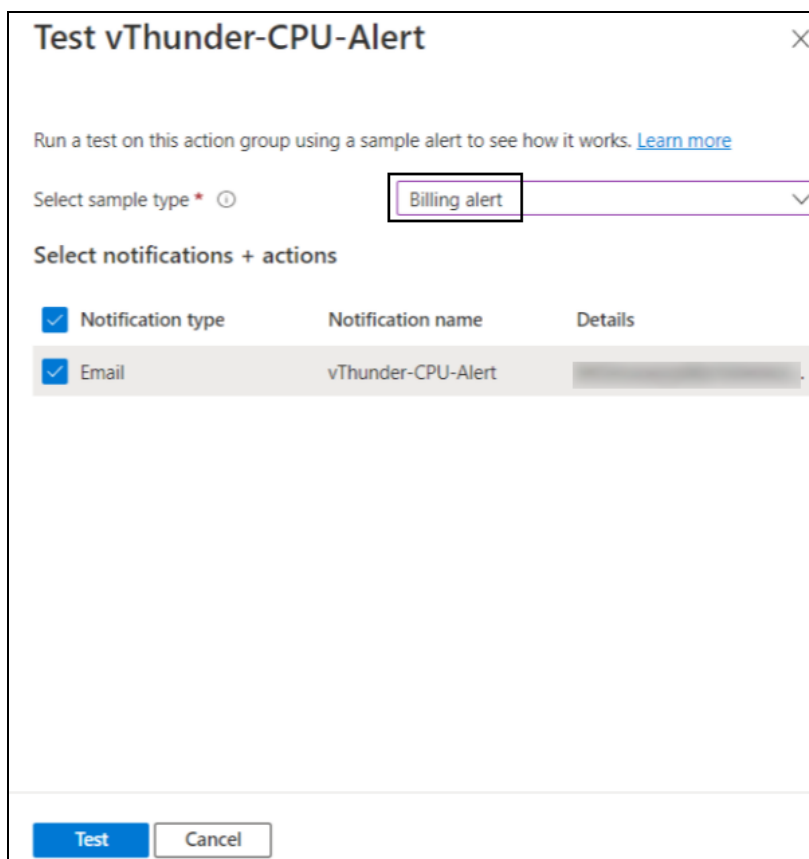
**Notifications**

| Notification type            | Name               | Status     | Selected |
|------------------------------|--------------------|------------|----------|
| Email/SMS message/Push/Voice | vThunder-CPU-Alert | Subscribed | Email    |

- Click **Test action group (preview)**.

The Test <action\_group\_name>-alert window is displayed.

Figure 184 : Test &lt;action\_group\_name&gt;-alert window



**Test vThunder-CPU-Alert** ✕

Run a test on this action group using a sample alert to see how it works. [Learn more](#)

Select sample type \* ⓘ **Billing alert** ▼

Select notifications + actions

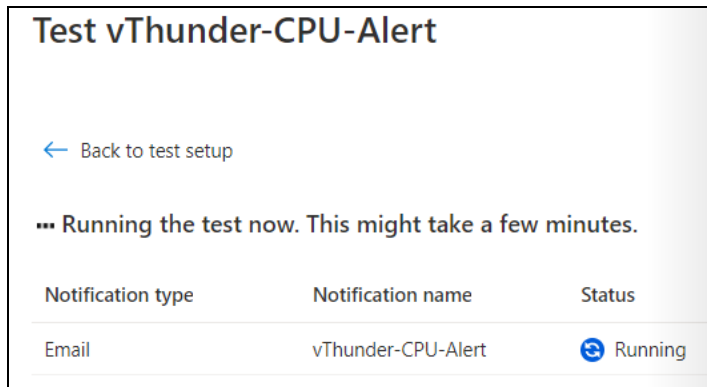
| <input checked="" type="checkbox"/> Notification type | Notification name  | Details |
|-------------------------------------------------------|--------------------|---------|
| <input checked="" type="checkbox"/> Email             | vThunder-CPU-Alert |         |

**Test** **Cancel**

- Select **Billing alert** as the Sample type and click **Test**.  
The running status for the test rule is displayed.

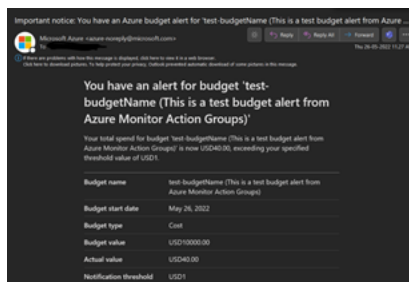


Figure 185 : Test &lt;action\_group\_name&gt;-alert window - Running status



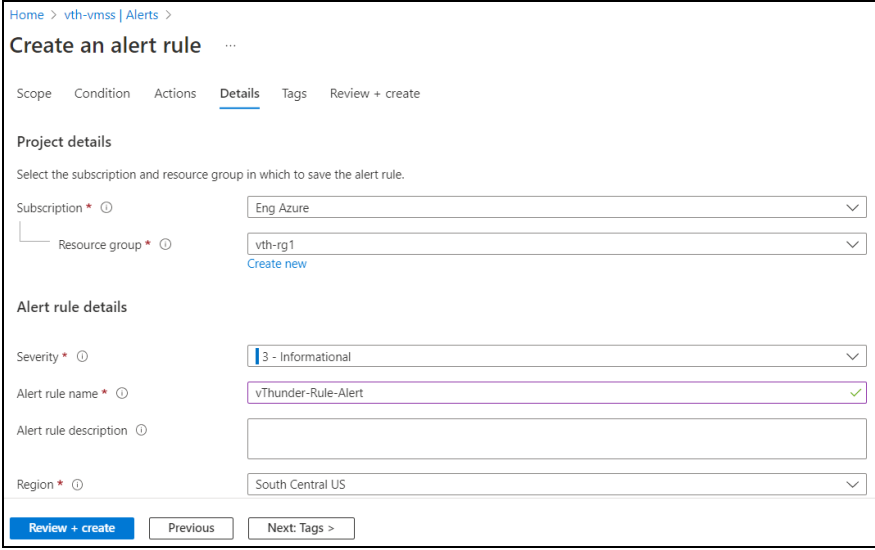
When the success status is displayed, an email notification is triggered to the email ID provided in the [Email Notification](#) step.

Figure 186 : Email Notification



17. Click **Done** on Test <action\_group\_name>-alert window.  
The selected action group is displayed.
18. Close the selected action group window.  
The Create an alert rule - Actions window is displayed.
19. Click **Next : Details** at the bottom of the window.  
The **Create an alert rule - Details** window is displayed.

Figure 187 : Create an alert rule window - Details tab



Home > vth-vmss | Alerts >

### Create an alert rule

Scope Condition Actions **Details** Tags Review + create

**Project details**

Select the subscription and resource group in which to save the alert rule.

Subscription \* ⓘ Eng Azure

Resource group \* ⓘ vth-rg1 [Create new](#)

**Alert rule details**

Severity \* ⓘ 3 - Informational

Alert rule name \* ⓘ vThunder-Rule-Alert ✓

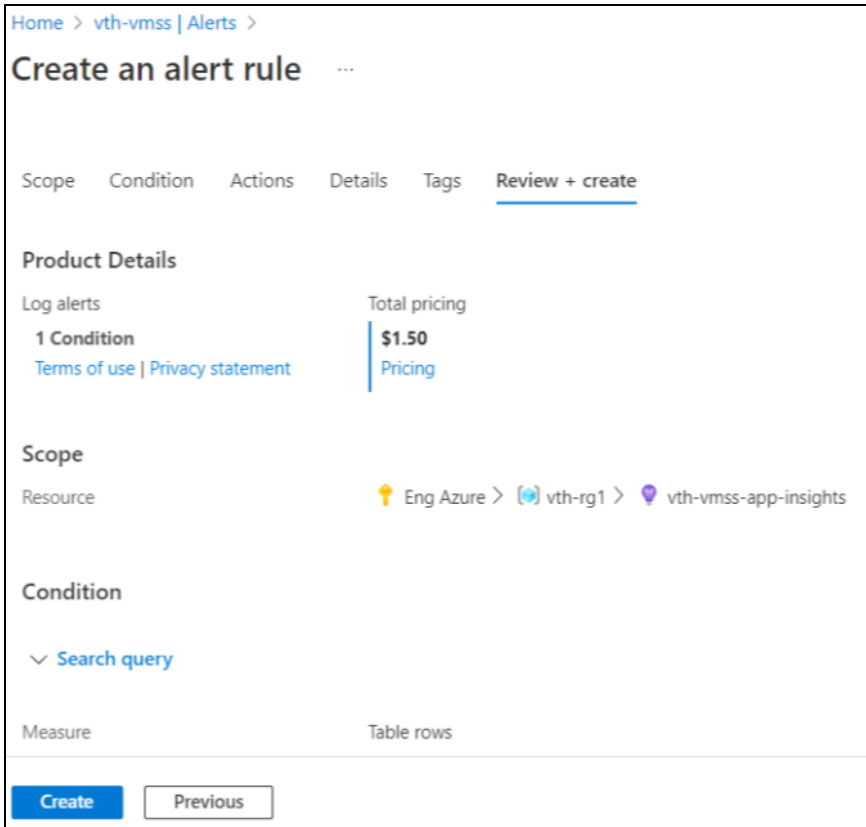
Alert rule description ⓘ

Region \* ⓘ South Central US

[Review + create](#) [Previous](#) [Next: Tags >](#)

20. Enter the Alert rule name and provide the other mandatory details.
21. Skip the other tabs and click **Review + create** at the bottom of the window.  
The **Create an alert rule - Review + create** window is displayed.

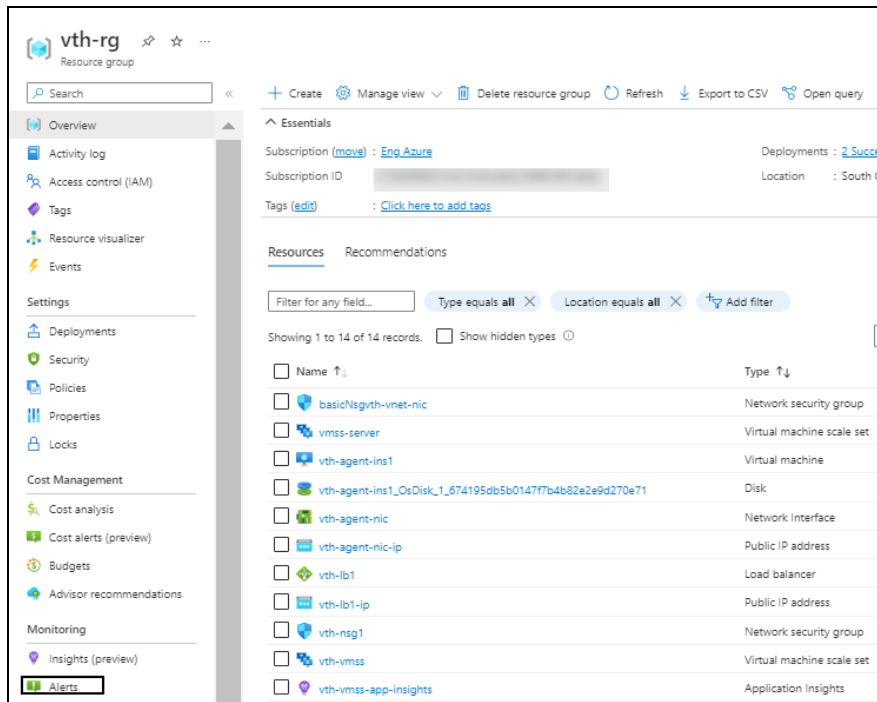
Figure 188 : Create an alert rule window - Review + create tab



The screenshot shows the 'Create an alert rule' window in the 'Review + create' tab. The breadcrumb navigation is 'Home > vth-vmss | Alerts >'. The title is 'Create an alert rule' with a three-dot menu icon. The tabs are 'Scope', 'Condition', 'Actions', 'Details', 'Tags', and 'Review + create'. The 'Review + create' tab is active. The 'Product Details' section shows 'Log alerts' with '1 Condition' and links for 'Terms of use' and 'Privacy statement'. The 'Total pricing' is '\$1.50' with a link for 'Pricing'. The 'Scope' section shows the resource path: 'Eng Azure > vth-rg1 > vth-vmss-app-insights'. The 'Condition' section shows a dropdown for 'Search query'. The 'Measure' and 'Table rows' sections are empty. At the bottom, there are 'Create' and 'Previous' buttons.

22. Click **Create**.  
The alert rule is created.
23. From **Home**, navigate to **Azure Services > Resource groups > <resource\_group\_name>**.  
The selected resource group - Overview window is displayed.

Figure 189 : Selected resource group - Overview window



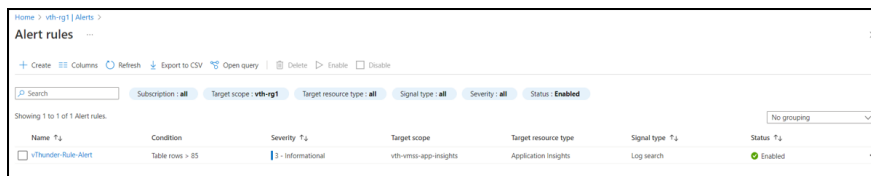
24. Click **Alerts** from the left **Monitoring** panel.

The selected alert window is displayed.

25. Click **Alert rules**.

The alert rules for the selected resource group is displayed.

Figure 190 : Selected resource group - Alert rules window



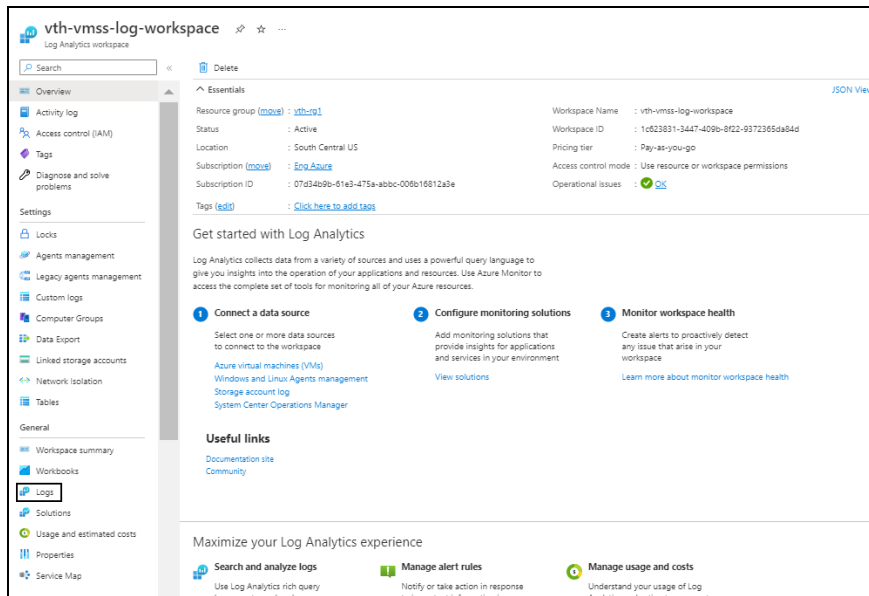
## Verify Logs in Log Analytics Workspace

To verify the logs in log analytics workspace, perform the following steps:

- From **Home**, navigate to **Azure Services > Log Analytics workspaces > <log\_workspace\_name>**.

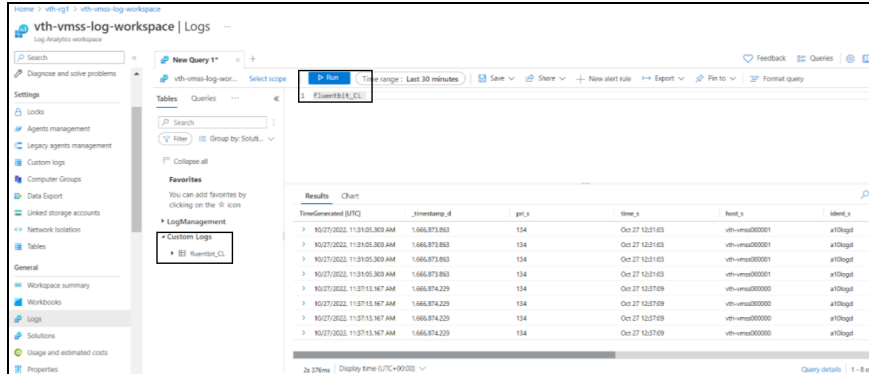
The selected log workspace - Overview window is displayed.

Figure 191 : Selected log workspace - Overview window



- b. Click **Logs** from the left **General** panel.  
The selected log window is displayed.

Figure 192 : Selected log analytics workspace - Logs window



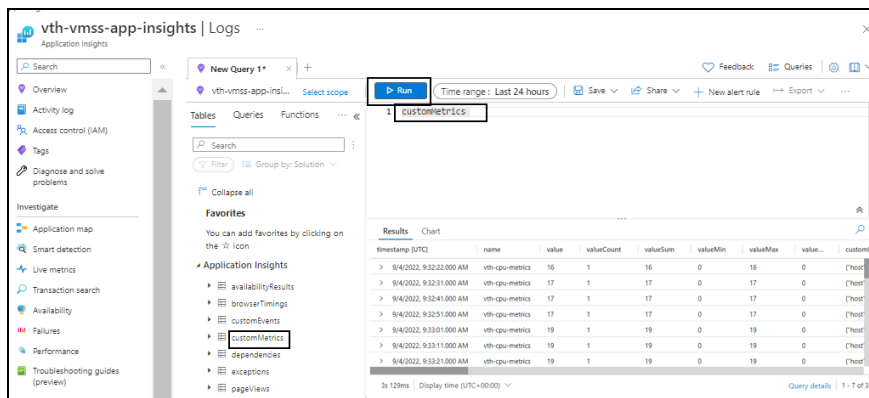
- c. Expand **Custom Logs** in the left **Tables** tab panel.
- d. Double-click **fluentbit\_CL**.  
The fluentbi\_CL query window is displayed.
- e. Click **Run**.  
All logs are displayed in tabular format with expandable details.

## Verify Metrics in Application Insights

To verify if the metrics in application insights, perform the following steps:

- From **Home**, navigate to **Azure Services > Application Insights > <application\_insight\_name>**.  
The selected application insight - Overview window is displayed.
- Click **Logs** from the left **Monitoring** panel.  
The selected log query window is displayed.
- Expand **Application Insights** in the left **Tables** tab panel.
- Double-click **customMetrics**.  
The customMetrics query window is displayed.

Figure 193 : Selected application insight - Logs window

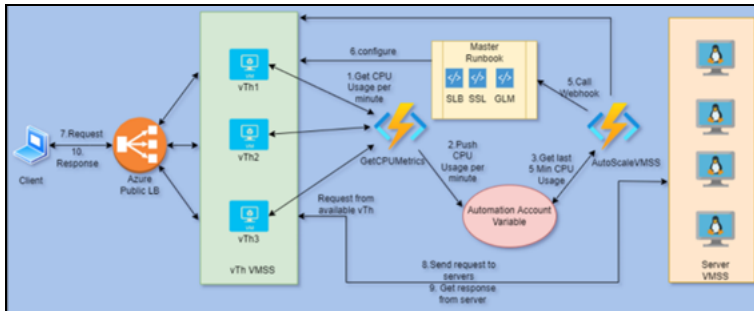


- Click **Run**.  
All logs are displayed in tabular format with expandable details. Each record is aggregated value for all vThunder instances. The **Value** field displays the data-CPU utilization percentage. Default interval is 60 seconds. This value is configured in telegraf agent of the agent instance.

## Configure Autoscaling using Azure Functions Setup

[Figure 194](#) shows the process flow when different Azure resources and system components are connected to each other in the 3NIC-NVM-VMSS Autoscaling using Azure Functions Setup.

Figure 194 : 3NIC-NVM-VMSS Autoscaling using Azure Functions Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Autoscale Function](#)
- [Verify Autoscale Function Creation](#)
- [AutoScale Function On-demand Password Change](#)

## Initial Setup

To configure autoscaling using Azure functions setup, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM\_TMPL\_3NIC\_NVM\_VMSS\_FUNCTION\_APP\_PARAM.json with a text editor.
2. Configure function application name, application insight name, and subscription ID.

```
{
 "functionAppName": "vth-auto-func-app",
 "applicationInsightsName": "vth-vmss-app-insights",
 "subscriptionId": "07d3xxxx-xxxx-xxxx-xxxx-xxxxx6812a3e",
 "filePath": "AZURE_FUNCTIONS\\GetMetrics.zip",
 "vThUserName": "admin"
}
```

### NOTE:

Do not change the vThunder instance username.

You can get the application insight name from **Home > Azure Services > Application Insights**.

You can get subscription ID value from **Home > Azure Services > Subscriptions > Subscription name**.

Provide the absolute file path of the folder where you have downloaded the ARM template > **AZURE\_FUNCTIONS > GetMetrics.zip**.

3. Verify if all the configurations in the ARM\_TMPL\_3NIC\_NVM\_VMSS\_FUNCTION\_APP\_PARAM.json file are correct and then save the changes.

## Create Autoscale Function

To create autoscale function using CLI, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create autoscale function:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_FUNCTION_APP_4.ps1
```

3. Provide the updated password of existing vThunder instances and then confirm the same password when prompted.

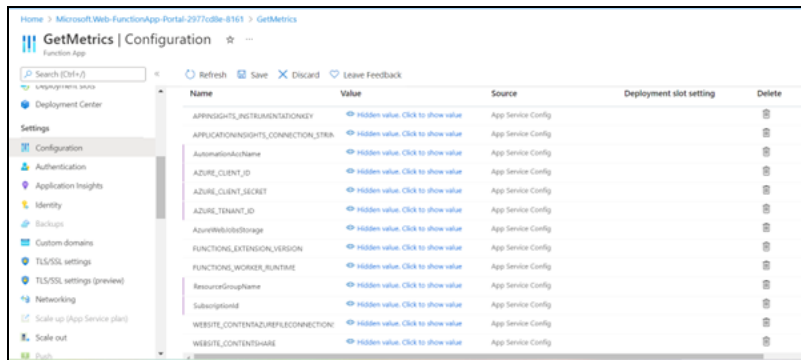
## Verify Autoscale Function Creation

To verify autoscale function creation, perform the following steps:

1. From **Home**, navigate to **Azure Services > Function App**.  
The Function App window is displayed.
2. Select GetMetrics function from the list.  
The GetMetrics function - Overview window is displayed.
3. Click **Configuration** from the left **Settings** panel.  
The GetMetrics function - Configuration window is displayed.



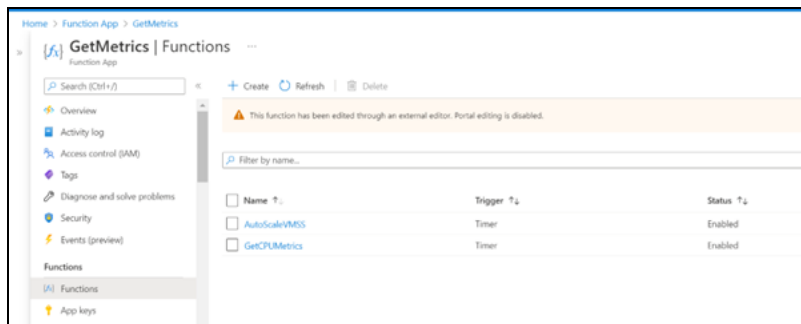
Figure 195 : GetMetrics function - Configuration window



4. Verify if all the function configurations are listed under Application settings.

5. Select **Functions** from left **Functions** panel.

The GetMetrics function - Functions window is displayed.



6. Verify if **AutoScaleVMSS** and **GetCPUMetrics** functions are listed.

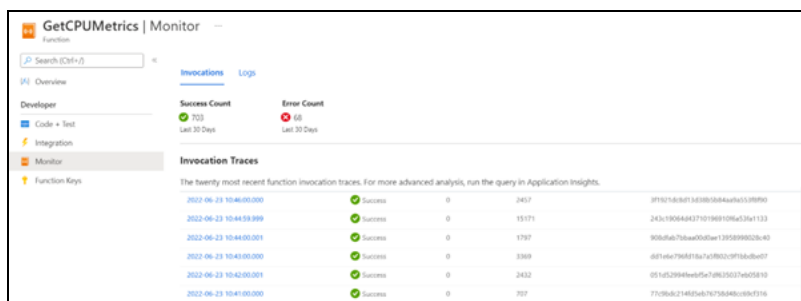
7. Click **GetCPUMetrics**.

The GetCPUMetrics function - Overview window is displayed.

8. Click **Monitor** from the left **Developer** panel.

The GetCPUMetrics function - Monitor window is displayed.

Figure 196 : GetCPUMetrics function - Monitor window



9. Verify if the logs are generated by the functions.

## AutoScale Function On-demand Password Change

If you are changing the vThunder instance password using [On-demand Password Change](#), perform the following steps else skip them:

1. Run the following script to get the encryption key and encrypted password:

```
PS C:\Users\TestUser\Templates> python .\utils\Encrypt_Password.py
```

2. Provide the recently updated password of existing vThunder instances and then confirm the same password when prompted:

```
Password:
Confirm Password:
<encrypted_key> <encrypted_password>
```

Figure 197 : Encrypted Key and Encrypted Password



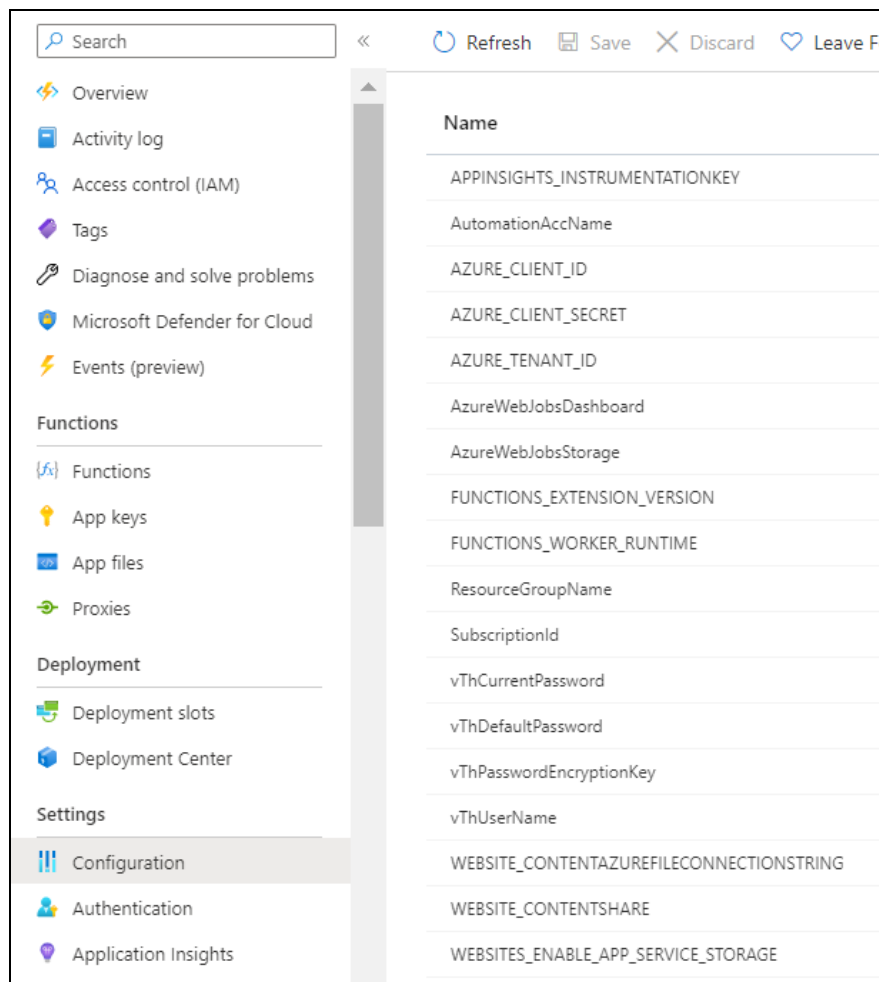
```
Password:
Confirm Password:
XEK4eIK_EoSP1SkYTBWESzIR07mK8BTm4HFPwQL=|gAAAAABj1_1dgkZ8zzfHqWQebw7UaJYVsQzELFRLGHKjMOc76-VFI-ET6r-D_z7r1ttxx5r94zH763X3oCU01msYBatq8a5Bg==
```

Encrypted Key                      Encrypted Password

The encrypted key and encrypted password are displayed.

3. From **Home**, navigate to **Azure Services > Function App > Settings > Configuration** and enter the encrypted key in the **vThPasswordEncryptionKey** field and encrypted password in the **vThCurrentPassword** value field.  
The function starts using the password provided in the **vThCurrentPassword** field to get the metric data from VMSS vThunder instances.

Figure 198 : Configuration window



## On-demand Password Change

The on-demand password change allows you to change the password for all the existing vThunder instances in the VMSS at one go.

To change the on-demand password, perform the following steps:

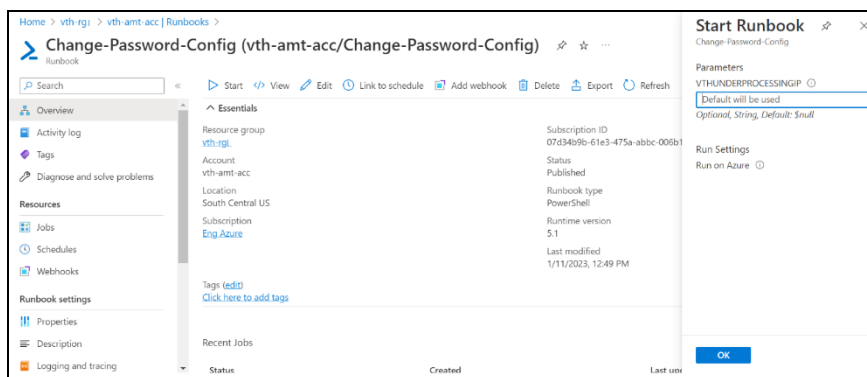
1. From **Home**, navigate to **Azure Services > Automation Accounts > Variables**.

Figure 199 : On-demand Password Change Variables

|                     |                     |       |
|---------------------|---------------------|-------|
| vThNewPassApplyFlag | String              | True  |
| vThNewPassword      | Unknown (encrypted) | ***** |

2. Set **vThNewPassApplyFlag** to **True**.
3. Update **vThNewPassword** with the new password.
4. Navigate to **Azure Services > Automation Accounts > <automation\_account\_name> > Runbooks**.
5. Select the **Change-Password-Config** runbook and click **Start**.
6. Leave the **vTHUNDERPROCESSINGIP** parameter empty so that it takes the default value.

Figure 200 : Change-Password-Config runbook



7. Navigate to **Azure Services > Automation Accounts > <automation\_account\_name> > Jobs**.
8. Verify if the **Change-Password-Config** runbook job has completed status.
9. Navigate to **Azure Services > Automation Accounts > Variables**, verify if the **vThNewPassApplyFlag** flag is set to **False** after the execution of the Change-Password-Config runbook is successful. The **vThNewPassApplyFlag** flag should be set to false after the password is updated for all vThunder instances in VMSS.

If you are autoscaling using Azure Function setup, you need to also change the password in the autoscale function. For more information, see [AutoScale Function On-demand Password Change](#).

## Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

### Access vThunder using CLI

---

To access the vThunder instances using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
  - Hostname: Public IP of Virtual Machine Instance under the VMSS  
Here, Public IP of **vth-vmss**
  - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->
Using keyboard-interactive authentication.
Password: xxxx <---Enter your password>
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

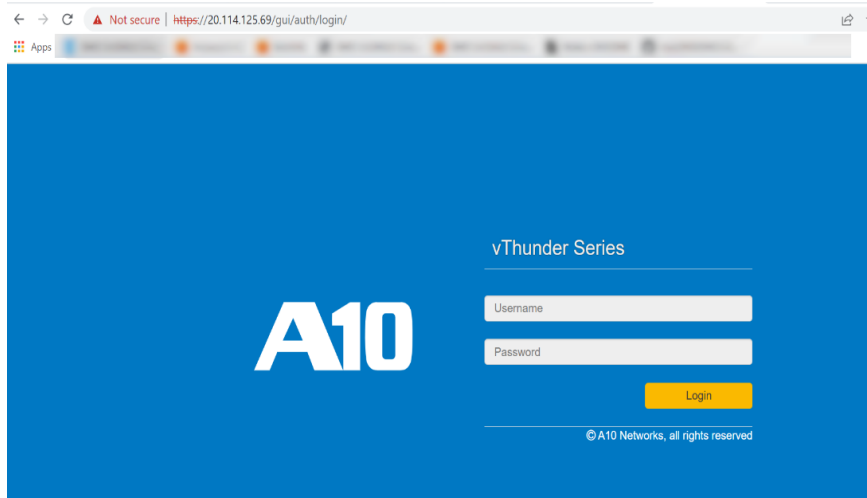
### Access vThunder using GUI

---

To access the vThunder instances using GUI, perform the following steps:

1. Open any browser.
2. Enter `https://<vthunder_public_IP>/gui/auth/login/` in the address bar.

Figure 201 : vThunder GUI



3. Enter the username provided by A10 Networks Support and recently changed password.  
The home page gets displayed.

## Verify Deployment

To verify deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:

```
vThunder(config)#show running-config slb
```

If the deployment is successful, the following configuration is displayed:

```
!Section configuration: 711 bytes
!
slb server vth-server-vmss_0 10.0.3.5
 port 53 udp
 health-check-disable
 port 80 tcp
 health-check-disable
 port 443 tcp
```

```

 health-check-disable
 !
 slb service-group sg443 tcp
 health-check-disable
 member vth-server-vmss_0 443
 !
 slb service-group sg53 udp
 health-check-disable
 member vth-server-vmss_0 53
 !
 slb service-group sg80 tcp
 health-check-disable
 member vth-server-vmss_0 80
 !
 slb virtual-server vip use-if-ip ethernet 1
 port 53 udp
 ha-conn-mirror
 source-nat auto
 service-group sg53
 port 80 http
 source-nat auto
 service-group sg80
 port 443 https
 source-nat auto
 service-group sg443
 !
 slb virtual-server vip2 10.0.2.10
 !

```

2. Run the following command on vThunder to verify the GLM License Provision configuration:

```
vThunder(config)#show license-info
```

If the master webhook is executed successfully, the following GLM configuration is displayed:

```

Host ID : 5DCB01EC264BECCCFECB3C2ED42E02384EE8C527
USB ID : Not Available
Billing Serials: A10f771cecbe0000

```

```

Token : A10f771cecbe
Product : ADC
Platform : vThunder
Burst : Disabled
GLM Ping Interval In Hours : 24

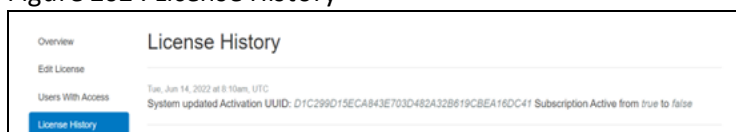
Enabled Licenses Expiry Date (UTC) Notes

SLB None
CGN None
GSLB None
RC None
DAF None
WAF None
AAM None
FP None
WEBROOT N/A Requires an additional Webroot license.
THREATSTOP N/A Requires an additional ThreatSTOP license.
QOSMOS N/A Requires an additional QOSMOS license.
WEBROOT_TI N/A Requires an additional Webroot Threat Intel
license.
CYLANCE N/A Requires an additional Cylance license.
IPSEC_VPN N/A Requires an additional IPsec VPN license.
500 Mbps Bandwidth 14-November-2022

```

- From vThunder Console, navigate to **Home > License History** to verify your license:

Figure 202 : License History



- Run the following command on vThunder to verify the SSL Certificate configuration:

```
vThunder(config)#show pki cert
```

If the SSL Certificate configuration is correct and applied successfully, the following SSL configuration is displayed:



| Name               | Type                     | Expiration         | Status |
|--------------------|--------------------------|--------------------|--------|
| -----              |                          |                    |        |
| server certificate | Jan 28 12:00:00 2028 GMT | [Unexpired, Bound] |        |

5. Run the following command to verify vThunder logs sync-up configuration:

```
vThunder(config)#show running-config acos-events
```

If the vThunder logs sync-up configuration is correct, the following configuration is displayed:

```
!Section configuration: 467 bytes
!
acos-events message-selector vThunderLog
 rule 1
 severity equal-and-higher debugging
!
acos-events log server fluentBitLogAgent 10.0.1.4
 health-check-disable
 port 514 udp
 health-check-disable
!
acos-events collector-group vThunderSyslog udp
 log-server fluentBitLogAgent 514
!
acos-events template fluentBitRemoteServer
 message-selector vThunderLog
 collector-group vThunderSyslog
!
acos-events active-template fluentBitRemoteServer
!
```

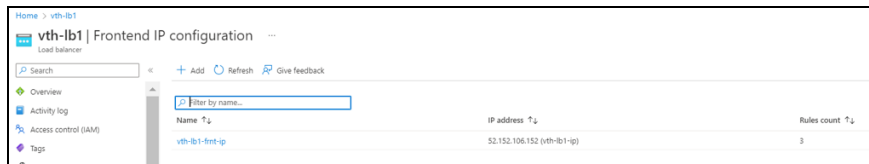
## Verify Traffic Flow

To verify the traffic flow from client machine to server machine via vThunder, perform the following:

1. From **Azure Portal** > **Azure Services** > **Resource Group** > <resource\_group\_name> > <load\_balancer> > **Settings** > **Frontend IP configuration**. Here, **vth-1b1** is the load balancer.

## 2. Copy the frontend IP address.

Figure 203 : Load balancer frontend IP address



## 3. Select your client instance from the **Virtual machine** list.

Here, **vth-client** is the client instance name.

## 4. SSH your client machine and run the following command to verify the traffic flow:

```
curl <vth-lb1-front-ip>
```

### Example

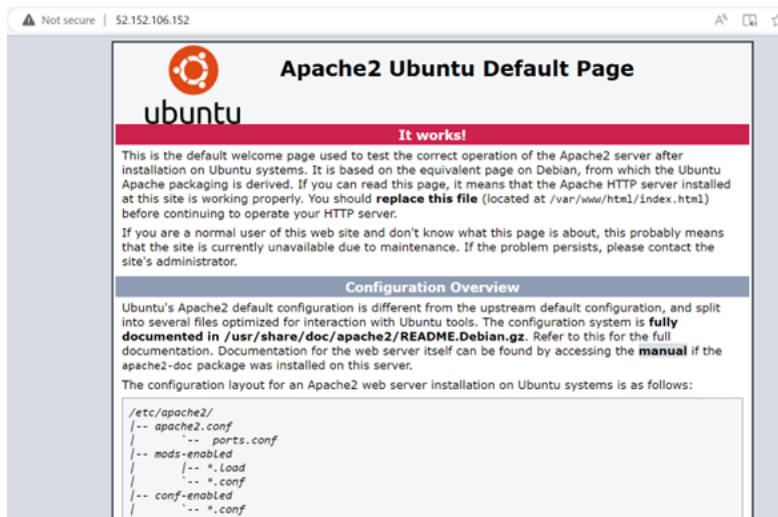
```
curl 52.152.106.152
```

Verify if a response is received.

or

Copy the load balancer frontend IP address in the browser.

Figure 204 : API response

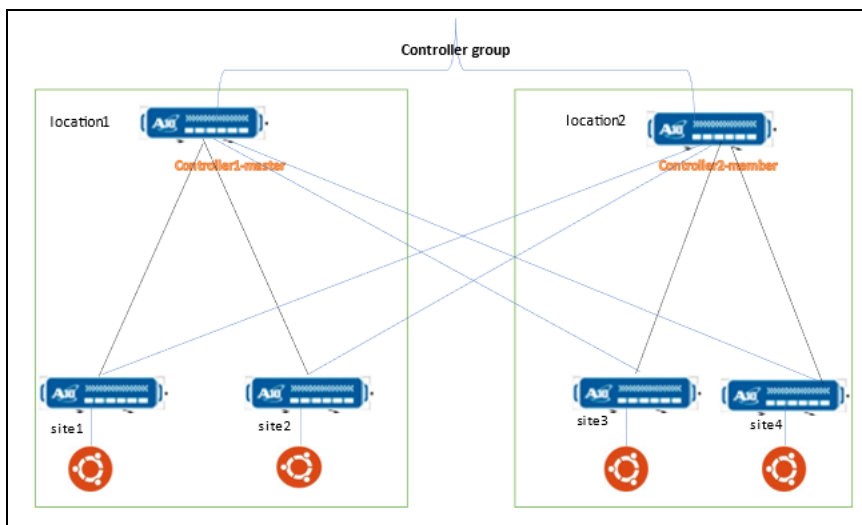


Verify if the API response is received.

# Deploy ARM A10-vThunder\_ADC-3NIC-6VM-2RG-GSLB

[Figure 205](#) shows the GSLB deployment topology. Using this template, two regions each containing one GSLB controller and two site devices can be deployed. A server is assigned to each site devices.

Figure 205 : 3NIC-6VM-2RG-GSLB Topology



The following topics are covered:

|                                                  |     |
|--------------------------------------------------|-----|
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## System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following resources to deploy vThunder on the Azure cloud:

Table 14 : System Requirements

| Resource Name         | Description                                                                                                                                                                                                                                        | Default Value                                                 |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Azure Resource Group  | A resource group with the specified name and location is created, if it doesn't exist.                                                                                                                                                             | Here, the Azure resource group name used is <b>gs1b-rg1</b> . |
| Azure Storage Account | <p>A storage account is created inside the resource group, if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> | <b>solutiontestingeastus</b><br><b>solutiontestingeastus2</b> |

| Resource Name                 | Description                                                                                                                                                                                                                                                                             | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | <p>One storage account is created in each GSLB region. So, total two storage accounts are created.</p> <p><b>Performance:</b><br/>Standard</p> <p><b>Replication:</b><br/>Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b><br/>Storagev2 (general purpose v2)</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Virtual Machine (VM) Instance | <p>Six vThunder instances are created:</p> <p><b>Image:</b> a10-vthunder-adc-520-for-microsoft-azure</p> <p><b>Size:</b> Standard_A4_v2</p> <p>Four Real servers are created:</p>                                                                                                       | <p>vThunder instances</p> <pre>\$vmName+\$region1+"1" region1 controller \$vmName+\$region1+"2" region1 site device 1 \$vmName+\$region1+"3" region1 site device 2 \$vmName+\$region2+"1" region2 controller \$vmName+\$region2+"2" region2 site device 1 \$vmName+\$region2+"3" region2 site device 2</pre> <p>Real Servers</p> <pre>\$linuxName+\$region1+"1" region1 linux 1 \$linuxName+\$region1+"2" region1 linux 2 \$linuxName+\$region2+"1" region2 linux 1 \$linuxName+\$region2+"2" region2 linux 2</pre> |

| Resource Name               | Description                                                                                                                                                                                                                                                              | Default Value                                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                             | <p><b>Version:</b> Linux Ubuntu 16.04.0-LTS</p> <p><b>Size:</b> Standard_B2s</p> <p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p><a href="#">Table 15</a> lists the supported VM sizes.</p> |                                                                                                                                |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance in each GSLB region.                                                                                                                                                                                       | <p><code>\$region1+vnet1, \$region2+vnet2</code></p> <p>Address prefix for virtual network are 10.1.0.0/16 and 10.2.0.0/16</p> |
| Subnet                      | Three subnets with an address prefix are created in each GSLB region.                                                                                                                                                                                                    | <p><code>mgmt_subnet_steps</code></p> <p><code>data1_subnet_steps</code></p> <p><code>data2_subnet_steps</code></p>            |

| Resource Name | Description                                                                                                                                                                                                                                                                                                                                                                                                                               | Default Value |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Public IP     | <p>Each A10 device is assigned a public IP address to its management interface as a primary IP configuration and to its data interface on client-side as a secondary IP configuration. The public IP address for secondary IP configuration is used in GSLB configuration by the controller.</p> <p>Each Real server (Linux) is assigned a public IP address to its management interface.</p> <p>The public IP addresses are dynamic.</p> |               |
| Private IP    | Each A10 device is assigned a private IP address to its management                                                                                                                                                                                                                                                                                                                                                                        |               |

| Resource Name                | Description                                                                                                                                                                                                                                                                                                                                                                                     | Default Value                                                                               |                                                                                         |                                                                                         |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                              | <p>interface as a primary IP configuration and to its client-side and server-side data interfaces as a secondary IP configuration. The secondary IP configuration for client-side data interface is used as a VIP address in SLB or GSLB configuration.</p> <p>Each Real server (Linux) is assigned a private IP address to its data interface.</p> <p>The private IP addresses are static.</p> |                                                                                             |                                                                                         |                                                                                         |
| Network Interface Card [NIC] | <p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> <li>Management Interface with</li> </ul>                                                                                                                                                                                                                                              | <p>Management Interface for Region 1</p> <p>10.1.10.5</p> <p>10.1.10.6</p> <p>10.1.10.7</p> | <p>Data Interface 1 for Region 1</p> <p>10.1.20.5</p> <p>10.1.20.6</p> <p>10.1.20.7</p> | <p>Data Interface 2 for Region 1</p> <p>10.1.30.5</p> <p>10.1.30.6</p> <p>10.1.30.7</p> |



| Resource Name                | Description                                                                                                                                                                                                                                                                                                                                 | Default Value                                                                                                                |                                                                                                                                                      |                                                                                                                          |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                              | public IP<br><ul style="list-style-type: none"> <li>Data Interface with primary private IP [Ethernet 1, Ethernet 2]</li> </ul> Two types of interfaces are created for each Real server: <ul style="list-style-type: none"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1]</li> </ul> | 10.1.10.8<br>10.1.10.9<br>Management Interface for Region 2<br>10.2.10.5<br>10.2.10.6<br>10.2.10.7<br>10.2.10.8<br>10.2.10.9 | 10.1.20.8<br>10.1.20.9<br>10.1.20.10<br>Data Interface 1 for Region 2<br>10.2.20.5<br>10.2.20.6<br>10.2.20.7<br>10.2.20.8<br>10.2.20.9<br>10.2.20.10 | 10.1.30.8<br>10.1.30.9<br>Data Interface 2 for Region 2<br>10.2.30.5<br>10.2.30.6<br>10.2.30.7<br>10.2.30.8<br>10.2.30.9 |
| Network Security Group [NSG] | For each A10 device, management interface, client-side data interface, and server-side data interface with Allow permissions for relevant ports are created.<br><br>For each Real Server (Linux),                                                                                                                                           | nsgman1region1<br>nsgdata1region1<br>nsgdata2region1<br>nsgman1region2<br>nsgdata1region2<br>nsgdata2region2                 |                                                                                                                                                      |                                                                                                                          |

| Resource Name | Description                                                                                     | Default Value                               |
|---------------|-------------------------------------------------------------------------------------------------|---------------------------------------------|
|               | management interface and data interfaces with Allow permissions for relevant ports are created. |                                             |
| Region        | Two regions are created.                                                                        | <code>eastus</code><br><code>eastus2</code> |

## Supported VM Sizes

Table 15 : Supported VM sizes

| Series   | Size           | Qualified Name  |
|----------|----------------|-----------------|
| A series | Standard A2    | Standard_A2     |
|          | Standard A2v2  | Standard_A2_v2  |
|          | Standard A2mv2 | Standard_A2m_v2 |
|          | Standard A4v2  | Standard_A4_v2  |
|          | Standard A4mv2 | Standard_A4m_v2 |
|          | Standard A3    | Standard_A3     |
|          | Standard A4    | Standard_A4     |
|          | Standard A8v2  | Standard_A8_v2  |
| B series | Standard B2s   | Standard_B2_s   |
|          | Standard B2ms  | Standard_B2ms   |
|          | Standard B4ms  | Standard_B4ms   |
| D series | Standard D2v2  | Standard_D2_v2  |

| Series   | Size           | Qualified Name  |
|----------|----------------|-----------------|
|          | Standard DS2v2 | Standard_DS2_v2 |
|          | Standard D4v3  | Standard_D4_v3  |
|          | Standard D4sv3 | Standard_D4s_v3 |
|          | Standard D3v2  | Standard_D3_v2  |
|          | Standard Ds3v2 | Standard_Ds3_v2 |
|          | Standard D5v2  | Standard_D5_v2  |
| F series | Standard F4s   | Standard_F4s    |
|          | Standard F8    | Standard_F8     |
|          | Standard F16s  | Standard_F16s   |

Azure is going to retire few of the above listed VM sizes soon, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

## Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

### Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM\_TMPL\_GSLB\_PARAM.json with a text editor.

**NOTE:** Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {
 "value": "vth-user"
},
"adminPassword": {
 "value": "vth-Password"
},
```

**NOTE:** This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure authentication type.

```
"authenticationType": {
 "value": "password"
},
```

4. Configure a DNS label prefix.

```
"dnsLabelPrefix": {
 "value": "vthunderipbare"
},
```

5. Configure a VM name.

```
"vmName": {
 "value": "vthunder"
},
```

6. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage":{
 "value": "vthunder_520_byol"
},
"imagePublisher_vthunder":{
```

```

 "value": "a10networks"
 },
 "imageOffer_vthunder": {
 "value": "a10-vthunder-adc-520-for-microsoft-azure"
 },

```

---

**NOTE:** Do not change the publisher name.

---

7. Set a VM size for vThunder instance.

```

 "vmSize": {
 "value": "Standard_A4_v2"
 },

```

Use a suitable VM size that supports at least 3 NICs. For VM sizes, see [System Requirements](#) section.

8. Configure a Linux machine name.

```

 "linuxName": {
 "value": "linux"
 },

```

9. Configure Linux machine details.

```

 "linuxName": {
 "value": "linux"
 },
 "ubuntuOSVersion": {
 "value": "16.04.0-LTS"
 },
 "imagePublisher_linux": {
 "value": "Canonical"
 },
 "imageOffer_linux": {
 "value": "UbuntuServer"
 },
 "vmSize_linux": {
 "value": "Standard_B2s"
 },

```

**10. Configure regions.**

```

 "region1":{
 "value": "eastus"
 },
 "region2":{
 "value": "eastus2"
 },

```

**11. Configure a network security group for the two regions.**

```

"networkSecurityGroupName_region1_Management1":{
 "value": "nsgman1region1"
},
"networkSecurityGroupName_region1_Data1":{
 "value": "nsgdata1region1"
},
"networkSecurityGroupName_region1_Data2":{
 "value": "nsgdata2region1"
},
"networkSecurityGroupName_region2_Management1":{
 "value": "nsgman1region2"
},
"networkSecurityGroupName_region2_Data1":{
 "value": "nsgdata1region2"
},
"networkSecurityGroupName_region2_Data2":{
 "value": "nsgdata2region2"
},

```

**12. Configure storage account names.**

```

"storageAccountName1": {
 "value": "solutiontestingeastus"
},
"storageAccountName2": {
 "value": "solutiontestingeastus2"
},

```

**13. Configure an address prefix and subnet values for each of the two regions' management interface and data interfaces.**

```

 "addressPrefix1": {
 "value": "10.1.0.0/16"
 },
 "region1_mgmt_prefix": {
 "value": "10.1.10.0/24"
 },
 "region1_data1_prefix": {
 "value": "10.1.20.0/24"
 },
 "region1_data2_prefix": {
 "value": "10.1.30.0/24"
 },
 "addressPrefix2": {
 "value": "10.2.0.0/16"
 },
 "region2_mgmt_prefix": {
 "value": "10.2.10.0/24"
 },
 "region2_data1_prefix": {
 "value": "10.2.20.0/24"
 },
 "region2_data2_prefix": {
 "value": "10.2.30.0/24"
 },
 },

```

#### 14. Configure network interface cards for the two regions.

```

 "vnetName1_mgmt_region1_PrivateAddress1" :{
 "value": "10.1.10.5"
 },
 "vnetName1_mgmt_region1_PrivateAddress2" :{
 "value": "10.1.10.6"
 },
 "vnetName1_mgmt_region1_PrivateAddress3" :{
 "value": "10.1.10.7"
 },
 "vnetName1_mgmt_region1_PrivateAddress4" :{
 "value": "10.1.10.8"
 },
 },

```

```
"vnetName1_mgmt_region1_PrivateAddress5" :{
 "value": "10.1.10.9"
},
"vnetName1_data1_region1_PrivateAddress1" :{
 "value": "10.1.20.5"
},
"vnetName1_data1_region1_PrivateAddress2" :{
 "value": "10.1.20.6"
},
"vnetName1_data1_region1_PrivateAddress3" :{
 "value": "10.1.20.7"
},
"vnetName1_data1_region1_PrivateAddress_secondary1" :{
 "value": "10.1.20.8"
},
"vnetName1_data1_region1_PrivateAddress_secondary2" :{
 "value": "10.1.20.9"
},
"vnetName1_data1_region1_PrivateAddress_secondary3" :{
 "value": "10.1.20.10"
},
"vnetName1_data2_region1_PrivateAddress1" :{
 "value": "10.1.30.5"
},
"vnetName1_data2_region1_PrivateAddress2" :{
 "value": "10.1.30.6"
},
"vnetName1_data2_region1_PrivateAddress3" :{
 "value": "10.1.30.7"
},
"vnetName1_data2_region1_PrivateAddress4" :{
 "value": "10.1.30.8"
},
"vnetName1_data2_region1_PrivateAddress5" :{
 "value": "10.1.30.9"
},
"vnetName2_mgmt_region2_PrivateAddress1" :{
```



```
 "value": "10.2.10.5"
 },
 "vnetName2_mgmt_region2_PrivateAddress2" :{
 "value": "10.2.10.6"
 },
 "vnetName2_mgmt_region2_PrivateAddress3" :{
 "value": "10.2.10.7"
 },
 "vnetName2_mgmt_region2_PrivateAddress4" :{
 "value": "10.2.10.8"
 },
 "vnetName2_mgmt_region2_PrivateAddress5" :{
 "value": "10.2.10.9"
 },
 "vnetName2_data1_region2_PrivateAddress1" :{
 "value": "10.2.20.5"
 },
 "vnetName2_data1_region2_PrivateAddress2" :{
 "value": "10.2.20.6"
 },
 "vnetName2_data1_region2_PrivateAddress3" :{
 "value": "10.2.20.7"
 },
 "vnetName2_data1_region2_PrivateAddress_secondary1" :{
 "value": "10.2.20.8"
 },
 "vnetName2_data1_region2_PrivateAddress_secondary2" :{
 "value": "10.2.20.9"
 },
 "vnetName2_data1_region2_PrivateAddress_secondary3" :{
 "value": "10.2.20.10"
 },
 "vnetName2_data2_region2_PrivateAddress1" :{
 "value": "10.2.30.5"
 },
 "vnetName2_data2_region2_PrivateAddress2" :{
 "value": "10.2.30.6"
```

```

 },
 "vnetName2_data2_region2_PrivateAddress3" :{
 "value": "10.2.30.7"
 },
 "vnetName2_data2_region2_PrivateAddress4" :{
 "value": "10.2.30.8"
 },
 "vnetName2_data2_region2_PrivateAddress5" :{
 "value": "10.2.30.9"
 }
}

```

15. Verify if all the configurations in the ARM\_TMPL\_GSLB\_PARAM.json file are correct and then save the changes.
16. Open the ARM\_TMPL\_GSLB\_1.json from the downloaded folder with a text editor.
17. Update the following variables:

```

"vnetName1": "vnet1",
...
...
"vnetName2": "vnet2",

```

18. Verify if all the configurations in the ARM\_TMPL\_GSLB\_1.json file are correct and then save the changes.

## Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a Azure resource group:

```

PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"

```

### Example:

```

PS C:\Users\TestUser\Templates> az group create --name gslb-rg1 --location "south central us"

```

```
{
 "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",
 "location": "southcentralus",
 "managedBy": null,
 "name": "gslb-rg1",
 "properties": {
 "provisioningState": "Succeeded"
 },
 "tags": null,
 "type": "Microsoft.Resources/resourceGroups"
}
```

Here, **gslb-rg1** resource group is created.

3. Run the following command to create a Azure deployment group.

```
PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>
```

#### Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g gslb-rg1
--template-file ARM_TMPL_GSLB_1.json --parameters ARM_TMPL_GSLB_
PARAM.json
```

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource\_group\_name>**.

In total, ten virtual machine instances is created i.e. six vThunder instances and four Linux real servers.

Figure 206 : Resource listing in the resource group

[illegible]

5. Verify if the private IP and public IP for each of the ten virtual machine instances are assigned correctly in the <resource\_group\_name> > <virtual\_machine\_name> > **Settings** > **Networking**. To do so, perform the following steps:
  - a. Select the management interface tab to verify the primary public IP, private IP, and security rule.

Figure 207 : Selected virtual machine - Networking window - Management interface tab

Home > Resource groups > gpo-rg1 > vthundereastus1

## vthundereastus1 | Networking

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

**Networking**

Connect

Disks

Size

Microsoft Defender for Cloud

Advisor recommendations

Extensions + applications

Continuous delivery

Availability + scaling

Configuration

Identity

Properties

Locks

Operations

Backup

Auto shutdown

Attach network interface Detach network interface

mgmttestus1 data1testus1 data2testus1

if configuration ( )  
(spoofing) (Primary)

**Network interface: mgmttestus1** Effective security rules Troubleshoot VM connection issues Topology

Virtual network/subnet: eastusnet1/mgmt\_subnet1 N/A Public IP: 40.121.165.234 N/A Private IP: 10.1.195.5 Accelerated networking: Disabled

**Inbound port rules** Outbound port rules Application security groups Load balancing

Network security group nsgman1region1 (attached to network interface: mgmttestus1)  
Impacts 0 subnets, 5 network interfaces

Add inbound port rule

| Priority | Name                          | Port | Protocol | Source            | Destination    | Action |
|----------|-------------------------------|------|----------|-------------------|----------------|--------|
| 1000     | Port_22                       | 22   | TCP      | 0.0.0.0/0         | Any            | Allow  |
| 1010     | https                         | 443  | TCP      | Any               | Any            | Allow  |
| 1020     | http                          | 80   | TCP      | Any               | Any            | Allow  |
| 1030     | gpoip                         | 4749 | Any      | Any               | Any            | Allow  |
| 1050     | ntp                           | 123  | UDP      | Any               | Any            | Allow  |
| 65000    | AllowVnetInBound              | Any  | Any      | VirtualNetwork    | VirtualNetwork | Allow  |
| 65001    | AllowAzureLoadBalancerInBound | Any  | Any      | AzureLoadBalancer | Any            | Allow  |
| 65500    | DenyAllInBound                | Any  | Any      | Any               | Any            | Deny   |

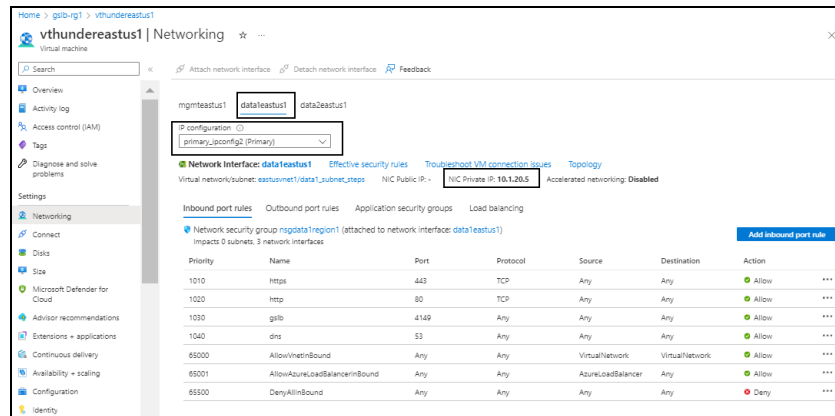
Need help?

Understand Azure load balancing

Quickstart: Create a public load balancer to load balance Virtual Machines

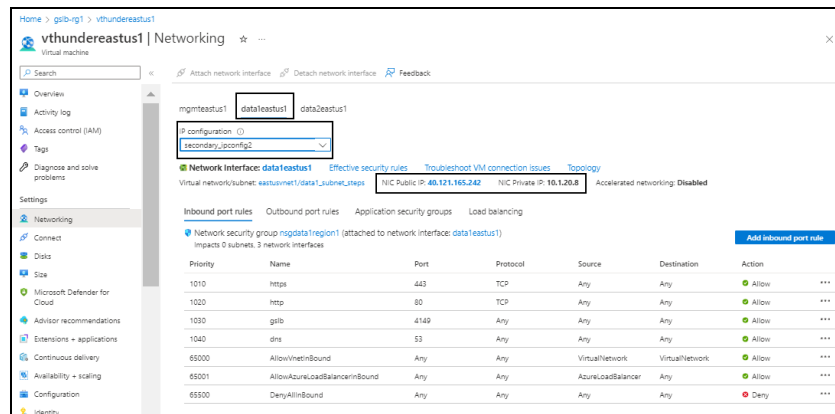
- b. Select the data interface tab to verify the primary private IP.

Figure 208 : Data interface tab - Primary configuration



- c. On the data interface tab, verify the secondary private IP and public IP.

Figure 209 : Data interface tab - Secondary configuration



## Configure vThunder as an SLB

The following topics are covered:

- [Initial Setup](#)
- [Change Password](#)
- [Deploy vThunder as an SLB](#)

## Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_GSLB\_SLB\_PARAM.json file with a text editor.

**NOTE:** Each parameter has a default value mentioned in the parameter file.

2. Configure SLB server host or domain for site devices.

```
{
 "slbServerHostOrDomain1": {
 "servername": "s1",
 "host": "10.1.30.8",
 "health-check-disable": 1,
 "action": "enable"
 },
 "slbServerHostOrDomain2": {
 "servername": "s1",
 "host": "10.1.30.9",
 "health-check-disable": 1,
 "action": "enable"
 },
 "slbServerHostOrDomain3": {
 "servername": "s1",
 "host": "10.2.30.8",
 "health-check-disable": 1,
 "action": "enable"
 },
 "slbServerHostOrDomain4": {
 "servername": "s1",
 "host": "10.2.30.9",
 "health-check-disable": 1,
 "action": "enable"
 },
}
```

### 3. Configure SLB server port for site devices.

```
"slbServerPortList1": {
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "health-check-disable": 1
 }
]
},
"slbServerPortList2": {
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "health-check-disable": 1
 }
]
},
"slbServerPortList3": {
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "health-check-disable": 1
 }
]
},
"slbServerPortList4": {
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "health-check-disable": 1
 }
]
},
```

#### 4. Configure service group port for site devices.

```
"serviceGroupList1": {
 "value": [
 {
 "name": "sg",
 "protocol": "tcp",
 "health-check-disable": 0,
 "member-list": [
 {
 "name": "s1",
 "port": 80
 }
]
 }
],
},
"serviceGroupList2": {
 "value": [
 {
 "name": "sg",
 "protocol": "tcp",
 "health-check-disable": 0,
 "member-list": [
 {
 "name": "s1",
 "port": 80
 }
]
 }
],
},
"serviceGroupList3": {
 "value": [
 {
 "name": "sg",
 "protocol": "tcp",
 "health-check-disable": 0,
```



```

 "member-list": [
 {
 "name": "s1",
 "port": 80
 }
]
 },
 "serviceGroupList4": {
 "value": [
 {
 "name": "sg",
 "protocol": "tcp",
 "health-check-disable": 0,
 "member-list": [
 {
 "name": "s1",
 "port": 80
 }
]
 }
]
 }
},

```

##### 5. Configure SLB virtual server for site devices.

The virtual server's default name is "vs1".

```

"virtualServerList1": {
 "virtual-server-name": "vs1",
 "metadata": {
 "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
 },
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "auto": 1,

```

```
 "service-group": "sg"
 }
]
 },
 "virtualServerList2": {
 "virtual-server-name": "vs1",
 "metadata": {
 "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
 },
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "auto": 1,
 "service-group": "sg"
 }
]
 },
 "virtualServerList3": {
 "virtual-server-name": "vs1",
 "metadata": {
 "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
 },
 "value": [
 {
 "port-number": 80,
 "protocol": "tcp",
 "auto": 1,
 "service-group": "sg"
 }
]
 },
 "virtualServerList4": {
 "virtual-server-name": "vs1",
 "metadata": {
```

```

 "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
 },
 "value": [
 {
 "port-number":80,
 "protocol":"tcp",
 "auto":1,
 "service-group":"sg"
 }
]
},

```

## 6. Configure GSLB service IP address for controller.

```

"serviceipList1": {
 "node-name": "vs1",
 "value": [
 {
 "port-num": 80,
 "port-proto": "tcp"
 }
]
},
"serviceipList2": {
 "node-name": "vs2",
 "value": [
 {
 "port-num": 80,
 "port-proto": "tcp"
 }
]
},
"serviceipList3": {
 "node-name": "vs3",
 "value": [
 {
 "port-num": 80,
 "port-proto": "tcp"
 }
]
}

```

```

 }
],
 "serviceipList4": {
 "node-name": "vs4",
 "value": [
 {
 "port-num": 80,
 "port-proto": "tcp"
 }
]
 },

```

## 7. Configure GSLB site details for controller.

```

"siteList1": {
 "site-name": "eastus_1",
 "vip-name": "vs1",
 "device-name": "slb1",
 "geo-location": "North America,United States"
},
"siteList2": {
 "site-name": "eastus_2",
 "vip-name": "vs2",
 "device-name": "slb2",
 "geo-location": "North America,United States"
},
"siteList3": {
 "site-name": "eastus2_1",
 "vip-name": "vs3",
 "device-name": "slb3",
 "geo-location": "North America.United States.California.San
Jose"
},
"siteList4": {
 "site-name": "eastus2_2",
 "vip-name": "vs4",
 "device-name": "slb4",
 "geo-location": "North America.United States.California.San

```

```
Jose"
 },
```

#### 8. Configure system geo location details for controller.

```
"geolocation": {
 "geo-location-iana": "0",
 "geo-location-geolite2-city": "1",
 "geolite2-city-include-ipv6": "0",
 "geo-location-geolite2-country": "0"
},
```

#### 9. Configure GSLB DNS policy for controller.

```
"dnsPolicy": {
 "policy-name": "a10",
 "type": "health-check, geographic"
},
```

#### 10. Configure GSLB virtual server for controller.

```
"gslbserverList1": {
 "virtual-server-name": "gslb-server",
 "ip-address": "10.1.20.8",
 "metadata": {
 "description": "gslb virtual server is using VIP from
ethernet 1 secondary subnet"
 },
 "value": [
 {
 "port-number": 53,
 "protocol": "udp",
 "gslb-enable": 1
 }
]
},
"gslbserverList2": {
 "virtual-server-name": "gslb-server",
 "ip-address": "10.2.20.8",
 "metadata": {
 "description": "gslb virtual server is using VIP from
ethernet 1 secondary subnet"
```

```

 },
 "value": [
 {
 "port-number": 53,
 "protocol": "udp",
 "gslb-enable": 1
 }
]
 },

```

#### 11. Configure GSLB protocol status for controller.

```

 "gslbprotocolStatus": {
 "status-interval": 1
 },

```

#### 12. Configure GSLB group for controller.

```

 "gslbcontrollerGroup1": {
 "name": "default",
 "priority": 255
 },
 "gslbcontrollerGroup2": {
 "name": "default",
 "priority": 100
 },

```

#### 13. Configure GSLB zone for controller.

```

 "gslbzone": {
 "service-port": 80,
 "service-name": "www",
 "name" : "gslb.a10.com"
 },

```

#### 14. Configure default route for vThunder instances.

```

 "defaultroute1":
 {
 "next-hop": "10.1.20.1"
 },
 "defaultroute2":
 {

```

```
"next-hop": "10.2.20.1"
}
```

15. Provide the resource group name.

```
"resourceGroupName": "gslb-test-rg"
"vThUsername": "admin"
```

**NOTE:** Do not change the vThunder instance username.

16. Verify if all the configurations in the ARM\_TMPL\_GSLB\_SLB\_PARAM.json file are correct and then save the changes.

## Change Password

To change the password for the vThunder instances, site devices, and servers, perform the following steps:

1. Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_GSLB_CHANGE_PASSWORD_2.ps1
```

**NOTE:** It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```
Enter Default Password:***
Enter New Password:***
Confirm New Password:***
```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

## Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_GSLB_CONFIG_3.ps1 -
resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_GSLB_CONFIG_3.ps1 -
resourceGroup gslb-rg1
```

---

**NOTE:** Except for the real server ip addresses, all other IP addresses are dynamically obtained from user environment.

---

3. Verify the following for each site devices:
  - Interfaces are enabled
  - SLB is configured
  - Site device is enabled to be a GSLB device.
  - Default route is configured pointing to the client-side data interface for traffic to exit the vThunder.
4. Verify the following for each GSLB controller:
  - Interfaces are enabled
  - vThunder device is configured with the required GSLB configuration
  - Geo location is enabled.
  - Default route is configured pointing to the client-side data interface for traffic to exit the vThunder.

## Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)



## Access vThunder using CLI

---

To access vThunder using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
  - Hostname: Public IP of Virtual Machine Instance  
Here, Public IP of `vthundereastus1`,  
`vthundereastus2`, `vthundereastus3`, `vthundereastus21`,  
`vthundereastus22`, `vthundereastus23`
  - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <---Enter username provided by A10 Networks Support--->
Using keyboard-interactive authentication.
Password: xxxx <---Enter your password--->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vThunder> enable <---Execute command--->
Password:<---just press Enter key--->
vThunder#config <---Configuration mode--->
```

## Access vThunder using GUI

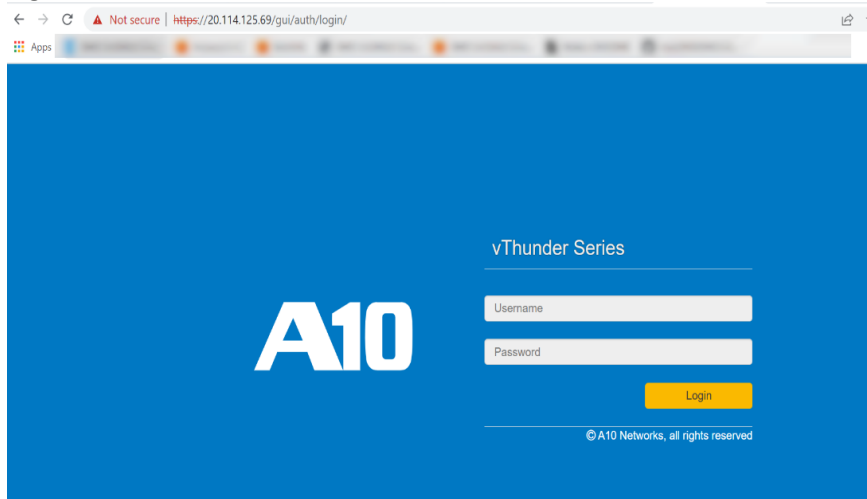
---

To access vThunder using GUI, perform the following steps:

1. Open any browser.

2. Enter `https://<vthunder_public_IP>` in the address bar.

Figure 210 : vThunder GUI



3. Enter the recently configured user credentials.  
The home page gets displayed.

## Access Linux Server using CLI

To access Real Server using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
  - Hostname: Public IP of Linux Ubuntu machine  
Here, Public IP of `linuxeastus1`, `linuxeastus2`, `linuxeastus21`, `linuxeastus22`
  - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, enter the following:

```
ubuntu login: vth-user <---Username--->
Password: vth-Password <---Password--->
.
.
.
```

```
.
vth-user@vth-user:~$
```

## Verify Deployment

To verify deployment using the ARM template, perform the following steps:

1. Verify SLB configuration on the following vThunder instances:

### CONTROLLER 1 - Master configuration

Run the following command:

```
vThunder-gslb:Master(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder master controller:

```
no system geo-location load iana
system geo-location load GeoLite2-City
!
!
interface management
 ip address dhcp
!
interface ethernet 1
 enable
 ip address dhcp
!
interface ethernet 2
 enable
 ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb virtual-server gslb-server 10.1.20.8
 port 53 udp
```

```
 gslb-enable
!
gslb service-ip vs1 10.1.20.9
 external-ip 137.117.81.170
 port 80 tcp
!
gslb service-ip vs2 10.1.20.10
 external-ip 137.117.81.196
 port 80 tcp
!
gslb service-ip vs3 10.2.20.9
 external-ip 20.246.2.117
 port 80 tcp
!
gslb service-ip vs4 10.2.20.10
 external-ip 20.230.84.149
 port 80 tcp
!
gslb group default
 enable
 priority 255
!
gslb site eastus_1
 geo-location "North America,United States"
 slb-dev slb1 104.211.58.124
 vip-server vs1
!
gslb site eastus_2
 geo-location "North America,United States"
 slb-dev slb2 104.211.58.122
 vip-server vs2
!
gslb site eastus2_1
 geo-location "North America,United States,California.San Jose"
 slb-dev slb3 20.230.76.141
 vip-server vs3
```

```

!
gslb site eastus2_2
 geo-location "North America.United States.California.San Jose"
 slb-dev slb4 20.230.78.91
 vip-server vs4
!
gslb policy a10
 metric-order health-check geographic
 dns server authoritative
!
gslb zone gslb.a10.com
 policy a10
 service 80 www
 dns-a-record vs1 static
 dns-a-record vs2 static
 dns-a-record vs3 static
 dns-a-record vs4 static
!
gslb protocol status-interval 1
!
gslb protocol enable controller

```

## CONTROLLER 2 - Member configuration

Run the following command:

```
vThunder-gslb:Member(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder member controller:

```

interface ethernet 1
 enable
 ip address dhcp
!
interface ethernet 2
 enable
 ip address dhcp
!

```

```
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb virtual-server gslb-server 10.2.20.8
 port 53 udp
 gslb-enable
!
gslb service-ip vs1 10.1.20.9
 external-ip 137.117.81.170
 port 80 tcp
!
gslb service-ip vs2 10.1.20.10
 external-ip 137.117.81.196
 port 80 tcp
!
gslb service-ip vs3 10.2.20.9
 external-ip 20.246.2.117
 port 80 tcp
!
gslb service-ip vs4 10.2.20.10
 external-ip 20.230.84.149
 port 80 tcp
!
gslb group default
 enable
 primary 20.232.185.150
!
gslb site eastus_1
 geo-location "North America,United States"
 slb-dev slb1 104.211.58.124
 vip-server vs1
!
gslb site eastus_2
 geo-location "North America,United States"
 slb-dev slb2 104.211.58.122
 vip-server vs2
```

```

!
gslb site eastus2_1
 geo-location "North America.United States.California.San Jose"
 slb-dev slb3 20.230.76.141
 vip-server vs3
!
gslb site eastus2_2
 geo-location "North America.United States.California.San Jose"
 slb-dev slb4 20.230.78.91
 vip-server vs4
!
gslb policy a10
 metric-order health-check geographic
 dns server authoritative
!
gslb zone gslb.a10.com
 policy a10
 service 80 www
 dns-a-record vs1 static
 dns-a-record vs2 static
 dns-a-record vs3 static
 dns-a-record vs4 static
!
gslb protocol status-interval 1
!
gslb protocol enable controller

```

### SITE1 REGION1 configuration

Run the following command:

```
vThunder(config)(NOLICENSE)#show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site1 region1:

```

interface management
 ip address dhcp
!

```

```
interface ethernet 1
 enable
 ip address dhcp
!
interface ethernet 2
 enable
 ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb server s1 10.1.30.8
 health-check disable
 port 80 tcp
 health-check disable
!
slb service-group sg tcp
 member s1 80
!
slb virtual-server vs1 10.1.20.9
 port 80 tcp
 source-nat auto
 service-group sg
!
!
gslb protocol enable device
```

### SITE2 REGION1 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site1 region2:

```
interface management
 ip address dhcp
!
```



```
interface ethernet 1
 enable
 ip address dhcp
!
interface ethernet 2
 enable
 ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb server s1 10.1.30.9
 health-check disable
 port 80 tcp
 health-check disable
!
slb service-group sg tcp
 member s1 80
!
slb virtual-server vs1 10.1.20.10
 port 80 tcp
 source-nat auto
 service-group sg
!
!
gslb protocol enable device
```

### SITE1 REGION2 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site1 region2:

```
interface management
 ip address dhcp
!
```

```
interface ethernet 1
 enable
 ip address dhcp
!
interface ethernet 2
 enable
 ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb server s1 10.2.30.8
 health-check disable
 port 80 tcp
 health-check disable
!
slb service-group sg tcp
 member s1 80
!
slb virtual-server vs1 10.2.20.9
 port 80 tcp
 source-nat auto
 service-group sg
!
!
gslb protocol enable device
```

### SITE2 REGION2 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site2 region2:

```
interface management
 ip address dhcp
!
```

```
interface ethernet 1
 enable
 ip address dhcp
!
interface ethernet 2
 enable
 ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb server s1 10.2.30.9
 health-check disable
 port 80 tcp
 health-check disable
!
slb service-group sg tcp
 member s1 80
!
slb virtual-server vs1 10.2.20.10
 port 80 tcp
 source-nat auto
 service-group sg
!
!
gslb protocol enable device
```

2. Run the following command on vThunder to verify the GSLB group information:

### CONTROLLER - Master configuration

Run the following command:

```
vThunder-gslb:Master(NOLICENSE) #show gslb group
```

If the deployment is successful, the following configuration is displayed:

```
Pri = Priority, Attrs = Attributes
S-Cfg = Secure Config
```

```

S-State = Secure Status
D = Disabled, L = Learn
P = Passive, * = Master
E = Enabled, EF = Enable-Fallback
Unsec = Unsecure, Unkwn = Unknown
Estng = Establishing, Estd = Established
Group: default, Master: local
Member Sys-ID Pri Attrs Status S-Cfg
S-State Address

local e592163a 255 L* OK
vThunder 58547cbd 100 L Synced D
Unsec 20.109.98.187

```

## CONTROLLER - Member configuration

Run the following command:

```
vThunder-gslb:Member (NOLICENSE) #show gslb group
```

If the deployment is successful, the following configuration is displayed:

```

Pri = Priority, Attrs = Attributes
S-Cfg = Secure Config
S-State = Secure Status
D = Disabled, L = Learn
P = Passive, * = Master
E = Enabled, EF = Enable-Fallback
Unsec = Unsecure, Unkwn = Unknown
Estng = Establishing, Estd = Established
Group: default, Master: vThunder
Member Sys-ID Pri Attrs Status S-Cfg
S-State Address

local 58547cbd 100 L OK
vThunder e592163a 255 PL* Synced D
Unsec 20.232.185.150

```

- Run the following command on vThunder to verify the GSLB protocol information:

### CONTROLLER - Master configuration

Run the following command:

```
vThunder-gslb:Master(NOLICENSE)#show gslb protocol
```

If the deployment is successful, the following configuration is displayed:

```
GSLB site: eastus_1
 SLB device: slb1 (10.1.20.5:4108) Established
 Session ID: 2869
 Secure Config: Disable |Current SSL State:
 Unsecure
 Connection succeeded: 1 |Connection failed:
 1
 Open packet sent: 1 |Open packet received:
 1
 Open session succeeded: 1 |Open session failed:
 0
 Sessions Dropped: 0 |Update packet received:
 7346
 Keepalive packet sent: 123 |Keepalive packet
received: 122
 Notify packet sent: 0 |Notify packet received:
 0
 Message Header Error: 0 |Protocol RDT(ms):
 40
 GSLB Protocol Version: 2 |Peer ACOS Version:
 5.2.0 Build 155
 Secure negotiation Success: 0 |Secure negotiation
Failures: 0
 SSL handshake Success: 0 |SSL handshake Failures:
 0

GSLB site: eastus_2
 SLB device: slb2 (10.1.20.5:2260) Established
```

```

Session ID: 7186
Secure Config: Disable |Current SSL State:
 Unsecure
Connection succeeded: 1 |Connection failed:
 1
Open packet sent: 1 |Open packet received:
 1
Open session succeeded: 1 |Open session failed:
 0
Sessions Dropped: 0 |Update packet received:
 7344
Keepalive packet sent: 123 |Keepalive packet
received: 122
Notify packet sent: 0 |Notify packet received:
 0
Message Header Error: 0 |Protocol RDT(ms):
 32
GSLB Protocol Version: 2 |Peer ACOS Version:
 5.2.0 Build 155
Secure negotiation Success: 0 |Secure negotiation
Failures: 0
SSL handshake Success: 0 |SSL handshake Failures:
 0

GSLB site: eastus2_1
 SLB device: slb3 (10.1.20.5:6668) Established
Session ID: 1353
Secure Config: Disable |Current SSL State:
 Unsecure
Connection succeeded: 1 |Connection failed:
 0
Open packet sent: 1 |Open packet received:
 1
Open session succeeded: 1 |Open session failed:
 0
Sessions Dropped: 0 |Update packet received:

```

```

7346
 Keepalive packet sent: 123 |Keepalive packet
received: 122
 Notify packet sent: 0 |Notify packet received:
0
 Message Header Error: 0 |Protocol RDT(ms):
20
 GSLB Protocol Version: 2 |Peer ACOS Version:
5.2.0 Build 155
 Secure negotiation Success: 0 |Secure negotiation
Failures: 0
 SSL handshake Success: 0 |SSL handshake Failures:
0

GSLB site: eastus2_2
 SLB device: slb4 (10.1.20.5:12936) Established
 Session ID: 46932
 Secure Config: Disable |Current SSL State:
Unsecure
 Connection succeeded: 1 |Connection failed:
0
 Open packet sent: 1 |Open packet received:
1
 Open session succeeded: 1 |Open session failed:
0
 Sessions Dropped: 0 |Update packet received:
7348
 Keepalive packet sent: 124 |Keepalive packet
received: 123
 Notify packet sent: 0 |Notify packet received:
0
 Message Header Error: 0 |Protocol RDT(ms):
20
 GSLB Protocol Version: 2 |Peer ACOS Version:
5.2.0 Build 155
 Secure negotiation Success: 0 |Secure negotiation

```

```

Failures: 0
SSL handshake Success: 0 |SSL handshake Failures:
 0

GSLB protocol is disabled for site devices.

```

## CONTROLLER - Member configuration

Run the following command on vThunder to verify the GSLB protocol information:

```
vThunder-gslb:Member(NOLICENSE) #show gslb protocol
```

If the deployment is successful, the following configuration is displayed:

```

GSLB site: eastus_1
SLB device: slb1 (10.2.20.5:4626) GroupControl
Session ID: Not Available
Secure Config: None |Current SSL State:
 None
Connection succeeded: 1 |Connection failed:
 1
Open packet sent: 1 |Open packet received:
 1
Open session succeeded: 1 |Open session failed:
 0
Sessions Dropped: 12 |Update packet received:
 1
Keepalive packet sent: 2 |Keepalive packet
received: 1
Notify packet sent: 0 |Notify packet received:
 0
Message Header Error: 0 |Protocol RDT(ms):
 0
GSLB Protocol Version: 2
Secure negotiation Success: 0 |Secure negotiation
Failures: 0
SSL handshake Success: 0 |SSL handshake Failures:
 0

```



```

GSLB site: eastus_2
 SLB device: slb2 (10.2.20.5:18556) GroupControl
 Session ID: Not Available
 Secure Config: None |Current SSL State:
 None
 Connection succeeded: 1 |Connection failed:
 1
 Open packet sent: 1 |Open packet received:
 1
 Open session succeeded: 1 |Open session failed:
 0
 Sessions Dropped: 1 |Update packet received:
 14
 Keepalive packet sent: 2 |Keepalive packet
received: 1
 Notify packet sent: 0 |Notify packet received:
 0
 Message Header Error: 0 |Protocol RDT(ms):
 0
 GSLB Protocol Version: 2
 Secure negotiation Success: 0 |Secure negotiation
Failures: 0
 SSL handshake Success: 0 |SSL handshake Failures:
 0

GSLB site: eastus2_1
 SLB device: slb3 (10.2.20.5:13002) GroupControl
 Session ID: Not Available
 Secure Config: None |Current SSL State:
 None
 Connection succeeded: 1 |Connection failed:
 1
 Open packet sent: 1 |Open packet received:
 1
 Open session succeeded: 1 |Open session failed:
 0

```

```

Sessions Dropped: 1 |Update packet received:
 10
Keepalive packet sent: 2 |Keepalive packet
received: 1
Notify packet sent: 0 |Notify packet received:
 0
Message Header Error: 0 |Protocol RDT(ms):
 0
GSLB Protocol Version: 2
Secure negotiation Success: 0 |Secure negotiation
Failures: 0
SSL handshake Success: 0 |SSL handshake Failures:
 0

GSLB site: eastus2_2
 SLB device: slb4 (10.2.20.5:1200) GroupControl
 Session ID: Not Available
 Secure Config: None |Current SSL State:
 None
Connection succeeded: 1 |Connection failed:
 0
Open packet sent: 1 |Open packet received:
 1
Open session succeeded: 1 |Open session failed:
 0
Sessions Dropped: 1 |Update packet received:
 18
Keepalive packet sent: 2 |Keepalive packet
received: 1
Notify packet sent: 0 |Notify packet received:
 0
Message Header Error: 0 |Protocol RDT(ms):
 0
GSLB Protocol Version: 2
Secure negotiation Success: 0 |Secure negotiation
Failures: 0

```

```
SSL handshake Success: 0 |SSL handshake Failures:
 0

GSLB protocol is disabled for site devices.
```

## Verify Traffic Flow

The traffic flow can be tested using the following:

- [DNS Lookup](#)
- [WGET](#)

## DNS Lookup

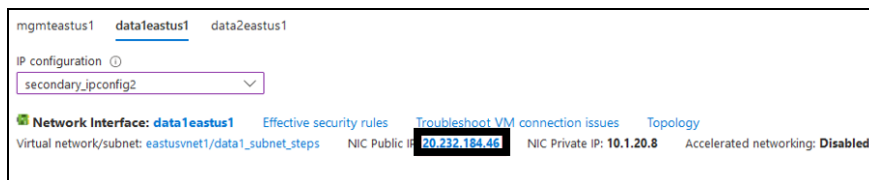
To verify the traffic flow from via vThunder, perform the following:

1. Perform a DNS lookup on server1 of region1 using the master controller's client-side data interface public IP in the following command:

```
$ dig @master_controller_data_public_IP www.gslb.a10.com
```

The master controller's client-side data interface public IP is used as DNS server IP. You can get the public IP from **Azure Portal** > **Azure Services** > **Resource Group** > <resource\_group\_name> > <master\_controller\_region1> > **Settings** > **Networking**.

Figure 211 : Master Controller Data Interface Public IP



The following response is received:

```
$ dig @20.232.184.46 www.gslb.a10.com

; <<>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.8 <<>> @20.232.184.46
www.gslb.a10.com
```

```

; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 11393
;; flags: qr rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:: udp: 1400
;; QUESTION SECTION:
;www.gslb.a10.com. IN A

;; ANSWER SECTION:
www.gslb.a10.com. 10 IN A 20.1.129.29
www.gslb.a10.com. 10 IN A 20.97.231.193
www.gslb.a10.com. 10 IN A 20.232.22.199
www.gslb.a10.com. 10 IN A 20.232.18.146

;; Query time: 82 msec
;; SERVER: 20.232.184.46#53(20.232.184.46)
;; WHEN: Wed Aug 31 00:11:40 PDT 2022
;; MSG SIZE rcvd: 125

```

## 2. Perform the DNS lookup again.

```

$ dig @20.232.184.46 www.gslb.a10.com

; <<>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.8 <<>> @20.232.184.46
www.gslb.a10.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 57272
;; flags: qr rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:: udp: 1400
;; QUESTION SECTION:

```

```

;www.gslb.a10.com. IN A

;; ANSWER SECTION:
www.gslb.a10.com. 10 IN A 20.97.231.193
www.gslb.a10.com. 10 IN A 20.1.129.29
www.gslb.a10.com. 10 IN A 20.232.22.199
www.gslb.a10.com. 10 IN A 20.232.18.146

;; Query time: 85 msec
;; SERVER: 20.232.184.46#53(20.232.184.46)
;; WHEN: Wed Aug 31 00:11:46 PDT 2022
;; MSG SIZE rcvd: 125

```

The response is received with shuffled server IP addresses.

## WGET

To verify the traffic flow via vThunder, perform the following:

1. Run the following command in the Terminal window of the Linux server1 of region1 instance to create an Apache Server virtual machine:

```
$ sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

2. From **Azure Portal** > **Azure Services** > **Resource Group** > <resource\_group\_name> > <site\_device\_region1> > **Settings** > **Networking**, select the secondary data interface public IP.
3. Run the following command on the Linux server1 of region1:

```
$ wget site_device_secondary_data_public_ip
```

The following response is received:

```

$ wget 20.232.22.199
--2023-01-09 17:49:47-- http://20.232.22.199/
Connecting to 20.232.22.199:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11321 (11K) [text/html]

```

```
Saving to: 'index.html.4'
```

```
index.html.4 100%
```

```
[=====
```

```
=====] 10.42K --.-KB/s in 0s
```

```
2023-01-09 17:49:47 (63.8 MB/s) - 'index.html.4' saved [1067
```

# Troubleshooting

---

## Common Errors

While deploying the templates, you might encounter some errors or issues. The common errors and issues are listed below:

### **Unauthorized**

This error is encountered when your credentials are incorrect or missing. Provide the correct credentials in the respective powershell script.

Given below is an example of the error:

```
Line |
149 | ... $response = Invoke-RestMethod -SkipCertificateCheck -Uri $Url -
Method ...
 |
~~~~~
      | {   "response": {       "status": "fail",       "err": {
"code": 1208008960,           "from": "HTTP",           "msg": "Unauthorized"
}   } }
```

### **The storage account named vthunderstorage already exists under the subscription.**

This error is encountered if the storage account name is already in use. Provide a unique storage account name in the parameter json file.

Given below is an example of the error:

```
{"status":"Failed","error":{"code":"DeploymentFailed","message":"At
least one resource deployment operation failed. Please list deployment
operations for details. Please see https://aka.ms/DeployOperations for
usage details.,"details":[{"code":"BadRequest","message":{"\r\n
\"error\": {\r\n    \"code\": \"DnsRecordInUse\", \r\n    \"message\":
\"DNS record vth-inst1.southcentralus.cloudapp.azure.com is already used
by another public IP.\", \r\n    \"details\": []\r\n } \r\n}"}},
{"code":"Conflict","message":{"\r\n    \"error\": {\r\n    \"code\":
```

```
\ "StorageAccountAlreadyExists\", \r\n    \ "message\": \ "The storage
account named vthunderstorage already exists under the
subscription.\ " \r\n    } \r\n }" ] ] ] }
```

### **Cannot bind argument to parameter 'Container' because it is null**

This error is encountered if the 'server.pem' is not available at the mentioned path or if the path format is incorrect. Provide a correct path of the 'server.pem' in the parameter json file.

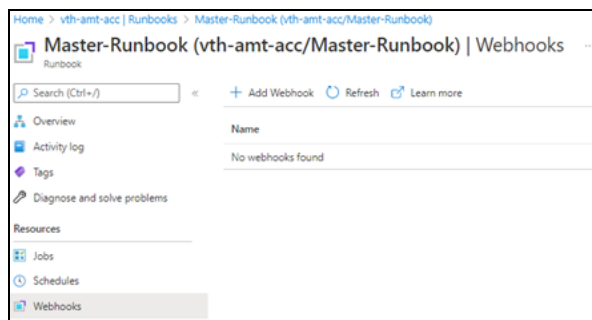
Given below is an example of the error:

```
Set -AzStorageBlobContent @blobSSL
Cannot bind argument to parameter 'Container' because it is null.
```

### **Cannot validate argument on parameter 'Uri'**

This error is encountered if webhook URL is not configured or it already exists. Delete 'master-webhook' from **Azure Portal** > **Automation Account** > **Runbooks** and ensure it is empty before the running webhook script.

Figure 212 : Master Runbook



Given below is an example of the error:

```
... -Invoke-WebRequest -Method POST -Uri $webHookURL.WebhookURI -UseBas
...
Cannot validate argument on parameter 'Uri'. The argument is null or
empty. Provide an argument that is not null or empty, and then try the
command again.
```

### **Runbook Job failed or not working**

If the Runbook job has failed or is not working, re-run the master runbook.

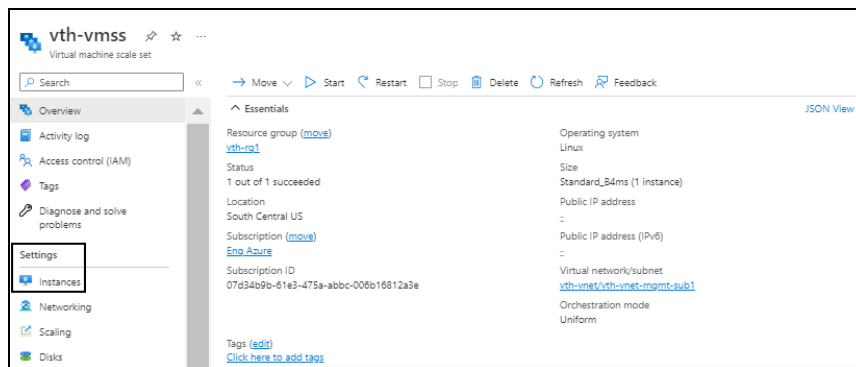


To re-run the master runbook, perform the following steps:

1. From **Azure Portal**, navigate to **Azure Services > Virtual machine scale sets > <vmss\_name>**.

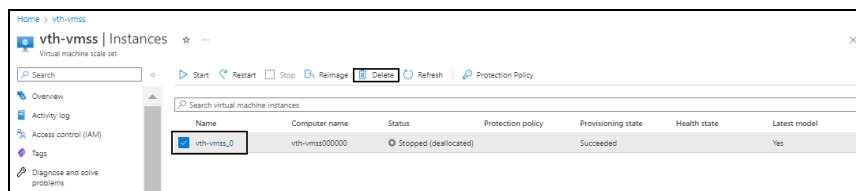
The selected vmss - Overview window is displayed.

Figure 213 : Selected vmss - Overview window



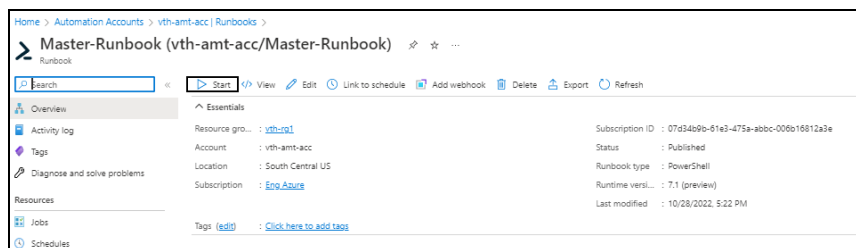
2. Click **Instances** from the left **Settings** panel.
- The selected vmss - Instances window is displayed.

Figure 214 : Selected vmss - Instances window



3. Click **Delete** to delete all the vmss instances.
4. From the Master-Runbook Job window, click **Start** to re-run the master runbook.

Figure 215 : Master-Runbook Job window



**NOTE:** It may take the system a few minutes to display the completed status.

---

5. Verify if all the runbook jobs have completed status.

# Appendix

---

The following topics are covered:

|                                                      |     |
|------------------------------------------------------|-----|
| <a href="#">List of Custom Role Permissions</a>      | 367 |
| <a href="#">Azure Service Application Access Key</a> | 372 |
| <a href="#">Default Password Policy</a>              | 385 |

## List of Custom Role Permissions

The following is the list of custom role permissions:

```
"Microsoft.Automation/automationAccounts/variables/read",
"Microsoft.Automation/automationAccounts/variables/write",
"Microsoft.Automation/automationAccounts/variables/delete",
"Microsoft.Automation/automationAccounts/runbooks/read",
"Microsoft.Automation/automationAccounts/runbooks/content/read",
"Microsoft.Automation/automationAccounts/jobs/write",
"Microsoft.Automation/automationAccounts/jobSchedules/write",
"Microsoft.Automation/automationAccounts/jobs/read",
"Microsoft.Automation/automationAccounts/jobs/output/read",
"Microsoft.Automation/automationAccounts/runbooks/operationResults/read",
"Microsoft.Automation/automationAccounts/jobs/streams/read",
"Microsoft.Automation/automationAccounts/jobSchedules/read",
"Microsoft.OperationalInsights/workspaces/sharedKeys/action",
"Microsoft.OperationalInsights/workspaces/read"

"Microsoft.Compute/virtualMachineScaleSets/read",
"Microsoft.Compute/virtualMachineScaleSets/write",
"Microsoft.Compute/virtualMachineScaleSets/delete",
"Microsoft.Compute/virtualMachineScaleSets/delete/action",
"Microsoft.Compute/virtualMachineScaleSets/start/action",
"Microsoft.Compute/virtualMachineScaleSets/powerOff/action",
"Microsoft.Compute/virtualMachineScaleSets/restart/action",
"Microsoft.Compute/virtualMachineScaleSets/deallocate/action",
"Microsoft.Compute/virtualMachineScaleSets/scale/action",
```

```
"Microsoft.Compute/virtualMachineScaleSets/networkInterfaces/read",
"Microsoft.Compute/virtualMachineScaleSets/publicIPAddresses/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/logDefinitions/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/diagnosticSettings/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/diagnosticSettings/write",
"Microsoft.Compute/virtualMachineScaleSets/instanceView/read",
"Microsoft.Compute/virtualMachineScaleSets/skus/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/metricDefinitions/read",
"Microsoft.Compute/virtualMachineScaleSets/vmSizes/read",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/read",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/write",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/delete",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/start/action",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/powerOff/action",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/restart/action",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/deallocate/action",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/instanceView/read",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/networkInterfaces/read",
```

```
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/networkInterfaces/ipConfigurations/read",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/networkInterfaces/ipConfigurations/publicIPAddresses/read",

"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/providers/Microsoft.Insights/metricDefinitions/read",

"Microsoft.Compute/locations/vmSizes/read",
"Microsoft.Compute/virtualMachines/read",
"Microsoft.Compute/virtualMachines/write",
"Microsoft.Compute/virtualMachines/delete",
"Microsoft.Compute/virtualMachines/start/action",
"Microsoft.Compute/virtualMachines/powerOff/action",
"Microsoft.Compute/virtualMachines/deallocate/action",
"Microsoft.Compute/virtualMachines/restart/action",

"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/logDefinitions/read",

"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/diagnosticSettings/read",

"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/diagnosticSettings/write",
"Microsoft.Compute/virtualMachines/instanceView/read",

"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/metricDefinitions/read",
"Microsoft.Compute/virtualMachines/vmSizes/read",

"Microsoft.Network/operations/read",

"Microsoft.Network/loadBalancers/read",
"Microsoft.Network/loadBalancers/write",
"Microsoft.Network/loadBalancers/delete",
"Microsoft.Network/loadBalancers/backendAddressPools/read",
```

```
"Microsoft.Network/loadBalancers/backendAddressPools/write",
"Microsoft.Network/loadBalancers/backendAddressPools/delete",
"Microsoft.Network/loadBalancers/backendAddressPools/join/action",

"Microsoft.Network/loadBalancers/backendAddressPools/backendPoolAddresses/
read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/diagnosticSe
ttings/read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/diagnosticSe
ttings/write",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/read",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/join/action",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/read",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/write",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/delete",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/join/action",
"Microsoft.Network/loadBalancers/inboundNatPools/read",
"Microsoft.Network/loadBalancers/inboundNatPools/join/action",
"Microsoft.Network/loadBalancers/inboundNatRules/read",
"Microsoft.Network/loadBalancers/inboundNatRules/write",
"Microsoft.Network/loadBalancers/inboundNatRules/delete",
"Microsoft.Network/loadBalancers/inboundNatRules/join/action",
"Microsoft.Network/loadBalancers/loadBalancingRules/read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/logDefinitio
ns/read",
"Microsoft.Network/loadBalancers/networkInterfaces/read",
"Microsoft.Network/loadBalancers/outboundRules/read",
```

```
"Microsoft.Network/loadBalancers/probes/read",
"Microsoft.Network/loadBalancers/probes/join/action",
"Microsoft.Network/loadBalancers/virtualMachines/read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/metricDefinitions/read",

"Microsoft.Network/networkSecurityGroups/read",
"Microsoft.Network/networkSecurityGroups/write",
"Microsoft.Network/networkSecurityGroups/delete",
"Microsoft.Network/networkSecurityGroups/defaultSecurityRules/read",
"Microsoft.Network/networkSecurityGroups/securityRules/read",
"Microsoft.Network/networkSecurityGroups/securityRules/write",
"Microsoft.Network/networkSecurityGroups/securityRules/delete",

"Microsoft.Network/publicIPAddresses/read",
"Microsoft.Network/publicIPAddresses/write",
"Microsoft.Network/publicIPAddresses/delete",

"Microsoft.Network/virtualNetworks/read",
"Microsoft.Network/virtualNetworks/write",
"Microsoft.Network/virtualNetworks/delete",

"Microsoft.Network/virtualNetworks/subnets/read",
"Microsoft.Network/virtualNetworks/subnets/write",
"Microsoft.Network/virtualNetworks/subnets/delete",

"Microsoft.Network/virtualNetworks/subnets/virtualMachines/read",
"Microsoft.Network/virtualNetworks/virtualMachines/read",

"Microsoft.Network/virtualNetworkGateways/read",
"Microsoft.Network/virtualNetworkGateways/write",
"Microsoft.Network/virtualNetworkGateways/delete",
"microsoft.network/virtualNetworkGateways/natRules/read",
"microsoft.network/virtualNetworkGateways/natRules/write",
"microsoft.network/virtualNetworkGateways/natRules/delete",

"Microsoft.Network/networkInterfaces/read",
```

```
"Microsoft.Network/networkInterfaces/write",  
"Microsoft.Network/networkInterfaces/delete",  
  
"Microsoft.Network/networkProfiles/read",  
"Microsoft.Network/networkProfiles/write",  
"Microsoft.Network/networkProfiles/delete",  
  
"Microsoft.Network/networkInterfaces/ipconfigurations/read",  
  
"Microsoft.Network/networkSecurityGroups/join/action",  
"Microsoft.Network/virtualNetworks/subnets/join/action",  
"Microsoft.Network/networkInterfaces/ipconfigurations/join/action",  
"Microsoft.Network/publicIPAddresses/join/action",  
"Microsoft.Network/virtualNetworks/join/action",
```

## Azure Service Application Access Key

The Azure service application access key is required to access the Azure resources.

The following topics are covered:

- [Use an existing Access Key](#)
- [Create a new Access Key](#)

### Use an existing Access Key

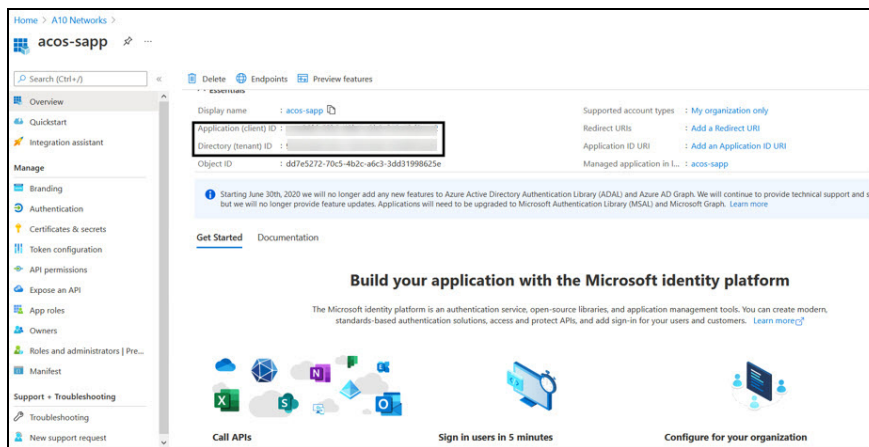
To use an existing Azure service application access key, perform the following steps:

1. From **Azure Portal**, navigate to **Azure Services > Azure Active Directory > App Registration**.  
The list of service applications are displayed under **Owned applications** tab.
2. If you are the owner of the required service application, the required service application would be listed under the **Owned applications** tab. If not, perform the below steps with Administrator privileges:



- a. Select **Owners** from the left **Manage** panel.  
The Owners window appears.
  - b. Select **Add** to get a list of user accounts.
  - c. Search and select your user account.
  - d. Click **Select** to add the user account to your owned application.
3. Select your service application from the list of applications.  
The selected service application window is displayed.

Figure 216 : Selected Service application window



4. Copy and save the Client ID, Tenant ID from the service application window.

```
client_id= 'cc4c86xx-65b3-48xx-a3xx-610cxxxxxxxx'
tenant_id= '91d27axx-8cax-41xx-82xx-3d1bxxxxxxxx'
```

## Create a new Access Key

To create a new Azure service application access key, perform the following steps with Administrator privileges:

1. [Create a Role](#)
2. [Register a Service Application](#)
3. [Associate Service Application with a Role](#)
4. [Create Certificate and Secrets](#)

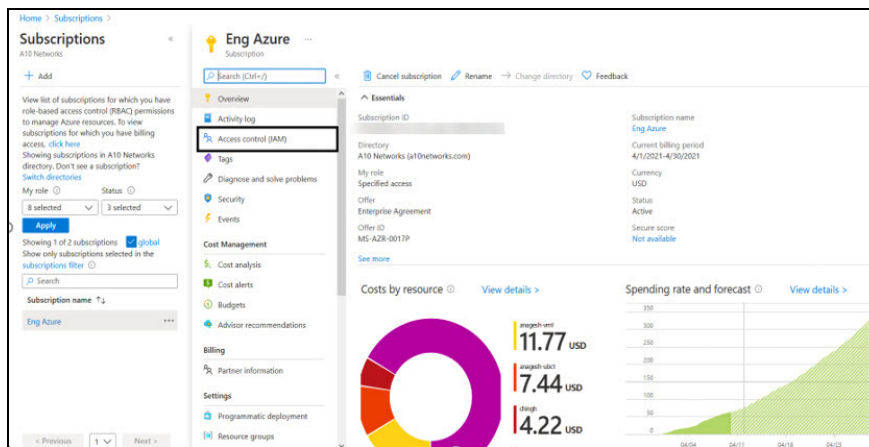
5. [Collect Azure Access Key](#)
6. [Import Azure Access Key](#)

## Create a Role

To create a custom role, perform the following steps:

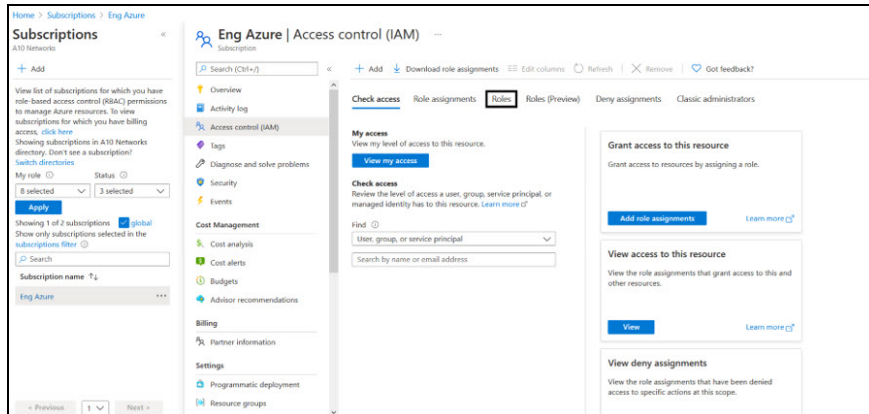
1. From **Home**, navigate to **Azure Services > Subscriptions > <subscription\_name>**. The selected Subscription - Overview window is displayed. Here, the subscription is Eng Azure.

Figure 217 : Subscriptions - Overview window



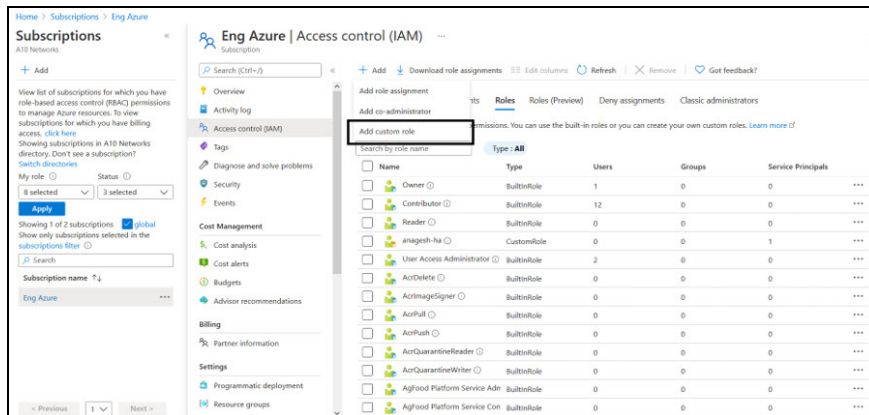
2. Click **Access control (IAM)** from left panel. The selected Subscription - Access control (IAM) window is displayed.
3. Select the **Roles** tab. The Roles window is displayed.

Figure 218 : Access Control - Role Window



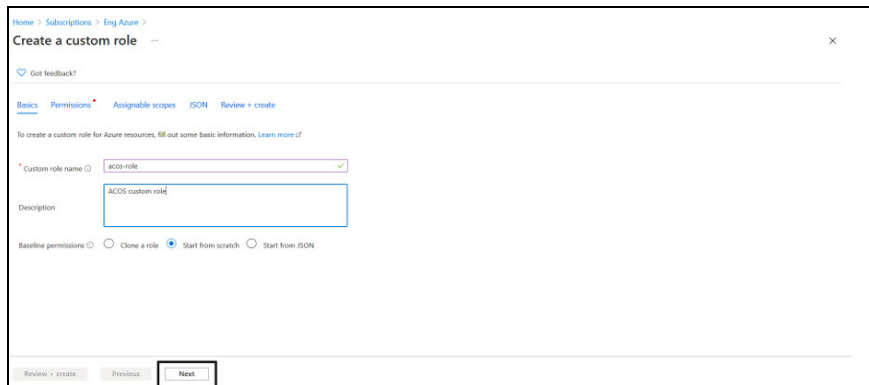
- Click **Add** to select **Add custom role** option.  
The Create a custom role window is displayed.

Figure 219 : Add custom role window



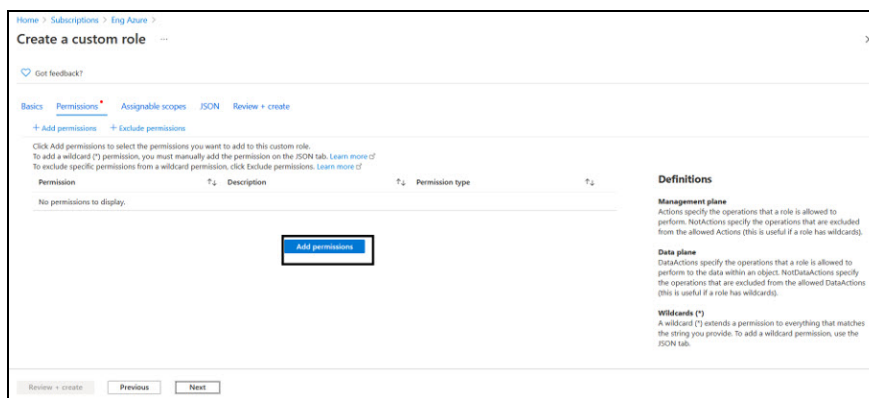
- Enter **Customer** role name and **Description** (optional) in the **Basics** tab.

Figure 220 : Create a custom role window



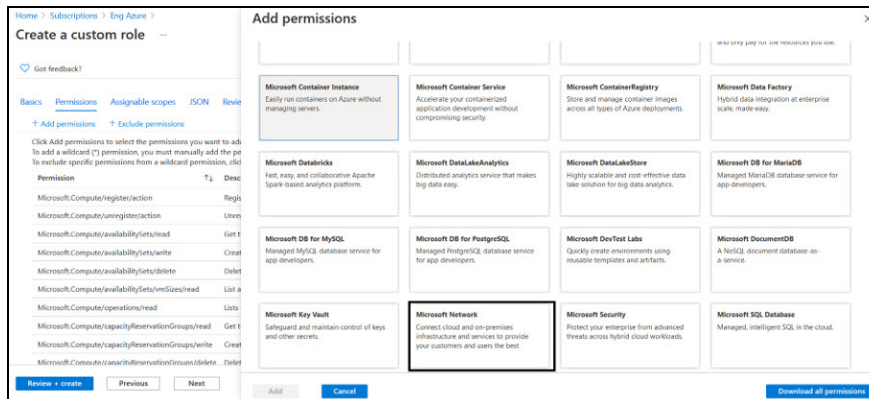
- Click **Next** at the bottom of the window.  
The Permissions window is displayed.

Figure 221 : Permission window



- Click **Add Permissions** to add permissions to the custom role.  
The Add Permissions window is displayed.

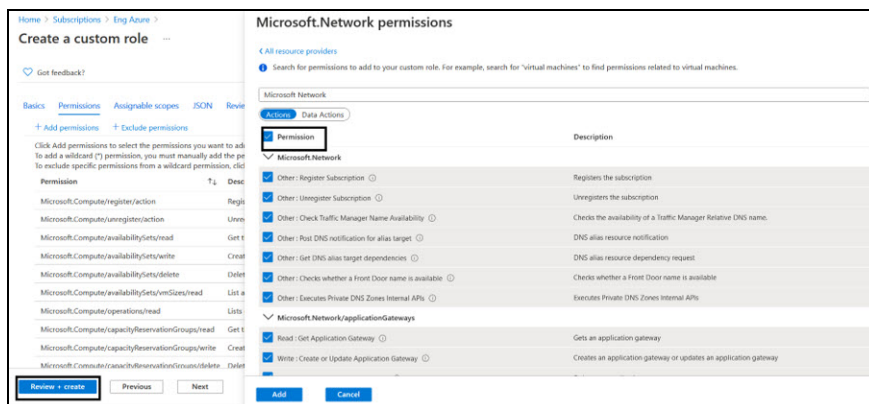
Figure 222 : Add permissions window



6. Search the following permission groups from the Add Permissions window and select the corresponding permissions listed in the [List of Custom Role Permissions](#):

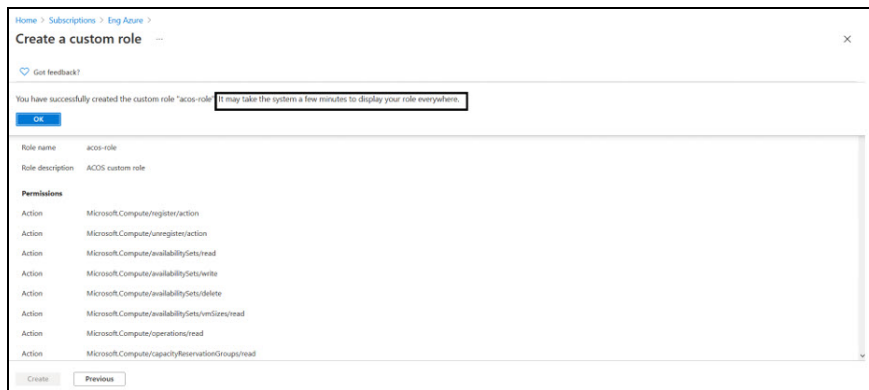
- Microsoft Automation
- Microsoft Operational Insights
- Microsoft Compute
- Microsoft Network

Figure 223 : Microsoft Network permissions window



The selected permissions are listed under **Create a custom role > Permissions** tab.

8. Click **Review + create** at the bottom of the window to skip the other tabs. The **Create a custom role** confirmation window is displayed.



- Click **OK** to successfully create the custom role with permissions.

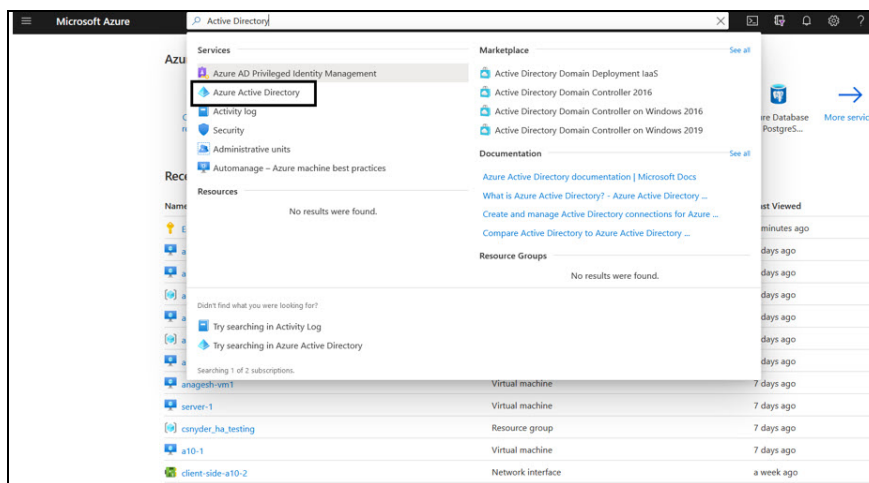
**NOTE:** It may take the system a few minutes to display your role everywhere.

## Register a Service Application

To register a service application, perform the following steps:

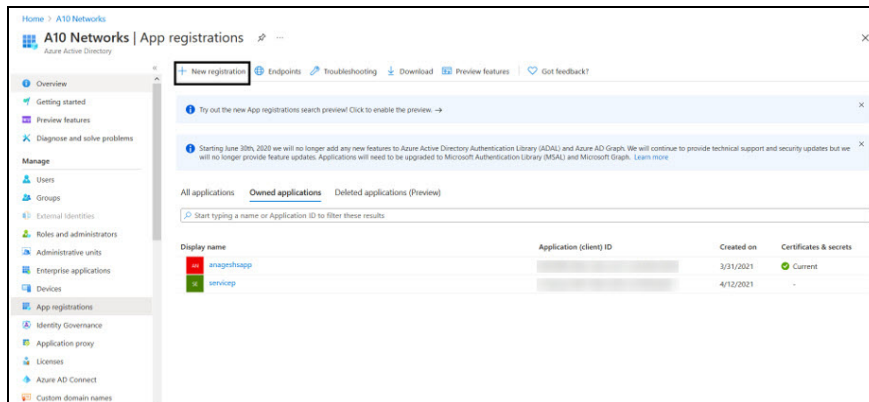
- From **Home**, navigate to **Azure Services > Azure Active Directory** option.

Figure 224 : Azure Active Directory window



- On the Azure Active Directory window, click **App registrations** menu option from the left **Manage** panel.  
The App registration window to register an application is displayed.

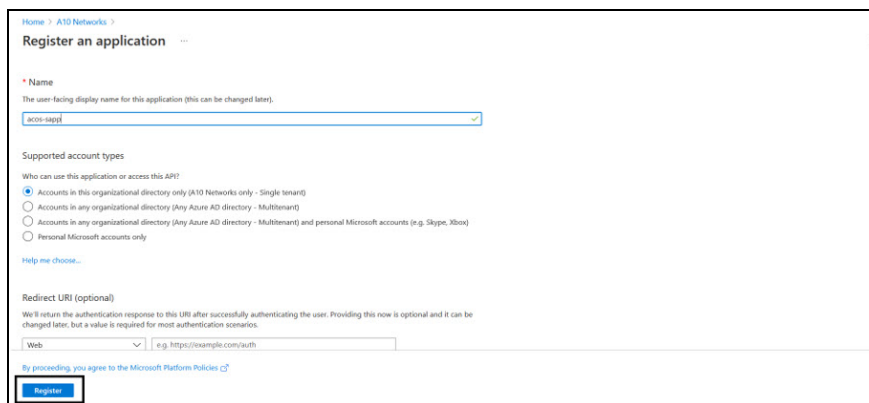
Figure 225 : App registrations window



### 3. Click **New Registration**.

The Register an application window is displayed.

Figure 226 : Register an application window



### 4. Enter the **Name** of the application. For example, acos-sapp.

### 5. Click **Register** to register the application. The application gets listed under Azure Active Directory - Apps registrations window.

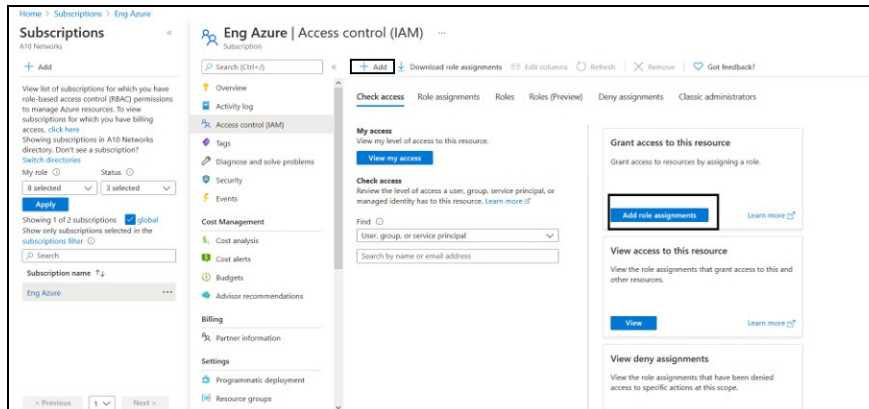
## Associate Service Application with a Role

To associate service application with a role, perform the following steps:

1. From **Home**, navigate to **Azure Services > Subscriptions > <subscription\_name>**. The selected Subscription - Overview window is displayed. Here, the subscription is Eng Azure.
2. Click **Access control (IAM)** from left panel.

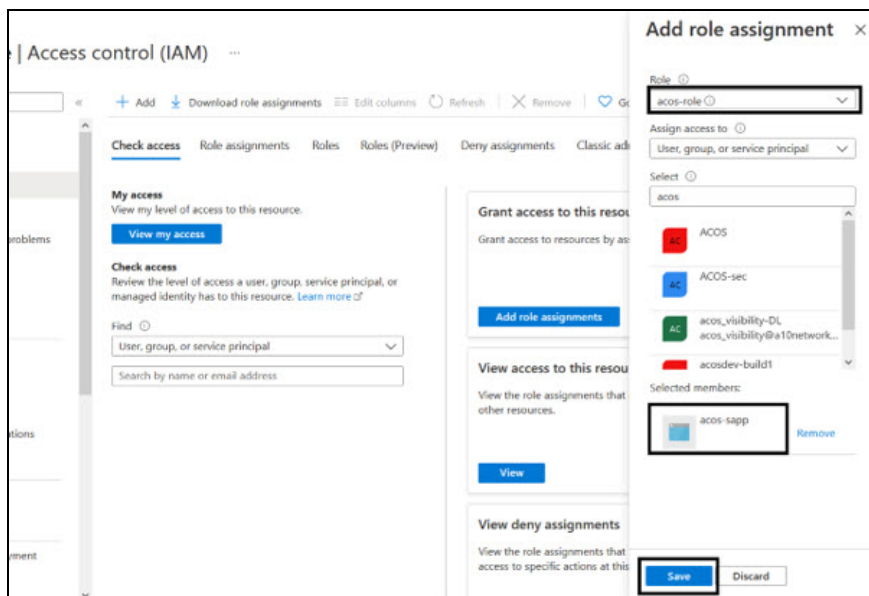
The selected Subscription - Access control (IAM) window is displayed.

Figure 227 : Subscription - Access control (IAM) window



- To assign a role to the above scope, click **Add** from the main menu options. The Add role assignment window is displayed.

Figure 228 : Add a role assignment -1



- Select a **Role** from the drop-down list. For example, acos-role.
- Select the required **Assign Access to** option from the drop-down list.
- Enter a string to search and select for a name or email address. For example, acos.



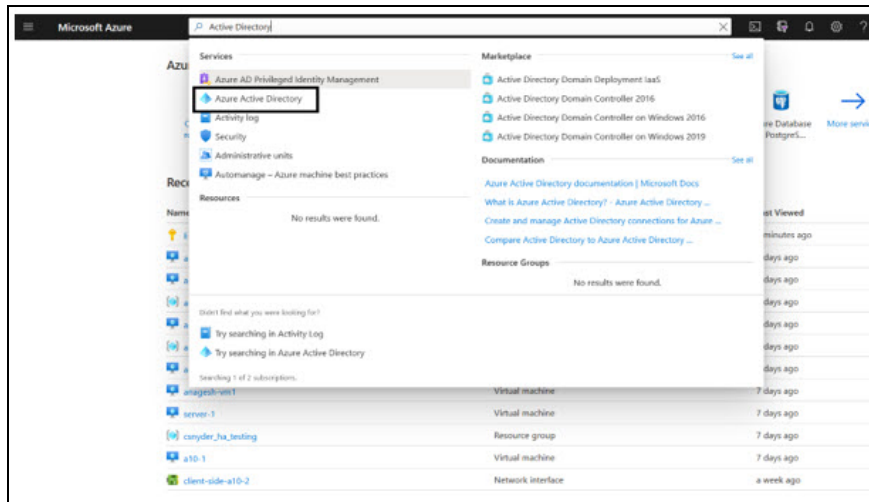
- Click the **Save** button to save the configuration.

## Create Certificate and Secrets

To create certificate and secrets for the assigned role, perform the following steps:

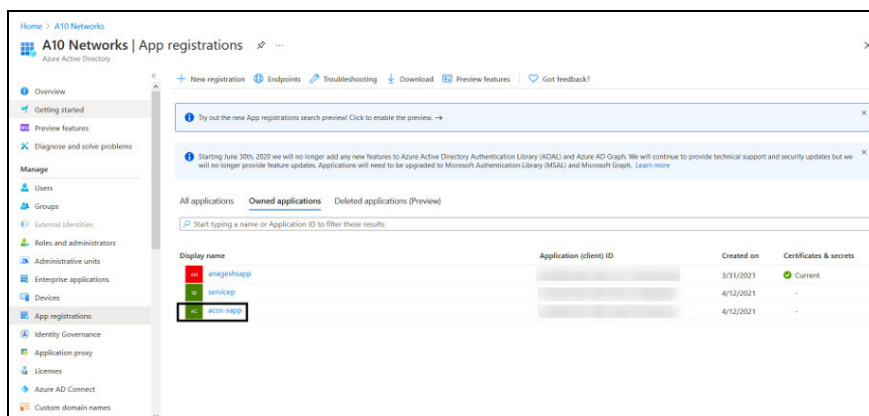
- From **Home**, navigate to **Azure Services > Azure Active Directory** option.

Figure 229 : Azure Active Directory - Overview window



- On the Azure Active Directory - Overview window, click **App registrations** menu option from the left panel. The App registration window with a registered application(s) is displayed.

Figure 230 : App registrations - Overall applications window

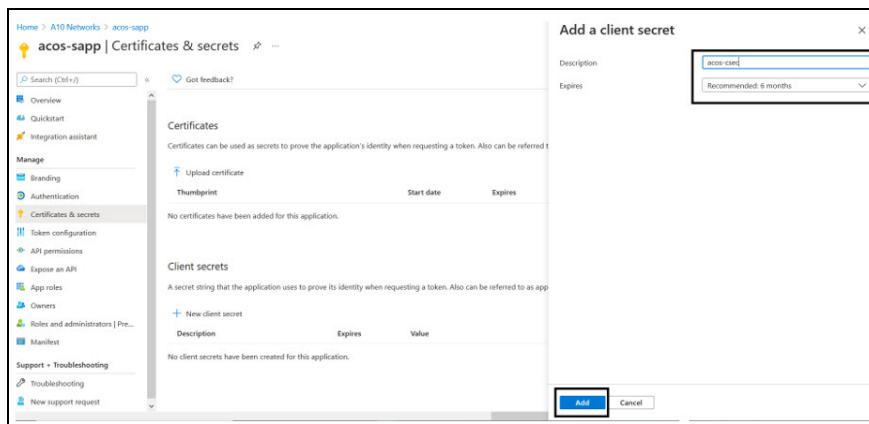


- Select a service application from list of applications.

The selected service application window is displayed.

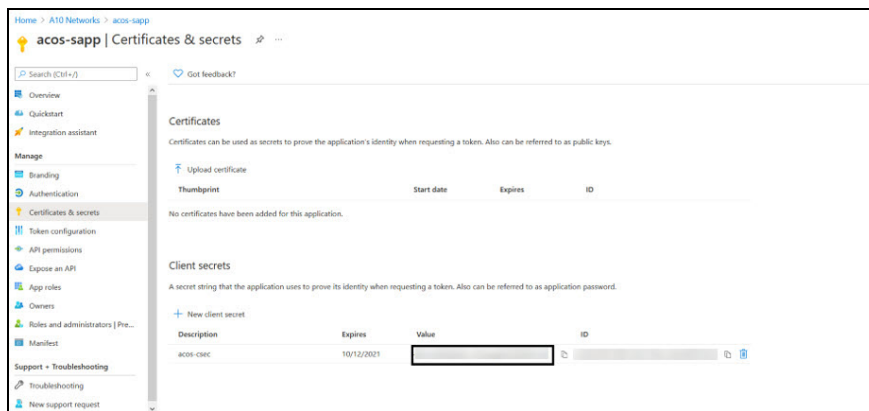
4. Select the **Certificates & secrets** option from the left Manage navigation pane. The acos sapp - Certificates & secrets window is displayed.
5. Browse and upload certificates.
6. Select the **Start date** and **Expires** date from the date picker or click the **New client secret** button. The Add a client secret window is displayed.

Figure 231 : Add a client secret window



7. Enter the New client secret **Description**, **Expires** value. The entered value is displayed on the acos-Certificates & secrets window.

Figure 232 : acos-sapp Certificates & secrets window



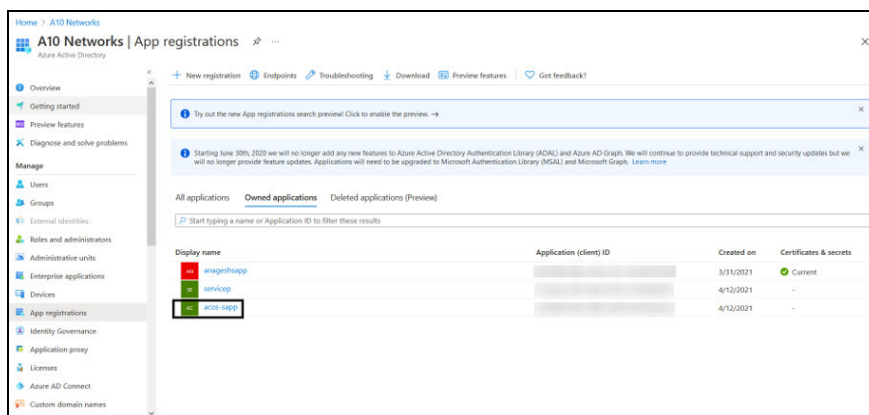
**NOTE:** Save the new client secret value in a text file, as it is not visible once the window is refreshed.

## Collect Azure Access Key

To collect Azure access keys, perform the following steps:

1. From **Home**, navigate to **Azure Services > Azure Active Directory > App registrations**.

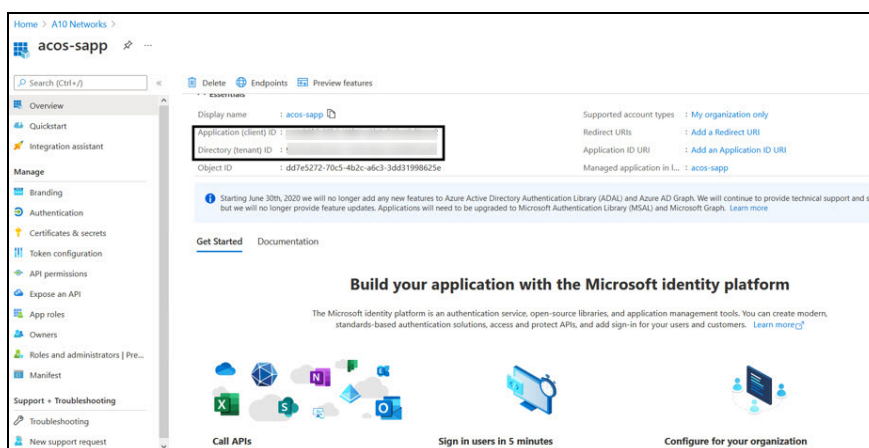
Figure 233 : Azure Active Directory - App registrations window



2. From the **Owned applications** tab, select service application from the list of applications.

The selected service application window is displayed.

Figure 234 : Selected Service application window

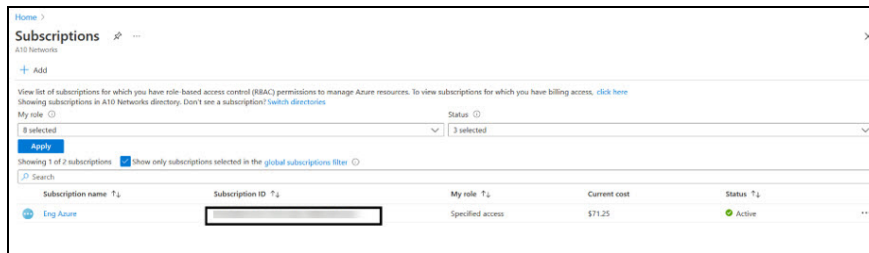


3. Copy the Client ID, Tenant ID from the service application window.

```
client_id= 'cc4c86xx-65b3-48xx-a3xx-610cxxxxxxxx'
tenant_id= '91d27axx-8cxx-41xx-82xx-3d1bxxxxxxxx'
```

4. Navigate to the **Home > Subscriptions > Registered Subscription Name**, and copy subscription ID value.

Figure 235 : Subscriptions window



5. Create a text file having subscription, client\_id, client\_secret, and tenant\_id information as shown below:

```
subscription='07d34bxx-61xx-47xx-abxx-006bxxxxxxxx'
client_id='cc4c86xx-65xx-48xx-a3xx-610cxxxxxxxx'
client_secret='G0x_hVDzZxxxx-olVsw.xxxx.Zxxxx-xx'
tenant_id='91d2xxxx-8xxe-41xx-82xx-3d1bxxxxxxxx'
```

## Import Azure Access Key

Each vThunder instance requires a copy of the Azure Access key and so it should be imported using the file transfer protocol methods.

To import the Azure access key, perform the following steps:

1. Log in to the vThunder instance.
2. Go to the config mode.

```
vThunder> enable
Password:
vThunder# config
```

3. Go to the admin mode.

```
vThunder(config)#admin ?
admin
NAME<length:1-31> System admin user name
vThunder(config)#admin admin
```

#### 4. Import the Azure Access key by using any of the file transfer methods recommended.

```
vThunder(config-admin:admin)#azure-cred import ?
  use-mgmt-port  Use management port as source port
  tftp:          Remote file path of tftp: file system(Format:
tftp://host/file)
  ftp:           Remote file path of ftp: file system(Format:
ftp://[user@]host[:port]/file)
  scp:           Remote file path of scp: file system(Format:
scp://[user@]host/file)
  sftp:          Remote file path of sftp: file system(Format:
sftp://[user@]host/file)
```

To delete the key, use the following command:

```
vThunder-Active(config-admin:admin) (NOLICENSE)#azure-cred delete 0
```

To verify the imported Azure Access keys, use the following commands:

```
vThunder-Active(config) (NOLICENSE)#admin ad
vThunder-Active(config) (NOLICENSE)#admin admin
vThunder-Active(config-admin:admin) (NOLICENSE)#azure-cred import
scp://username@<ip-addr>:<file-path>/cred.txt
vThunder-Active(config-admin:admin) (NOLICENSE)#azure-cred sh
vThunder-Active(config-admin:admin) (NOLICENSE)#azure-cred show
SUB_ID = 'dfe16a52-xxxx-xxxx-a168-91767a54c0Ce'
client_id = 'b8d52c6f-xxxx-xxxx-bafd-e03cc942aa66'
secret = '****_XGE9u00r+M2Css=*****-0b'
tenant = '1e94d773-****-****-b25d-3b3e1b64948d'
vThunder-Active(config-admin:admin) (NOLICENSE)#
```

## Default Password Policy

The default password policy has the following criteria:

- The password should be at least nine characters in length.
- The password should contain at least one number, an uppercase letter (English), a lowercase letter (English), and a special character.

- The password should have at least one letter or number different from the previous password.
- The password should not contain its corresponding username with the same capitalization of letters.
- The password should not contain repeated characters of the same letter or number with the same capitalization of letters.
- The password should not contain the sequential row keyboard input of four letters or numbers with the same capitalization of letters.



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