



Installing vThunder ADC using PowerShell Templates

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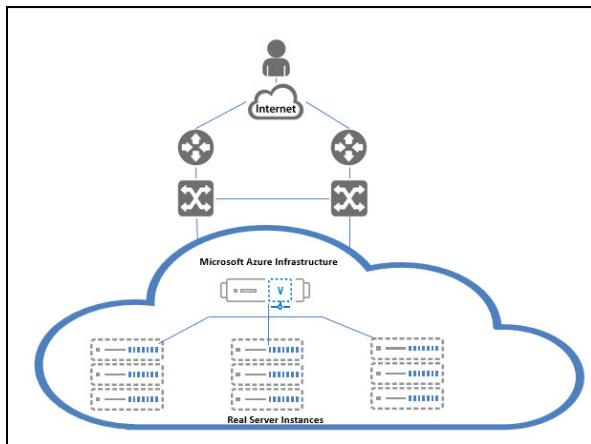
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Introduction

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

Table 1 : Available PowerShell Templates

| Template | Description | Configuration |
|---------------------------|--|---|
| A10-vThunder_ADC-2NIC-1VM | <ul style="list-style-type: none">Creates one vThunder instance with two Network Interface Cards (NICs).Deploys a Certificate Authority SSL Certificate and Server Load Balancer (SLB). | <ul style="list-style-type: none">2 NICs (1 Management + 1 Data)BYOL (Bring Your Own License)1 VM (vThunder Virtual Instance)SLB (vThunder Server Load Balancer) |

| Template | Description | Configuration |
|---|--|---|
| | | <ul style="list-style-type: none"> SSL (Apply SSL Certificate) |
| A10-vThunder_ADC-2NIC-1VM-GLM | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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_ADC-3NIC-2VM-HA-GLM-PVTVIP | <ul style="list-style-type: none"> Creates two vThunder instances with High Availability setup and an A10 Global License | <ul style="list-style-type: none"> 3 NICs (1 Management + 2 Data) BYOL (Bring Your Own |

| Template | Description | Configuration |
|--|---|---|
| | <p>Manager integration, each vThunder has three Network Interface Cards.</p> <ul style="list-style-type: none"> Deploys a Certificate Authority SSL Certificate, and a Server Load Balancer. | <p>License)</p> <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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 to apply SLB config into vThunder for newly |

| Template | Description | Configuration |
|----------------------------|--|---|
| | | added/deleted web/app servers via server VMSS) |
| A10-vThunder_ADC-3NIC-VMSS | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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) |

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 PowerShell 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 PowerShell 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](#).
- PowerShell Templates
Go to [GitHub](#) [Branch: release/v1.0.0] and download the required PowerShell 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

PowerShell 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-P5, build 114 (Jul-14-2022,05:11)
- 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 PowerShell template folder and set the execution policy for this folder.

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

PowerShell Templates

To implement infrastructure as a code for your Azure solutions, use PowerShell 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.

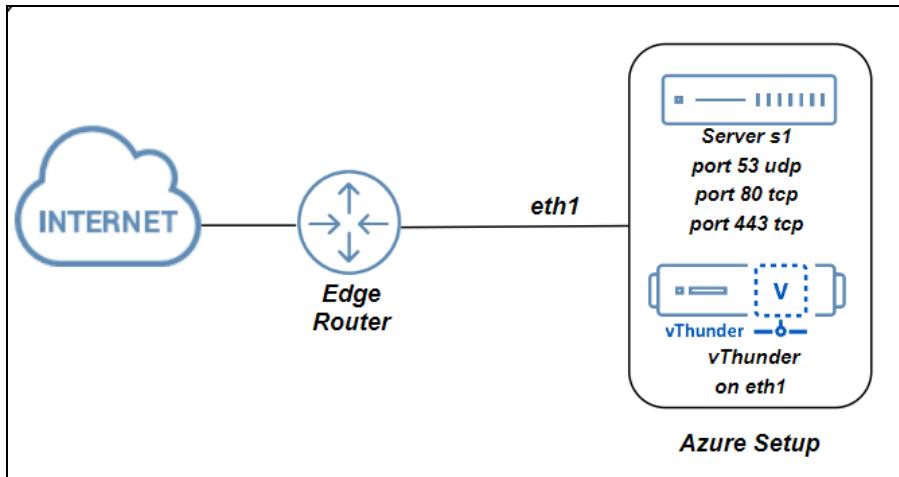
The following templates are available:

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

Deploy PowerShell A10-vThunder_ADC-2NIC-1VM

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

Figure 2 : 2NIC-1VM Topology



The following topics are covered:

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System Requirements

The PowerShell 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 | <p>A resource group with the specified name and location is created if it doesn't exist.</p> <p>All the resources required for this template is created under the resource group.</p> | Here, the Azure resource group name used is vth-rg1 . |
| 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> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | vthunderstorage |
| Virtual Machine (VM) Instance | <p>A virtual machine instance is created for vThunder.</p> <p>Product: A10 vThunder</p> | vth-inst1 |

| Resource Name | Description | Default Value |
|------------------------------|--|---|
| | <p>Operating system: Linux</p> <p>Default Size: Standard_DS2v2 (4 vCPUs, 16 GiB Memory)</p> <hr/> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 3 lists the supported VM sizes.</p> | |
| 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: <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1] | vth-inst1-mgmt-nic1 10.0.1.5 vth-inst1-data-nic2 10.0.2.5 [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 PowerShell template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template, and open the PS_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 virtual network.

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

4. Configure a DNS label prefix.

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

5. Configure a VM name.

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

6. Set a VM Size for vThunder.

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

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

7. 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.

8. Configure two network interface cards.

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

9. 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": "10.0.1.5"
},
"eth1PrivatePrefix": {
    "value": "10.0.2.0/24"
},
"eth1PrivateAddress": {
    "value": "10.0.2.4"
},
```

10. Configure a public IP address.

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

11. Configure a Network Security Group.

```
"networkSecurityGroupName": {
    "value": "vth-nsgr1"
},
```

12. Verify if all the configurations in the PS_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 PowerShell template.
2. Run the following command to create a deployment group in Azure and provide a unique storage account name when prompted.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_2NIC_1VM_1.ps1 -resourceGroup <resource_group_name> -location "<location_name>"
```

Example:

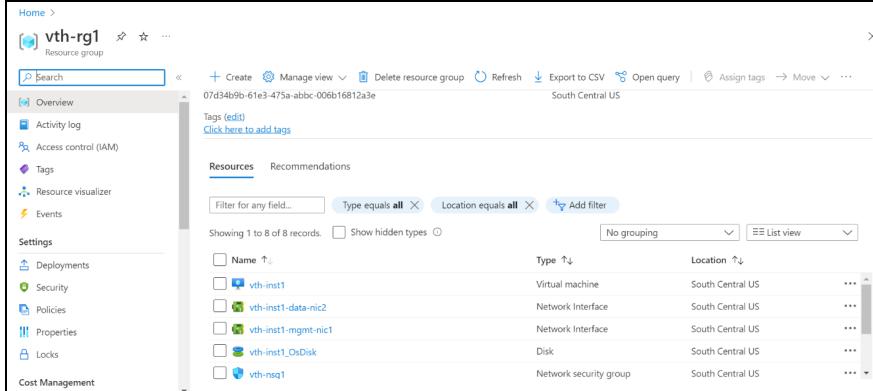
```
PS C:\Users\TestUser\Templates> .\PS_TMPL_2NIC_1VM_1.ps1 -resourceGroup vth-rg1 -location "south central us"

cmdlet PS_TMPL_2NIC_1VM_1.ps1 at command pipeline position 1
Supply values for the following parameters:
storageaccount: vthunderstorage
vth-rg1
vthunderstorage
South Central US
```

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

3. 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



| Name | Type | Location | ... |
|---------------------|------------------------|------------------|-----|
| vth-inst1 | Virtual machine | South Central US | ... |
| vth-inst1-data-nic2 | Network Interface | South Central US | ... |
| vth-inst1-mgmt-nic1 | Network Interface | South Central US | ... |
| vth-inst1_OsDisk | Disk | South Central US | ... |
| vth-nsq1 | Network security group | 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

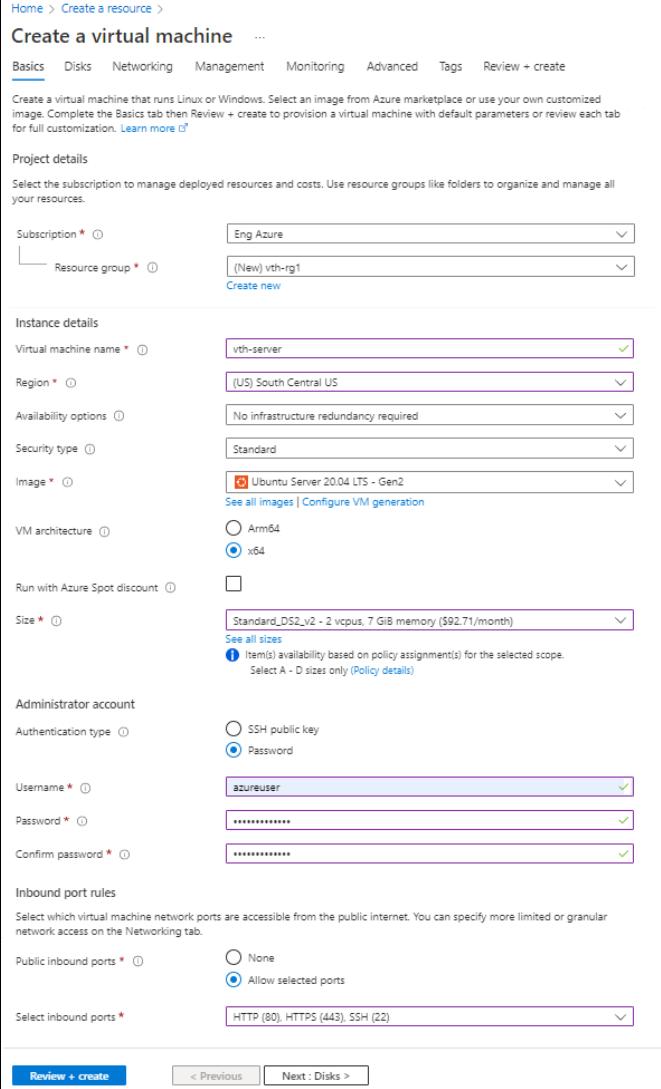
- Depending upon the Authentication type selected, provide the information.

Inbound port rules

- Public inbound ports

- Select inbound ports

Figure 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 * Eng Azure [Create new](#)

Resource group * (New) vth-rg1 [Create new](#)

Instance details

Virtual machine name *

Region * (US) South Central US

Availability options No infrastructure redundancy required

Security type Standard

Image * Ubuntu Server 20.04 LTS - Gen2 [See all images](#) [Configure VM generation](#)

VM architecture Arm64 x64

Run with Azure Spot discount

Size * Standard_DS2_v2 - 2 vcpus, 7 GiB memory (\$92.71/month) 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 * HTTP (80), HTTPS (443), SSH (22)

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

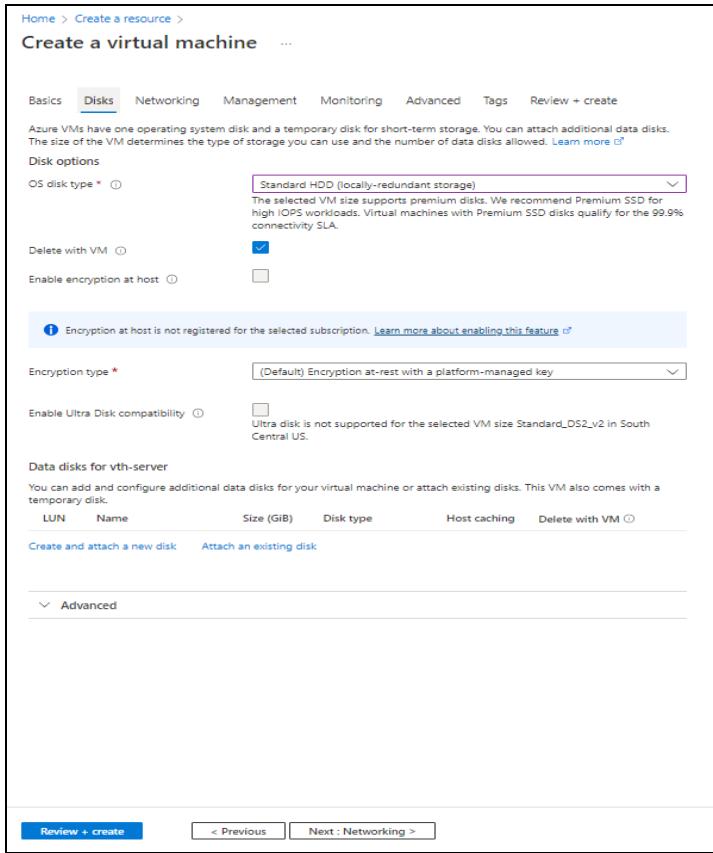
3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

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

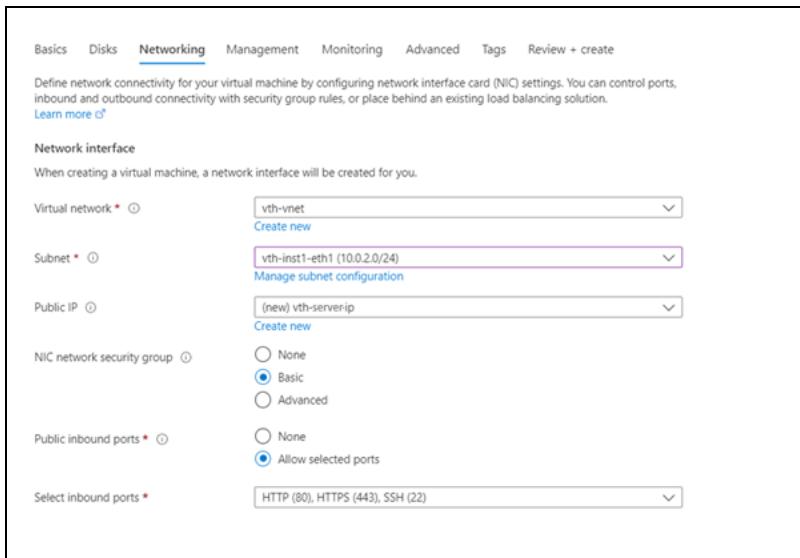


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

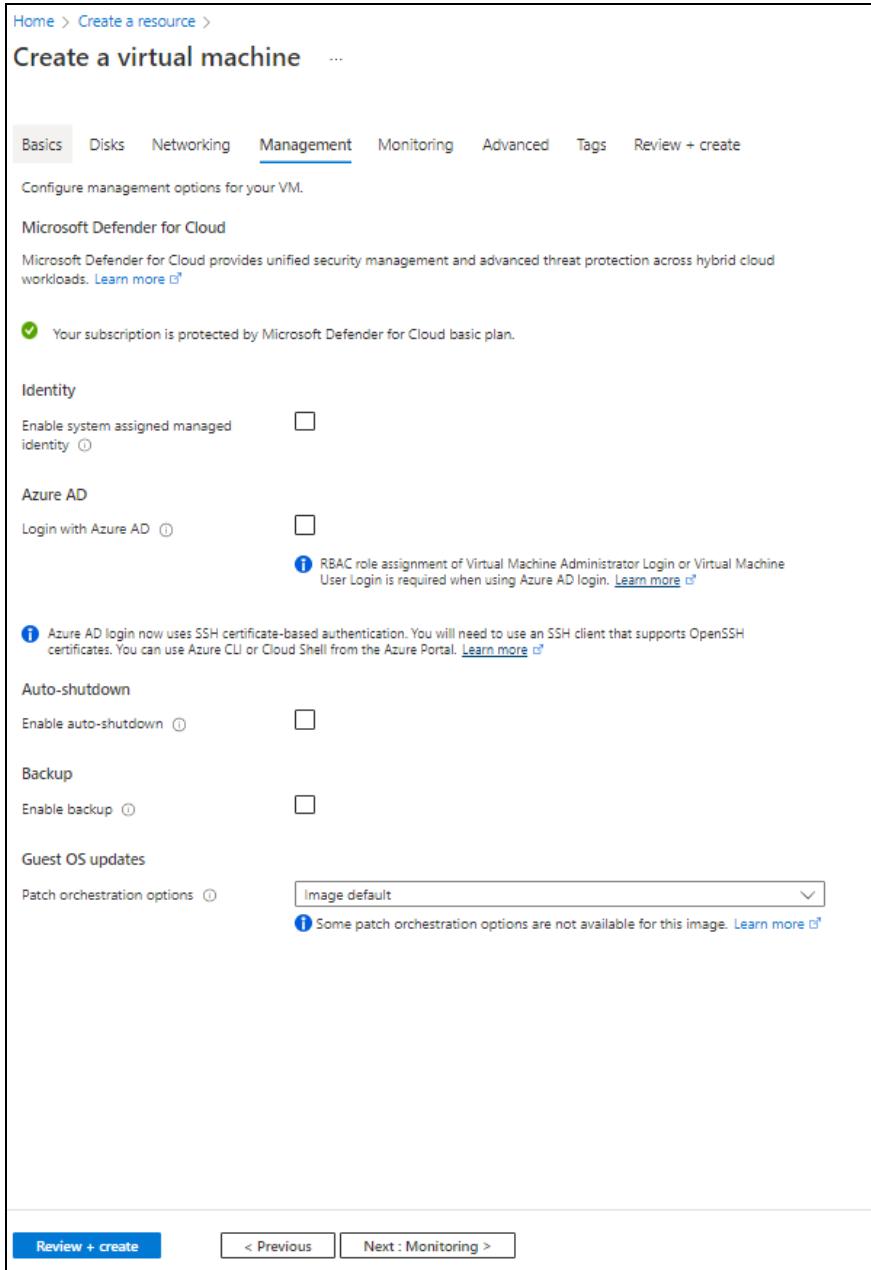
Figure 6 : Create a virtual machine window - Networking tab



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.

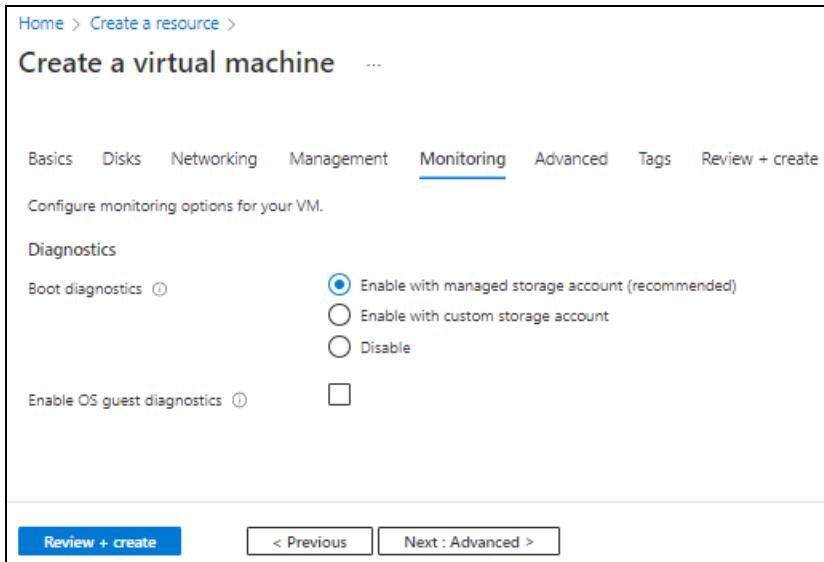
Figure 7 : Create a virtual machine window - Management tab



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

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

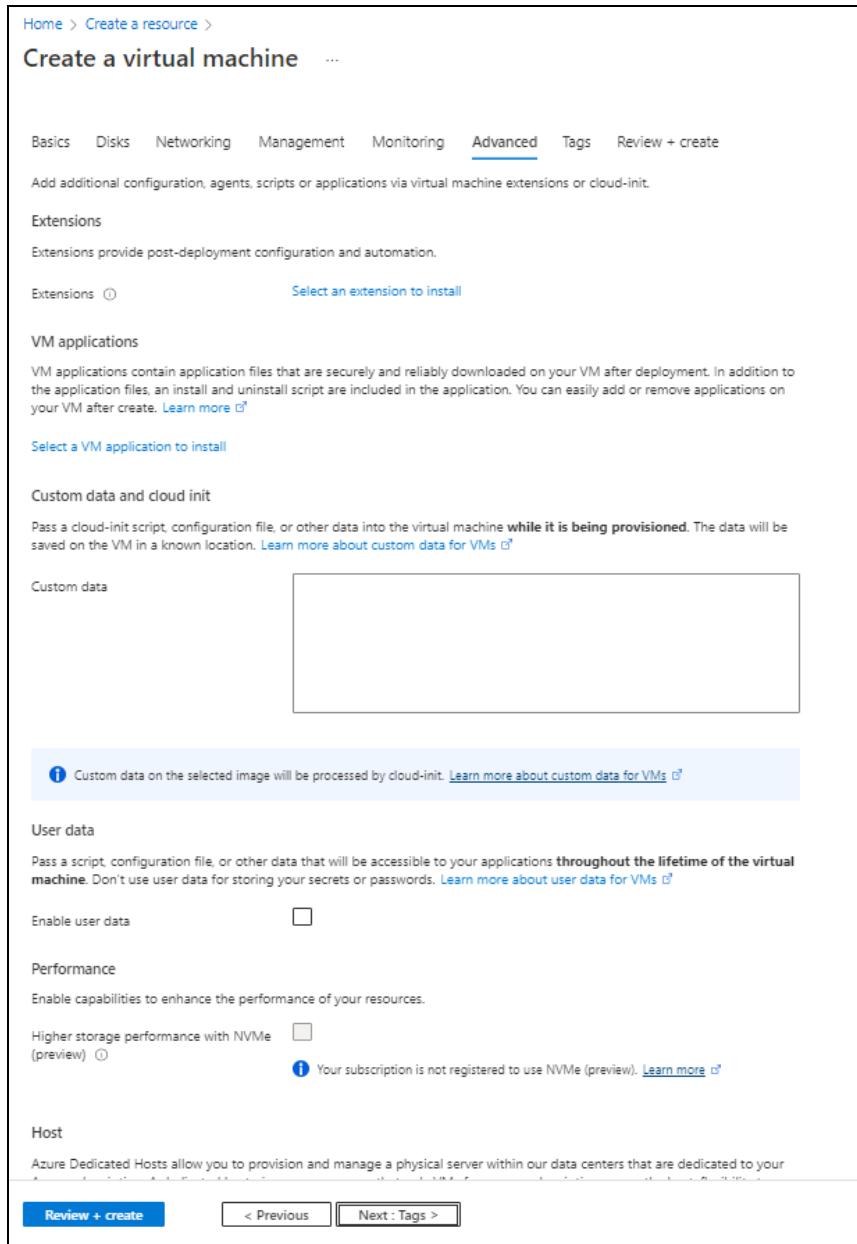
Figure 8 : Create a virtual machine window - Monitoring tab



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

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

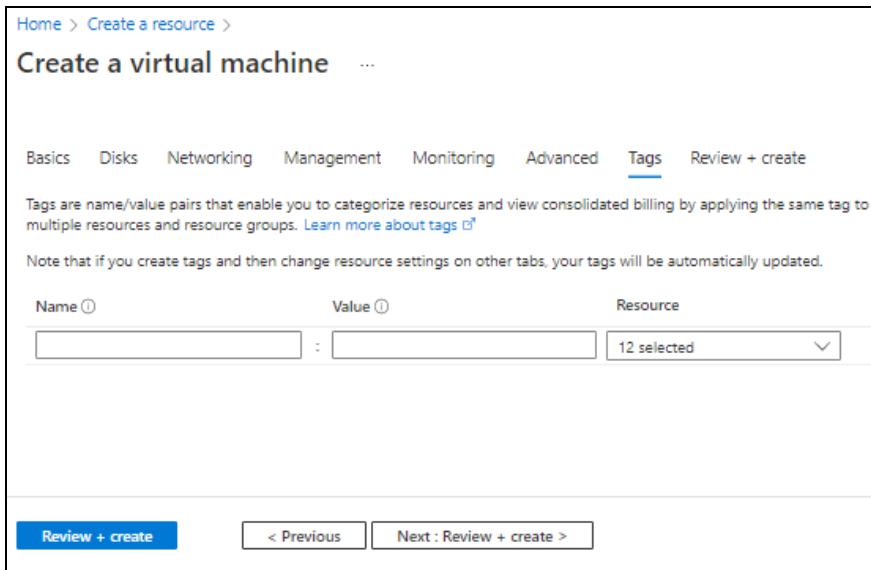
Figure 9 : Create a virtual machine window - Advanced tab



13. Click **Next : Tags at the bottom of the window.**

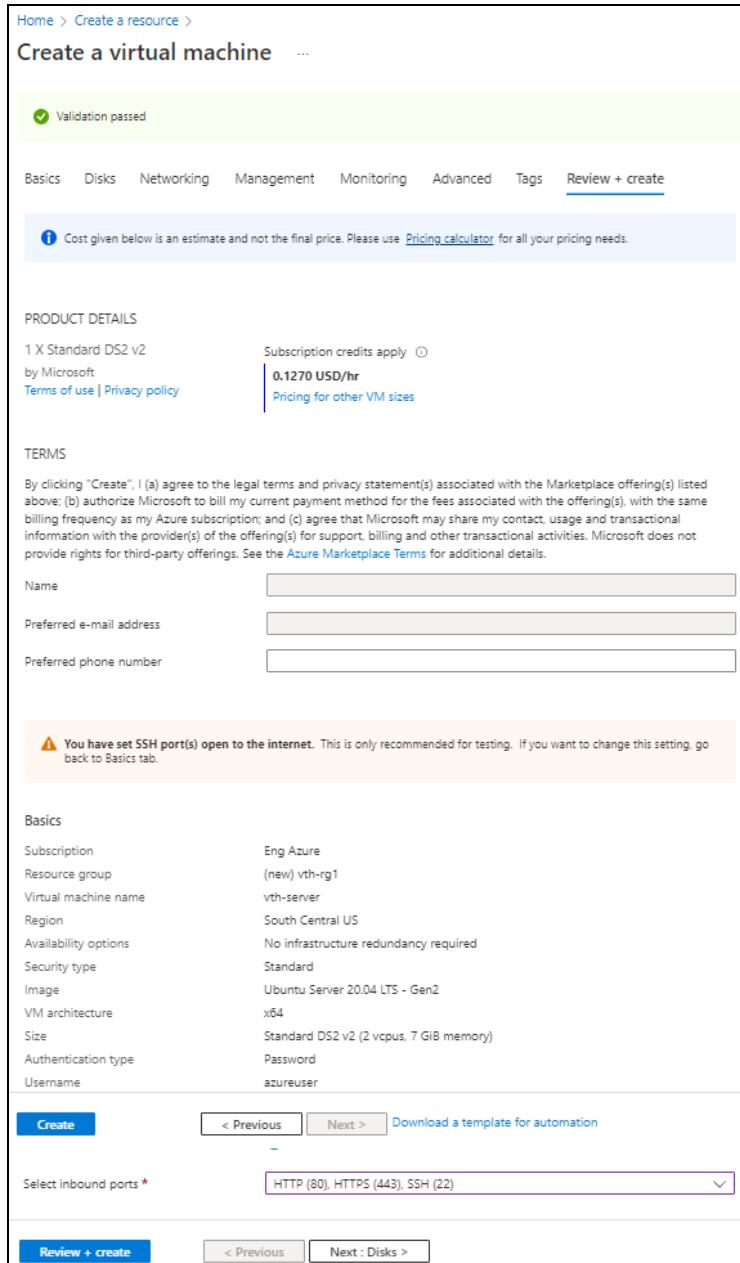
14. Select or enter the information to categorized resources in the **Tags tab as needed.**

Figure 10 : Create a virtual machine window - Tags tab



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



- Click **Create** at the bottom of the window.

The Server virtual machine gets created and listed in the **Home > Azure Services > Virtual machine** window.

- 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

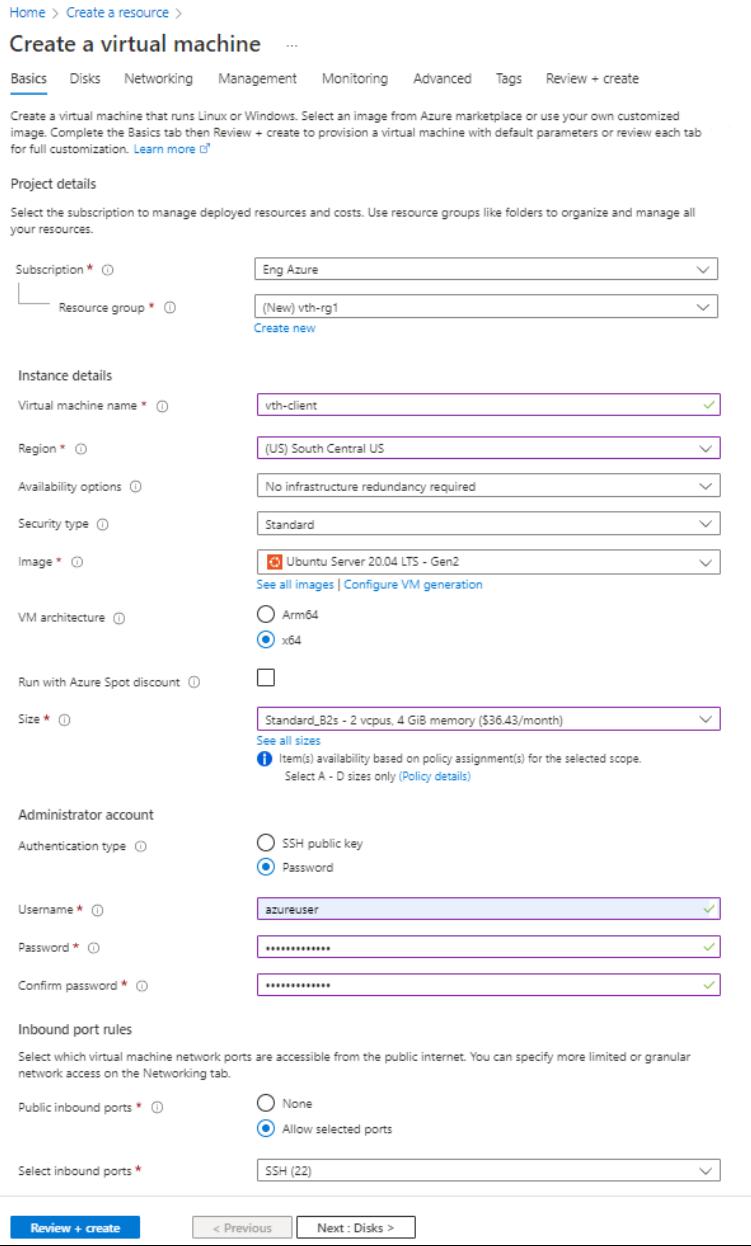
Administrator account

- 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



The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields filled in include:

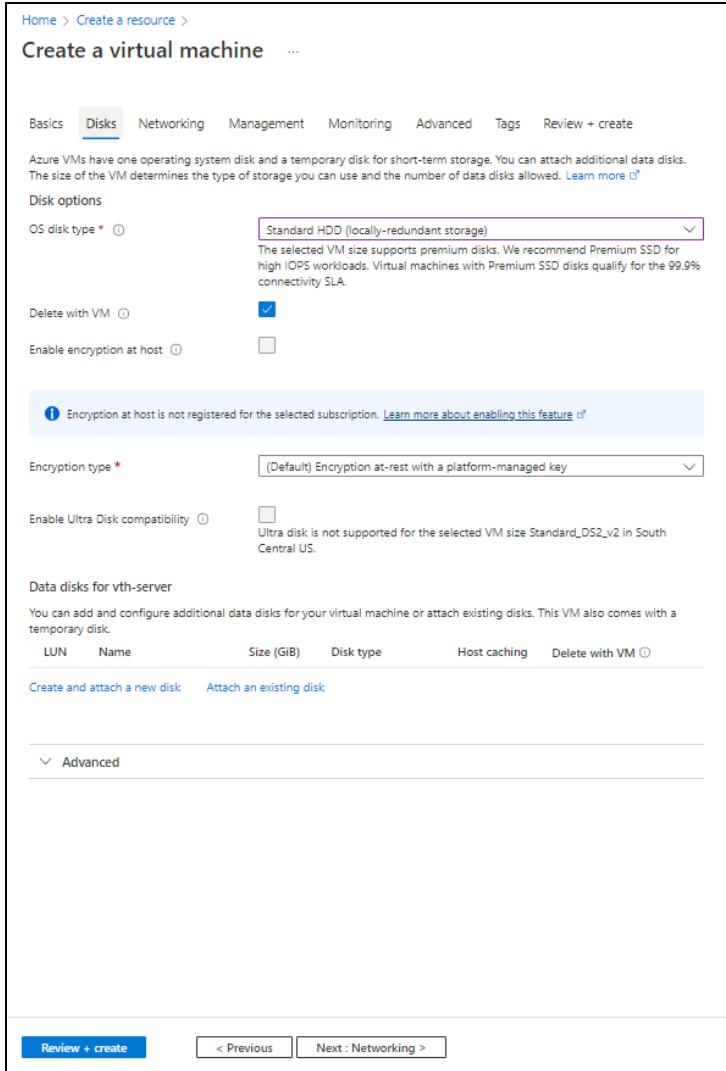
- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- Virtual machine name:** vth-client
- Region:** (US) South Central US
- Availability options:** No infrastructure redundancy required
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Size:** Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)
- Administrator account:**
 - Authentication type: Password
 - Username: azureuser
 - Password: (redacted)
 - Confirm password: (redacted)
- Inbound port rules:**
 - Public inbound ports: Allow selected ports
 - Select inbound ports: SSH (22)

At the bottom, there are 'Review + create' and 'Next : Disks >' buttons.

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 13 : Create a virtual machine window - Disks tab



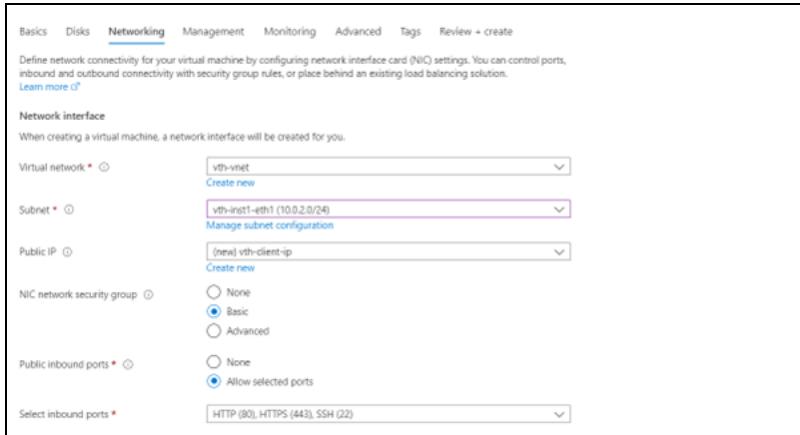
- Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
- Select or enter the following mandatory information in the **Networking** tab:

Network interface

[Deploy PowerShell A10-vThunder_ADC-2NIC-1VM](#)

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

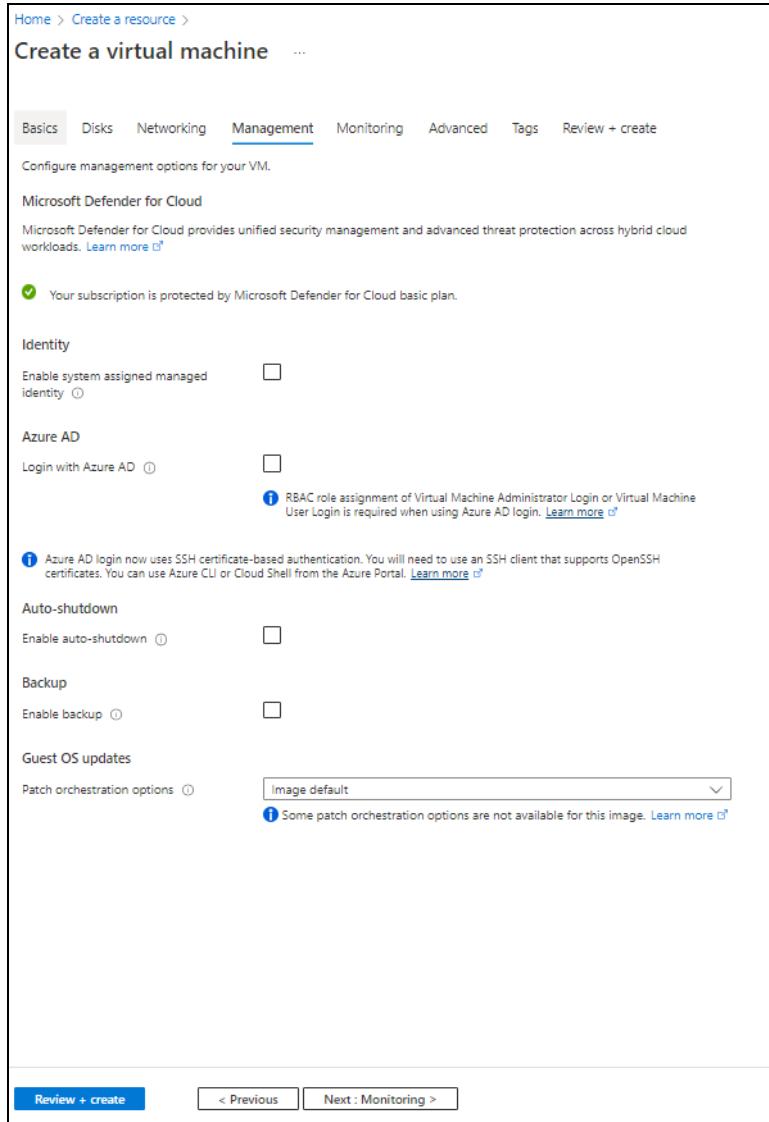
Figure 14 : Create a virtual machine window - Networking tab



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.

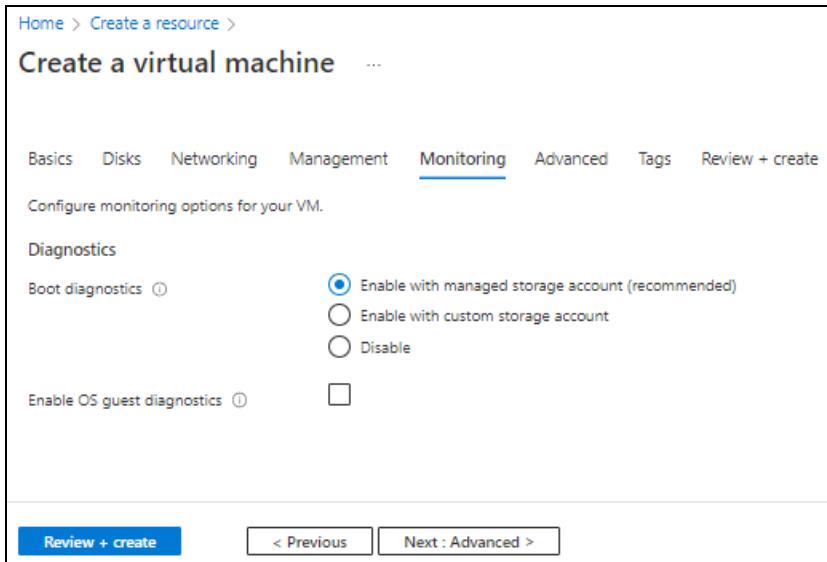
Figure 15 : Create a virtual machine window - Management tab



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

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

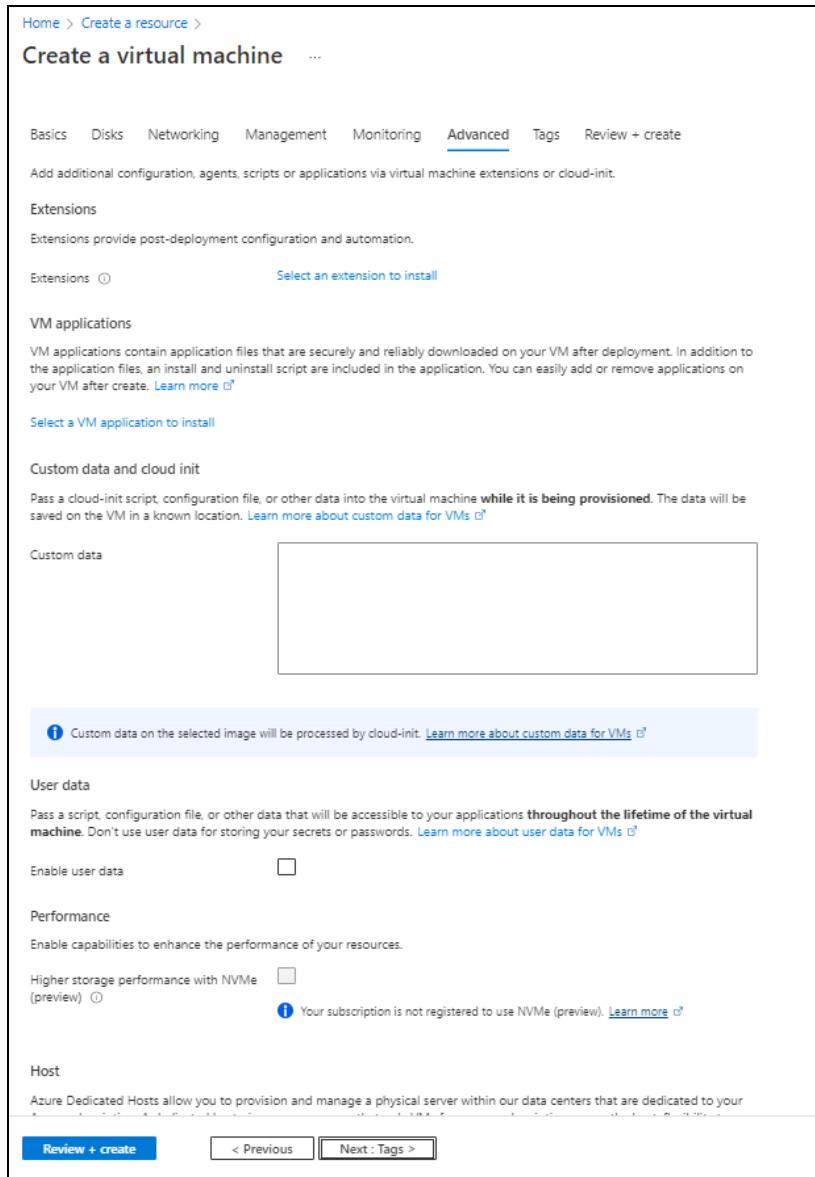
Figure 16 : Create a virtual machine window - Monitoring tab



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

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

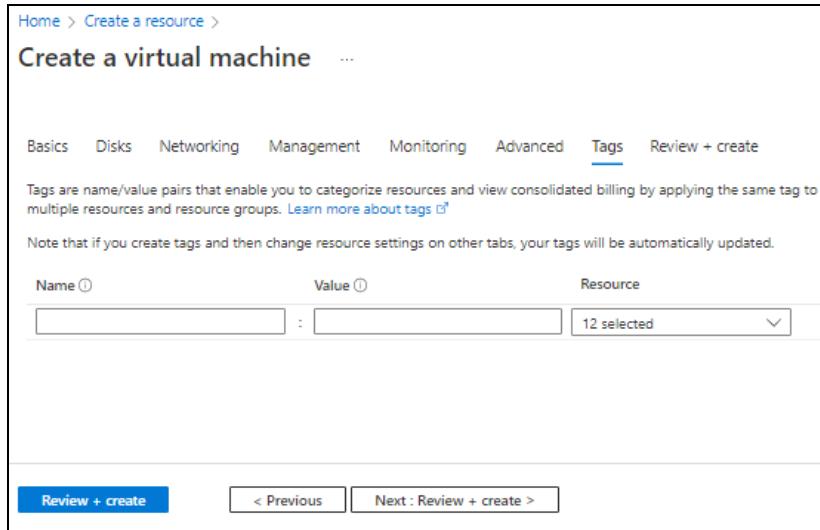
Figure 17 : Create a virtual machine window - Advanced tab



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.**

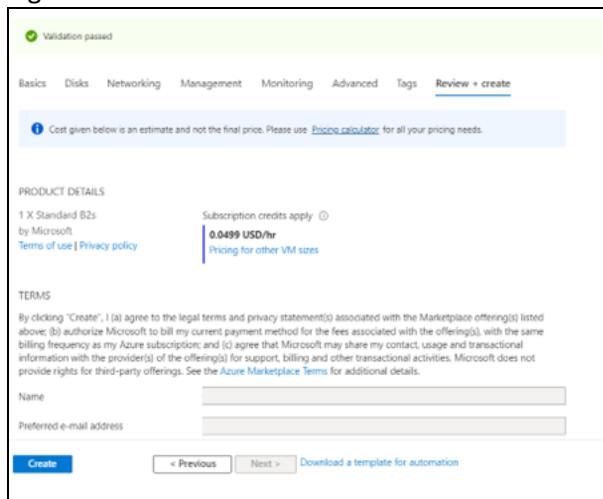
Figure 18 : Create a virtual machine window - Tags tab



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 19 : 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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": 80,
            "proto": "HTTP"
        },
        {
            "port": 443,
            "proto": "HTTPS"
        }
    ]
},
```

```
        "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 PS_TMPL_2NIC_1VM_SLB_CONFIG_PARAM.json file are correct and save the changes.

Change Password

To change the password, perform the following steps:

- Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\PS_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.

- 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:

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

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_2NIC_1VM_SLB_CONFIG_3.ps1 -resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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--->

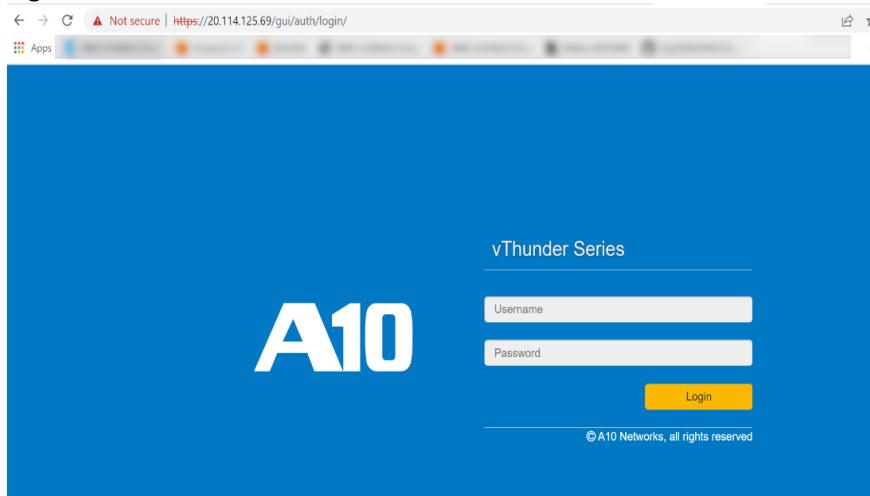
```

Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

1. Open any browser.
2. Enter https://<vt thunder_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 PowerShell 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
!
!
```

- Run the following command on vThunder:

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

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

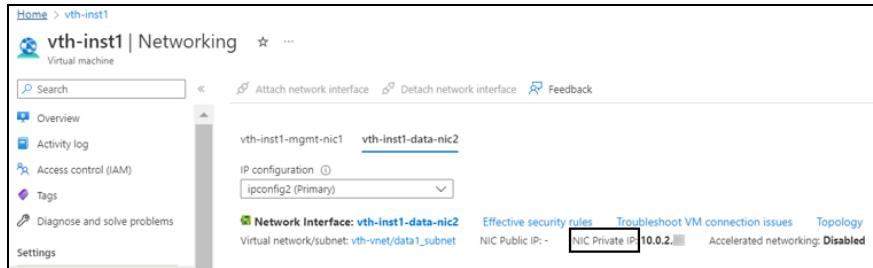
| Name | Type | Expiration | Status |
|--------------------|------|--------------------------|--------------------|
| <hr/> | | | |
| server certificate | | Jan 28 12:00:00 2028 GMT | [Unexpired, Bound] |

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

Figure 21 : vThunder instance Data Subnet Private IP



- 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

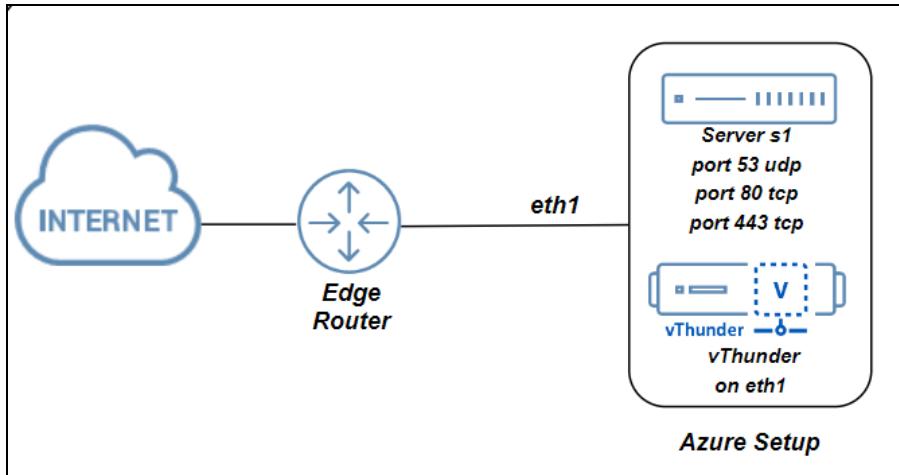
```
curl 10.0.2.4
```

Verify if a response is received.

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

[Figure 22](#) shows the 2NIC-1VM-GLM deployment topology. Using the PowerShell 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 | 80 |
| Configure vThunder GLM | 85 |
| Access vThunder using CLI or GUI | 86 |
| Verify Deployment | 88 |
| Verify Traffic Flow | 90 |

System Requirements

The PowerShell 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 | <p>A resource group with the specified name and location is created, if it doesn't exist.</p> <p>All the resources required for this template is created under the resource group.</p> | Here, the Azure resource group name used is <code>vth-rg1</code> . |
| 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> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | <code>vthunderstorage</code> |
| Virtual Machine (VM) Instance | <p>A virtual machine instance is created for vThunder.</p> <p>Product: A10 vThunder</p> | <code>vth-inst1</code> |

| Resource Name | Description | Default Value |
|------------------------------|--|---|
| | <p>Operating system: Linux</p> <p>Default Size: Standard_DS2v2 (4 vCPUs, 16 GiB Memory)</p> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p>Table 5 lists the supported VM sizes.</p> | |
| 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: <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1] | vth-inst1-mgmt-nic1 10.0.1.5 vth-inst1-data-nic2 10.0.2.5 [Primary IP] |
| Network Security Group | A security group is created for all the associated default interfaces. | vth-nsgr |

| 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template, and open the PS_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 virtual network.

```

    "virtual_network": {
        "value": "vth-vnet"
    },

```

4. Configure a DNS label prefix.

```

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

```

5. Configure a VM name.

```

    "vmName": {
        "value": "vth-inst1"
    },

```

6. Set a VM Size for vThunder.

```

    "vmSize": {
        "value": "Standard_DS2_v2"
    },

```

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

7. 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.

8. Configure two network interface cards.

```

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

9. 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": "10.0.1.5"
},
"eth1PrivatePrefix": {
    "value": "10.0.2.0/24"
},
"eth1PrivateAddress": {
    "value": "10.0.2.4"
},
```

10. Configure a public IP address.

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

11. Configure a Network Security Group.

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

12. Verify if all the configurations in the PS_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 PowerShell template.
2. Run the following command to create a deployment group in Azure and provide a unique storage account name when prompted.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_2NIC_1VM_1.ps1 -resourceGroup  
<resource_group_name> -location "<location_name>"
```

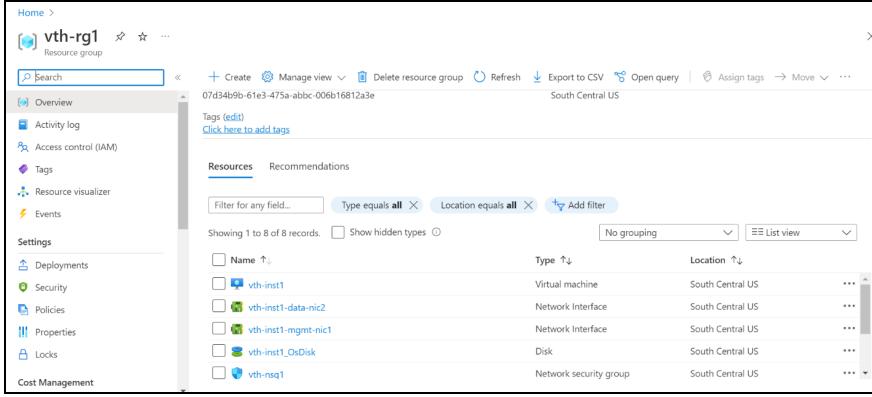
Example:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_2NIC_1VM_1.ps1 -resourceGroup  
vth-rg1 -location "south central us"  
  
cmdlet PS_TMPL_2NIC_1VM_1.ps1 at command pipeline position 1  
Supply values for the following parameters:  
storageaccount: vthunderstorage  
vth-rg1  
vthunderstorage  
South Central US
```

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

3. 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



The screenshot shows the Azure portal interface for the 'vth-rg1' resource group. On the left, there's a navigation sidebar with options like Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Deployments, Security, Policies, Properties, Locks, and Cost Management. The main area is titled 'Resources' and shows a list of 8 records. The columns are 'Name', 'Type', and 'Location'. The resources listed are:

| Name | Type | Location |
|---------------------|------------------------|------------------|
| vth-inst1 | Virtual machine | South Central US |
| vth-inst1-data-nic2 | Network Interface | South Central US |
| vth-inst1-mgmt-nic1 | Network Interface | South Central US |
| vth-inst1_OsDisk | Disk | South Central US |
| vth-nsq1 | Network security group | 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

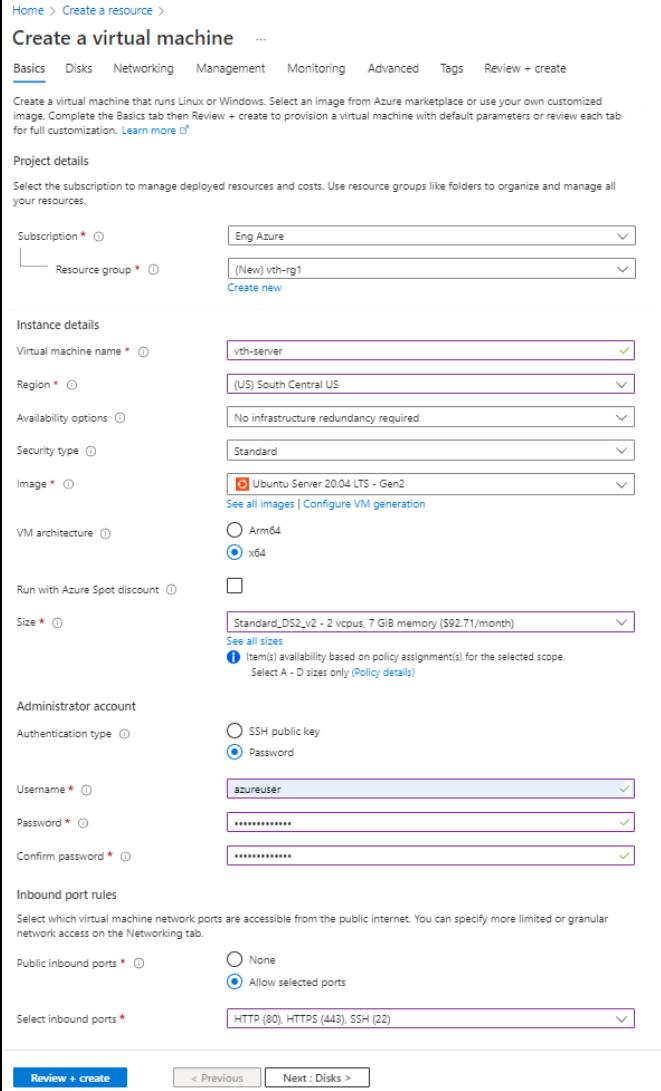
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 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 * Eng Azure

Resource group * (New) vth-rg1 Create new

Instance details

Virtual machine name *

Region * (US) South Central US

Availability options No infrastructure redundancy required

Security type Standard

Image * Ubuntu Server 20.04 LTS - Gen2 See all images | Configure VM generation

VM architecture Arm64 x64

Run with Azure Spot discount

Size * Standard_DS2_v2 - 2 vcpus, 7 GiB memory (\$92.71/month) 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 * HTTP (80), HTTPS (443), SSH (22)

Buttons

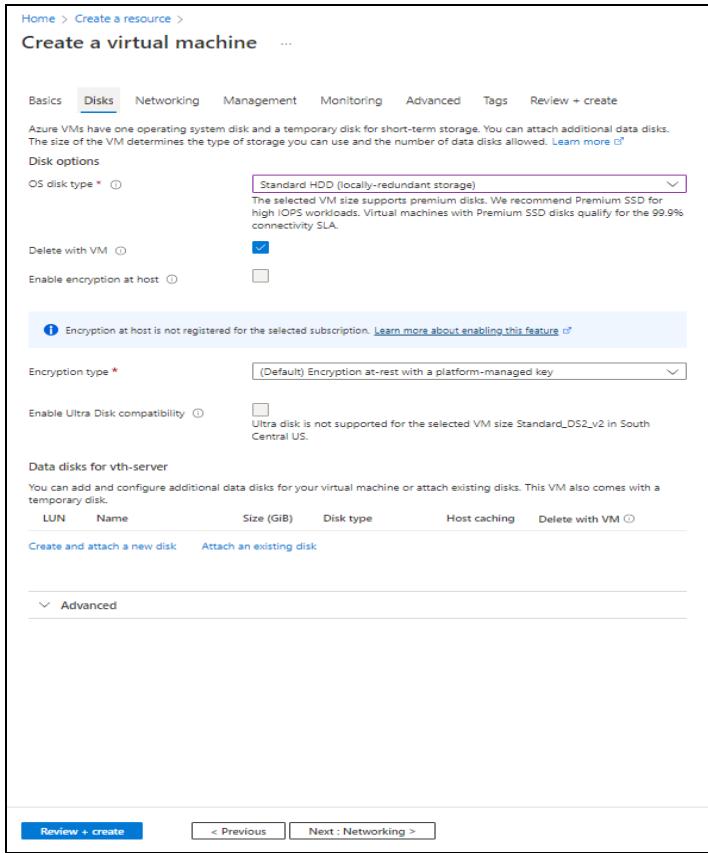
Review + create < Previous Next : Disks >

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 25 : Create a virtual machine window - Disks tab

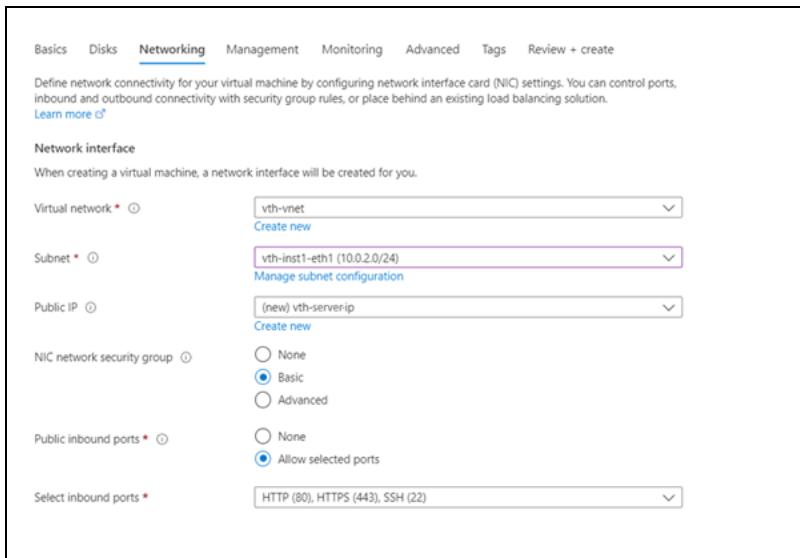


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

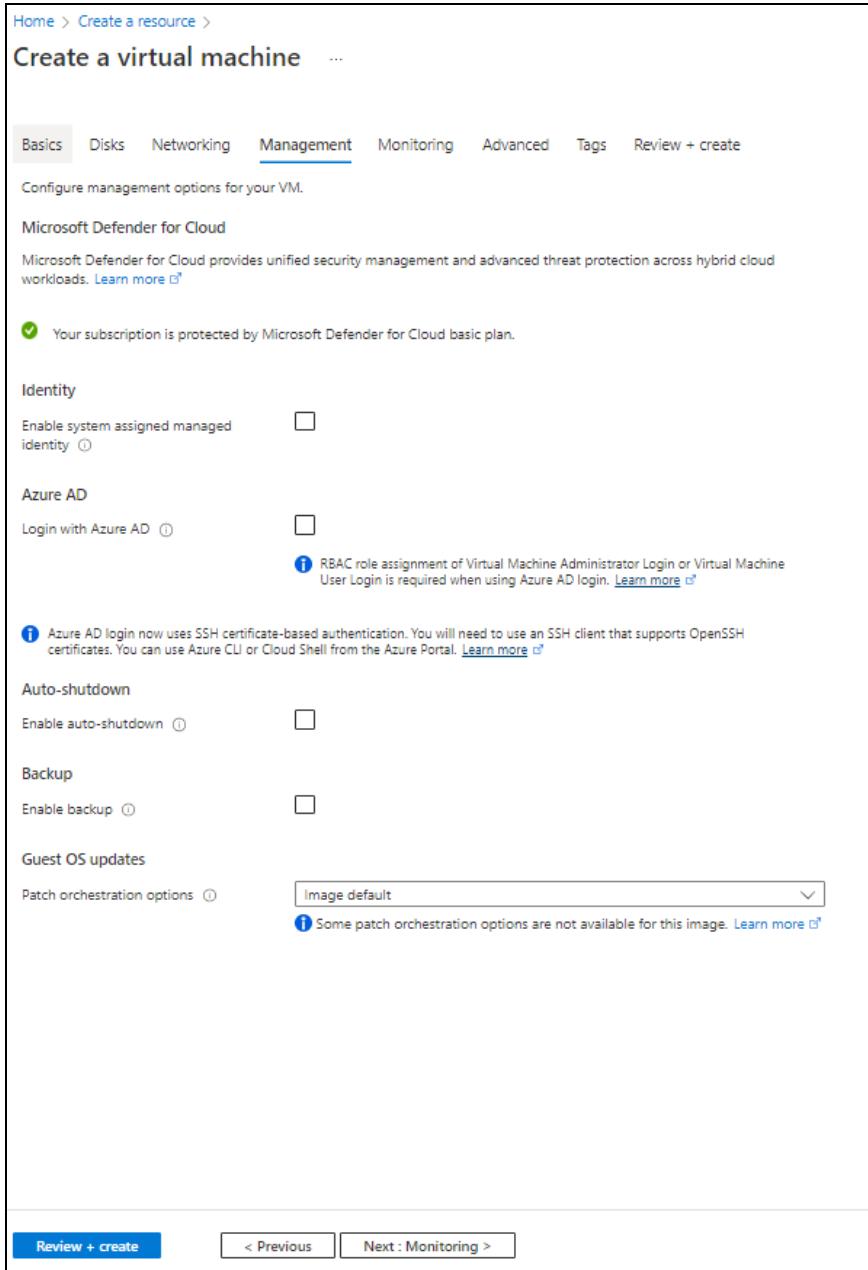
Figure 26 : Create a virtual machine window - Networking tab



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.

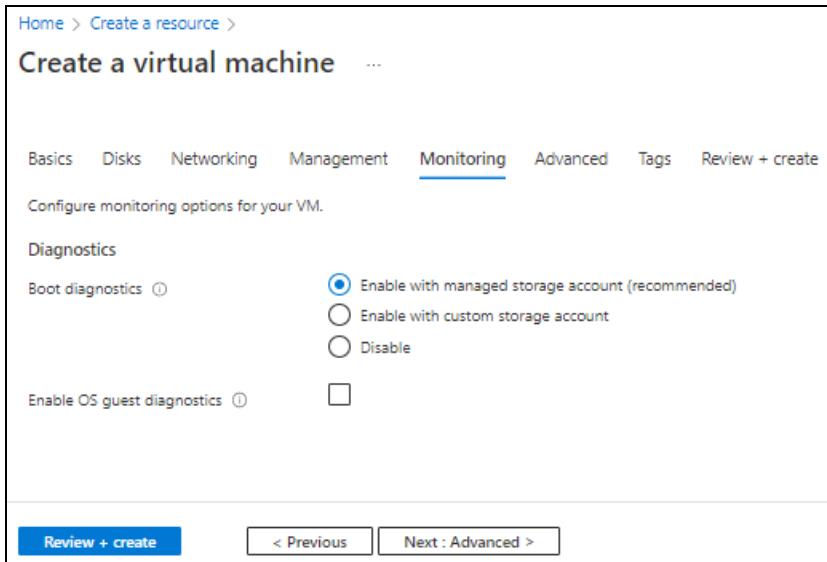
Figure 27 : Create a virtual machine window - Management tab



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

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

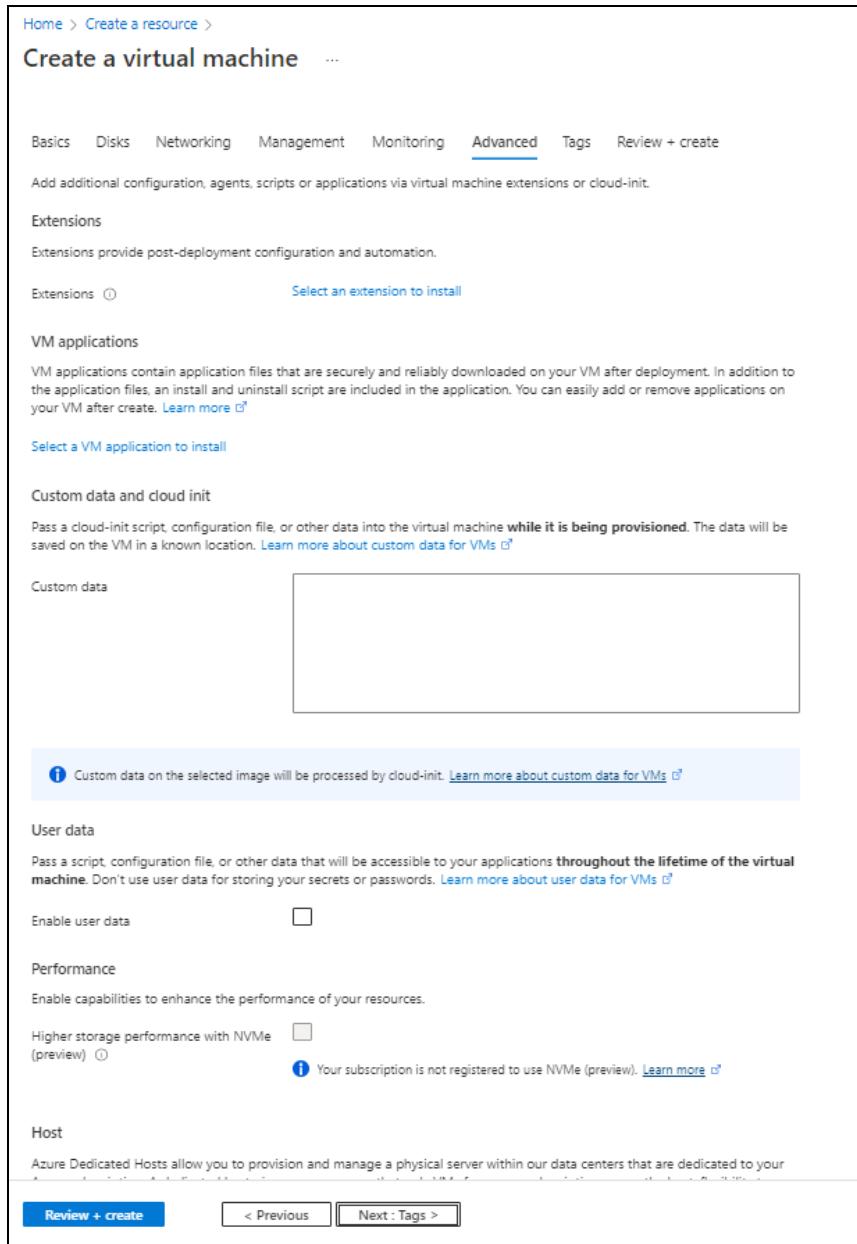
Figure 28 : Create a virtual machine window - Monitoring tab



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

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

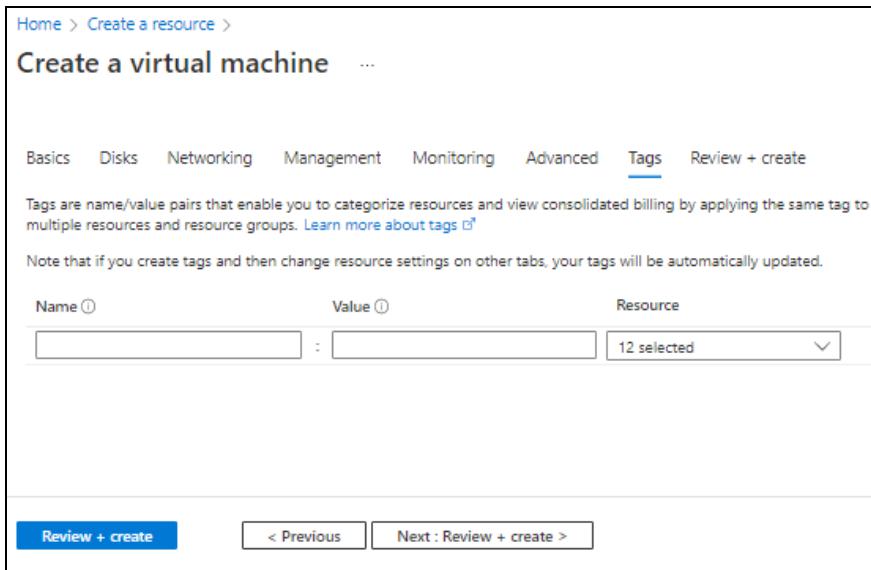
Figure 29 : Create a virtual machine window - Advanced tab



13. Click **Next : Tags at the bottom of the window.**

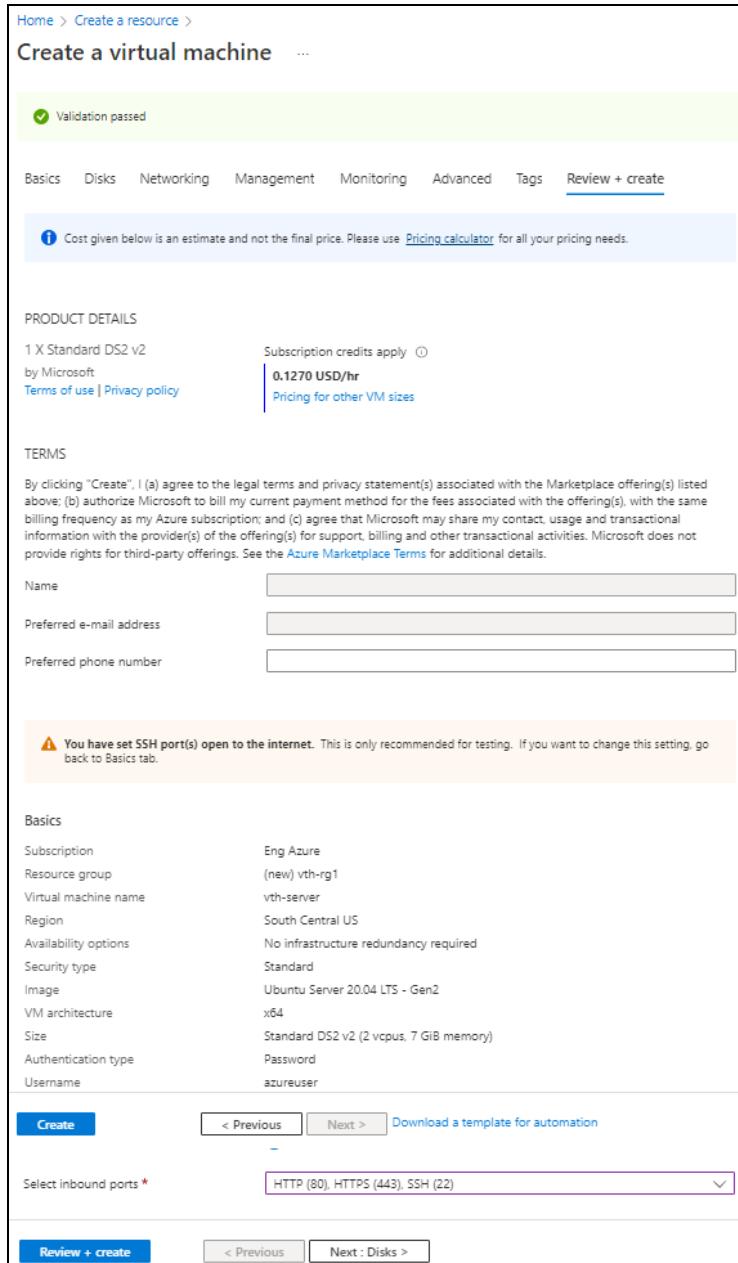
14. Select or enter the information to categorized resources in the **Tags tab as needed.**

Figure 30 : Create a virtual machine window - Tags tab



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



16. 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

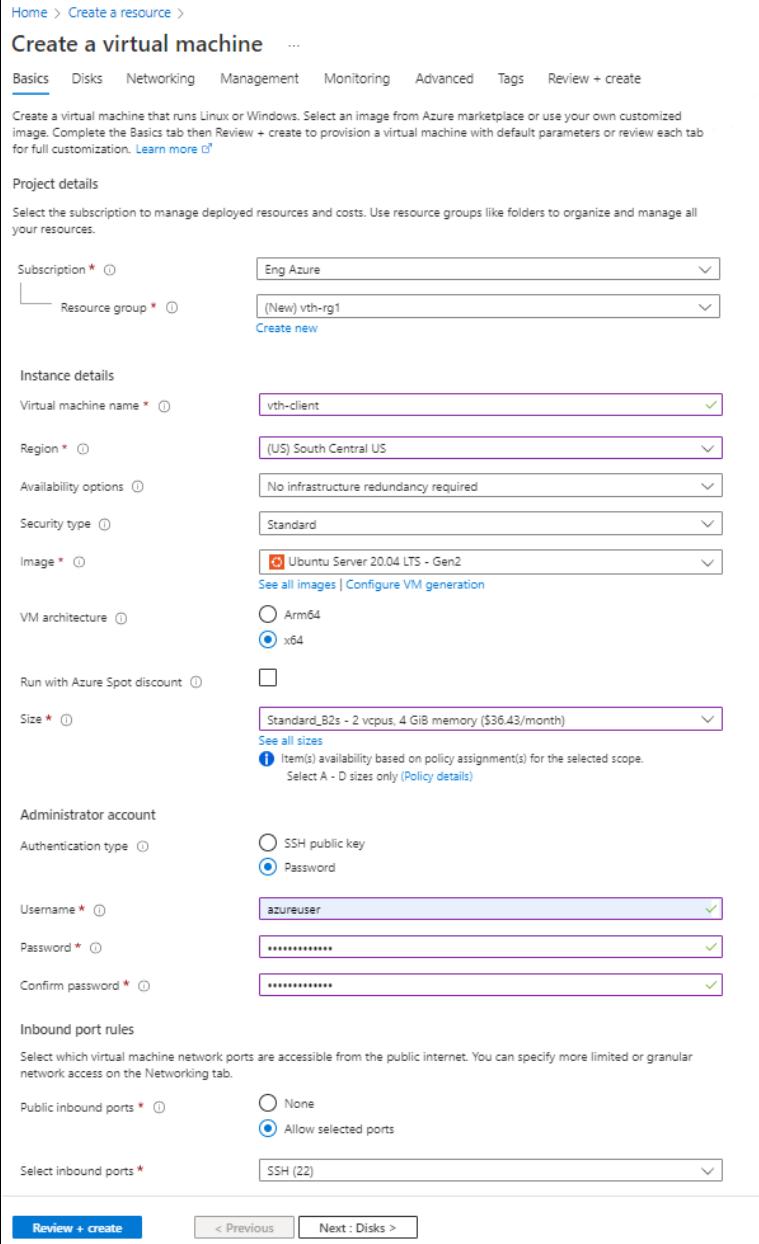
Administrator account

- 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



The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields filled in include:

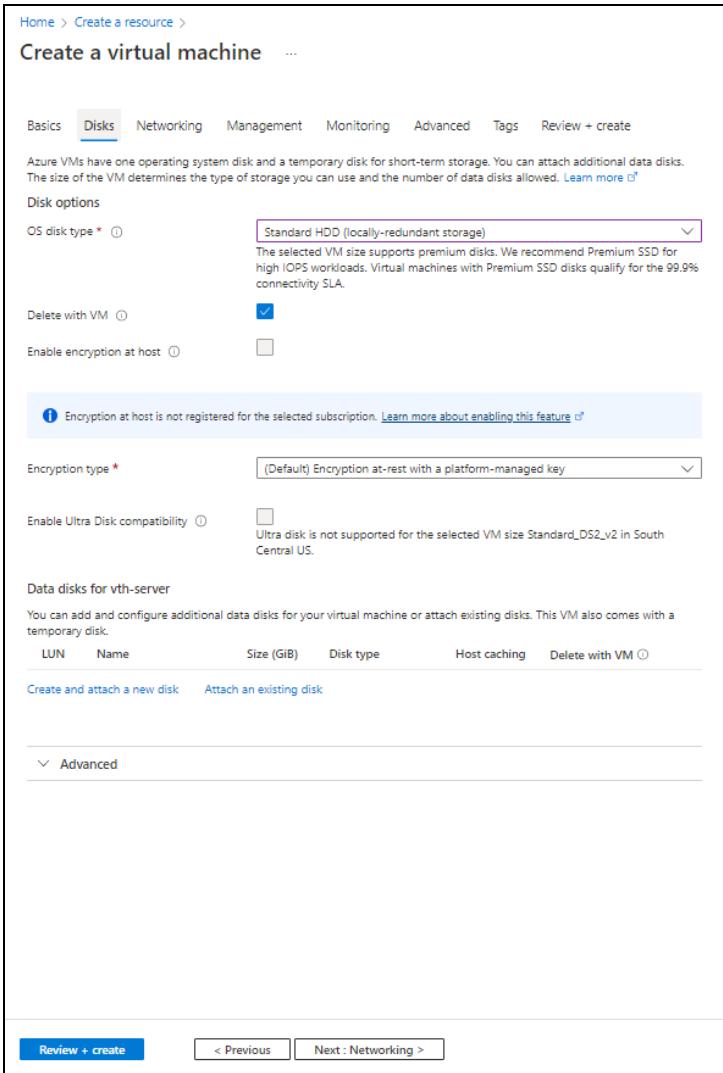
- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- Virtual machine name:** vth-client
- Region:** (US) South Central US
- Availability options:** No infrastructure redundancy required
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Size:** Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)
- Administrator account:**
 - Authentication type: Password
 - Username: azureuser
 - Password: (redacted)
 - Confirm password: (redacted)
- Inbound port rules:**
 - Public inbound ports: Allow selected ports
 - Select inbound ports: SSH (22)

At the bottom, there are 'Review + create' and 'Next : Disks >' buttons.

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

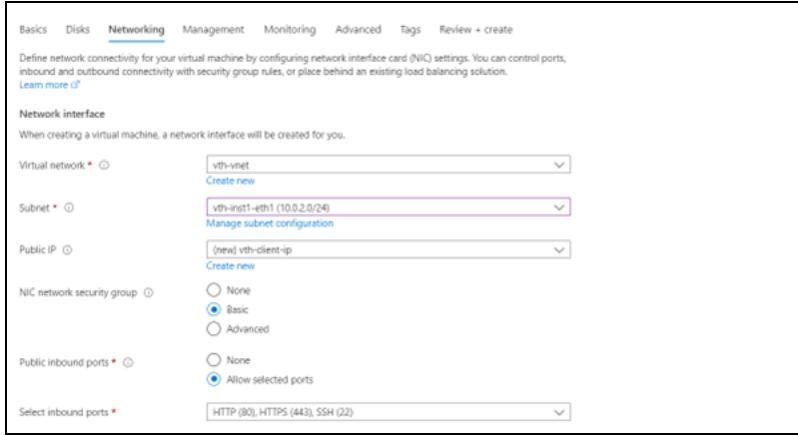


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

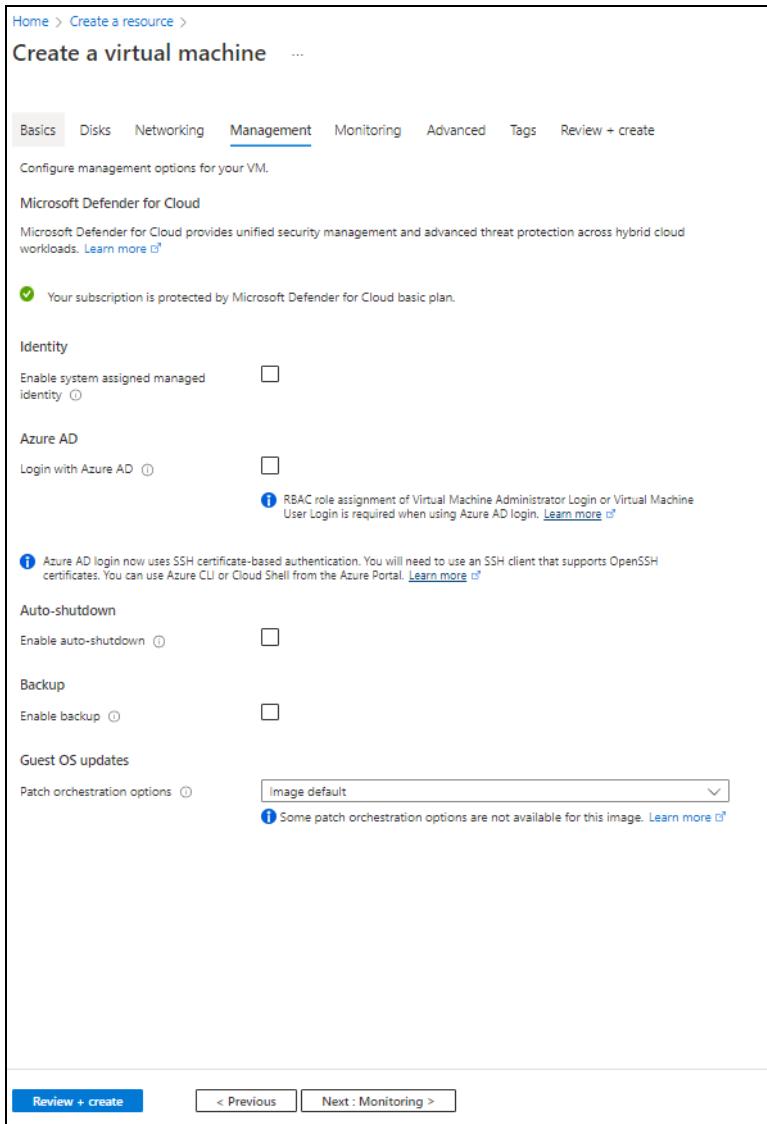
Figure 34 : Create a virtual machine window - Networking tab



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.

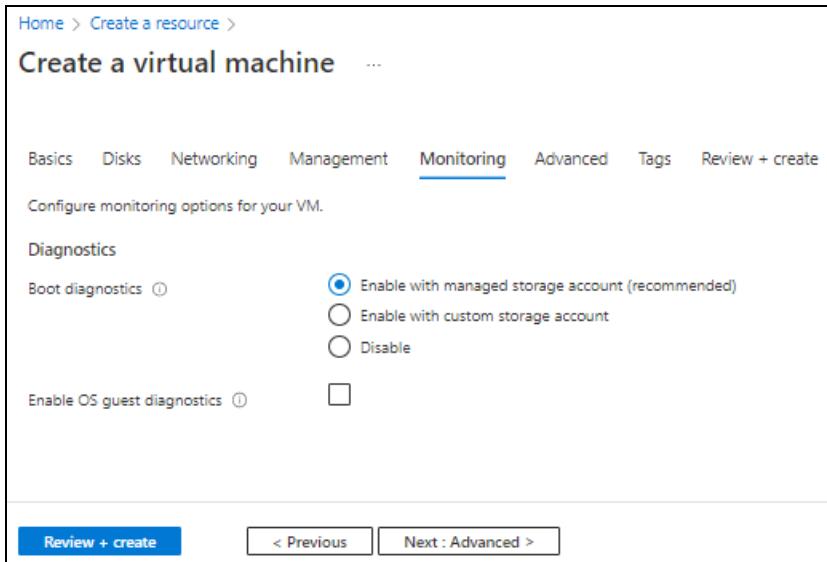
Figure 35 : Create a virtual machine window - Management tab



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

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

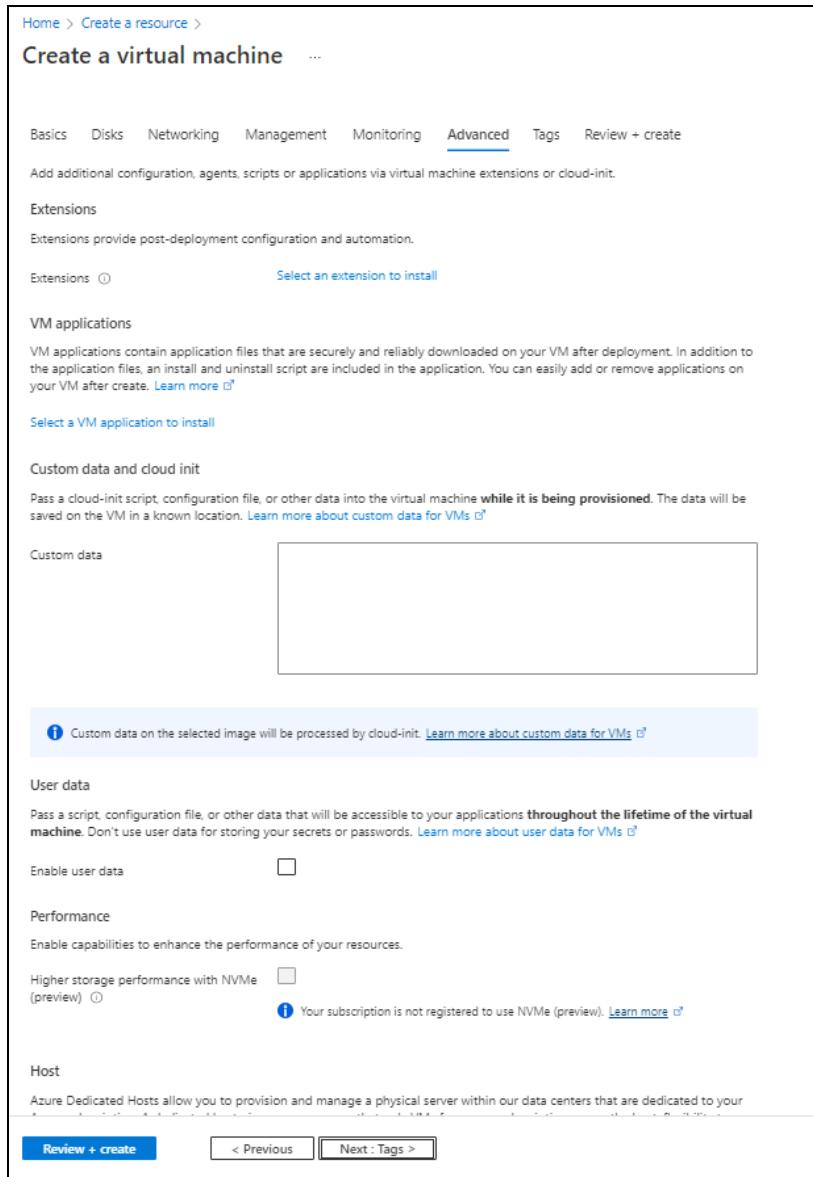
Figure 36 : Create a virtual machine window - Monitoring tab



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

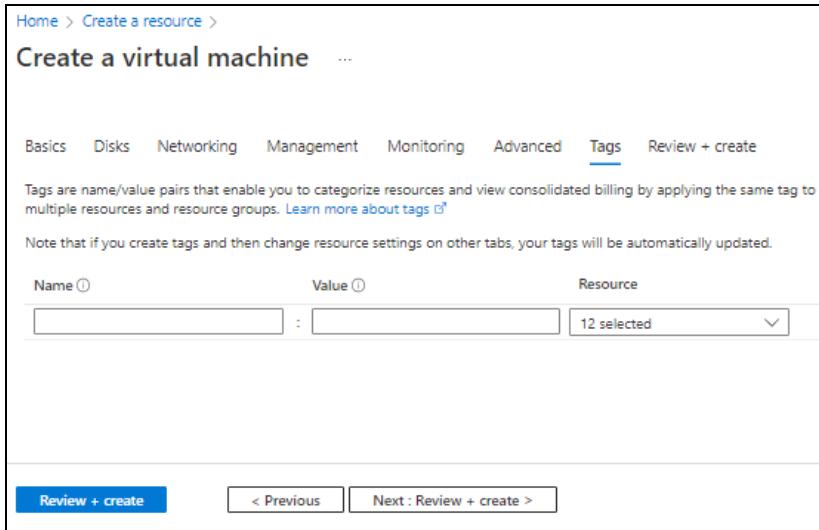
12. Select or enter the additional configuration in the **Advanced tab as needed.**

Figure 37 : Create a virtual machine window - Advanced tab



- 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.**

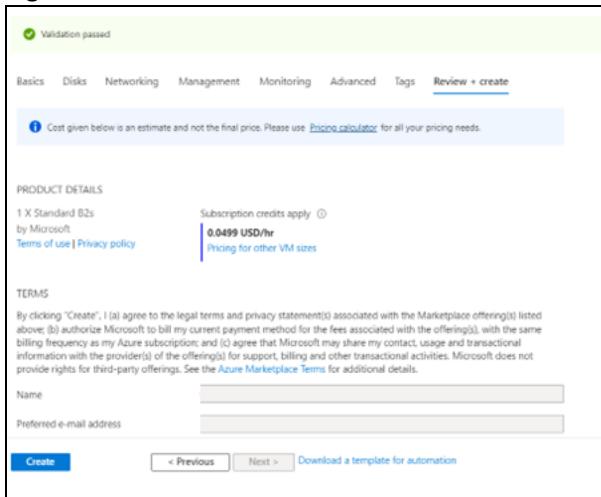
Figure 38 : Create a virtual machine window - Tags tab



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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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 PS_TMPL_2NIC_1VM_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> .\PS_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 PowerShell template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_2NIC_1VM_SLB_CONFIG_3.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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.

Configure vThunder GLM

The following topics are covered:

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

Initial Setup

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

1. Open the PS_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 PS_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 PowerShell template.
 2. Run the following command to apply GLM on vThunder:

```
PS C:\Users\TestUser\Templates> .\PS_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]

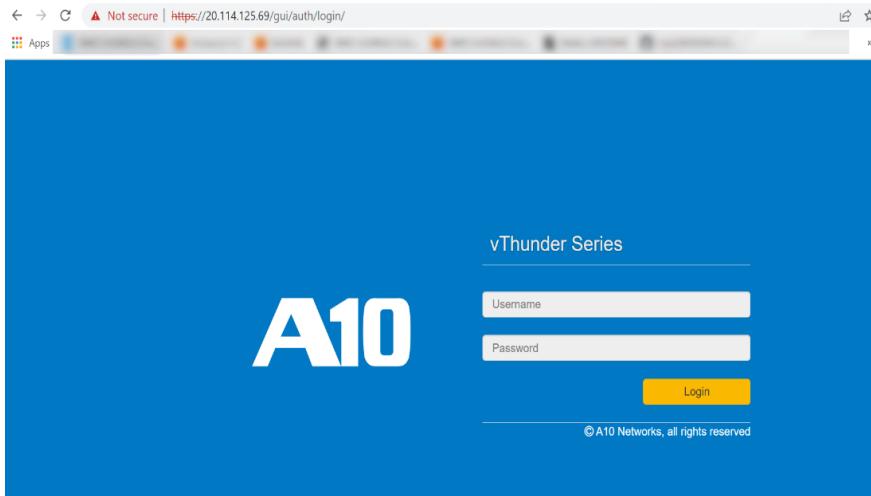
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

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 PowerShell 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 |
| <hr/> | | |
| 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 |
|--------------------|--------------------------|--------------------|--------|
| <hr/> | | | |
| server certificate | Jan 28 12:00:00 2028 GMT | [Unexpired, Bound] | |

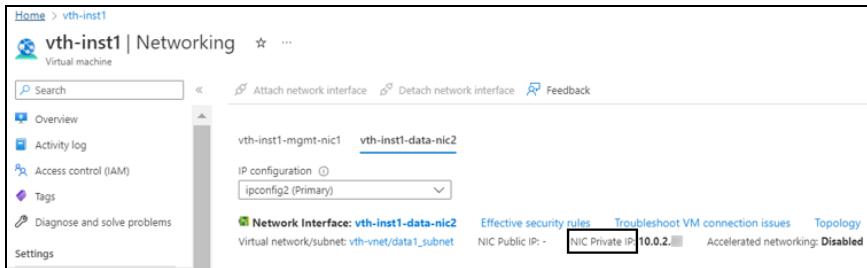
Verify Traffic Flow

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 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 10.0.2.4
```

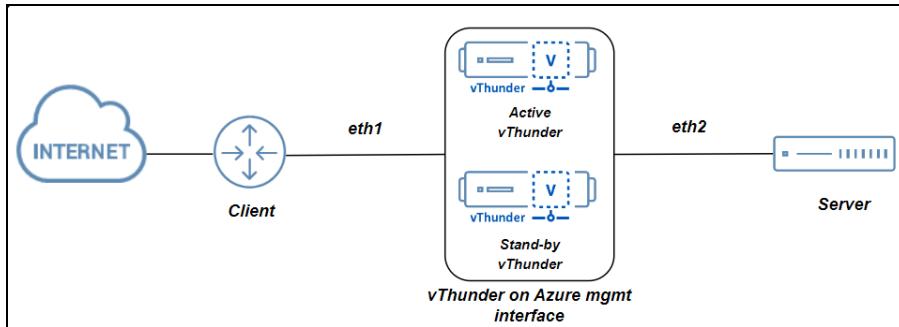
Verify if a response is received.

Deploy PowerShell 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 | 93 |
| Create vThunder Instances | 96 |
| Configure Server and Client Machine | 101 |
| Configure vThunder as an SLB | 119 |
| Configure High Availability | 125 |
| Access vThunder using CLI or GUI | 128 |
| Verify Deployment | 130 |
| Verify Traffic Flow | 133 |

System Requirements

The PowerShell 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 | <p>A resource group with the specified name and location is created, if it doesn't exist.</p> <p>All the resources required for this template is created under the resource group.</p> | Here, the Azure resource group name used is vth-rg1 . |
| 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> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | vthunderstorage |
| Virtual Machine (VM) | Two virtual machine instances are created for vThunder. | vth-inst1 vth-inst2 |

| Resource Name | Description | Default Value | | | | | | |
|------------------------------|---|---|----------------------------|----------|----------------------------|--------------------------|--|-------------------------|
| Instance | <p>Product: A10 vThunder</p> <p>Operating system: Linux</p> <p>Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory)</p> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 7 lists the supported VM sizes.</p> | | | | | | | |
| 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: <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary | <table border="1"> <tr> <td>vth-inst1-mgmt-nic1</td> <td>10.0.1.4</td> </tr> <tr> <td>vth-inst1-data-nic2</td> <td>10.0.2.4 [Primary IP]</td> </tr> <tr> <td></td> <td>10.0.2.X [Secondary]</td> </tr> </table> | vth-inst1-mgmt-nic1 | 10.0.1.4 | vth-inst1-data-nic2 | 10.0.2.4 [Primary IP] | | 10.0.2.X [Secondary] |
| vth-inst1-mgmt-nic1 | 10.0.1.4 | | | | | | | |
| vth-inst1-data-nic2 | 10.0.2.4 [Primary IP] | | | | | | | |
| | 10.0.2.X [Secondary] | | | | | | | |

| Resource Name | Description | Default Value | | | | | | | | | | | | | | | | |
|--------------------------------------|---|--|--|-----|---------------------|--------------------------|--|----------------------------|---------------------|----------|---------------------|--------------------------|--|----------------------------|---------------------|--------------------------|--|----------------------------|
| | <p>private IP [Ethernet 1, Ethernet 2]</p> <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> <hr/> | <table border="1"> <tr> <td></td><td>IP]</td></tr> <tr> <td>vth-inst1-data-nic3</td><td>10.0.3.4 [Primary IP]</td></tr> <tr> <td></td><td>10.0.3.X [Secondary IP]</td></tr> <tr> <td>vth-inst2-mgmt-nic1</td><td>10.0.1.6</td></tr> <tr> <td>vth-inst2-data-nic2</td><td>10.0.2.6 [Primary IP]</td></tr> <tr> <td></td><td>10.0.2.X [Secondary IP]</td></tr> <tr> <td>vth-inst2-data-nic3</td><td>10.0.3.6 [Primary IP]</td></tr> <tr> <td></td><td>10.0.3.X [Secondary IP]</td></tr> </table> | | IP] | vth-inst1-data-nic3 | 10.0.3.4 [Primary IP] | | 10.0.3.X [Secondary IP] | vth-inst2-mgmt-nic1 | 10.0.1.6 | vth-inst2-data-nic2 | 10.0.2.6 [Primary IP] | | 10.0.2.X [Secondary IP] | vth-inst2-data-nic3 | 10.0.3.6 [Primary IP] | | 10.0.3.X [Secondary IP] |
| | IP] | | | | | | | | | | | | | | | | | |
| vth-inst1-data-nic3 | 10.0.3.4 [Primary IP] | | | | | | | | | | | | | | | | | |
| | 10.0.3.X [Secondary IP] | | | | | | | | | | | | | | | | | |
| vth-inst2-mgmt-nic1 | 10.0.1.6 | | | | | | | | | | | | | | | | | |
| vth-inst2-data-nic2 | 10.0.2.6 [Primary IP] | | | | | | | | | | | | | | | | | |
| | 10.0.2.X [Secondary IP] | | | | | | | | | | | | | | | | | |
| vth-inst2-data-nic3 | 10.0.3.6 [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 7 : Supported VM sizes

| Series | Size | Qualified Name |
|----------|---------------|----------------|
| A series | Standard A4v2 | Standard_A4_v2 |

| Series | Size | Qualified Name |
|---------------|-------------------|-----------------------|
| | 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 |
| 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template, and open the PS_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.

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

5. Configure a vThunder instance names.

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

6. Set VM size for vThunder.

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

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

7. 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.

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

```
"nic1Name_vm1": {
    "value": "vth-inst1-mgmt-nic1"
},
"nic2Name_vm1": {
    "value": "vth-inst1-data-nic2"
},
"nic3Name_vm1": {
```

```

        "value": "vth-inst1-data-nic3"
    },
    "nic1Name_vm2": {
        "value": "vth-inst2-mgmt-nic1"
    },
    "nic2Name_vm2": {
        "value": "vth-inst2-data-nic2"
    },
    "nic3Name_vm2": {
        "value": "vth-inst2-data-nic3"
    },

```

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

```

"vm1MgmtIntfName": {
    "value": "vth-inst1-mgmt-int"
},
"addressPrefix": {
    "value": "10.0.0.0/16"
},
"mgmtIntfPrivatePrefix": {
    "value": "10.0.1.0/24"
},
"vm1Eth1Name": {
    "value": "vth-inst1-eth1"
},
"eth1PrivatePrefix": {
    "value": "10.0.2.0/24"
},
"vm1Eth2Name": {
    "value": "vth-inst1-eth2"
},
"eth2PrivatePrefix": {
    "value": "10.0.3.0/24"
},
"vm2MgmtIntfName": {
    "value": "vth-inst2-mgmt-int"
},

```

```

    "vm2Eth1Name": {
        "value": "vth-inst2-eth1"
    },
    "vm2Eth2Name": {
        "value": "vth-inst2-eth2"
    },

```

10. Configure network security group for two vThunder instances.

```

    "networkSecurityGroupName_vm1": {
        "value": "vth-inst1-nsg"
    },
    "networkSecurityGroupName_vm2": {
        "value": "vth-inst2-nsg"
    }

```

11. Verify if all the configurations in the PS_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 PowerShell template.
2. Run the following command to create a deployment group in Azure.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_1.ps1 -  
resourceGroup <resource_group_name> -location "<location_name>"
```

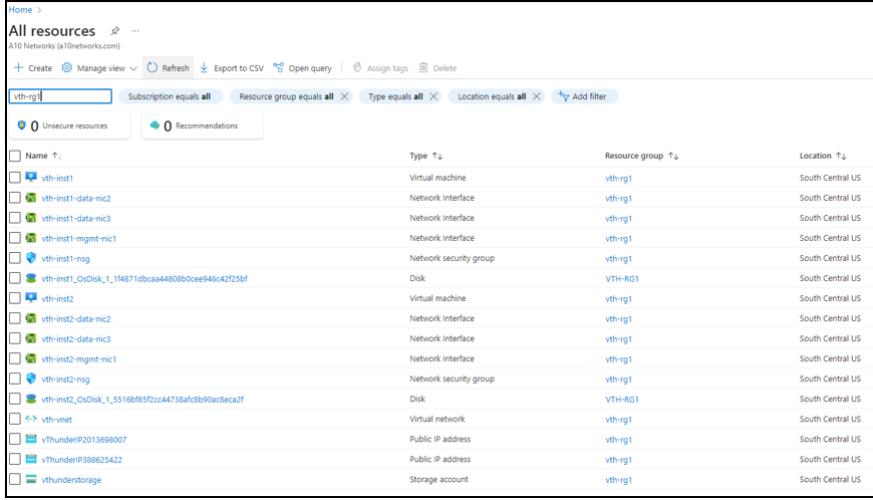
Example:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_1.ps1 -  
resourceGroup vth-rg1 -location "south central us"
```

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

3. 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-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_1f4871dbca44808b0ce946c42725bf | 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_35116bf85f2cc44738afcfb90acdeca2f | Disk | VTH-RG1 | South Central US |
| vth-net | Virtual network | vth-rg1 | South Central US |
| vThunderP2013698007 | Public IP address | vth-rg1 | South Central US |
| vThunderP388625422 | Public IP address | vth-rg1 | South Central US |
| vthunstorage | 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

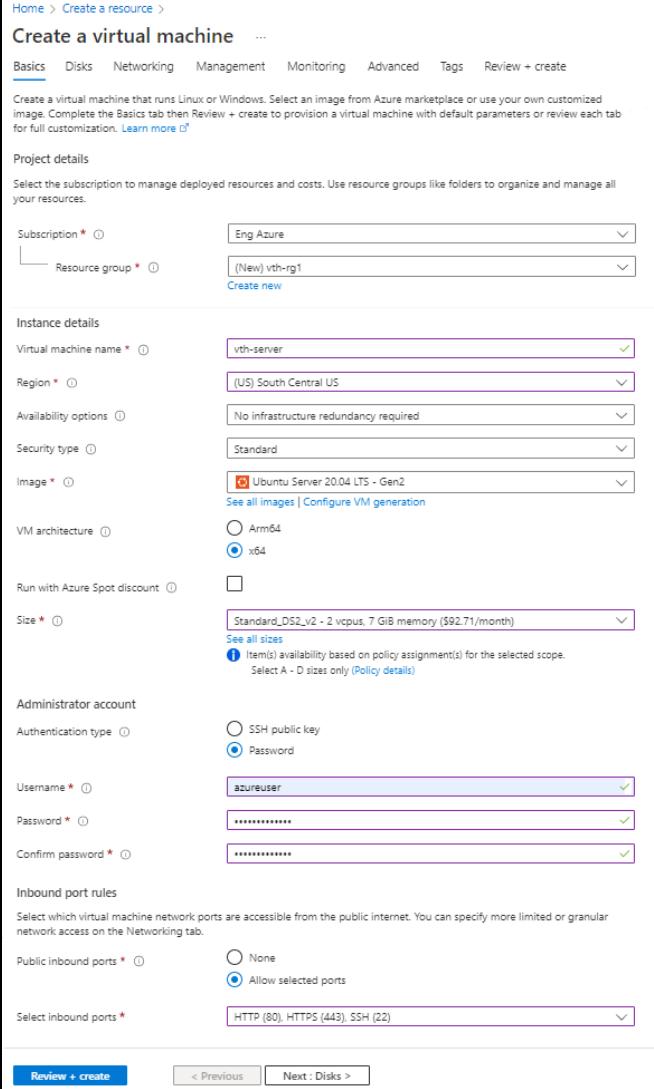
Administrator account

- Depending upon the Authentication type 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 * Eng Azure

Resource group * (New) vth-rg1 [Create new](#)

Instance details

Virtual machine name * vth-server

Region * (US) South Central US

Availability options * No infrastructure redundancy required

Security type * Standard

Image * Ubuntu Server 20.04 LTS - Gen2 [See all images](#) [Configure VM generation](#)

VM architecture * x64

Run with Azure Spot discount

Size * Standard_DS2_v2 - 2 vcpus, 7 GiB memory (\$92.71/month) [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 * Password

Username * azureuser

Password * [View](#)

Confirm password * [View](#)

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 * HTTP (80), HTTPS (443), SSH (22)

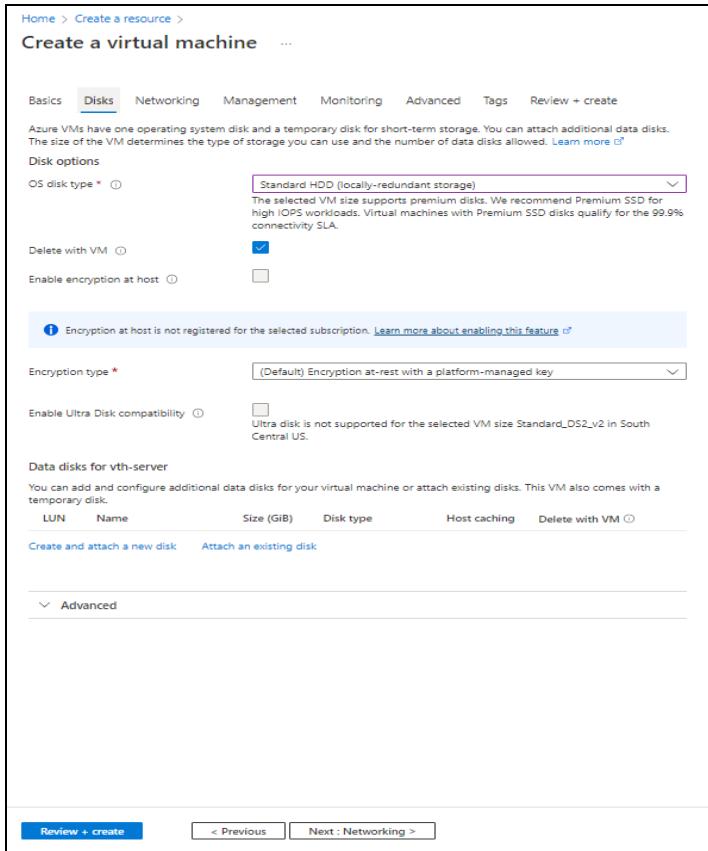
Review + create < Previous Next : Disks >

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 45 : Create a virtual machine window - Disks tab

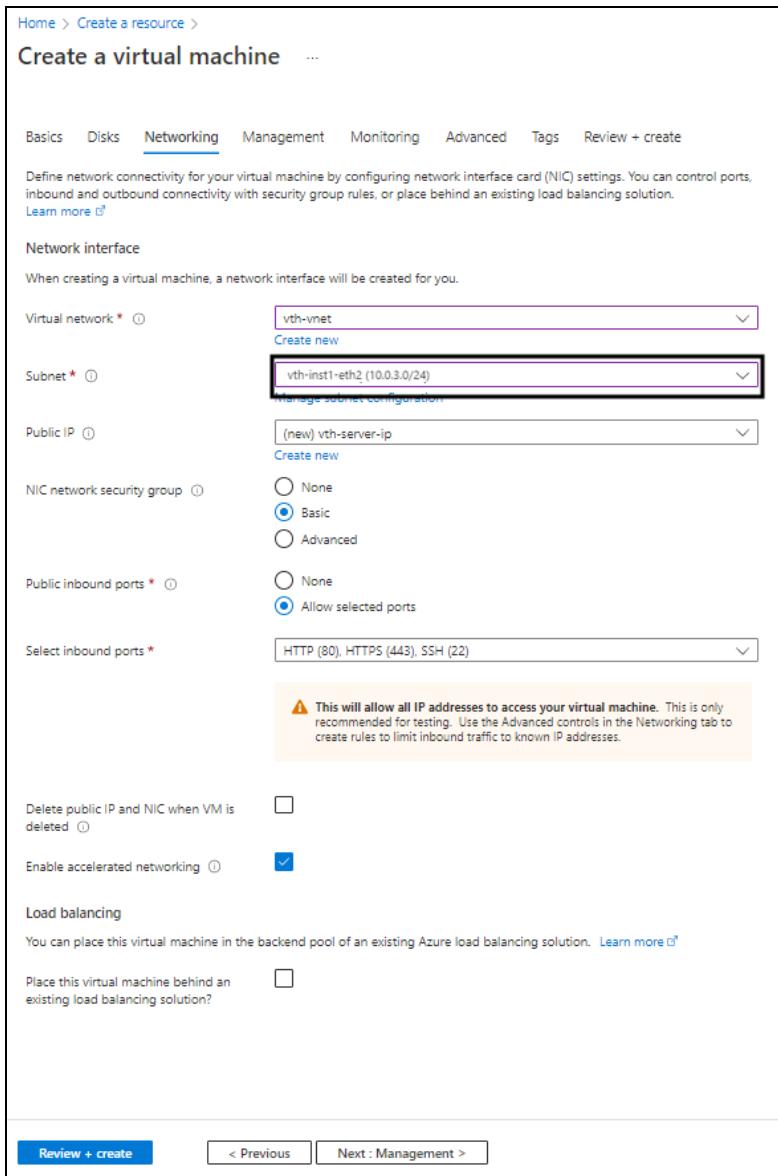


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

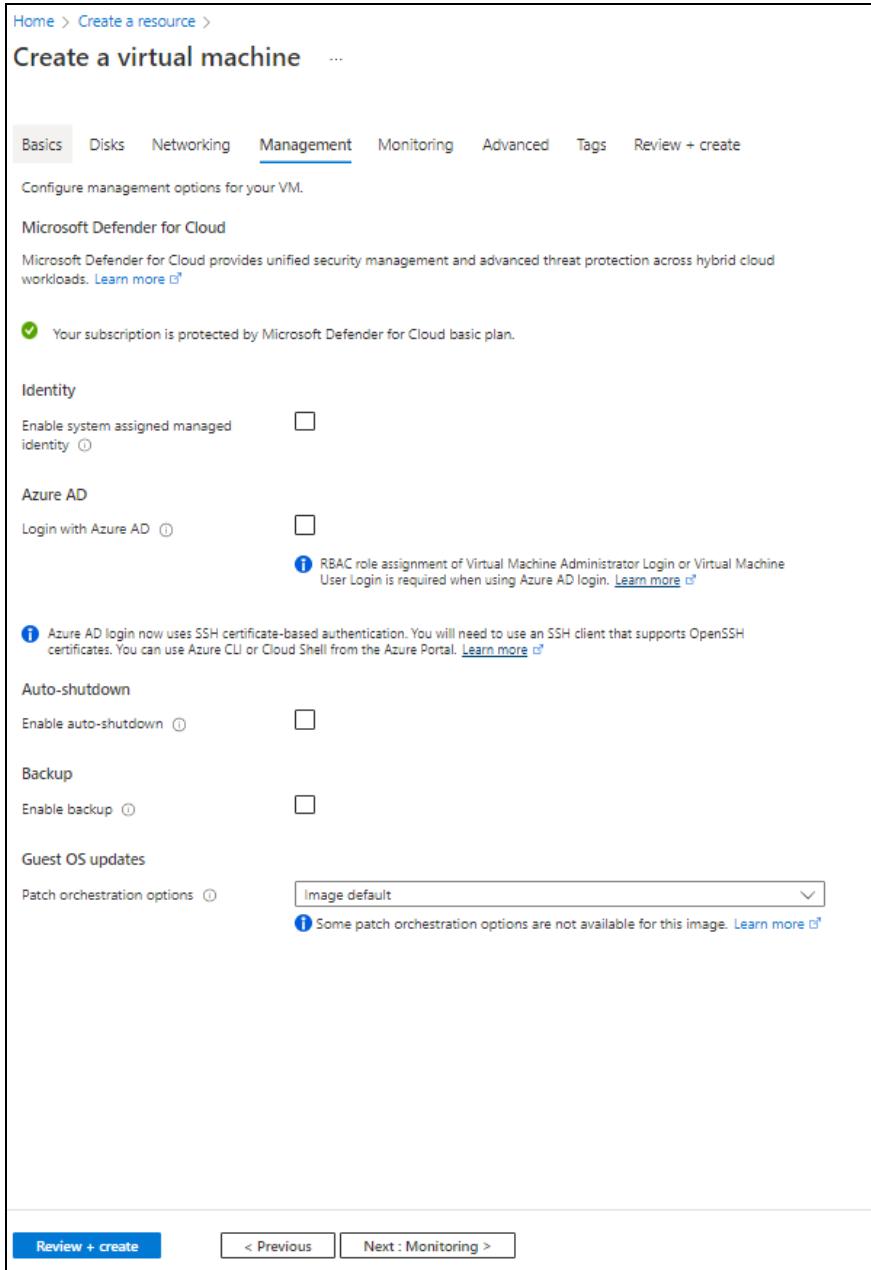
Figure 46 : Create a virtual machine window - Networking tab



- 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.

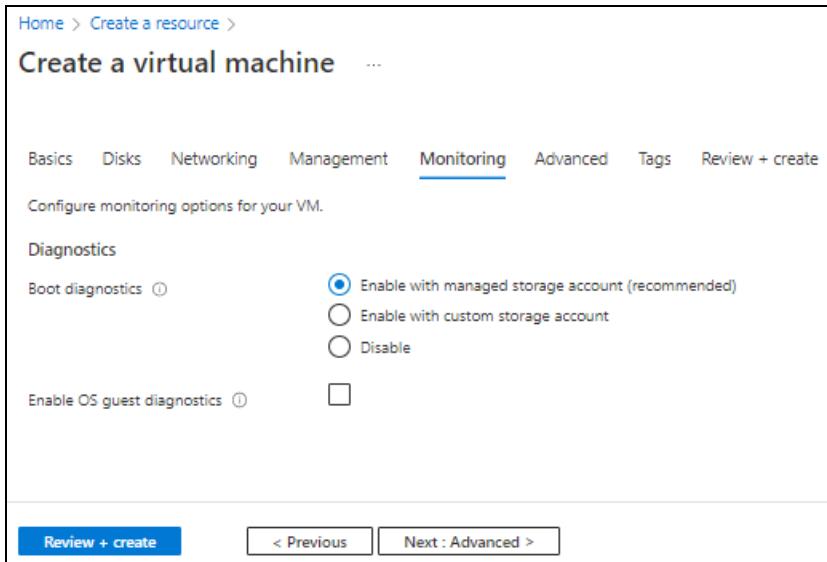
Figure 47 : Create a virtual machine window - Management tab



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

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

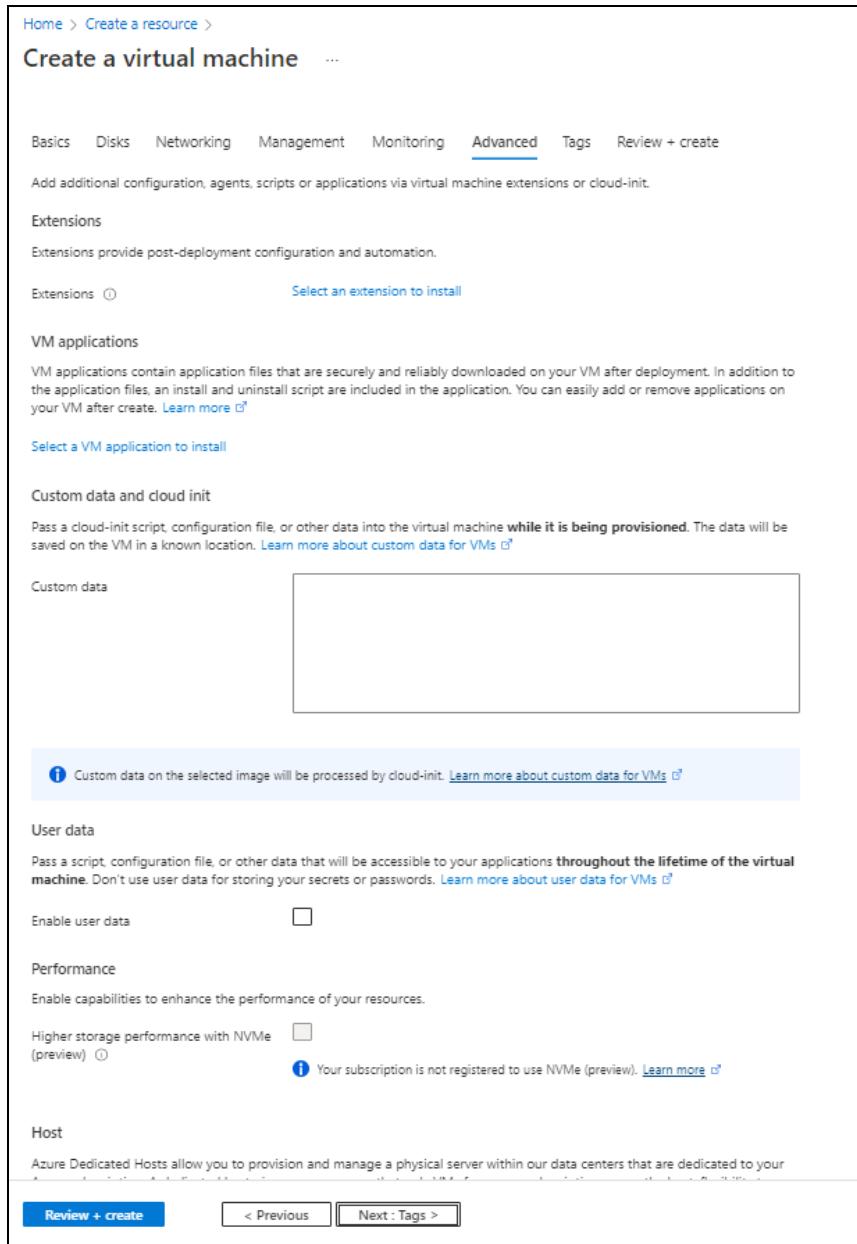
Figure 48 : Create a virtual machine window - Monitoring tab



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

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

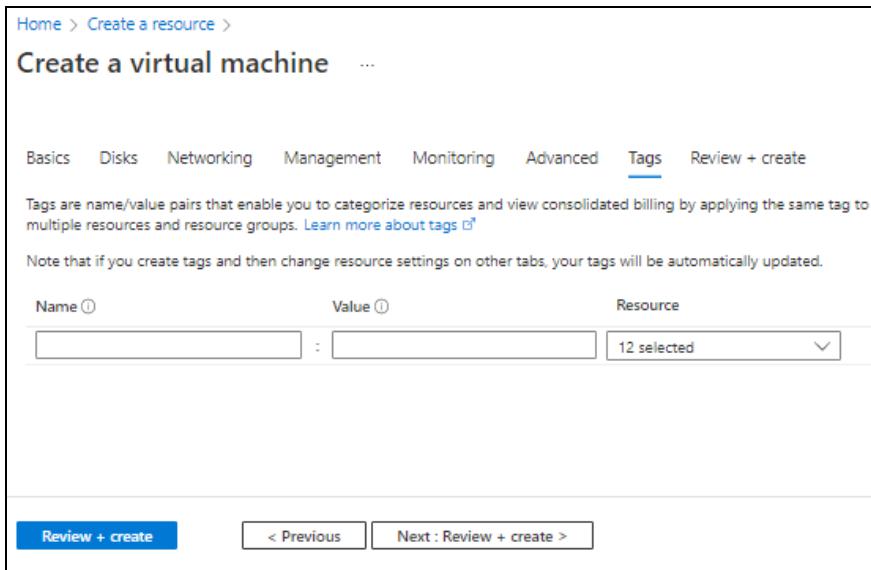
Figure 49 : Create a virtual machine window - Advanced tab



13. Click **Next : Tags at the bottom of the window.**

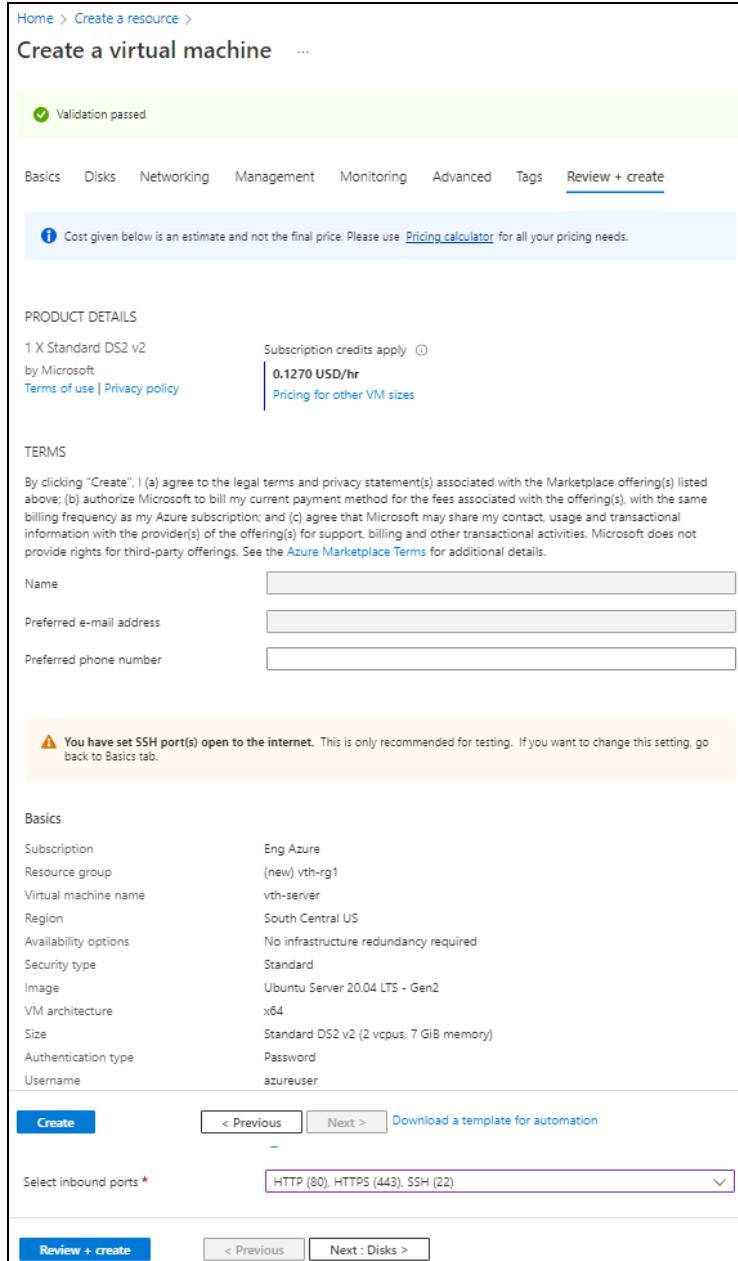
14. Select or enter the information to categorized resources in the **Tags tab as needed.**

Figure 50 : Create a virtual machine window - Tags tab



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



16. 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

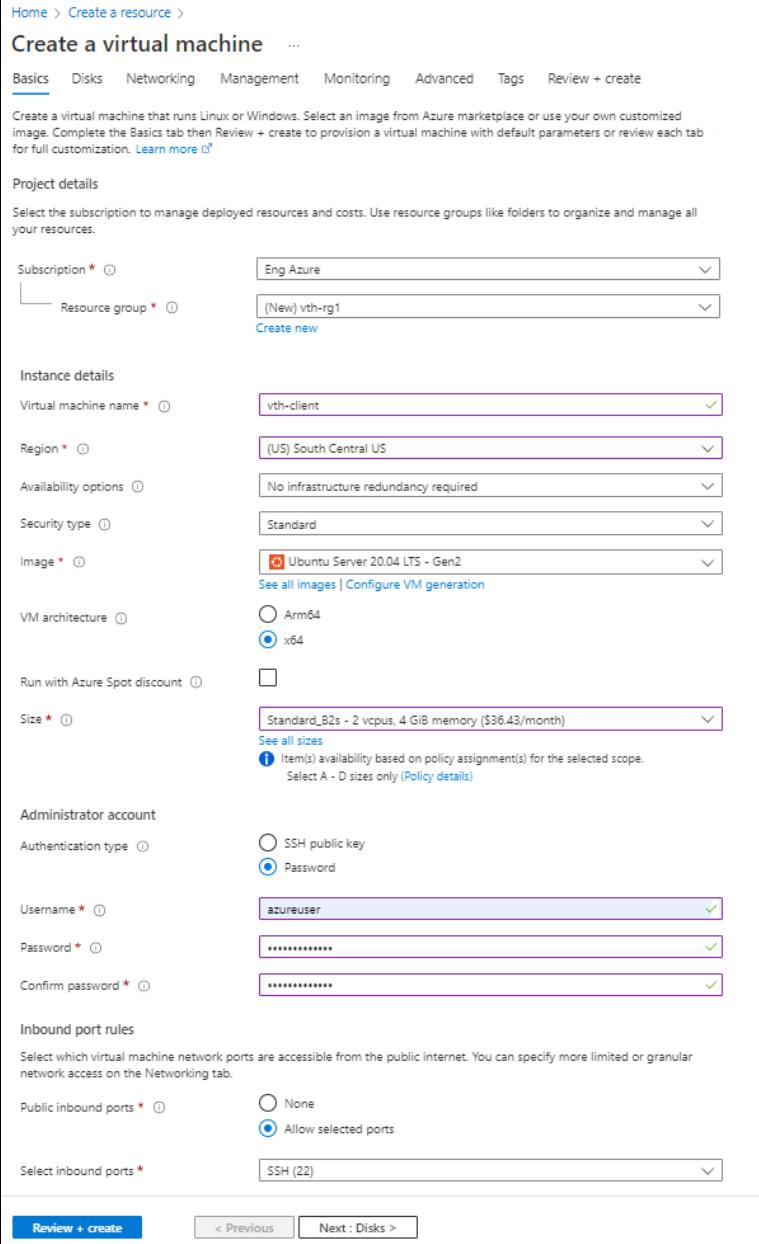
Administrator account

- 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



The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields filled in include:

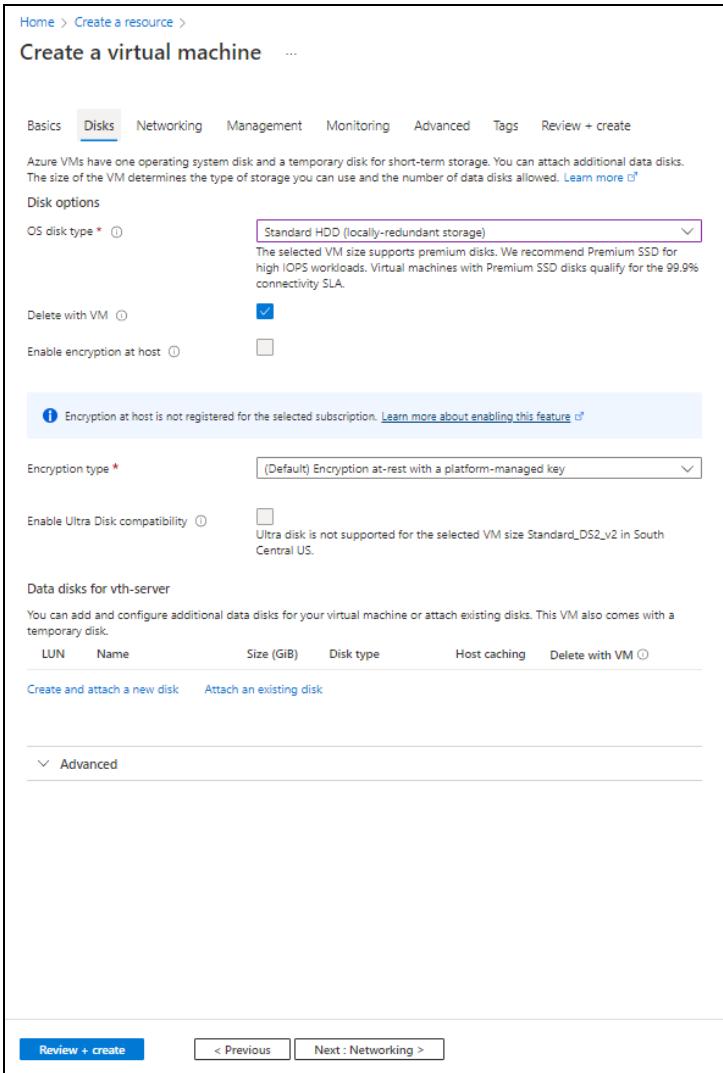
- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- Virtual machine name:** vth-client
- Region:** (US) South Central US
- Availability options:** No infrastructure redundancy required
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Size:** Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)
- Administrator account:**
 - Authentication type: Password
 - Username: azureuser
 - Password: (redacted)
 - Confirm password: (redacted)
- Inbound port rules:**
 - Public inbound ports: Allow selected ports
 - Select inbound ports: SSH (22)

At the bottom, there are 'Review + create' and 'Next : Disks >' buttons.

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

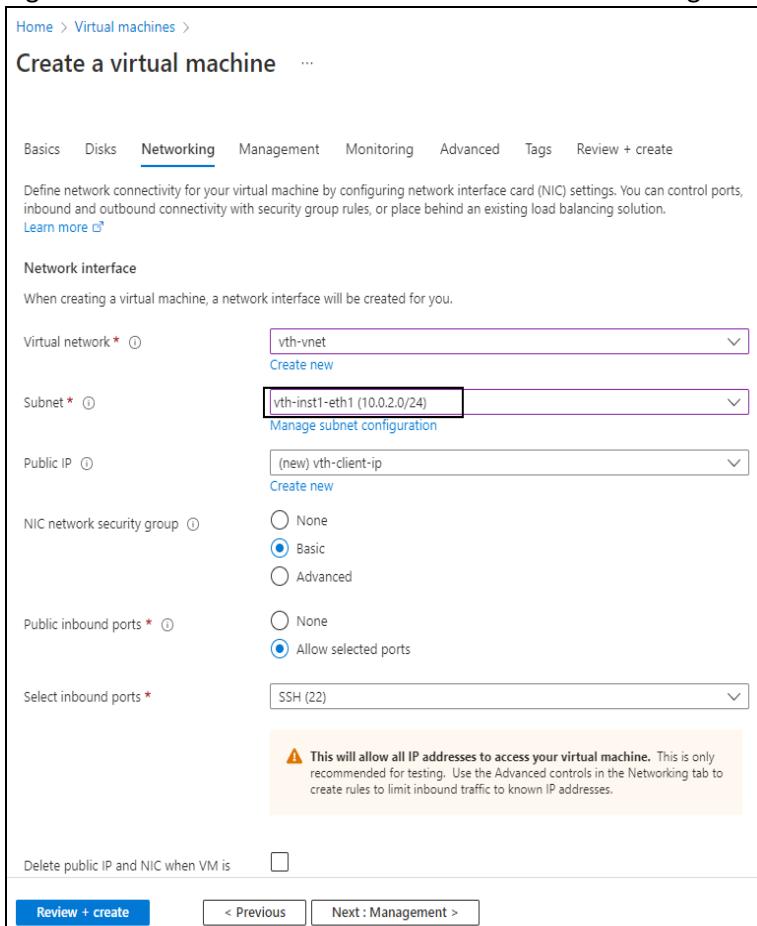


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

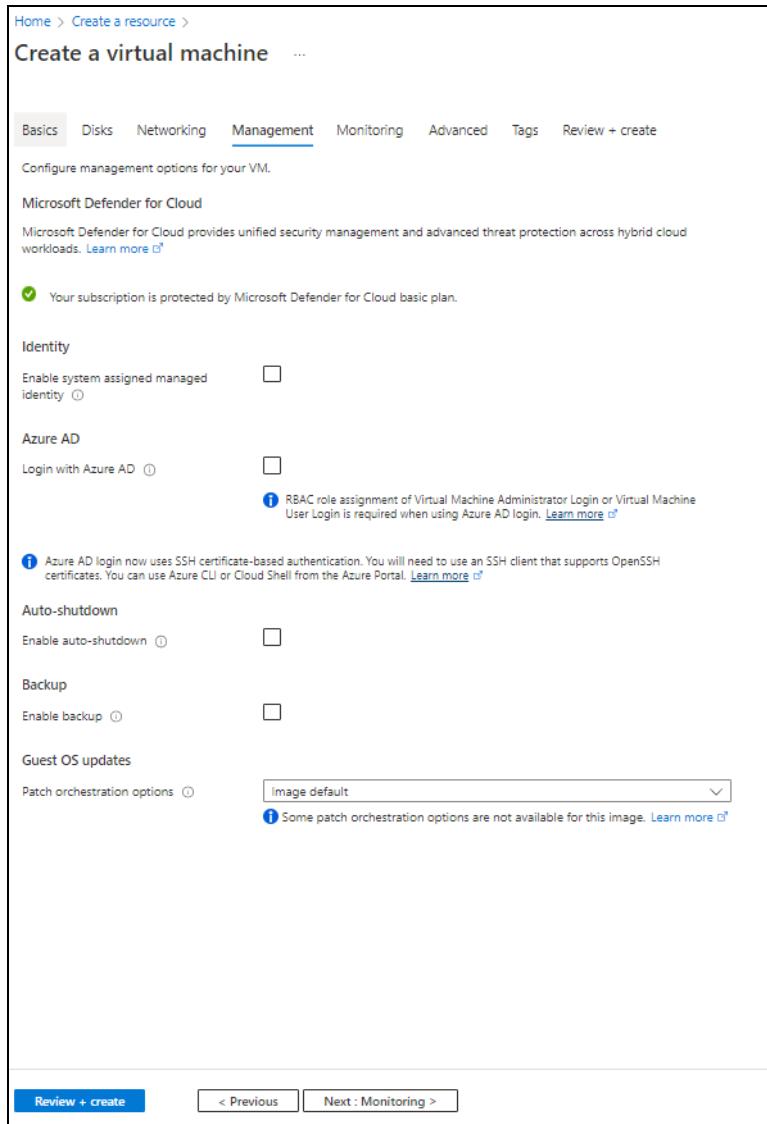
Figure 54 : Create a virtual machine window - Networking tab



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.

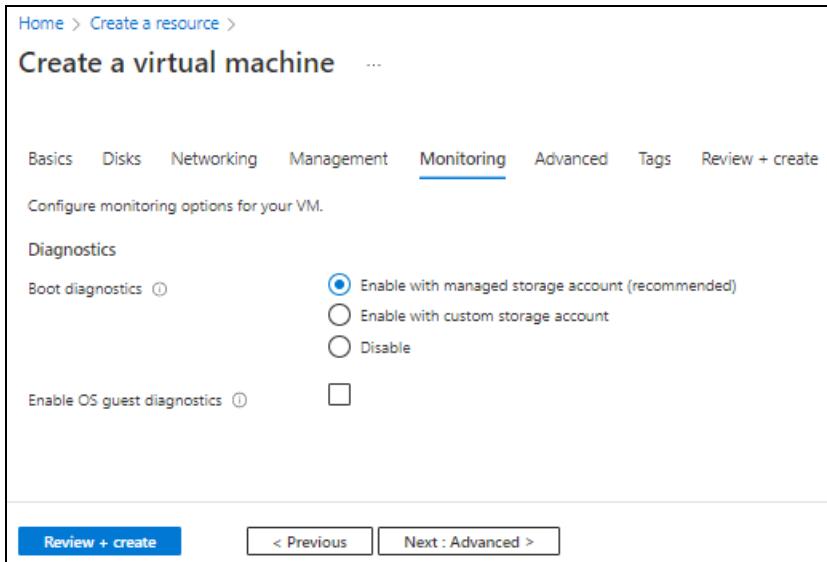
Figure 55 : Create a virtual machine window - Management tab



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

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

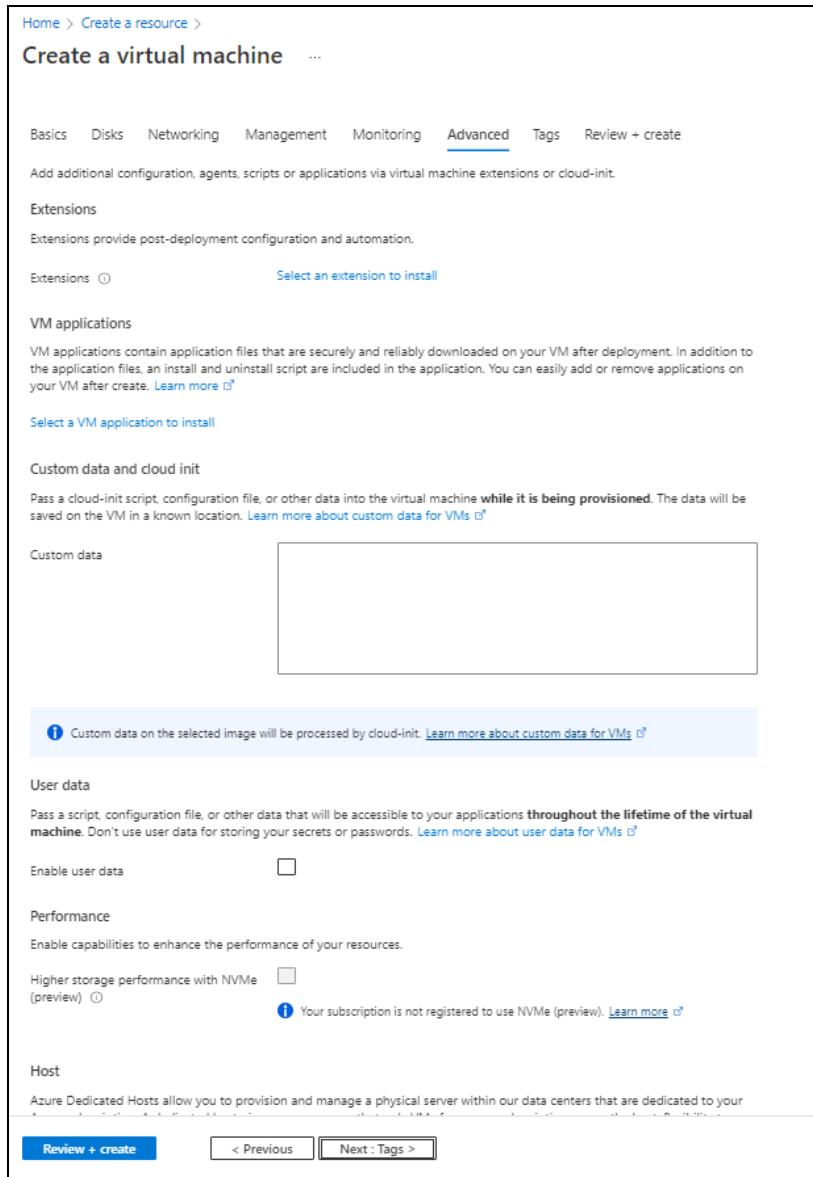
Figure 56 : Create a virtual machine window - Monitoring tab



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

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

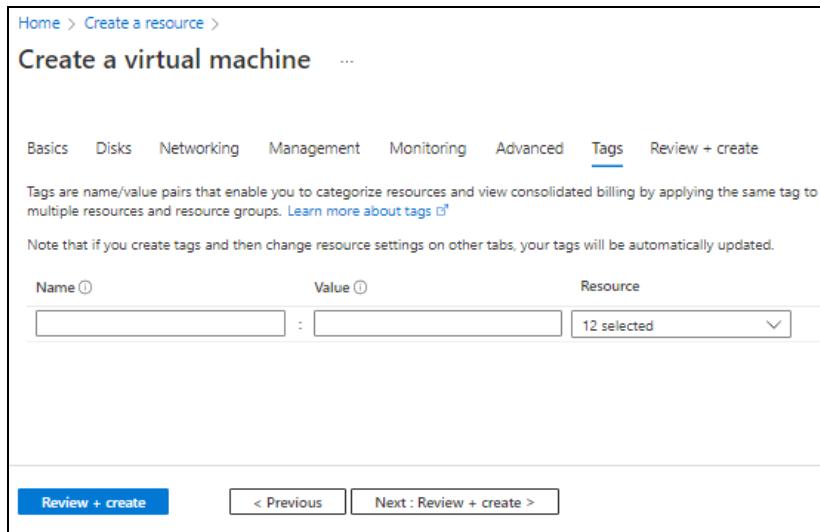
Figure 57 : Create a virtual machine window - Advanced tab



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.**

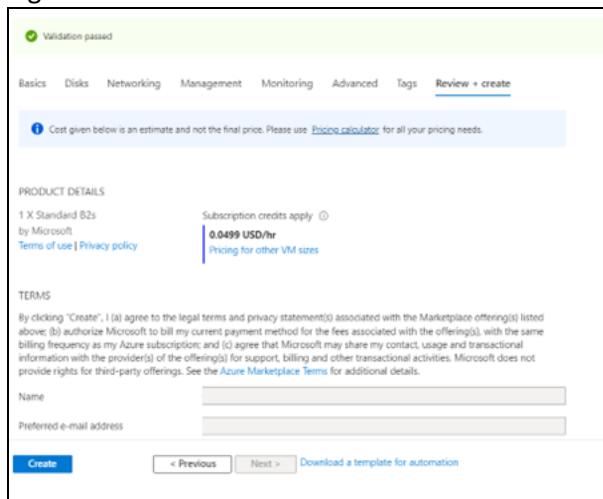
Figure 58 : Create a virtual machine window - Tags tab



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 59 : 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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": 80,
            "proto": "HTTP"
        },
        {
            "port": 443,
            "proto": "HTTPS"
        }
    ]
},
```

```

        "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",

```

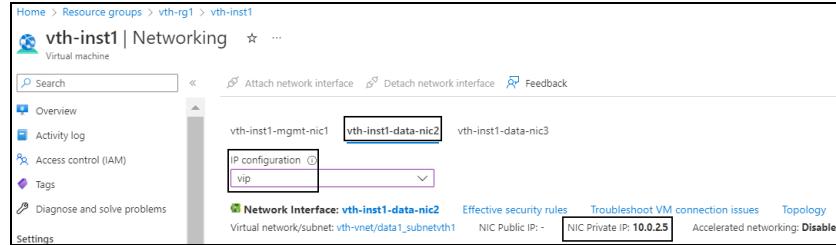
```
        "port":53
    }
]
},
{
    "name":"sg80",
    "protocol":"tcp",
    "health-check-disable":1
    "member-list": [
        {
            "name":"s1",
            "port":80
        }
    ]
}
]
```

5. Configure a virtual server.

The virtual server default name is “vip”. The vip address is generated dynamically after deploying the PowerShell template. Therefore, its default value under **virtualServerList** should be replaced. To get the vip 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 2 tab > **IP configuration > vip**. Here, Data NIC 2 is **vth-inst1-data-nic2**.

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



e. Select the **NIC Private IP**.

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

```

"virtualServerList": {
    "virtual-server-name": "vip",
    "ip-address": "10.0.2.5",
    "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 PS_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:

- Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\PS_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.

- 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:

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

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_SLB_CONFIG_3.ps1  
-resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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

The following topics are covered:

- [Configure Azure Access Key](#)
- [Configure High Availability for vThunder](#)

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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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.

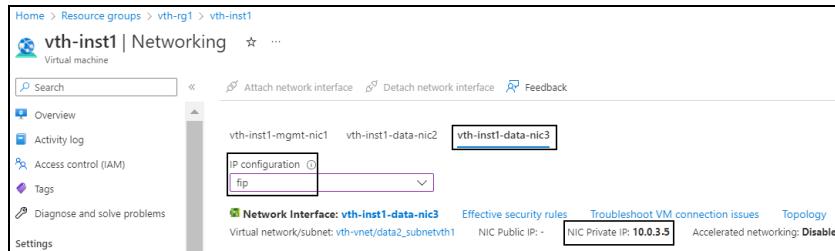
```
"terminal": {
    "idle-timeout":0
},
```

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

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



- Select the **NIC Private IP**.

- 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":"10.0.3.5"
                }
            ]
        }
    }
],
```

```

        }
    ]
}
]
]
```

- Verify if all the configurations in the PS_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:

- Import Azure access key on both the vThunder instances. For more information, refer [Import Azure Access Key](#).
- Run the following command to configure both VM in HA mode.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_CONFIG_4.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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]

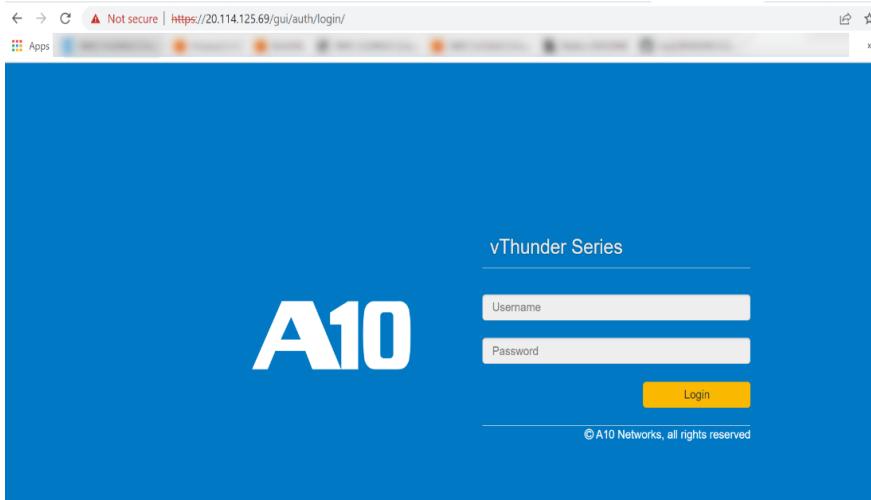
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

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 PowerShell 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 10.0.0.2.5
    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
!

```

- 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 |
|--------------------|--------------------------|--------------------|--------|
| <hr/> | | | |
| server certificate | Jan 28 12:00:00 2028 GMT | [Unexpired, Bound] | |

- 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 10.0.3.5
    floating-ip 10.0.2.5
    blade-parameters
        priority 100
!
```

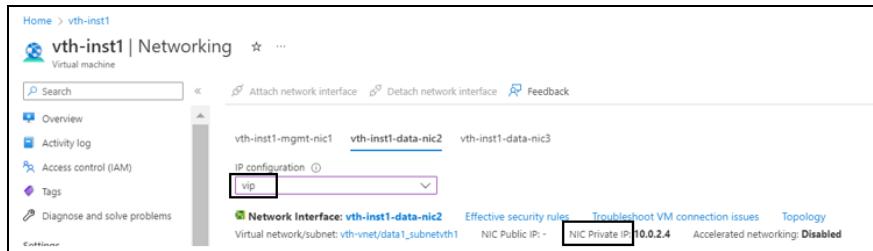
```
vrrp-a peer-group
  peer 10.0.2.4
  peer 10.0.2.6
!
ip route 0.0.0.0 /0 10.0.1.1
!
```

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.
4. SSH your client machine and run the following command to verify the traffic flow:
`curl <VIP>`

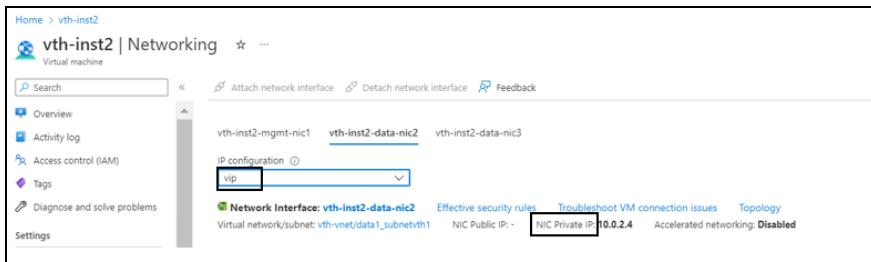
Example

```
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 64 : 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
```

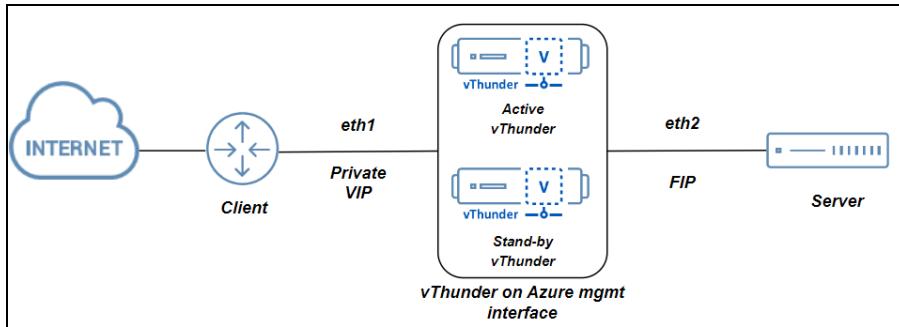
Verify if a response is received.

Deploy PowerShell 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 | 144 |
| Configure vThunder as an SLB | 162 |
| Configure High Availability | 168 |
| Configure vThunder using GLM | 171 |
| Verify Deployment | 174 |
| Verify Traffic Flow | 178 |

System Requirements

The PowerShell 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 vth-rg1 . |
| 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- | vthunderstorage |

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

| Resource Name | Description | Default Value | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|--|----------------------------|----------|----------------------------|--------------------------|--|----------------------------|----------------------------|--------------------------|--|----------------------------|----------------------------|----------|----------------------------|--------------------------|--|----------------------------|----------------------------|--------------------------|--|----------------------------|
| Cloud Network [VCN] | assigned to the virtual 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 | | | | | | | | | | | | | | | | | | | | |
| Network Interface Card [NIC] | <p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1, Ethernet 2] <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> | <table border="1"> <tbody> <tr> <td>vth-inst1-mgmt-nic1</td><td>10.0.1.4</td></tr> <tr> <td>vth-inst1-data-nic2</td><td>10.0.2.4 [Primary IP]</td></tr> <tr> <td></td><td>10.0.2.X [Secondary IP]</td></tr> <tr> <td>vth-inst1-data-nic3</td><td>10.0.3.4 [Primary IP]</td></tr> <tr> <td></td><td>10.0.3.X [Secondary IP]</td></tr> <tr> <td>vth-inst2-mgmt-nic1</td><td>10.0.1.6</td></tr> <tr> <td>vth-inst2-data-nic2</td><td>10.0.2.6 [Primary IP]</td></tr> <tr> <td></td><td>10.0.2.X [Secondary IP]</td></tr> <tr> <td>vth-inst2-data-nic3</td><td>10.0.3.6 [Primary IP]</td></tr> <tr> <td></td><td>10.0.3.X [Secondary IP]</td></tr> </tbody> </table> | vth-inst1-mgmt-nic1 | 10.0.1.4 | vth-inst1-data-nic2 | 10.0.2.4 [Primary IP] | | 10.0.2.X [Secondary IP] | vth-inst1-data-nic3 | 10.0.3.4 [Primary IP] | | 10.0.3.X [Secondary IP] | vth-inst2-mgmt-nic1 | 10.0.1.6 | vth-inst2-data-nic2 | 10.0.2.6 [Primary IP] | | 10.0.2.X [Secondary IP] | vth-inst2-data-nic3 | 10.0.3.6 [Primary IP] | | 10.0.3.X [Secondary IP] |
| vth-inst1-mgmt-nic1 | 10.0.1.4 | | | | | | | | | | | | | | | | | | | | | |
| vth-inst1-data-nic2 | 10.0.2.4 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.2.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| vth-inst1-data-nic3 | 10.0.3.4 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.3.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| vth-inst2-mgmt-nic1 | 10.0.1.6 | | | | | | | | | | | | | | | | | | | | | |
| vth-inst2-data-nic2 | 10.0.2.6 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.2.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| vth-inst2-data-nic3 | 10.0.3.6 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.3.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| Network | A security group is cre- | vth-inst1-nsg | | | | | | | | | | | | | | | | | | | | |

| Resource Name | Description | Default Value |
|--------------------------------------|---|---------------|
| Security Group [NSG] | ated for all the associated default interfaces. | 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 |
| | 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template and open the PS_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 virtual network.

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

4. Configure vThunder instance names.

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

5. Set VM size for vThunder.

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

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

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

NOTE: Do not change the publisher name.

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

```
"nic1Name_vm1": {  
    "value": "vth-inst1-mgmt-nic1"  
},  
"nic2Name_vm1": {  
    "value": "vth-inst1-data-nic2"  
},  
"nic3Name_vm1": {  
    "value": "vth-inst1-data-nic3"  
},  
"nic1Name_vm2": {  
    "value": "vth-inst2-mgmt-nic1"  
},  
"nic2Name_vm2": {  
    "value": "vth-inst2-data-nic2"  
},  
"nic3Name_vm2": {  
    "value": "vth-inst2-data-nic3"  
},
```

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

```
"vm1MgmtIntfName": {  
    "value": "vth-inst1-mgmt-int"  
},  
"addressPrefix": {  
    "value": "10.0.0.0/16"  
},  
"mgmtIntfPrivatePrefix": {  
    "value": "10.0.1.0/24"  
},  
"vm1Eth1Name": {  
    "value": "vth-inst1-eth1"  
},  
"eth1PrivatePrefix": {  
    "value": "10.0.2.0/24"  
},  
"vm1Eth2Name": {
```

```
        "value": "vth-inst1-eth2"
    },
    "eth2PrivatePrefix": {
        "value": "10.0.3.0/24"
    },
    "vm2MgmtIntfName": {
        "value": "vth-inst2-mgmt-int"
    },
    "vm2Eth1Name": {
        "value": "vth-inst2-eth1"
    },
    "vm2Eth2Name": {
        "value": "vth-inst2-eth2"
    },
}
```

9. Configure network security group for two vThunder instances.

```
"networkSecurityGroupName_vm1": {
    "value": "vth-inst1-nsg"
},
"networkSecurityGroupName_vm2": {
    "value": "vth-inst2-nsg"
}
```

10. Verify if all the configurations in the PS_TMPL_3NIC_2VM_HA_GL_M_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 PowerShell template.
2. Run the following command to create a deployment group in Azure.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_GL_M_PVTVIP_1.ps1
-resourceGroup <resource_group_name> -location "<location_name>"
```

Example:

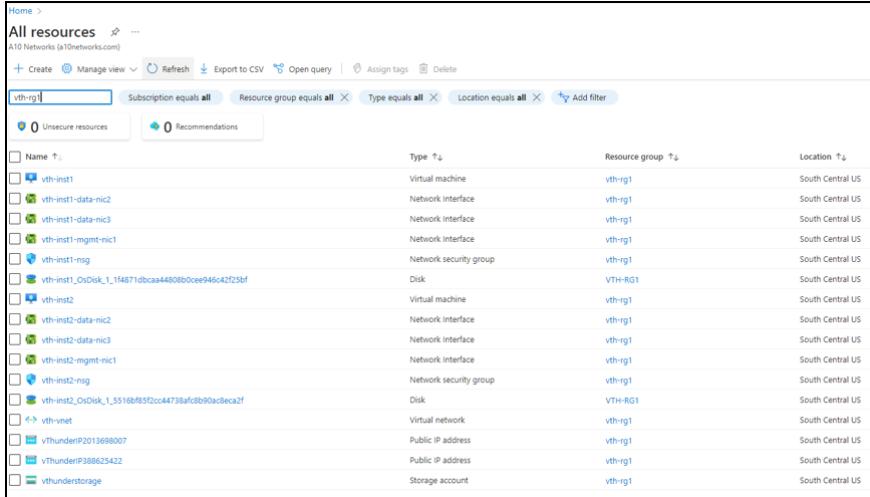
```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_GLM_PVTVIP_1.ps1
-resourceGroup vth-rg1 -location "south central us"

cmdlet PS_TMPL_3NIC_2VM_HA_GLM_PVTVIP_1 at command pipeline position 1
Supply values for the following parameters:
storageaccount: vthunderstorage
vth-rg1
vthunderstorage
South Central US
```

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

- 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



The screenshot shows the Azure portal's 'All resources' view for the 'vth-rg1' resource group. The table lists various resources with their details:

| 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-msg | Network security group | vth-rg1 | South Central US |
| vth-inst1_OsDisk_1_14871dbcaaa44b0bb0ce946c42725bf | 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-msg | Network security group | vth-rg1 | South Central US |
| vth-inst2_OsDisk_1_5516bf85f2cc44738afcd890ac8eca2f | Disk | VTH-RG1 | South Central US |
| vth-net | Virtual network | vth-rg1 | South Central US |
| vThunderIP2013698007 | Public IP address | vth-rg1 | South Central US |
| vThunderIP388625422 | 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

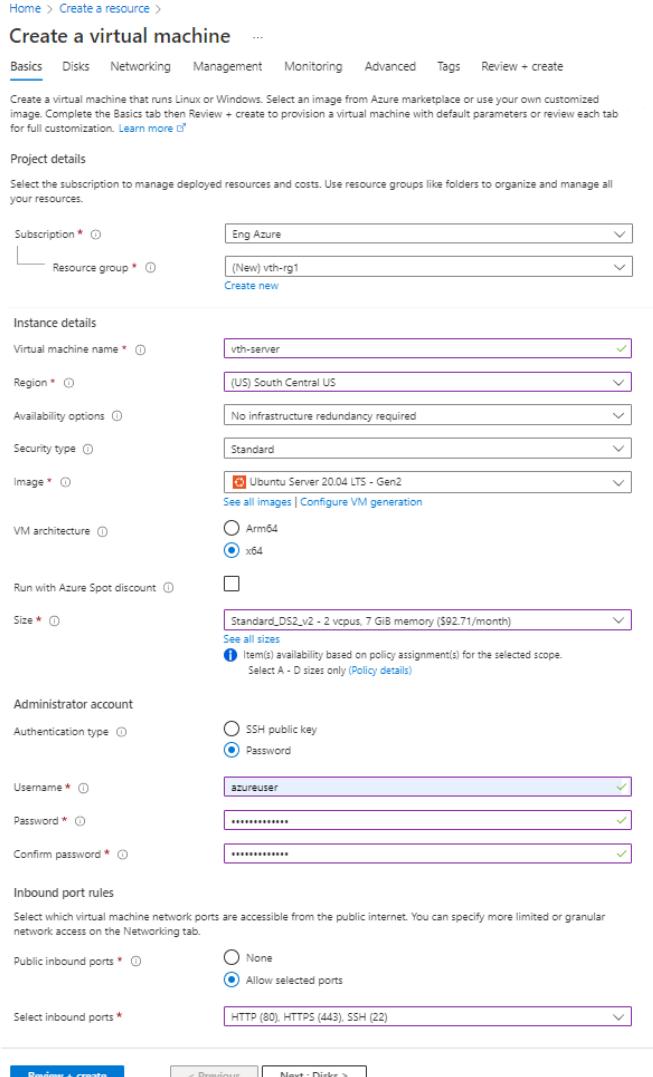
Administrator account

- 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 * Eng Azure

Resource group * (New) vth-rg1 [Create new](#)

Instance details

Virtual machine name * vth-server

Region * (US) South Central US

Availability options No infrastructure redundancy required

Security type Standard

Image * Ubuntu Server 20.04 LTS - Gen2 [See all images](#) [Configure VM generation](#)

VM architecture x64

Run with Azure Spot discount

Size * Standard_DS2_v2 - 2 vcpus, 7 GiB memory (\$92.71/month) [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 Password SSH public key

Username * azureuser

Password * [View password](#)

Confirm password * [View 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 * HTTP (80), HTTPS (443), SSH (22)

Buttons

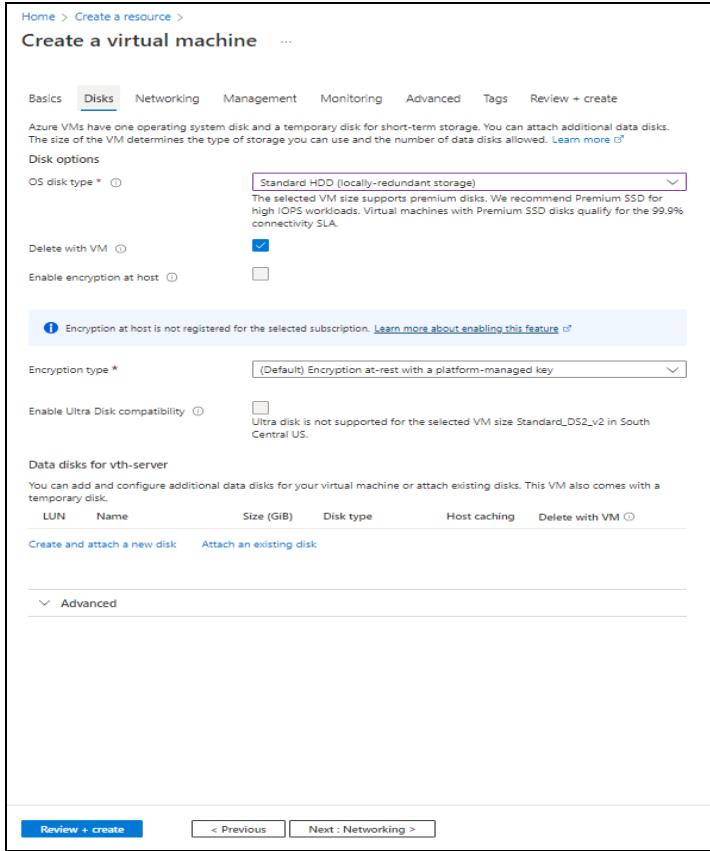
[Review + create](#) [< Previous](#) [Next : Disks >](#)

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 68 : Create a virtual machine window - Disks tab

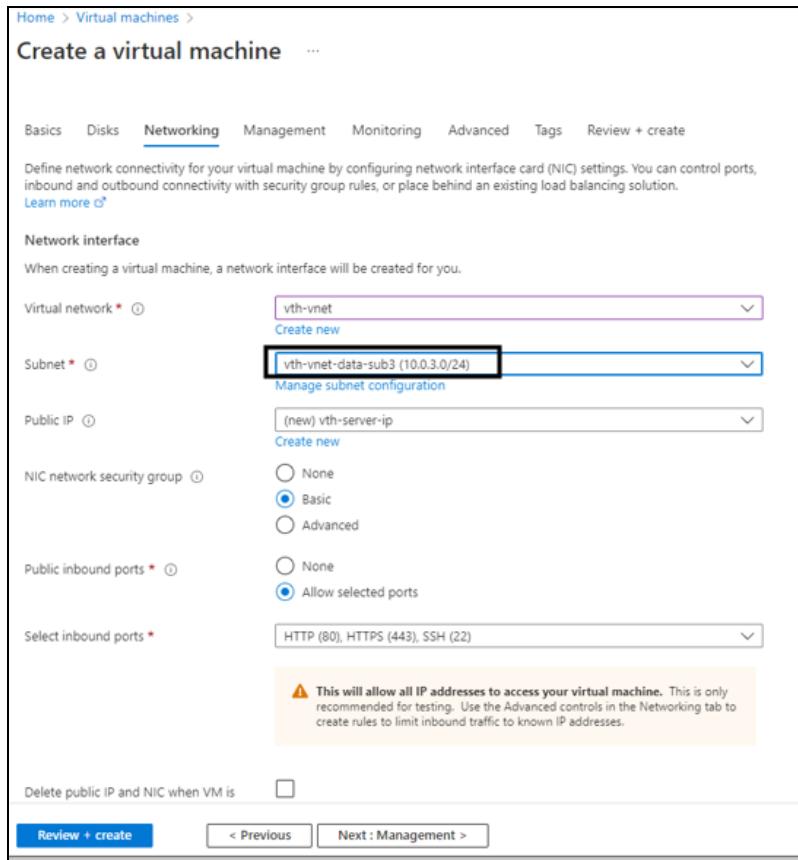


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

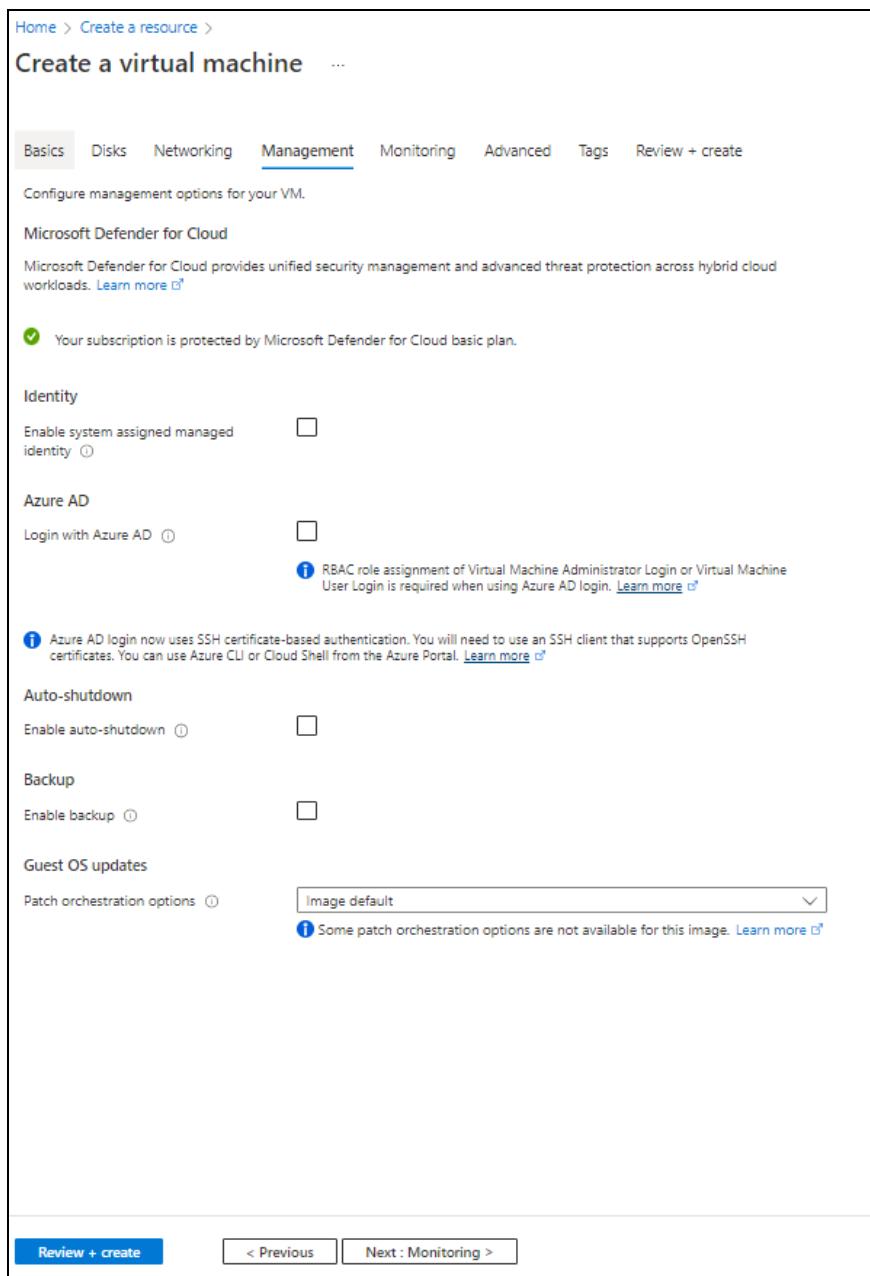
Figure 69 : Create a virtual machine window - Networking tab



- 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.

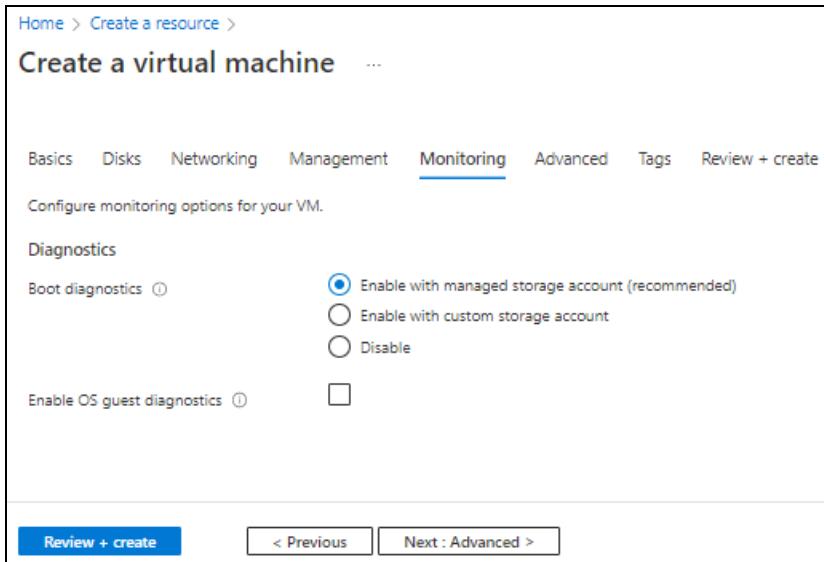
Figure 70 : Create a virtual machine window - Management tab



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

10. Select or enter the information in the **Monitoring** tab as needed.

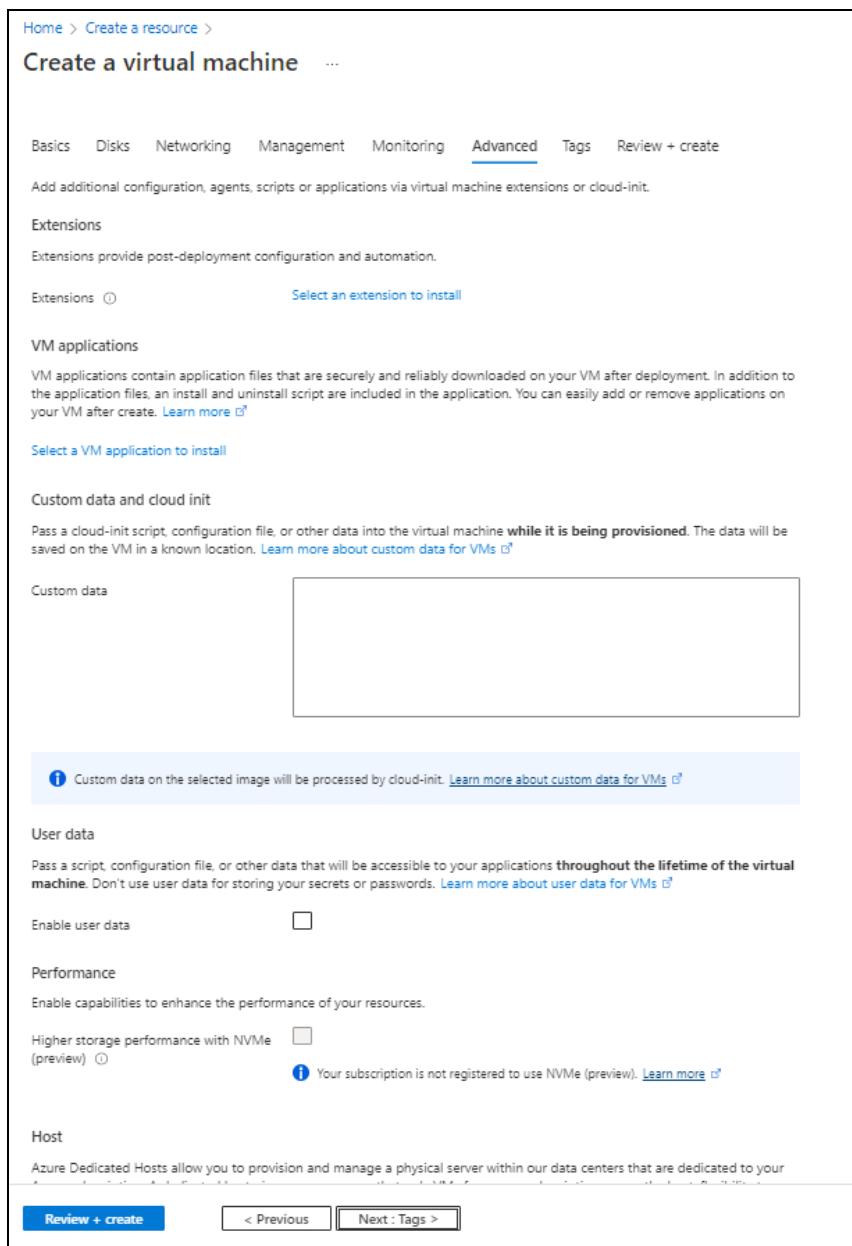
Figure 71 : Create a virtual machine window - Monitoring tab



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

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

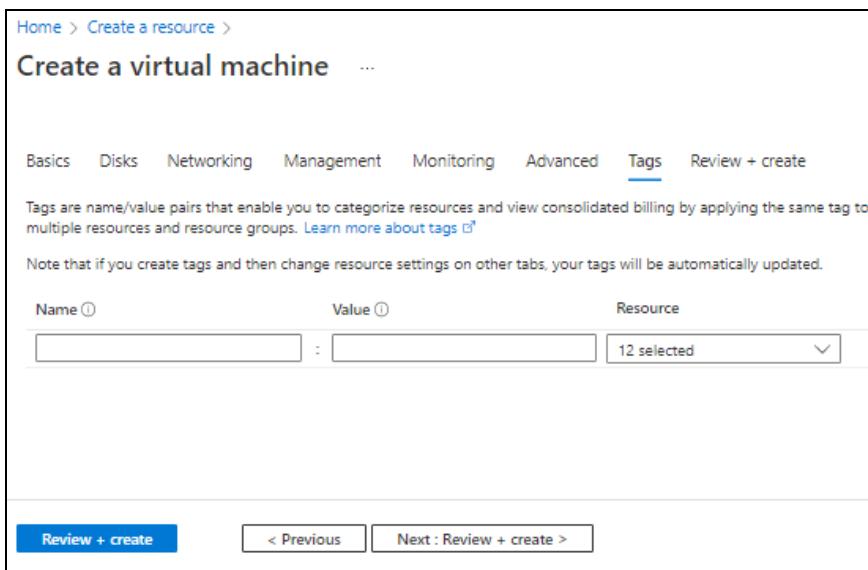
Figure 72 : Create a virtual machine window - Advanced tab



13. Click **Next : Tags** at the bottom of the window.

14. Select or enter the information in the **Tags** tab as needed.

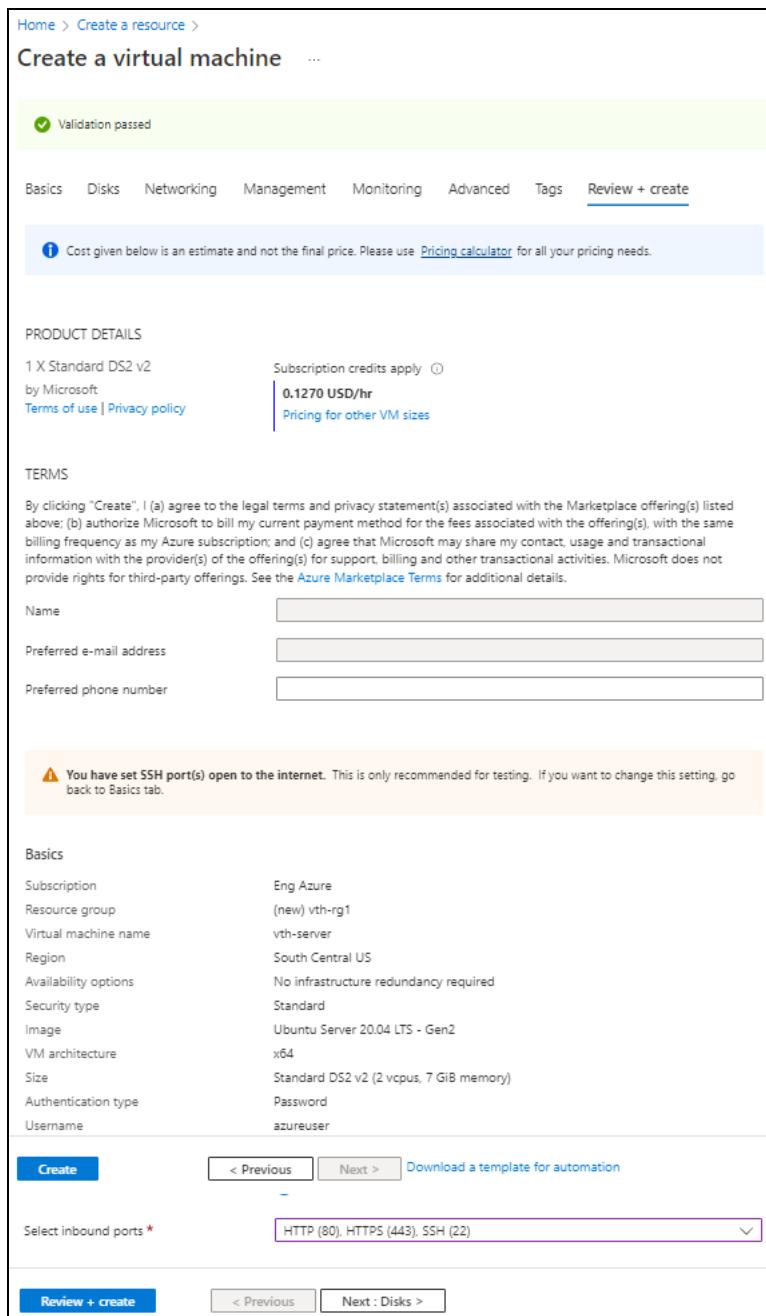
Figure 73 : Create a virtual machine window - Tags tab



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



16. Click **Create** at the bottom of the window.
 The Server machine gets created.
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

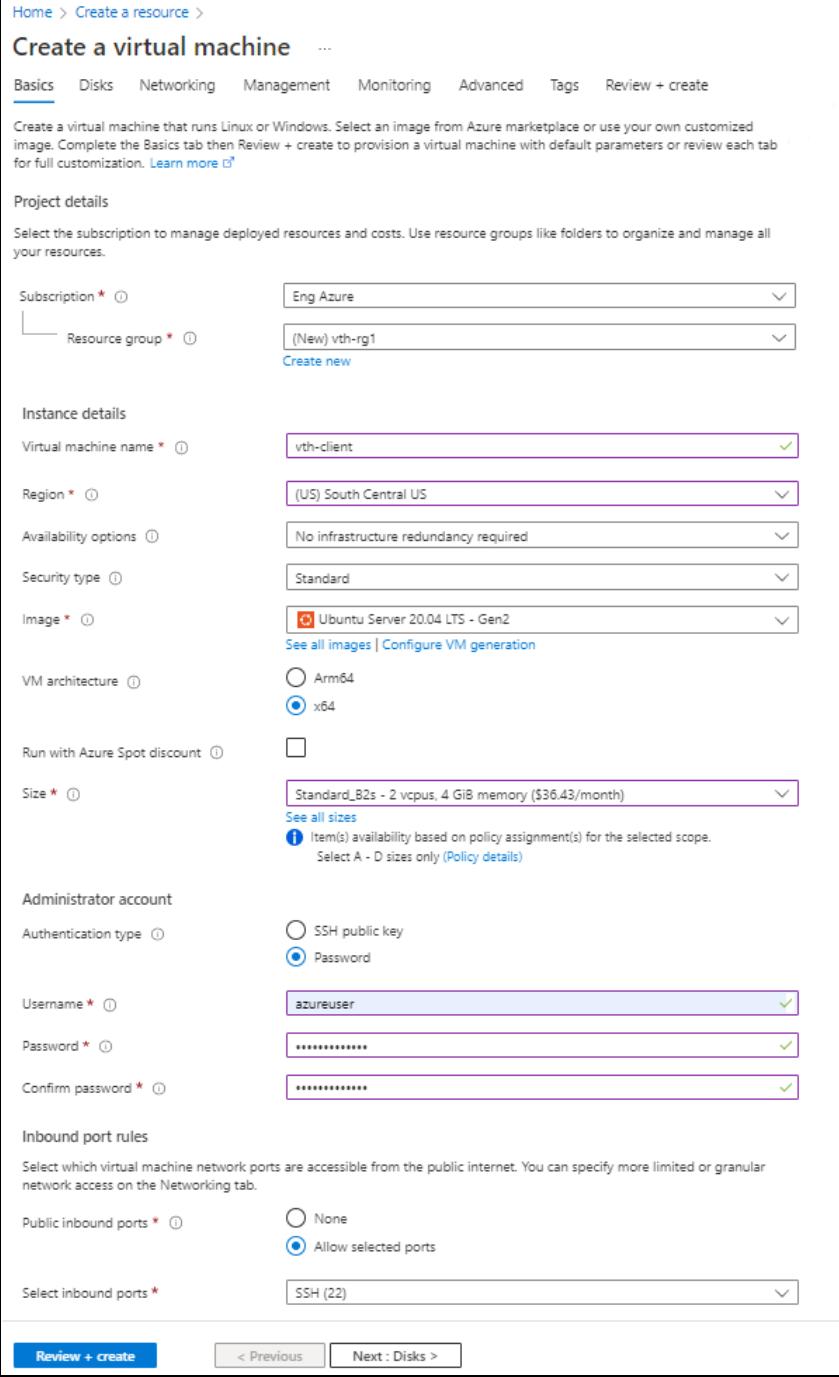
Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 75 : Create a virtual machine window - Basics tab



The screenshot shows the 'Create a virtual machine' Basics tab configuration window. The 'Subscription' dropdown is set to 'Eng Azure'. The 'Resource group' dropdown shows '(New) vth-rg1'. The 'Virtual machine name' is 'vth-client'. The 'Region' is '(US) South Central US'. Under 'Image', 'Ubuntu Server 20.04 LTS - Gen2' is selected. The 'VM architecture' is 'x64'. The 'Size' is 'Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)'. Under 'Administrator account', 'Password' is selected. The 'Username' is 'azureuser' and the 'Confirm password' is also 'azureuser'. In the 'Inbound port rules' section, 'Allow selected ports' is selected and 'SSH (22)' is listed. At the bottom, there are 'Review + create', '< Previous', and 'Next : Disks >' buttons.

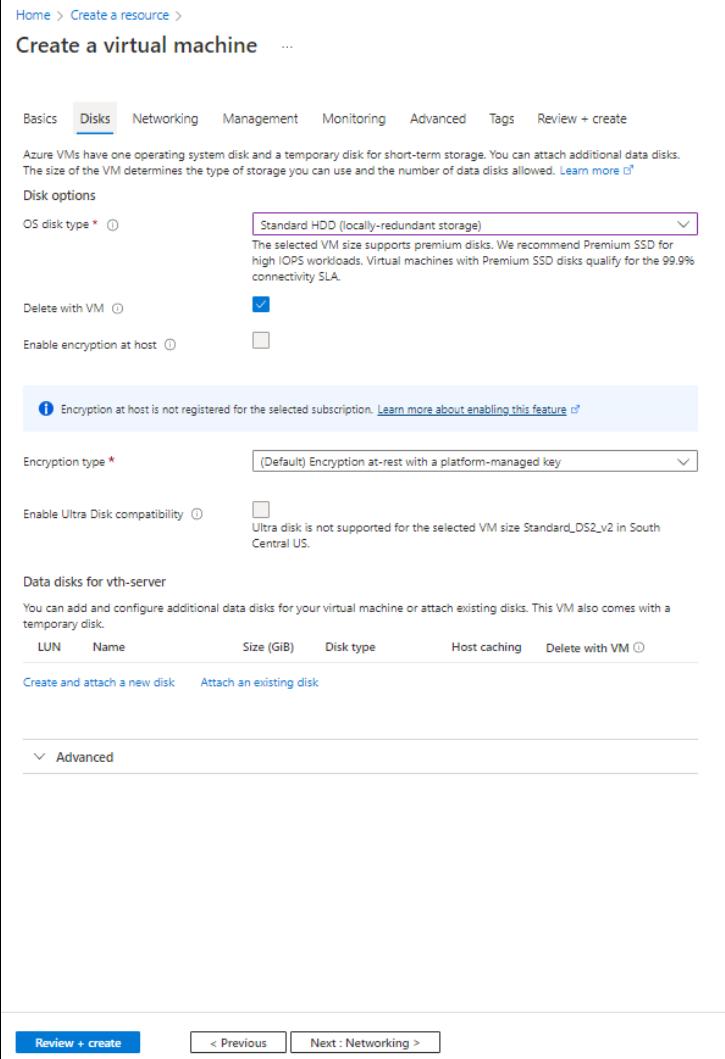
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

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



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Disks' tab. The top navigation bar includes 'Home > Create a resource > Create a virtual machine ...'. The tabs at the top are 'Basics', 'Disks' (which is selected), 'Networking', 'Management', 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The main content area is titled 'Disk options'. Under 'OS disk type *', 'Standard HDD (locally-redundant storage)' is selected. A note states: '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.' Below this are checkboxes for 'Delete with VM' (checked) and 'Enable encryption at host' (unchecked). A note indicates: 'Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)''. Under 'Encryption type *', '(Default) Encryption at-rest with a platform-managed key' is selected. A note states: 'Ultra disk is not supported for the selected VM size Standard_DS2_v2 in South Central US.' Below this is a section for 'Data disks for vth-server' with a note: 'You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.' A table header for 'Create and attach a new disk' lists columns: LUN, Name, Size (GiB), Disk type, Host caching, and Delete with VM. At the bottom of the page are buttons for 'Review + create', '< Previous', and 'Next : Networking >'.

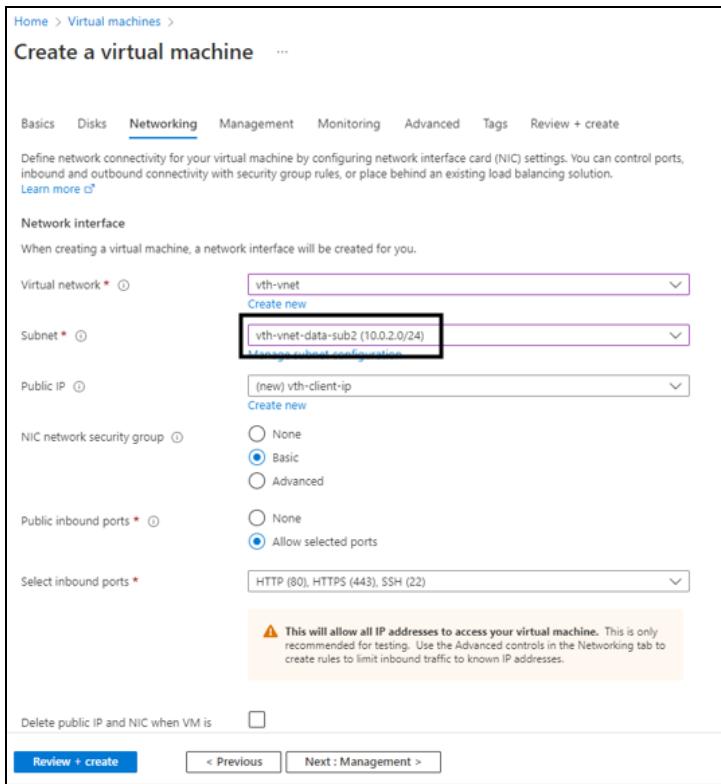
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

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



The screenshot shows the 'Create a virtual machine' window with the 'Networking' tab selected. The 'Networking' tab is highlighted with a blue underline. Below it, there are several configuration fields:

- Virtual network ***: A dropdown menu showing 'vth-vnet' with a 'Create new' button below it.
- Subnet ***: A dropdown menu showing 'vth-vnet-data-sub2 (10.0.2.0/24)' with a 'Manage subnet configuration' link below it. This field is highlighted with a red rectangle.
- Public IP**: A dropdown menu showing '(new) vth-client-ip' with a 'Create new' button below it.
- NIC network security group**: Radio buttons for 'None', 'Basic' (selected), and 'Advanced'.
- Public inbound ports ***: Radio buttons for 'None' and 'Allow selected ports' (selected).
- Select inbound ports ***: A dropdown menu showing 'HTTP (80), HTTPS (443), SSH (22)'.

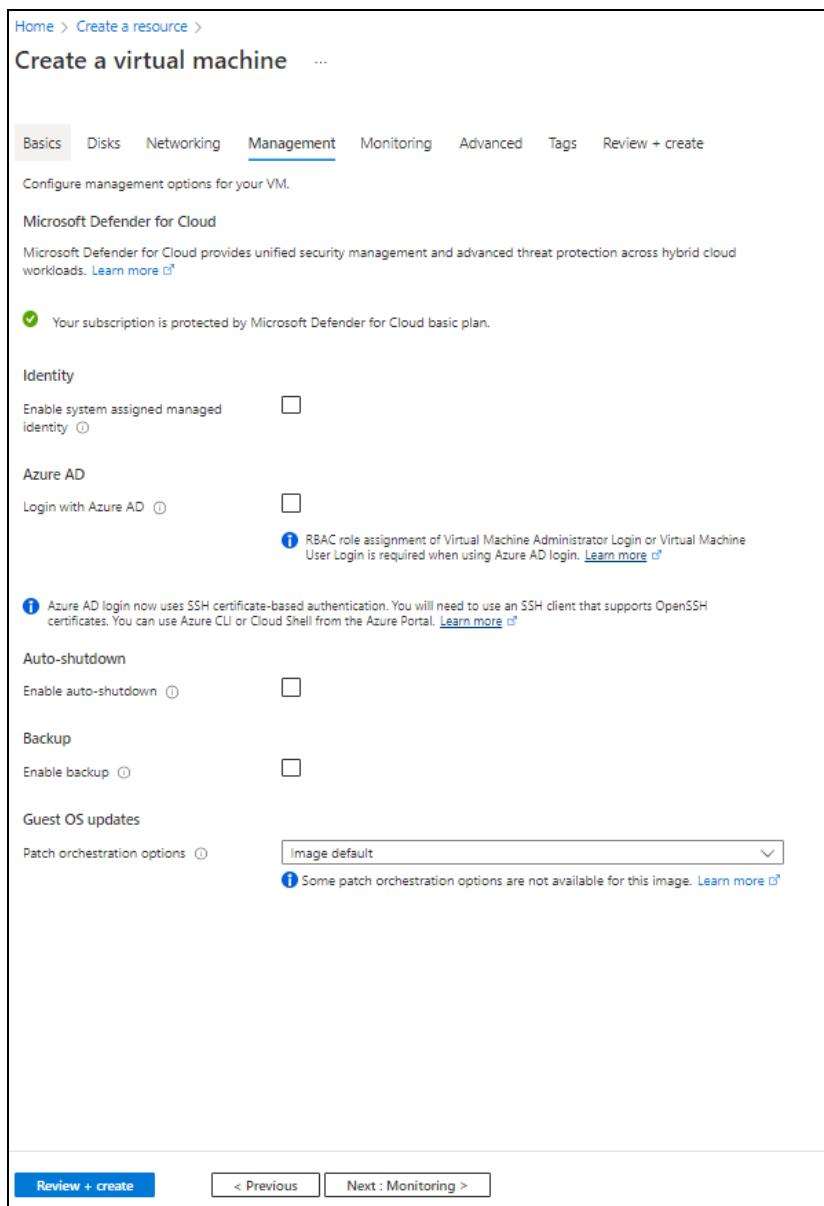
A warning message is displayed in a yellow box: **⚠️ This will allow all IP addresses to access your virtual machine.** This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

At the bottom of the window, there are buttons for 'Review + create', '< Previous', and '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.

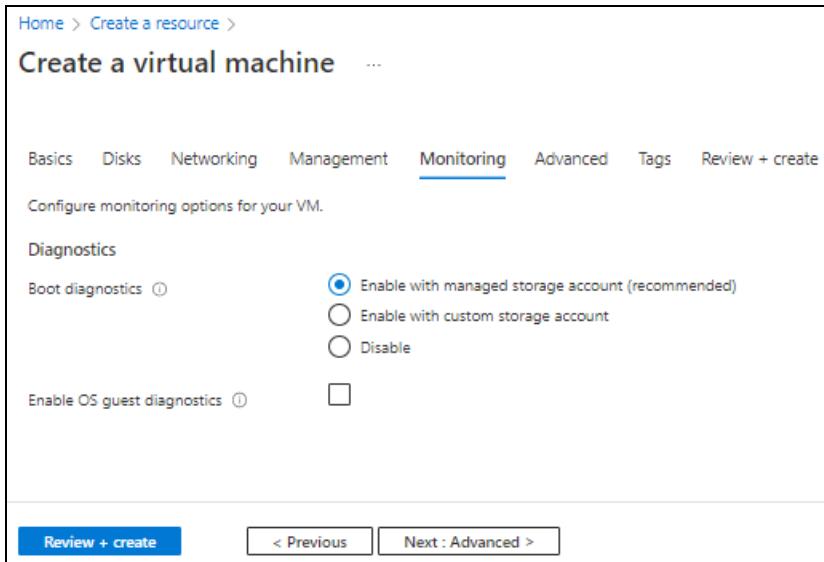
Figure 78 : Create a virtual machine window - Management tab



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

10. Select or enter the information in the **Monitoring** tab as needed.

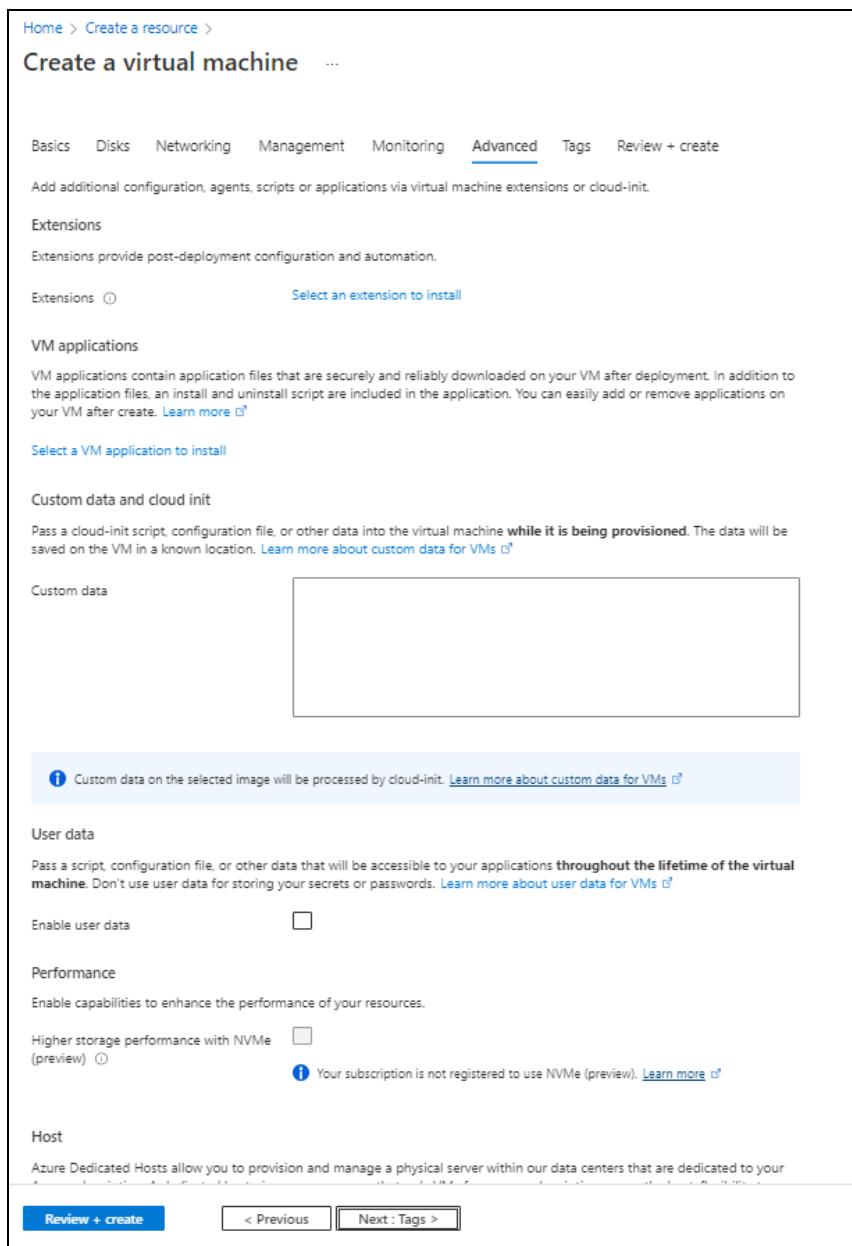
Figure 79 : Create a virtual machine window - Monitoring tab



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

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

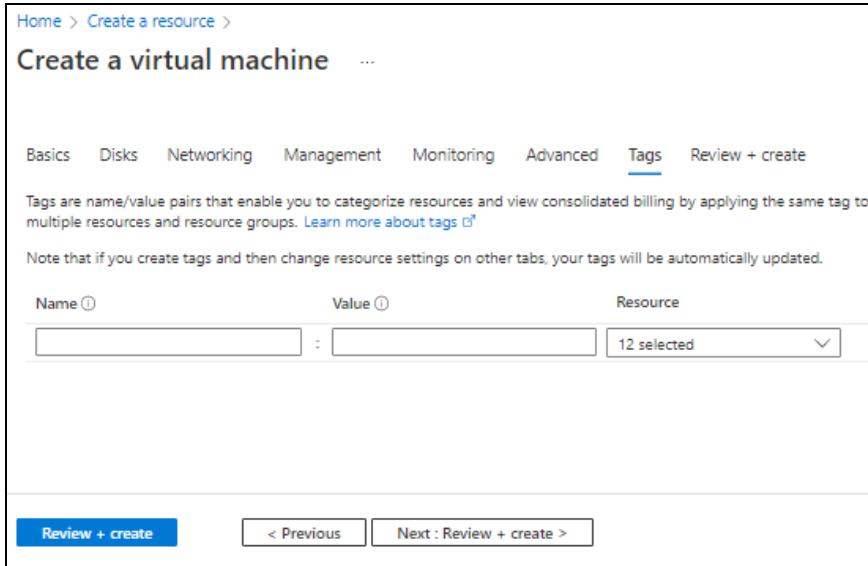
Figure 80 : Create a virtual machine window - Advanced tab



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

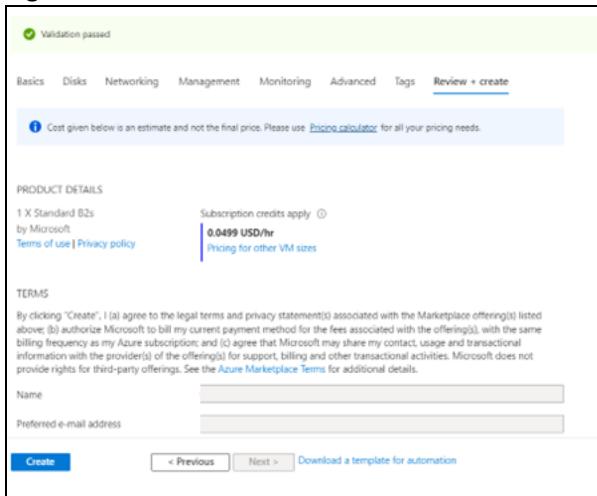


| Name ⓘ | Value ⓘ | Resource |
|--------|---------|-------------|
| | | 12 selected |

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



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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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
                }
            ]
        }
    ]
},
```

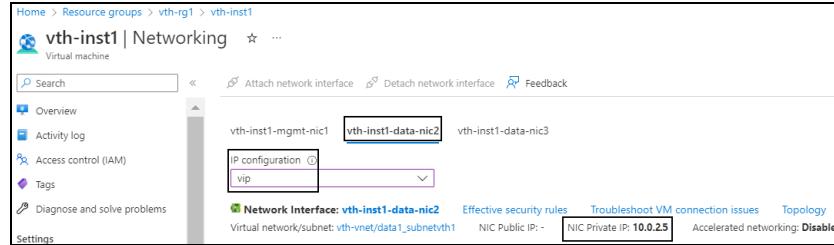
```
        "port":53
    }
]
},
{
    "name":"sg80",
    "protocol":"tcp",
    "health-check-disable":1
    "member-list": [
        {
            "name":"s1",
            "port":80
        }
    ]
}
]
```

5. Configure virtual server.

The virtual server default name is “vip”. The vip address is generated dynamically after deploying the PowerShell template. Therefore, its default value under **virtualServerList** should be replaced. To get the vip 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 2 tab > **IP configuration > vip**. Here, Data NIC 2 is **vth-inst1-data-nic2**.

Figure 83 : Virtual machine - Networking window - Data NIC 2 tab



e. Select the **NIC Private IP**.

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

```

"virtualServerList": {
    "virtual-server-name": "vip",
    "ip-address": "10.0.2.5",
    "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 PS_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> .\PS_TMPL_3NIC_2VM_HA_GL_M_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 PowerShell template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_SLB_CONFIG_3.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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

The following topics are covered:

- [Configure Azure Access Key](#)
- [Configure High Availability for vThunder](#)

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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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.

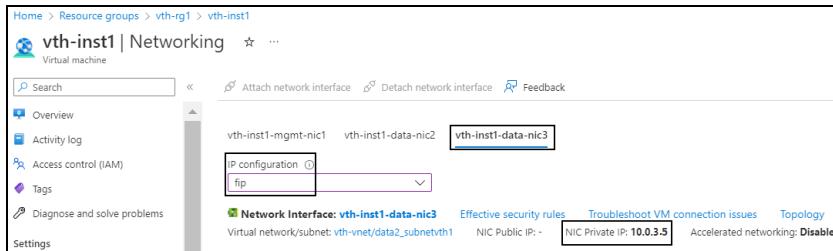
```
"terminal": {  
    "idle-timeout":0  
},
```

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

Figure 84 : Virtual machine - Networking window - Data NIC 3 tab



- Select the **NIC Private IP**.

- 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":"10.0.3.5"  
                }  
            ]  
        }  
    }  
]
```

```
        }
    ]
}
]
]
```

7. Verify if all the configurations in the PS_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> .\PS_TMPL_3NIC_2VM_HA_CONFIG_4.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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 PS_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 PowerShell template.
2. Run the following command to apply SLB on vThunder:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_GLM_CONFIG_5.ps1 -  
resourceGroupName <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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.

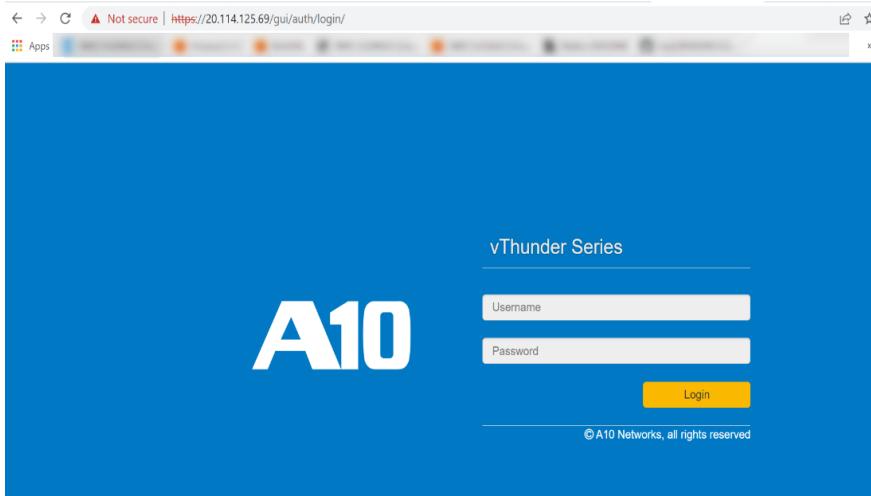
[type ? for help]
```

```
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://<vt thunder_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 PowerShell 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 10.0.0.3.7
```

```
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 10.0.2.5
    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 |
|--------------------|------|--------------------------|--------------------|
| <hr/> | | | |
| 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 10.0.3.5
    floating-ip 10.0.2.5
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.2.4
    peer 10.0.2.6
!
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
```

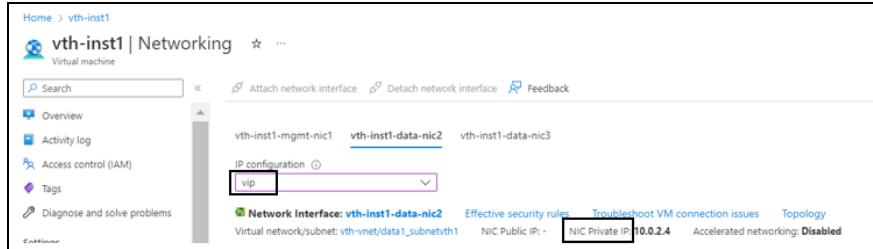
| | | |
|-------------------|------|--|
| AAM | None | |
| FP | None | |
| WEBROOT | N/A | Requires an additional Webroot license. |
| THREATSTOP | N/A | Requires an additional ThreatSTOP license. |
| QOSMOS | N/A | Requires an additional QOSMOS license. |
| WEBROOT_TI | N/A | Requires an additional 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:

- 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.
- Copy the VIP address of the active vThunder instance.

Figure 85 : Active vThunder instance 1 VIP



- 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>`

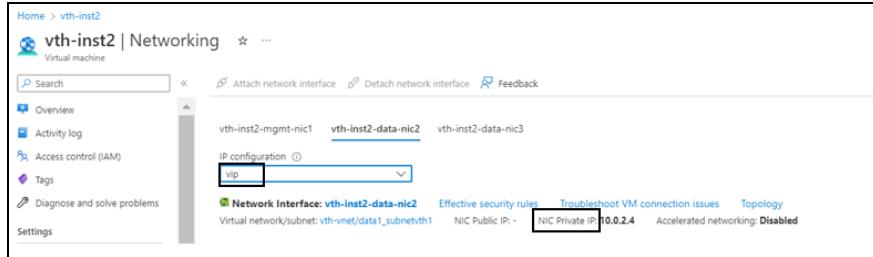
Example

```
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 86 : 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
```

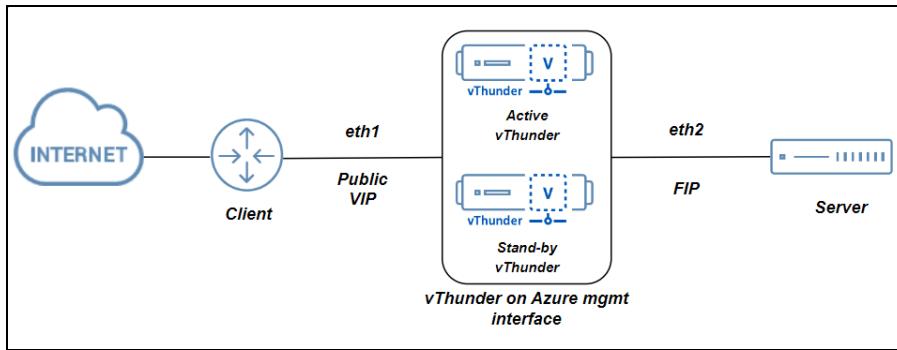
Verify if a response is received.

Deploy PowerShell 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:

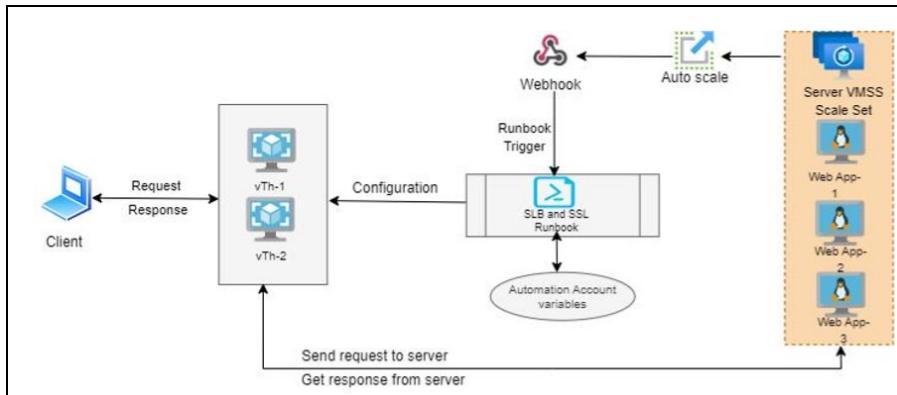
- One management interface and two data interfaces each
- HA support
- GLM integration
- Backend server autoscaling support.

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 | 199 |
| Configure Automation Account | 207 |
| Configure vThunder as an SLB | 215 |
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System Requirements

The PowerShell 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 <code>vth-rg1</code> . |

| Resource Name | Description | Default Value |
|-------------------------------|---|--|
| 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> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | <code>vthunderstorage</code> |
| Virtual Machine (VM) Instance | <p>Two virtual machine instances are created for vThunder.</p> <p>Product: A10 vThunder</p> <p>Operating system: Linux</p> <p>Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory)</p> | <code>vth-inst1</code> <code>vth-inst2</code> |

| Resource Name | Description | Default Value |
|----------------------------------|---|--|
| | <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p>Table 11 lists the supported VM sizes.</p> | |
| Azure Automation Account | An automation account is created under the resource group. | vth-amt-acc |
| Azure Run-book with Webhook | <p>A custom runbook is created under the automation account:</p> <p>SLB-Config</p> <p>A webhook is created for SLB.</p> | |
| Virtual Machine Scale Set [VMSS] | A virtual machine scale set is created. | vth-server-vmss |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance. | vth-vmss-vnet 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. | <p>Subnet1: vth-vnet1-mgmt-sub1 10.0.1.0/24</p> <p>Subnet2: vth-vnet1-data-sub2 10.0.2.0/24</p> <p>Subnet3: vth-vnet1-data-sub3 10.0.3.0/24</p> | | | | | | | | | | | | | | | | | | | | |
| Network Interface Card [NIC] | <p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1, Ethernet 2] <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> | <table border="1"> <tbody> <tr> <td>vth-inst1-mgmt-nic1</td><td>10.0.1.4</td></tr> <tr> <td>vth-inst1-data-nic2</td><td>10.0.2.4 [Primary IP]</td></tr> <tr> <td></td><td>10.0.2.X [Secondary IP]</td></tr> <tr> <td>vth-inst1-data-nic3</td><td>10.0.3.4 [Primary IP]</td></tr> <tr> <td></td><td>10.0.3.X [Secondary IP]</td></tr> <tr> <td>vth-inst2-mgmt-nic1</td><td>10.0.1.6</td></tr> <tr> <td>vth-inst2-data-nic2</td><td>10.0.2.6 [Primary IP]</td></tr> <tr> <td></td><td>10.0.2.X [Secondary IP]</td></tr> <tr> <td>vth-inst2-data-nic3</td><td>10.0.3.6 [Primary IP]</td></tr> <tr> <td></td><td>10.0.3.X [Secondary IP]</td></tr> </tbody> </table> | vth-inst1-mgmt-nic1 | 10.0.1.4 | vth-inst1-data-nic2 | 10.0.2.4 [Primary IP] | | 10.0.2.X [Secondary IP] | vth-inst1-data-nic3 | 10.0.3.4 [Primary IP] | | 10.0.3.X [Secondary IP] | vth-inst2-mgmt-nic1 | 10.0.1.6 | vth-inst2-data-nic2 | 10.0.2.6 [Primary IP] | | 10.0.2.X [Secondary IP] | vth-inst2-data-nic3 | 10.0.3.6 [Primary IP] | | 10.0.3.X [Secondary IP] |
| vth-inst1-mgmt-nic1 | 10.0.1.4 | | | | | | | | | | | | | | | | | | | | | |
| vth-inst1-data-nic2 | 10.0.2.4 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.2.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| vth-inst1-data-nic3 | 10.0.3.4 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.3.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| vth-inst2-mgmt-nic1 | 10.0.1.6 | | | | | | | | | | | | | | | | | | | | | |
| vth-inst2-data-nic2 | 10.0.2.6 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.2.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| vth-inst2-data-nic3 | 10.0.3.6 [Primary IP] | | | | | | | | | | | | | | | | | | | | | |
| | 10.0.3.X [Secondary IP] | | | | | | | | | | | | | | | | | | | | | |
| Network | A security group is cre- | vth-nsg1 | | | | | | | | | | | | | | | | | | | | |

| Resource Name | Description | Default Value |
|--------------------------------------|---|---------------|
| Security Group [NSG] | ated for all the associated default interfaces. | vth-nsg2 |
| 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 |
| 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template, and open the PS_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 virtual network.

```
"virtual_network": {  
    "value": "vth-vmss-vnet"  
},
```

4. Configure vThunder instance names.

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

5. Set VM size for vThunder.

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

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

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

NOTE: Do not change the publisher name.

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

```

"nic1Name_vm1": {
    "value": "vth-inst1-mgmt-nic1"
},
"nic2Name_vm1": {
    "value": "vth-inst1-data-nic2"
},
"nic3Name_vm1": {
    "value": "vth-inst1-data-nic3"
},
"nic1Name_vm2": {
    "value": "vth-inst2-mgmt-nic1"
},
"nic2Name_vm2": {
    "value": "vth-inst2-data-nic2"
},
"nic3Name_vm2": {
    "value": "vth-inst2-data-nic3"
},

```

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

```

"vm1MgmtIntfName": {
    "value": "vth-inst1-mgmt"
},
"addressPrefix": {
    "value": "10.0.0.0/16"
},
"mgmtIntfPrivatePrefix": {
    "value": "10.0.1.0/24"
},
"vm1Eth1Name": {
    "value": "vth-inst1-data1"
},
"eth1PrivatePrefix": {
    "value": "10.0.2.0/24"
},
"vm1Eth2Name": {

```

```

        "value": "vth-inst1-data2"
    },
    "eth2PrivatePrefix": {
        "value": "10.0.3.0/24"
    },
    "vm2MgmtIntfName": {
        "value": "vth-inst2-mgmt"
    },
    "vm2Eth1Name": {
        "value": "vth-inst2-data1"
    },
    "vm2Eth2Name": {
        "value": "vth-inst2-data2"
    },

```

9. Configure network security group for two vThunder instances.

```

    "networkSecurityGroupName_vm1": {
        "value": "vth-nsg1"
    },
    "networkSecurityGroupName_vm2": {
        "value": "vth-nsg2"
    }
}

```

10. Verify if all the configurations in the PS_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 PowerShell template.
2. Run the following command to create a deployment group in Azure and provide a unique storage account name when prompted.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_1.ps1 -resourceGroup <resource_group_name> -location "<location_name>"
```

Example:

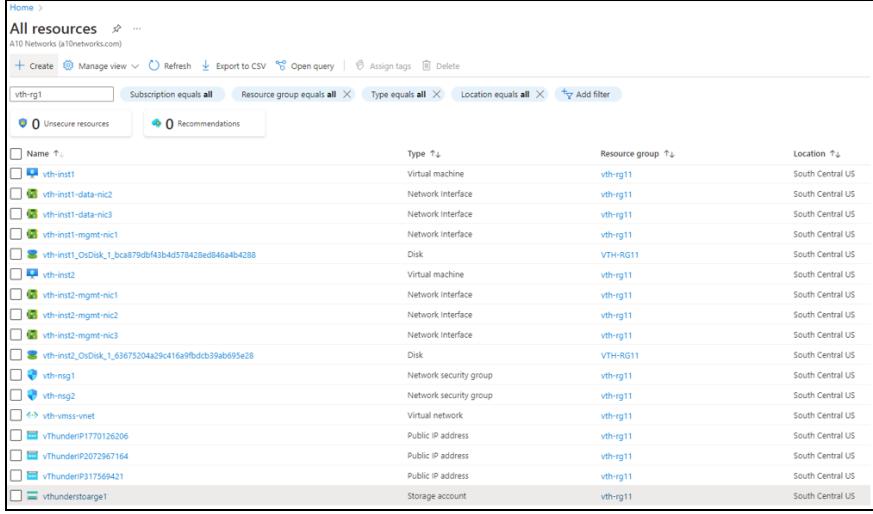
```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_1.ps1 -resourceGroup vth-rg1 -location "south central us"

cmdlet .\PS_TMPL_3NIC_2VM_1.ps1 at command pipeline position 1
Supply values for the following parameters:
storageaccount: vthunderstorage
vth-rg1
vthunderstorage
South Central US
```

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

- 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



The screenshot shows the Azure portal's 'All resources' view for the 'vth-rg1' resource group. The table lists various resources with their types, resource groups, and locations. The resources include two virtual machines ('vth-inst1', 'vth-inst2'), several network interfaces ('vth-inst1-data-nic2', 'vth-inst1-data-nic3', 'vth-inst1-mgmt-nic1', 'vth-inst2-data-nic2', 'vth-inst2-mgmt-nic3'), a disk ('vth-inst1_OsDisk_1'), a network security group ('vth-nsgr1'), a virtual network ('vth-vnet'), and three public IP addresses ('vThunderIP1770126206', 'vThunderIP2072967164', 'vThunderIP317569421'). All resources belong to the 'vth-rg1' resource group and are located in 'South Central US'.

| 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_bca879dbf43b4d578428ed046a4b4280 | 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-mgmt-nic3 | Network interface | vth-rg1 | South Central US |
| vth-inst2_OsDisk_1_bca879dbf43b4d578428ed046a4b4280 | Disk | VTH-RG1 | South Central US |
| vth-nsgr1 | Network security group | vth-rg1 | South Central US |
| vth-nsgr2 | Network security group | vth-rg1 | South Central US |
| vth-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

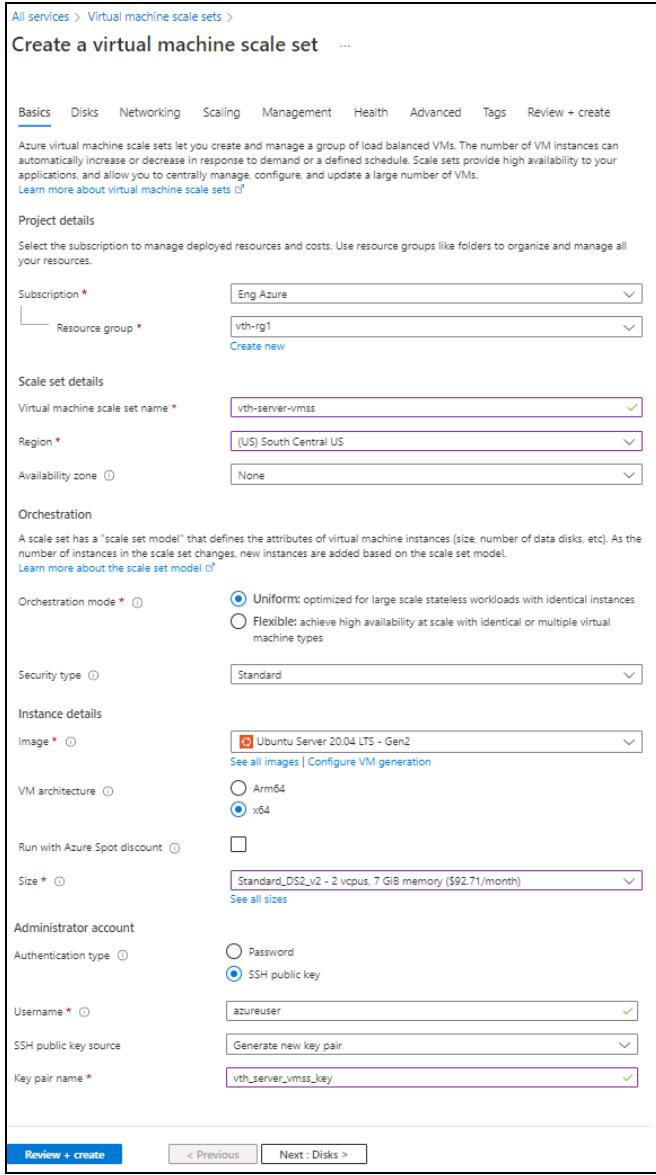
Instance details

- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Figure 90 : Create a virtual machine scale set window - Basics tab



The screenshot shows the 'Create a virtual machine scale set' window in the Azure portal. The 'Basics' tab is selected. The configuration includes:

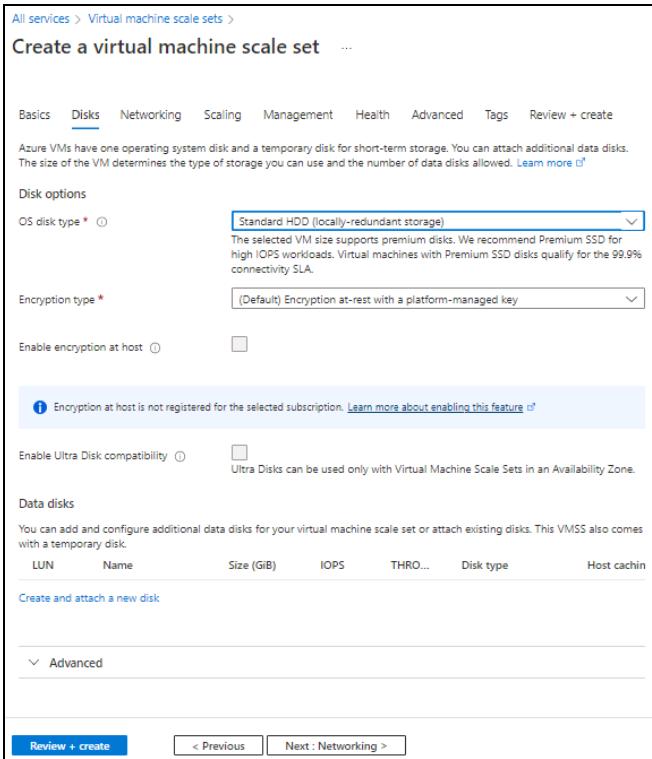
- Subscription:** Eng Azure
- Resource group:** vth-rg1
- Virtual machine scale set name:** vth-server-vmss
- Region:** (US) South Central US
- Availability zone:** None
- Orchestration mode:** Uniform (selected)
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Run with Azure Spot discount:** Unchecked
- Size:** Standard_DS2_v2 - 2 vcpus, 7 GiB memory (\$92.71/month)
- Administrator account:**
 - Authentication type: SSH public key (selected)
 - Username: azureuser
 - SSH public key source: Generate new key pair
 - Key pair name: vth_server_vmss_key

At the bottom, there are buttons for **Review + create**, < Previous, and 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

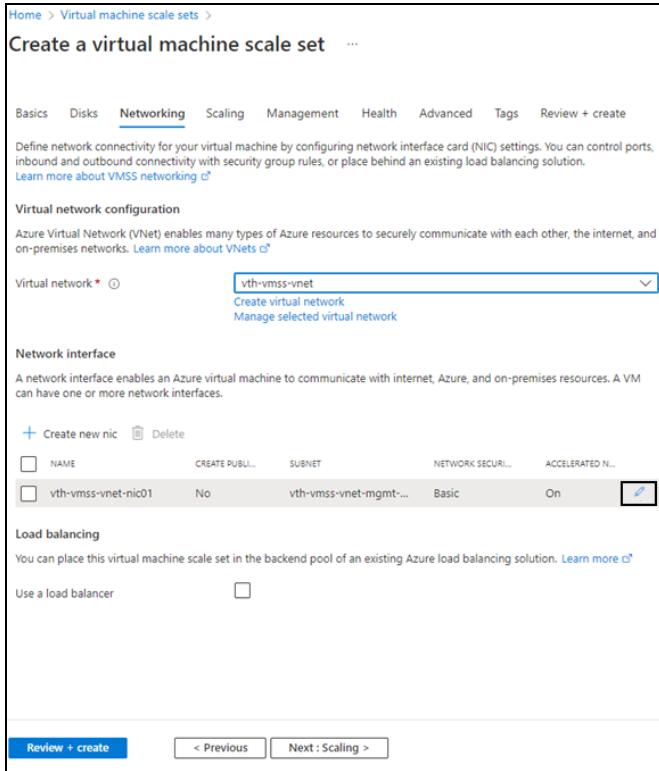
Figure 91 : Create a virtual machine scale set window - Disks tab



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

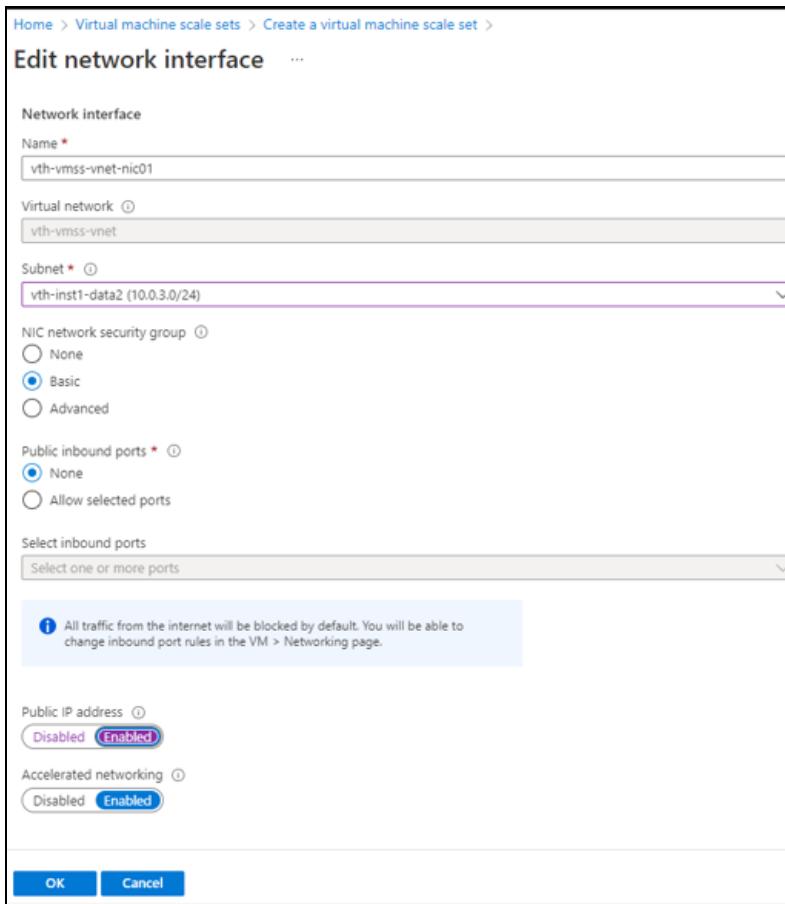


- If Data subnet 2 (Ethernet 2) value is not assigned to management NIC 1, click the edit button corresponding to it.

The **Edit Network Interface** window appears.

- Select Data subnet 2 value in the **Subnet** field and then click **OK**. Here, the Subnet 3 value is **10.0.3.0/24**.

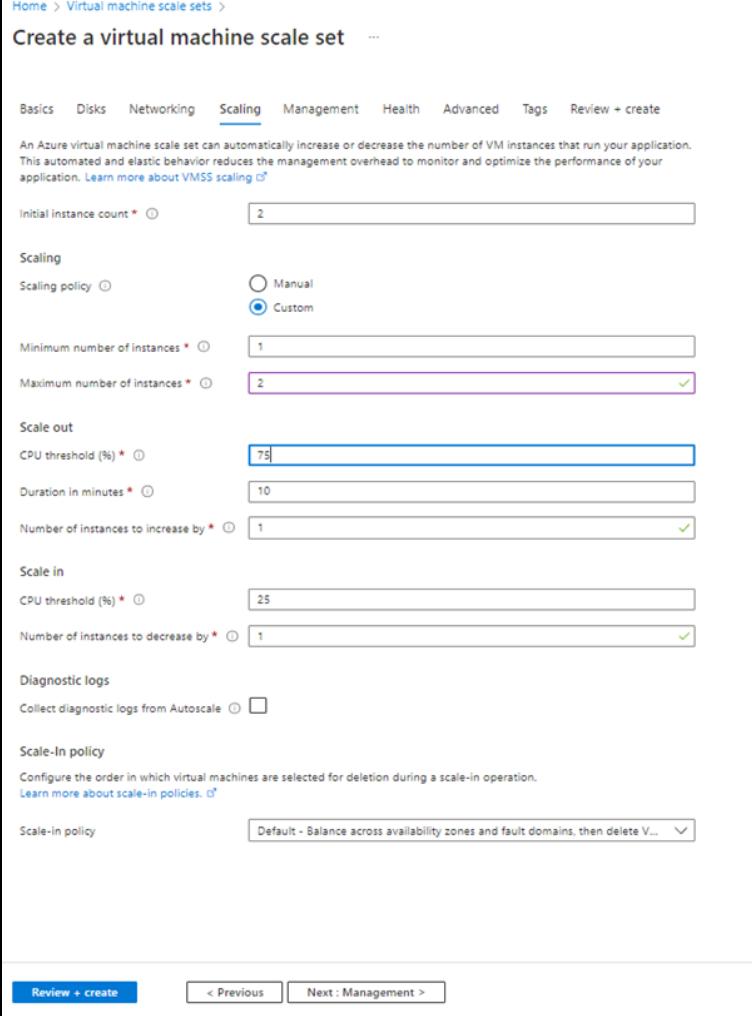
Figure 93 : Edit network interface window



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



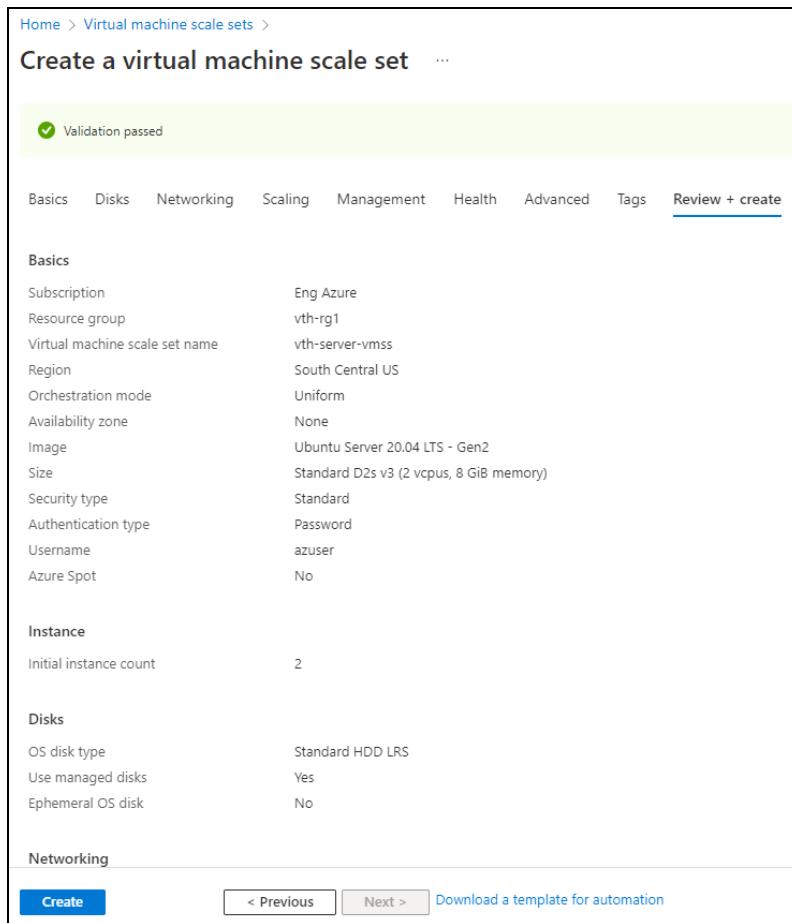
The screenshot shows the 'Create a virtual machine scale set' wizard with the 'Scaling' tab selected. The 'Scaling' tab is highlighted in blue at the top of the navigation bar. Below the tabs, there is a note about VMSS scaling. The main configuration area includes:

- Initial instance count:** Set to 2.
- Scaling policy:** Set to **Custom**.
- Minimum number of instances:** Set to 1.
- Maximum number of instances:** Set to 2.
- Scale out:**
 - CPU threshold (%):** Set to 75.
 - Duration in minutes:** Set to 10.
 - Number of instances to increase by:** Set to 1.
- Scale in:**
 - CPU threshold (%):** Set to 25.
 - Number of instances to decrease by:** Set to 1.
- Diagnostic logs:** An unchecked checkbox for "Collect diagnostic logs from Autoscale".
- Scale-in policy:** A dropdown menu set to "Default - Balance across availability zones and fault domains, then delete V...".

At the bottom of the window, there are three buttons: **Review + create** (highlighted in blue), **< Previous**, and **Next : Management >**.

11. Click **Review + create** at the bottom of the window to skip the other tabs.

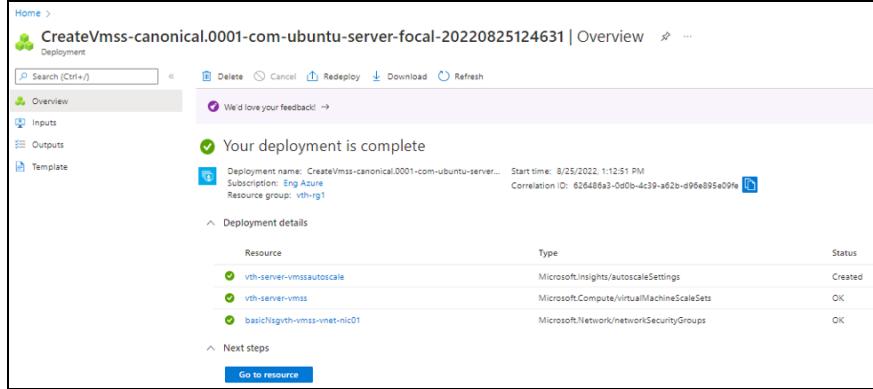
Figure 95 : Create a virtual machine scale set window - Review + create tab



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 96 : Create VMSS window



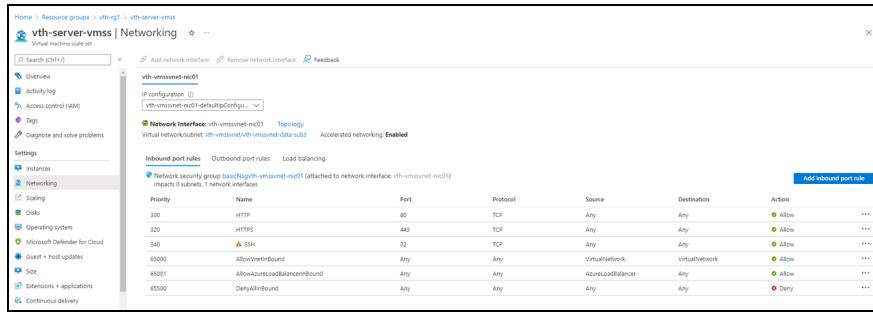
NOTE: It may take the system several minutes to display your resources.

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



| Priority | Name | Port | Protocol | Source | Destination | Action |
|----------|-----------------------------|------|----------|-------------------|----------------|--------|
| 200 | HTTP | 80 | TCP | Any | Any | Allow |
| 320 | HTTPS | 443 | TCP | Any | Any | Allow |
| 340 | SSH | 22 | TCP | Any | Any | Allow |
| 65000 | AllowVmBound | Any | Any | VirtualNetwork | VirtualNetwork | Allow |
| 65001 | AllowAzureLoadBalancedBound | Any | Any | AzureLoadBalancer | Any | Allow |
| 65500 | DenyAllInbound | Any | Any | Any | Any | Deny |

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

[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 * ⓘ Eng Azure

Resource group * ⓘ (New) vth-rg1 [Create new](#)

Instance details

Virtual machine name * ⓘ vth-client

Region * ⓘ (US) South Central US

Availability options ⓘ No infrastructure redundancy required

Security type ⓘ Standard

Image * ⓘ Ubuntu Server 20.04 LTS - Gen2 [See all images](#) | [Configure VM generation](#)

VM architecture ⓘ x64 Arm64

Run with Azure Spot discount ⓘ

Size * ⓘ Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month) [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 * ⓘ azureuser

Password * ⓘ [Reset password](#)

Confirm password * ⓘ [Reset 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 * ⓘ SSH (22)

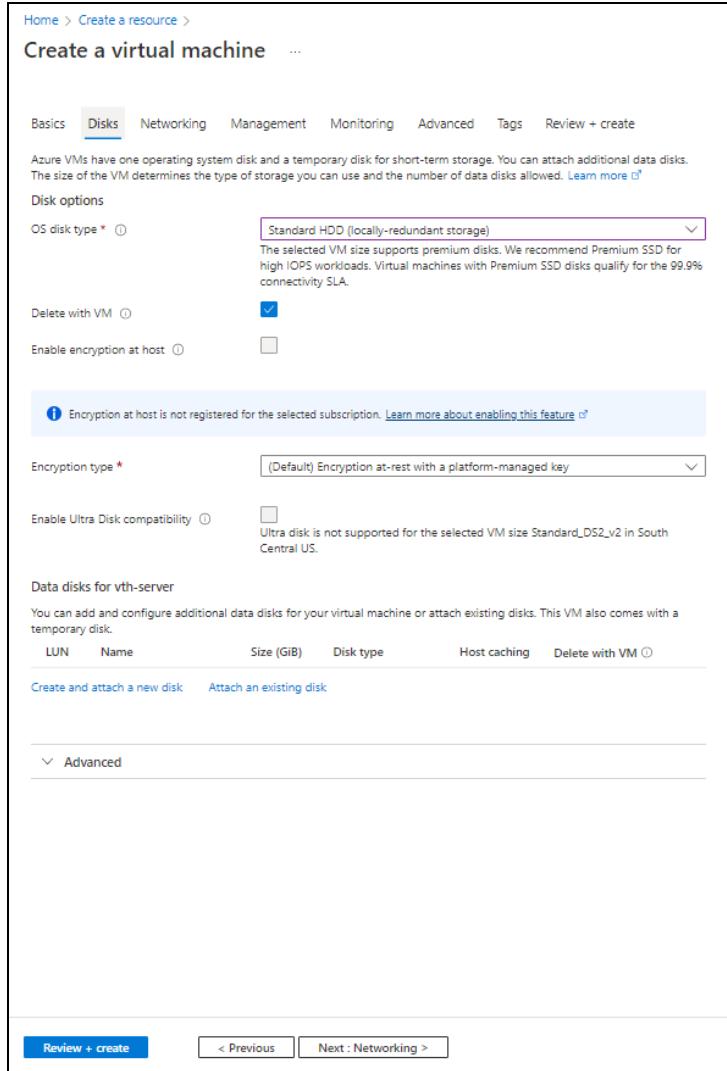
[Review + create](#) [< Previous](#) [Next : Disks >](#)

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



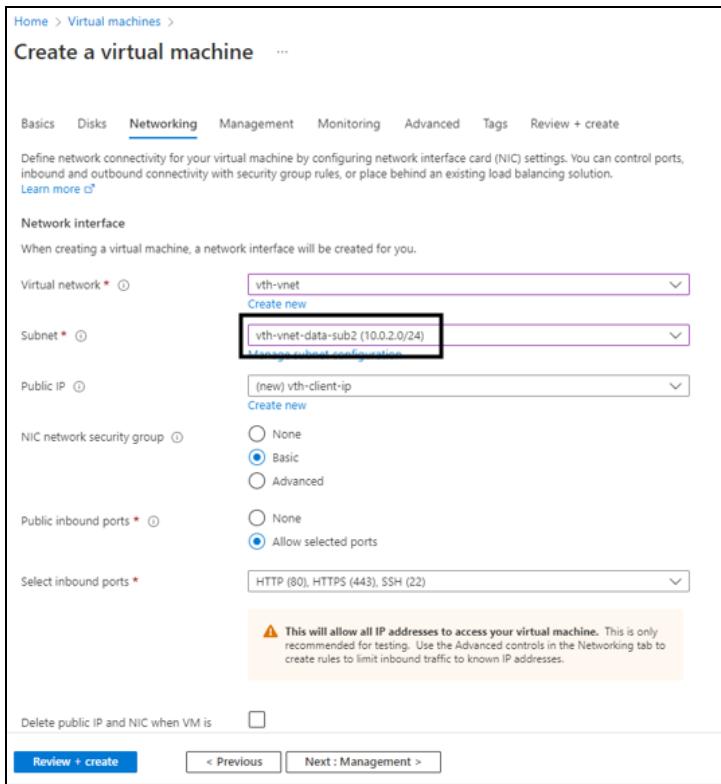
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

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



The screenshot shows the 'Create a virtual machine' window with the 'Networking' tab selected. The 'Networking' tab is highlighted in blue at the top of the navigation bar.

Virtual network: vth-vnet (selected)

Subnet: vth-vnet-data-sub2 (10.0.2.0/24) (selected)

Public IP: (new) vth-client-ip (selected)

NIC network security group: Basic (selected)

Public inbound ports: Allow selected ports (selected)

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

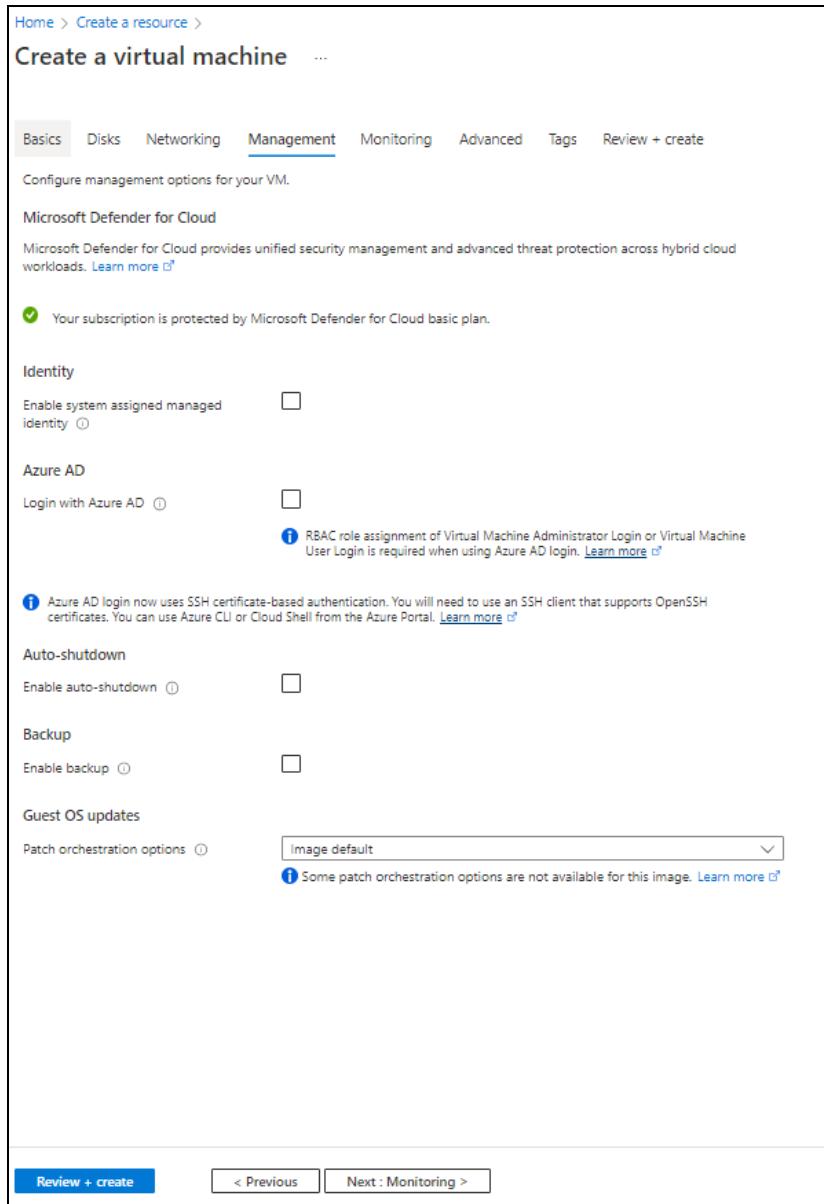
A warning message in a yellow box states: "⚠️ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses."

At the bottom of the window, there are buttons for 'Review + create' (highlighted in blue), '< Previous', and '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.

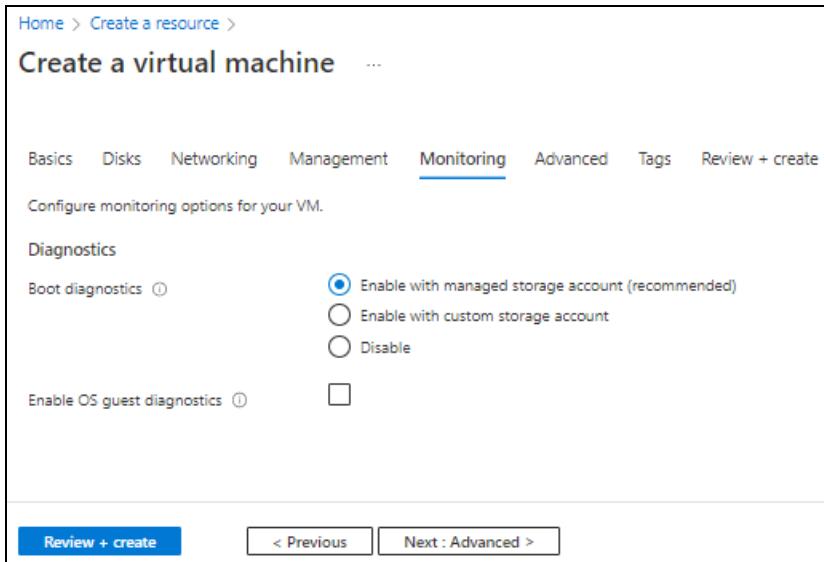
Figure 101 : Create a virtual machine window - Management tab



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

10. Select or enter the information in the **Monitoring** tab as needed.

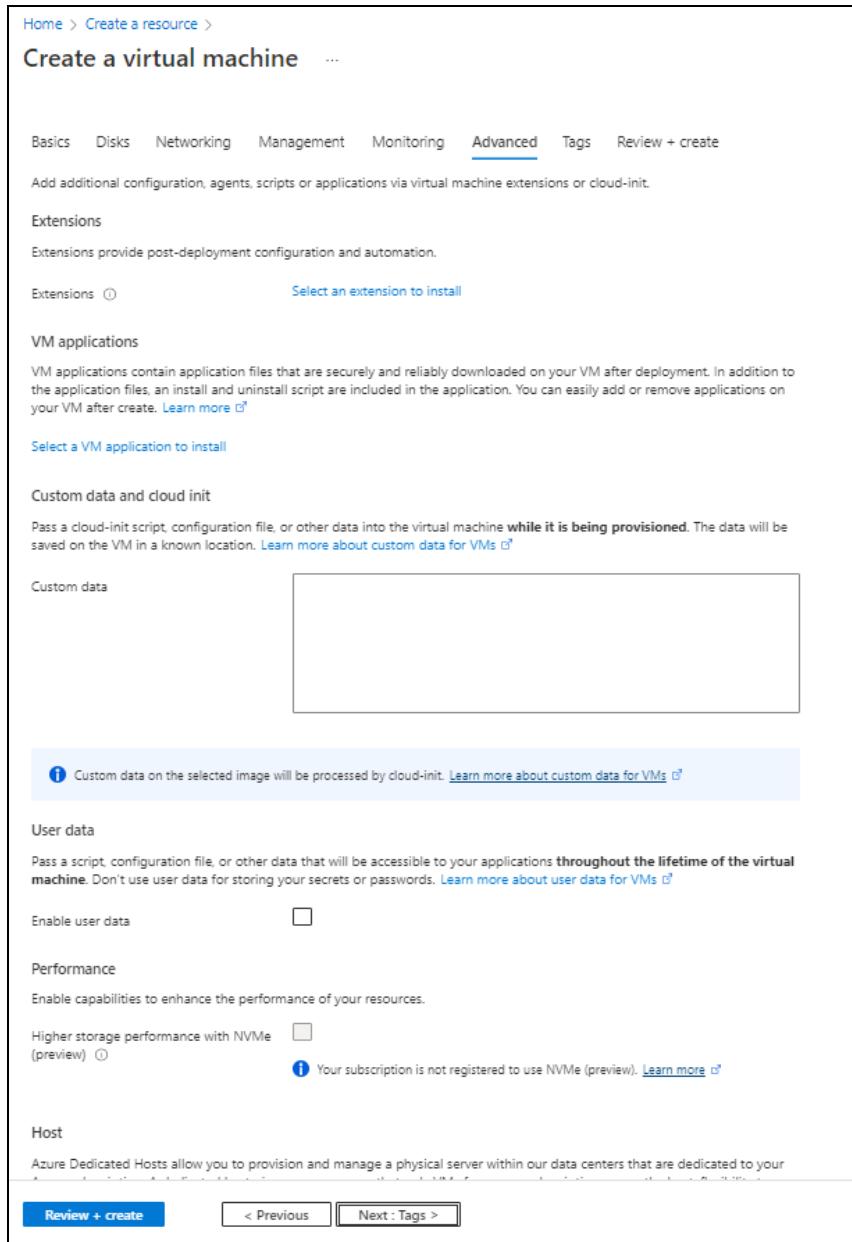
Figure 102 : Create a virtual machine window - Monitoring tab



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

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

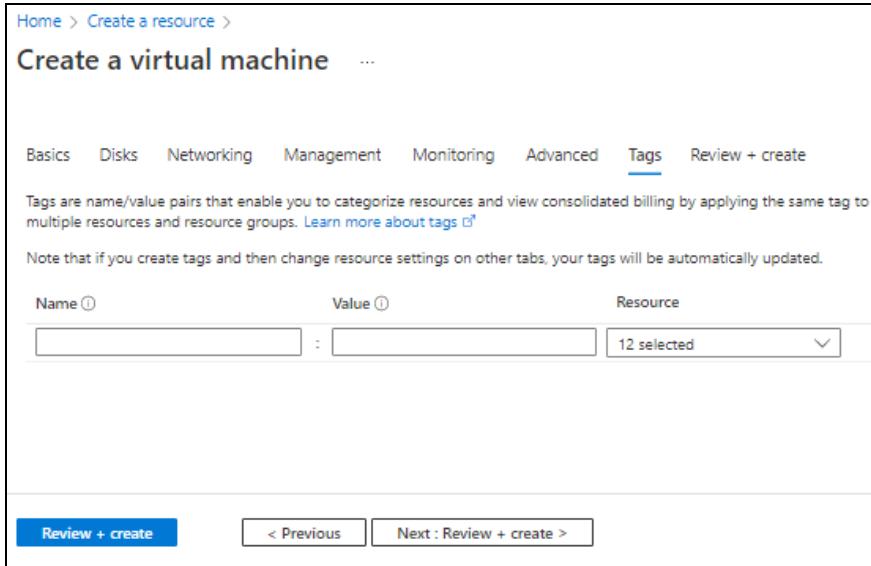
Figure 103 : Create a virtual machine window - Advanced tab



13. Click **Next : Tags** at the bottom of the window.

14. Select or enter the information in the **Tags** tab as needed.

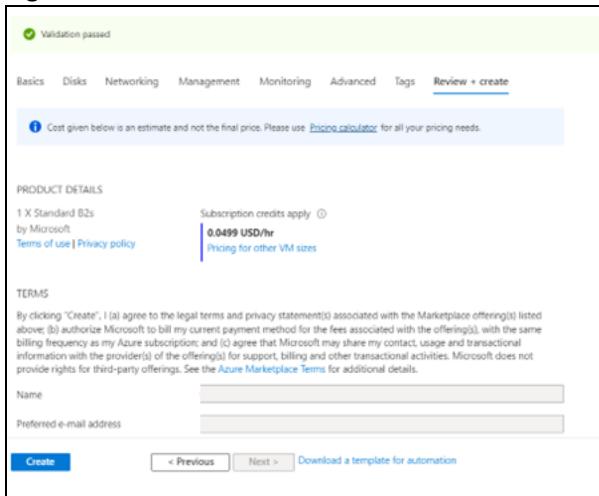
Figure 104 : Create a virtual machine window - Tags tab



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



16. Click **Create** at the bottom of the window.

The Client machine gets created.

Configure Automation Account

The following topics are covered:

- [Configure Azure Access Key](#)
- [Create Automation Account](#)
- [Create Runbook](#)
- [Create Automation Account Webhook](#)

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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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": "<service-app-client-secret>",
"appId": "<service-app-client-id>",
"tenantId": "<service-app-tenant-id>,"
```

5. Configure resource group name. It is the resource group where virtual machine scale set having vThunder servers and resources created by the PowerShell template are available.

```
"resourceGroupName": "vth-rg1",
```

6. Configure VMSS.

```
"vmssName": "vth-server-vmss",
```

7. Configure network interface cards.

```
"mgmtInterface1": "vth-inst1-mgmt-nic1",
"mgmtInterface2": "vth-inst2-mgmt-nic1",
```

8. Provide the resource group name.

```
"resourceGroupName": "vth-rg1"
"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 PS_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:

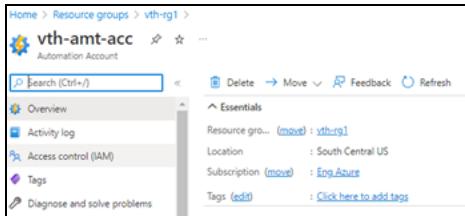
```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_2.ps1
```

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.

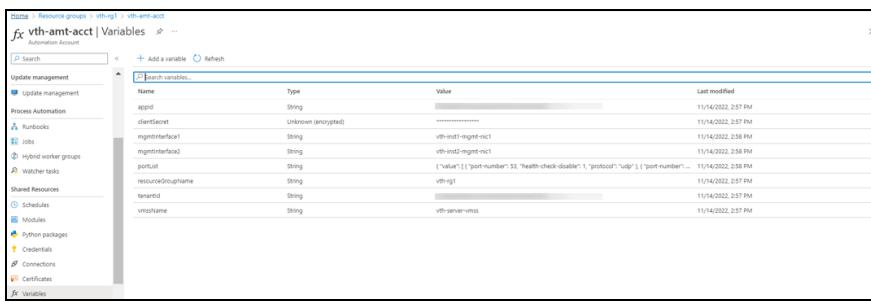
Figure 106 : Selected automation account - Overview window



- Click **Variables** from the left **Shared Resources** panel.

The selected automation account - Variables window is displayed.

Figure 107 : Selected automation account - Variables window



- Verify if all the variables associated with the automation account are listed.

Change Password

To change the password, perform the following steps:

- Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_HA_GL_M_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.

- 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](#).

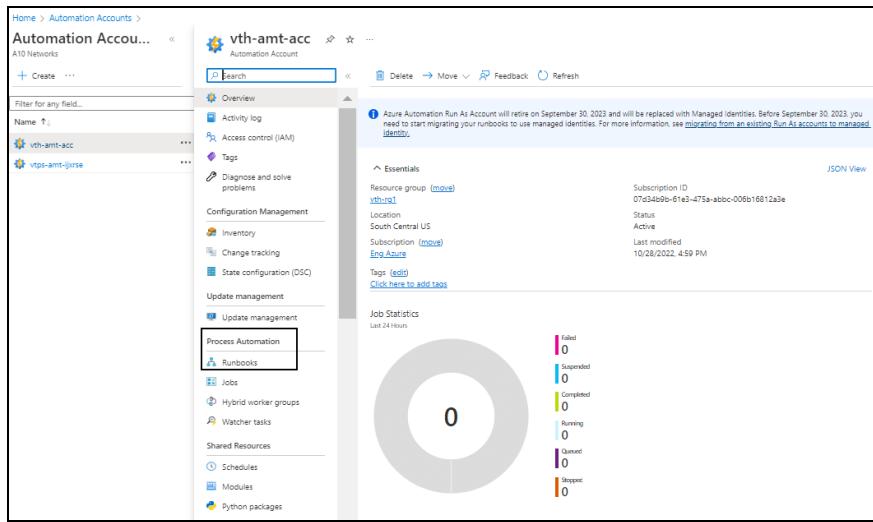
Create Runbook

To create the SLB-Config runbook, perform the following steps:

- From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.

The selected automation account window is displayed.

Figure 108 : Selected automation account window



- Select **Runbooks** from left **Process Automation** panel.

The <automation_account_name> - Runbooks window is displayed.

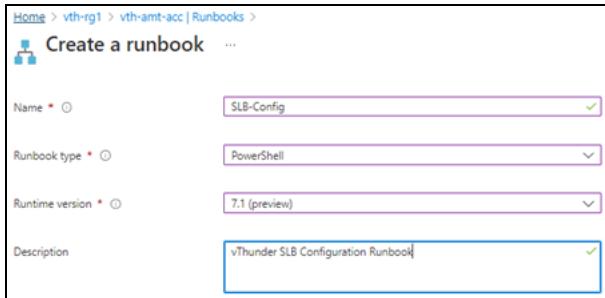
Figure 109 : Selected automation account - Runbooks window



- Click **Create a runbook**.

The **Create a runbook** window is displayed.

Figure 110 : Create a runbook window



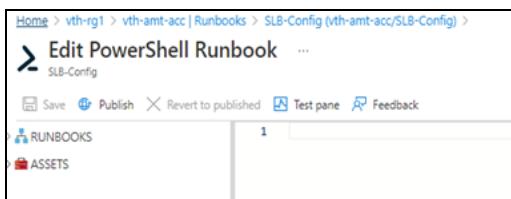
4. Select or enter the following information:

- Name: SLB-Config
- Runbook type: PowerShell
- Runtime version: 7.1
- Description

5. Click **Create**.

The **Edit PowerShell Runbook** is displayed.

Figure 111 : Edit PowerShell Runbook window



NOTE: It may take the system a few minutes to display the edit window.

6. From the downloaded template folder, open **PS_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:

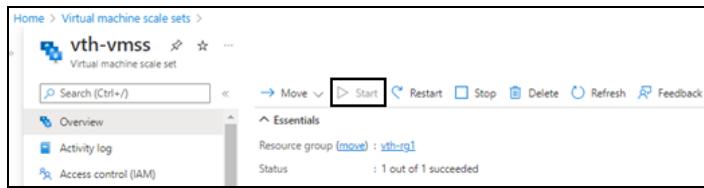
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the Runbook Job creation](#)

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 112 : 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 PowerShell template.
2. Run the following command to create the webhook:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_WEBHOOK_4.ps1 -runBookName "<runbook_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_WEBHOOK_4.ps1 -runBookName "SLB-Config"
```

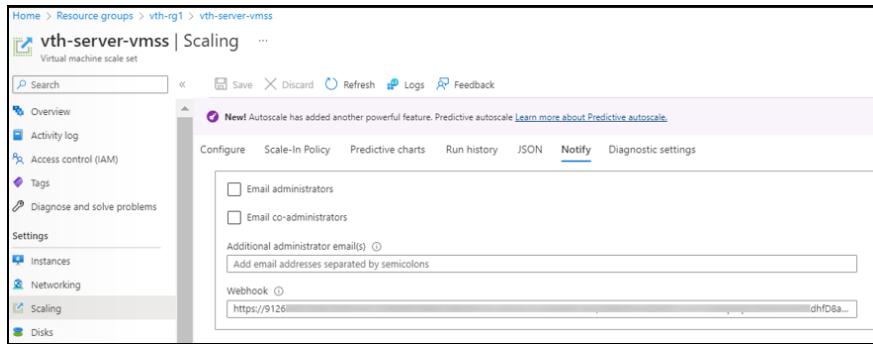
After the webhook installation is complete, the webhook url is displayed.

Save this URL :

```
https://fa72c8e5-xxxx-xxxx-9dc5-b4a71eec0a95.webhook.scus.azure-automation.net/webhooks?token=Q*****pG4UEOScfqdEGEAkqJPgdK%2b0pusoUAwk*****%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 113 : VMSS-Scaling - Notify tab



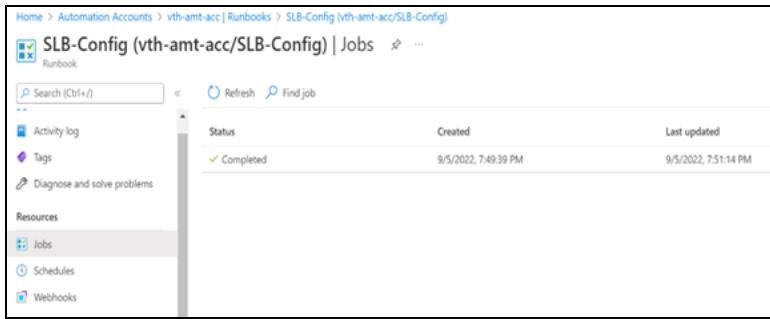
6. Select **Notify** tab.
7. Copy the saved webhook url and paste it in the **Webhook** field.
8. Click **Save** to save the changes.

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**.

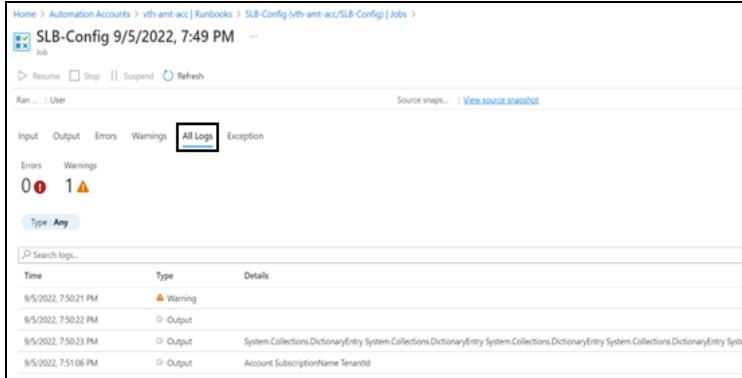
Figure 114 : Selected automation account - Jobs window



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 115 : 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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.

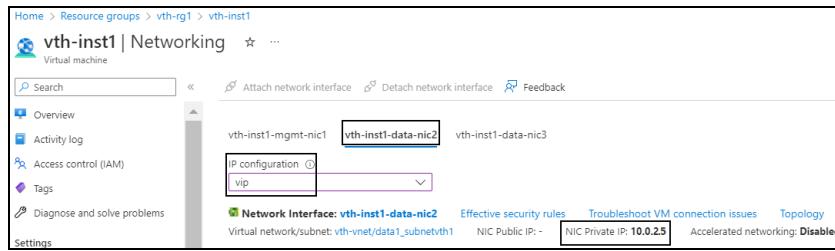
```
"serviceGroupList": {  
    "value": [  
        {  
            "name": "sg443",  
            "protocol": "tcp",  
            "health-check-disable": 1  
        },  
        {  
            "name": "sg53",  
            "protocol": "udp",  
            "health-check-disable": 1  
        },  
        {  
            "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 PowerShell template. Therefore, its default value under **virtualServerList** should be replaced. To get the vip 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 the Data NIC 2 tab > **IP configuration > vip**. Here, Data NIC 2 is **vth-inst1-data-nic2**.

Figure 116 : Virtual machine - Networking window - Data NIC 2 tab



- d. Select **Networking** from the left **Settings** panel.
- e. Select the **NIC Private IP**.
- f. Replace **ip-address** value under **virtualServerList** With this **vip**.

```

"virtualServerList": {
    "virtual-server-name": "vip",
    "ip-address": "10.0.2.5",
    "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 PS_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 PowerShell template.
2. Run the following command to deploy vThunder as an SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_SLB_CONFIG_5.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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 PowerShell template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template and open the PS_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
},
```

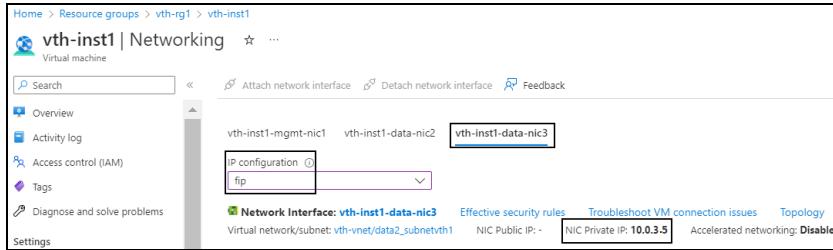
6. Configure VRID details.

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 PowerShell template. Therefore, its default value under `vrid-list` should be replaced. To get the fip 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.

- d. Select the Data NIC 3 tab > **IP configuration**. Here, **vth-inst1-data-nic3**.

Figure 117 : Virtual machine - Networking tab - Data NIC 3 tab



- e. Select the **NIC Private IP**.

- f. Replace the **ip-address** value under **vrnid-list** with this **fip**.

```
"vrnid-list": [
    {
        "vrnid-val":0,
        "blade-parameters": {
            "priority": 100
        },
        "floating-ip": {
            "ip-address-cfg": [
                {
                    "ip-address":"10.0.3.5"
                }
            ]
        }
    }
]
```

7. Verify if all the configurations in the PS_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> .\PS_TMPL_3NIC_2VM_HA_CONFIG_6.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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 PowerShell template.

To configure the parameters, perform the following steps:

1. From the downloaded PowerShell template folder, open the PS_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 PS_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 PowerShell template.
2. Run the following command to apply SLB on vThunder:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_2VM_GLM_CONFIG_7.ps1 -  
resourceGroupName <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_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]

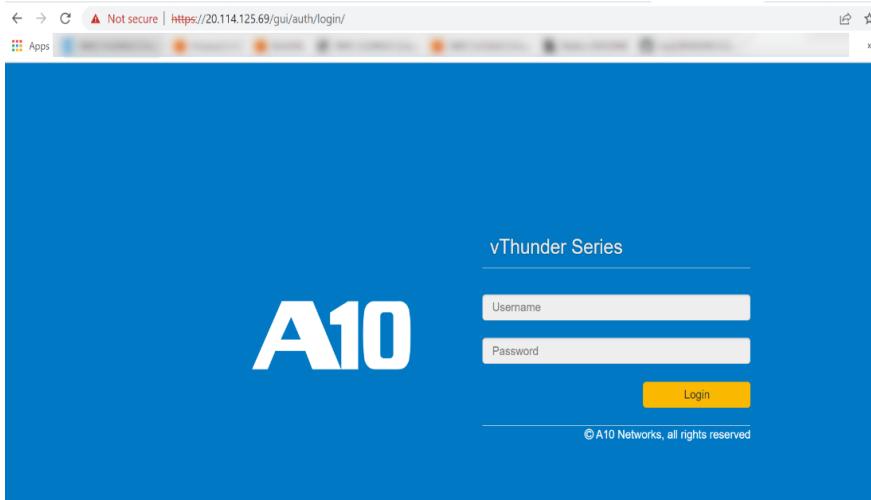
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

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 118 : vThunder GUI



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

Verify Deployment

To verify deployment using the PowerShell 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 10.0.2.5
  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 10.0.0.3.5
    floating-ip 10.0.0.2.5
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.0.2.4
    peer 10.0.0.2.6
!
ip route 0.0.0.0 /0 10.0.0.2.1
!
```

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 |
|--------------------|------|--------------------------|--------------------|
| <hr/> | | | |
| 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) #
```

- Run the following command to disable the active standby vThunder:

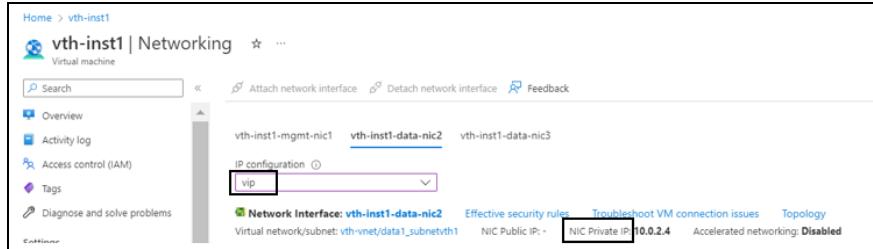
```
vThunder-ForcedStandby(config) #vrrp-a force-self-standby disable  
vThunder-Active(config) #
```

Verify Traffic Flow

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

- 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.
- Copy the VIP address of the active vThunder instance.

Figure 119 : Active vThunder instance 1 VIP



- 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>
```

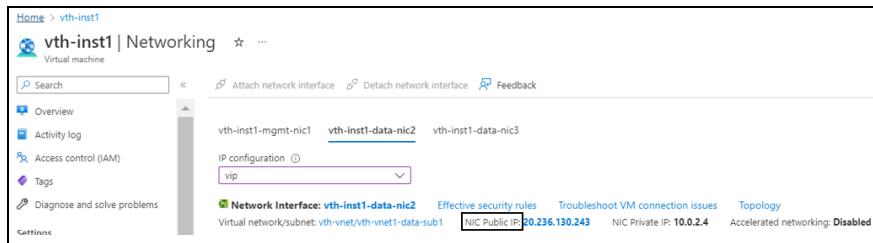
Example

```
curl 10.0.2.4
```

Verify if a response is received.

- Copy the Public IP address of the active vThunder instance 1 data subnet 1.

Figure 120 : Active vThunder instance 1 Public IP address



- Run the following command from the client machine to verify the traffic flow:

```
curl <public_ip_of_data_nic2>
```

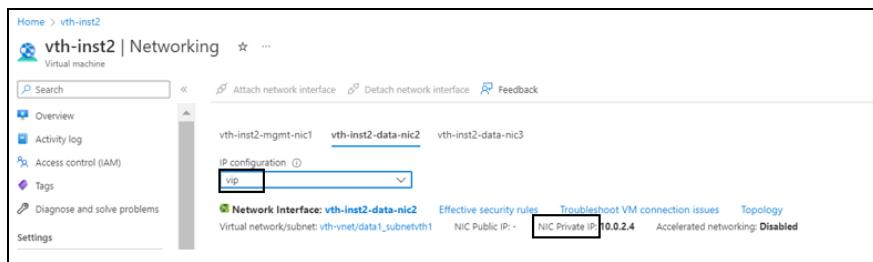
Example

```
curl 20.236.130.243
```

Verify if a response is received.

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

Figure 121 : Active vThunder instance 2 VIP



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

```
curl <VIP>
```

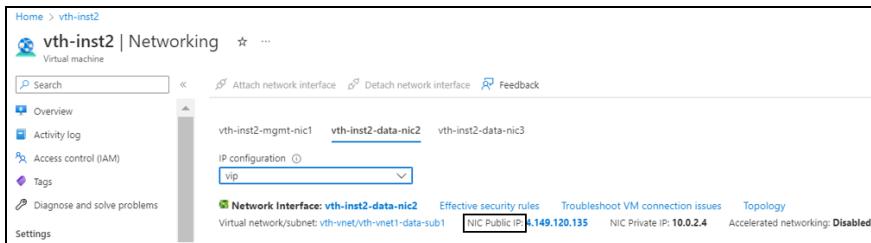
Example

```
curl 10.0.2.4
```

Verify if a response is received.

- Copy the Public IP address of the active vThunder instance 2 subnet 1.

Figure 122 : 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>
```

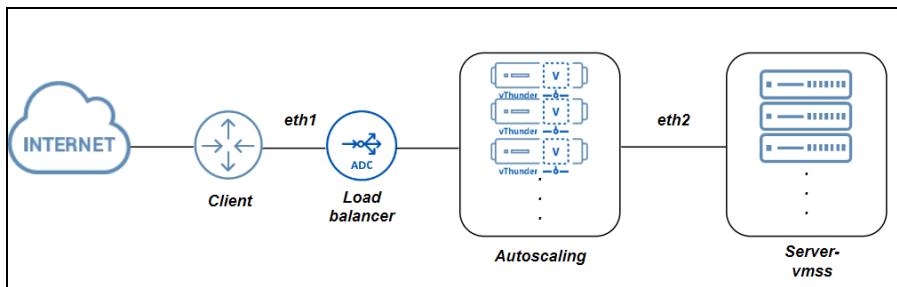
Verify if a response is received.

Deploy PowerShell A10-vThunder_ADC-3NIC-VMSS

[Figure 123](#) 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 123 : 3NIC-NVM-VMSS Topology



The following topics are covered:

| | |
|--|-----|
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| Create vThunder Instances | 238 |
| Configure Server VMSS | 246 |
| Configure Automation Account | 255 |
| Enable Autoscaling | 269 |
| On-demand Password Change | 298 |
| Access vThunder using CLI or GUI | 300 |
| Verify Deployment | 301 |

System Requirements

The PowerShell 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 | <p>A resource group with the specified name and location is created if it doesn't exist.</p> <p>All the resources required for this template is created under the resource group.</p> | Here, the Azure resource group name used is <code>vth-rg1</code> . |
| 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> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | <p>Azure Storage Account: <code>vthunderstorage</code></p> <p>SSL Container: <code>ssl</code></p> <p>Log Agent Container: <code>vth-agent-cont</code></p> |
| Virtual Machine | Two virtual machine instances are created, vThunder and | A10 vThunder instance: <code>vth-vmss_0</code> |

| Resource Name | Description | Default Value |
|-----------------------------|---|---|
| (VM) Instance | <p>monitoring agent.</p> <p>Product: A10 vThunder</p> <p>Operating system: Linux</p> <p>Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory)</p> <p>Product: A10 Monitoring Agent</p> <p>Operating system: Linux</p> <p>Default Size: Standard DS2_V2 (2 vCPUs, 7 GiB Memory)</p> <hr/> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 13 lists the supported VM sizes.</p> | A10 Monitoring Agent: <code>vth-agent-ins1</code> |
| Azure Automation Account | An automation account is created under the resource group. | <code>vth-amt-acc</code> |
| Azure Run-book with Webhook | <p>Multiple custom runbooks are created under the automation account:</p> <ul style="list-style-type: none"> • Change-Password-Config | |

| Resource Name | Description | Default Value |
|-------------------------------|---|---|
| | <ul style="list-style-type: none"> • Event-Config • GLM-Config • GLM-Revoke-Config • Master-Runbook • SLB-Config • SSL-Config <p>A webhook is created under the Master-Runbook.</p> | |
| 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. | <p>Default application insight name: vth-vmss-app-insights</p> <p>Default custom metrics name: vth-cpu-metrics</p> <p>Default threshold for autoscale-in is 25%.</p> <p>Default threshold for autoscale-out is 80%.</p> |
| Azure Load Balancer [LB] | <p>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.</p> <p>One backend pool is created, and it gets attached to the Network Interface Card 2 (NIC2).</p> | <p>Azure Load Balancer: vth-1b1</p> <p>Backend Pool: vth-1b1-bck-pool1</p> <p>Three default rules are created:</p> <ul style="list-style-type: none"> • rulePort80 • rulePort443 • rulePort53 |

| Resource Name | Description | Default Value |
|----------------------------------|--|---|
| | <p>Three default LB rules are created.</p> <p>Three default health probes are created.</p> | <p>Three default probes are created:</p> <ul style="list-style-type: none"> • HealthProbe80 • HealthProbe443 • HealthProbe53 |
| Virtual Machine Scale Set [VMSS] | A virtual machine scale set is created. | vth-vmss |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance. | vth-vmss-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 |
| Public and Private IP address | Single frontend static public IP is created and attached to LB interface. | Public IP address: vth-lb1-ip Private IP address: vth-lb1-frnt-ip |
| Network Interface Card [NIC] | <p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> • Management Interface with public IP • Data Interface with primary private IP [Ethernet 1, Ethernet | vth-inst1-mgmt-nic1 vth-inst1-data-nic2 vth-inst1-data-nic3 |

| Resource Name | Description | Default Value |
|--------------------------------------|---|---------------|
| | <p>2]</p> <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> | |
| 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 |

| Series | Size | Qualified Name |
|----------|----------------|----------------|
| | Standard D5_v2 | 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](#)
- [Verify Resource Creation](#)

Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template, and open the PS_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 prefix for vThunder host name.

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

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_B4ms"
},
```

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 load balancer name, public IP name, backend IP name, and frontend pool name.

```

    "lbPubIPName": {
        "value": "vth-lb1-ip"
    },
    "lbName": {
        "value": "vth-lb1"
    },

```

```

    "lbBackEndPoolName": {
        "value": "vth-lb1-bck-pool1"
    },
    "lbFrontEndName": {
        "value": "vth-lb1-frnt-ip"
    },

```

16. Configure vThunder monitoring VM name.

```

    "vmName": {
        "value": "vth-agent-ins1"
    },

```

17. Configure log agent container name.

```

    "logAgentContainerName": {
        "value": "vth-agent-cont"
    }

```

18. Verify if all the configurations in the PS_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 PowerShell template.
2. Run the following command to create a deployment group in Azure.

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_NVM_VMSS_1.ps1 -resourceGroup <resource_group_name> -location "<location_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_NVM_VMSS_1.ps1 -resourceGroup vth-rg1 -location "south central us"
```

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

Verify Resource Creation

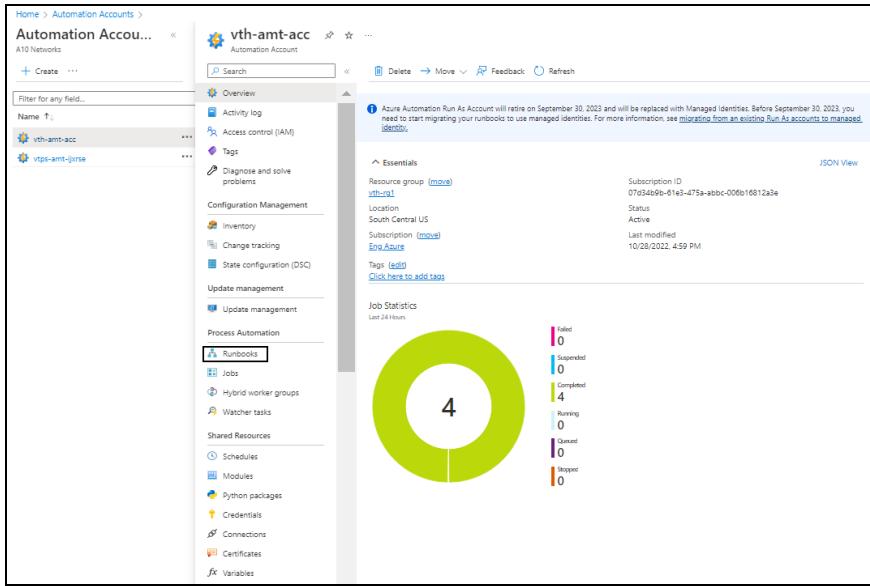
Runbook

To verify the creation of runbooks, perform the following steps:

- From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.

The selected automation account - Overview window is displayed.

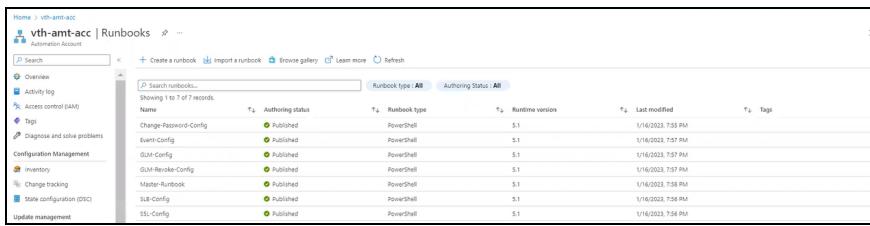
Figure 124 : Selected automation account - Overview window



- Click **Runbooks** from the left **Process Automation** panel.

The selected automation account - Jobs window is displayed.

Figure 125 : Selected automation account - Runbooks window



| Name | Authoring status | Runbook type | Runtime version | Last modified | Tags |
|------------------------|------------------|--------------|-----------------|---------------------|------|
| Change-Password-Config | Published | PowerShell | 5.1 | 10/16/2022, 7:53 PM | |
| Event-Config | Published | PowerShell | 5.1 | 10/16/2022, 7:57 PM | |
| GLM-Config | Published | PowerShell | 5.1 | 10/16/2022, 7:57 PM | |
| GLM-Reverb-Config | Published | PowerShell | 5.1 | 10/16/2022, 7:57 PM | |
| Master-Runbook | Published | PowerShell | 5.1 | 10/16/2022, 7:58 PM | |
| SIA-Config | Published | PowerShell | 5.1 | 10/16/2022, 7:58 PM | |
| SSL-Config | Published | PowerShell | 5.1 | 10/16/2022, 7:58 PM | |

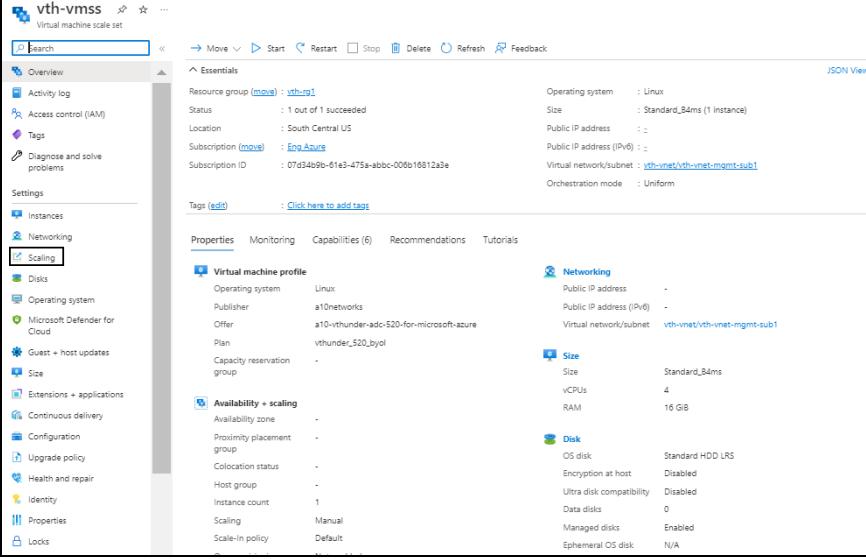
Instance Count

To verify the instance count, perform the following steps:

- 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 126 : Virtual machine scale set - Overview window



Essentials

- Resource group (move) : **vth-rg1**
- Status : 1 out of 1 succeeded
- Location : South Central US
- Subscription (move) : **Eng Azure**
- Subscription ID : 07d349fb-6f63-475a-ab0b-000b16912a3e
- Tags (edit) : Click here to add tags
- Operating system : Linux
- Size : Standard_B4ms (1 instance)
- Public IP address : -
- Public IP address (IPv6) : -
- Virtual network/subnet : **vth-vnet/vth-vnet-mgmt-sub1**
- Orchestration mode : Uniform

Properties

Networking

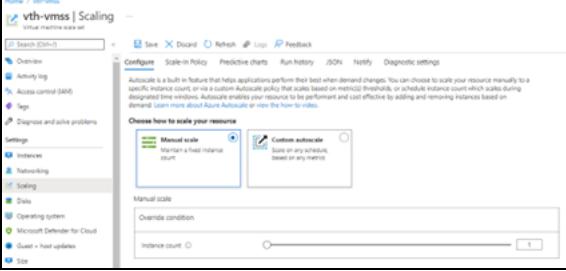
Size

Disk

2. Click **Scaling** from the left **Settings** panel.

The selected VMSS - Scaling window is displayed.

Figure 127 : Virtual machine scale set - Scaling window - Configure tab



Configure

Autoscale is a built-in feature that helps applications perform their best when demand changes. You can choose to scale your resources manually to a specific instance count, or via a custom Autoscale policy (that scales based on metrics) thresholds, or schedule instance count which scales during designated time windows. Autoscale enables your resources 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** (selected): Maintain a fixed instance count.
- Custom automate**: Scale on any schedule, based on any criteria.

Manual scale

Override condition

Instance count: 1

3. Verify the configured instance count.

If the instance gets deleted either manually or automatically, VMSS creates a new instance.

LB creation

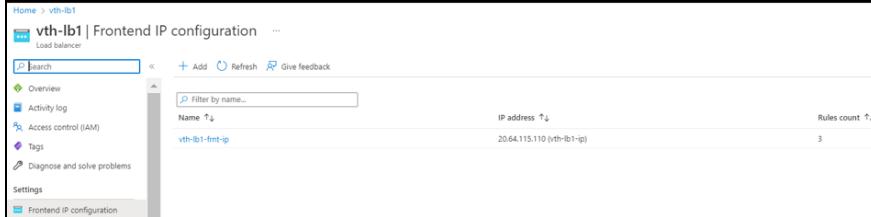
To verify LB resource creation, perform the following steps:

a. From **Home**, navigate to **Azure Services > Load balancer > <lb_name>**.

The selected LB - Overview window is displayed. Here, the LB name is **vth-lb1**.

- b. Click **Frontend IP configuration** from the left **Settings** panel to verify if the LB frontend IP is created.

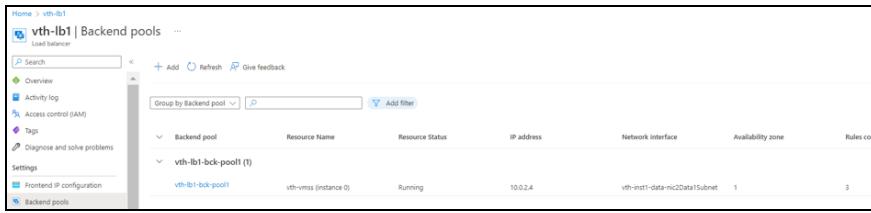
Figure 128 : Selected Frontend IP configuration window



| Name | IP address | Rules count |
|----------------|----------------------------|-------------|
| vth-lb1-fnt-ip | 20.64.115.110 (vth-lb1-ip) | 3 |

- c. Click **Backend pools** from the left **Settings** panel to verify if the backend pools are created.

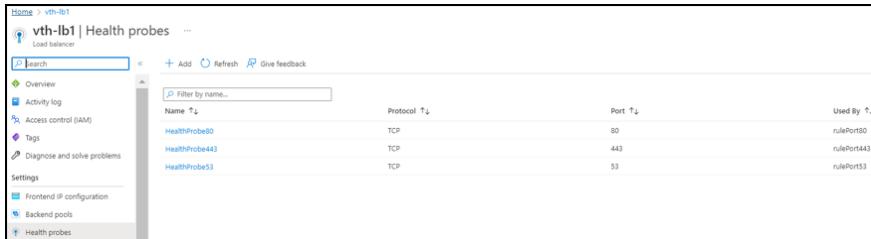
Figure 129 : Selected Backend pools window



| Backend pool | Resource Name | Resource Status | IP address | Network interface | Availability zone | Rules count |
|-------------------|-----------------------|-----------------|------------|--------------------------------|-------------------|-------------|
| vth-lb1-bck-pool1 | vth-vmss (instance 0) | Running | 10.0.2.4 | vth-vmss1-data-nic2Data1Subnet | 1 | 3 |

- d. Click **Health probes** from the left **Settings** panel to verify if the health probes are created.

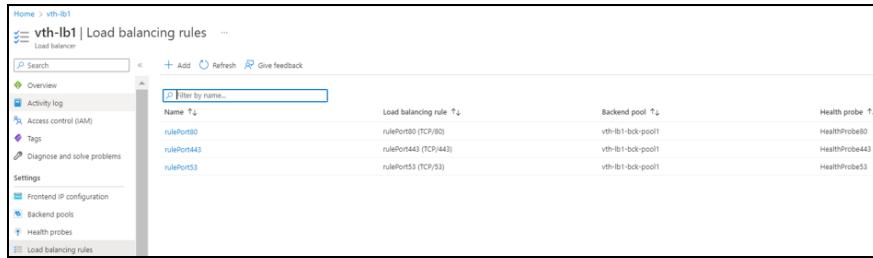
Figure 130 : Selected Health Probes window



| Name | Protocol | Port | Used By |
|----------------|----------|------|-------------|
| HealthProbe80 | TCP | 80 | rulePort80 |
| HealthProbe443 | TCP | 443 | rulePort443 |
| HealthProbe53 | TCP | 53 | rulePort153 |

- e. Click **Load balancing rules** from the left **Settings** panel to verify if the load balancing rules are created.

Figure 131 : Selected load balancing rules window



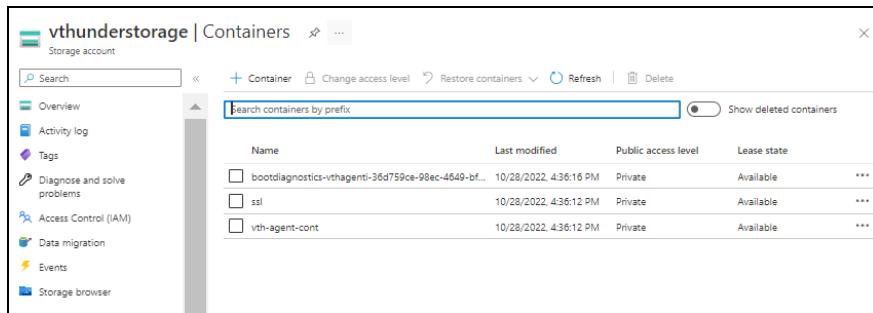
| Name | Load balancing rule | Backend pool | Health probe |
|-------------|-----------------------|-------------------|----------------|
| rulePort80 | rulePort80 (TCP/80) | vth-lb1-bck-pool1 | HealthProbe80 |
| rulePort443 | rulePort443 (TCP/443) | vth-lb1-bck-pool1 | HealthProbe443 |
| rulePort53 | rulePort53 (TCP/53) | vth-lb1-bck-pool1 | HealthProbe53 |

Storage Account Container

To verify storage account container, perform the following steps:

- 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 **vthunderstorage**.
- Click **Containers** from the left **Data storage** panel.
The selected storage account - Containers window is displayed.

Figure 132 : Selected storage account - Containers window



| Name | Last modified | Public access level | Lease state |
|--|------------------------|---------------------|-------------|
| bootdiagnostics-vthagenti-36d759ce-98ec-4649-bf... | 10/28/2022, 4:36:16 PM | Private | Available |
| ssl | 10/28/2022, 4:36:12 PM | Private | Available |
| vth-agent-cont | 10/28/2022, 4:36:12 PM | Private | Available |

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

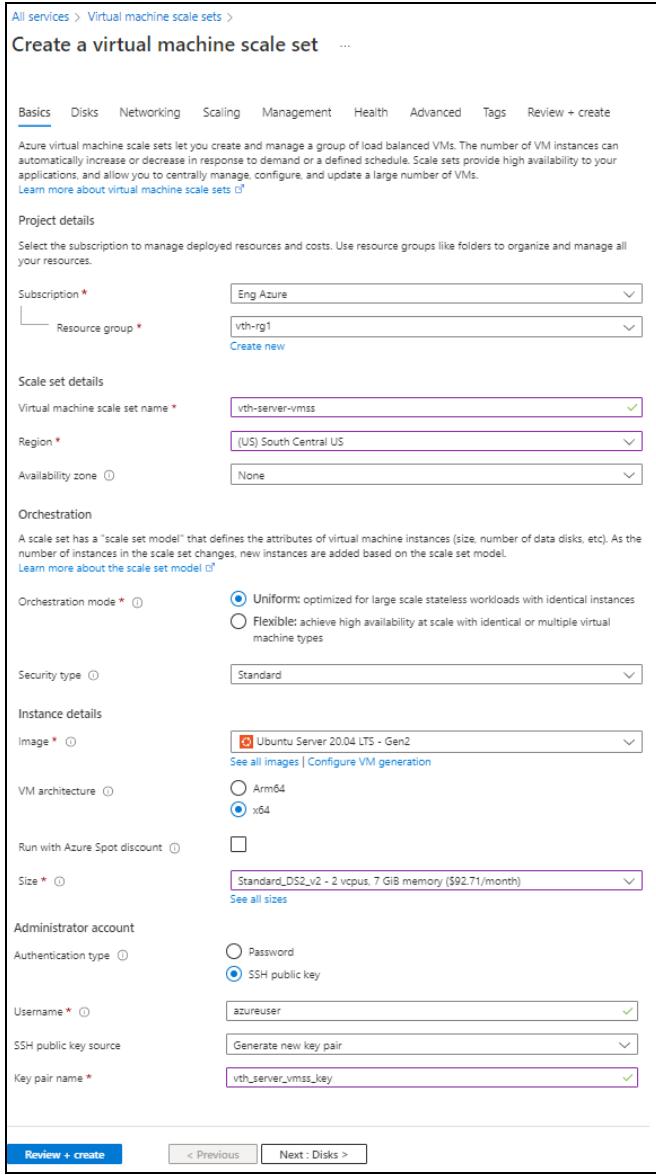
Instance details

- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

Figure 133 : Create a virtual machine scale set window - Basics tab



The screenshot shows the 'Create a virtual machine scale set' window in the Azure portal. The 'Basics' tab is selected. The configuration includes:

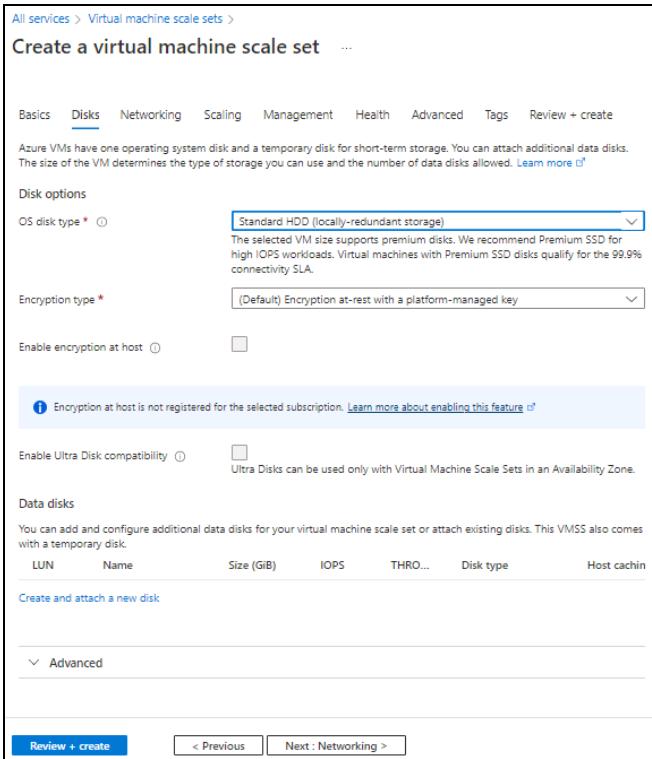
- Subscription:** Eng Azure
- Resource group:** vth-rg1
- Virtual machine scale set name:** vth-server-vmss
- Region:** (US) South Central US
- Availability zone:** None
- Orchestration mode:** Uniform (selected)
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Run with Azure Spot discount:** Unchecked
- Size:** Standard_DS2_v2 - 2 vcpus, 7 GiB memory (\$92.71/month)
- Administrator account:**
 - Authentication type: SSH public key (selected)
 - Username: azureuser
 - SSH public key source: Generate new key pair
 - Key pair name: vth_server_vmss_key

At the bottom, there are buttons for **Review + create**, < Previous, and 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

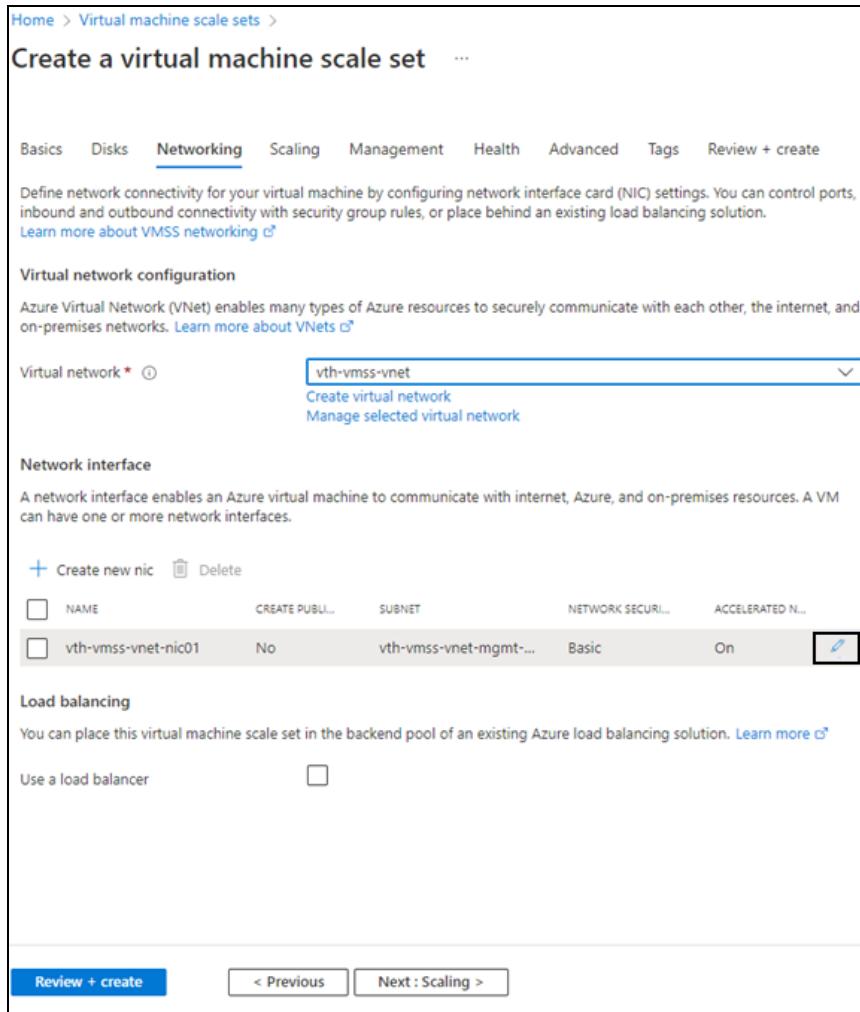
Figure 134 : Create a virtual machine scale set window - Disks tab



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

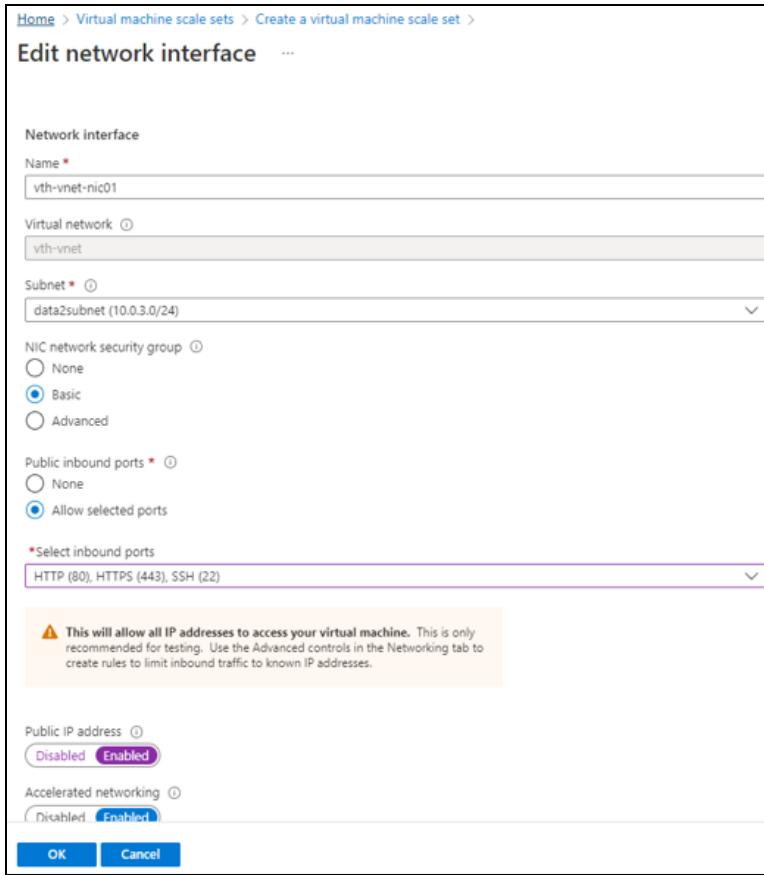
6. Select the Virtual network in the **Networking** tab.

Figure 135 : Create a virtual machine scale set window - Networking tab



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**.

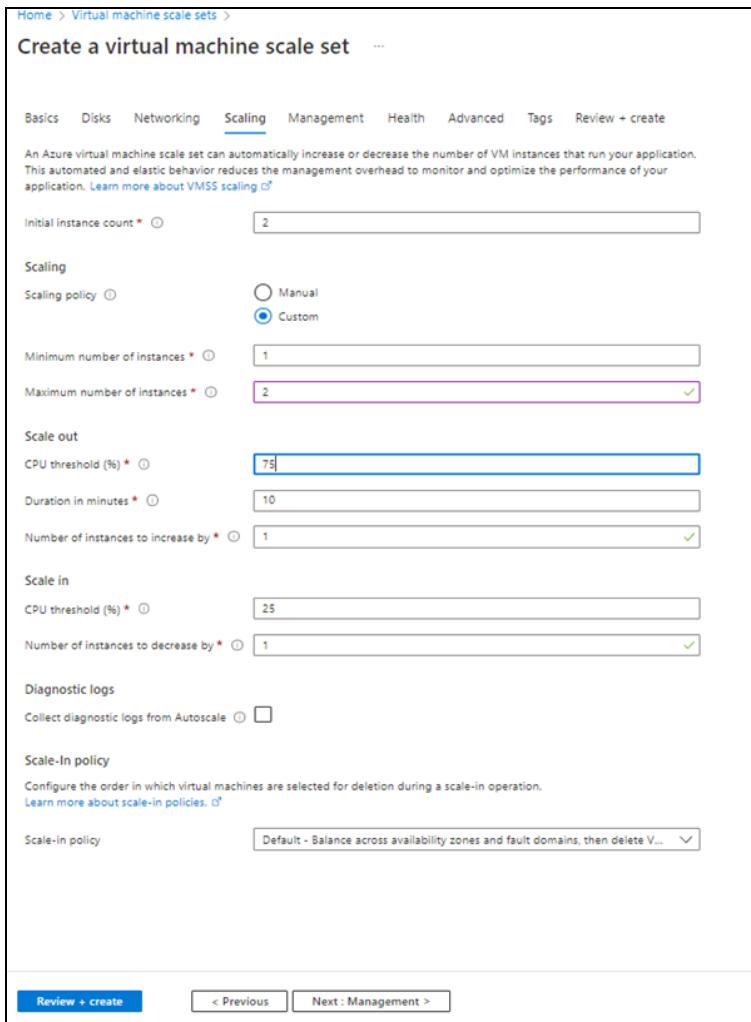
Figure 136 : Edit network interface window



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 137 : Create a virtual machine scale set window - Scaling tab



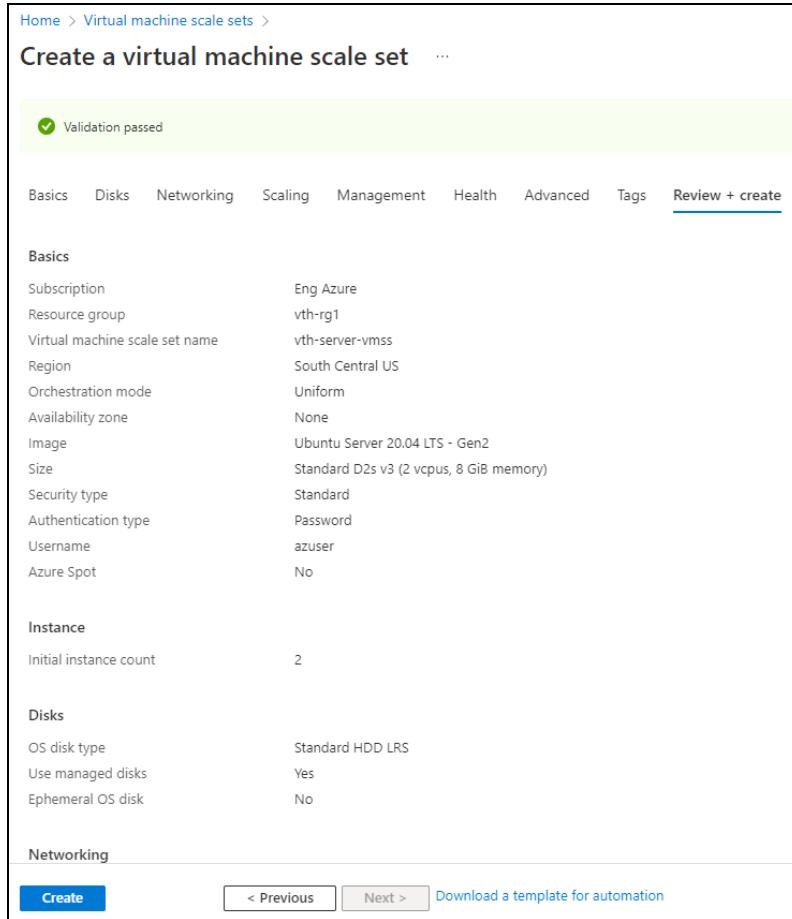
The screenshot shows the 'Create a virtual machine scale set' wizard in the Azure portal, with the 'Scaling' tab selected. The 'Scaling' tab allows you to define how many VM instances to run based on CPU usage. Key configuration options include:

- Initial instance count:** Set to 2.
- Scaling policy:** Set to **Custom**.
- Minimum number of instances:** Set to 1.
- Maximum number of instances:** Set to 2.
- Scale out:** Set to a CPU threshold of 75% over a duration of 10 minutes, increasing by 1 instance.
- Scale in:** Set to a CPU threshold of 25%, decreasing by 1 instance.
- Diagnostic logs:** Unchecked.
- Scale-in policy:** Set to 'Default - Balance across availability zones and fault domains, then delete V...'.
Configure the order in which virtual machines are selected for deletion during a scale-in operation.

At the bottom, there are navigation buttons: **Review + create**, **< Previous**, and **Next : Management >**.

11. Click **Review + create** at the bottom of the window to skip the other tabs.

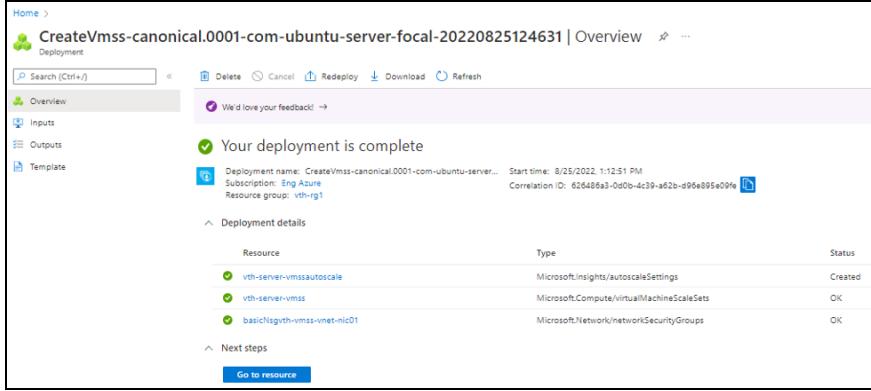
Figure 138 : Create a virtual machine scale set window - Review + create tab



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 139 : Create VMSS window



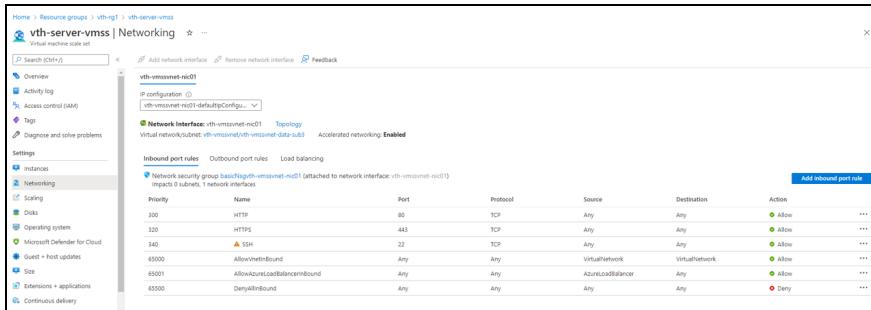
NOTE: It may take the system several minutes to display your resources.

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 140 : 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 PowerShell template.

To configure the parameters, perform the following steps:

1. Open the PS_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>.

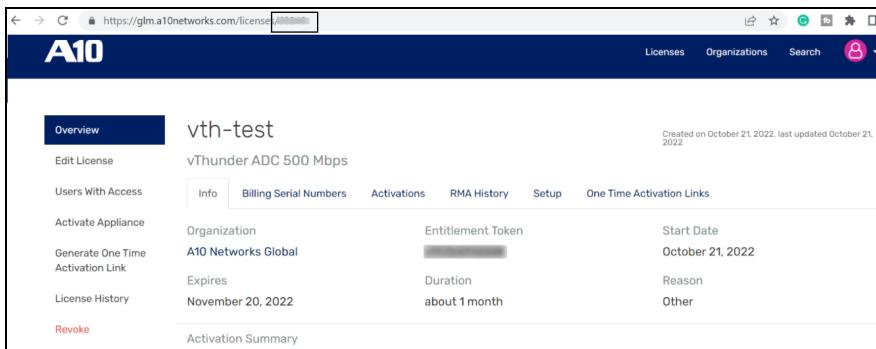
```
"azureAutoScaleResources": {
    "resourceGroupName": "vth-rg1",
    "automationAccountName": "vth-amt-acc",
    "vThunderScaleSetName": "vth-vmss",
    "serverScaleSetName": "vth-server-vmss",
    "storageAccountName": "vthunderstorage",
    "appId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
    "tenantId": "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



The screenshot shows the A10 Networks License Management interface. A license named 'vth-test' is displayed. The license details are as follows:

- Organization:** A10 Networks Global
- Entitlement Token:** [REDACTED]
- Start Date:** October 21, 2022
- Expires:** November 20, 2022
- Duration:** about 1 month
- Reason:** Other

4. Configure SSL parameters.

```

"sslParam": {
    "requestTimeout": 40,
    "path": "server.pem",
    "file": "server",
    "certificationType": "pem",
    "containerName": "ssl",

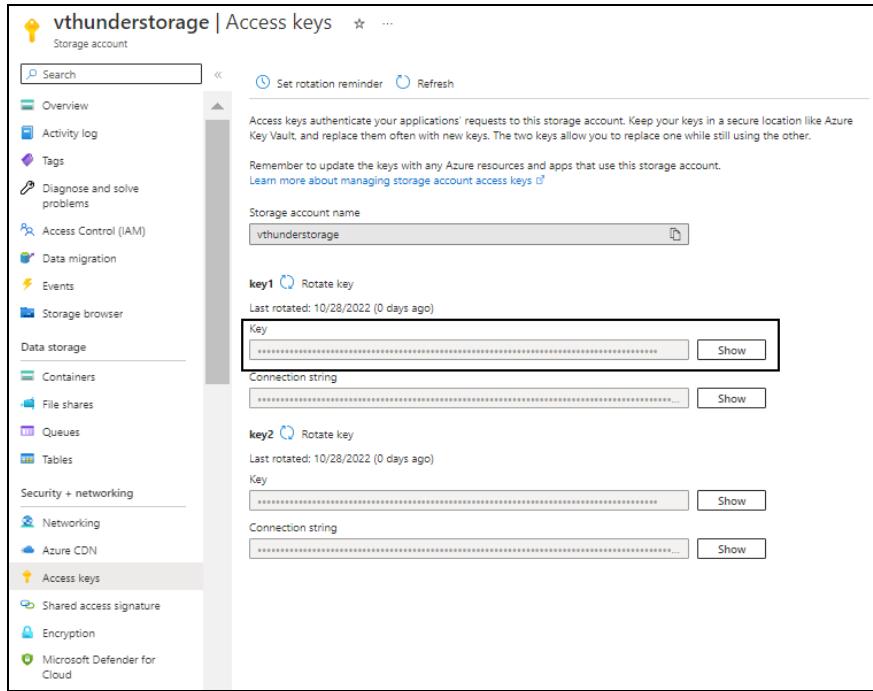
"storageAccountKey": "LX6z8xxxxxxehXx0xxxv7xxxx/xxxOfxxxxxxxxR0xxx5gXxxxx
xfhxcx0gxxxxx9rxxASxxxxs=="
},

```

NOTE: The `server.pem` file should be placed in the same downloaded folder from which your 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 141 : 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
                }
            ]
        }
    ]
}
```

Deploy PowerShell A10-vThunder_ADC-3NIC-VMSS

```
        }
    ],
},
"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**.

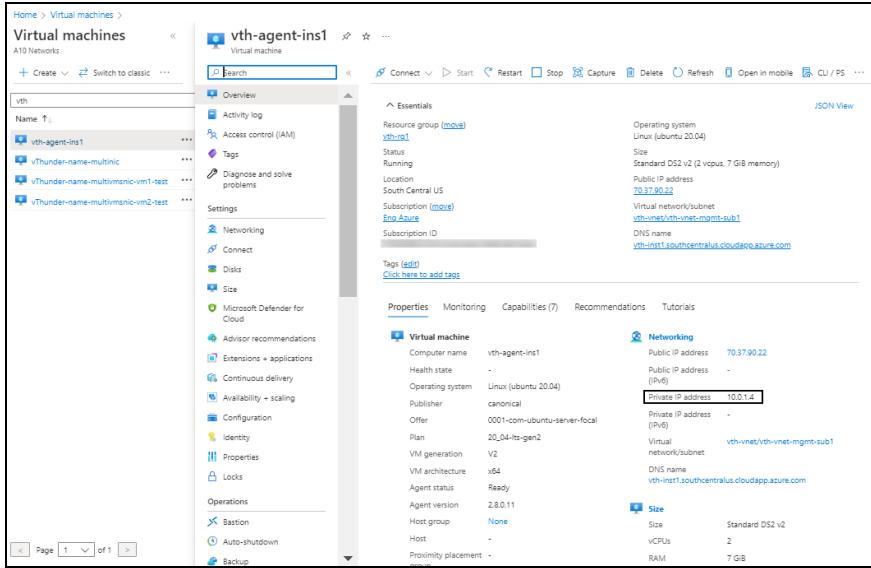
```
"clientSecret": "9-xxxx~jIxxxEVyxxxxHNxxxOwv_xxxxZLxxxTM",
```

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 142 : 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 PS_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> .\PS_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](#).

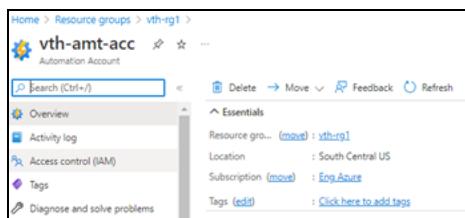
Verify the Automation Account Creation

To verify the creation of an automation account, perform the following steps:

- From the **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
The selected resource group - Overview window is displayed.
- Under **Resources** tab, group the resources based on the resource type.
- Verify if the recently created automation account is listed under **Automation Accounts** type.
- Select the required automation account.

The selected automation account - Overview window is displayed.

Figure 143 : Selected automation account - Overview window



- Click **Variables** from the left **Shared Resources** panel.

The selected automation account - Variables window is displayed

Figure 144 : Selected automation account - Variables window

The screenshot shows the 'Variables' page for the 'vth-amt-acc' Automation Account. The left sidebar lists various management sections like Overview, Activity log, Access control (IAM), Tags, etc. The main area displays a table of variables with columns for Name, Type, Value, and Last modified. Some variable values are redacted with '*****'. The table includes entries for agentPrivateIP, autoScaleParam, azureAutoScaleResources, clientSecret, gmrParam, sbrParam, sfpParam, vCPUUsage, vTHCurrentPassword, vTHDefaultPassword, vTHNewPassApplyFlag, vTHNewPassword, vTHOldIP, and vTHUsername.

| Name | Type | Value | Last modified |
|-------------------------|---------------------|---|--------------------|
| agentPrivateIP | String | 10.0.1.4 | 1/16/2023, 8:13 PM |
| autoScaleParam | String | {"maxCalcOutLimit": 10, "minCalcInLimit": 1, "scaleInThreshold": 25, "scaleOutThreshold": 80} | 1/16/2023, 8:12 PM |
| azureAutoScaleResources | String | {"resourceGroupName": "vthrg77", "automationAccountName": "vth-amt-acc77", "vThunder": "vth77"} | 1/16/2023, 8:12 PM |
| clientSecret | Unknown (encrypted) | ***** | 1/16/2023, 8:13 PM |
| gmrParam | Unknown (encrypted) | ***** | 1/16/2023, 8:12 PM |
| sbrParam | String | {"ip_port": {"value": 111, "port-number": 53, "protocol": "udp", "health-check-disable": 1}, {"ip_port": {"value": 111, "port-number": 53, "protocol": "tcp", "health-check-disable": 1}} | 1/16/2023, 8:12 PM |
| sfpParam | 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 |
| vTHOldIP | String | ***** | 1/16/2023, 8:13 PM |
| vTHUsername | String | admin | 1/16/2023, 8:13 PM |

- Verify if all the variables associated with the automation account are listed.

Create Automation Account Webhook

The following topics are covered:

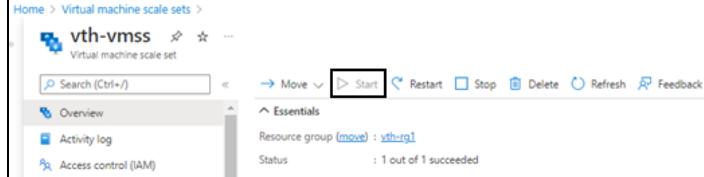
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the AutoScale Resource Variable creation](#)
- [Verify the SSL File availability](#)
- [Verify the Runbook Jobs creation](#)

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 145 : 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 PowerShell template.
2. Run the following command to create the webhook:

```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_NVM_VMSS_WEBHOOK_3.ps1
```

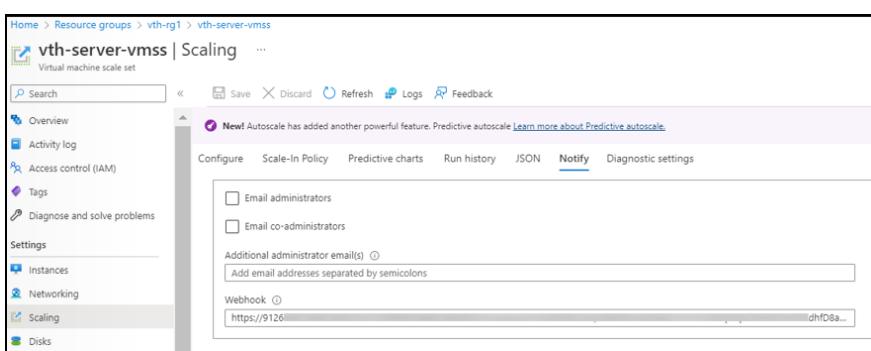
- After the webhook installation is complete, the webhook url is displayed.

Save this URL :

```
https://fa72c8e5-xxxx-xxxx-9dc5-b4a71eec0a95.webhook.scus.azure-automation.net/webhooks?token=Q*****pG4UEOScfqdEGEAKqJPgdK%2b0pusoUAwK*****%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 146 : 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.

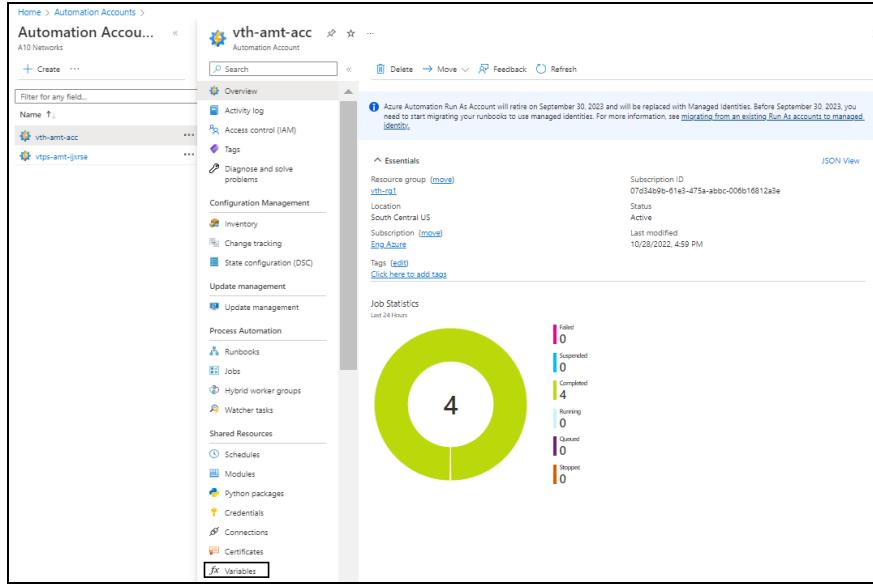
Verify the AutoScale Resource Variable creation

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 147 : Selected automation account - Overview window



2. Click **Variables from the left **Shared Resources** panel.**

The selected automation account - Variables window is displayed.

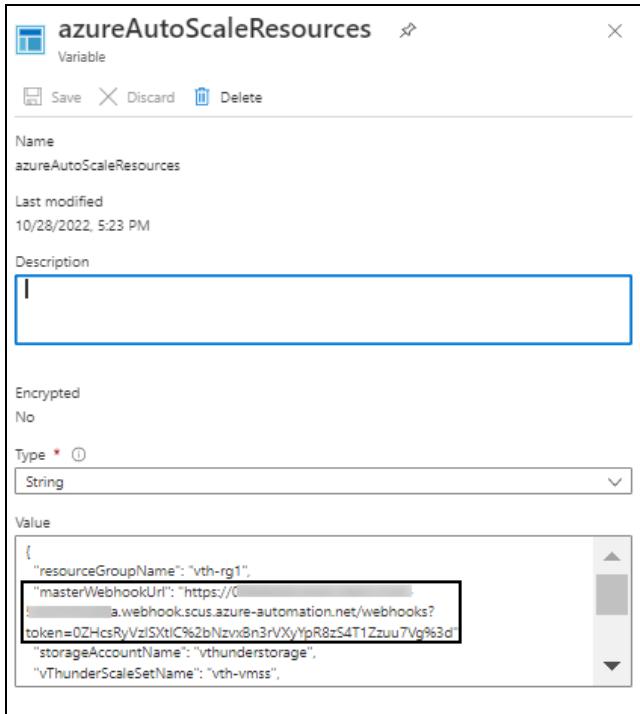
Figure 148 : Selected automation account - Variables window

| Name | Type | Value | Last modified |
|-------------------------|---------------------|---|---------------------|
| agentPrivateIp | String | 10.0.1.4 | 10/28/2022, 4:58 PM |
| autoScaleParam | String | {"minScaleInLimit": 1, "maxScaleOutLimit": 10, ...} | 10/28/2022, 4:58 PM |
| azureAutoScaleResources | String | {"resourceGroupName": "Vth-rg1", "masterWeb...} | 10/28/2022, 5:23 PM |
| clientSecret | Unknown (encrypted) | ***** | 10/28/2022, 4:59 PM |
| glmParam | Unknown (encrypted) | ***** | 10/28/2022, 4:58 PM |
| slbParam | String | {"vip_port": {"value": [{"port-number": 53, "ser...}} | 10/28/2022, 4:58 PM |
| ssiParam | Unknown (encrypted) | ***** | 10/28/2022, 4:58 PM |
| vCPUUsage | Object | 0 | 10/28/2022, 4:58 PM |
| vThunderIP | String | {"70.37.82.61": null} | 10/28/2022, 5:27 PM |

3. Select the **azureAutoScaleResources variable.**

The **azureAutoScaleResources** variable window is displayed.

Figure 149 : AzureAutoScaleResources variable window



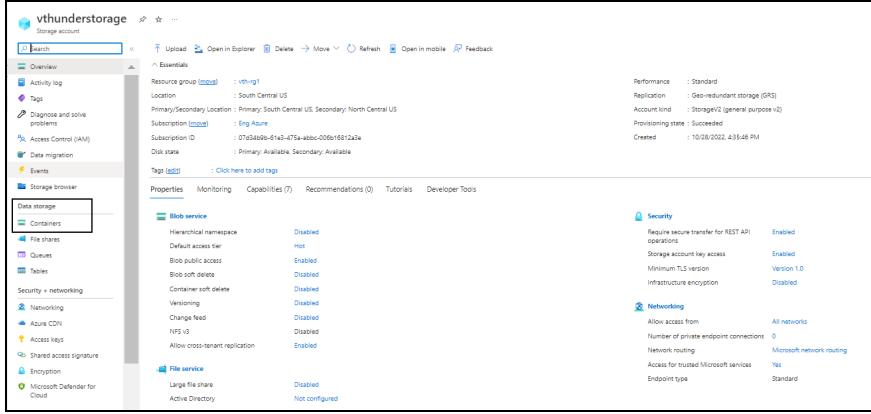
- Verify the master webhook URL in the **Value** field.

Verify the SSL File availability

To verify the availability of SSL file, perform the following steps:

- From **Home**, navigate to **Azure Services > Storage Accounts > <storage_account_name>**.
The selected storage account - Overview window is displayed.

Figure 150 : Selected storage account - Overview window



Storage account

Essentials

- Resource group (local) : vth-rg1
- Location : South Central US
- Primary/Secondary Location : Primary: South Central US; Secondary: North Central US
- Subscription (local) : Eng Azure
- Subscription ID : 07d3a0de-41a3-475a-abcc-000916812a4
- Disk state : Primary: Available, Secondary: Available
- Tags (local) : 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

- Return secure transfer for REST API operations : Enabled
- Storage account key access : Enabled
- Minimum TLS version : Version 1.0
- Infrastructure encryption : Disabled

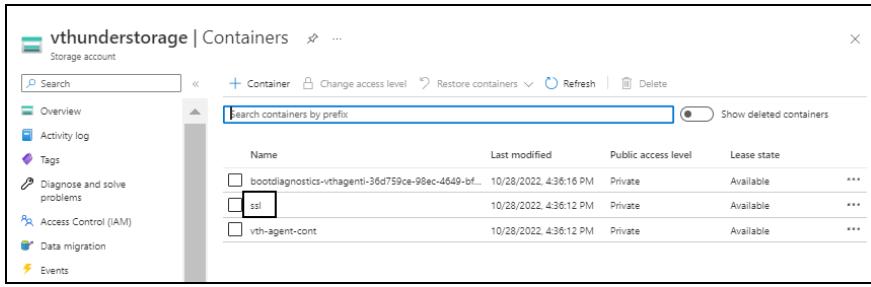
Networking

- 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

2. Click **Containers** from the left **Data Storage** panel.

The selected storage account - Containers window is displayed.

Figure 151 : Selected storage account - Containers window



Storage account

Containers

Overview **Activity log** **Tags** **Diagnose and solve problems** **Access Control (IAM)** **Data migration** **Events**

Search **Container** **Change access level** **Restore containers** **Refresh** **Delete**

Search containers by prefix

Name **Last modified** **Public access level** **Lease state**

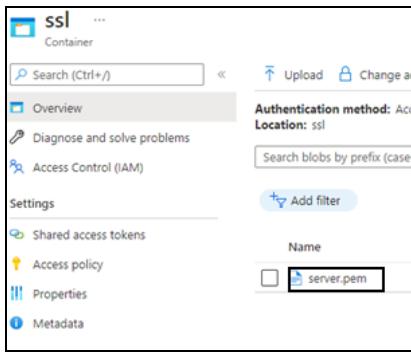
| | | | |
|---|------------------------|---------|-----------|
| bootdiagnostics-ithagent-36d759ce-98ec-4649-bf... | 10/28/2022, 4:36:16 PM | Private | Available |
| ssl | 10/28/2022, 4:36:12 PM | Private | Available |
| vth-agent-cont | 10/28/2022, 4:36:12 PM | Private | Available |

Show deleted containers

3. Select the SSL container.

The SSL container window is displayed.

Figure 152 : SSL Container window



Container

Overview

Authentication method: Access Location: ssl

Search (Ctrl+ /) **Upload** **Change access level**

Search blobs by prefix (case sensitive)

Add filter

Name

| |
|------------|
| server.pem |
|------------|

4. Verify if the SSL config file is listed. Here, the SSL config file is **server.pem**.

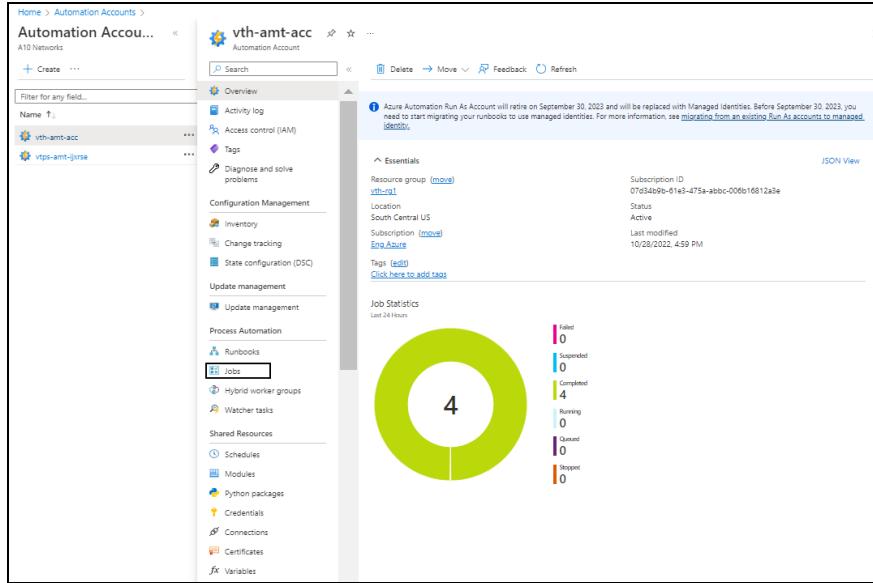
Verify the Runbook Jobs creation

To verify the creation of runbook jobs, perform the following steps:

- From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.

The selected automation account - Overview window is displayed.

Figure 153 : Selected automation account - Overview window



- Click **Jobs** from the left **Process Automation** panel.

The selected automation account - Jobs window is displayed.

Figure 154 : Selected automation account - Jobs window

| Runbook | Job created | Status | Run on | Last status update |
|--------------------|------------------------|-------------|--------|------------------------|
| SSL-Config | 8/25/2022, 12:05:48 PM | ✓ Completed | Azure | 8/25/2022, 12:06:40 PM |
| Event-Config | 8/25/2022, 12:05:48 PM | ✓ Completed | Azure | 8/25/2022, 12:06:33 PM |
| SLB-Config | 8/25/2022, 12:05:48 PM | ✓ Completed | Azure | 8/25/2022, 12:06:28 PM |
| Master-Runbook | 8/25/2022, 12:05:14 PM | ✓ Completed | Azure | 8/25/2022, 12:06:28 PM |
| QoS-Reserve-Config | 8/25/2022, 12:05:14 PM | ✓ Completed | Azure | 8/25/2022, 12:06:21 PM |
| QoS-Config | 8/25/2022, 12:05:51 PM | Completed | Azure | 8/25/2022, 12:06:03 PM |

- Verify if all the runbook jobs have completed status.

The master runbook automatically triggers all the jobs one-by-one.

NOTE:

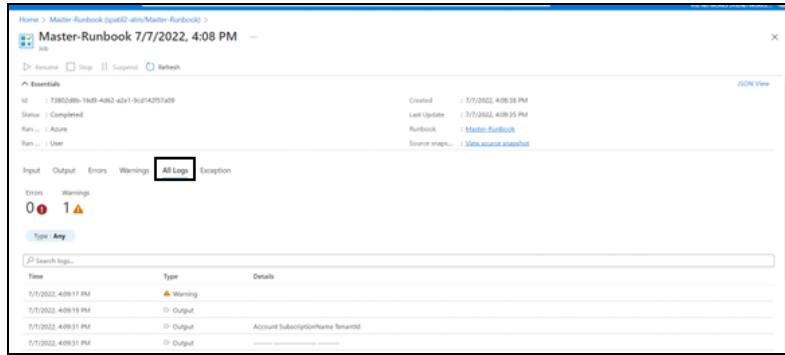
It may take the system a few minutes to display the completed status.

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 155 : 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:

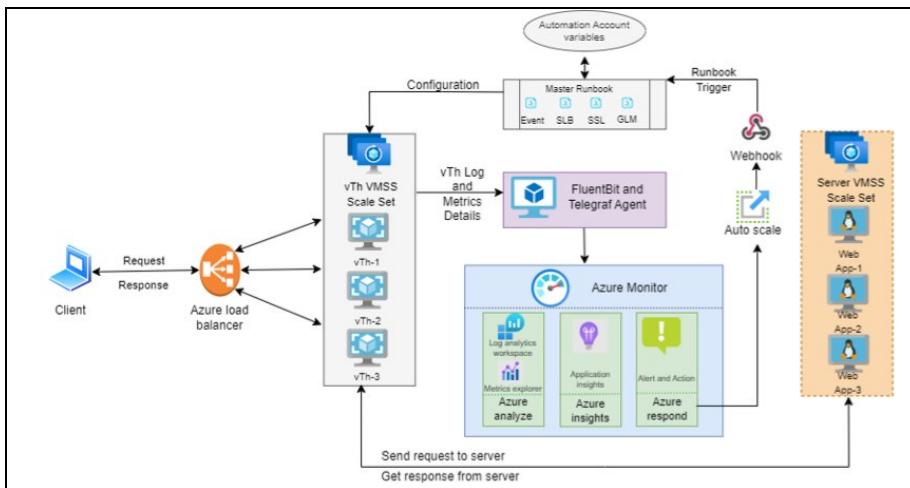
- CPU utilization metrics can be collected by the Custom Azure functions. The function periodically maintains vThunder CPU Utilization.
- AutoScaling can be done as per the automation account threshold configuration with variable name **ThresholdForScaleOut** and **ThresholdForScaleIn** for Scale Out 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 156](#) 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 156 : 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

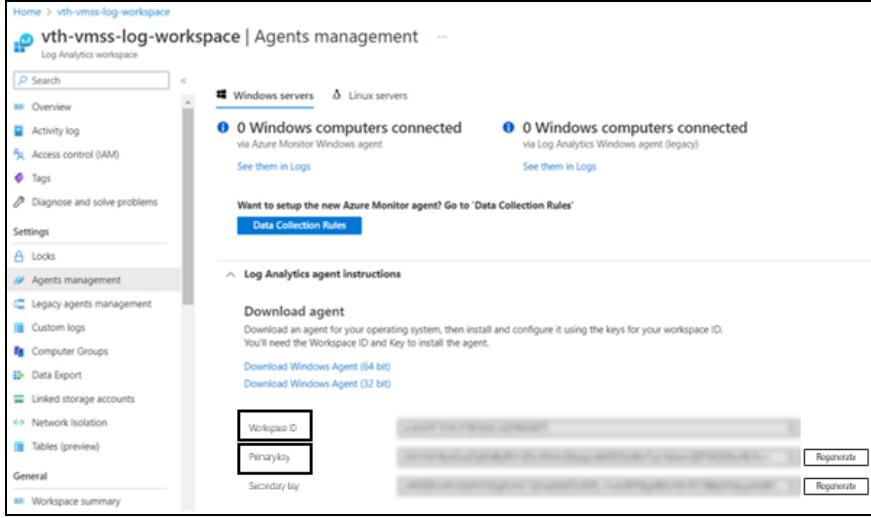
To configure autoscaling and log monitoring using the PowerShell template, perform the following steps:

1. Navigate to the folder where you have downloaded the PowerShell template and open PS_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 157 : Agents management window

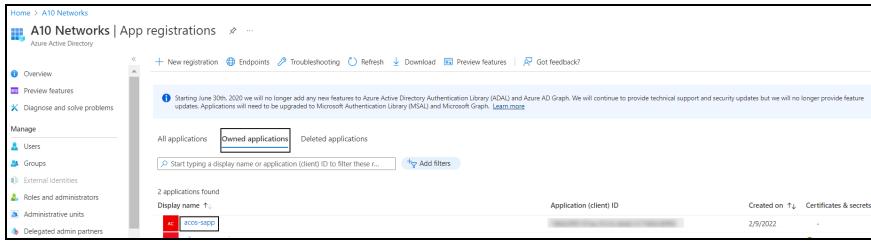


3. Update client ID, tenant ID, and client secret.

```
(cat /etc/environment; echo "AZURE_CLIENT_ID=10724xxx-xxxx-xxxx-xxxx-xxxx-xxxxc14726d"; echo "AZURE_TENANT_ID=91d27xxx-xxxx-xxxx-xxxx-xxxxbf81fcbb2f"; echo "AZURE_CLIENT_SECRET=9-xxx~jxxOREVyxXXXXHNxxxOwv_xxxxxxZLIYxxx")
```

You can get these values from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application_name>**.

Figure 158 : 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 159 : Selected application insight - Overview window

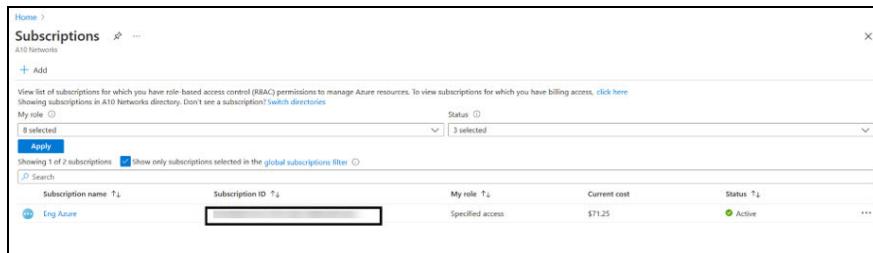


5. Navigate to the folder where you have downloaded the PowerShell template > plugins > telegraf > plugins > inputs > customplugin and open **get_cpu_param.json** file with a text editor to configure the CPU parameters.

```
{
    "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 160 : Subscriptions window



6. Verify if all the configurations in the **PS_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 PowerShell template.
2. Run the following command to create fluentbit and telegraf agents in VM:

```
PS C:\Users\TestUser\Templates> .\PS_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.

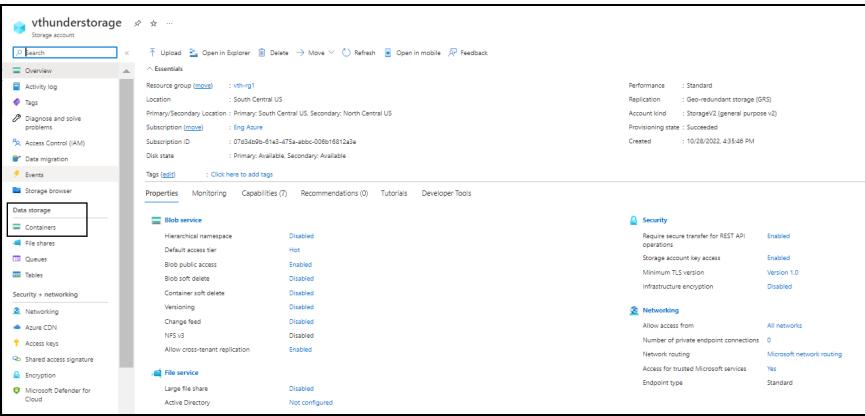
Verify Log Agent file upload

To verify if the log agent file is uploaded, perform the following steps:

- From **Home**, navigate to **Azure Services > Storage Accounts > <storage_account_name>**.

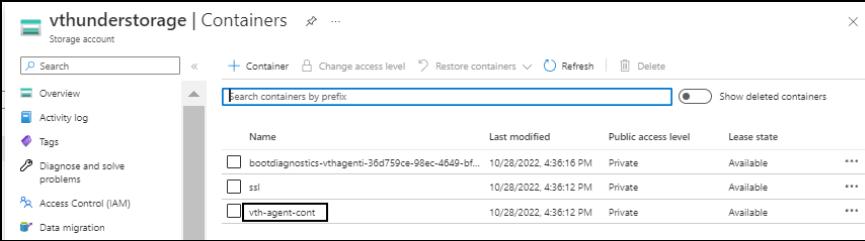
The selected storage account - Overview window is displayed.

Figure 161 : Selected storage account - Overview window



- Click **Containers** from the left Data Storage panel.

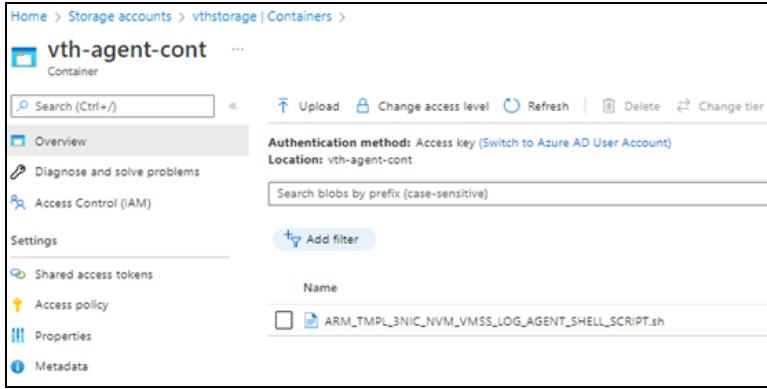
The selected storage account - Containers window is displayed.



- Select the agent container.

The agent container window is displayed.

Figure 162 : Agent container window



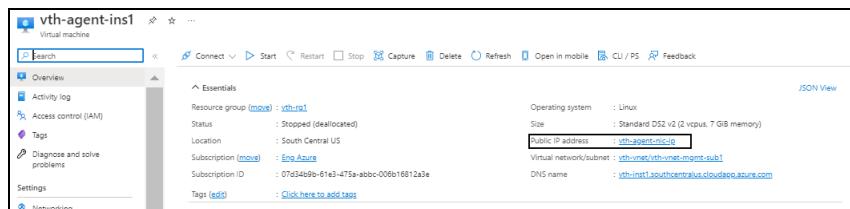
- Verify if PS_TMPL_3NIC_NVM_VMSS_LOG_AGENT_SHELL_SCRIPT.sh file is uploaded.

Access vThunder Agent using CLI

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

- Open PuTTY.
- 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 163 : Virtual machine - Agent instance window



- Click Open.
- In the active PuTTY session, enter the following:

```
login as: vth-user <---adminUsername value configured in PS_TMPL_3NIC_
NVM_VMSS_PARAM.json--->
Using keyboard-interactive authentication.
```

```

Password: vth-Password <---adminPassword value configured in PS_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.

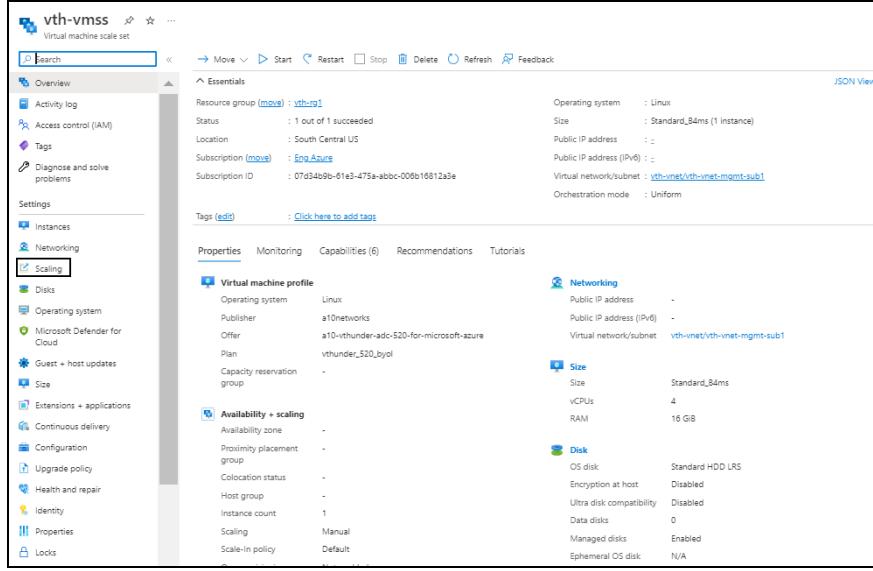
Create Autoscale Rule

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.

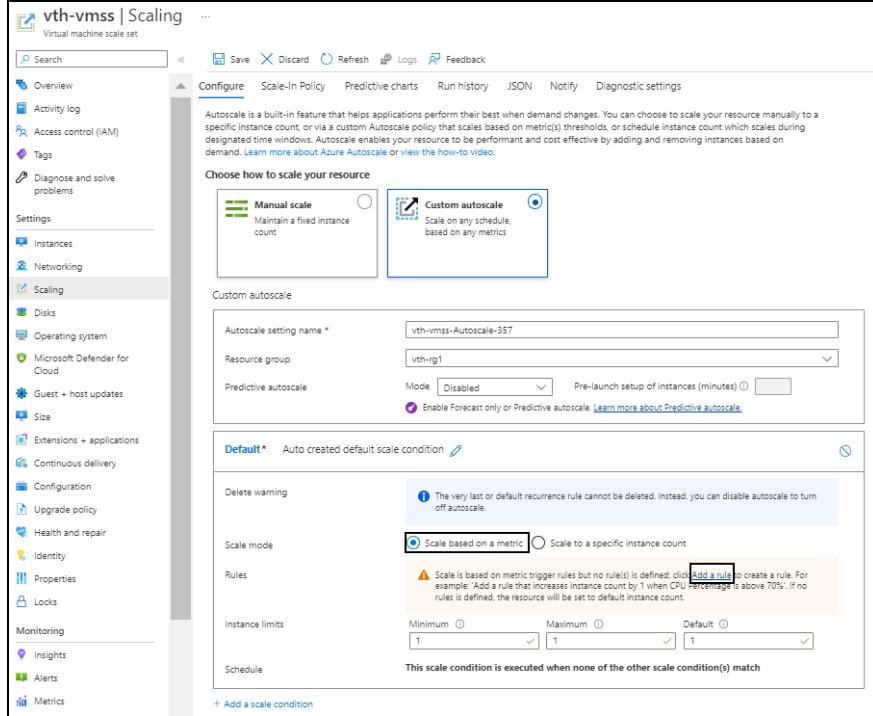
Figure 164 : Selected VMSS - Overview window



2. Click **Scaling** from the left **Settings** panel.

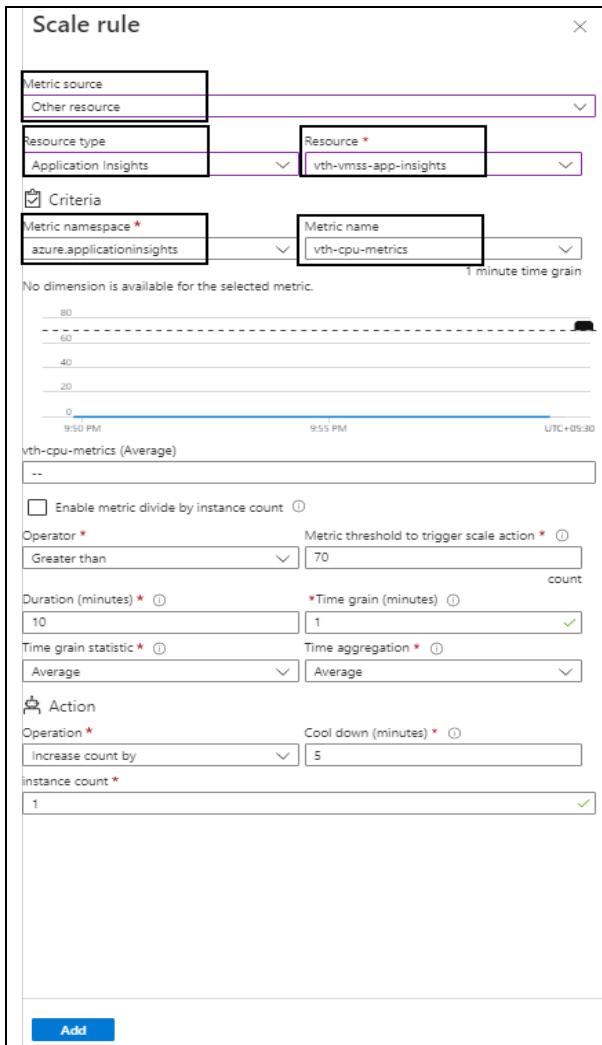
The selected vmss - Scaling window is displayed.

Figure 165 : Selected VMSS - Scaling window



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.

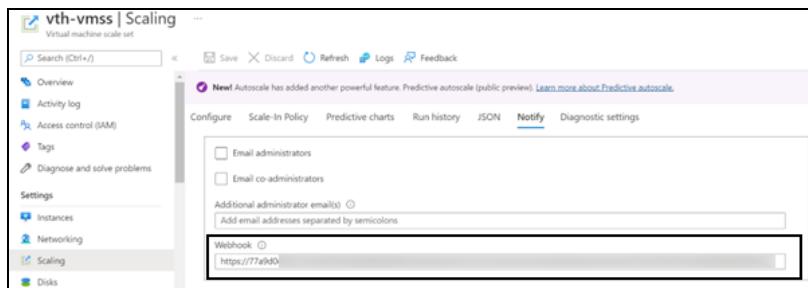
Figure 166 : Scale rule window



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**.

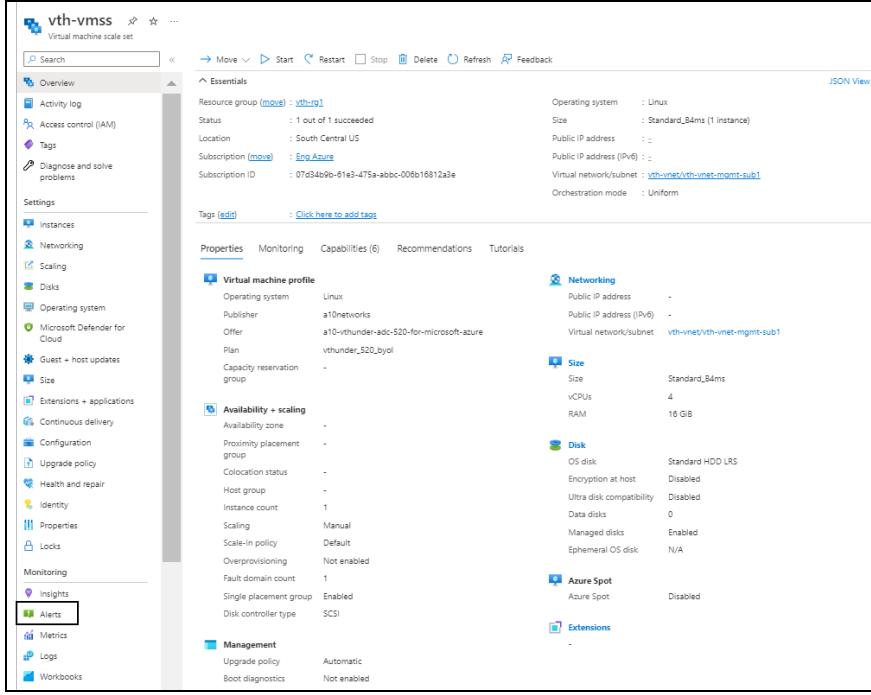
Figure 167 : Selected VMSS - Scaling window - Notify tab



Create Autoscale Alert

- From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.
The selected vmss - Overview window is displayed.

Figure 168 : Selected VMSS - Overview window



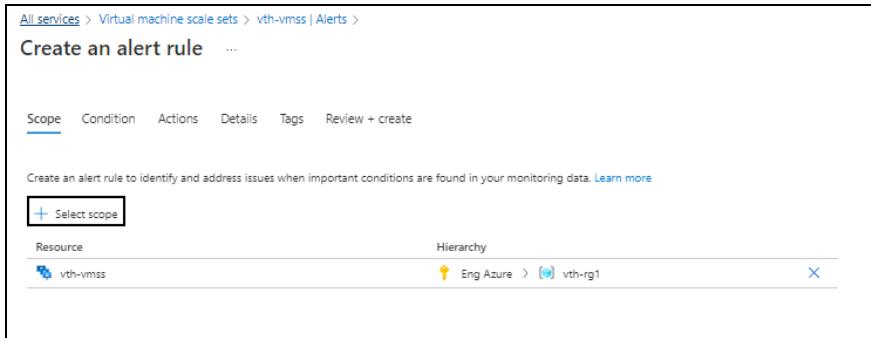
2. Click **Alerts** from the left **Monitoring** panel.
- The selected vmss - Alerts window is displayed.

Figure 169 : Selected VMSS - Alerts window



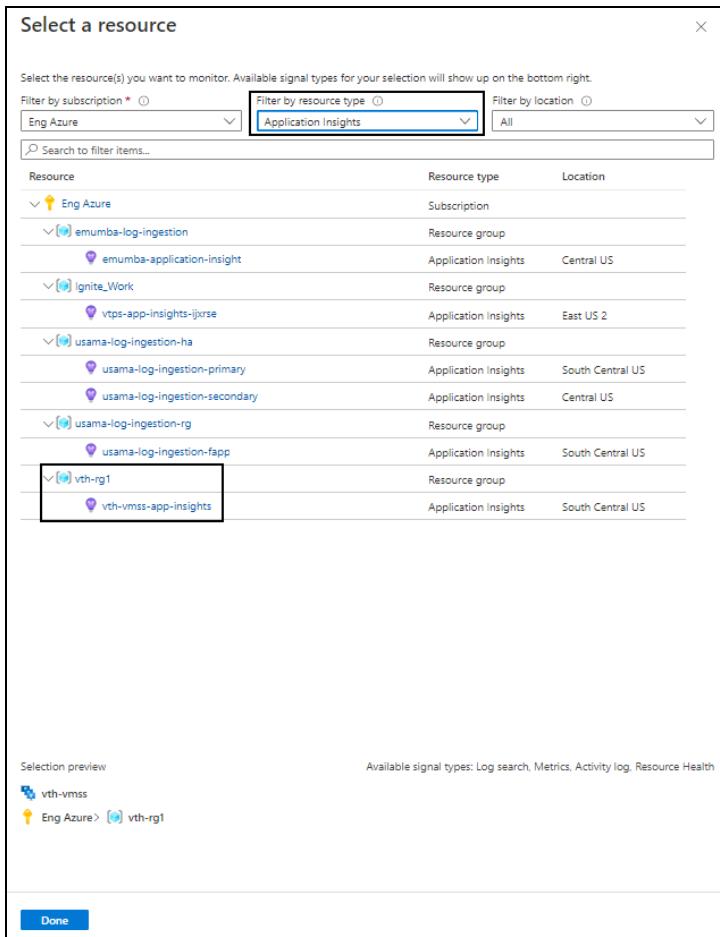
3. Click **Create > Alert rule**.
- The Create an alert rule - Scope window is displayed.

Figure 170 : Create an alert rule window - Scope tab



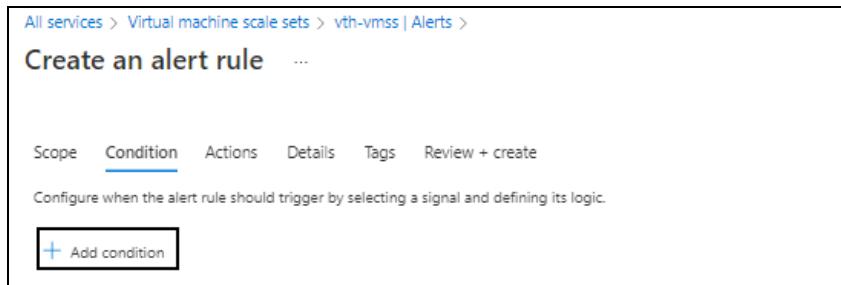
4. Click **Select scope** in the **Scope** tab.
 The **Select a resource** window is displayed.

Figure 171 : Select a resource window



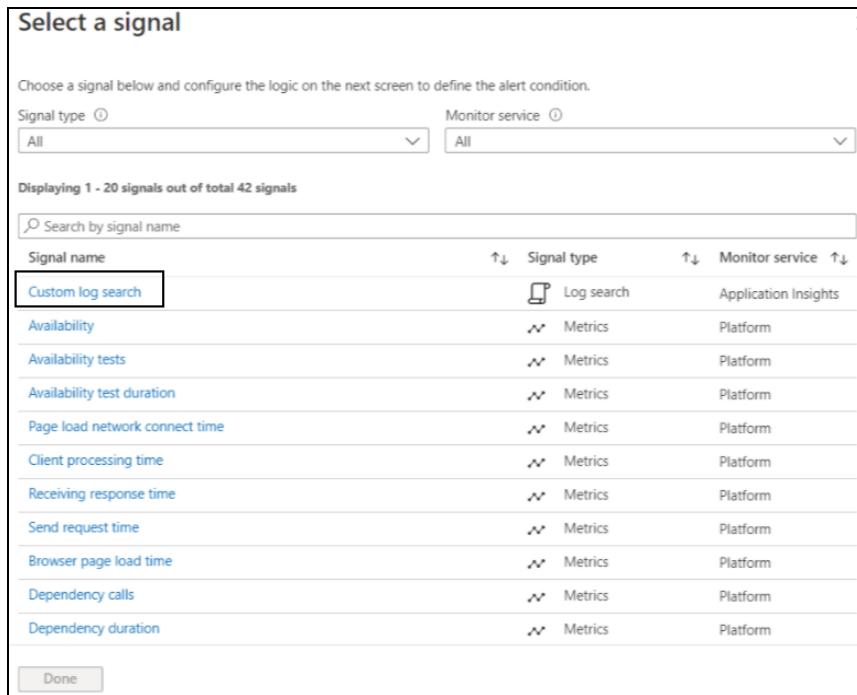
5. From **Filter by resource type**, select **Application Insights**.
The resource group having application insight resources are displayed.
6. Select the required application insight resource and click **Done**.
The selected application insight resource is listed under the alert rule scope.
7. Click **Next : Condition** at the bottom of the window.
The **Create an alert rule - Condition** tab window is displayed.

Figure 172 : Create an alert rule window - Condition tab



8. Click **Add condition** in the **Condition** tab.
The **Select a signal** window is displayed.

Figure 173 : Select a signal window



9. Select **Custom log search as the signal.**

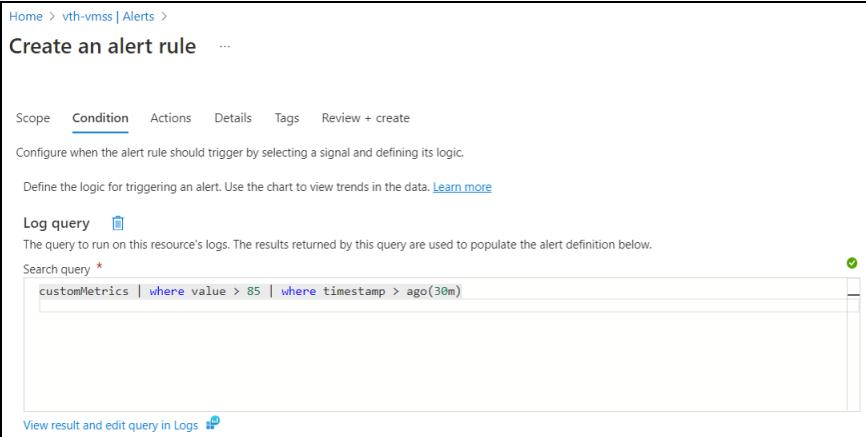
The window to define the signal's logic is displayed in the alert rule condition.

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 174 : 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.

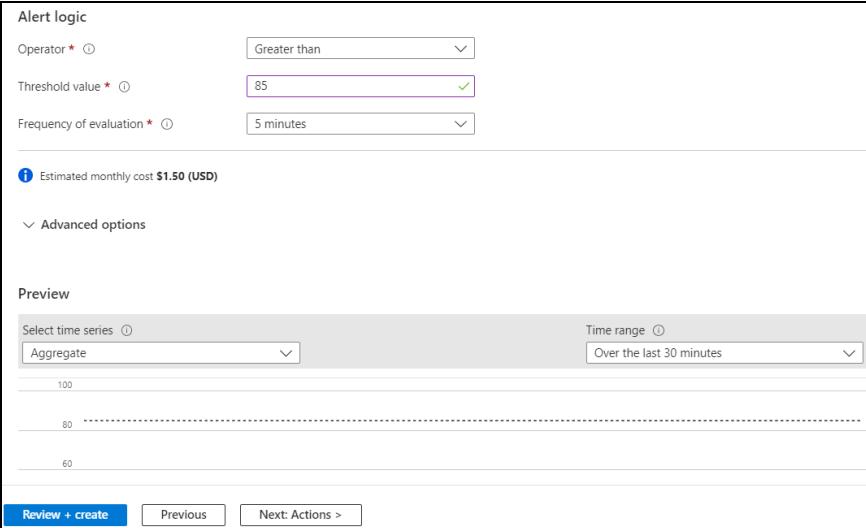
Search query * 

```
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 175 : 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  Over the last 30 minutes

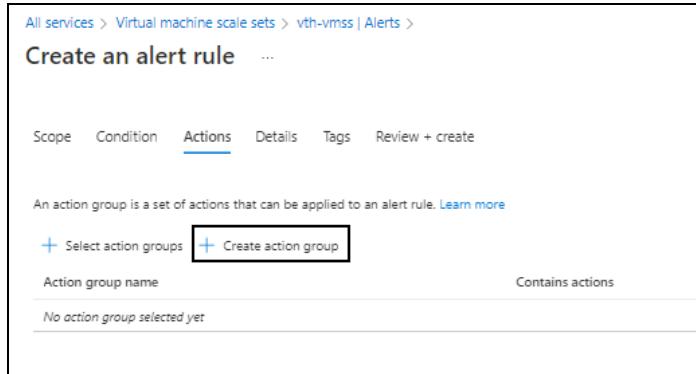
| |
|-----|
| 100 |
| 80 |
| 60 |

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

Depending upon the signal logic configuration, the monthly cost for the alert is displayed.

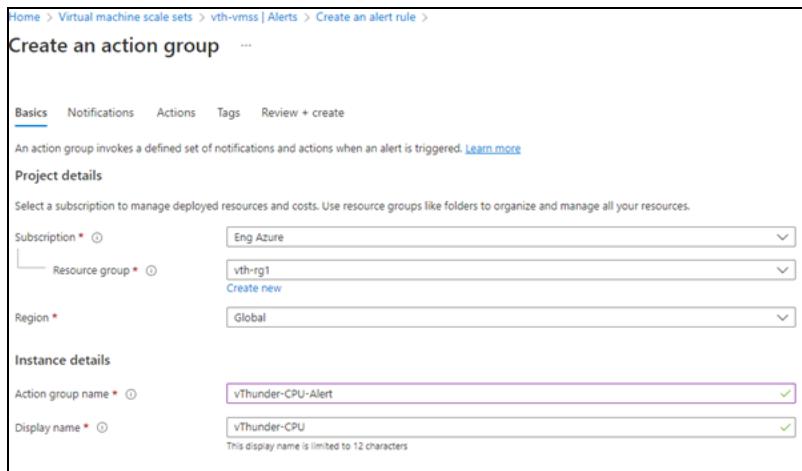
12. Click **Next : Actions** at the bottom of the window.
The **Create an alert rule - Actions** window is displayed.

Figure 176 : Create an alert rule window - Actions tab



13. Click **Create action group**.
The **Create an action group - Basics** window is displayed.

Figure 177 : 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

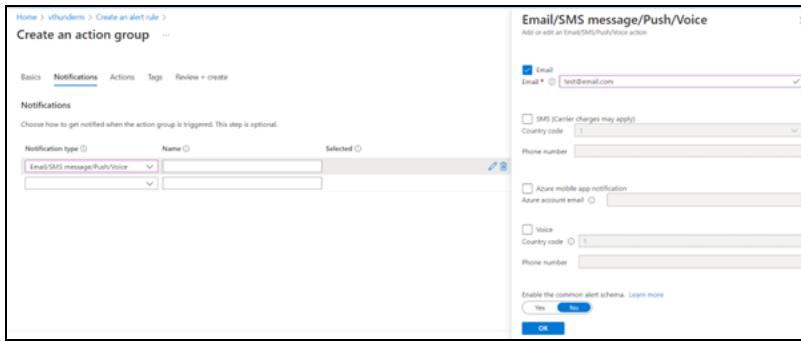
b. Click **Next : Notifications** at the bottom of the window.

The **Create an action group - Notifications** window is displayed.

c. Select the **Notification type**.

The corresponding window to configure the notification type is displayed.

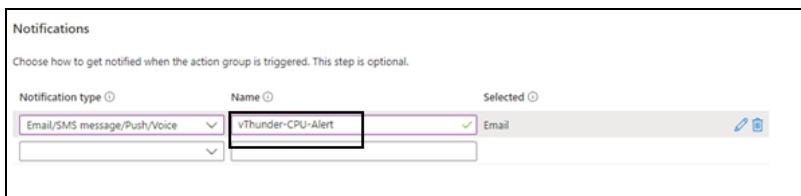
Figure 178 : Create an action group window - Notifications tab - Type



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.

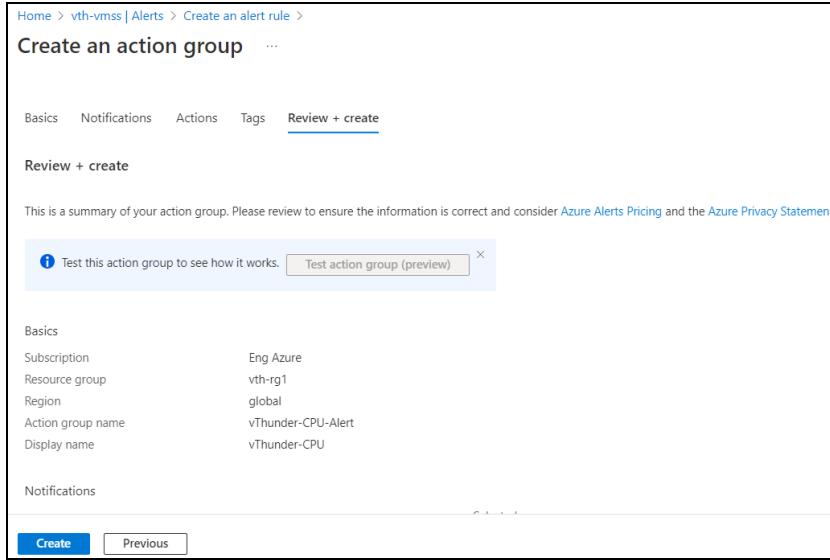
Figure 179 : Create an action group window - Notifications tab



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.

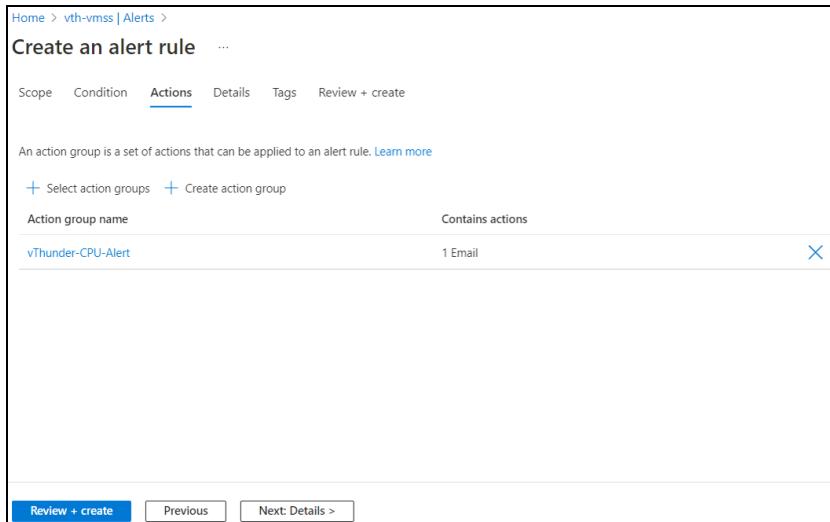
Figure 180 : Create an action group window - Review + create tab



g. Click **Create**.

The action group is listed under **Actions** tab.

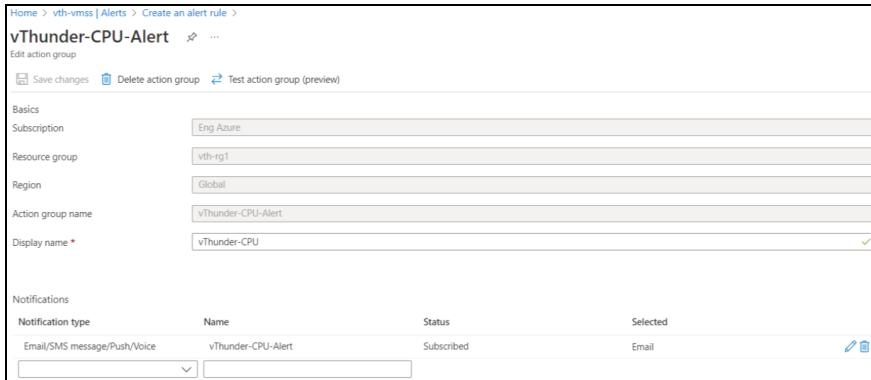
Figure 181 : Create an alert rule window - Actions tab



14. Select the recently created action group.

The selected action group is displayed.

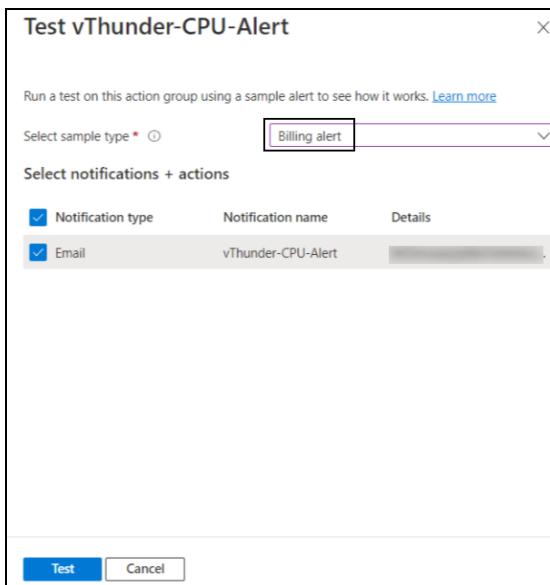
Figure 182 : Selected action group



15. Click **Test action group (preview).**

The Test <action_group_name>-alert window is displayed.

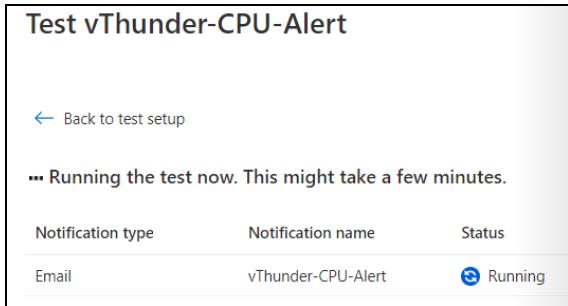
Figure 183 : Test <action_group_name>-alert window



16. Select **Billing alert as the Sample type and click **Test**.**

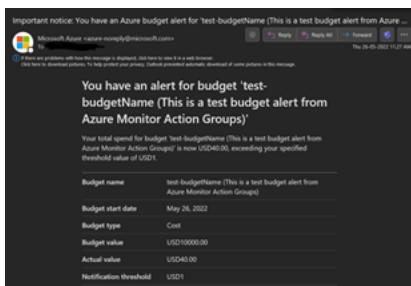
The running status for the test rule is displayed.

Figure 184 : Test <action_group_name>-alert window - Running status



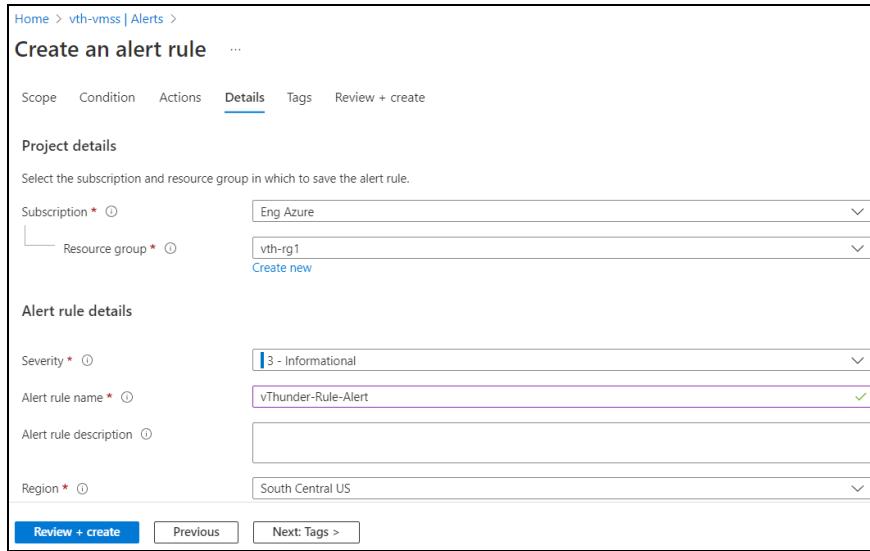
When the success status is displayed, an email notification is triggered to the email ID provided in the [Email Notification](#) step.

Figure 185 : Email Notification



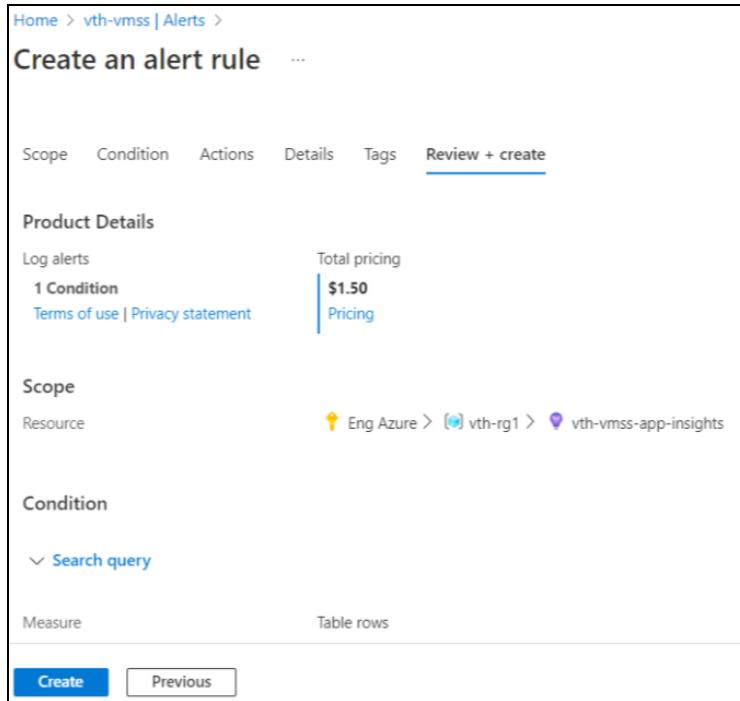
17. Click **Done** on Test <action_group_name>-alert window.
The selected action group is displayed.
18. Close the selected action group window.
The Create an alert rule - Actions window is displayed.
19. Click **Next : Details** at the bottom of the window.
The Create an alert rule - Details window is displayed.

Figure 186 : Create an alert rule window - Details tab



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 187 : Create an alert rule window - Review + create tab



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 188 : 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 189 : Selected resource group - Alert rules window

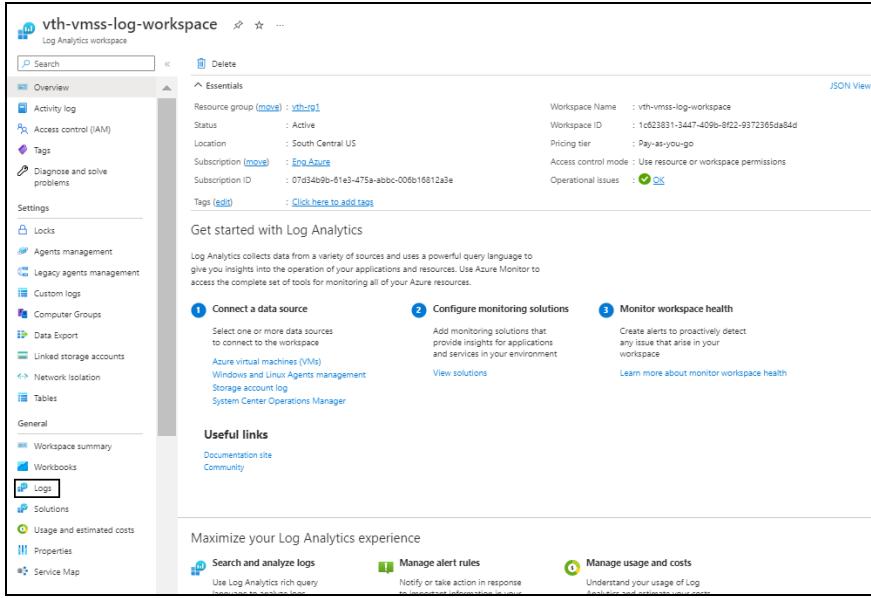
Verify Logs in Log Analytics Workspace

To verify the logs in log analytics workspace, perform the following steps:

- a. From **Home**, navigate to **Azure Services > Log Analytics workspaces > <log_workspace_name>**.

The selected log workspace - Overview window is displayed.

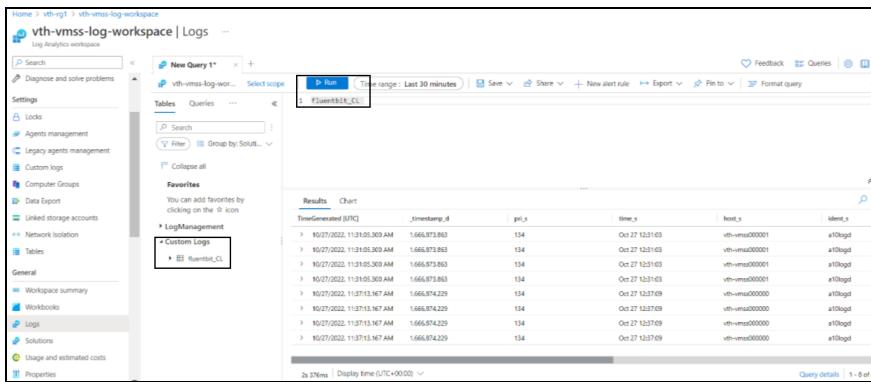
Figure 190 : Selected log workspace - Overview window



- b. Click **Logs** from the left **General** panel.

The selected log window is displayed.

Figure 191 : Selected log analytics workspace - Logs window



| TimeGenerated (UTC) | _IngestTime | _id | host | ident |
|-----------------------------|--------------|-----|-----------------|--------|
| 10/27/2022, 11:31:05,309 AM | 1466.873,863 | 134 | Oct 27 12:31:03 | a10bgd |
| 10/27/2022, 11:31:05,309 AM | 1466.873,863 | 134 | Oct 27 12:31:03 | a10bgd |
| 10/27/2022, 11:31:05,309 AM | 1466.873,863 | 134 | Oct 27 12:31:03 | a10bgd |
| 10/27/2022, 11:31:05,309 AM | 1466.873,863 | 134 | Oct 27 12:31:03 | a10bgd |
| 10/27/2022, 11:31:13,167 AM | 1466.874,229 | 134 | Oct 27 12:31:09 | a10bgd |
| 10/27/2022, 11:31:13,167 AM | 1466.874,229 | 134 | Oct 27 12:31:09 | a10bgd |
| 10/27/2022, 11:31:13,167 AM | 1466.874,229 | 134 | Oct 27 12:31:09 | a10bgd |
| 10/27/2022, 11:31:13,167 AM | 1466.874,229 | 134 | Oct 27 12:31:09 | a10bgd |

- 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**.

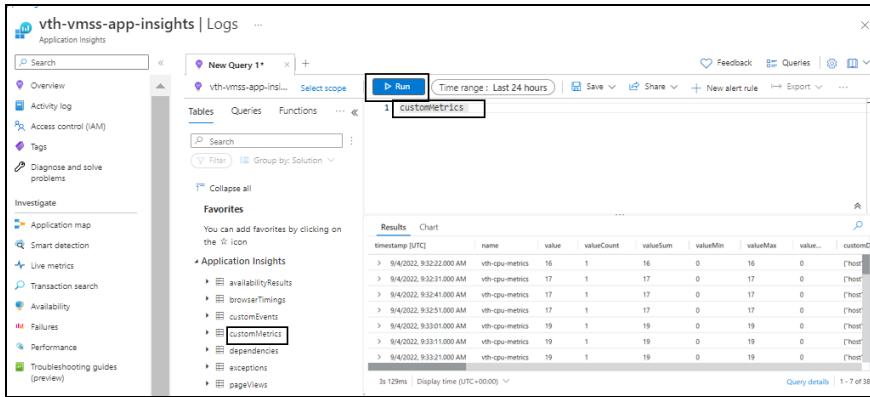
All logs are displayed in tabular format with expandable details.

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 192 : Selected application insight - Logs window



The screenshot shows the Azure Application Insights Logs interface. On the left, there's a navigation sidebar with various monitoring and diagnostic tools like Overview, Activity log, Access control (IAM), Tag, Diagnose and solve problems, Application map, Smart detection, Transaction search, Availability, Failures, Performance, and Troubleshooting guides. The main area has tabs for Tables, Queries, Functions, and a search bar. A query editor is open with the text "customMetrics". Below it, a table titled "Results" displays data from 9/4/2022. The columns are timestamp [UTC], name, value, valueCount, valueSum, valueMin, valueMax, value..., and customID. The data shows multiple entries for "vth-cpu-metrics" at different times, with values ranging from 16 to 19. At the bottom, it says "3s 129ms Display time (UTC+0000) ~" and "Query details 1 - 7 of 10".

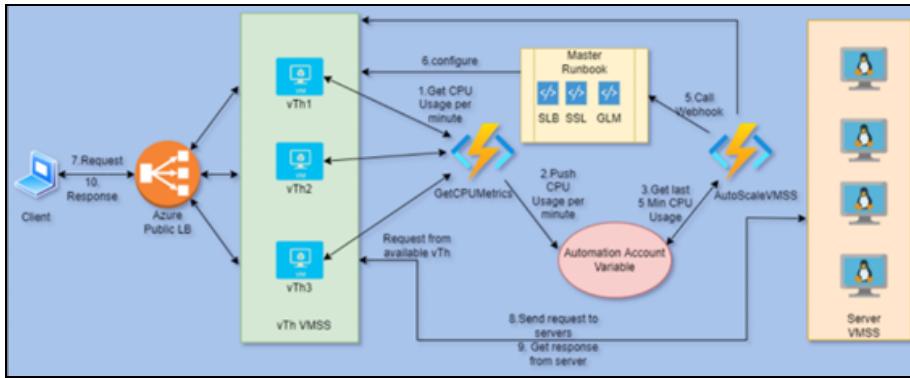
e. Click **Run**.

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 193](#) 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 193 : 3NIC-NVM-VMSS Autoscaling using Azure Functions Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Autoscale Function](#)
- [Verify Autoscale Function Creation](#)
- [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 PowerShell template and open the PS_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 PowerShell template > **AZURE_FUNCTIONS > GetMetrics.zip**.

3. Verify if all the configurations in the **PS_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 PowerShell template.
2. Run the following command to create autoscale function:

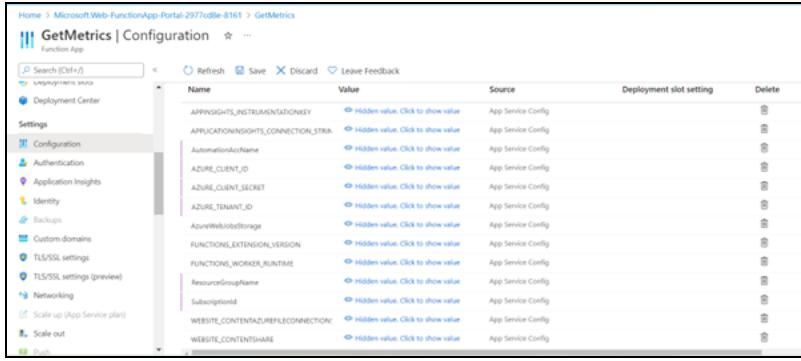
```
PS C:\Users\TestUser\Templates> .\PS_TMPL_3NIC_NVM_VMSS_FUNCTION_APP_4.ps1
```
3. Provide the updated password of existing vThunder instances and then confirm the same password when prompted.

Verify Autoscale Function Creation

To verify autoscale function creation, perform the following steps:

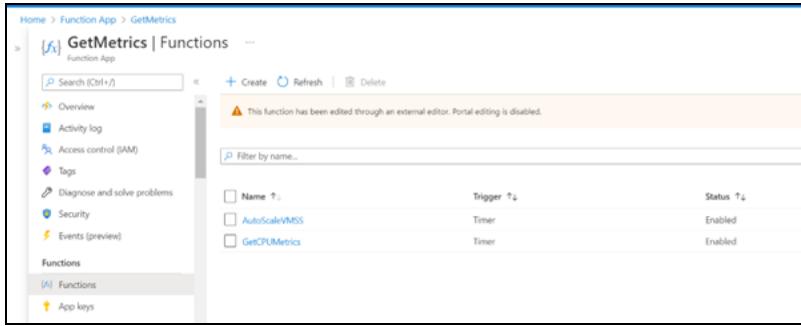
1. From **Home**, navigate to **Azure Services > Function App**.
The Function App window is displayed.
2. Select GetMetrics function from the list.
The GetMetrics function - Overview window is displayed.
3. Click **Configuration** from the left **Settings** panel.
The GetMetrics function - Configuration window is displayed.

Figure 194 : 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.



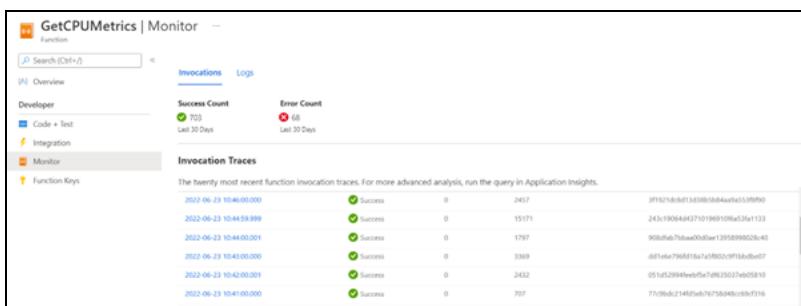
6. Verify if **AutoScaleVMSS** and **GetCPUMetrics** functions are listed.
7. Click **GetCPUMetrics**.

The GetCPUMetrics function - Overview window is displayed.

8. Click **Monitor** from the left **Developer** panel.

The GetCPUMetrics function - Monitor window is displayed.

Figure 195 : GetCPUMetrics function - Monitor window



9. Verify if the logs are generated by the functions.

On-demand Password Change

To change the password for all existing vThunder instances on-demand, perform the following steps:

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 196 : Encrypted Key and Encrypted Password



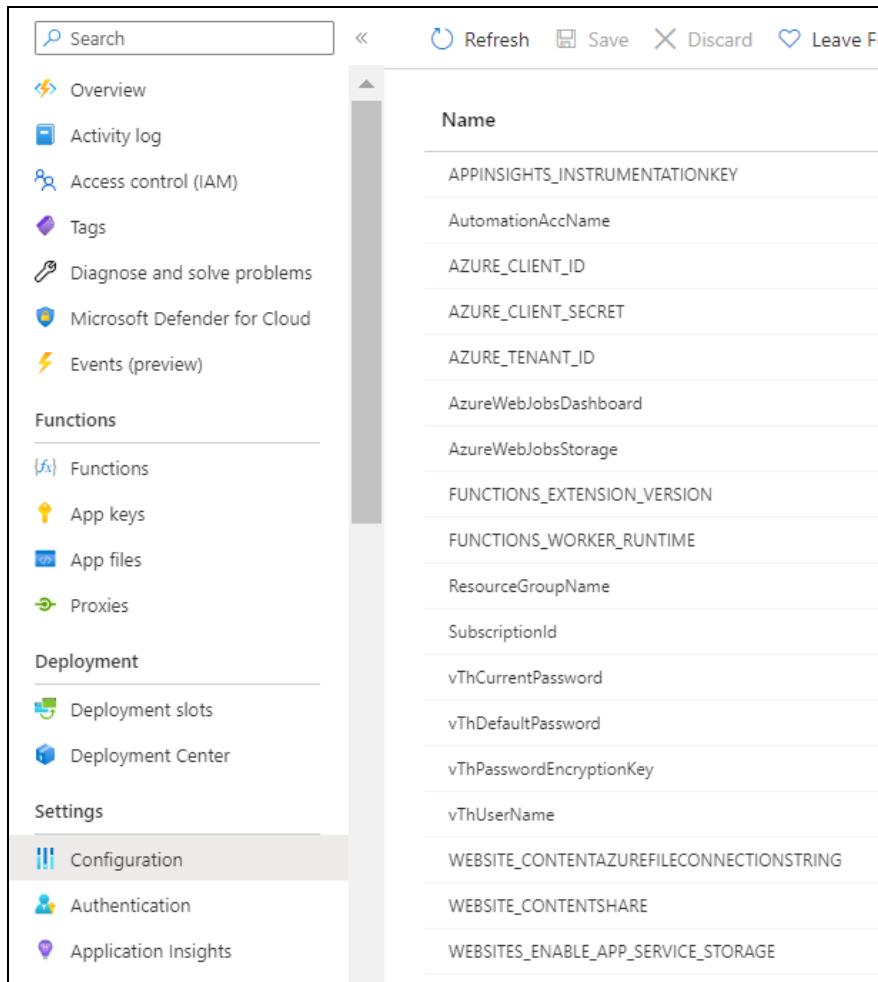
Encrypted Key
Encrypted Password

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 197 : 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:

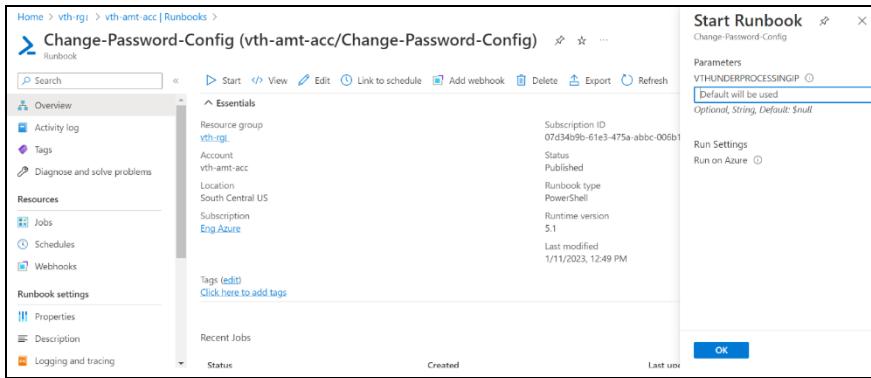
- From **Home**, navigate to **Azure Services > Automation Accounts > Variables**.

Figure 198 : On-demand Password Change Variables

| | | |
|---------------------|---------------------|-------|
| vThNewPassApplyFlag | String | True |
| vThNewPassword | Unknown (encrypted) | ***** |

- Set **vThNewPassApplyFlag** to **True**.
- Update **vThNewPassword** with the new password.
- Navigate to **Azure Services > Automation Accounts > <automation_account_name> > Runbooks**.
- Select the **Change-Password-Config** runbook and click **Start**.
- Leave the **vTHUNDERPROCESSINGIP** parameter empty so that it takes the default value.

Figure 199 : Change-Password-Config runbook



- Navigate to **Azure Services > Automation Accounts > <automation_account_name> > Jobs**.
- Verify if the **Change-Password-Config** runbook job has completed status.
- 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.

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]

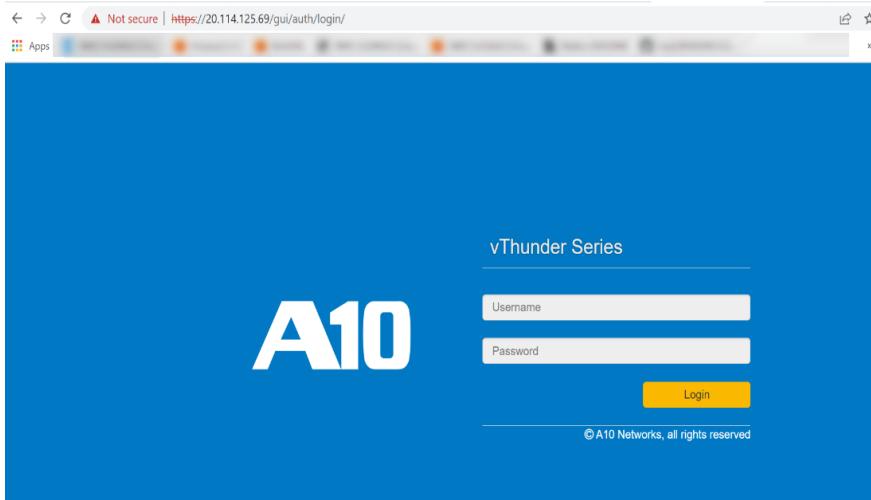
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

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 200 : 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 PowerShell 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
!
```

- 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

```

3. From vThunder Console, navigate to **Home > License History** to verify your license:

Figure 201 : License History



4. 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]

- Run the following command to verify vThunder logs sync-up configuration:

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

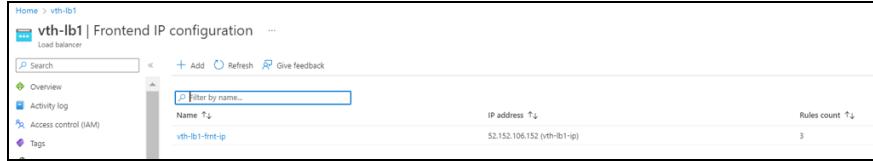
Verify Traffic Flow

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

- 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 202 : Load balancer frontend IP address



The screenshot shows a table with one row. The columns are 'Name' (vth-lb1-fnt-ip), 'IP address' (52.152.106.152 (vth-lb1-ip)), and 'Rules count' (3).

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-font-ip>
```

Example

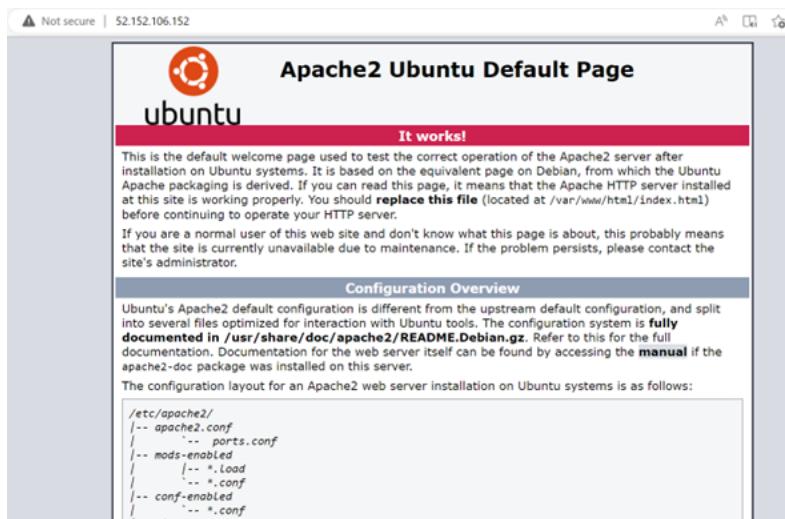
```
curl 52.152.106.152
```

Verify if a response is received.

or

Copy the load balancer frontend IP address in the browser.

Figure 203 : API response



The screenshot shows the Apache2 Ubuntu Default Page. It includes a heading 'Apache2 Ubuntu Default Page' with the Ubuntu logo, a 'It works!' message, a 'Configuration Overview' section, and a file tree diagram of the Apache configuration directory structure.

Verify if the API response is received.

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.

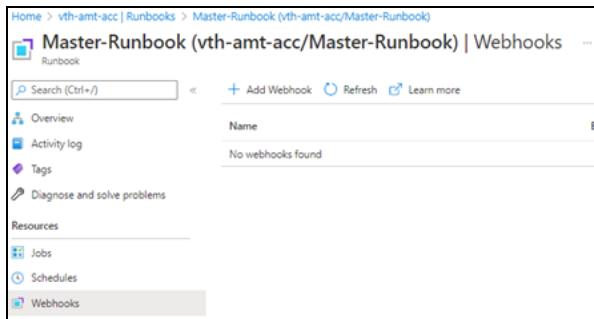
Given below is an example of the error:

```
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 204 : 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

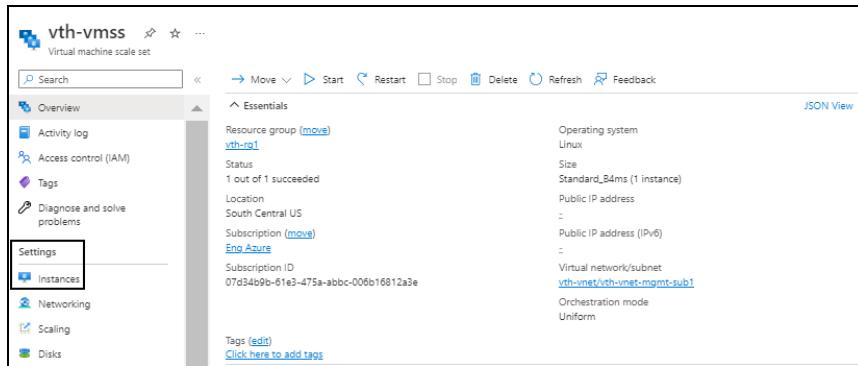
If the Runbook job has failed or is not working, re-run the master runbook.

To re-run the master runbook, perform the following steps:

- From **Azure Portal**, navigate to **Azure Services > Virtual machine scale sets > <vmss_name>**.

The selected vmss - Overview window is displayed.

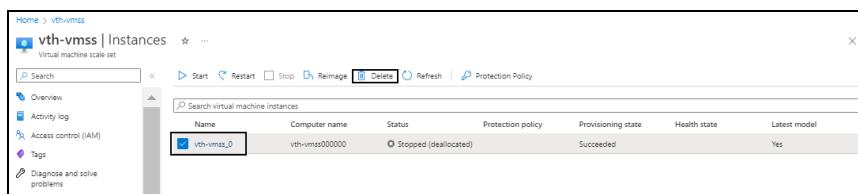
Figure 205 : Selected vmss - Overview window



- Click **Instances** from the left **Settings** panel.

The selected vmss - Instances window is displayed.

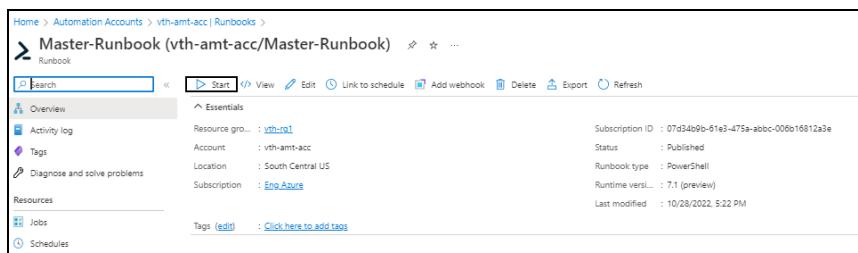
Figure 206 : Selected vmss - Instances window



- Click **Delete** to delete all the vmss instances.

- From the Master-Runbook Job window, click **Start** to re-run the master runbook.

Figure 207 : 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

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/diagnosticSettings/read",
"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/diagnosticSettings/write",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/read",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/join/action",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPools/read",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPools/write",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPools/delete",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPools/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/logDefinitions/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:

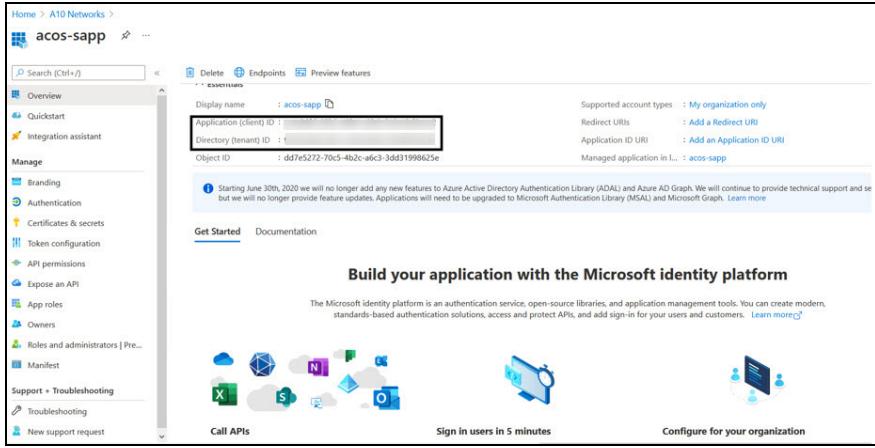
- [Use an existing Access Key](#)
- [Create a new Access Key](#)

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 208 : 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-8cxx-41xx-82xx-3d1bxxxxxxx'
```

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](#)

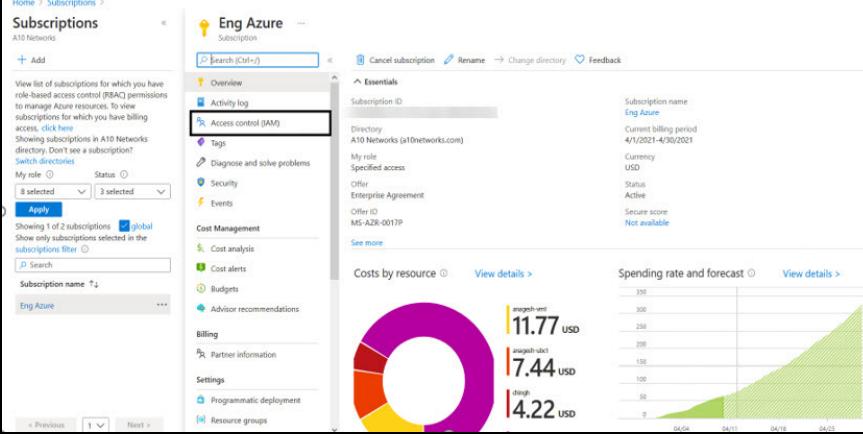
Create a Role

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 209 : Subscriptions - Overview window



The screenshot shows the Azure Subscriptions - Overview window for the 'Eng Azure' subscription. The left sidebar lists various subscription management options like 'Activity log', 'Tags', 'Diagnose and solve problems', etc. The main area displays subscription details such as 'Subscription name: Eng Azure', 'Current billing period: 4/1/2021-4/30/2021', and 'Status: Active'. It also shows spending data: 'Costs by resource' (epoch-ent: 11.77 USD, epoch-obj: 7.44 USD, epoch: 4.22 USD) and a 'Spending rate and forecast' chart showing a projected increase from \$0 to approximately \$350 over the next month.

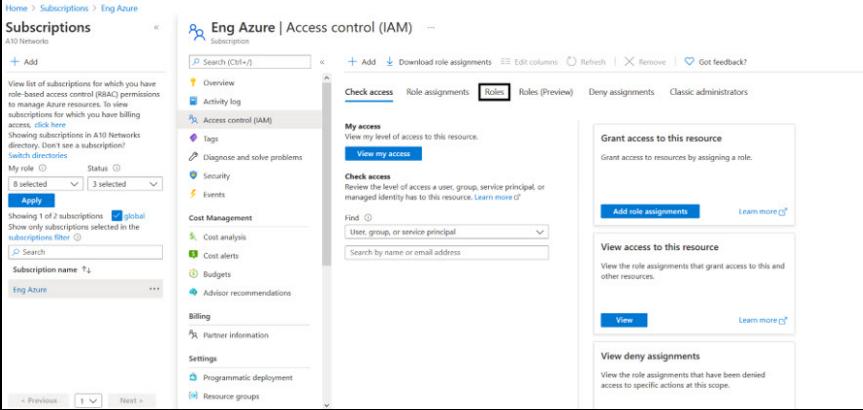
- Click **Access control (IAM)** from left panel.

The selected Subscription - Access control (IAM) window is displayed.

- Select the **Roles** tab.

The Roles window is displayed.

Figure 210 : Access Control - Role Window

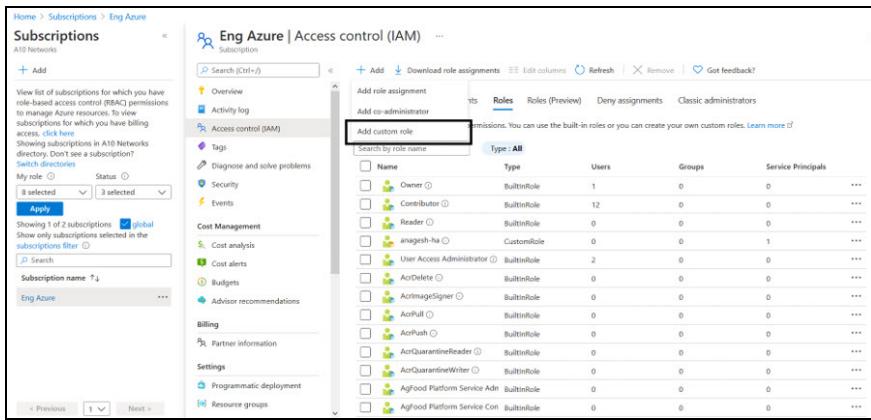


The screenshot shows the Azure Subscriptions - Access control (IAM) window for the 'Eng Azure' subscription. The left sidebar is identical to Figure 209. The main area has tabs for 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', etc. The 'Roles' tab is selected, displaying a 'Check access' section where users can 'View my access' or 'Review the level of access a user, group, service principal, or managed identity has to this resource'. It also shows sections for 'Grant access to this resource', 'View access to this resource', and 'View deny assignments'.

- Click **Add** to select **Add custom role** option.

The Create a custom role window is displayed.

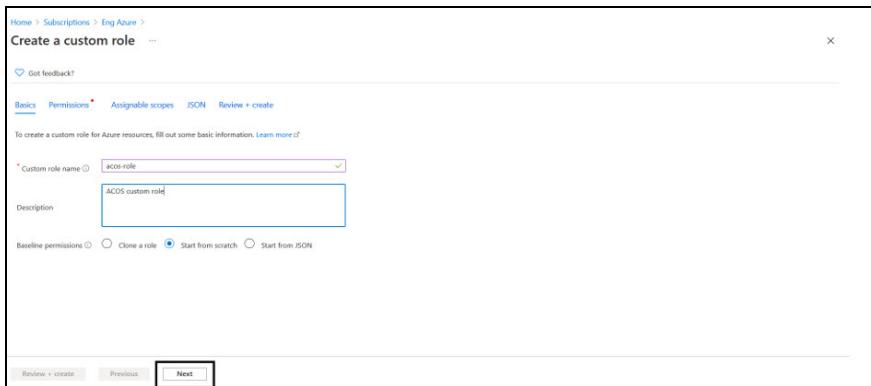
Figure 211 : Add custom role window



| Name | Type | Users | Groups | Service Principals |
|------------------------------|-------------|-------|--------|--------------------|
| Owner | BuiltInRole | 1 | 0 | 0 |
| Contributor | BuiltInRole | 12 | 0 | 0 |
| Reader | BuiltInRole | 0 | 0 | 0 |
| anagesh-ha | CustomRole | 0 | 0 | 1 |
| User Access Administrator | BuiltInRole | 2 | 0 | 0 |
| AcrDelete | BuiltInRole | 0 | 0 | 0 |
| AcrImageSigner | BuiltInRole | 0 | 0 | 0 |
| AcrPull | BuiltInRole | 0 | 0 | 0 |
| AcrPush | BuiltInRole | 0 | 0 | 0 |
| AcrQuarantineReader | BuiltInRole | 0 | 0 | 0 |
| AcrQuarantineWriter | BuiltInRole | 0 | 0 | 0 |
| AcrFood Platform Service Con | BuiltInRole | 0 | 0 | 0 |

5. Enter **Customer role name** and **Description** (optional) in the **Basics** tab.

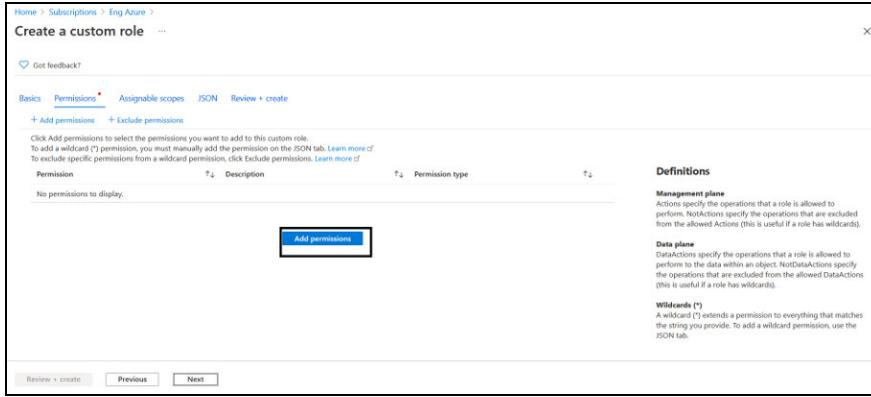
Figure 212 : Create a custom role window



6. Click **Next** at the bottom of the window.

The Permissions window is displayed.

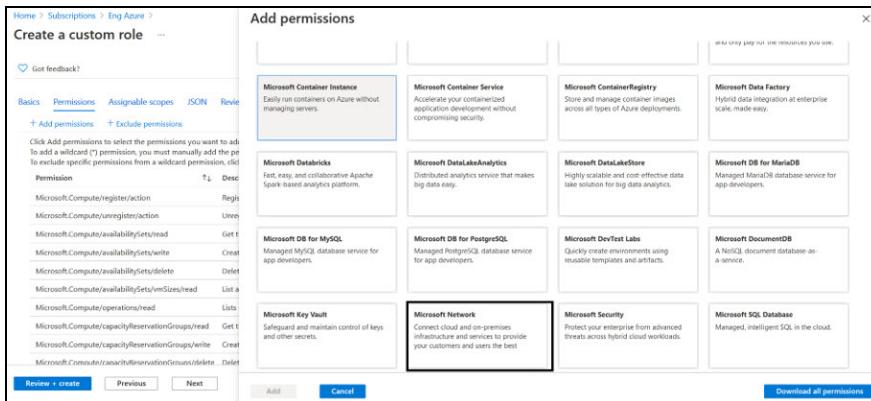
Figure 213 : Permission window



7. Click **Add Permissions** to add permissions to the custom role.

The Add Permissions window is displayed.

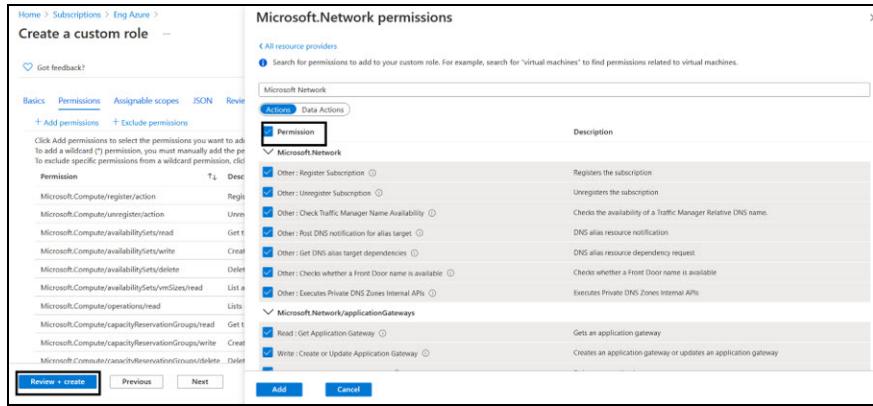
Figure 214 : Add permissions window



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 215 : 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.



9. Click **OK** to successfully create the custom role with permissions.

NOTE:

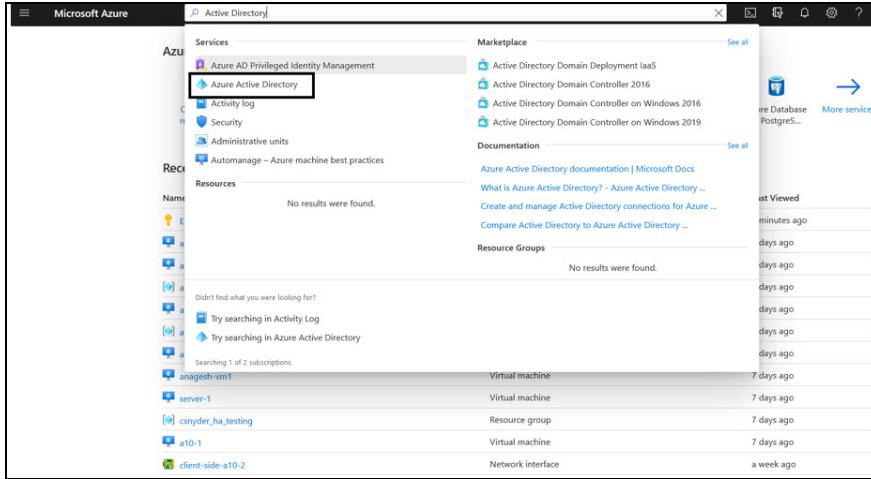
It may take the system a few minutes to display your role everywhere.

Register a Service Application

To register a service application, perform the following steps:

- From **Home**, navigate to **Azure Services > Azure Active Directory** option.

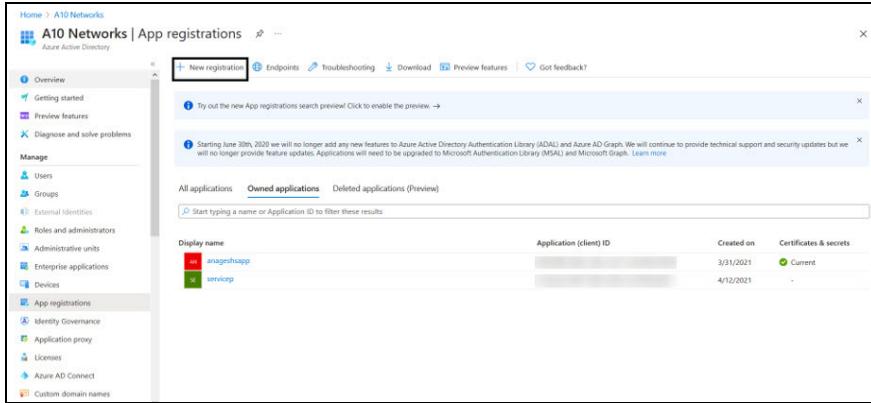
Figure 216 : Azure Active Directory window



- 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.

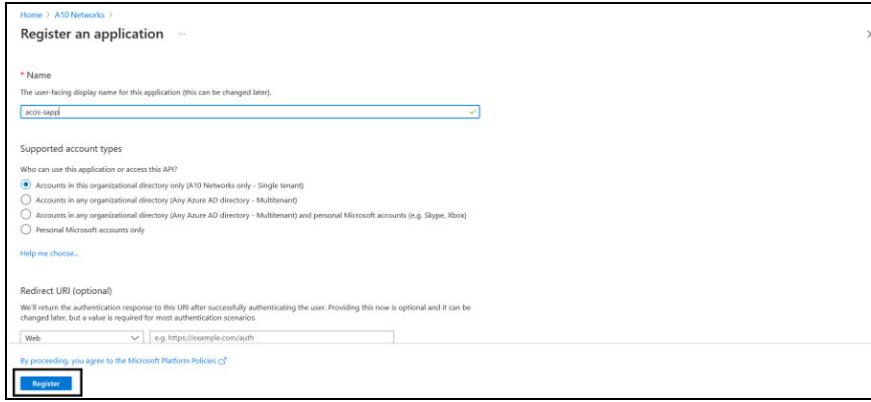
Figure 217 : App registrations window



- Click **New Registration**.

The Register an application window is displayed.

Figure 218 : Register an application window



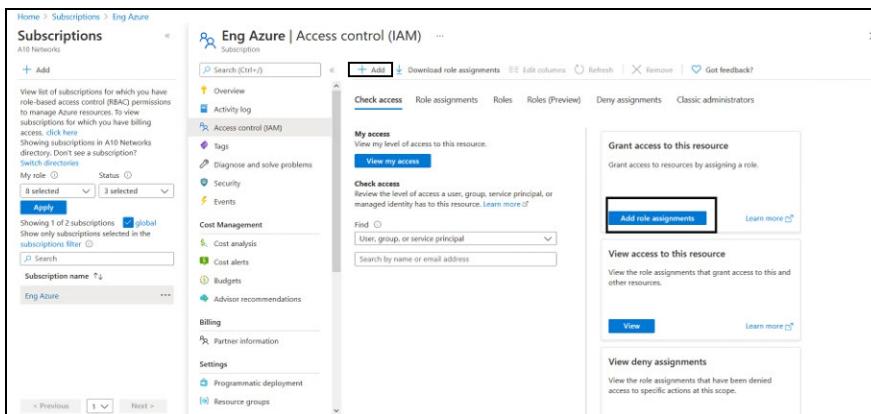
4. Enter the **Name** of the application. For example, acos-sapp.
5. Click **Register** to register the application. The application gets listed under Azure Active Directory - Apps registrations window.

Associate Service Application with a Role

To associate service application with a role, perform the following steps:

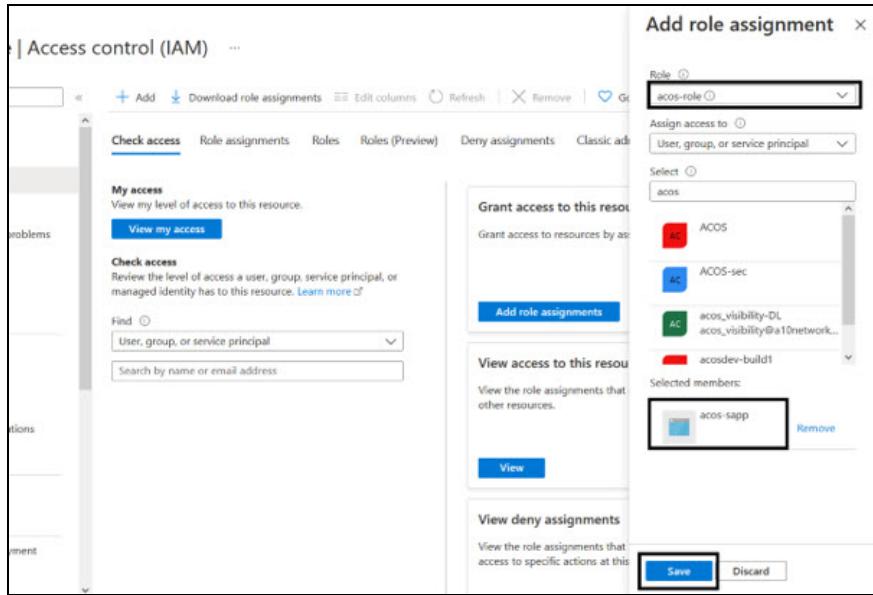
1. From **Home**, navigate to **Azure Services > Subscriptions > <subscription_name>**. The selected Subscription - Overview window is displayed. Here, the subscription is Eng Azure.
2. Click **Access control (IAM)** from left panel. The selected Subscription - Access control (IAM) window is displayed.

Figure 219 : Subscription - Access control (IAM) window



3. To assign a role to the above scope, click **Add** from the main menu options. The Add role assignment window is displayed.

Figure 220 : Add a role assignment -1



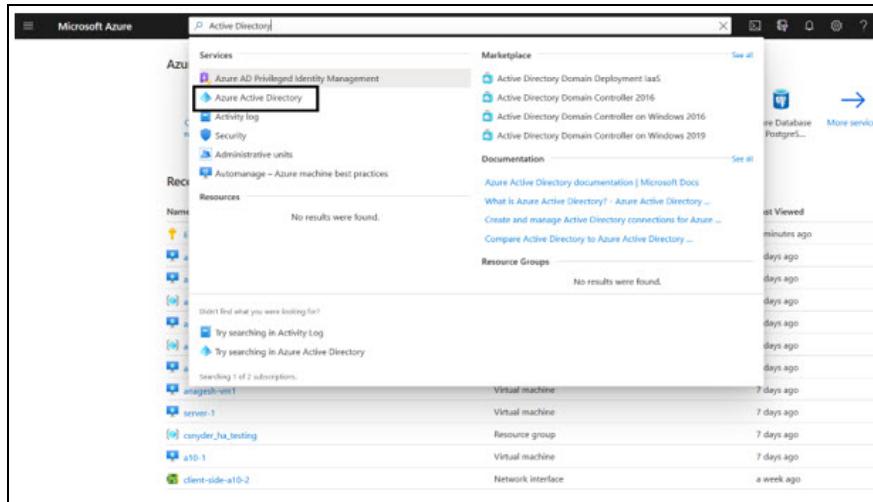
4. Select a **Role** from the drop-down list. For example, acos-role.
5. Select the required **Assign Access to** option from the drop-down list.
6. Enter a string to search and select for a name or email address. For example, acos.
7. Click the **Save** button to save the configuration.

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.

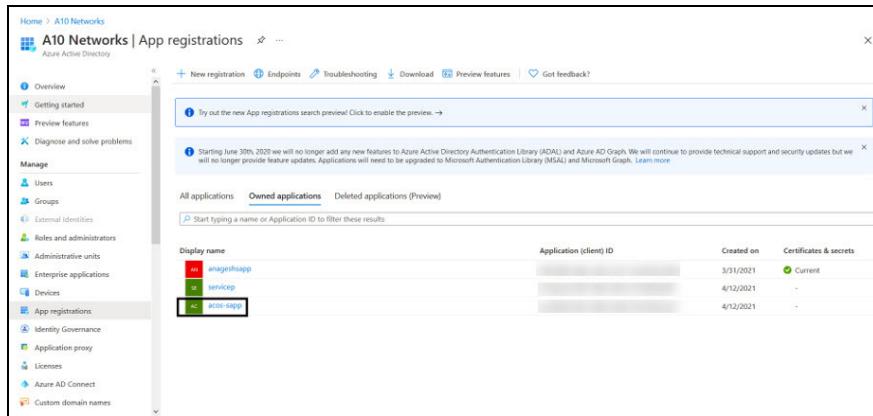
Figure 221 : Azure Active Directory - Overview window



- 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 222 : App registrations - Overall applications window



- Select a service application from list of applications.

The selected service application window is displayed.

- Select the **Certificates & secrets** option from the left Manage navigation pane.

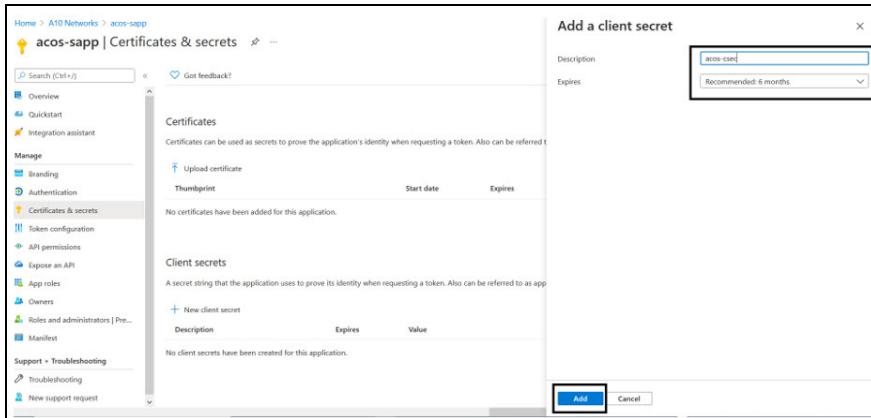
Theacos sapp - Certificates & secrets window is displayed.

- 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.

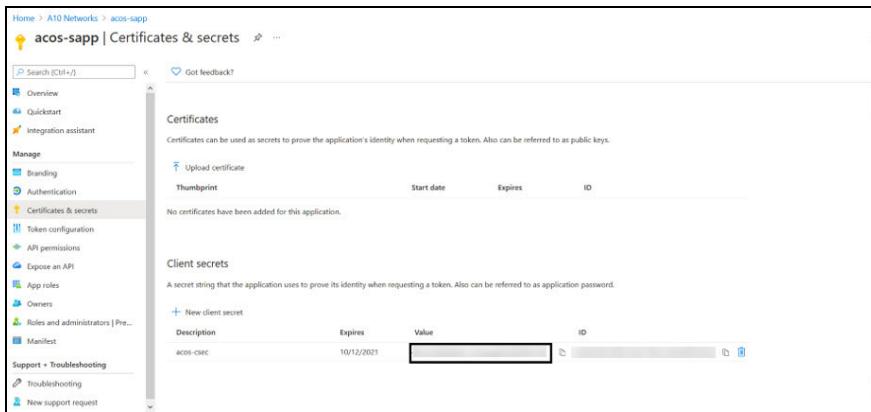
Figure 223 : Add a client secret window



7. Enter the New client secret **Description**, **Expires** value.

The entered value is displayed on the acos-Certificates & secrets window.

Figure 224 : acos-sapp Certificates & secrets window



NOTE:

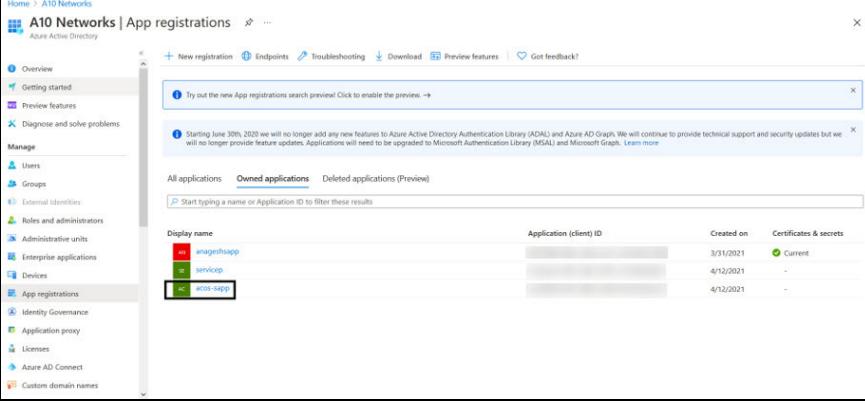
Save the new client secret value in a text file, as it is not visible once the window is refreshed.

Collect Azure Access Key

To collect Azure access keys, perform the following steps:

- From **Home**, navigate to **Azure Services > Azure Active Directory > App registrations**.

Figure 225 : Azure Active Directory - App registrations window



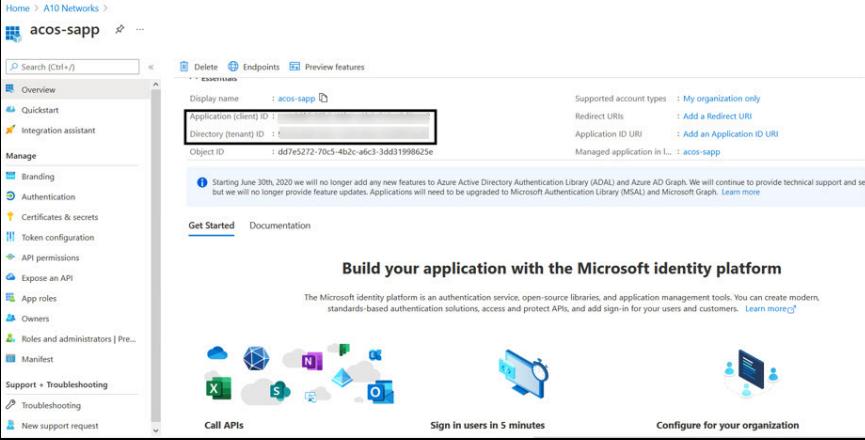
The screenshot shows the 'App registrations' section of the Azure Active Directory portal. The left sidebar includes options like Overview, Getting started, Preview features, Diagnose and solve problems, Users, Groups, External identities, Roles and administrators, Administrative units, Enterprise applications, Devices, App registrations, Identity Governance, Application proxy, Licenses, Azure AD Connect, and Custom domain names. The main area displays a table of registered applications under the 'Owned applications' tab. The table columns are Display name, Application (client) ID, Created on, and Certificates & secrets. The registered applications are:

| Display name | Application (client) ID | Created on | Certificates & secrets |
|--------------|-------------------------|------------|------------------------|
| managerapp | [Redacted] | 3/31/2021 | Current |
| serviceapp | [Green] | 4/12/2021 | - |
| acos-sapp | [Blue] | 4/12/2021 | - |

- From the **Owned applications** tab, select service application from the list of applications.

The selected service application window is displayed.

Figure 226 : Selected Service application window



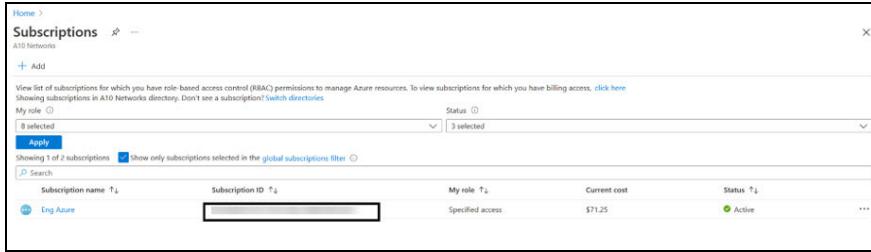
The screenshot shows the details for the 'acos-sapp' application. The left sidebar includes Overview, Quickstart, Integration assistant, Branding, Authentication, Certificates & secrets, Token configuration, API permissions, Expose an API, App roles, Owners, Roles and administrators, Manifest, Support, Troubleshooting, and New support request. The main area shows the application details: Display name (acos-sapp), Application (client) ID (dd7e5272-70c5-4b2c-a6c3-3dd31998625e), Directory (tenant) ID (f5...), Object ID (dd7e5272-70c5-4b2c-a6c3-3dd31998625e), and Supported account types (My organization only). Below this, there's a 'Get Started' button and a 'Documentation' link. A section titled 'Build your application with the Microsoft identity platform' provides links to 'Call APIs', 'Sign in users in 5 minutes', and 'Configure for your organization'. A note at the bottom states: 'Starting June 30th, 2020 we will no longer add any new features to Azure Active Directory Authentication Library (ADAL) and Azure AD Graph. We will continue to provide technical support and security updates but we will no longer provide feature updates. Applications will need to be upgraded to Microsoft Authentication Library (MSAL) and Microsoft Graph. Learn more'.

- Copy the Client ID, Tenant ID from the service application window.

```
client_id= 'cc4c86xx-65b3-48xx-a3xx-610cxxxxxxxx'
tenant_id= '91d27axx-8cxx-41xx-82xx-3d1bxxxxxxx'
```

- Navigate to the **Home > Subscriptions > Registered Subscription Name**, and copy subscription ID value.

Figure 227 : 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-o1Vsw.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-baf8-e03cc942aa66'  
secret = '*****_XGEEd9u0Or+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.

