



# Installing vThunder ADC using ARM Templates

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# Table of Contents

<b>Introduction .....</b>	<b>9</b>
Azure Cloud Terminology .....	13
Prerequisites .....	15
Image Repository .....	16
Get Started .....	16
ARM Templates .....	17
<b>Deploy ARM Template 2NIC-1VM .....</b>	<b>18</b>
System Requirements .....	18
Supported VM Sizes .....	21
Create vThunder Instance .....	22
Initial Setup .....	22
Deploy vThunder .....	25
Configure vThunder as an SLB .....	26
Initial Setup .....	27
Deploy vThunder as an SLB .....	30
Access vThunder using CLI or GUI .....	31
Access vThunder using CLI .....	31
Access vThunder using GUI .....	32
Verify Deployment .....	33
<b>Deploy ARM Template 2NIC-1VM-GLM .....</b>	<b>35</b>
System Requirements .....	35
Supported VM Sizes .....	38
Create vThunder Instance .....	39
Initial Setup .....	39
Deploy vThunder .....	42
Configure vThunder as an SLB .....	43
Initial Setup .....	43
Deploy vThunder as an SLB .....	47

Configure vThunder GLM .....	48
Initial Setup .....	48
Apply GLM License .....	49
Access vThunder using CLI or GUI .....	49
Access vThunder using CLI .....	50
Access vThunder using GUI .....	51
Verify Deployment .....	51
<b>Deploy ARM Template 3NIC-2VM-HA .....</b>	<b>54</b>
System Requirements .....	54
Create vThunder Instances .....	58
Initial Setup .....	59
Deploy vThunder .....	62
Configure Server and Client Machine .....	64
Create a Server Machine .....	64
Create a Client Machine .....	74
Configure vThunder as an SLB .....	82
Initial Setup .....	82
Deploy vThunder as an SLB .....	86
Configure High Availability for vThunder .....	88
Initial Setup .....	88
Create High Availability for vThunder .....	90
Access vThunder using CLI or GUI .....	90
Access vThunder using CLI .....	91
Access vThunder using GUI .....	92
Verify Deployment .....	92
<b>Deploy ARM Template 3NIC-2VM-HA-GLM-PVTVIP .....</b>	<b>96</b>
System Requirements .....	96
Supported VM Sizes .....	100
Create vThunder Instances .....	101
Initial Setup .....	101

Deploy vThunder .....	105
Configure Server and Client Machine .....	106
Create a Server Machine .....	107
Create a Client Machine .....	116
Configure vThunder as an SLB .....	124
Initial Setup .....	124
Deploy vThunder as an SLB .....	128
Configure High Availability for vThunder .....	130
Initial Setup .....	130
Create High Availability for vThunder .....	132
Configure vThunder using GLM .....	132
Initial Setup .....	133
Apply GLM License .....	133
Access vThunder using Console/CLI .....	134
Access vThunder using CLI .....	134
Access vThunder using GUI .....	135
Verify Deployment .....	136
<b>Deploy ARM Template 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO .....</b>	<b>141</b>
System Requirements .....	142
Supported VM Sizes .....	146
Create vThunder Instances .....	147
Initial Setup .....	147
Deploy vThunder .....	151
Configure Server VMSS .....	153
Create a Server Machine .....	153
Verify the Server VMSS Creation .....	161
Create Automation Account .....	162
Initial Setup .....	162
Create an Automation Account .....	163
Verify the Automation Account creation .....	164

Create Runbook .....	165
Create Automation Account Webhook .....	166
Initial Setup .....	167
Create a Webhook .....	167
Verify the Runbook Job creation .....	168
Configure vThunder as an SLB .....	169
Initial Setup .....	170
Deploy vThunder as an SLB .....	173
Configure High Availability for vThunder .....	174
Initial Setup .....	174
Create High Availability for vThunder .....	176
Configure vThunder using GLM .....	177
Initial Setup .....	177
Apply GLM License .....	178
Access vThunder using CLI or GUI .....	178
Access vThunder using CLI .....	179
Access vThunder using GUI .....	180
Verify Deployment .....	180
<b>Deploy ARM Template 3NIC-NVM-VMSS .....</b>	<b>184</b>
System Requirements .....	185
Supported VM Sizes .....	189
Create vThunder Instances .....	190
Initial Setup .....	190
Deploy vThunder .....	194
Verify Resource Creation .....	195
Configure Server VMSS .....	198
Create a Server Machine .....	199
Verify the Server VMSS Creation .....	206
Create Automation Account .....	207
Initial Setup .....	207

Create an Automation Account .....	212
Verify the Automation Account Creation .....	212
Create Runbooks .....	213
Create Automation Account Webhook .....	220
Initial Setup .....	220
Create a Webhook .....	221
Verify the AutoScale Resource Variable creation .....	221
Verify the SSL File availability .....	223
Verify the Runbook Jobs creation .....	225
Enable Autoscaling .....	227
Autoscaling Options .....	228
Configure Autoscaling and Log Monitoring using Agent Setup .....	228
Initial Setup .....	229
Create Fluentbit and Telegraf Agent .....	231
Verify Log Agent file upload .....	232
Access vThunder Agent using CLI .....	233
Create Autoscale Rule .....	235
Create Autoscale Alert .....	239
Verify Logs in Log Analytics Workspace .....	252
Verify Metrics in Application Insights .....	254
Configure Autoscaling using Azure Functions Setup .....	255
Initial Setup .....	255
Create Autoscale Function .....	256
Verify Autoscale Function Creation .....	256
Access vThunder using CLI or GUI .....	258
Access vThunder using CLI .....	258
Access vThunder using GUI .....	259
Verify Deployment .....	259
<b>Deploy ARM Template 3NIC-6VM-2RG-GSLB .....</b>	<b>264</b>
System Requirements .....	264

Supported VM Sizes .....	271
Create vThunder Instances .....	272
Initial Setup .....	272
Deploy vThunder .....	279
Configure vThunder as an SLB .....	282
Initial Setup .....	283
Deploy vThunder as an SLB .....	292
Access vThunder using CLI or GUI .....	293
Access vThunder using CLI .....	293
Access vThunder using GUI .....	294
Access Linux Server using CLI .....	295
Verify Deployment .....	295
<b>Troubleshooting .....</b>	<b>313</b>
Common Errors .....	313
<b>Appendix .....</b>	<b>317</b>
List of Custom Role Permissions .....	317
Azure Service Application Access Key .....	322
Use an existing Access Key .....	322
Create a new Access Key .....	323
Create a Role .....	323
Register a Service Application .....	328
Associate Service Application with a Role .....	330
Create Certificate and Secrets .....	332
Collect Azure Access Key .....	334
Import Azure Access Key .....	336

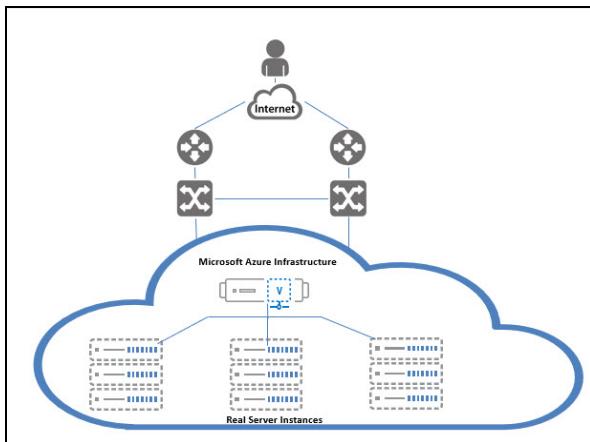
# Introduction

---

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

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

Figure 1 : vThunder for Microsoft Azure



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

Table 1 : Available ARM Templates

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

Template	Description	Configuration
		<ul style="list-style-type: none"> <li>SSL (Apply SSL Certificate)</li> </ul>
ARM-2NIC-1VM-GLM	<ul style="list-style-type: none"> <li>Creates 1 vThunder instance with 2 Network Interface Cards and A10 Global License Manager (GLM) integration.</li> <li>Deploys a Certificate Authority SSL Certificate and Server Load Balancer.</li> </ul>	<ul style="list-style-type: none"> <li>2 NICs (1 Management + 1 Data)</li> <li>BYOL (Bring Your Own License)</li> <li>1 VM (vThunder Virtual Instance)</li> <li>SLB (vThunder Server Load Balancer)</li> <li>SSL (Apply SSL Certificate)</li> <li>GLM (Auto apply A10 license)</li> </ul>
ARM-3NIC-2VM-HA	<ul style="list-style-type: none"> <li>Creates 2 vThunder instances with High Availability (HA) setup, each vThunder contains 3 Network Interface Cards.</li> <li>Deploys a Certificate Authority SSL Certificate and Server Load Balancer.</li> </ul>	<ul style="list-style-type: none"> <li>3 NICs (1 Management + 2 Data)</li> <li>BYOL (Bring Your Own License)</li> <li>2 VMs (vThunder Virtual Instances)</li> <li>SLB (vThunder Server Load Balancer)</li> <li>SSL (Apply SSL Certificate)</li> <li>HA (High Availability with auto switchover with next available vThunder VM using VRRP)</li> </ul>
ARM-3NIC-2VM-HA-GLM-PVTVIP	<ul style="list-style-type: none"> <li>Creates 2 vThunder instances with High Availability setup and an A10 Global License</li> </ul>	<ul style="list-style-type: none"> <li>3 NICs (1 Management + 2 Data)</li> <li>BYOL (Bring Your Own</li> </ul>

Template	Description	Configuration
	<p>Manager integration, each vThunder has 3 Network Interface Cards.</p> <ul style="list-style-type: none"> <li>Deploys a Certificate Authority SSL Certificate, and a Server Load Balancer.</li> </ul>	<p>License)</p> <ul style="list-style-type: none"> <li>2 VMs (vThunder Virtual Instances)</li> <li>SLB (vThunder Server Load Balancer)</li> <li>SSL (Apply SSL Certificate)</li> <li>GLM (Auto apply A10 license)</li> <li>HA (High Availability with auto switchover with available VM using VRRP)</li> <li>VIP (Private Interface)</li> </ul>
ARM-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO	<ul style="list-style-type: none"> <li>Creates 2 vThunder instances with High Availability (HA) setup and GLM integration, each vThunder contains 3 Network Interface Cards.</li> <li>Deploys a Certificate Authority SSL Certificate, Server Load Balancer, and backend server autoscaling support.</li> </ul>	<ul style="list-style-type: none"> <li>3 NICs (1 Management + 2 Data)</li> <li>BYOL (Bring Your Own License)</li> <li>2 VMs (vThunder Virtual Instances)</li> <li>SLB (vThunder Server Load Balancer)</li> <li>SSL (Apply SSL Certificate)</li> <li>GLM (Auto apply A10 license)</li> <li>HA (High Availability with auto switchover for the available VM using VRRP)</li> <li>VIP (Public Interface)</li> <li>BACKAUTO (Webhook URL to apply SLB config into vThunder for newly</li> </ul>

Template	Description	Configuration
		added/deleted web/app servers via server VMSS)
ARM-3NIC-VMSS	<ul style="list-style-type: none"> <li>• Creates multiple vThunder instances in a Virtual Machine scale set using CPU Matrix-based autoscaling with GLM integration. Each vThunder contains 3 Network Interface Cards.</li> <li>• Deploys a Certificate Authority SSL Certificate, Server Load Balancer, Log Analysis using Azure Log Analytics integration, and Azure Application Insight integration.</li> </ul>	<ul style="list-style-type: none"> <li>• 3 NICs (1 Management + 2 Data)</li> <li>• BYOL (Bring Your Own License)</li> <li>• Multiple VMs (vThunder Virtual Instances)</li> <li>• SLB (vThunder Server Load Balancer)</li> <li>• SSL (Apply SSL Certificate)</li> <li>• GLM (Auto apply for A10 license)</li> <li>• VMSS (vThunder virtual machine auto-scale set. Autoscaling on data CPU threshold.)</li> <li>• MONITOR (Azure monitor services for vThunder Syslog and data CPU metric monitoring)</li> </ul>
ARM-3NIC-6VM-2RG-GSLB	<ul style="list-style-type: none"> <li>• Creates 2 Global Server Load Balancer (GSLB) regions, 1 GSLB controller and 2 site devices in each of the two regions.</li> <li>• Creates 2 real servers (Ubuntu 16.04.0-LTS) in each region.</li> </ul>	<ul style="list-style-type: none"> <li>• 3 NICs (1 Management + 2 Data)</li> <li>• BYOL (Bring Your Own License)</li> <li>• 6 VMs (Three vThunder Virtual Instances in each Region)</li> <li>• 2 RGs (Regions)</li> </ul>

Template	Description	Configuration
		<ul style="list-style-type: none"><li>• GSLB (vThunder SLB in multiple regions)</li></ul>

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/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/resource-manager/resource-group-overview>.
- **Virtual network** — The Microsoft Azure Virtual Network service enables resources to securely communicate with other resources in an Azure network in the cloud. A virtual network is hence logical isolation of the Azure cloud for an Azure account. You can connect different virtual networks and to on-premises networks. For more information, see <https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorial-availability-sets>.
- **Network security group (NSG)** — A network security group (NSG) contains a list of security rules that allow or deny network traffic to resources connected to Azure virtual networks (VNet). The NSGs can be associated with subnets or individual

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

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

## Prerequisites

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

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

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

- Valid [SSL certificate](#) to apply on vThunder (Optional).
- Text editor (Notepad++, Notepad or any other text editor application).

- [A10 GLM account](#) access and valid licenses.

This access is required for the templates using GLM. For more information, see [Global License Manager User Guide](#).

- ARM Templates

Go to [GitHub](#) [Branch: release/v1.0.0] and download the required ARM template folder to your local machine. The template folder contains the json parameter files and PowerShell scripts for the deployment of the respective template. For example, the downloaded folder path is C:\Users\TestUser\Templates.

- A10 vThunder default user credentials

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

## Image Repository

ARM templates support the following Azure Marketplace A10 vThunder images:

- [A10 vThunder ADC 520 BYOL for Microsoft Azure - Microsoft Azure](#)

Tested with 64-bit Advanced Core OS (ACOS) version 5.2.0, build 155 (Aug-10-2020,14:34)

- [A10 vThunder ADC 521 BYOL for Microsoft Azure - Microsoft Azure](#)

Tested with 64-bit Advanced Core OS (ACOS) version 5.2.1-p5, build 114 (Jul-14-2022,05:11)

## 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-xxxx-xxxx-xxxx-xxxxxxxxxxxx",  
   "id": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx",  
   "isDefault": true,  
   "managedByTenants": []},
```

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

## 2. Install Az Module.

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

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

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

## ARM Templates

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

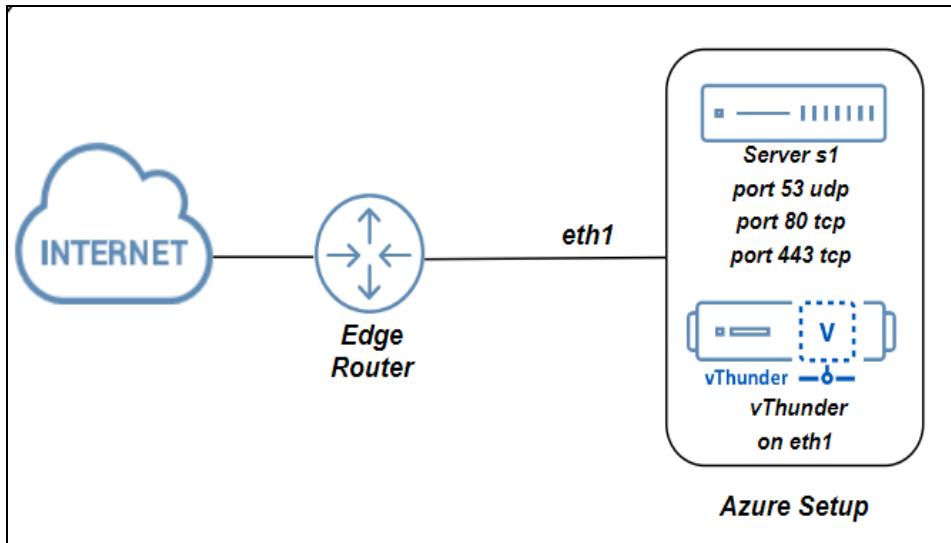
The following templates are available:

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

# Deploy ARM Template 2NIC-1VM

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

Figure 2 : 2NIC-1VM Topology



The following topics are covered:

<a href="#">System Requirements</a>	18
<a href="#">Supported VM Sizes</a>	21
<a href="#">Create vThunder Instance</a>	22
<a href="#">Configure vThunder as an SLB</a>	26
<a href="#">Access vThunder using CLI or GUI</a>	31
<a href="#">Verify Deployment</a>	33

## System Requirements

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

deployment.

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

Table 2 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	<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 <b>vth-rg1</b> .
Azure Storage Account	<p>A storage account is created inside the resource group if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p><b>Performance:</b> Standard</p> <p><b>Replication:</b> Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b> Storagev2 (general purpose v2)</p>	<b>vthunderstorage</b>
Virtual Machine (VM) Instance	<p>A virtual machine instance is created for vThunder.</p> <p><b>Product:</b> A10 vThunder</p> <p><b>Operating system:</b> Linux</p> <p><b>Default Size:</b> Standard_DS2v2 (4 vCPUs, 16 GiB Memory)</p>	<b>vth-inst1</b>

Resource Name	Description	Default Value
	<p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p><a href="#">Table 3</a> lists the supported VM sizes.</p>	
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<b>vth-vnet</b>  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"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1]</li> </ul>	<b>vth-inst1-mgmt-nic1</b> 10.0.1.47 <b>vth-inst1-data-nic2</b> 10.0.2.47 [Primary IP]
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	<b>vth-nsg1</b>

## Supported VM Sizes

Table 3 : Supported VM sizes

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

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

For more information on Windows and Linux VM sizes, see

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

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

## Create vThunder Instance

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM\_TMPL\_2NIC\_1VM\_PARAM.json with a text editor.

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

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

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

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

### 3. Configure a storage account name.

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

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

### 4. Configure a virtual network.

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

### 5. Configure a DNS label prefix.

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

### 6. Configure a vThunder name.

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

### 7. Set a VM Size for vThunder.

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

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

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

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

```

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

```

---

**NOTE:** **Do not change the publisher name.**

---

## 9. Configure two network interface cards.

```

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

```

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

```

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

```

## 11. Configure a public IP address.

```

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

```

## 12. Configure a Network Security Group.

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

## 13. Configure authentication type.

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

## 14. Verify if all the configurations in the ARM\_TMPL\_2NIC\_1VM\_PARAM.json file are correct and then save the changes.

# Deploy vThunder

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

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

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

### Example:

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

## Deploy ARM Template 2NIC-1VM

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

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

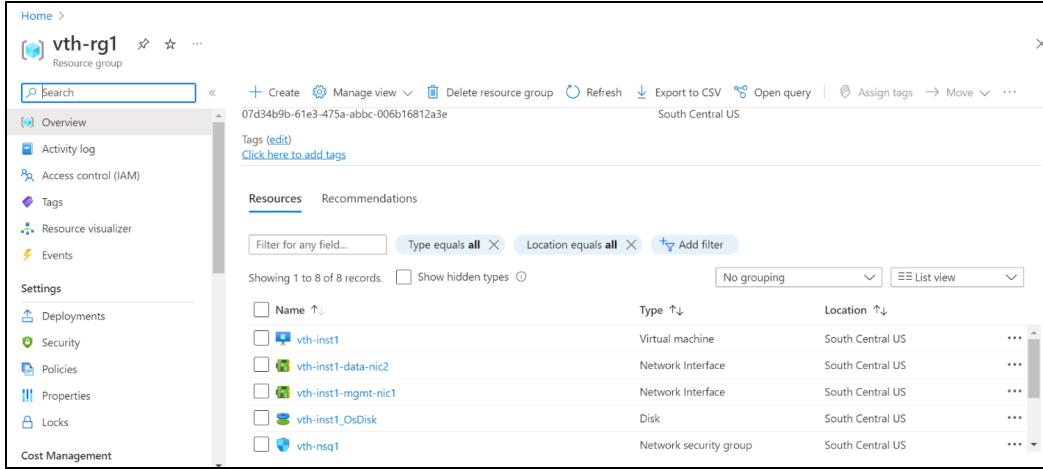
**Example:**

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 --template-file ARM_TMPL_2NIC_1VM_1.json --parameters ARM_TMPL_2NIC_1VM_PARAM.json
```

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

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

Figure 3 : Resource listing in the resource group



Name	Type	Location
vth-inst1	Virtual machine	South Central US
vth-inst1-data-nic1	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 vThunder as an SLB

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_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 management 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. Verify if all the configurations in the ARM\_TMPL\_2NIC\_1VM\_SLB\_CONFIG\_PARAM.json file are correct and save the changes.

## Deploy vThunder as an SLB

---

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

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_SLB_CONFIG_2.ps1 -  
resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_SLB_CONFIG_2.ps1 -  
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```

SSL Certificate
Do you want to upload ssl certificate ?
[Y] Yes  [N] 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](#)

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

## 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 default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```
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-->
vThunder(config)#admin <admin_username> password <new_password>
```

---

**NOTE:** It is highly recommended to change the default password when you login for the first time.

---

## Access vThunder using GUI

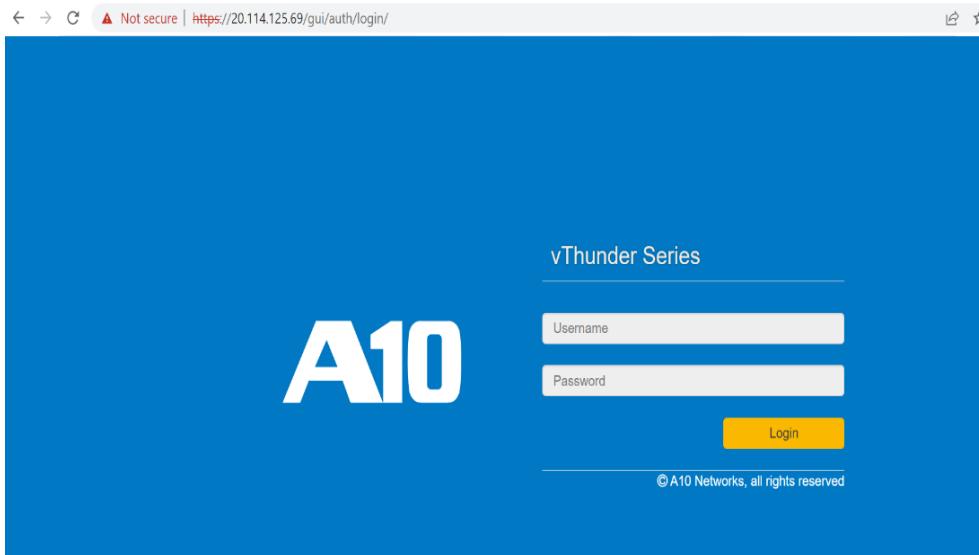
---

To access vThunder using GUI, perform the following steps:

1. Open any browser.

- Enter [https://<vthunder\\_public\\_IP>/gui/auth/login/](https://<vthunder_public_IP>/gui/auth/login/) in the address bar.

Figure 4 : vThunder GUI



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

## Verify Deployment

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

- 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
```

[Deploy ARM Template 2NIC-1VM](#)


---

```

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

```

- Run the following command on vThunder:

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

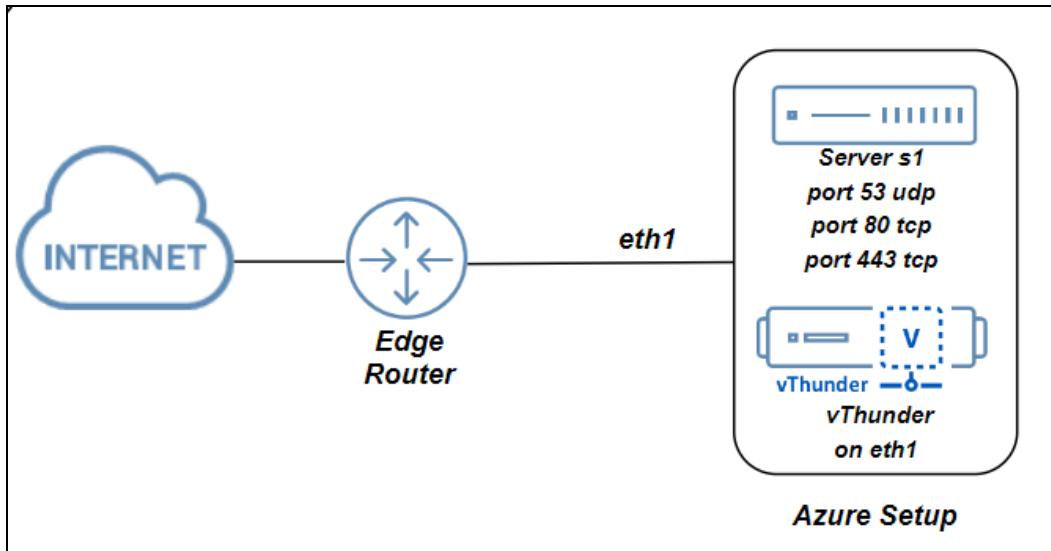
If the deployment is successful, the following SSL configuration is displayed:

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

# Deploy ARM Template 2NIC-1VM-GLM

[Figure 5](#) shows the 2NIC-1VM-GLM deployment topology. Using the ARM template, one vThunder instance containing one management interface and one data interface with GLM integration can be deployed.

Figure 5 : 2NIC-1VM-GLM Topology



The following topics are covered:

<a href="#">System Requirements</a>	35
<a href="#">Create vThunder Instance</a>	39
<a href="#">Configure vThunder as an SLB</a>	43
<a href="#">Configure vThunder GLM</a>	48
<a href="#">Access vThunder using CLI or GUI</a>	49
<a href="#">Verify Deployment</a>	51

## System Requirements

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

deployment.

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

Table 4 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	<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 <b>vth-rg1</b> .
Azure Storage Account	<p>A storage account is created inside the resource group, if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p><b>Performance:</b> Standard</p> <p><b>Replication:</b> Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b> Storagev2 (general purpose v2)</p>	<b>vthunderstorage</b>
Virtual Machine (VM) Instance	<p>A virtual machine instance is created for vThunder.</p> <p><b>Product:</b> A10 vThunder</p> <p><b>Operating system:</b> Linux</p> <p><b>Default Size:</b> Standard_DS2v2 (4 vCPUs, 16 GiB Memory)</p>	<b>vth-inst1</b>

Resource Name	Description	Default Value
	<p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p><a href="#">Table 5</a> lists the supported VM sizes.</p>	
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<b>vth-vnet</b> 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"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1]</li> </ul>	<b>vth-inst1-mgmt-nic1</b> 10.0.1.47 <b>vth-inst1-data-nic2</b> 10.0.2.47 [Primary IP]
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	<b>vth-nsg</b>

## Supported VM Sizes

Table 5 : Supported VM sizes

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

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

For more information on Windows and Linux VM sizes, see

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

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

## Create vThunder Instance

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM\_TMPL\_2NIC\_1VM\_PARAM.json with a text editor.

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

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

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

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

### 3. Configure a storage account name.

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

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

### 4. Configure a virtual network.

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

### 5. Configure a DNS label prefix.

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

### 6. Configure a vThunder name.

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

### 7. Set a VM Size for vThunder.

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

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

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

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

```

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

```

---

**NOTE:** **Do not change the publisher name.**

---

## 9. Configure two network interface cards.

```

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

```

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

```

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

```

## 11. Configure a public IP address.

```

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

```

## 12. Configure a Network Security Group.

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

## 13. Configure authentication type.

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

## 14. Verify if all the configurations in the ARM\_TMPL\_2NIC\_1VM\_PARAM.json file are correct and then save the changes.

# Deploy vThunder

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

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

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

### Example:

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

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

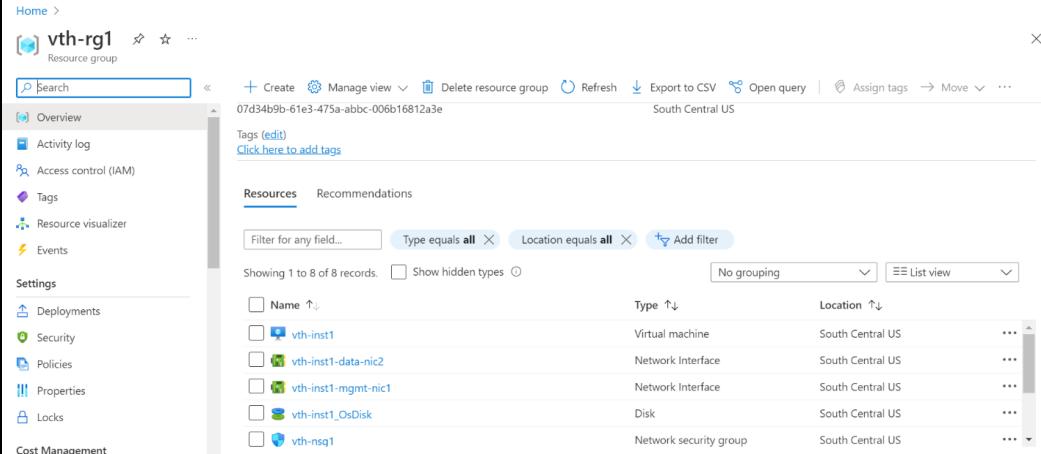
```
PS C:\Users\TestUser\Templates> az deployment group create -g <resource_group_name> --template-file <template_name> --parameters <param_template_name>
```

#### Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 --template-file ARM_TMPL_2NIC_1VM_1.json --parameters ARM_TMPL_2NIC_1VM_PARAM.json
```

### 4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource\_group\_name>**.

Figure 6 : Resource listing in the resource group



The screenshot shows the Azure portal interface for the resource group 'vth-rg1'. The left sidebar includes options like Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings (Deployments, Security, Policies, Properties, Locks, Cost Management), and a 'Tags (edit)' section. The main area displays a table of resources with columns for 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 vThunder as an SLB

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_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 management 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. Verify if all the configurations in the ARM\_TMPL\_2NIC\_1VM\_SLB\_CONFIG\_PARAM.json file are correct and then save the changes.

## Deploy vThunder as an SLB

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

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_SLB_CONFIG_2.ps1 -resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_SLB_CONFIG_2.ps1 -resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

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

```

Virtual Server Name: vs1
Resource Group Name: vth-rg1
Instance Public IP: 20.165.38.180
configured ethernet 1 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared

```

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

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

## Configure vThunder GLM

The following topics are covered:

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

## Initial Setup

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

1. Open the ARM\_TMPL\_2NIC\_1VM\_GLM\_CONFIG\_PARAM.json with a text editor.
2. Configure GLM account details.

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

```

        "entitlement_token": {
            "value": "<license_entitlement_token>"
        }
    }
}

```

3. Verify if the configurations in the ARM\_TMPL\_2NIC\_1VM\_GLM\_CONFIG\_PARAM.json file are correct and then save the changes.

## Apply GLM License

To apply GLM license, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_GLM_CONFIG_3.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](#)

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

## 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 default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```
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-->
vThunder(config)#admin <admin_username> password <new_password>
```

---

**NOTE:** It is highly recommended to change the default password when you login for the first time.

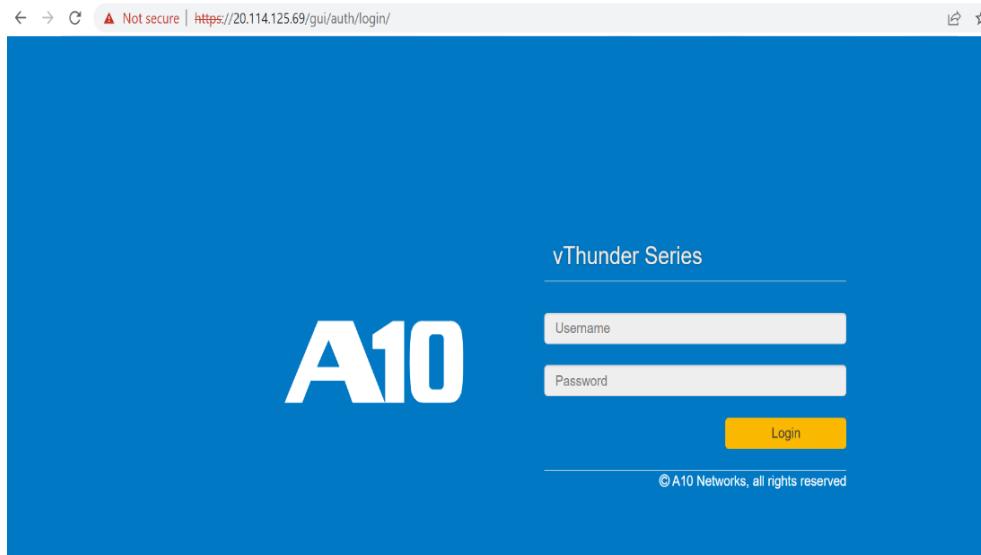
---

## 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/](https://<vthunder_public_IP>/gui/auth/login/) in the address bar.

Figure 7 : vThunder GUI



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

## Verify Deployment

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

1. Run the following command on vThunder:

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

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

```
interface management
  ip address dhcp
!
```

[Deploy ARM Template 2NIC-1VM-GLM](#)

```
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:

[Deploy ARM Template 2NIC-1VM-GLM](#)

Host ID	:	5DCB01EC264BECCCFCB3C2ED42E02384EE8C527
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
<hr/>		
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:

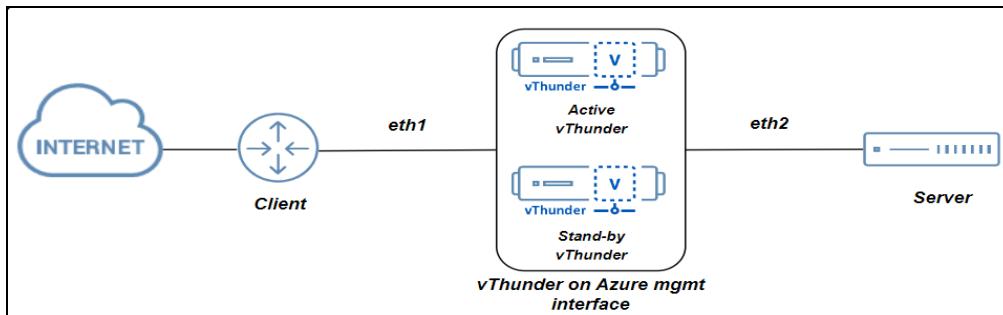
Name	Type	Expiration	Status
<hr/>			
server certificate	Jan 28 12:00:00 2028 GMT	[Unexpired, Bound]	

# Deploy ARM Template 3NIC-2VM-HA

[Figure 8](#) 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 8 : 3NIC-2VM-HA Topology



The following topics are covered:

<a href="#">System Requirements</a> .....	54
<a href="#">Create vThunder Instances</a> .....	58
<a href="#">Configure Server and Client Machine</a> .....	64
<a href="#">Configure vThunder as an SLB</a> .....	82
<a href="#">Access vThunder using CLI or GUI</a> .....	90
<a href="#">Verify Deployment</a> .....	92

## System Requirements

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

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

Table 6 : System Requirements

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

Resource Name	Description	Default Value										
	<p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p><a href="#">Table 7</a> lists the supported VM sizes.</p>											
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<b>vth-vnet</b> 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]	<p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1, Ethernet 2]</li> </ul> <p><b>NOTE:</b> The secondary IP of data interface is taken from DHCP server.</p>	<table border="1"> <tr> <td><b>vth-inst1-mgmt-nic1</b></td> <td>10.0.1.35</td> </tr> <tr> <td><b>vth-inst1-data-nic2</b></td> <td>10.0.2.35 [Primary IP]</td> </tr> <tr> <td></td> <td>10.0.2.X [Secondary IP]</td> </tr> <tr> <td><b>vth-inst1-data-nic3</b></td> <td>10.0.3.35 [Primary IP]</td> </tr> <tr> <td></td> <td>10.0.3.X [Secondary IP]</td> </tr> </table>	<b>vth-inst1-mgmt-nic1</b>	10.0.1.35	<b>vth-inst1-data-nic2</b>	10.0.2.35 [Primary IP]		10.0.2.X [Secondary IP]	<b>vth-inst1-data-nic3</b>	10.0.3.35 [Primary IP]		10.0.3.X [Secondary IP]
<b>vth-inst1-mgmt-nic1</b>	10.0.1.35											
<b>vth-inst1-data-nic2</b>	10.0.2.35 [Primary IP]											
	10.0.2.X [Secondary IP]											
<b>vth-inst1-data-nic3</b>	10.0.3.35 [Primary IP]											
	10.0.3.X [Secondary IP]											

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

## Supported VM Sizes

Table 7 : Supported VM sizes

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

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

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

For more information on Windows and Linux VM sizes, see

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

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

## Create vThunder Instances

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM\_TMPL\_3NIC\_2VM\_HA\_PARAM.json with a text editor.

---

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

---

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

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

---

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

---

3. Configure a storage account name.

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

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

4. Configure a virtual network.

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

## 5. Configure DNS label prefixes.

```

    "dnsLabelPrefix_vthunder1": {
        "value": "vth-inst1-prefix1"
    },
    "dnsLabelPrefix_vthunder2": {
        "value": "vth-inst2-prefix1"
    },

```

## 6. Configure a vThunder instance names.

```

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

```

## 7. Set VM size for vThunder.

```

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

```

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

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

```

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

```

---

**NOTE:** Do not change the publisher name.

---

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

```

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

```

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

```

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

```

```

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

```

**11. Configure public IP address for two vThunder instances.**

```

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

```

**12. Configure network security group for two vThunder instances.**

```

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

```

**13. Verify if all the configurations in the ARM\_TMPL\_3NIC\_2VM\_HA\_PARAM.json file are correct and then save the changes.**

## Deploy vThunder

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

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

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

**Example:**

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

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

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

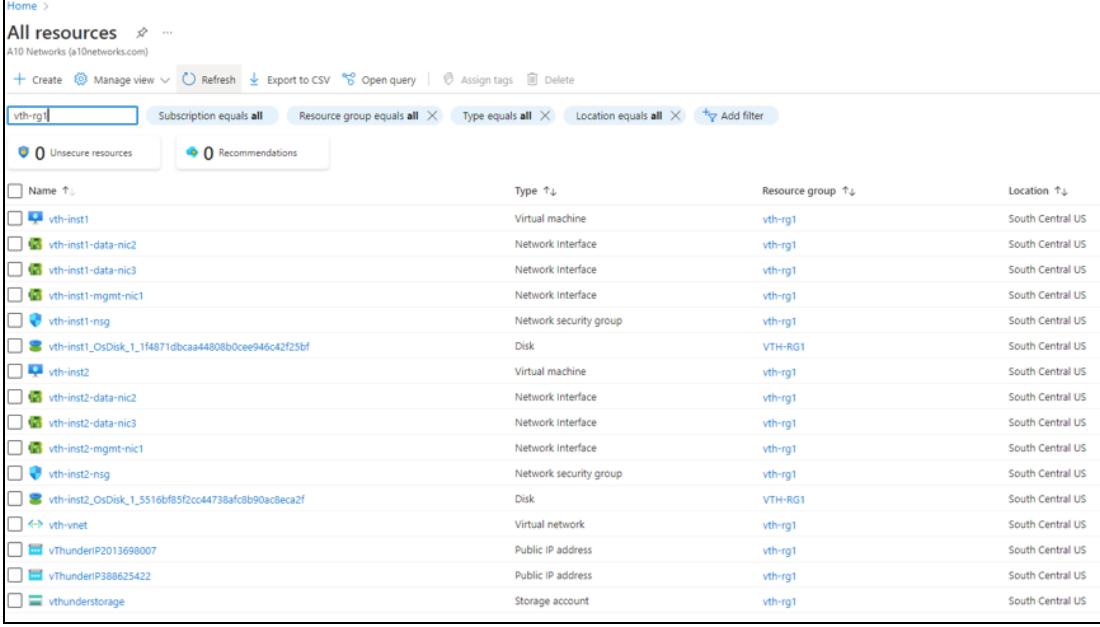
**Example:**

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

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

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

Figure 9 : 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_1f4871dbcaa44800b0cee946c42f25bf	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_5516bf85f2cc44738afc8b90ac8eca2f	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 thru **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

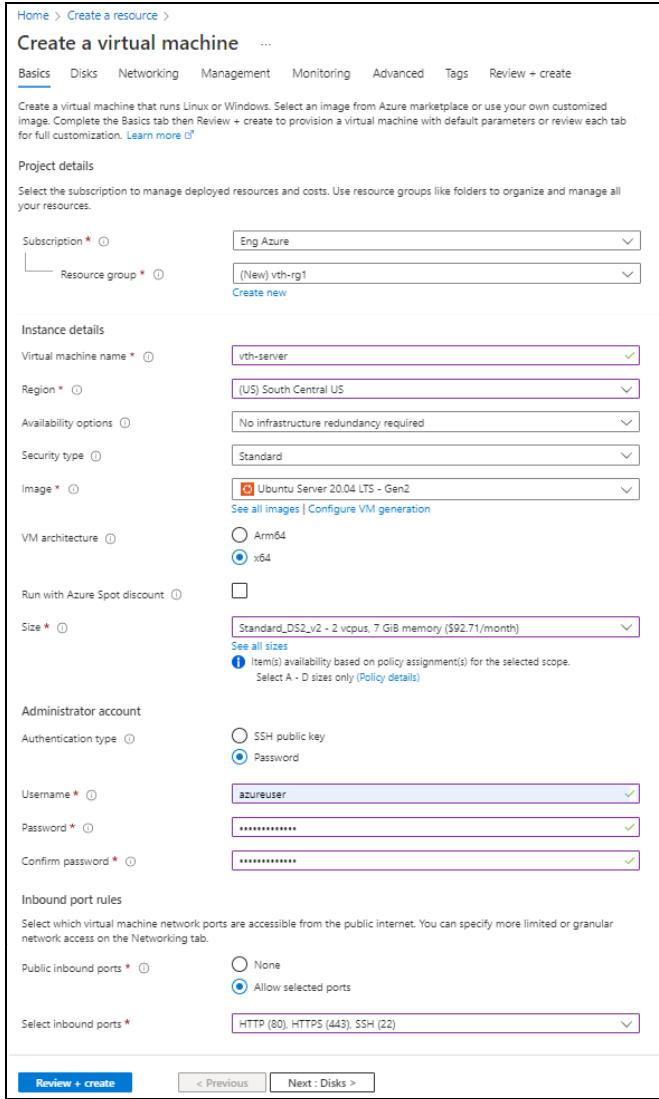
- Depending upon the Authentication type selected, provide the information.

#### Inbound port rules

- Public inbound ports
- Select inbound ports

## Deploy ARM Template 3NIC-2VM-HA

Figure 10 : Create a virtual machine window - Basics tab



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

- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- 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
- VM architecture:** x64
- Size:** Standard\_DS2\_v2 - 2 vcpus, 7 GiB memory (\$92.71/month)
- Administrator account:**
  - Authentication type: Password (selected)
  - Username: azureuser
  - Password: (redacted)
  - Confirm password: (redacted)
- Inbound port rules:**
  - Public inbound ports: Allow selected ports
  - Select inbound ports: HTTP (80), HTTPS (443), SSH (22)

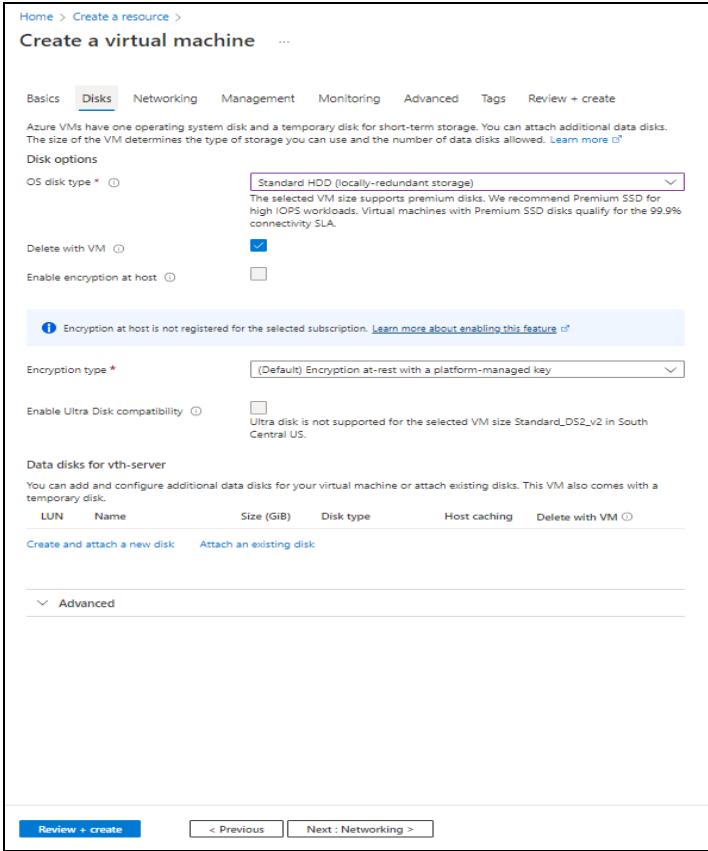
At the bottom, there are buttons for **Review + create**, < Previous, and Next : Disks >.

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 11 : Create a virtual machine window - Disks tab



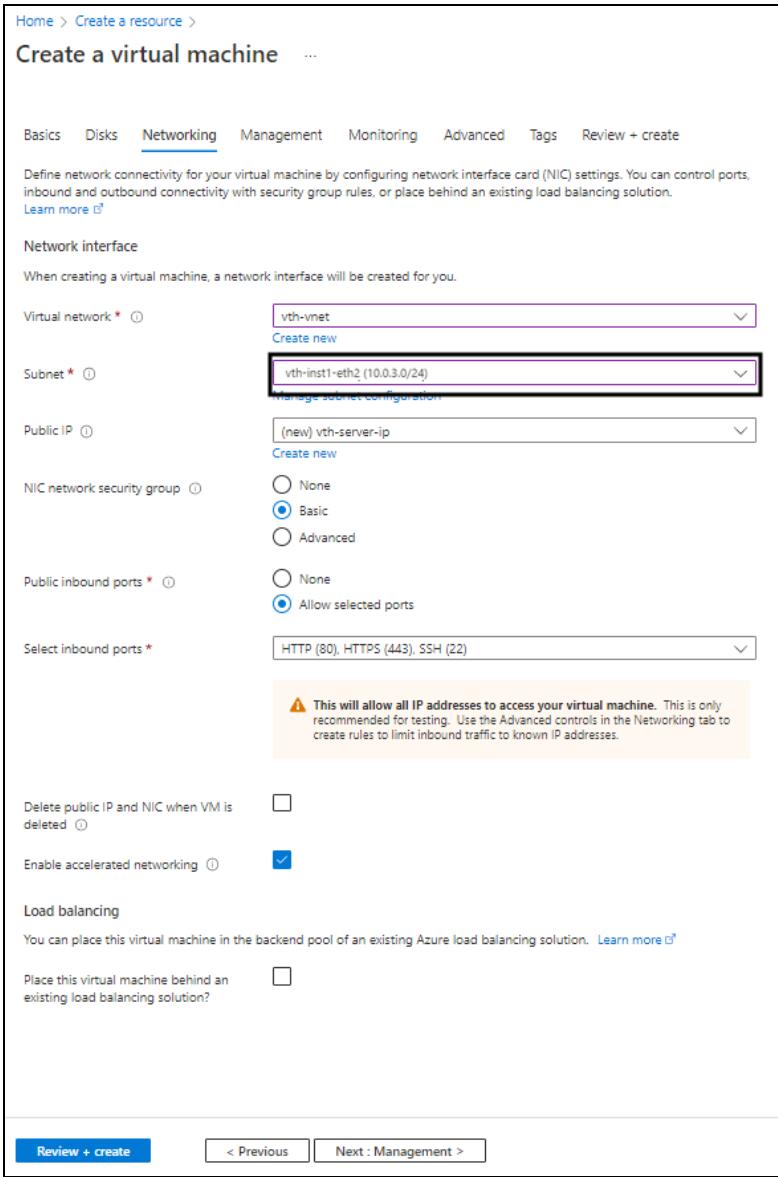
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

#### Network interface

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

[Deploy ARM Template 3NIC-2VM-HA](#)

Figure 12 : Create a virtual machine window - Networking tab



The screenshot shows the 'Networking' tab of the 'Create a virtual machine' wizard. The tabs at the top are Basics, Disks, Networking (which is selected), Management, Monitoring, Advanced, Tags, and Review + create.

**Network interface**

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

**Virtual network \***: vth-vnet (selected)

**Subnet \***: vth-inst1-eth2 (10.0.3.0/24) (selected)

**Public IP**: (new) vth-server-ip

**NIC network security group**: Basic (selected)

**Public inbound ports \***: Allow selected ports (selected)

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

**Warning message:** 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.

**Checkboxes:**

- Delete public IP and NIC when VM is deleted:
- Enable accelerated networking:

**Load balancing**

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

**Place this virtual machine behind an existing load balancing solution?**:

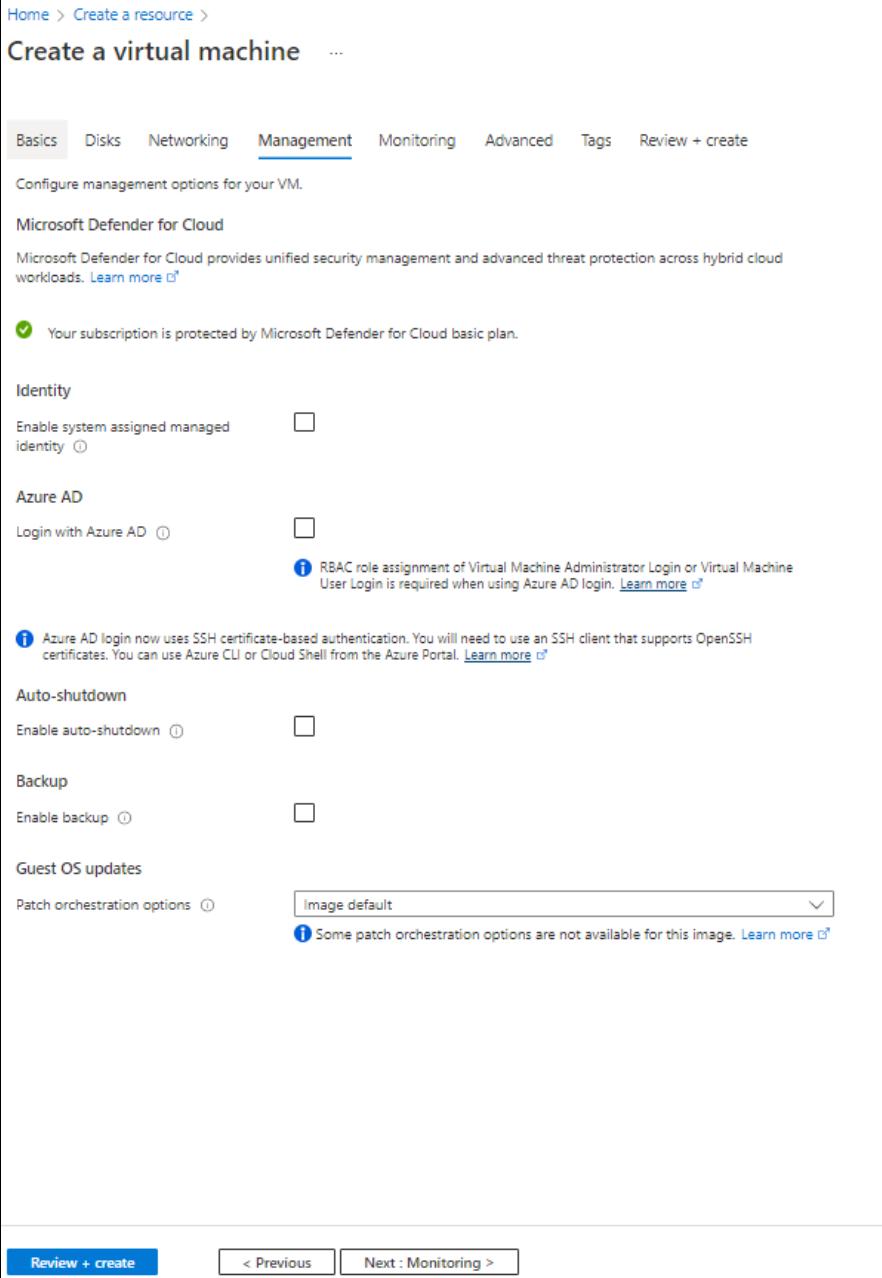
**Buttons at the bottom:**

- Review + create
- < Previous
- Next : Management >

- 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 13 : Create a virtual machine window - Management tab

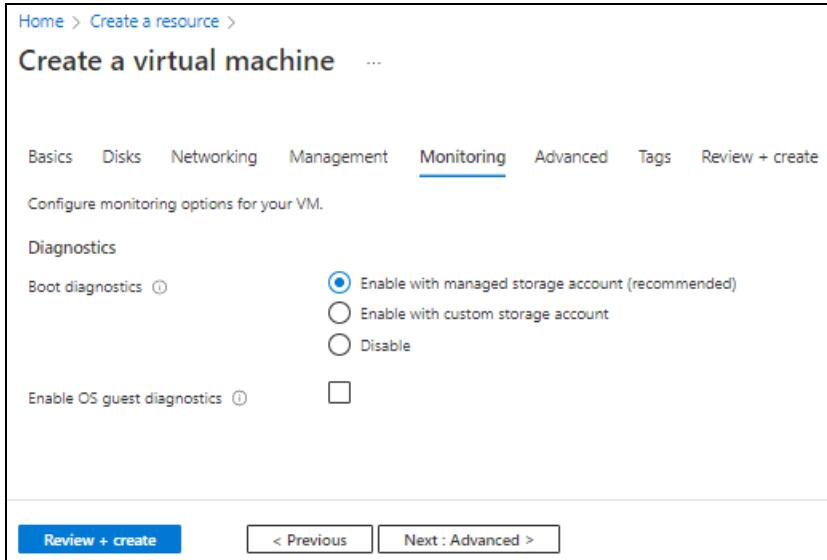


The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Management' tab. The top navigation bar includes 'Home > Create a resource > Create a virtual machine'. The 'Management' tab is selected, with other tabs like 'Basics', 'Disks', 'Networking', 'Monitoring', 'Advanced', and 'Tags' visible. A sub-header says 'Configure management options for your VM.' Below this, the 'Microsoft Defender for Cloud' section is shown, stating it provides unified security management and advanced threat protection across hybrid cloud workloads, with a 'Learn more' link. A note indicates that the subscription is protected by Microsoft Defender for Cloud basic plan. The 'Identity' section contains two options: 'Enable system assigned managed identity' (with a help link) and 'Login with Azure AD' (with a help link). A note for 'Azure AD' login mentions using SSH certificate-based authentication and provides links for 'Learn more'. The 'Auto-shutdown' section has an 'Enable auto-shutdown' option. The 'Backup' section has an 'Enable backup' option. The 'Guest OS updates' section includes a dropdown for 'Patch orchestration options' set to 'Image default', with a note that some options are not available for this image and a 'Learn more' link. At the bottom of the window are buttons for 'Review + create', '< Previous', and 'Next : Monitoring >'.

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

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

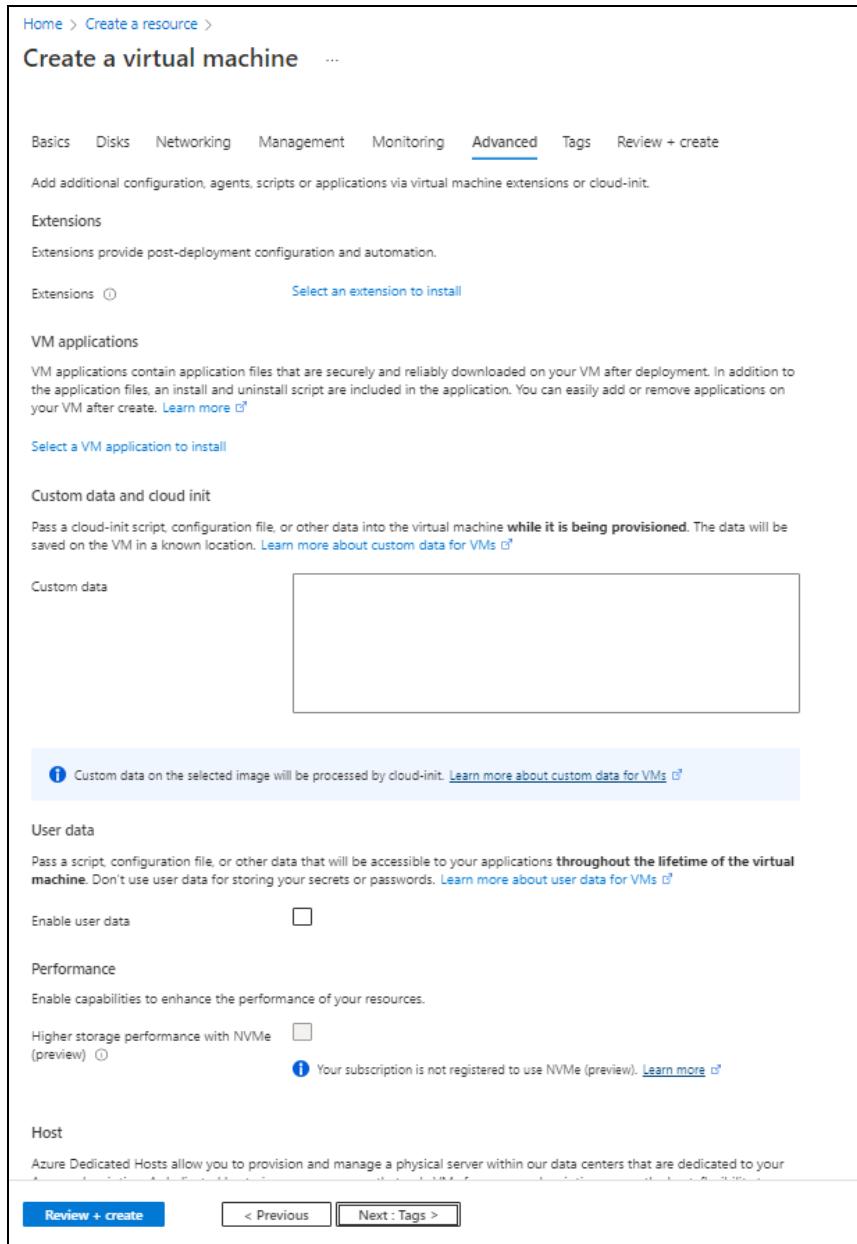
Figure 14 : Create a virtual machine window - Monitoring tab



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

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

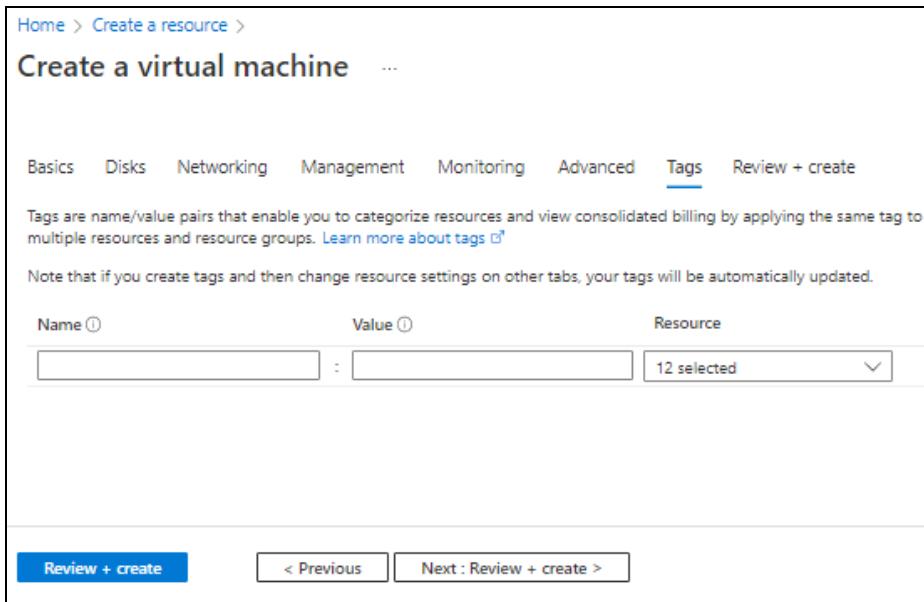
Figure 15 : Create a virtual machine window - Advanced tab



**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.**

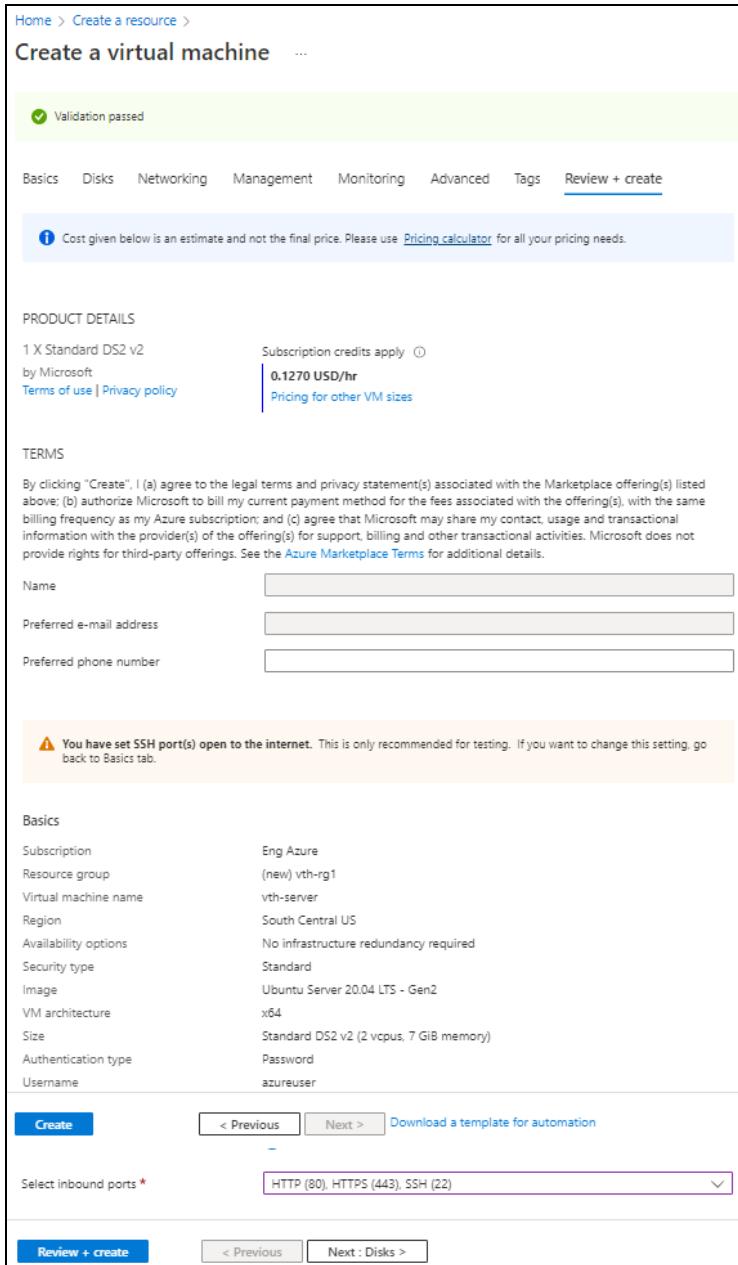
Figure 16 : Create a virtual machine window - Tags tab



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.

[Deploy ARM Template 3NIC-2VM-HA](#)

Figure 17 : Create a virtual machine window - Review + create tab



The screenshot shows the 'Create a virtual machine' window in the Azure portal, specifically the 'Review + create' tab. At the top, a green bar indicates 'Validation passed'. Below it, tabs for Basics, Disks, Networking, Management, Monitoring, Advanced, Tags, and Review + create are shown, with 'Review + create' being the active tab.

**PRODUCT DETAILS:**

- 1 X Standard DS2 v2 by Microsoft
- Subscription credits apply (0.1270 USD/hr)
- [Terms of use](#) | [Privacy policy](#)
- [Pricing for other VM sizes](#)

**TERMS:**

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

Fields for Name, Preferred e-mail address, and Preferred phone number are present.

A warning message in a yellow box states: "⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab."

**Basics:**

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

Buttons at the bottom include 'Create' (highlighted in blue), '< Previous' and 'Next >', and 'Download a template for automation'.

**Select inbound ports \***: A dropdown menu shows 'HTTP (80), HTTPS (443), SSH (22)'.

Navigation buttons at the bottom are 'Review + create' (highlighted in blue), '< Previous' and 'Next : Disks >'.

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.

## Create a Client Machine

---

To create a Client machine, perform the following steps:

1. From Home, navigate thru **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

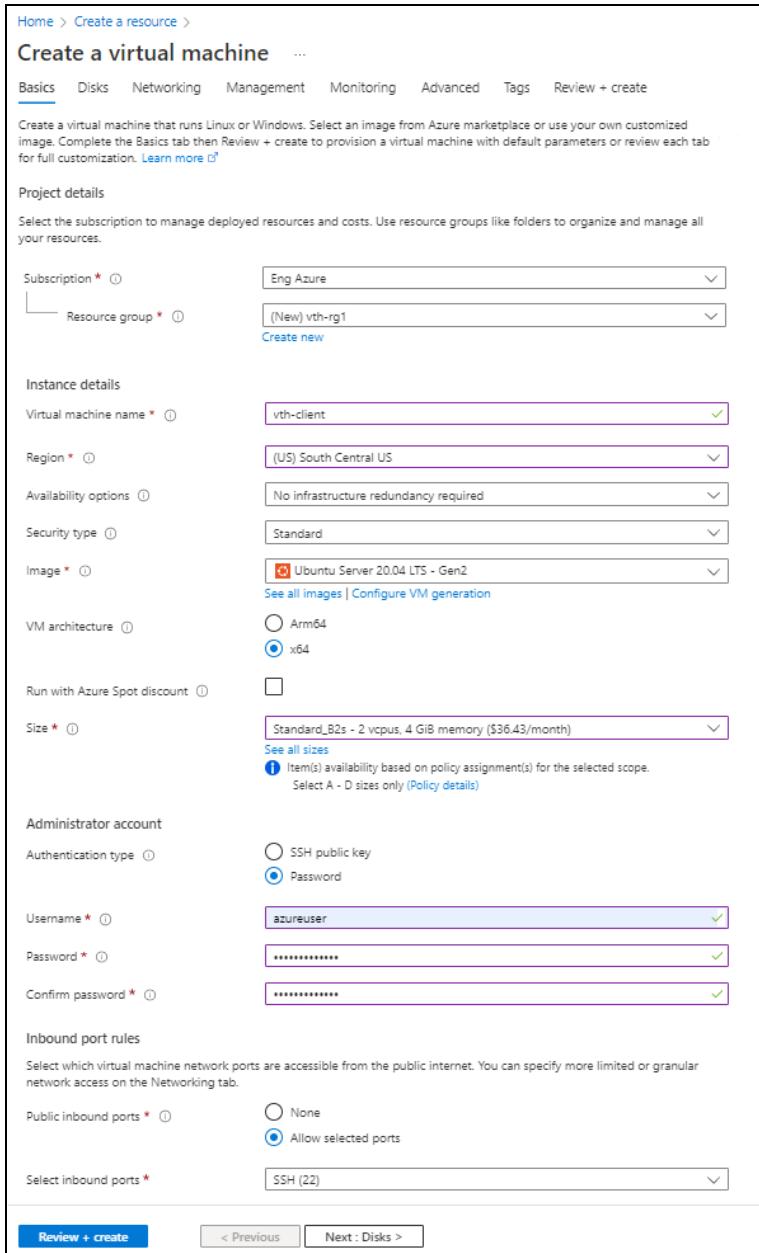
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 18 : Create a virtual machine window - Basics tab



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Basics' tab. The window title is 'Create a virtual machine ...'. The tabs at the top are 'Basics', 'Disks', 'Networking', 'Management', 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The 'Basics' tab is selected.

**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  x64

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 (Password)  SSH public key  Password

Username \* (azureuser)

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 \* (Allow selected ports)  None  Allow selected ports

Select inbound ports \* (SSH (22))

**Buttons at the bottom:**

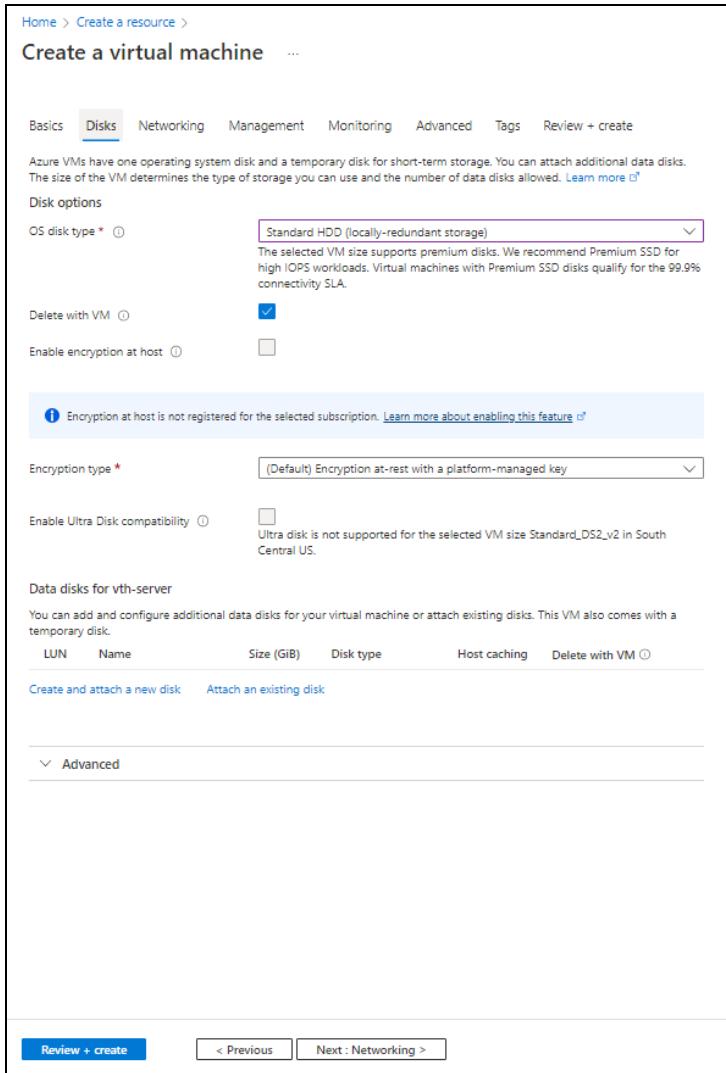
- Review + create** (blue button)
- < Previous
- Next : Disks >

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

[Deploy ARM Template 3NIC-2VM-HA](#)

- OS disk type
- Encryption type

Figure 19 : Create a virtual machine window - Disks tab



Home > Create a resource >

## Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

**Disk options**

OS disk type \*

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

Delete with VM

Enable encryption at host

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

Encryption type \*

Enable Ultra Disk compatibility  Ultra disk is not supported for the selected VM size Standard\_DS2\_v2 in South Central US.

**Data disks for vth-server**

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

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM

[Create and attach a new disk](#) [Attach an existing disk](#)

! Advanced

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

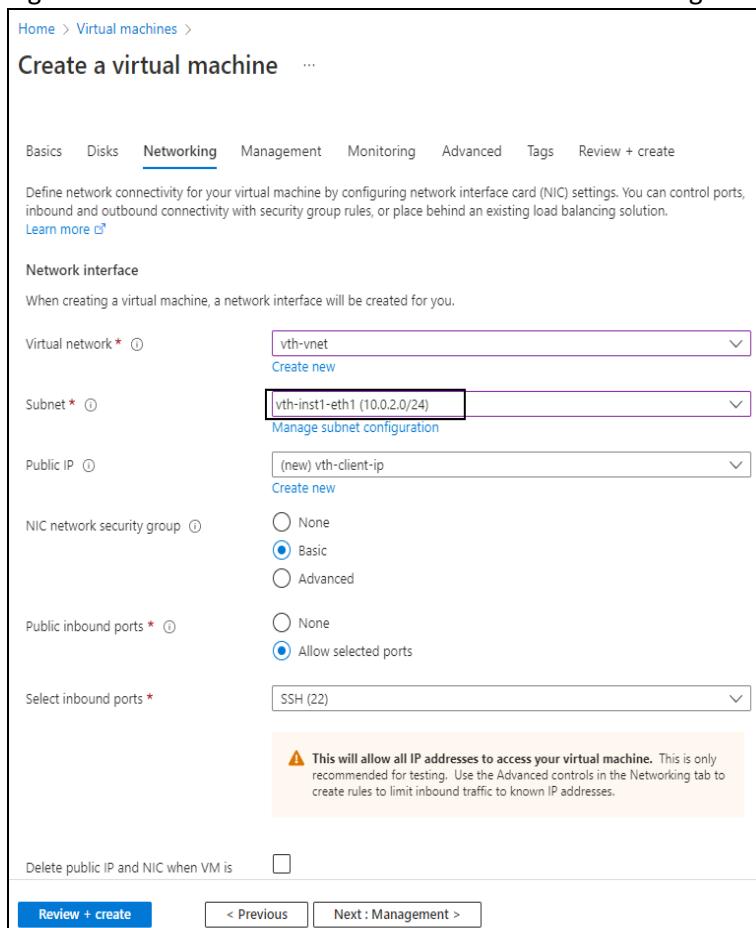
- Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
- Select or enter the following mandatory information in the **Networking** tab:

Network interface

## Deploy ARM Template 3NIC-2VM-HA

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

Figure 20 : Create a virtual machine window - Networking tab

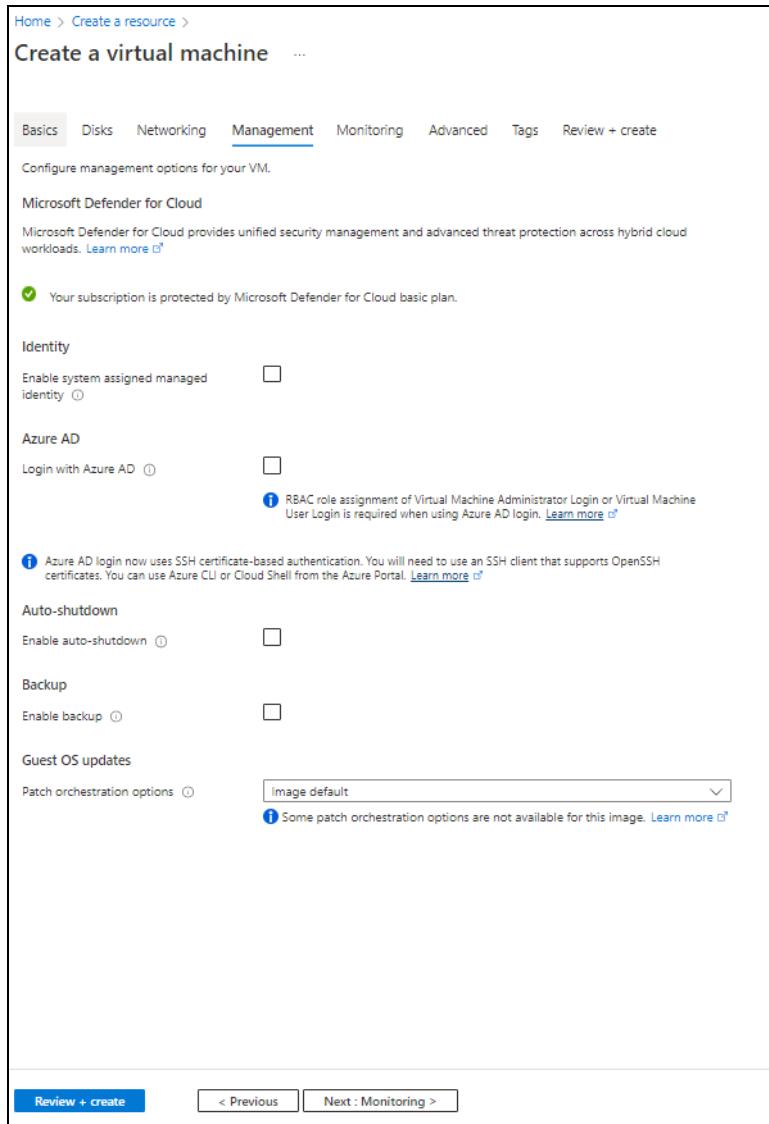


7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

[Deploy ARM Template 3NIC-2VM-HA](#)

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

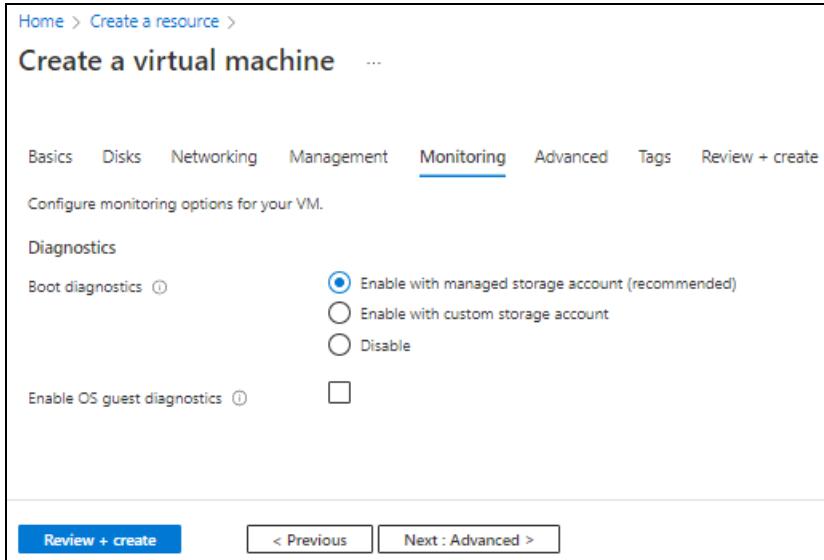
Figure 21 : Create a virtual machine window - Management tab



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

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

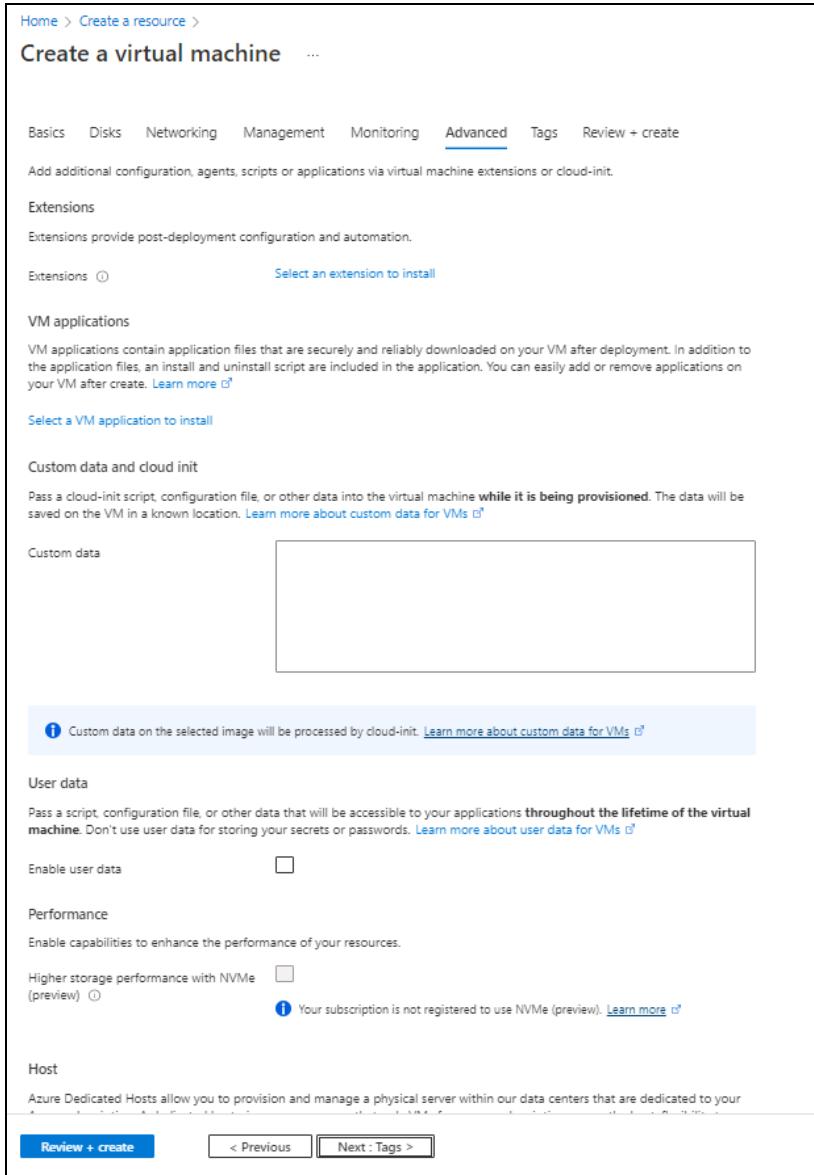
Figure 22 : Create a virtual machine window - Monitoring tab



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

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

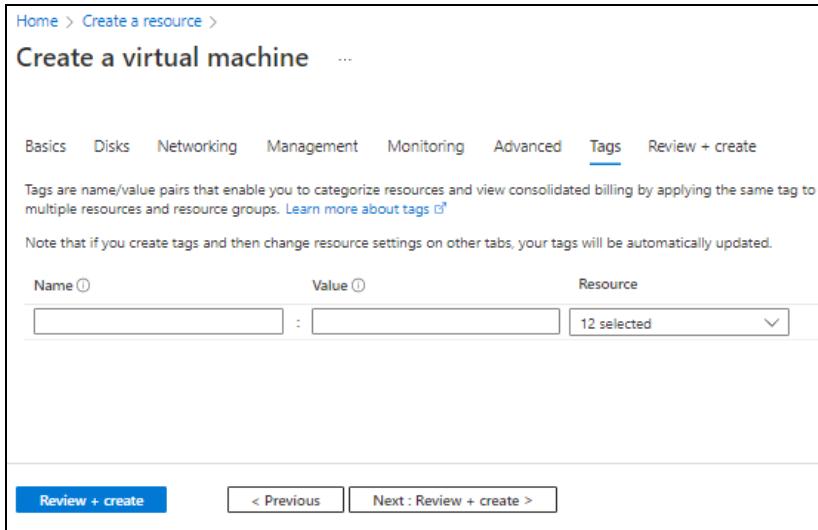
Figure 23 : Create a virtual machine window - Advanced tab



**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.**

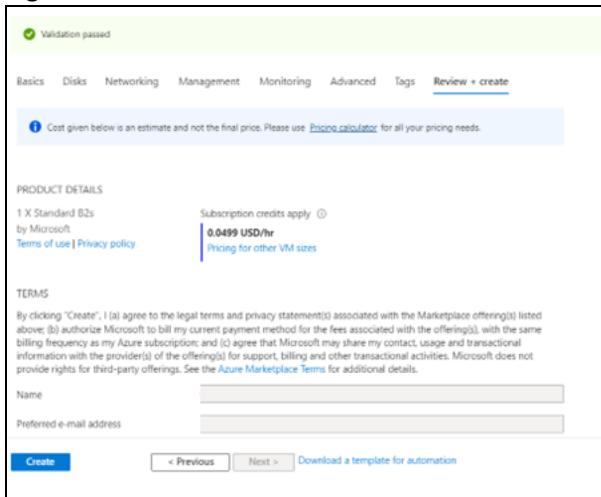
Figure 24 : Create a virtual machine window - Tags tab



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 25 : 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](#)
- [Deploy vThunder as an SLB](#)

### Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_HA\_SLB\_CONFIG\_PARAM.json with a text editor.

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

2. Configure a SLB server host or domain.

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

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

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

3. Configure SLB server ports.

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

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

#### 4. Configure service group list ports.

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

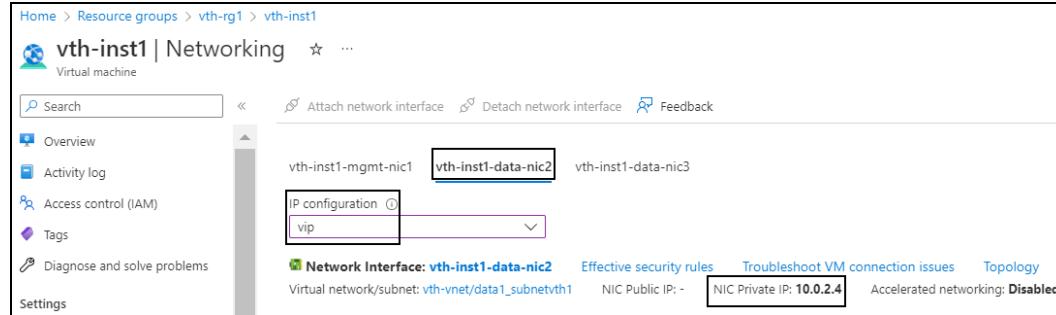
```
        }
    ],
},
{
  "name": "sg80",
  "protocol": "tcp",
  "health-check-disable": 1
  "member-list": [
    {
      "name": "s1",
      "port": 80
    }
  ]
}
],
```

## 5. Configure a virtual server.

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

- a. From **Home**, navigate thru **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 26 : 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": "10.0.2.4",
        "metadata": {
            "description": "virtual server is using VIP from
ethernet 1 subnet"
        },
        "value": [
            {
                "port-number":53,
                "protocol":"udp",
                "ha-conn-mirror":1,
                "auto":1,
                "service-group":"sg53"
            },
            {
                "port-number":80,
                "protocol":"http",
                "auto":1,
                "service-group":"sg80"
            },
            {
                "port-number":443,
                "protocol":"https",
                "auto":1,
            }
        ]
    }
}

```

```

        "service-group": "sg443"
    }
]
},

```

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

## 6. Configure SSL.

```

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

```

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

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

```

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

```

## 7. Verify if the vip address and all other configurations in the ARM\_TMPL\_3NIC\_2VM\_HA\_SLB\_CONFIG\_PARAM.json file are correct and then save the changes.

## Deploy vThunder as an SLB

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

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.

- Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_SLB_CONFIG_2.ps1  
-resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_SLB_CONFIG_2.ps1  
-resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate  
Do you want to upload ssl certificate ?  
[Y] Yes [No] No [?] Help (default is "N") : Y  
SLB Server Host IP: 10.0.3.7  
Virtual Server Name: vip  
Resource Group Name: vth-rg1  
vThunder1 Public IP: 13.85.81.137  
vThunder2 Public IP: 13.85.81.113  
Configuring vm: vth-inst1  
configured ethernet- 1 ip  
configured ethernet- 2 ip  
Configured server  
Configured service group  
0  
Configured virtual server  
SSL Configured.  
Configurations are saved on partition: shared  
Configured vThunder Instance 1  
Configuring vm: vth-inst2  
configured ethernet- 1 ip  
configured ethernet- 2 ip  
Configured server  
Configured service group  
0  
Configured virtual server  
SSL Configured.  
Configurations are saved on partition: shared  
Configured vThunder Instance 2
```

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

## Configure High Availability for vThunder

The following topics are covered:

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

### Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_HA\_CONFIG\_PARAM.json with a text editor.

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

2. Configure DNS.

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

3. Configure a Network Gateway IP.

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

```
"rib-list": [
    {
        "ip-dest-addr": "0.0.0.0",
        "ip-mask": "/0",
        "ip-nexthop-ipv4": [
            {
                "ip-next-hop": "10.0.1.1"
            }
        ]
    }
],
```

#### 4. Set VRRP-A.

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

#### 5. Set a Terminal Idle Timeout.

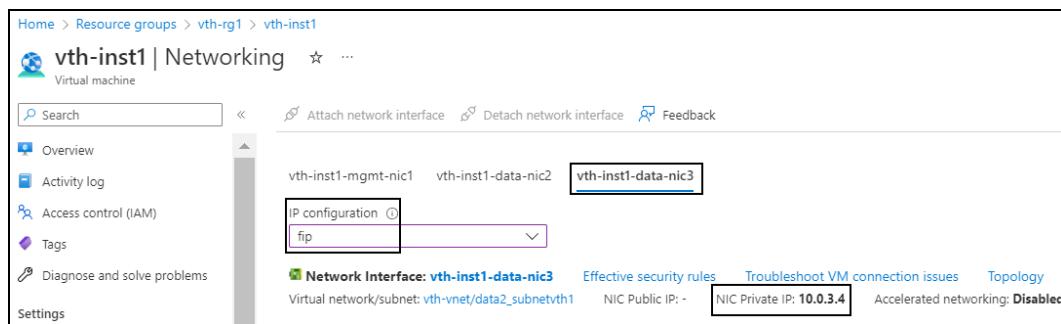
```
"terminal": {
    "idle-timeout":0
},
```

#### 6. Configure the VRID details.

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

- From the **Home**, navigate thru **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 27 : 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": "10.0.3.4"
                }
            ]
        }
    ]
}

```

- Verify if all the configurations in the ARM\_TMPL\_3NIC\_2VM\_HA\_CONFIG\_PARAM.json file are correct and then save the changes.

## Create High Availability for vThunder

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

- 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.

```
S C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_3.ps1 -  
resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_3.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](#)

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

## 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 default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```
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-->
vThunder(config)#admin <admin_username> password <new_password>
```

---

**NOTE:** It is highly recommended to change the default password when you login for the first time.

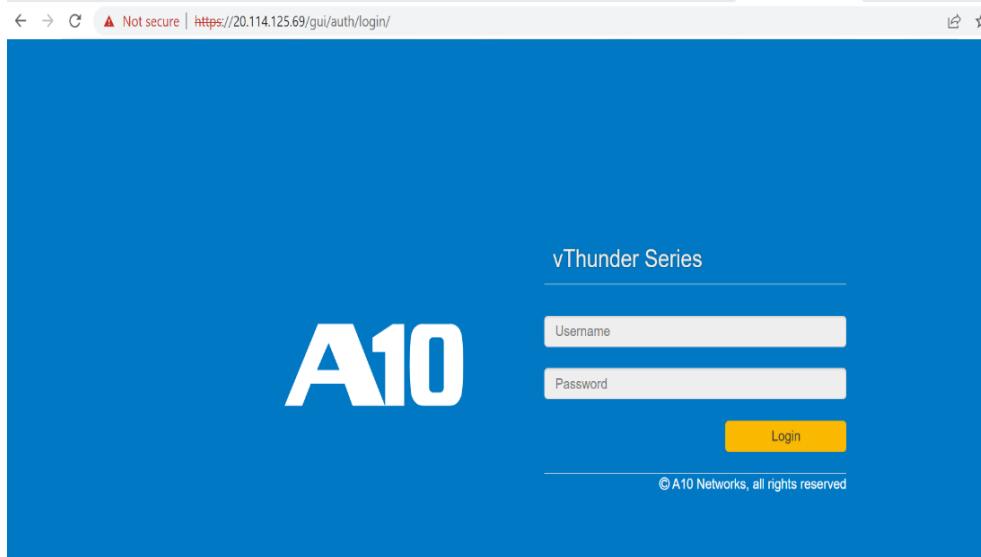
---

## 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 28 : vThunder GUI



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

## Verify Deployment

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

1. Run the following command on vThunder:

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

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

```
!Section configuration: 602 bytes
!
```

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

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

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

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

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

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

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

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

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

!
vrrp-a common
  device-id 1
  set-id 1
  enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
interface management
  ip address dhcp
!
interface ethernet 1
  enable
  ip address dhcp
!
interface ethernet 2
  enable
  ip address dhcp
!
vrrp-a vrid 0
```

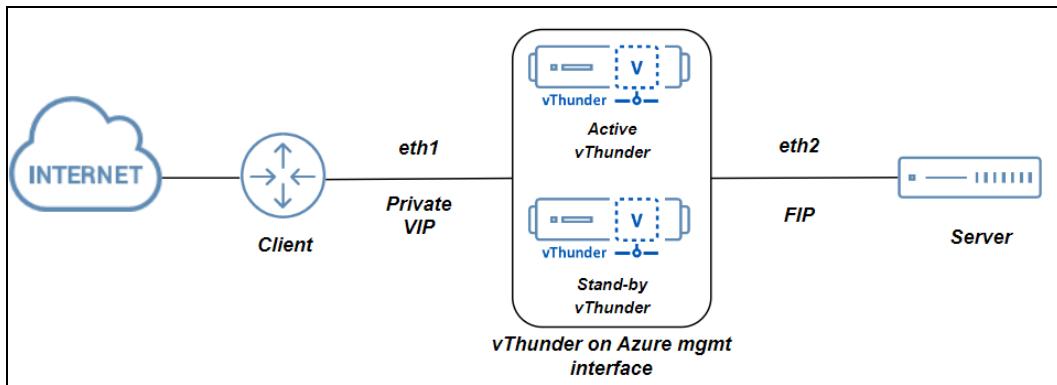
```
floating-ip 10.0.3.4
floating-ip 10.0.2.4
blade-parameters
    priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.1.1
!
```

# Deploy ARM Template 3NIC-2VM-HA-GLM-PVTVIP

[Figure 29](#) 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 29 : 3NIC-2VM-HA-GLM-PVTVIP Topology



The following topics are covered:

<a href="#">System Requirements</a>	96
<a href="#">Create vThunder Instances</a>	101
<a href="#">Configure Server and Client Machine</a>	106
<a href="#">Configure vThunder as an SLB</a>	124
<a href="#">Configure vThunder using GLM</a>	132
<a href="#">Verify Deployment</a>	136

## System Requirements

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

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

Table 8 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	<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><b>Performance:</b> Standard</p> <p><b>Replication:</b> Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b> Storagev2 (general purpose v2)</p>	<code>vthunderstorage</code>
Virtual	Two virtual machine	<code>vth-inst1</code>

Resource Name	Description	Default Value
Machine (VM) Instance	<p>instances are created for vThunder.</p> <p><b>Product:</b> A10 vThunder</p> <p><b>Operating system:</b> Linux</p> <p><b>Default Size:</b> Standard_B4ms (4 vCPUs, 16 GiB Memory)</p> <p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p><a href="#">Table 9</a> lists the supported VM sizes.</p>	vth-inst2
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: vth-vnet1-mgmt-sub1 10.0.1.0/24 Subnet2:

Resource Name	Description	Default Value	
		<b>vth-vnet1-data-sub2</b> 10.0.2.0/24 Subnet3: <b>vth-vnet1-data-sub3</b> 10.0.3.0/24	
Public IP	A public IP address is assigned to the management interface of each vThunder instance.	<b>vth-inst1-mgmt-nic1-ip</b>  <b>vth-inst2-mgmt-nic1-ip</b>	
Network Interface Card [NIC]	<p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1, Ethernet 2]</li> </ul> <p><b>NOTE:</b> The secondary IP of data interface is taken from DHCP server.</p>	<b>vth-inst1-mgmt-nic1</b>	10.0.1.35
		<b>vth-inst1-data-nic2</b>	10.0.2.35 [Primary IP]
			10.0.2.X [Secondary IP]
		<b>vth-inst1-data-nic3</b>	10.0.3.35 [Primary IP]
			10.0.3.X [Secondary IP]
		<b>vth-inst2-mgmt-nic1</b>	10.0.1.36
		<b>vth-inst2-data-nic2</b>	10.0.2.36 [Primary IP]
			10.0.2.X [Secondary IP]
		<b>vth-inst2-data-nic3</b>	10.0.3.36 [Primary IP]
			10.0.3.X [Secondary IP]
Network Security Group	A security group is created for all the associated default	<b>vth-inst1-nsg</b>  <b>vth-inst2-nsg</b>	

Resource Name	Description	Default Value
[NSG]	interfaces.	
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer <a href="#">Azure Service Application Access Key</a> .	

## 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 ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM\_TMPL\_3M\_HA\_GLM\_PVTVIP\_PARAM.json with a text editor.

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

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

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

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

### 3. Configure a storage account name.

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

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

### 4. Configure a virtual network.

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

### 5. Configure DNS label prefixes.

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

### 6. Configure vThunder instance names.

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

### 7. Set VM size for vThunder.

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

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

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

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

---

**NOTE:** Do not change the publisher name.

---

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

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

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

```

    "addressPrefixValue": {
        "value": "10.0.0.0/16"
    },
    "mgmtIntfPrivatePrefix_vthunder1": {
        "value": "10.0.1.0/24"
    },
    "eth1PrivatePrefix_vthunder1": {
        "value": "10.0.2.0/24"
    },
    "eth2PrivatePrefix_vthunder1": {
        "value": "10.0.3.0/24"
    },
    "mgmtIntfPrivateAddress_vthunder1": {
        "value": "10.0.1.35"
    },
    "eth1PrivateAddress_vthunder1": {
        "value": "10.0.2.35"
    },
    "eth2PrivateAddress_vthunder1": {
        "value": "10.0.3.35"
    },
    "mgmtIntfPrivateAddress_vthunder2": {
        "value": "10.0.1.36"
    },
    "eth1PrivateAddress_vthunder2": {
        "value": "10.0.2.36"
    },
    "eth2PrivateAddress_vthunder2": {
        "value": "10.0.3.36"
    },
}

```

## 11. Configure public IP address for each vThunder instances.

```

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

```

## 12. Configure network security group for two vThunder instances.

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

## 13. Verify if all the configurations in the ARM\_TMPL\_3NIC\_2VM\_HA\_GLM\_PVTVIP\_PARAM.json file are correct and then save the changes.

# Deploy vThunder

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

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

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

### Example:

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

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

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

#### Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 --template-file ARM_TMPL_3NIC_2VM_HA_GLM_PVTVIP_1.json --parameters ARM_TMPL_3NIC_2VM_HA_GLM_PVTVIP_PARAM.json
```

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

### 4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource\_group\_name>**.

Figure 30 : Resource listing in the resource group

All resources				
Subscription equals all <resource_group_name> Type equals all Location equals all				
Unsecure resources		Type	Resource group	Location
<input type="checkbox"/>	Name ↑			
<input type="checkbox"/>	vth-inst1	Virtual machine	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst1-data-nic2	Network Interface	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst1-data-nic3	Network Interface	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst1-mgmt-nic1	Network Interface	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst1-rng	Network security group	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst1_OsDisk_1_1f4871dbcaa44808b0cee946c42f25bf	Disk	VTH-RG1	South Central US
<input type="checkbox"/>	vth-inst2	Virtual machine	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst2-data-nic2	Network Interface	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst2-data-nic3	Network Interface	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst2-mgmt-nic1	Network Interface	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst2-rng	Network security group	vth-rg1	South Central US
<input type="checkbox"/>	vth-inst2_OsDisk_1_5516bf85f2cc44738afc8b90ac8eca2f	Disk	VTH-RG1	South Central US
<input type="checkbox"/>	vth-vnet	Virtual network	vth-rg1	South Central US
<input type="checkbox"/>	vThunderIP2013690007	Public IP address	vth-rg1	South Central US
<input type="checkbox"/>	vThunderIP388625422	Public IP address	vth-rg1	South Central US
<input type="checkbox"/>	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 thru **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

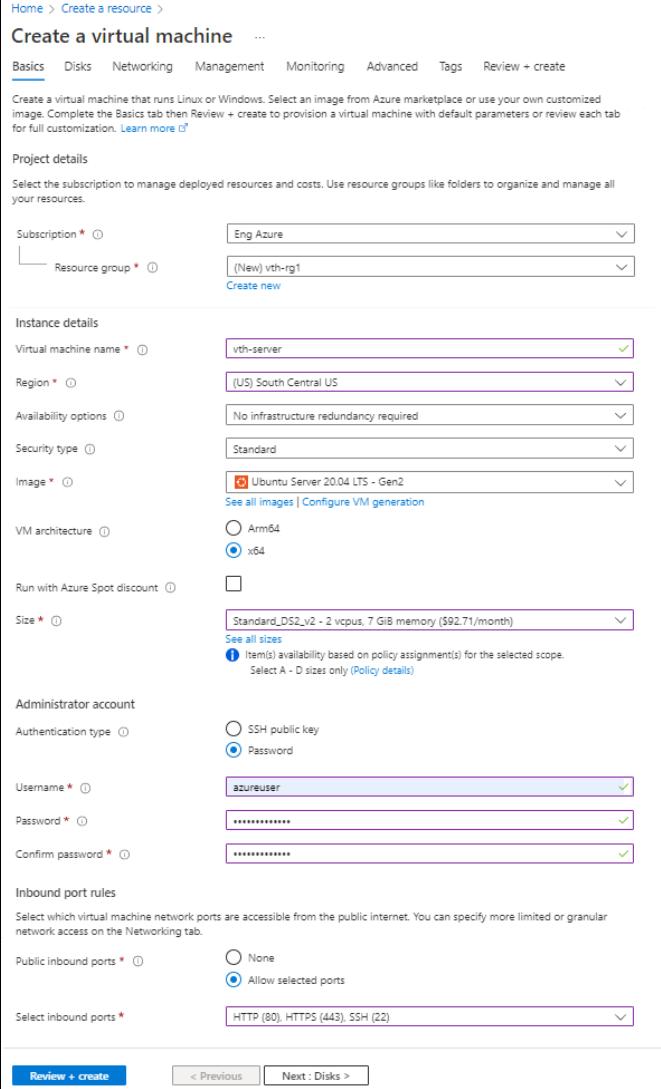
Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 31 : Create a virtual machine window - Basics tab



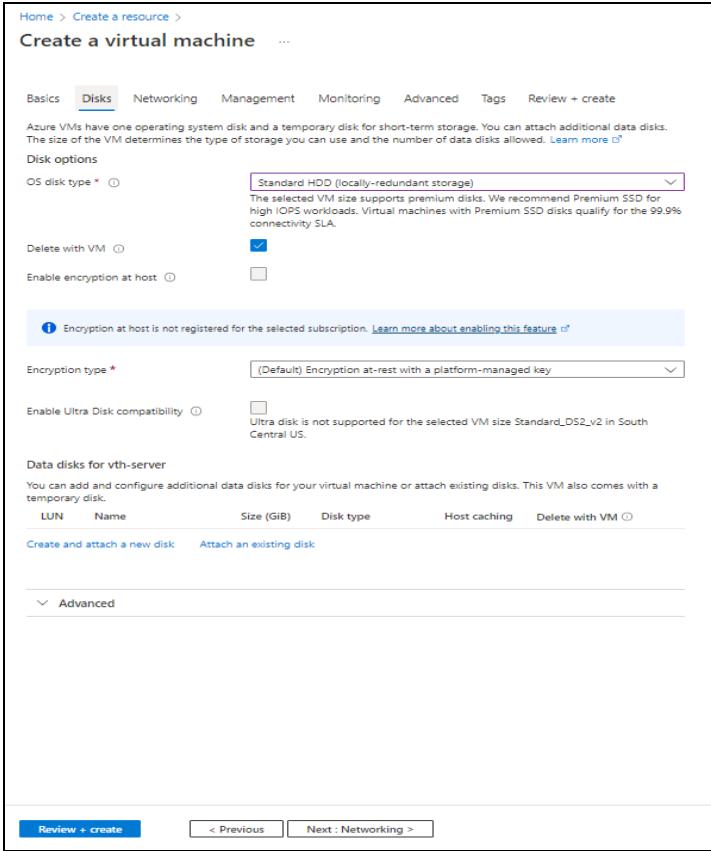
The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields include:

- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- 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
- VM architecture:** x64
- Size:** Standard\_DS2\_v2 - 2 vcpus, 7 GiB memory (\$92.71/month)
- Administrator account:**
  - Authentication type: Password (selected)
  - Username: azureuser
  - Password: (redacted)
  - Confirm password: (redacted)
- Inbound port rules:**
  - Public inbound ports: Allow selected ports
  - Select inbound ports: HTTP (80), HTTPS (443), SSH (22)

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 32 : Create a virtual machine window - Disks tab

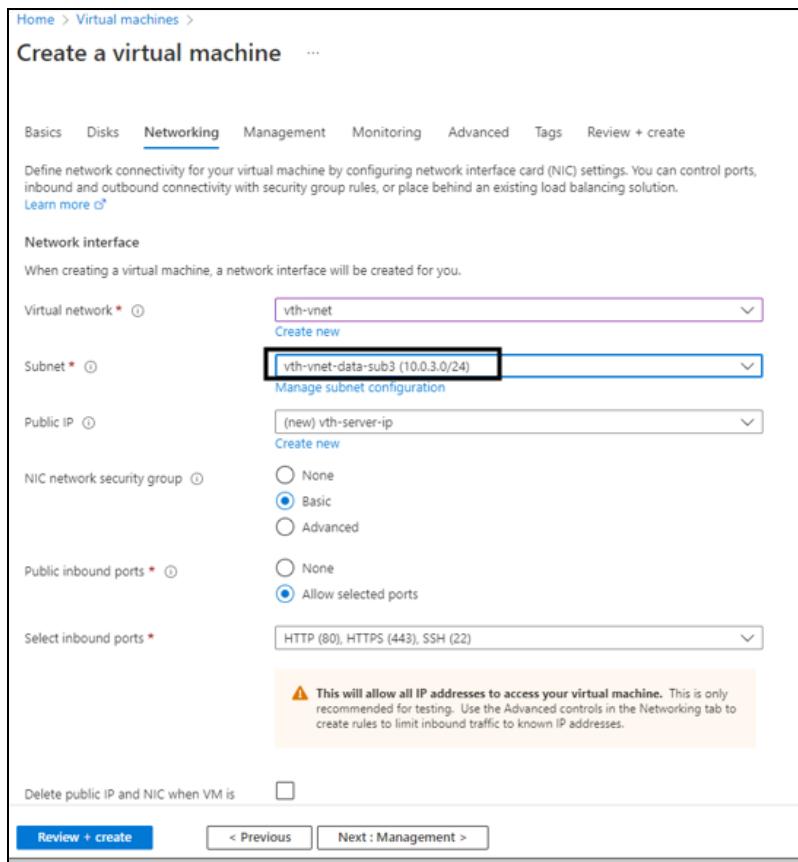


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

#### Network interface

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

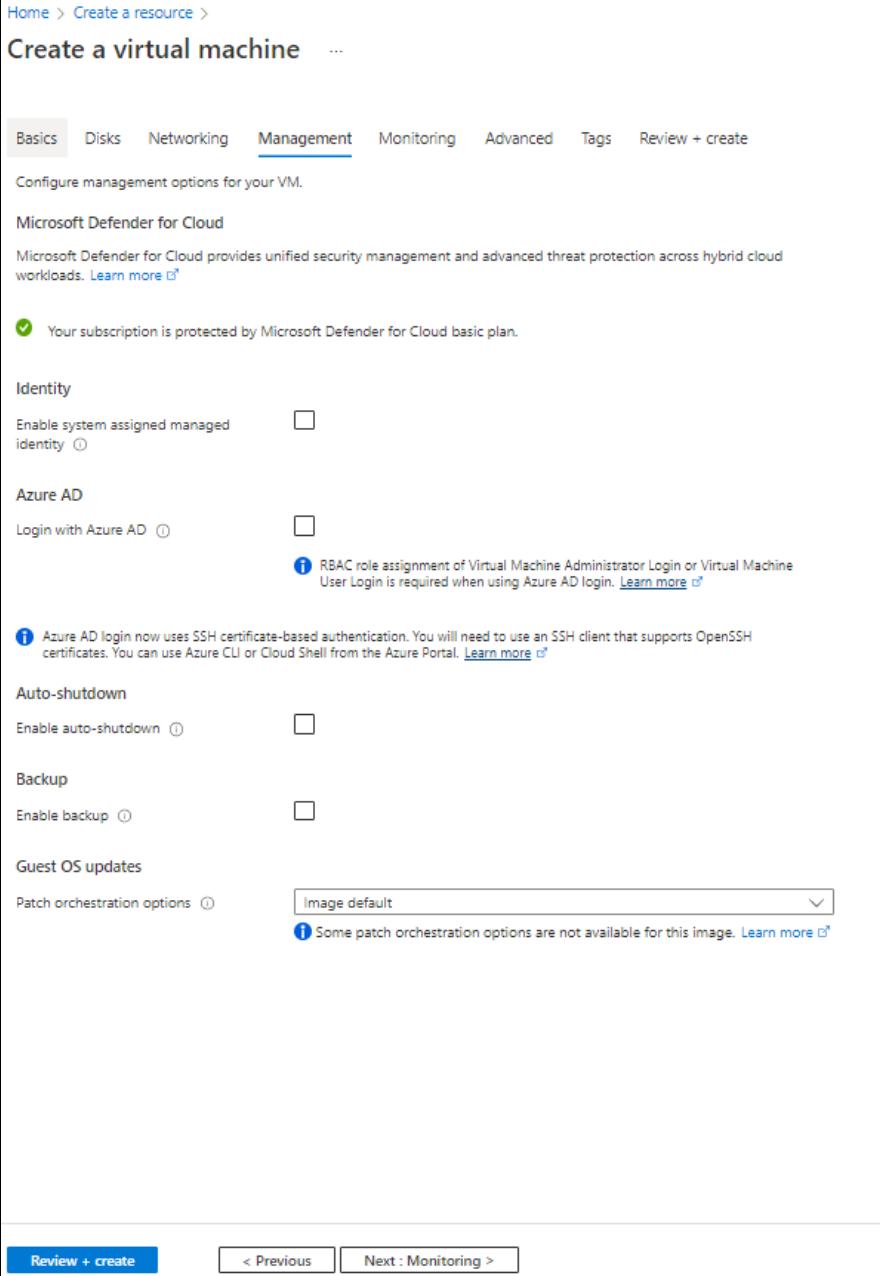
Figure 33 : Create a virtual machine window - Networking tab



- 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 34 : Create a virtual machine window - Management tab

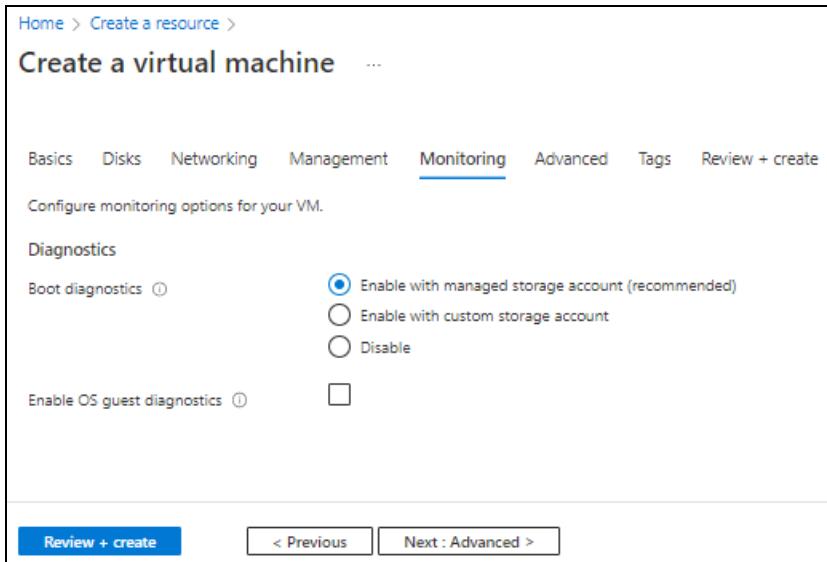


The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Management' tab. The top navigation bar includes 'Home > Create a resource > Create a virtual machine'. The 'Management' tab is selected, with other tabs like 'Basics', 'Disks', 'Networking', 'Monitoring', 'Advanced', and 'Tags' visible. A sub-header says 'Configure management options for your VM.' Below this, the 'Microsoft Defender for Cloud' section is shown, stating it provides unified security management and advanced threat protection across hybrid cloud workloads, with a link to 'Learn more'. A note indicates that the subscription is protected by Microsoft Defender for Cloud basic plan. The 'Identity' section contains two options: 'Enable system assigned managed identity' (with a help icon) and 'Login with Azure AD' (with a help icon). The 'Login with Azure AD' option includes a note about RBAC role assignment for Virtual Machine Administrator Login or Virtual Machine User Login, with a link to 'Learn more'. The 'Auto-shutdown' section has an 'Enable auto-shutdown' checkbox. The 'Backup' section has an 'Enable backup' checkbox. The 'Guest OS updates' section shows 'Patch orchestration options' set to 'Image default' (with a dropdown arrow), with a note that some patch orchestration options are not available for this image, and a link to 'Learn more'. At the bottom of the window are buttons for 'Review + create', '< Previous', and 'Next : Monitoring >'.

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

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

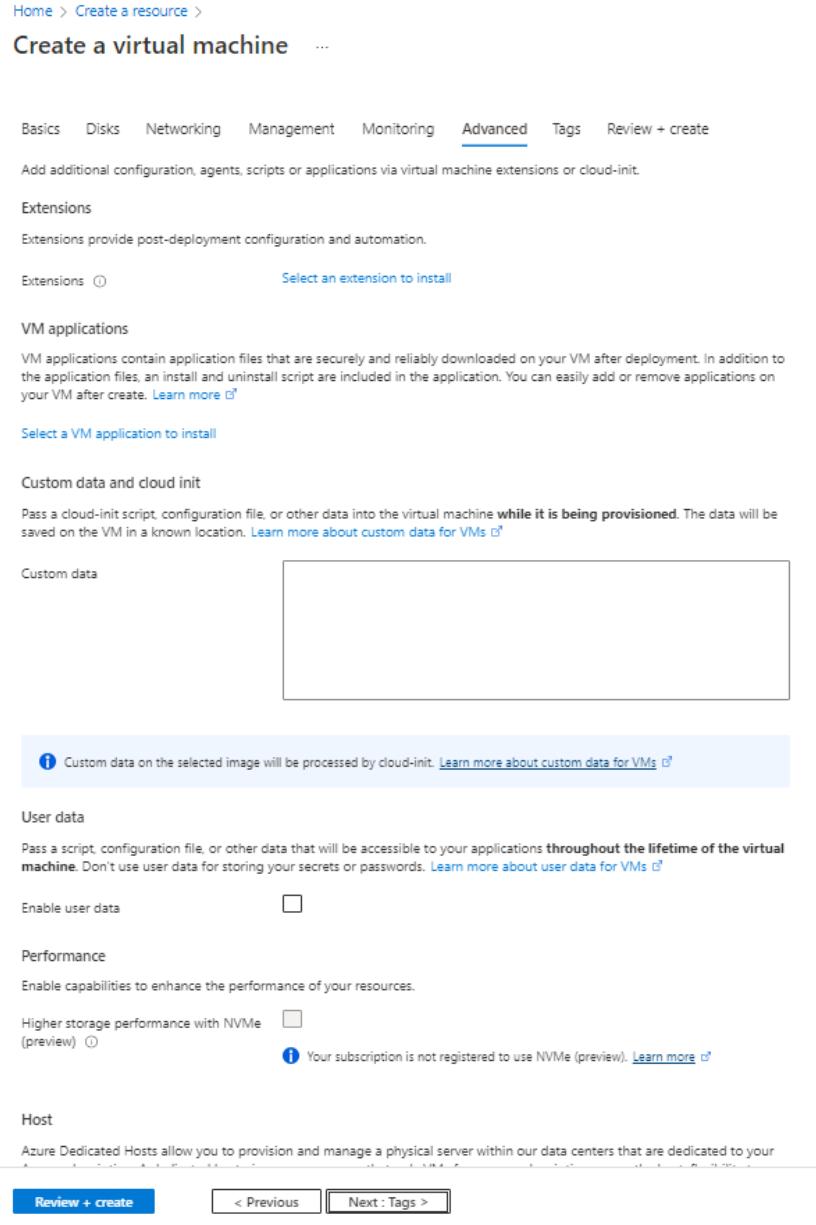
Figure 35 : Create a virtual machine window - Monitoring tab



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

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

Figure 36 : Create a virtual machine window - Advanced tab



Home > Create a resource >

## Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

**Extensions**  
Extensions provide post-deployment configuration and automation.

Extensions ⓘ Select an extension to install

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

Select a VM application to install

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

Custom data

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

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

Enable user data

**Performance**  
Enable capabilities to enhance the performance of your resources.

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

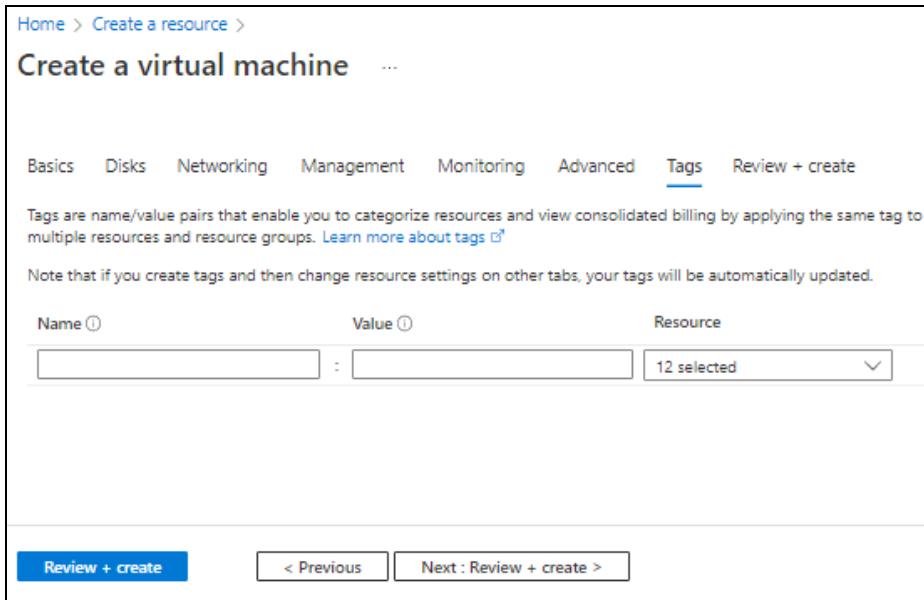
**Host**  
Azure Dedicated Hosts allow you to provision and manage a physical server within our data centers that are dedicated to your workloads.

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

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

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

Figure 37 : Create a virtual machine window - Tags tab

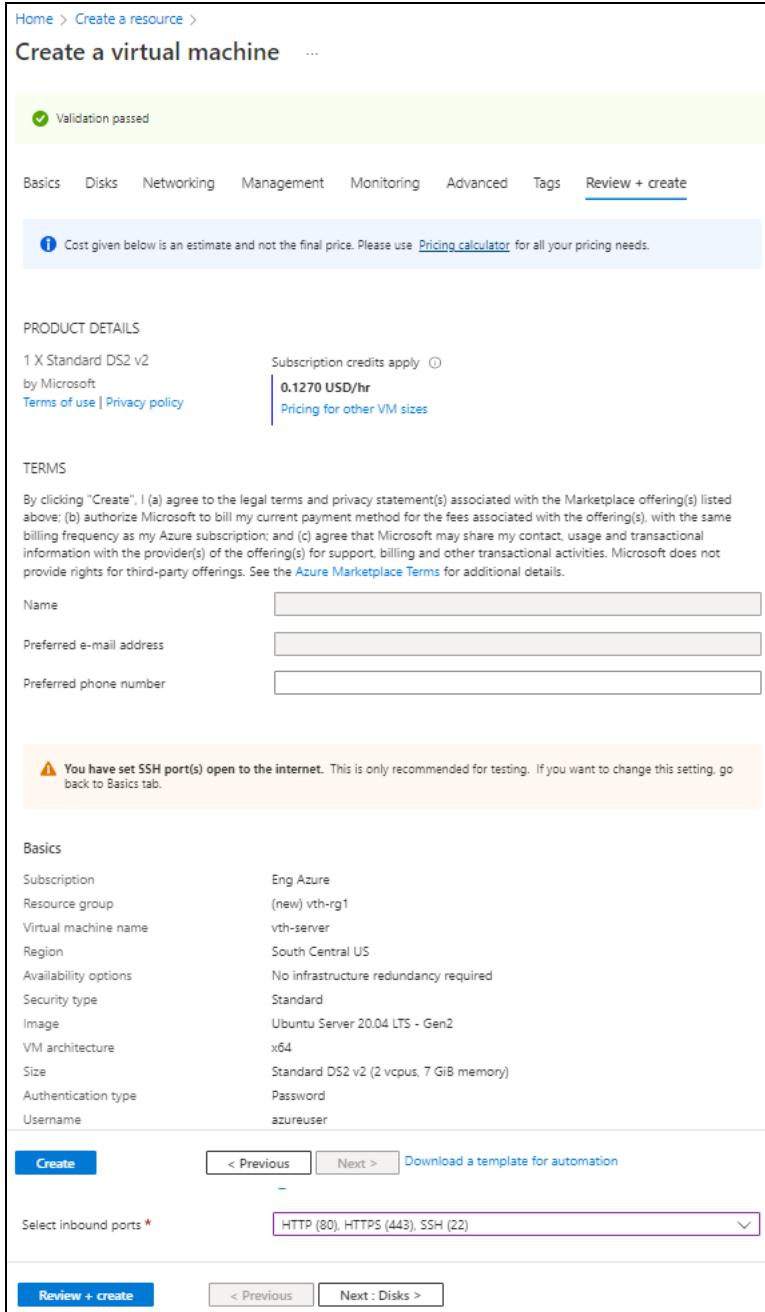


15. Click **Next : Review + create** at the bottom of the window.

The fields **Name** and **Preferred e-mail address** are auto-populated as per the Azure account.

[Deploy ARM Template 3NIC-2VM-HA-GLM-PVTVIP](#)

Figure 38 : Create a virtual machine window - Review + create tab



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Review + create' tab. At the top, a green bar indicates 'Validation passed'. Below it, tabs for Basics, Disks, Networking, Management, Monitoring, Advanced, Tags, and Review + create are shown, with 'Review + create' being the active tab.

A note at the top of the main area states: 'Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.'

**PRODUCT DETAILS**

1 X Standard DS2 v2 by Microsoft	Subscription credits apply ⓘ <b>0.1270 USD/hr</b>
<a href="#">Terms of use</a>   <a href="#">Privacy policy</a>	<a href="#">Pricing for other VM sizes</a>

**TERMS**

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

Fields for Name, Preferred e-mail address, and Preferred phone number are present.

A warning message in a yellow box states: '⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.'

**Basics**

Subscription	Eng Azure
Resource group	(new) vth-rg1
Virtual machine name	vth-server
Region	South Central US
Availability options	No infrastructure redundancy required
Security type	Standard
Image	Ubuntu Server 20.04 LTS - Gen2
VM architecture	x64
Size	Standard D52 v2 (2 vcpus, 7 GiB memory)
Authentication type	Password
Username	azureuser

At the bottom, there are buttons for 'Create' (highlighted in blue), '< Previous' and 'Next >', and a link to 'Download a template for automation'. A dropdown menu for 'Select inbound ports' shows 'HTTP (80), HTTPS (443), SSH (22)'.

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

## Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate thru **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

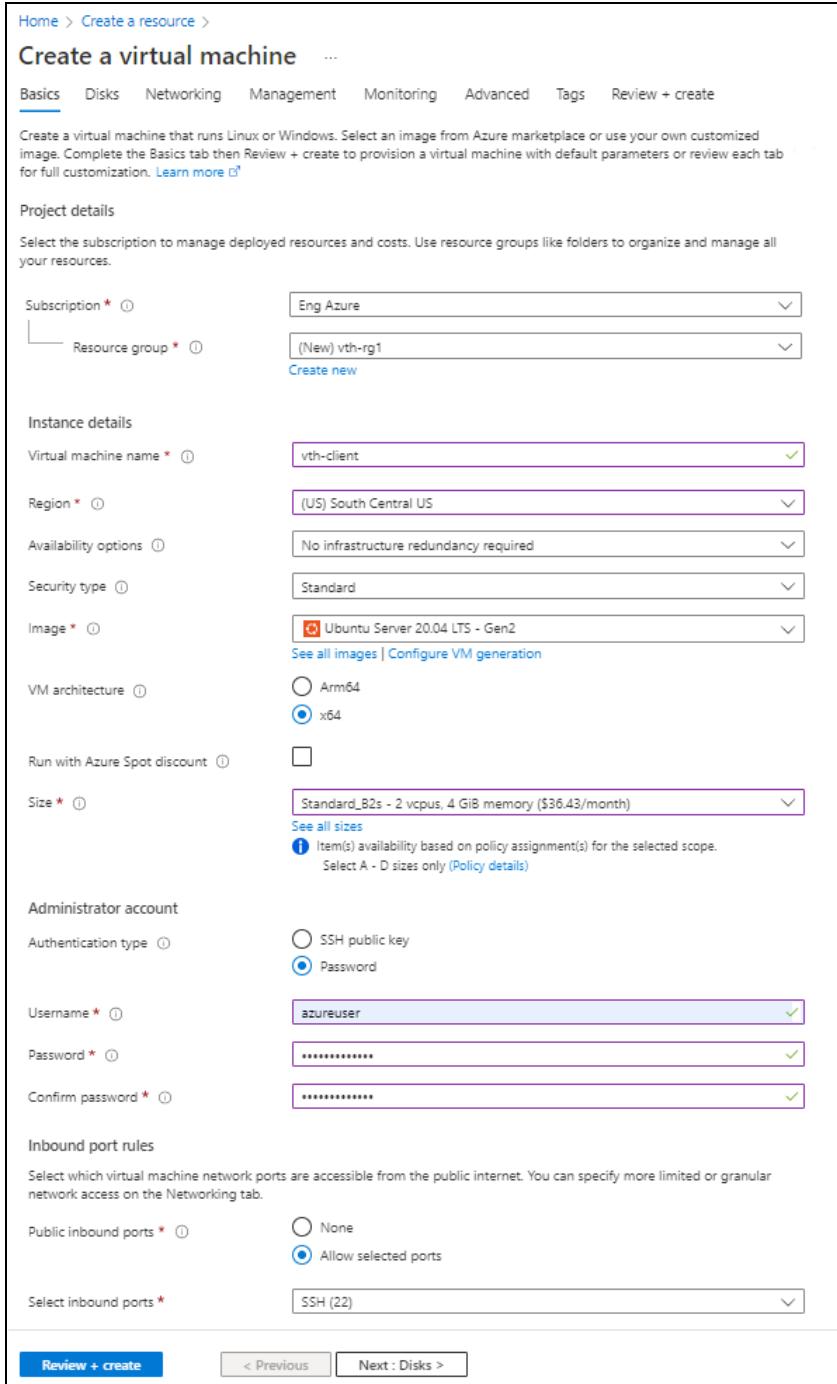
- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

[Deploy ARM Template 3NIC-2VM-HA-GLM-PVTVIP](#)

Figure 39 : Create a virtual machine window - Basics tab



The screenshot shows the 'Create a virtual machine' window in the Azure portal, specifically the 'Basics' tab. The window is titled 'Create a virtual machine' and includes a breadcrumb navigation bar: Home > Create a resource > Create a virtual machine.

**Project details:** Subscription: Eng Azure; Resource group: (New) vth-rg1 (selected). Project details note: Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

**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 (selected); VM architecture: x64 (selected); Run with Azure Spot discount: Unchecked; Size: Standard\_B2s - 2 vcpus, 4 GiB memory (\$36.43/month) (selected).

**Administrator account:** Authentication type: Password (selected); Username: azureuser; Password: (redacted); Confirm password: (redacted).

**Inbound port rules:** Public inbound ports: Allow selected ports (selected); Select inbound ports: SSH (22).

**Bottom navigation:** Review + create (highlighted in blue), < Previous, Next : Disks >.

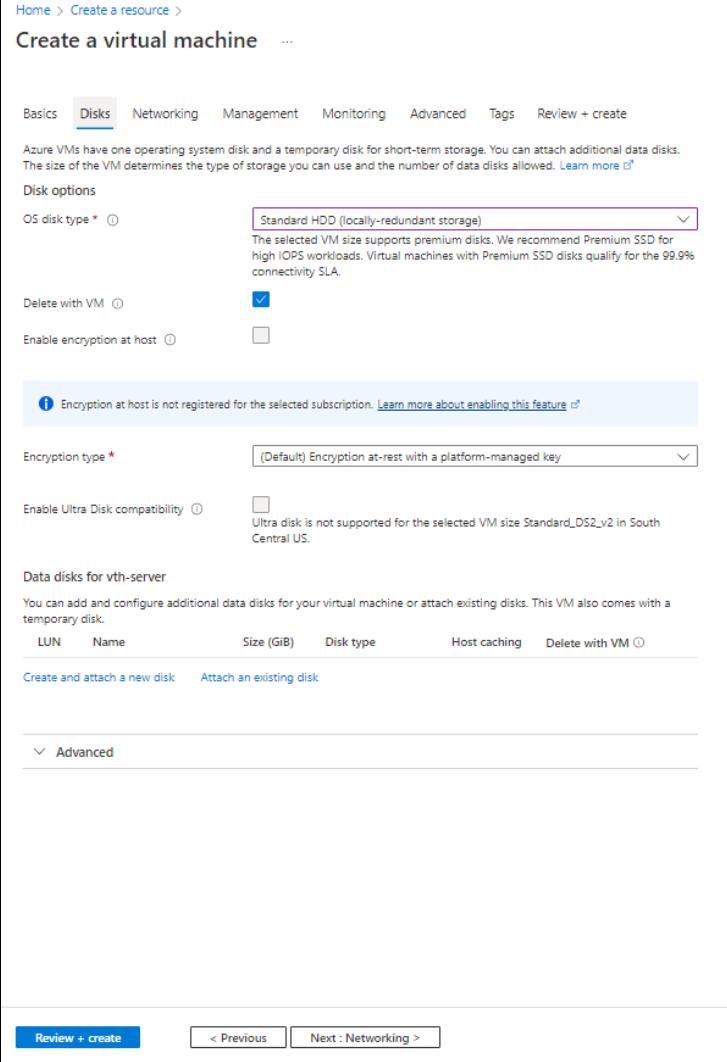
3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

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

### Disk options

- OS disk type
- Encryption type

Figure 40 : 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 'Disks' tab is selected in the top navigation bar. The page displays the following configuration:

- Disk options:**
  - OS disk type:** Standard HDD (locally-redundant storage) (selected)
  - Delete with VM:** Checked
  - Enable encryption at host:** Unchecked

A note indicates: "Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)."
- Encryption type:** (Default) Encryption at-rest with a platform-managed key
- Enable Ultra Disk compatibility:** Unchecked (with a note: "Ultra disk is not supported for the selected VM size Standard\_DS2\_v2 in South Central US.")
- Data disks for vth-server:** A table for managing additional data disks.
- Buttons at the bottom:** Review + create, < Previous, Next : Networking >

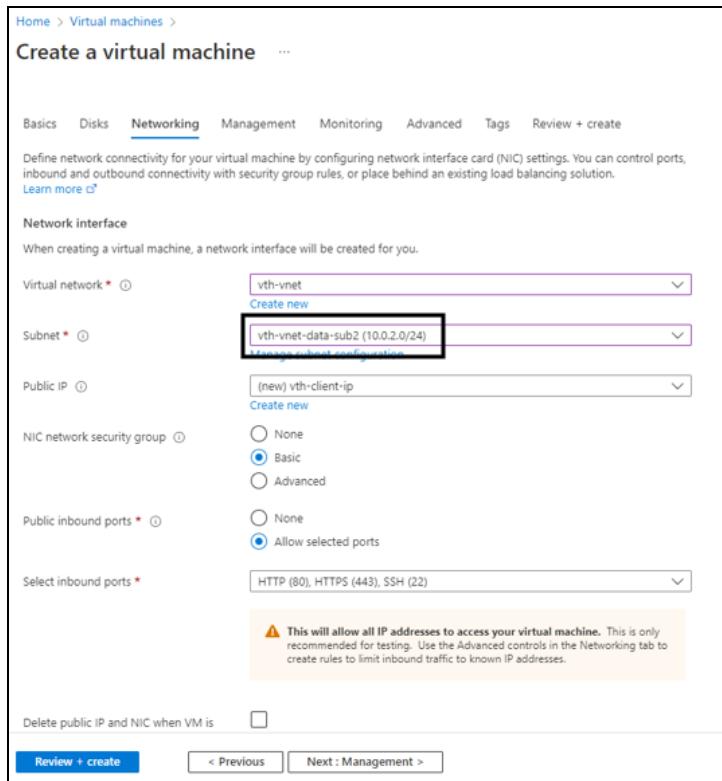
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

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

**Network interface**

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

Figure 41 : Create a virtual machine window - Networking tab

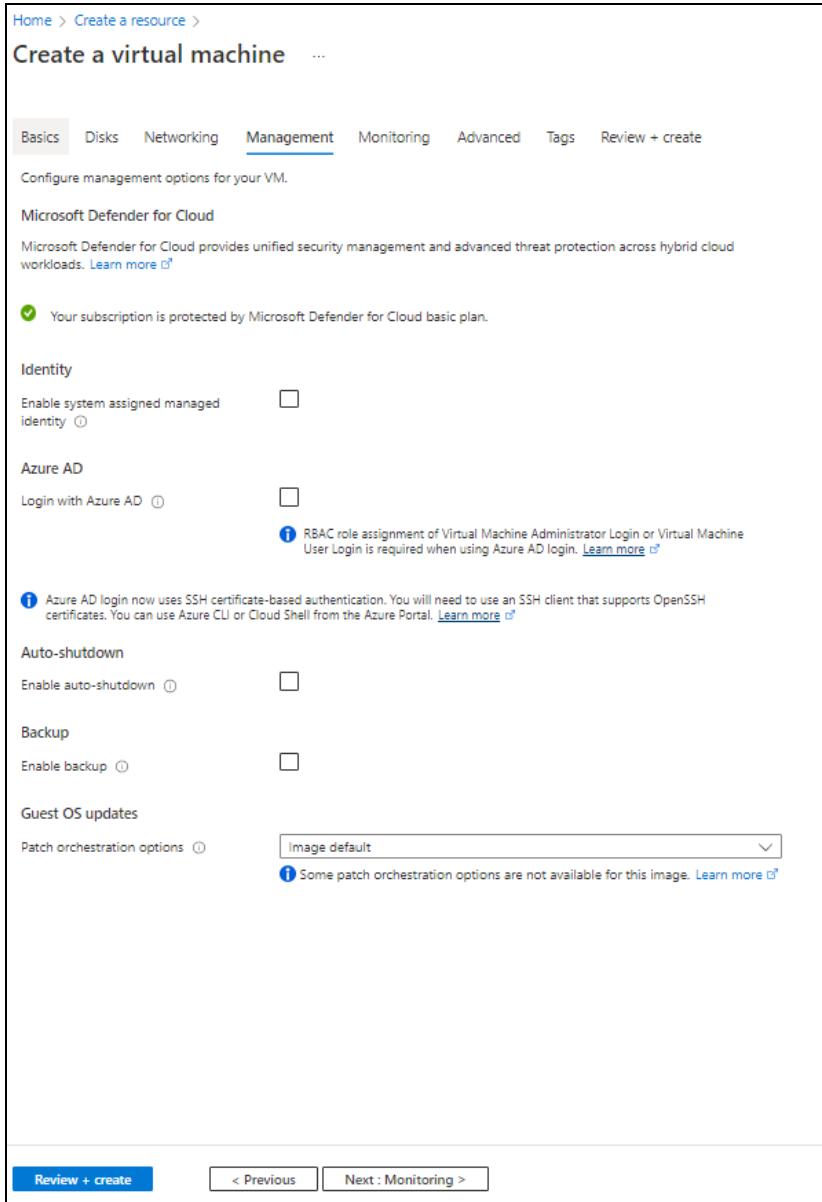


**7. Leave the remaining fields as is and click **Next : Management** at the bottom of the window.**

[Deploy ARM Template 3NIC-2VM-HA-GLM-PVTVIP](#)

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

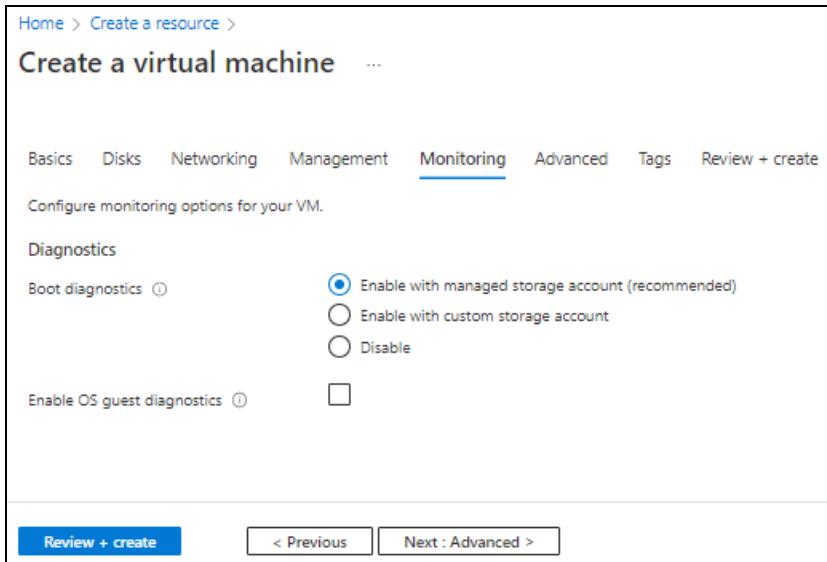
Figure 42 : Create a virtual machine window - Management tab



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

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

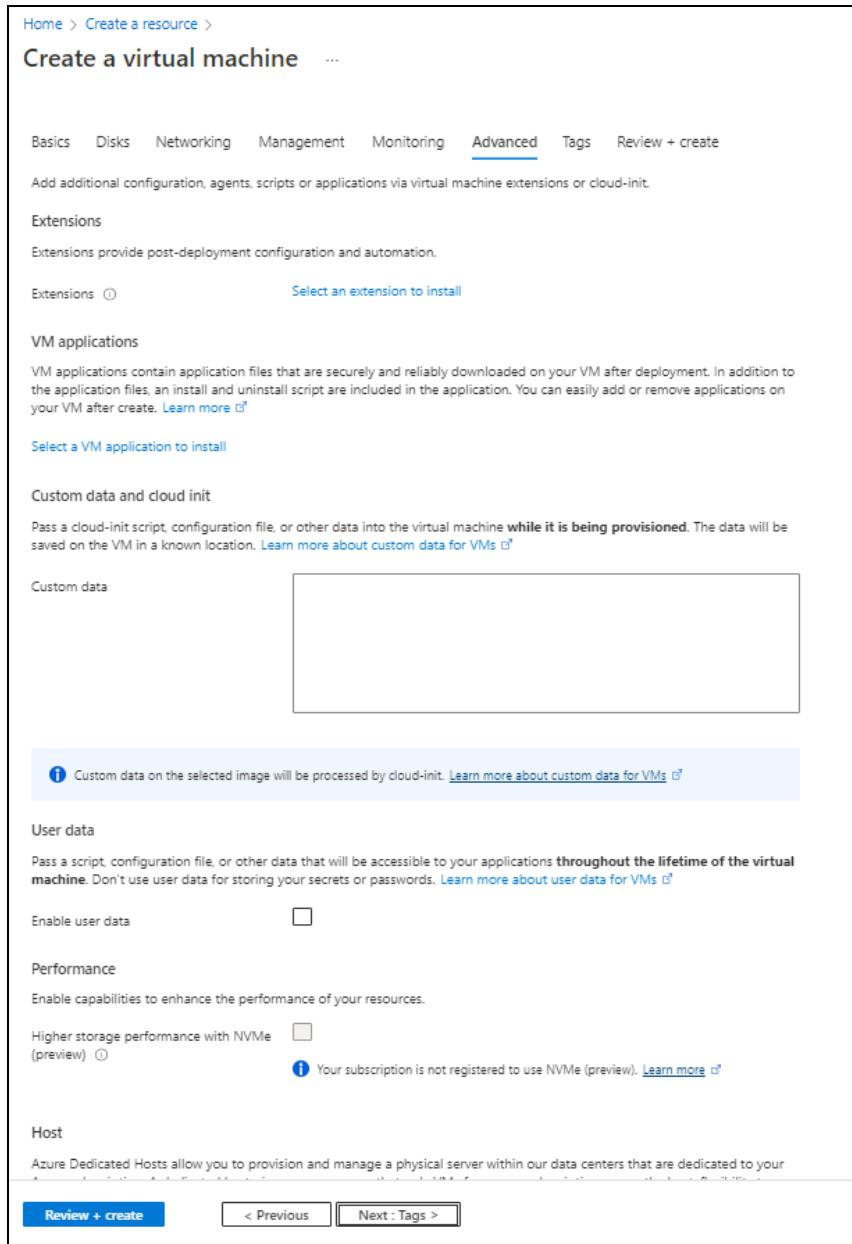
Figure 43 : Create a virtual machine window - Monitoring tab



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

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

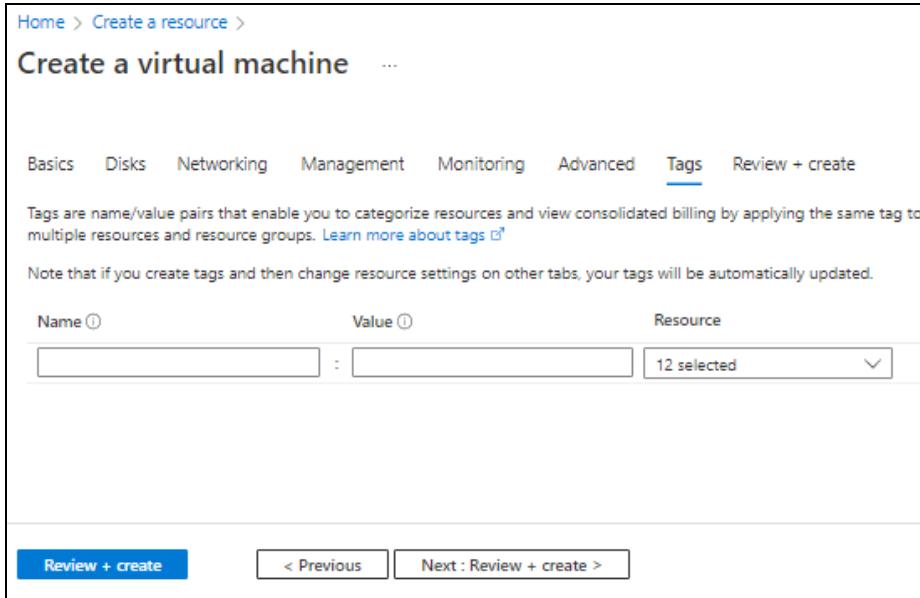
Figure 44 : Create a virtual machine window - Advanced tab



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

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

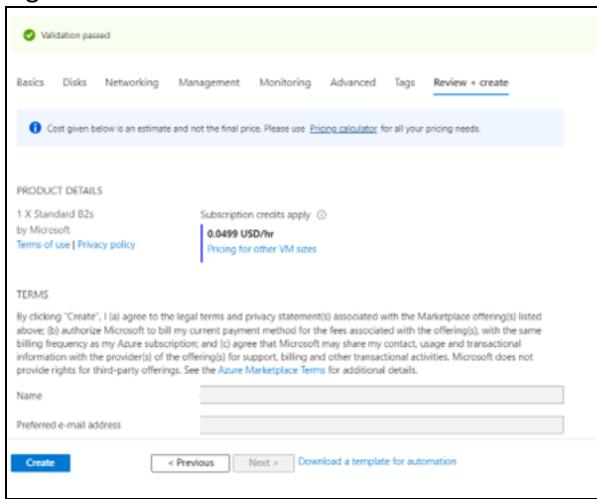
Figure 45 : Create a virtual machine window - Tags tab



**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 46 : 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](#)
- [Deploy vThunder as an SLB](#)

### Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_SLB\_CONFIG\_PARAM.json with a text editor.

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

2. Configure SLB server host or domain.

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

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

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

3. Configure SLB server ports.

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

```

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

```

#### 4. Configure service group list ports.

```

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

```

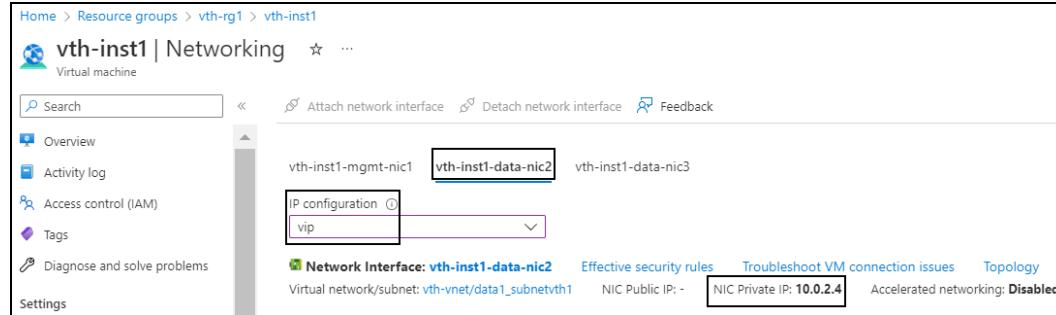
```
        ],
    },
    {
        "name": "sg80",
        "protocol": "tcp",
        "health-check-disable": 1
        "member-list": [
            {
                "name": "s1",
                "port": 80
            }
        ]
    }
],
```

## 5. Configure virtual server.

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

- a. From **Home**, navigate thru **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 47 : 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": "10.0.2.4",
        "metadata": {
            "description": "virtual server is using VIP from
ethernet 1 subnet"
        },
        "value": [
            {
                "port-number":53,
                "protocol":"udp",
                "ha-conn-mirror":1,
                "auto":1,
                "service-group":"sg53"
            },
            {
                "port-number":80,
                "protocol":"http",
                "auto":1,
                "service-group":"sg80"
            },
            {
                "port-number":443,
                "protocol":"https",
                "auto":1,
            }
        ]
    }
}

```

```

        "service-group": "sg443"
    }
]
},

```

---

**NOTE:** `ha-conn-mirror` does not work on port 80 and 443.

---

## 6. Configure SSL.

```

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

```

---

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

---

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

```

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

```

## 7. Verify if the vip address and all other configurations in the ARM\_TMPL\_3NIC\_2VM\_SLB\_CONFIG\_PARAM.json file are correct and then save the changes.

# Deploy vThunder as an SLB

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

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.

- Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_2.ps1 -  
resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_2.ps1 -  
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate  
Do you want to upload ssl certificate ?  
[Y] Yes [No] No [?] Help (default is "N") : Y  
SLB Server Host IP: 10.0.3.7  
Virtual Server Name: vip  
Resource Group Name: vth-rg1  
vThunder1 Public IP: 13.85.81.137  
vThunder2 Public IP: 13.85.81.113  
Configuring vm: vth-inst1  
configured ethernet- 1 ip  
configured ethernet- 2 ip  
Configured server  
Configured service group  
0  
Configured virtual server  
SSL Configured.  
Configurations are saved on partition: shared  
Configured vThunder Instance 1  
Configuring vm: vth-inst2  
configured ethernet- 1 ip  
configured ethernet- 2 ip  
Configured server  
Configured service group  
0  
Configured virtual server  
SSL Configured.  
Configurations are saved on partition: shared  
Configured vThunder Instance 2
```

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

## Configure High Availability for vThunder

The following topics are covered:

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

### Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_HA\_CONFIG\_PARAM.json with a text editor.

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

2. Configure DNS.

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

3. Configure a Network Gateway IP.

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

```
"rib-list": [
    {
        "ip-dest-addr": "0.0.0.0",
        "ip-mask": "/0",
        "ip-nexthop-ipv4": [
            {
                "ip-next-hop": "10.0.1.1"
            }
        ]
    }
],
```

#### 4. Set VRRP-A.

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

#### 5. Set a Terminal Idle Timeout.

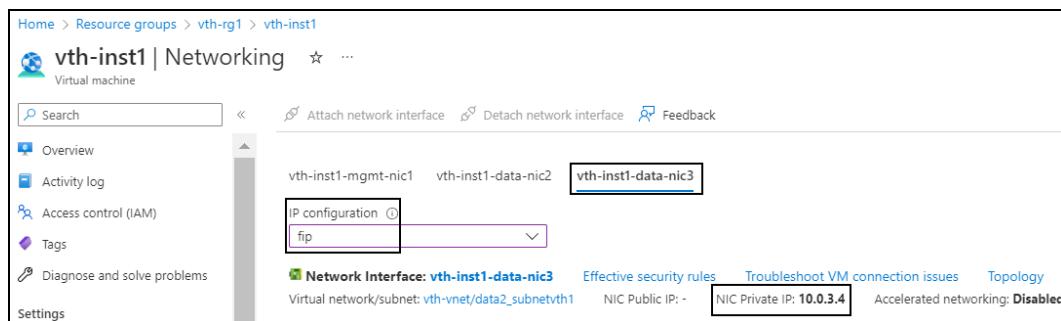
```
"terminal": {
    "idle-timeout":0
},
```

#### 6. Configure the VRID details.

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

- From the **Home**, navigate thru **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 48 : 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": "10.0.3.4"
                }
            ]
        }
    ]
}

```

- Verify if all the configurations in the ARM\_TMPL\_3NIC\_2VM\_HA\_CONFIG\_PARAM.json file are correct and then save the changes.

## Create High Availability for vThunder

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

- 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.

```
S C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_3.ps1 -  
resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_3.ps1 -  
resourceGroup vth-rg1
```

## Configure vThunder using GLM

The following topics are covered:

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

## Initial Setup

Before configuring vThunder with GLM, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_GLM\_CONFIG\_PARAM.json with a text editor.
2. Configure GLM account details.

```
{  
    "parameters": {  
        "user_name": {  
            "value": "user_name"  
        },  
        "user_password": {  
            "value": "user_password"  
        },  
        "entitlement_token": {  
            "value": "token"  
        }  
    }  
}
```

3. Verify if the configurations in the ARM\_TMPL\_3NIC\_2VM\_GLM\_CONFIG\_PARAM.json file are correct and then save the changes.

## Apply GLM License

To apply GLM License, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_4.ps1 -  
resourceGroupName <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_4.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](#)

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

### 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 default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```
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-->
vThunder(config)#admin <admin_username> password <new_password>
```

---

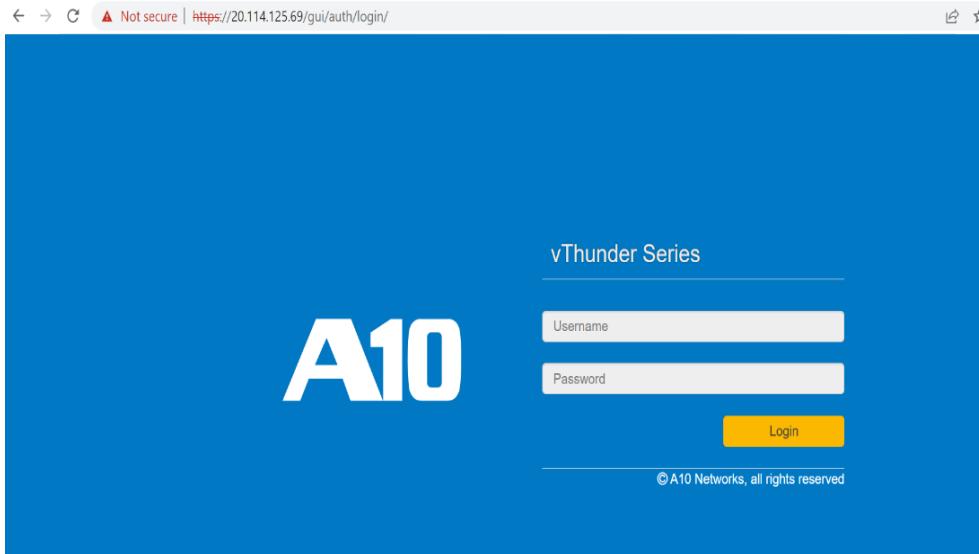
**NOTE:** It is highly recommended to change the default password when you login for the first time.

---

## Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

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



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

## Verify Deployment

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

1. Run the following command on vThunder:

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

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

```
!Section configuration: 602 bytes
!
slb server s1 10.0.3.7
  port 53 udp
    health-check-disable
  port 80 tcp
    health-check-disable
  port 443 tcp
```

```

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

- 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]

- Run the following command to verify HA:

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

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

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

!
vrrp-a common
  device-id 1
  set-id 1
  enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
glm use-mgmt-port
glm enable-requests
glm token A10f771cecbe
!
interface management
  ip address dhcp
!
interface ethernet 1
  enable
  ip address dhcp
!
interface ethernet 2
  enable
  ip address dhcp
!
vrrp-a vrid 0
  floating-ip 10.0.3.4
  floating-ip 10.0.2.4
  blade-parameters
```

```

    priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.1.1
!
```

4. Run the following command to verify the GLM License Provision configuration:

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

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

```

Host ID          : 5DCB01EC264BECCCFECB3C2ED42E02384EE8C527
USB ID          : Not Available
Billing Serials: A10f771cecbbe0000
Token           : A10f771cecbbe
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.
```

[Deploy ARM Template 3NIC-2VM-HA-GLM-PVTVIP](#)

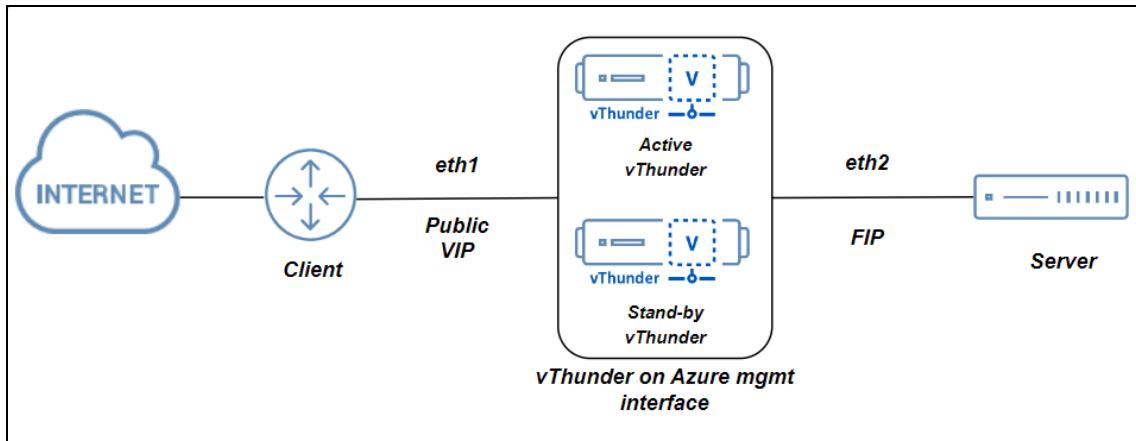
CYLANCE	N/A	Requires an additional Cylance license.
IPSEC_VPN	N/A	Requires an additional IPsec VPN license.
25 Mbps Bandwidth 21-December-2022		

# Deploy ARM Template 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO

[Figure 49](#) shows the 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO deployment topology. Using this template, two vThunder instances can be deployed containing:

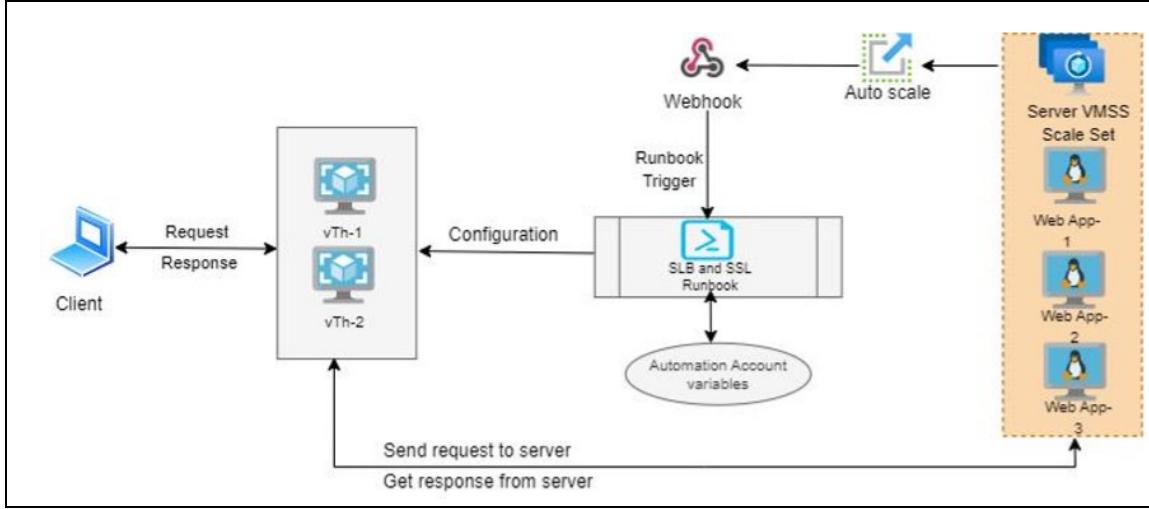
- One management interface and two data interfaces each
- HA support
- GLM integration
- Backend server autoscaling support.

Figure 49 : 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO Topology



[Figure 50](#) 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 50 : 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO Process Flow



The following topics are covered:

<a href="#">System Requirements</a>	142
<a href="#">Create vThunder Instances</a>	147
<a href="#">Configure Server VMSS</a>	153
<a href="#">Configure vThunder as an SLB</a>	169
<a href="#">Configure High Availability for vThunder</a>	174
<a href="#">Configure vThunder using GLM</a>	177
<a href="#">Access vThunder using CLI or GUI</a>	178
<a href="#">Verify Deployment</a>	180

## System Requirements

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

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

Table 10 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	<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 <b>vth-rg1</b> .
Azure Storage Account	<p>A storage account is created inside the resource group, if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p><b>Performance:</b> Standard</p> <p><b>Replication:</b> Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b> Storagev2 (general purpose v2)</p>	<b>vthunderstorage</b>
Virtual Machine (VM)	Two virtual machine instances are created for vThunder.	<b>vth-inst1</b> <b>vth-inst2</b>

Resource Name	Description	Default Value
Instance	<p><b>Product:</b> A10 vThunder</p> <p><b>Operating system:</b> Linux</p> <p><b>Default Size:</b> Standard_B4ms (4 vCPUs, 16 GiB Memory)</p> <p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p><a href="#">Table 11</a> 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	A custom runbook is created under the automation account: SLB-Config A webhook is created for SLB.	

Resource Name	Description	Default Value												
Virtual Machine Scale Set [VMSS]	A virtual machine scale set is created.	<b>vth-server-vmss</b>												
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<b>vth-vmss-vnet</b> Address prefix for virtual network: <b>10.0.0.0/16</b>												
Subnet	Three subnets are created with an address prefix each.	Subnet1: <b>vth-vnet1-mgmt-sub1 10.0.1.0/24</b> Subnet2: <b>vth-vnet1-data-sub2 10.0.2.0/24</b> Subnet3: <b>vth-vnet1-data-sub3 10.0.3.0/24</b>												
Public IP	A public IP address is assigned to the management interface of each vThunder instance.	<b>vth-inst1-mgmt-nic1-ip</b>  <b>vth-inst2-mgmt-nic1-ip</b>												
Network Interface Card [NIC]	<p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1, Ethernet 2]</li> </ul>	<table border="1"> <tr> <td><b>vth-inst1-mgmt-nic1</b></td><td><b>10.0.1.35</b></td></tr> <tr> <td><b>vth-inst1-data-nic2</b></td><td><b>10.0.2.35</b> [Primary IP]</td></tr> <tr> <td></td><td><b>10.0.2.X</b> [Secondary IP]</td></tr> <tr> <td><b>vth-inst1-data-nic3</b></td><td><b>10.0.3.35</b> [Primary IP]</td></tr> <tr> <td></td><td><b>10.0.3.X</b> [Secondary IP]</td></tr> <tr> <td><b>vth-inst2-mgmt-nic1</b></td><td><b>10.0.1.36</b></td></tr> </table>	<b>vth-inst1-mgmt-nic1</b>	<b>10.0.1.35</b>	<b>vth-inst1-data-nic2</b>	<b>10.0.2.35</b> [Primary IP]		<b>10.0.2.X</b> [Secondary IP]	<b>vth-inst1-data-nic3</b>	<b>10.0.3.35</b> [Primary IP]		<b>10.0.3.X</b> [Secondary IP]	<b>vth-inst2-mgmt-nic1</b>	<b>10.0.1.36</b>
<b>vth-inst1-mgmt-nic1</b>	<b>10.0.1.35</b>													
<b>vth-inst1-data-nic2</b>	<b>10.0.2.35</b> [Primary IP]													
	<b>10.0.2.X</b> [Secondary IP]													
<b>vth-inst1-data-nic3</b>	<b>10.0.3.35</b> [Primary IP]													
	<b>10.0.3.X</b> [Secondary IP]													
<b>vth-inst2-mgmt-nic1</b>	<b>10.0.1.36</b>													

Resource Name	Description	Default Value	
	<b>NOTE:</b> The secondary IP of data interface is taken from DHCP server.	vth-inst2-data-nic2	10.0.2.36 [Primary IP]
			10.0.2.X [Secondary IP]
		vth-inst2-data-nic3	10.0.3.36 [Primary IP]
			10.0.3.X [Secondary IP]
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	vth-nsg1  vth-nsg2	
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer <a href="#">Azure Service Application Access Key</a> .		

## 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

Series	Size	Qualified Name
	Standard B4ms	Standard_B4ms
D series	Standard D3v2	Standard_D3_v2
	Standard DS3v2	Standard_DS3_v2
	Standard D5v2	Standard_D5_v2
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

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

For more information on Windows and Linux VM sizes, see

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

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

## Create vThunder Instances

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM\_TMPL\_3NIC\_2VM\_PARAM.json with a text editor.

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

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

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

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

3. Configure a storage account name.

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

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

4. Configure a virtual network.

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

5. Configure DNS label prefixes.

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

## 6. Configure vThunder instance names.

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

## 7. Set VM size for vThunder.

```
"vthunderSize": {
    "value": "Standard_DS3_v2"
},
```

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

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

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

---

**NOTE:** Do not change the publisher name.

---

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

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

```

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

```

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

```

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

```

```

    "eth1PrivateAddress_vthunder2": {
        "value": "10.0.2.36"
    },
    "eth2PrivateAddress_vthunder2": {
        "value": "10.0.3.36"
    },

```

**11. Configure public IP address for each vThunder instances.**

```

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

```

**12. Configure network security group for two vThunder instances.**

```

    "networkSecurityGroupName_vthunderm1": {
        "value": "vth-inst1-nsg"
    },
    "networkSecurityGroupName_vthunderm2": {
        "value": "vth-inst2-nsg"
    }

```

**13. Verify if all the configurations in the ARM\_TMPL\_3NIC\_2VM\_PARAM.json file are correct and then save the changes.**

## Deploy vThunder

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

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

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

**Example:**

```
PS C:\Users\TestUser\Templates> az group create --name vth-rg1 --location "south central us"
```

```
{  
    "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/resourceGroups/vth-rg1",  
    "location": "southcentralus",  
    "managedBy": null,  
    "name": "vth-rg1",  
    "properties": {  
        "provisioningState": "Succeeded"  
    },  
    "tags": null,  
    "type": "Microsoft.Resources/resourceGroups"  
}
```

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

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

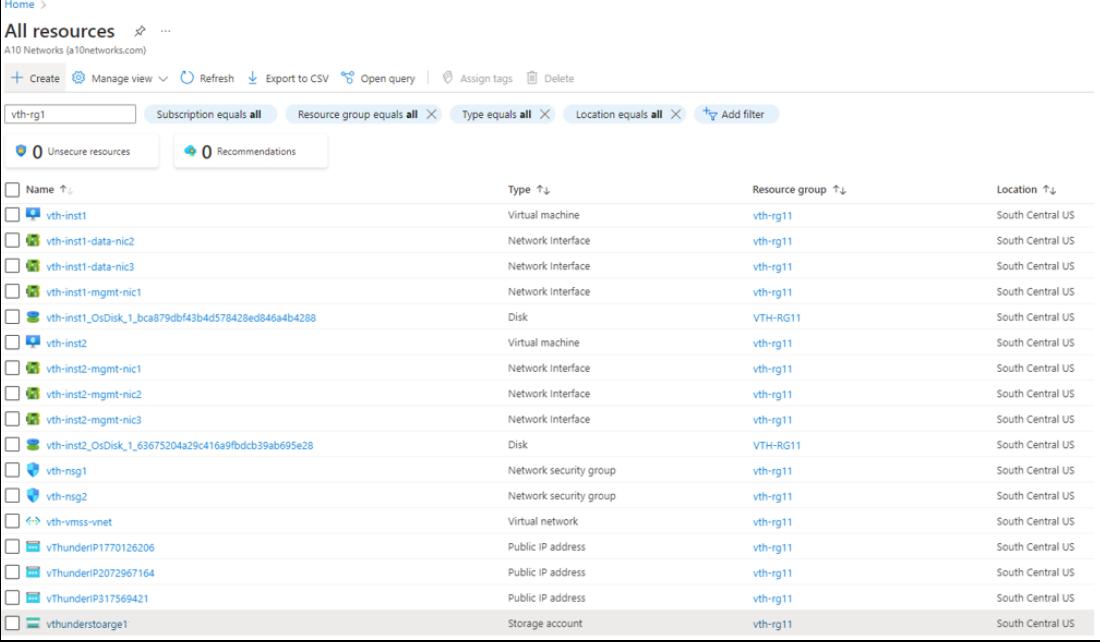
**Example:**

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -  
-template-file ARM_TMPL_3NIC_2VM_1.json --parameters ARM_TMPL_3NIC_2VM_  
PARAM.json
```

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

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

Figure 51 : Resource listing in the resource group



Name	Type	Resource group	Location
vth-inst1	Virtual machine	vth-rg11	South Central US
vth-inst1-data-nic2	Network Interface	vth-rg11	South Central US
vth-inst1-data-nic3	Network Interface	vth-rg11	South Central US
vth-inst1-mgmt-nic1	Network Interface	vth-rg11	South Central US
vth-inst1_OsDisk_1_bca879dbf43b4d578428ed846a4b4288	Disk	VTH-RG11	South Central US
vth-inst2	Virtual machine	vth-rg11	South Central US
vth-inst2-mgmt-nic1	Network Interface	vth-rg11	South Central US
vth-inst2-mgmt-nic2	Network Interface	vth-rg11	South Central US
vth-inst2-mgmt-nic3	Network Interface	vth-rg11	South Central US
vth-inst2_OsDisk_1_63675204a29c416a9fbdc39ab695e28	Disk	VTH-RG11	South Central US
vth-nsg1	Network security group	vth-rg11	South Central US
vth-nsg2	Network security group	vth-rg11	South Central US
vth-vms-vmnet	Virtual network	vth-rg11	South Central US
vThunderIP1770126206	Public IP address	vth-rg11	South Central US
vThunderIP2072967164	Public IP address	vth-rg11	South Central US
vThunderIP317569421	Public IP address	vth-rg11	South Central US
vthunderstorage1	Storage account	vth-rg11	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 thru **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

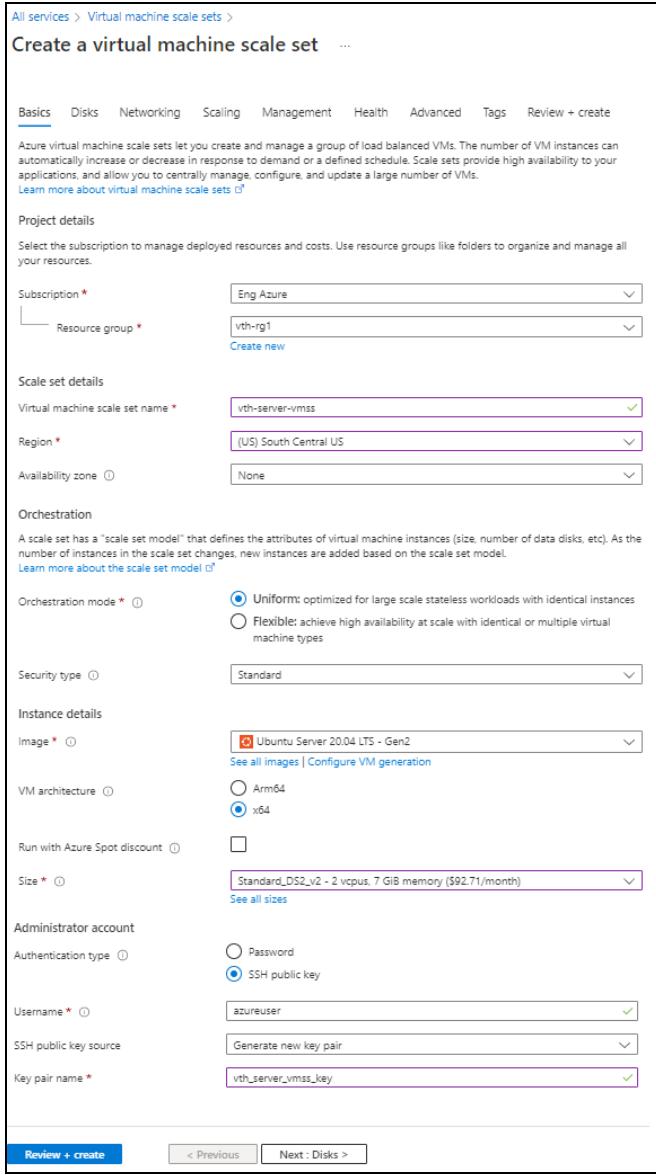
- Image
- Size

#### Administrator account

- Depending upon the Authentication type, provide the information.

## Deploy ARM Template 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO

Figure 52 : 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:

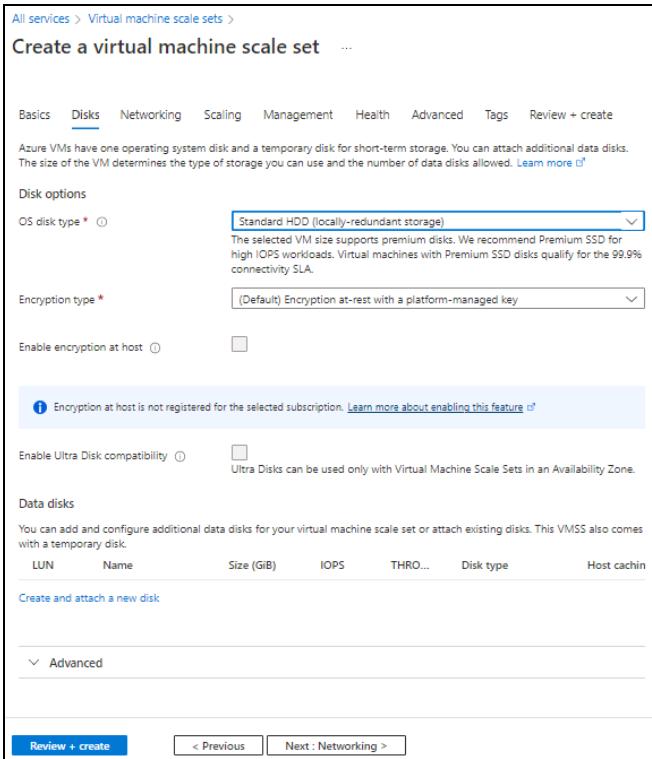
- Subscription:** Eng Azure
- Resource group:** vth-rg1
- Virtual machine scale set name:** vth-server-vmss
- Region:** (US) South Central US
- Availability zone:** None
- Orchestration mode:** Uniform (selected)
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Run with Azure Spot discount:** Unchecked
- Size:** Standard\_DS2\_v2 - 2 vcpus, 7 GB 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

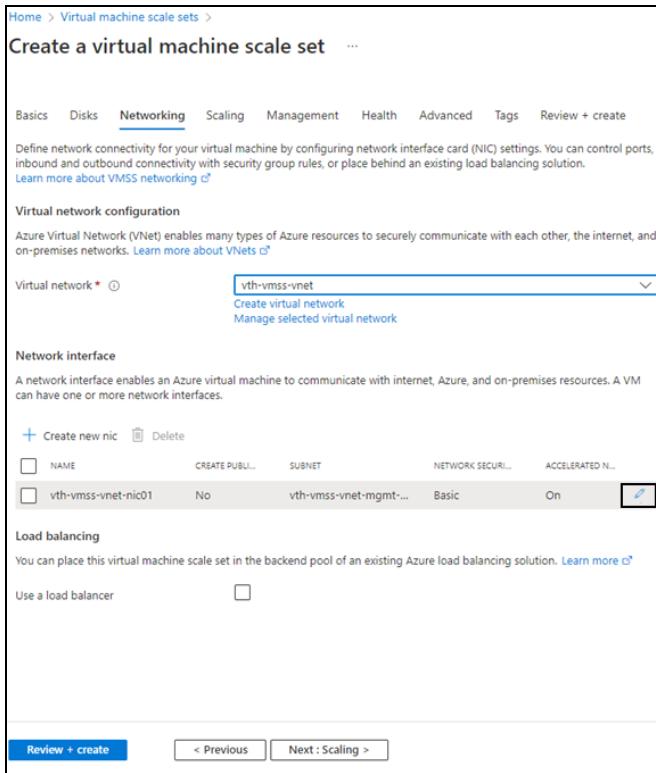
Figure 53 : Create a virtual machine scale set window - Disks tab



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

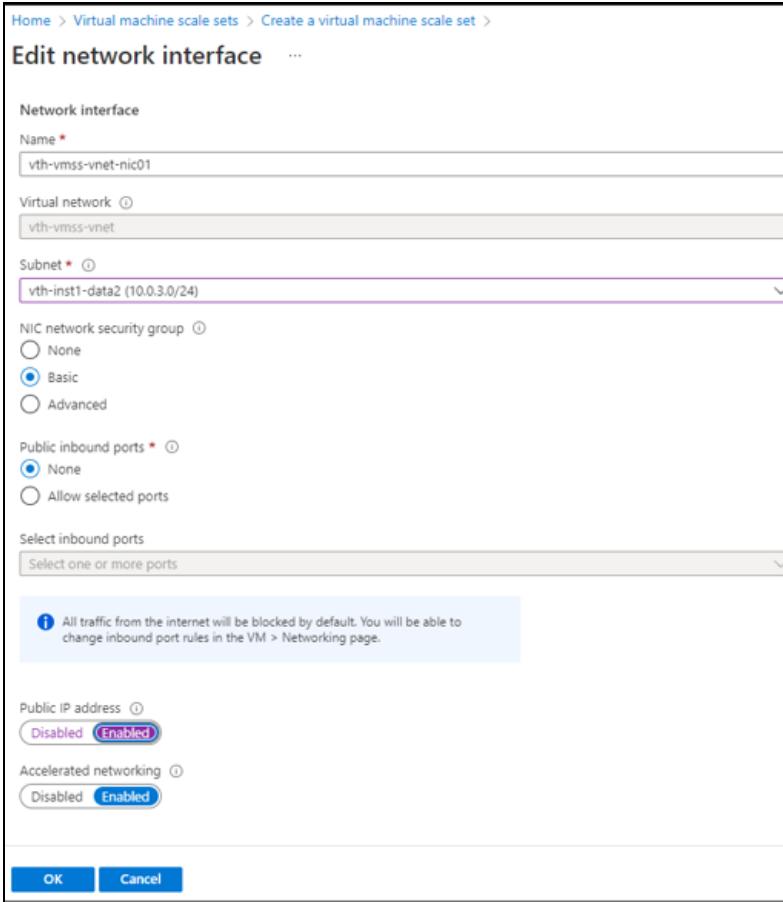
## 6. Select the Virtual network in the **Networking** tab.

Figure 54 : Create a virtual machine scale set window - Networking tab



7. If Data subnet 2 (Ethernet 2) value is not assigned to management NIC 1, click the edit button corresponding to it.  
The **Edit Network Interface** window appears.
8. Select Data subnet 2 value in the **Subnet** field and then click **OK**. Here, the Subnet 3 value is **10.0.3.0/24**.

Figure 55 : Edit network interface window



The screenshot shows the 'Edit network interface' configuration page. At the top, the breadcrumb navigation is: Home > Virtual machine scale sets > Create a virtual machine scale set > Edit network interface. The main section is titled 'Edit network interface'. It contains the following fields:

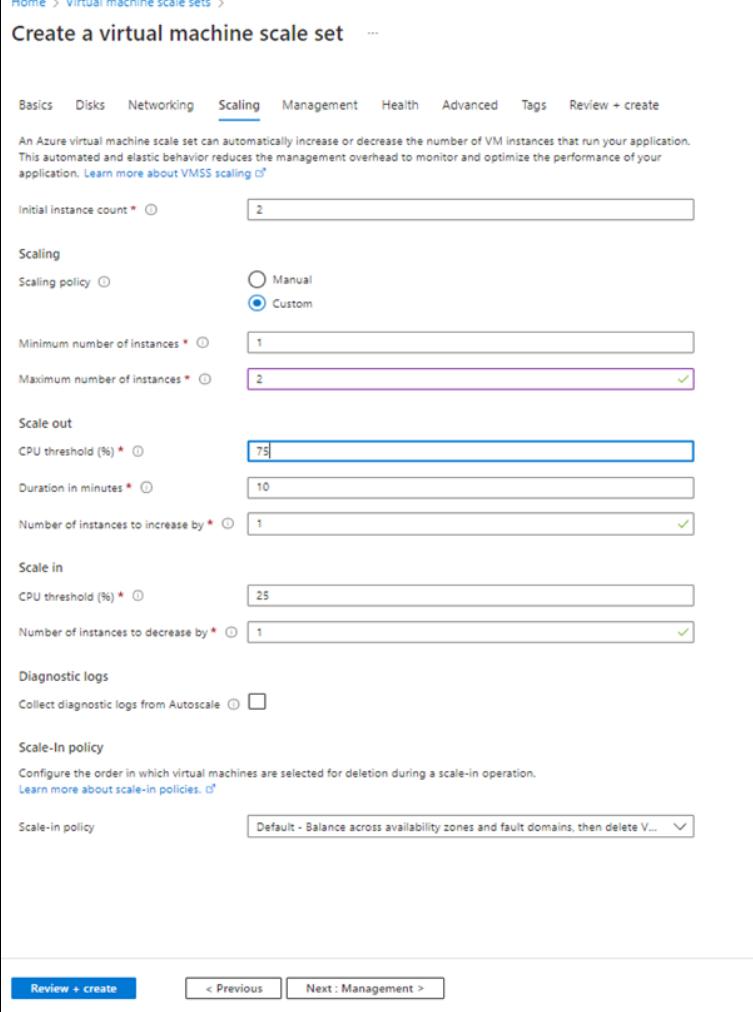
- Name \***: vth-vmss-vnet-nic01
- Virtual network**: vth-vmss-vnet
- Subnet \***: vth-inst1-data2 (10.0.3.0/24)
- NIC network security group**:
  - None
  - Basic
  - Advanced
- Public inbound ports \***:
  - None
  - Allow selected ports
- Select inbound ports**: A dropdown menu showing 'Select one or more ports'.
- Info message**: A tooltip states: 'All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.'
- Public IP address**:
  - Disabled
  - Enabled
- Accelerated networking**:
  - Disabled
  - Enabled

At the bottom are two buttons: 'OK' and 'Cancel'.

9. Leave the remaining fields as is in the **Networking** tab and click **Next : Scaling** at the bottom of the window.

## 10. Select or enter the information in the **Scaling** tab as shown below.

Figure 56 : Create a virtual machine scale set window - Scaling tab



The screenshot shows the 'Create a virtual machine scale set' wizard in the Azure portal, specifically the 'Scaling' tab. The 'Scaling' tab is selected in the top navigation bar. The page includes a brief description of what a VMSS scale set does and links to learn more about VMSS scaling.

**Scaling Policy:** Set to 'Custom'. The 'Initial instance count' is 2. The 'Minimum number of instances' is 1. The 'Maximum number of instances' is 2.

**Scale Out Policies:** CPU threshold is set to 75%. Duration is 10 minutes. Number of instances to increase by is 1.

**Scale In Policies:** CPU threshold is set to 25%. Number of instances to decrease by is 1.

**Diagnostic Logs:** The 'Collect diagnostic logs from Autoscale' checkbox is unchecked.

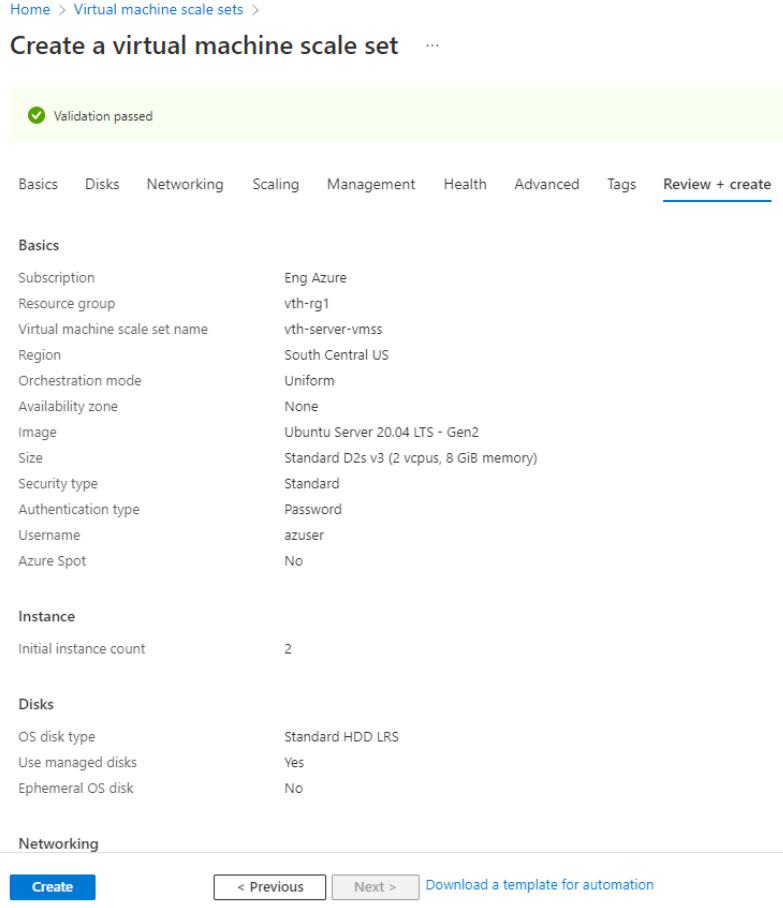
**Scale-In Policy:** The policy is set to 'Default - Balance across availability zones and fault domains, then delete V...'. A dropdown menu is open next to this setting.

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

[Deploy ARM Template 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

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

Figure 57 : Create a virtual machine scale set window - Review + create tab



The screenshot shows the 'Create a virtual machine scale set' configuration page. The 'Review + create' tab is selected. The configuration details are as follows:

Setting	Value
Subscription	Eng Azure
Resource group	vth-rg1
Virtual machine scale set name	vth-server-vmss
Region	South Central US
Orchestration mode	Uniform
Availability zone	None
Image	Ubuntu Server 20.04 LTS - Gen2
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Security type	Standard
Authentication type	Password
Username	azuser
Azure Spot	No
Instance	
Initial instance count	2
Disks	
OS disk type	Standard HDD LRS
Use managed disks	Yes
Ephemeral OS disk	No
Networking	

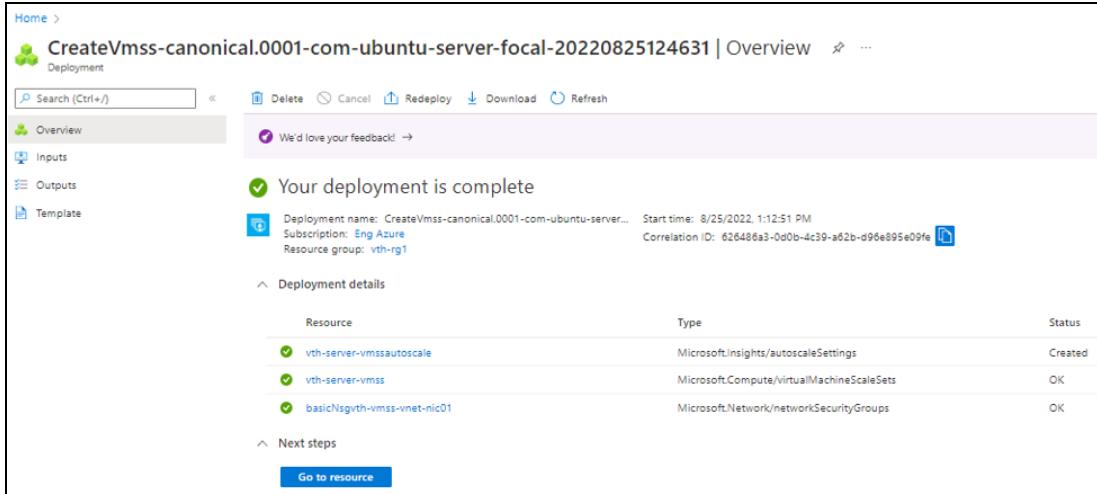
At the bottom, there are buttons for 'Create', '< Previous', 'Next >', and 'Download a template for automation'.

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

When the VMSS is created, a message "Your deployment is complete" is displayed in the Create VMSS window.

## Deploy ARM Template 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO

Figure 58 : Create VMSS window



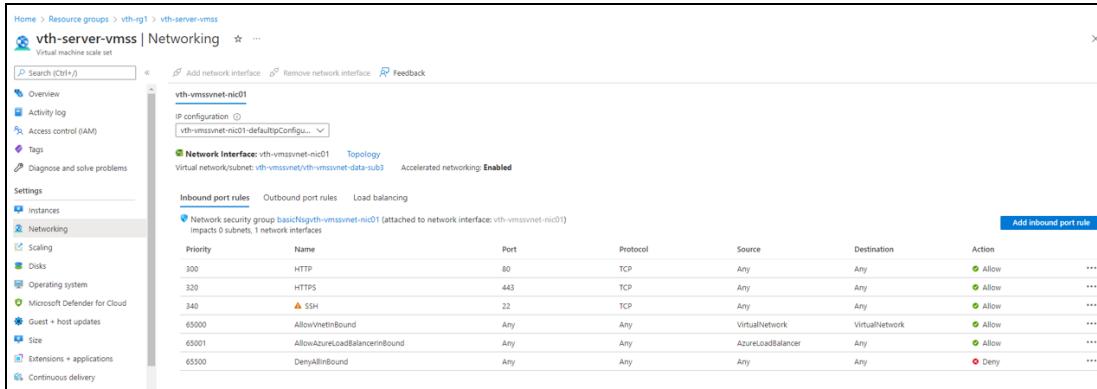
**NOTE:** It may take the system several minutes to display your resources.

## 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 59 : VMSS > Inbound port rules



Priority	Name	Port	Protocol	Source	Destination	Action
300	HTTP	80	TCP	Any	Any	Allow
320	HTTPS	443	TCP	Any	Any	Allow
340	SSH	22	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

## Create Automation Account

The following topics are covered:

- [Initial Setup](#)
- [Create an Automation Account](#)
- [Verify the Automation Account creation](#)

### Initial Setup

Before creating an automation account, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_AUTOMATION\_ACCOUNT\_PARAM.json with a text editor.

2. Configure Automation Account.

If the automation account does not exist, then a new automation account gets created inside resource group. If automation account already exists, then template gets auto-updated.

If the automation account variable does not exist, then a new automation account variable gets created inside the automation account. If an automation account variable already exists, an error "The variable already exists" is prompted.

```
"automationAccountName": "vth-amt-acc",
```

3. Configure location.

```
"location": "South Central US",
```

4. Provide the client secret ID, application ID, and tenant ID from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application\_name>**.

```
"clientSecret": "<client-secret-id>",
"appId": "<application-id>",
"tenantId": "<tenant-id>,"
```

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

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

6. Configure VMSS.

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

7. Configure network interface cards.

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

8. 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
    }
  ]
}
```

9. Verify if all the configurations in the ARM\_TMPL\_3NIC\_2VM\_AUTOMATION\_ACCOUNT\_PARAM.json file are correct and then save the changes.

## Create an Automation Account

To create an automation account, run the following command:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_2.ps1
```

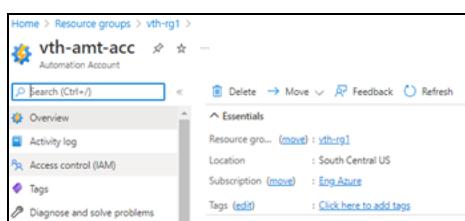
## Verify the Automation Account creation

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

1. From **Home**, navigate thru **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 60 : Selected automation account - Overview window



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

The selected automation account - Variables window is displayed.

Figure 61 : Selected automation account - Variables window

The screenshot shows the 'Variables' page for the 'vth-amt-acc' automation account. The left sidebar includes options like Update management, Process Automation, Runbooks, Jobs, Hybrid worker groups, Watcher tasks, Shared Resources (with 'Variables' selected), Schedules, Modules, Python packages, Credentials, Connections, and Certificates. The main area displays a table of variables:

Name	Type	Value	Last modified
apid	String	[REDACTED]	11/14/2022, 2:57 PM
clientSecret	Unknown (encrypted)	[REDACTED]	11/14/2022, 2:58 PM
mgmtInterface1	String	vth-int1-mgmt-nic1	11/14/2022, 2:58 PM
mgmtInterface2	String	vth-int2-mgmt-nic1	11/14/2022, 2:58 PM
portList	String	({"value": [{"port-number": 53, "health-check-disable": 1, "protocol": "udp"}, {"port-number": ...	11/14/2022, 2:58 PM
resourceGroupName	String	vth-rg1	11/14/2022, 2:57 PM
tenantId	String	[REDACTED]	11/14/2022, 2:57 PM
vmsName	String	vth-server-vmss	11/14/2022, 2:57 PM

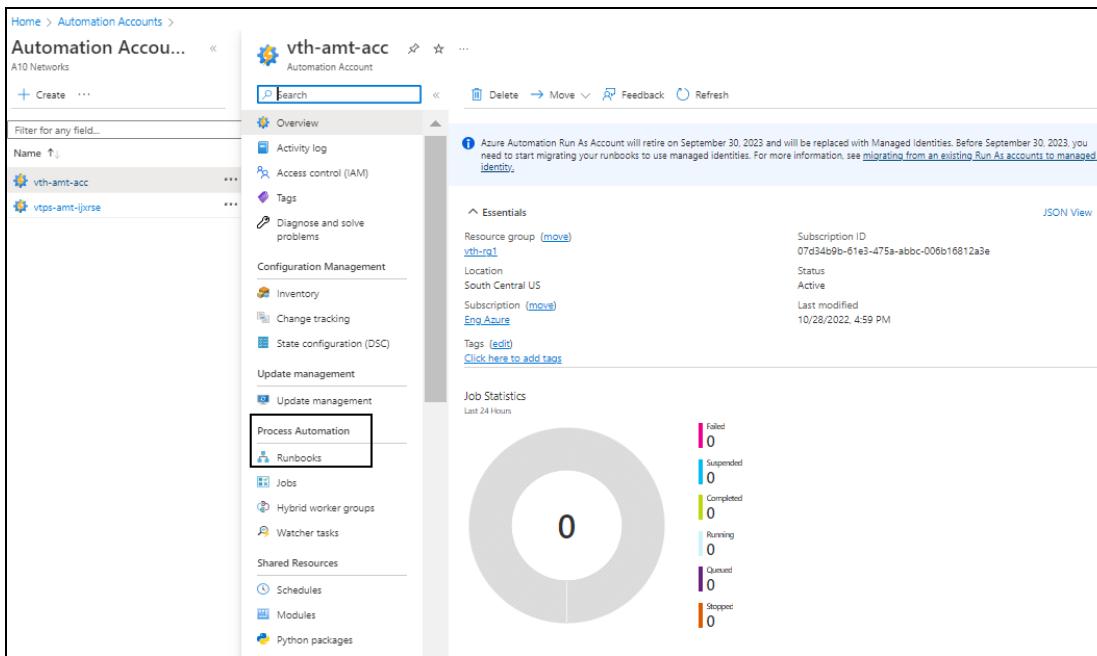
6. Verify if all the variables associated with the automation account are listed.

## Create Runbook

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

- From **Home**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.

Figure 62 : Selected automation account window



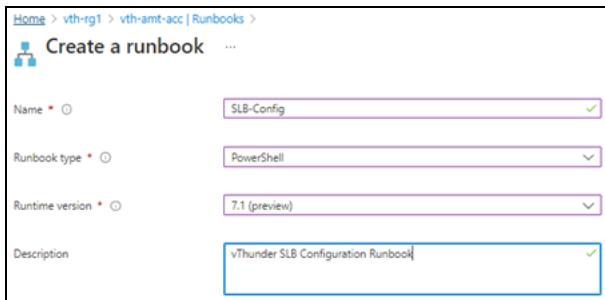
- Select **Runbooks** from left **Process Automation** panel.  
The <automation\_account\_name> - Runbooks window is displayed.

Figure 63 : Selected automation account - Runbooks window



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

Figure 64 : Create a runbook window



The screenshot shows the 'Create a runbook' interface. It includes fields for Name (set to 'SLB-Config'), Runbook type (set to 'PowerShell'), Runtime version (set to '7.1 (preview)'), and a Description field containing 'vThunder SLB Configuration Runbook'. The 'Description' field is highlighted with a blue border.

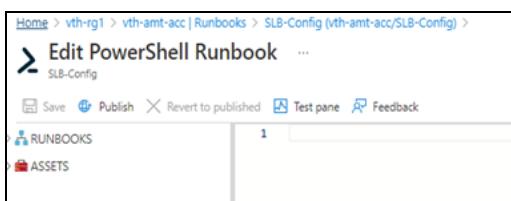
4. Select or enter the following information:

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

5. Click **Create**.

The **Edit PowerShell Runbook** is displayed.

Figure 65 : Edit PowerShell Runbook window



The screenshot shows the 'Edit PowerShell Runbook' window. The left sidebar lists 'RUNBOOKS' and 'ASSETS'. The main right panel is currently empty, with the number '1' displayed at the top center.

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

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_2VM\_SLB\_SERVER\_RUNBOOK.ps1** with a text editor and copy the entire content of the runbook.
7. Paste this content in the right panel of the **Edit PowerShell Runbook** window.
8. Click **Save** and then click **Publish**.  
The runbook gets created for the selected automation account.

## Create Automation Account Webhook

The following topics are covered:

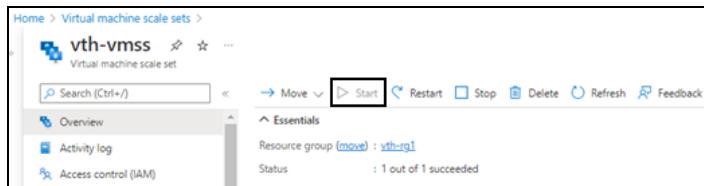
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the Runbook Job creation](#)

## Initial Setup

To verify that the virtual machine instances are running, perform the following steps:

1. From **Home**, navigate thru **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 66 : VMSS window



## Create a Webhook

To create a webhook, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_WEBHOOK_3.ps1 -runBookName "<runbook_name>"
```

### Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_WEBHOOK_3.ps1 -runBookName "SLB-Config"
```

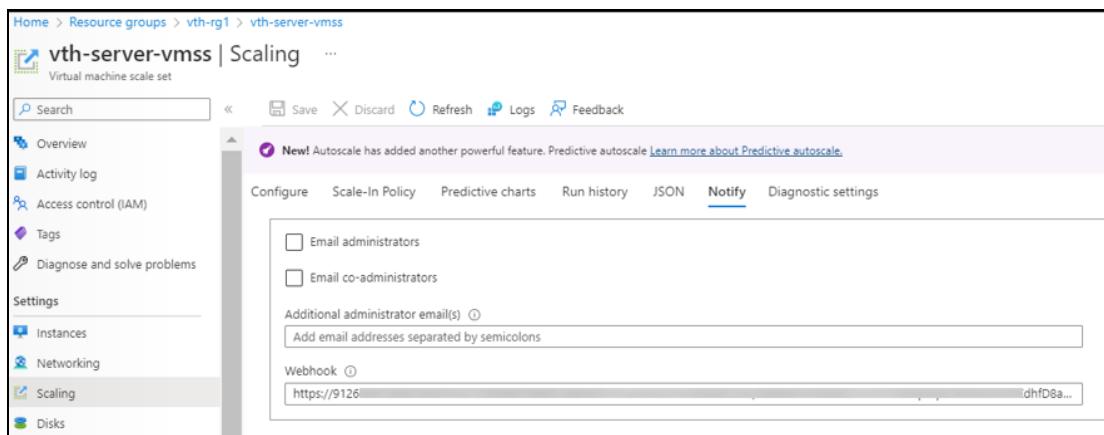
After the webhook installation is complete, the webhook url is displayed.

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 thru **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 67 : 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

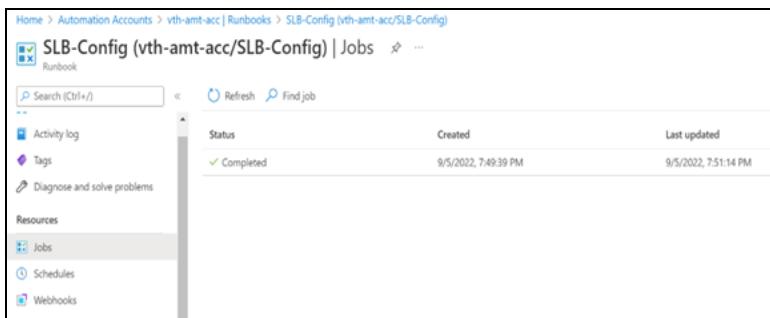
To verify the creation of runbook job, perform the following steps:

1. From **Home**, navigate thru **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 68 : Selected automation account - Jobs window



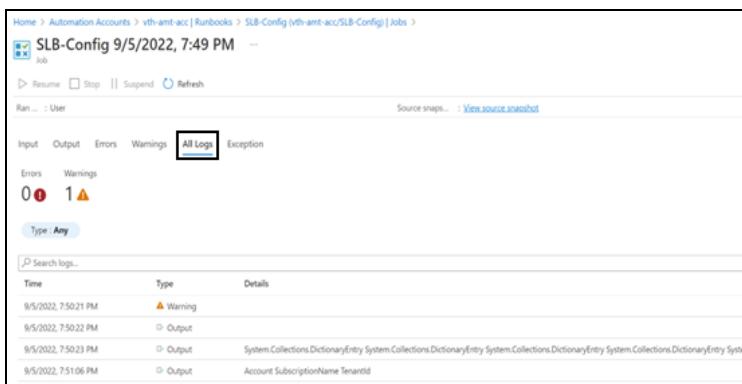
Status	Created	Last updated
Completed	9/5/2022, 7:49:39 PM	9/5/2022, 7:51:14 PM

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 69 : Selected runbook job window



Type	Time	Type	Details
Warning	9/5/2022, 7:50:21 PM	Output	System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.
Output	9/5/2022, 7:50:22 PM	Output	Account SubscriptionName TenantId
Output	9/5/2022, 7:50:23 PM	Output	System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.
Output	9/5/2022, 7:51:06 PM	Output	Account SubscriptionName TenantId

## Configure vThunder as an SLB

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_3NIC\_2VM\_SLB\_CONFIG\_PARAM.json with a text editor.

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

2. Configure service group list ports.

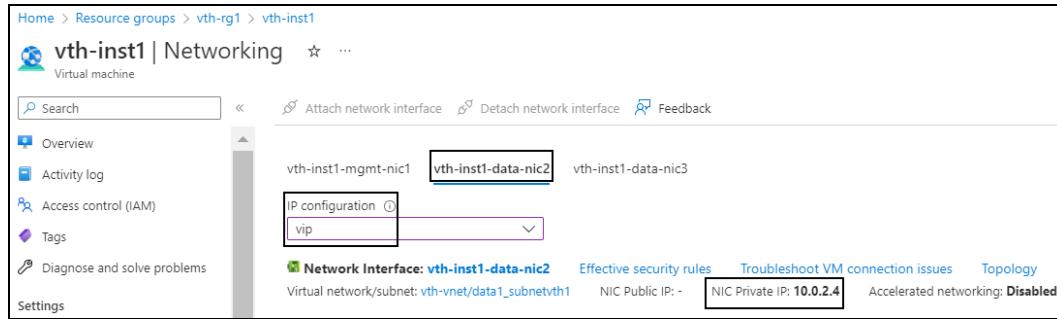
```
"serviceGroupList": {  
    "value": [  
        {  
            "name": "sg443",  
            "protocol": "tcp",  
            "health-check-disable": 1  
        },  
        {  
            "name": "sg53",  
            "protocol": "udp",  
            "health-check-disable": 1  
        },  
        {  
            "name": "sg80",  
            "protocol": "tcp",  
            "health-check-disable": 1  
        }  
    ]  
},
```

3. Configure virtual server.

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

- a. From **Home**, navigate thru **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 70 : 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": "10.0.2.4",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 subnet"
    },
    "value": [
        {
            "port-number":53,
            "protocol":"udp",
            "ha-conn-mirror":1,
            "auto":1,
            "service-group":"sg53"
        },
        {

```

```

        "port-number":80,
        "protocol":"http",
        "auto":1,
        "service-group":"sg80"
    },
{
    "port-number":443,
    "protocol":"https",
    "auto":1,
    "service-group":"sg443"
}
]
},

```

---

**NOTE:** `ha-conn-mirror` does not work on port 80 and 443.

---

#### 4. Configure SSL.

```

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

```

---

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

---

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

```

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

```

#### 5. Verify if the vip address and all other configurations in the `ARM_TMPL_3NIC_2VM_SLB_CONFIG_PARAM.json` file are correct and then save the changes.

## Deploy vThunder as an SLB

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

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_4.ps1 -  
resourceGroup <resource_group_name>
```

### Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_4.ps1 -  
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate  
Do you want to upload ssl certificate ?  
[Y] Yes [No] No [?] Help (default is "N") : Y  
SLB Server Host IP: 10.0.3.7  
Virtual Server Name: vip  
Resource Group Name: vth-rg1  
vThunder1 Public IP: 13.85.81.137  
vThunder2 Public IP: 13.85.81.113  
Configuring vm: vth-inst1  
configured ethernet- 1 ip  
configured ethernet- 2 ip  
Configured server  
Configured service group  
0  
Configured virtual server  
SSL Configured.  
Configurations are saved on partition: shared  
Configured vThunder Instance 1  
Configuring vm: vth-inst2  
configured ethernet- 1 ip  
configured ethernet- 2 ip
```

```

Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 2

```

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

## Configure High Availability for vThunder

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM\_TMPL\_3NIC\_2VM\_HA\_CONFIG\_PARAM.json with a text editor.
2. Configure DNS.

```

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

```

3. Configure a Network Gateway IP.

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

```

"rib-list": [
    {
        "ip-dest-addr": "0.0.0.0",
        "ip-mask": "/0",

```

```
        "ip-nexthop-ipv4": [
            {
                "ip-next-hop": "10.0.2.1"
            }
        ]
    },
]
```

4. Set a VRRP-A.

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

5. Set a Terminal Idle Timeout.

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

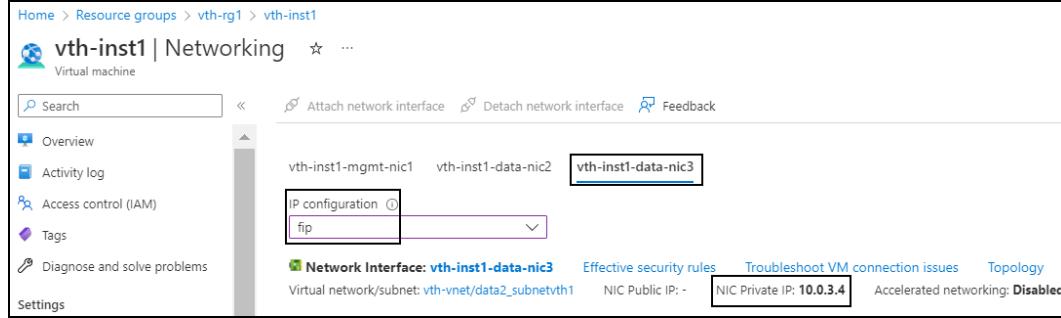
6. Configure VRID details.

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

- a. From **Home**, navigate thru **Azure Services > Resource Group > <resource\_group\_name>**.
- b. Go to the first virtual machine instance. Here, first virtual machine instance is **vth-inst1**.
- c. Select **Networking** from the left **Settings** panel.

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

Figure 71 : 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": "10.0.3.4"
                }
            ]
        }
    }
]
```

7. Verify if all the configurations in the **ARM\_TMPL\_3NIC\_2VM\_HA\_CONFIG\_PARAM.json** file are correct and then save the changes.

## Create High Availability for vThunder

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

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

```
S C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_5.ps1 -resourceGroup <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_5.ps1 -resourceGroup vth-rg1
```

## Configure vThunder using GLM

The following topics are covered:

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

## Initial Setup

Before configuring vThunder with GLM, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. From the downloaded ARM template folder, open the ARM\_TMPL\_3NIC\_2VM\_GLM\_CONFIG\_PARAM.json with a text editor.
2. Configure GLM account details.

```
{
  "parameters": {
    "user_name": {
      "value": "user_name"
    },
    "user_password": {
      "value": "user_password"
    },
    "entitlement_token": {
      "value": "entitlement_token"
    }
  }
}
```

```

        "value": "token"
    }
}
}
```

3. Verify if the configurations in the ARM\_TMPL\_3NIC\_2VM\_GLM\_CONFIG\_PARAM.json file are correct and then save the changes.

## Apply GLM License

---

To apply GLM License, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_6.ps1 -resourceGroupName <resource_group_name>
```

**Example:**

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_6.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](#)

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

## 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 default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```

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-->
vThunder(config)#admin <admin_username> password <new_password>
```

---

**NOTE:** It is highly recommended to change the default password when you login for the first time.

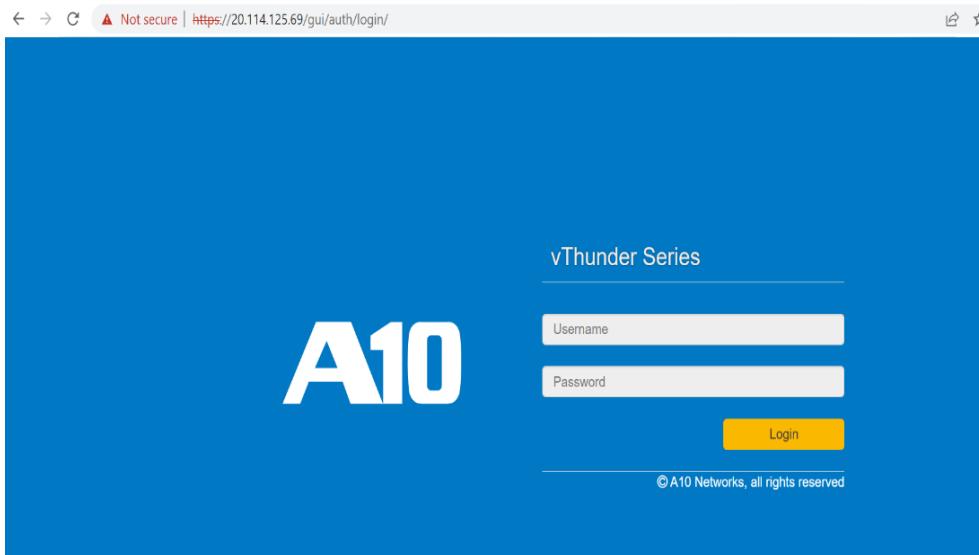
---

## 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 72 : vThunder GUI



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

## Verify Deployment

To verify deployment thru the ARM template, perform the following steps:

1. Run the following command on vThunder:

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

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

```

slb service-group sg443 tcp
    health-check-disable
!
slb service-group sg53 udp
    health-check-disable
!
slb service-group sg80 tcp
    health-check-disable
!
slb virtual-server vip 10.0.2.4
    port 53 udp
        ha-conn-mirror
        source-nat auto
        service-group sg53
    port 80 http
        source-nat auto
        service-group sg80
    port 443 https
        source-nat auto
        service-group sg443
!

```

## 2. Run the following command to verify HA:

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

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

```

!Current configuration: 536 bytes
!Configuration last updated at 17:36:35 IST Mon Sep 5 14 2022
!Configuration last saved at 17:35:40 IST Wed Sep 5 14 2022
!64-bit Advanced Core OS (ACOS) version 5.2.0, build 155 (Aug-10-
2020,14:34)

!
vrrp-a common
    device-id 1
    set-id 1
    enable

```

```
!
multi-config enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
glm use-mgmt-port
glm enable-requests
glm token vTh11e089e10
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.2.1
!
```

3. Run the following command to verify the SSL Certificate configuration:

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

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

Name	Type	Expiration	Status
<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) #
```

5. Run the following command to disable the active standby vThunder:

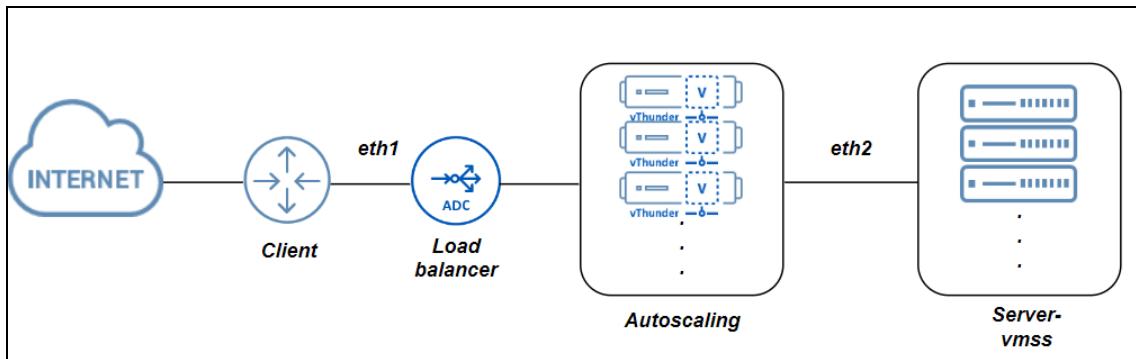
```
vThunder-ForcedStandby(config) #vrrp-a force-self-standby disable  
vThunder-Active(config) #
```

# Deploy ARM Template 3NIC-NVM-VMSS

[Figure 73](#) 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 73 : 3NIC-NVM-VMSS Topology



The following topics are covered:

<a href="#">System Requirements</a> .....	185
<a href="#">Create vThunder Instances</a> .....	190
<a href="#">Configure Server VMSS</a> .....	198
<a href="#">Enable Autoscaling</a> .....	227
<a href="#">Access vThunder using CLI or GUI</a> .....	258
<a href="#">Verify Deployment</a> .....	259

## System Requirements

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

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

Table 12 : System Requirements

Resource Name	Description	Default Value
Azure Resource Group	<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><b>Performance:</b> Standard</p> <p><b>Replication:</b> Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b> 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 (VM) Instance	Two virtual machine instances are created, vThunder and monitoring agent.	<p>A10 vThunder instance: <code>vth-vmss_0</code></p> <p>A10 Monitoring Agent: <code>vth-</code></p>

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

Resource Name	Description	Default Value
	<ul style="list-style-type: none"> <li>• GLM-Revoke-Config</li> <li>• Master-Runbook</li> <li>• SLB-Config</li> <li>• SSL-Config</li> </ul> <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.	<code>vth-vmss-log-workspace</code>
Azure Application Insights	The custom metrics are created. Depending upon the configured threshold values, it is considered for autoscaling.	<p>Default application insight name: <code>vth-vmss-app-insights</code></p> <p>Default custom metrics name: <code>vth-cpu-metrics</code></p> <p>Default threshold for autoscale-in is <b>25%</b>.</p> <p>Default threshold for autoscale-out is <b>80%</b>.</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>Three default LB rules are created.</p>	<p>Azure Load Balancer: <code>vth-lb1</code></p> <p>Backend Pool: <code>vth-lb1-bck-pool1</code></p> <p>Three default rules are created:</p> <ul style="list-style-type: none"> <li>• rulePort80</li> <li>• rulePort443</li> <li>• rulePort53</li> </ul> <p>Three default probes are created:</p>

<b>Resource Name</b>	<b>Description</b>	<b>Default Value</b>
	Three default health probes are created.	<ul style="list-style-type: none"> <li>• HealthProbe80</li> <li>• HealthProbe443</li> <li>• HealthProbe53</li> </ul>
Virtual Machine Scale Set [VMSS]	A virtual machine scale set is created.	<b>vth-vmss</b>
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance.	<b>vth-vmss-vnet</b> Address prefix for virtual network: 10.0.0.0/16
Subnet	Three subnets are created with an address prefix each.	Subnet1: <b>10.0.1.0/24</b> Subnet2: <b>10.0.2.0/24</b> Subnet3: <b>10.0.3.0/24</b>
Public and Private IP address	Single frontend static public IP is created and attached to LB interface.	Public IP address: <b>vth-lb1-ip</b> Private IP address: <b>vth-lb1-frnt-ip</b>
Network Interface Card [NIC]	Two types of interfaces are created for each vThunder instance: <ul style="list-style-type: none"> <li>• Management Interface with public IP</li> <li>• Data Interface with primary private IP [Ethernet 1, Ethernet 2]</li> </ul>	<b>vth-inst1-mgmt-nic1</b> <b>vth-inst1-data-nic2</b> <b>vth-inst1-data-nic3</b>

Resource Name	Description	Default Value
	<b>NOTE:</b> The secondary IP of data interface is taken from DHCP server.	
Network Security Group [NSG]	A security group is created for all the associated default interfaces.	<b>vth-nsg1</b>
Azure Service Application Access Key	An existing key can be used or a new key can be created. For more information, refer <a href="#">Azure Service Application Access Key</a> .	

## Supported VM Sizes

Table 13 : Supported VM sizes

Series	Size	Qualified Name
A series	Standard A4_v2	Standard_A4_v2
	Standard A4m_v2	Standard_A4m_v2
	Standard/Basic A4	Standard_A4
	Standard A8_v2	Standard_A8_v2
B series	Standard B2s	Standard_B2_s
	Standard B2ms	Standard_B2ms
	Standard B4ms	Standard_B4ms
D series	Standard D3_v2	Standard_D3_v2
	Standard DS3_v2	Standard_DS3_v2
	Standard D5_v2	Standard_D5_v2

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

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

For more information on Windows and Linux VM sizes, see

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

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

## Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)
- [Verify Resource Creation](#)

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM\_TMPL\_3NIC\_NVM\_VMSS\_PARAM.json with a text editor.

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

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

```

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

```

---

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

---

3. Configure DNS label prefixes for vThunder host name and vThunder agent host name.

```

    "dnsLabelPrefix": {
        "value": "vth-inst1"
    },
    "dnsLabelPrefix1": {
        "value": "vth-inst2"
    },

```

4. Configure a virtual network scale set.

```

    "vmssName": {
        "value": "vth-vmss"
    },

```

5. Set a VMSS size for vThunder.

```

    "vmssSku": {
        "value": "Standard_B4ms"
    },

```

6. Set a VM size for Agent.

```

    "vmSku": {
        "value": "Standard_DS2_V2"
    },

```

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

7. Set an instance count.

```

    "instanceCount": {
        "value":1
    },

```

---

**NOTE:** The instance count cannot be less than 1.

---

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

```

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

```

---

**NOTE:** Do not change the publisher name.

---

9. Configure an address prefix and subnet values for each vThunder instances' management interface and data interfaces.

```

    "mgmtIntfPrivatePrefix": {
        "value": "10.0.1.0/24"
    },
    "eth1PrivatePrefix": {
        "value": "10.0.2.0/24"
    },
    "eth2PrivatePrefix": {
        "value": "10.0.3.0/24"
    },

```

10. Configure network interface cards for each vThunder instances.

```

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

```

```

        "value": "vth-inst1-data-nic2"
    },
    "nic3Name": {
        "value": "vth-inst1-data-nic3"
    },

```

**11. Configure NIC1 public IP name for vThunder.**

```

    "nic1PublicIPName": {
        "value": "vth-inst1-mgmt-nic1-ip"
    },

```

**12. Configure a network security group.**

```

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

```

**13. Configure a storage account name.**

```

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

```

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

**14. Configure SSL container name.**

```

    "sslContainerName": {
        "value": "ssl"
    },

```

---

**NOTE:** Do not change the SSL container name.

---

**15. Configure storage account type.**

```

    "storageAccountType": {
        "value": "Standard_GRS"
    },

```

**16. Configure load balancer name, public IP name, backend IP name, and frontend pool name.**

```

    "lbPublicIPName": {
        "value": "vth-lb1-ip"
    },

```

```

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

```

**17. Configure vThunder monitoring VM name.**

```

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

```

**18. Configure log agent container name.**

```

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

```

**19. Verify if all the configurations in the ARM\_TMPL\_3NIC\_NVM\_VMSS\_PARAM.json file are correct and then save the changes.**

## Deploy vThunder

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

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

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

**Example:**

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

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

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

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

**Example:**

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 -
--template-file ARM_TMPL_3NIC_NVM_VMSS_1.json --parameters ARM_TMPL_
3NIC_NVM_VMSS_PARAM.json
```

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

## Verify Resource Creation

To verify the instance count, perform the following steps:

1. From **Home**, navigate thru **Azure Services > Virtual machine scale set > <vmss\_name>**.

The selected VMSS - Overview window is displayed. Here, the VMSS name is **vth-vmss**.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 74 : Virtual machine scale set - Overview window

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

The selected VMSS - Scaling window is displayed.

Figure 75 : Virtual machine scale set - Scaling window - Configure tab

3. Verify the configured instance count.

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

To verify LB resource creation, perform the following steps:

a. From **Home**, navigate thru **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.

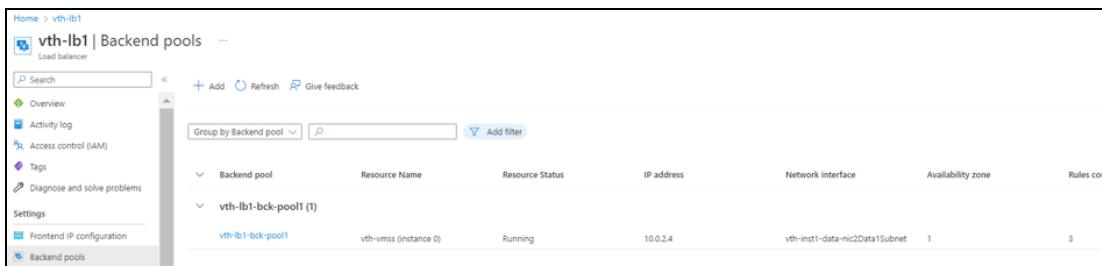
Figure 76 : Selected Frontend IP configuration window



Name	IP address	Rules count
vth-lb1-fmt-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.

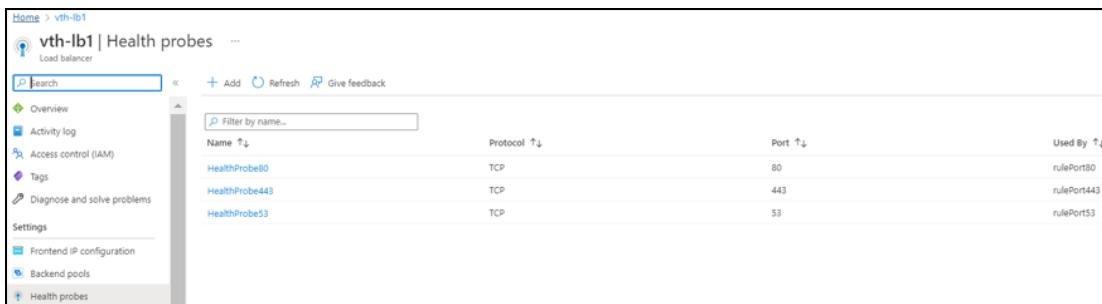
Figure 77 : Selected Backend pools window



Backend pool	Resource Name	Resource Status	IP address	Network interface	Availability zone	Rules count
vth-lb1-bck-pool1 (1)	vth-vmss (instance 0)	Running	10.0.2.4	vth-inst1-data-nic2Data1Subnet	1	3

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

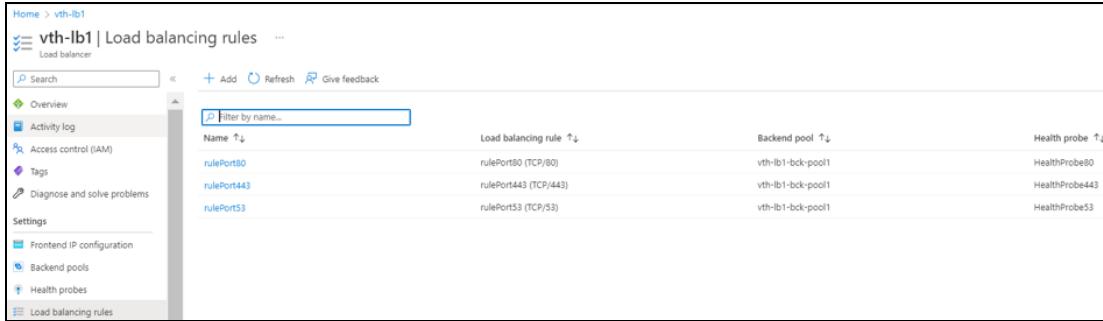
Figure 78 : Selected Health Probes window



Name	Protocol	Port	Used By
HealthProbe80	TCP	80	rulePort80
HealthProbe443	TCP	443	rulePort443
HealthProbe53	TCP	53	rulePort53

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

Figure 79 : Selected load balancing rules window

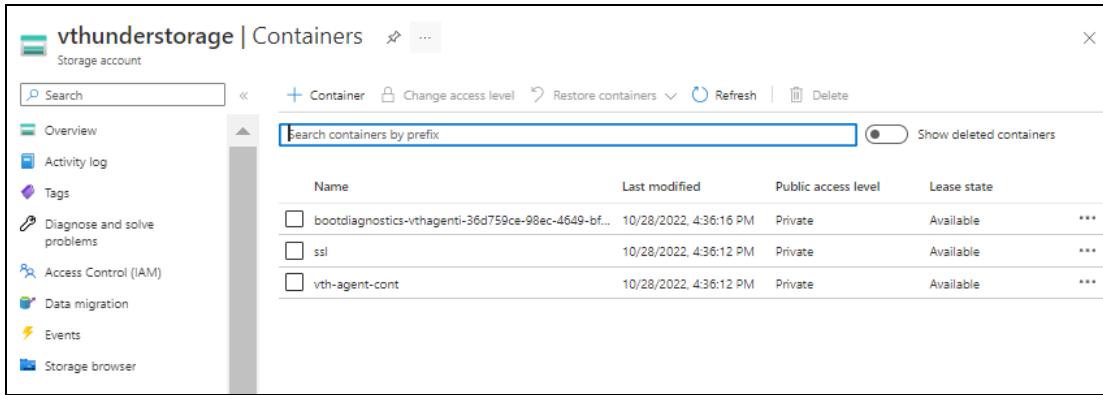


Name	Load balancing rule	Backend pool	Health probe
rulePort80	rulePort80 (TCP/80)	vth-lb1-bck-pool1	HealthProbe80
rulePort443	rulePort443 (TCP/443)	vth-lb1-bck-pool1	HealthProbe443
rulePort53	rulePort53 (TCP/53)	vth-lb1-bck-pool1	HealthProbe53

To verify storage account container, perform the following steps:

- From **Home**, navigate thru **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 80 : 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 thru **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

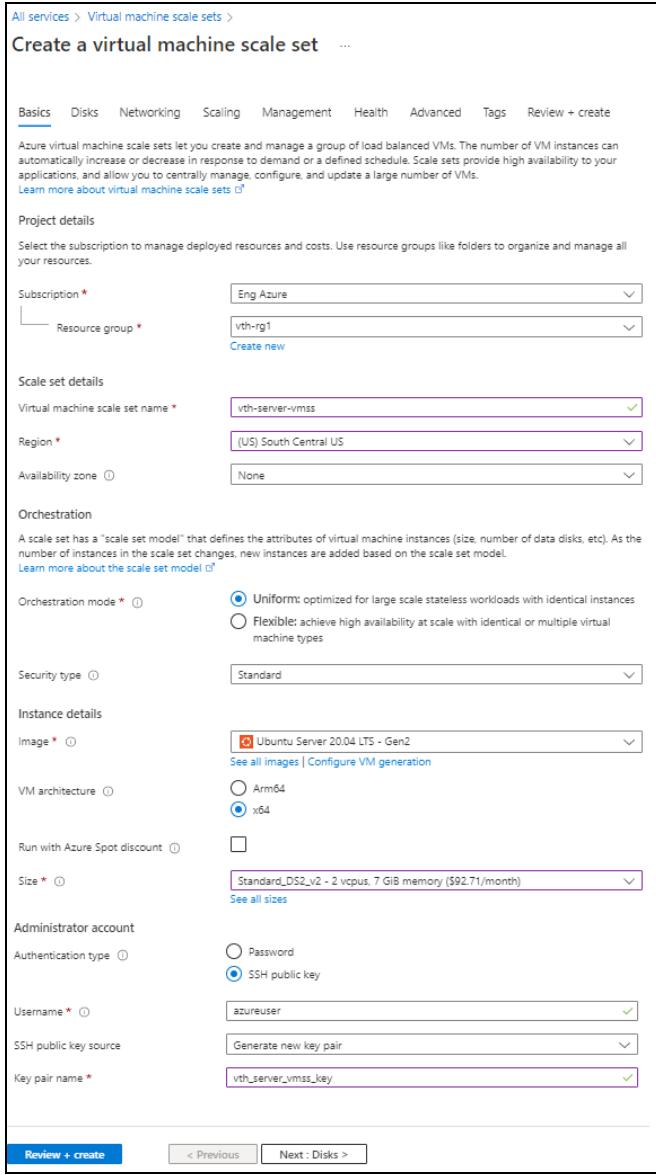
- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 81 : 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 GB 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

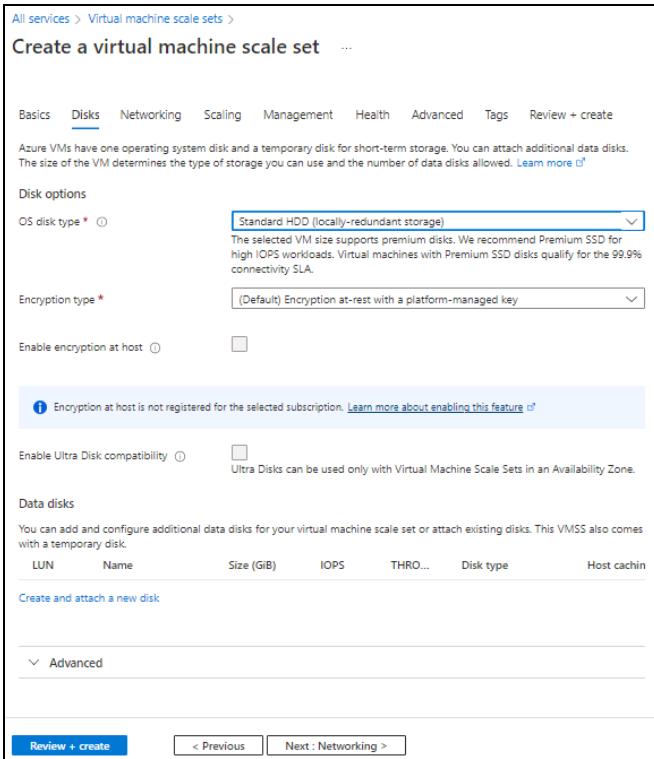
At the bottom, there are buttons for **Review + create**, < Previous, and Next : Disks >.

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**

[Deploy ARM Template 3NIC-NVM-VMSS](#)

- OS disk type
- Encryption type

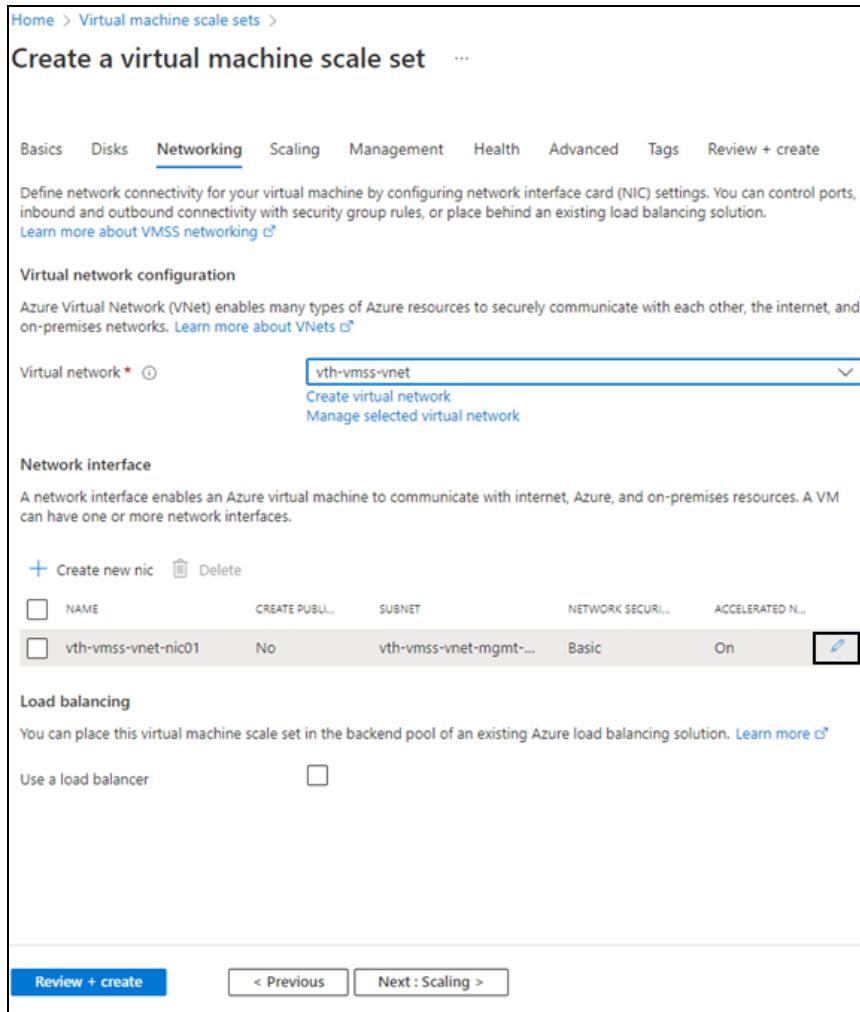
Figure 82 : Create a virtual machine scale set window - Disks tab



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

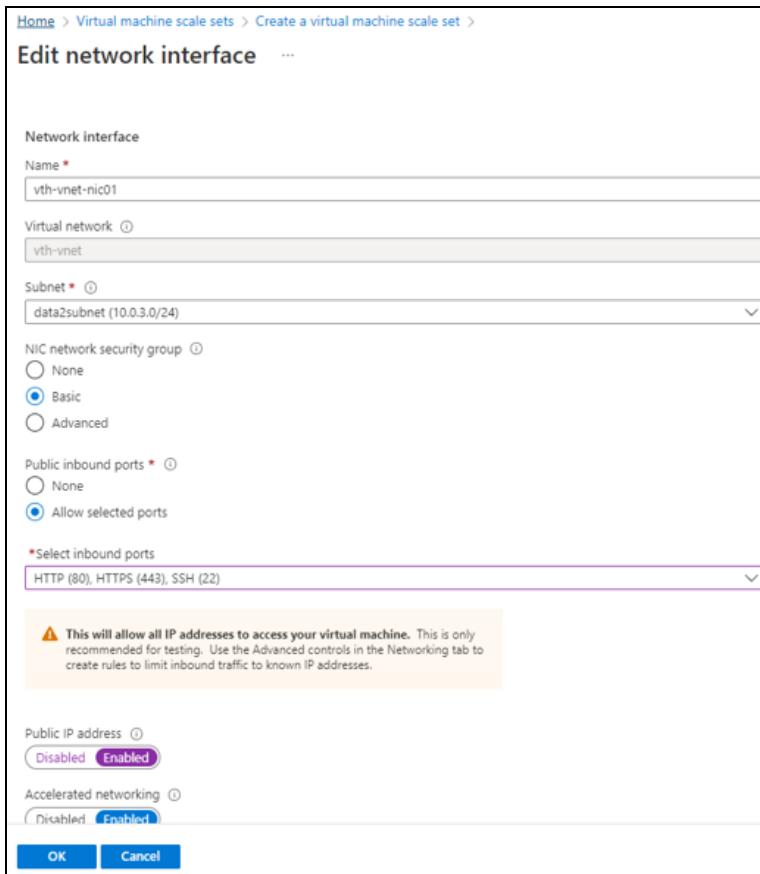
## 6. Select the Virtual network in the **Networking** tab.

Figure 83 : 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**.

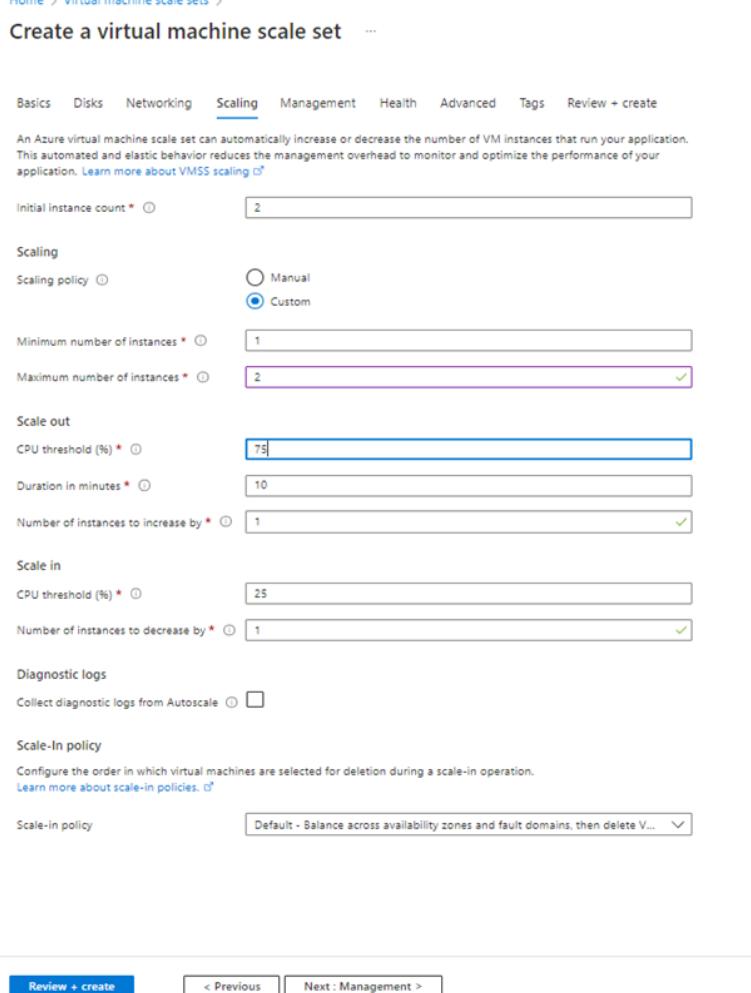
Figure 84 : Edit network interface window



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



The screenshot shows the 'Create a virtual machine scale set' wizard on the 'Scaling' tab. The 'Scaling' tab is selected in the top navigation bar. The page includes a brief description of VMSS scaling and links to learn more about it.

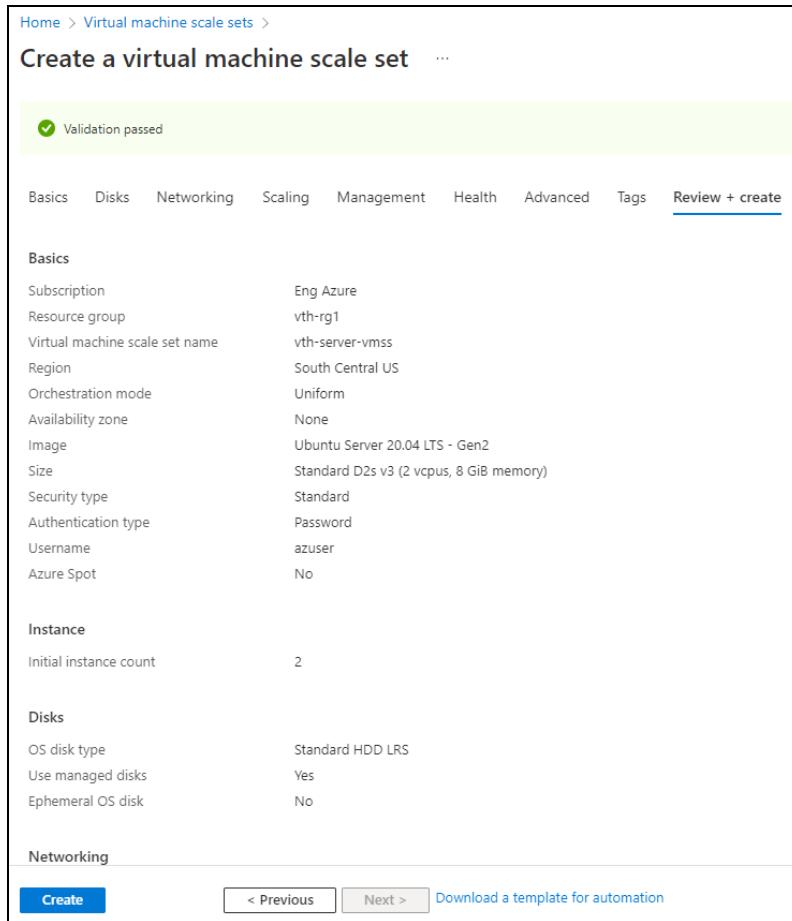
**Scaling**

- Initial instance count:** 2
- Scaling policy:** Custom (selected)
- Minimum number of instances:** 1
- Maximum number of instances:** 2
- Scale out:**
  - CPU threshold (%): 75
  - Duration in minutes: 10
  - Number of instances to increase by: 1
- Scale in:**
  - CPU threshold (%): 25
  - Number of instances to decrease by: 1
- Diagnostic logs:** Collect diagnostic logs from Autoscale (unchecked)
- Scale-In policy:** Configure the order in which virtual machines are selected for deletion during a scale-in operation. (Learn more about scale-in policies.)
- Scale-in policy:** Default - Balance across availability zones and fault domains, then delete V...

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

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

Figure 86 : Create a virtual machine scale set window - Review + create tab

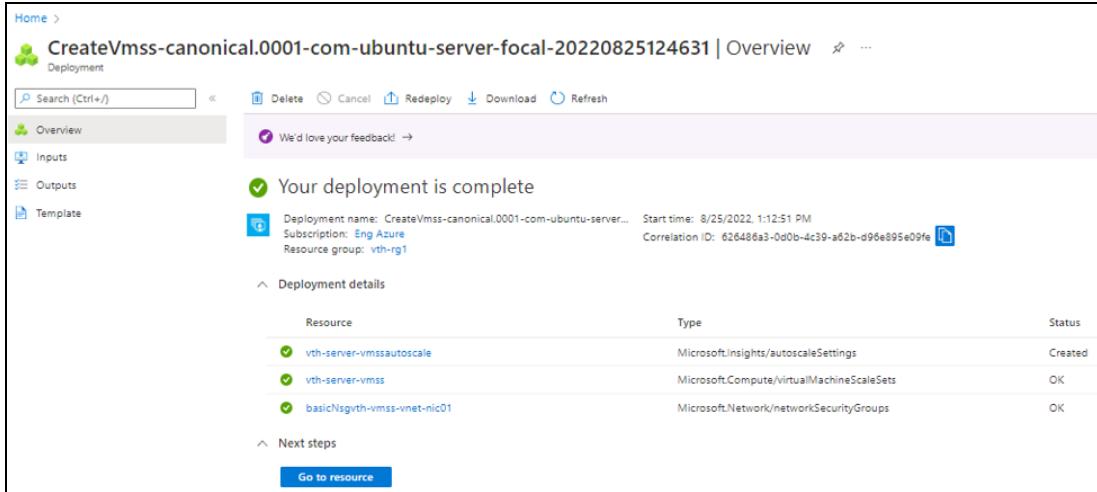


12. Click **Create** at the bottom of the window.

When the VMSS is created, a message "Your deployment is complete" is displayed in the Create VMSS window.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 87 : Create VMSS window



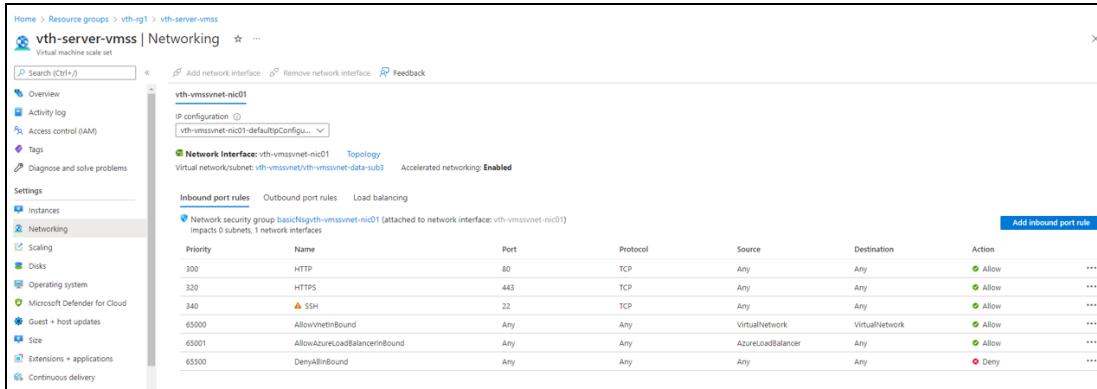
**NOTE:** It may take the system several minutes to display your resources.

## 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 88 : VMSS > Inbound port rules



Priority	Name	Port	Protocol	Source	Destination	Action
300	HTTP	80	TCP	Any	Any	Allow
320	HTTPS	443	TCP	Any	Any	Allow
340	SSH	22	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

## Create Automation Account

The following topics are covered:

- [Initial Setup](#)
- [Create an Automation Account](#)
- [Verify the Automation Account Creation](#)

### Initial Setup

Before creating an automation account, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the refer ARM\_TMPL\_3NIC\_NVM\_VMSS\_RUNBOOK\_VARIABLES.json with a text editor.
2. Configure the Azure autoscale resources.

If the automation account does not exist, then a new automation account gets created inside resource group. If automation account already exists, then template gets auto-updated.

If the automation account variable does not exist, then a new automation account variable gets created inside the automation account. If an automation account variable already exists, an error is displayed "The variable already exists".

Provide the application/client ID and tenant ID saved in the [Collect Azure Access Key](#) step or you can get these values from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application\_name>**.

```
"azureAutoScaleResources": {
    "resourceGroupName": "vth-rg1",
    "automationAccountName": "vth-amt-acc",
    "vThunderScaleSetName": "vth-vmss",
    "serverScaleSetName": "vth-server-vmss",
    "storageAccountName": "vthunderstorage",
    "appId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
    "tenantId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
    "masterWebhookUrl": "<master-runbook-webhook-url>"}
```

```

        "location": "South Central US"
    },

```

**NOTE:** Do not change the **Master Webhook url**. It gets updated automatically.

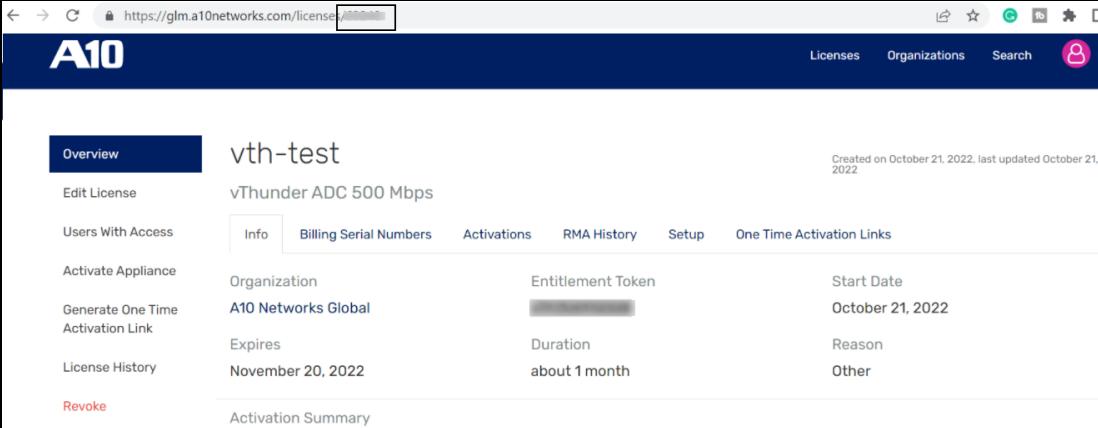
### 3. Configure the GLM parameters.

```

"glmParam": {
    "userName": "youremail@a10networks.com",
    "userPassword": "your_password",
    "entitlementToken": "A10xxa2fxxxx",
    "licenseId": "59xxx"
},

```

You can get the license ID from [GLM Portal](#). Select your license and go to the URL. The license ID is at the end of the URL. For example, [glm.a10networks.com/license/12345](https://glm.a10networks.com/license/12345)



Overview		vth-test		Created on October 21, 2022, last updated October 21, 2022	
Edit License	vThunder ADC 500 Mbps	Info	Billing Serial Numbers	Activations	RMA History
Users With Access	Organization			Entitlement Token	Start Date
Activate Appliance	A10 Networks Global			[REDACTED]	October 21, 2022
Generate One Time Activation Link	Expires			Duration	Reason
License History	November 20, 2022			about 1 month	Other
Revoke	Activation Summary				

### 4. Configure SSL parameters.

```

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

```

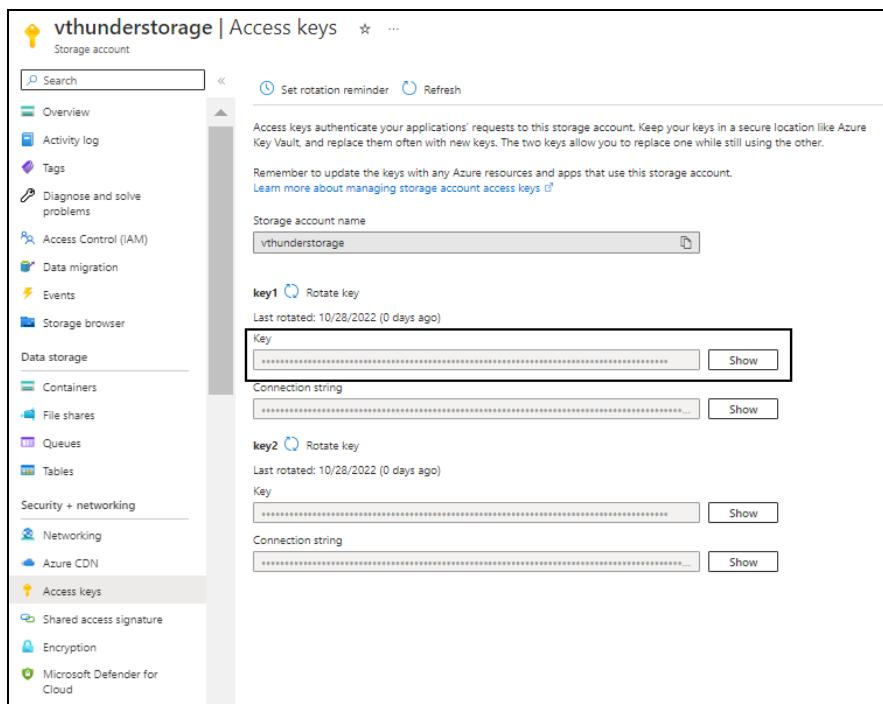
[Deploy ARM Template 3NIC-NVM-VMSS](#)

```
"storageAccountKey": "LX6zxxxxxxxxehXx0xxxv7xxxx/xxxOfxxxxxxxxR0xxx5gXxxxx
xfhxcx0gxxxxx9rxxASxxxxsxx=="
},
```

**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 89 : Selected storage account - Access keys window



## 5. Configure SLB parameters.

```
"slbParam": {
    "slb_port": {
        "value": [
            {
                "port-number": 53,
                "protocol": "udp",
                "weight": 1
            }
        ]
    }
}
```

```
        "health-check-disable":1
    },
{
    "port-number": 80,
    "protocol": "tcp",
    "health-check-disable":1
},
{
    "port-number": 443,
    "protocol": "tcp",
    "health-check-disable":1
}
],
},
"vip_port":{
    "value": [
        {
            "port-number":53,
            "protocol":"udp",
            "ha-conn-mirror":1,
            "auto":1,
            "service-group":"sg53"
        },
        {
            "port-number":80,
            "protocol":"http",
            "auto":1,
            "service-group":"sg80"
        },
        {
            "port-number":443,
            "protocol":"https",
            "auto":1,
            "service-group":"sg443"
        }
    ]
},
}
```

```

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

```

## 6. Configure AutoScale parameters.

```

    "autoScaleParam": {
        "maxScaleOutLimit": 10,
        "minScaleInLimit": 1,
        "scaleInThreshold": 25,
        "scaleOutThreshold": 80
    },
},

```

---

**NOTE:** These parameters are applied only for the function-based autoscaling. Skip these parameters for Agent-based autoscaling.

---

## 7. Provide the client secret ID from **Azure Portal > Azure Services > Azure Active Directory > App Registration > Owned applications > <application\_name> > Certificates & secrets**.

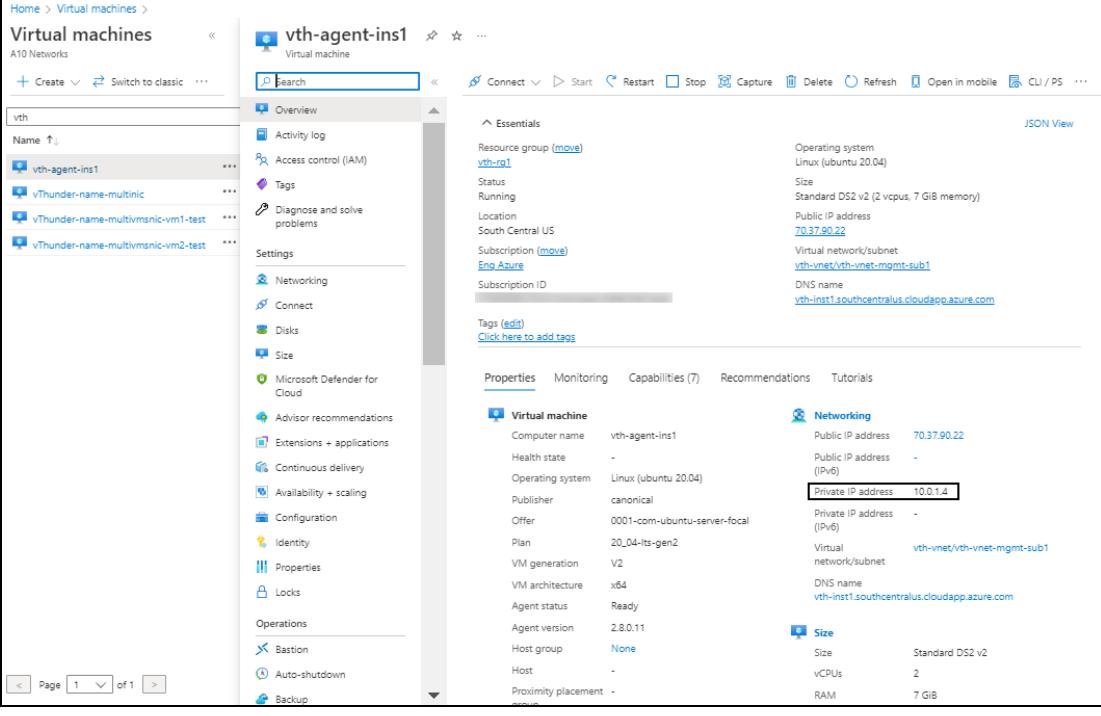
```
"clientSecret": "9-xxx~jIxxxEVyxxxxHNxxxOwv_xxxxZLxxxTM",
```

## 8. Configure private IP of agent VM.

```
"agentPrivateIP": "10.0.1.4"
```

You get this value from **Azure Portal > Azure Services > Virtual machine > <virtual\_machine> > Overview > Properties > Private IP address**.

Figure 90 : Selected virtual machine - Overview window



**vth-agent-ins1** Virtual machine

**Essentials**

- Name: vth-agent-ins1
- Resource group: vth-rg1
- Status: Running
- Location: South Central US
- Subscription ID: Eng Azure
- Tags (edit): Click here to add tags

**Properties** **Monitoring** **Capabilities (7)** **Recommendations** **Tutorials**

Virtual machine	Networking
Computer name: vth-agent-ins1	Public IP address: 70.37.90.22
Health state: -	Public IP address (IPv6): -
Operating system: Linux (ubuntu 20.04)	Private IP address (IPv6): -
Publisher: canonical	Virtual network/subnet: vth-vnet/vth-vnet-mgmt-sub1
Offer: 0001-com-ubuntu-server-focal	DNS name: vth-inst1.southcentralus.cloudapp.azure.com
Plan: 20_04_lts-gen2	
VM generation: V2	
VM architecture: x64	
Agent status: Ready	
Agent version: 2.8.0.11	
Host group: None	
Host: -	
Proximity placement group: -	
Size: Standard DS2 v2	
vCPUs: 2	
RAM: 7 GiB	

- Verify if all the configurations in the refer ARM\_TMPL\_3NIC\_NVM\_VMSS\_RUNBOOK\_VARIABLES.json file are correct and then save the changes.

## Create an Automation Account

To create an automation account, run the following command:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_AUTOMATION_ACCOUNT_2.ps1
```

## Verify the Automation Account Creation

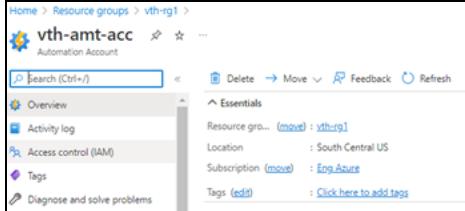
To verify the creation of an automation account, perform the following steps:

- From the **Home**, navigate thru **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.

**4. Select the required automation account.**

The selected automation account - Overview window is displayed.

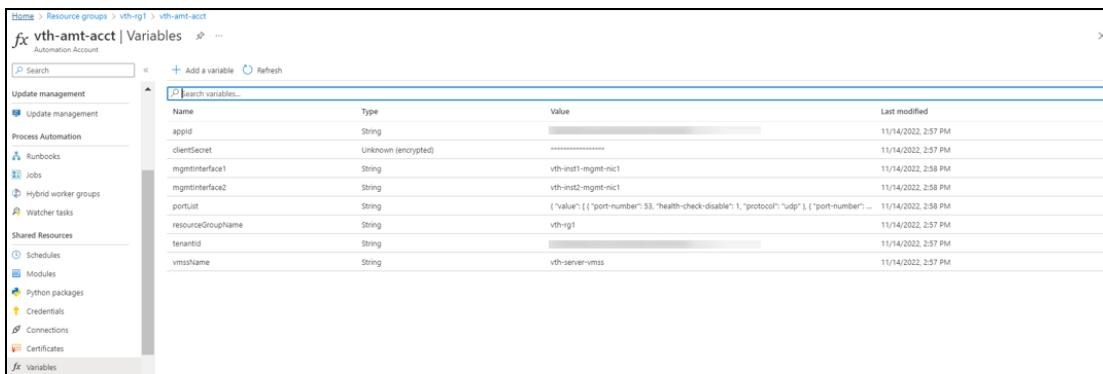
Figure 91 : Selected automation account - Overview window



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

The selected automation account - Variables window is displayed.

Figure 92 : Selected automation account - Variables window



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

## Create Runbooks

Create the following runbooks:

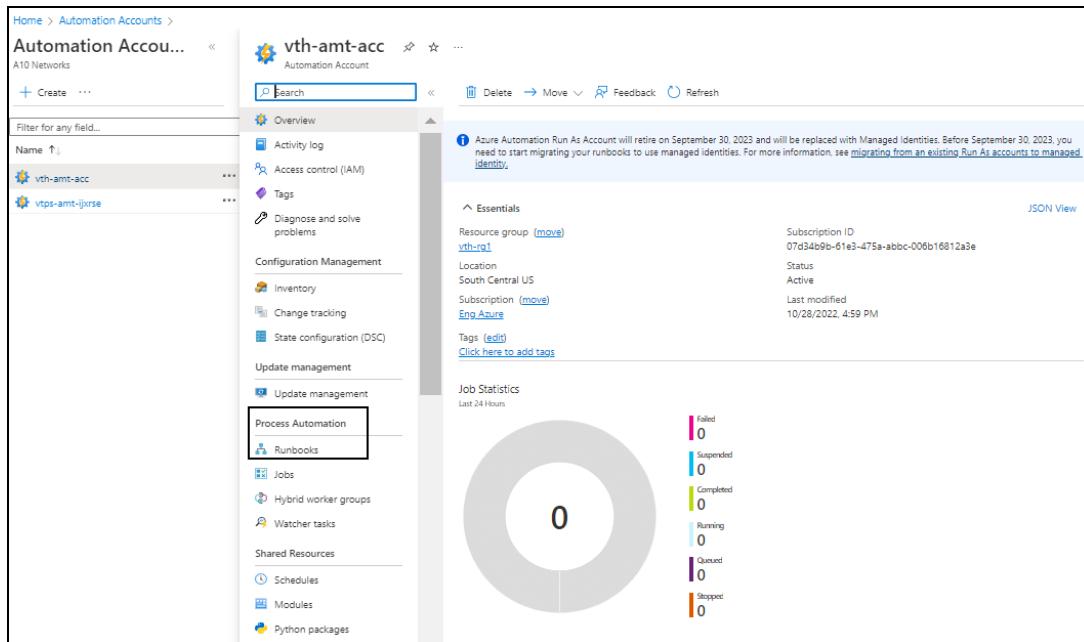
- [SSL-Config Runbook](#)
- [SLB-Config Runbook](#)
- [GLM-Config Runbook](#)
- [GLM-Revoke-Config Runbook](#)
- [Event-Config Runbook](#)
- [Master-Runbook](#)

## SSL-Config Runbook

To create a SSL-Config runbook, perform the following steps:

- From **Home**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.

Figure 93 : Selected automation account window



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

The <automation\_account\_name> - Runbooks window is displayed.

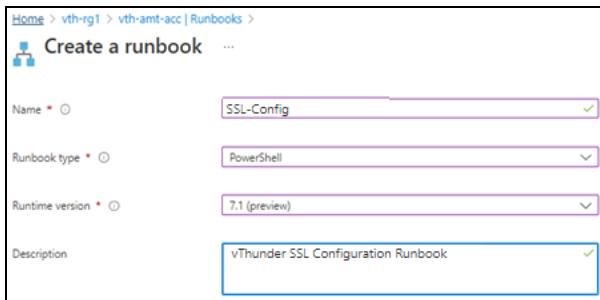
Figure 94 : Selected automation account - Runbooks window



- Click **Create a runbook**.

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

Figure 95 : Create a runbook window



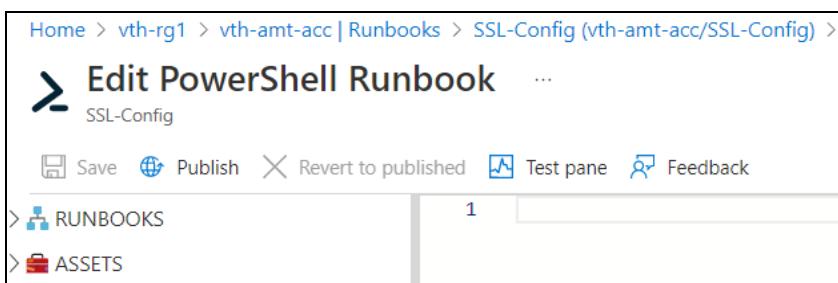
4. Select or enter the following information:

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

5. Click **Create**.

The **Edit PowerShell Runbook** is displayed.

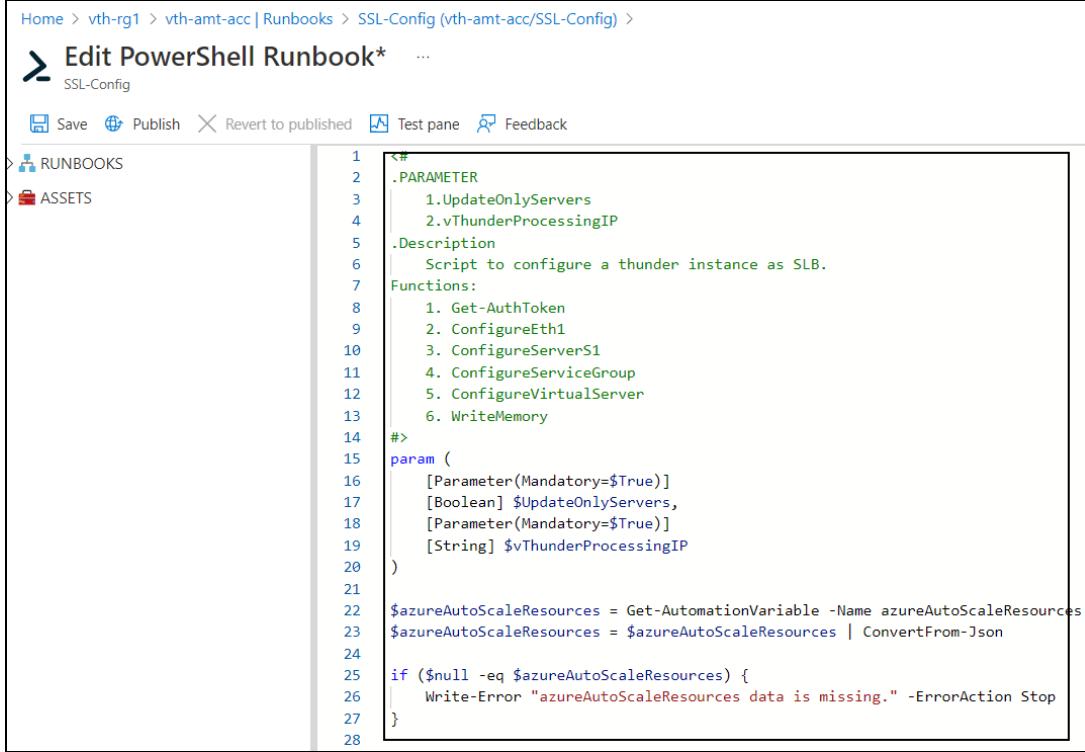
Figure 96 : Edit Runbook window



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

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_NVM\_VMSS\_SSL\_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.



The screenshot shows the 'Edit PowerShell Runbook' interface. The left sidebar lists 'RUNBOOKS' and 'ASSETS'. The main area contains the PowerShell script for 'SSL-Config'.

```

1<#
2.PARAMETER
3    1.UpdateOnlyServers
4        2.vThunderProcessingIP
5.
6.Description
7    Script to configure a thunder instance as SLB.
8.
9.Functions:
10    1. Get-AuthToken
11        2. ConfigureEth1
12            3. ConfigureServerS1
13                4. ConfigureServiceGroup
14                    5. ConfigureVirtualServer
15                        6. WriteMemory
16#>
17param (
18    [Parameter(Mandatory=$True)]
19    [Boolean] $UpdateOnlyServers,
20    [Parameter(Mandatory=$True)]
21    [String] $vThunderProcessingIP
22)
23$azureAutoScaleResources = Get-AutomationVariable -Name azureAutoScaleResources
24$azureAutoScaleResources = $azureAutoScaleResources | ConvertFrom-Json
25if ($null -eq $azureAutoScaleResources) {
26    Write-Error "azureAutoScaleResources data is missing." -ErrorAction Stop
27}

```

8. Click **Save** and then click **Publish**.

The runbook gets created for the selected automation account.

### SLB-Config Runbook

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

1. From the **Azure Portal**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.
2. Select **Runbooks** from left **Process Automation** panel.  
The <automation\_account\_name> - Runbooks window is displayed.
3. Click **Create a runbook**.  
The **Create a runbook** window is displayed.
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.

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

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_NVM\_VMSS\_SLB\_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.

### GLM-Config Runbook

To create a GLM-Config runbook, perform the following steps:

1. From the **Azure Portal**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.
2. Select **Runbooks** from left **Process Automation** panel.  
The <automation\_account\_name> - Runbooks window is displayed.
3. Click **Create a runbook**.  
The **Create a runbook** window is displayed.
4. Select or enter the following information:
- Name: GLM-Config
  - Runbook type: PowerShell
  - Runtime version: 7.1
  - Description
5. Click **Create**.  
The **Edit PowerShell Runbook** is displayed.

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

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_NVM\_VMSS\_GLM\_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.

### **GLM-Revoke-Config Runbook**

To create a GLM-Revoke-Config runbook, perform the following steps:

1. From the **Azure Portal**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.
2. Select **Runbooks** from left **Process Automation** panel.  
The <automation\_account\_name> - Runbooks window is displayed.
3. Click **Create a runbook**.  
The **Create a runbook** window is displayed.
4. Select or enter the following information:
  - Name: GLM-Revoke-Config
  - Runbook type: PowerShell
  - Runtime version: 7.1
  - Description
5. Click **Create**.  
The **Edit PowerShell Runbook** is displayed.

---

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

---

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_NVM\_VMSS\_GLM\_REVOKE\_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.

## Event-Config Runbook

To create a Event-Config runbook, perform the following steps:

1. From the **Azure Portal**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.
2. Select **Runbooks** from left **Process Automation** panel.  
The <automation\_account\_name> - Runbooks window is displayed.
3. Click **Create a runbook**.  
The **Create a runbook** window is displayed.
4. Select or enter the following information:
  - Name: Event-Config
  - Runbook type: PowerShell
  - Runtime version: 7.1
  - Description
5. Click **Create**.  
The **Edit PowerShell Runbook** is displayed.

---

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

---

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_NVM\_VMSS\_ACOS\_EVENT\_CONFIG\_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.

## Master-Runbook

To create a Master-Runbook, perform the following steps:

1. From the **Azure Portal**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.  
The selected automation account window is displayed.
2. Select **Runbooks** from left **Process Automation** panel.  
The <automation\_account\_name> - Runbooks window is displayed.

3. Click **Create a runbook**.  
The **Create a runbook** window is displayed.
4. Select or enter the following information:
  - Name: Master-Runbook
  - Runbook type: PowerShell
  - Runtime version: 7.1
  - Description
5. Click **Create**.  
The **Edit PowerShell Runbook** is displayed.

---

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

---

6. From the downloaded template folder, open **ARM\_TMPL\_3NIC\_NVM\_VMSS\_MASTER\_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:

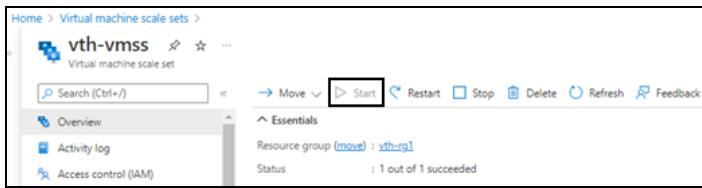
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the AutoScale Resource Variable creation](#)
- [Verify the SSL File availability](#)
- [Verify the Runbook Jobs creation](#)

### Initial Setup

To verify that the virtual machine scale set resources are running, perform the following steps:

1. From **Home**, navigate thru **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 97 : VMSS window



## Create a Webhook

To create a webhook, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_WEBHOOK_3.ps1
```

3. 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
```

4. Save this webhook url for future purpose.

## Verify the AutoScale Resource Variable creation

To verify the creation of an autoscale resource variable, perform the following steps:

1. From **Home**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.

The selected automation account - Overview window is displayed.

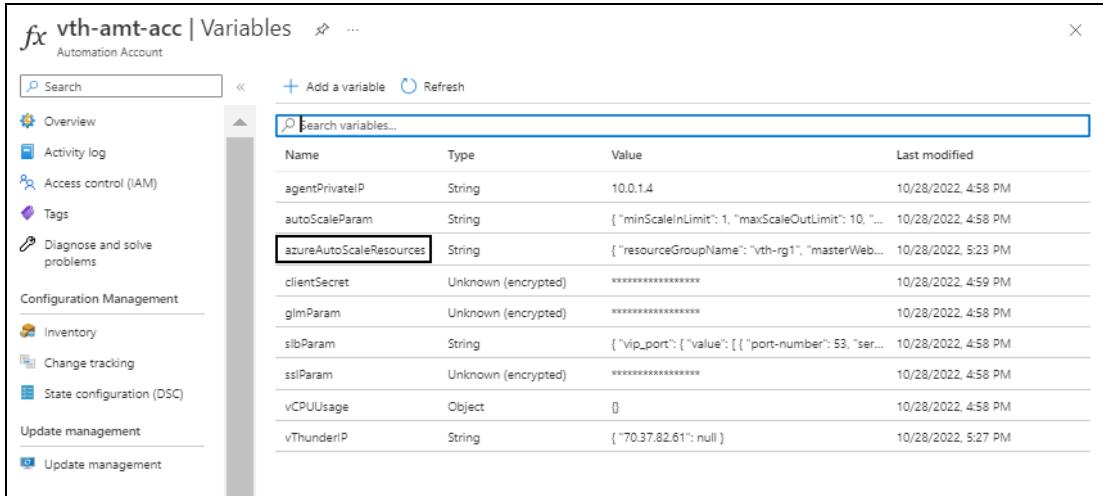
Figure 98 : Selected automation account - Overview window

migrating from an existing Run As accounts to managed identities'." data-bbox="170 133 846 482"/&gt;

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

The selected automation account - Variables window is displayed.

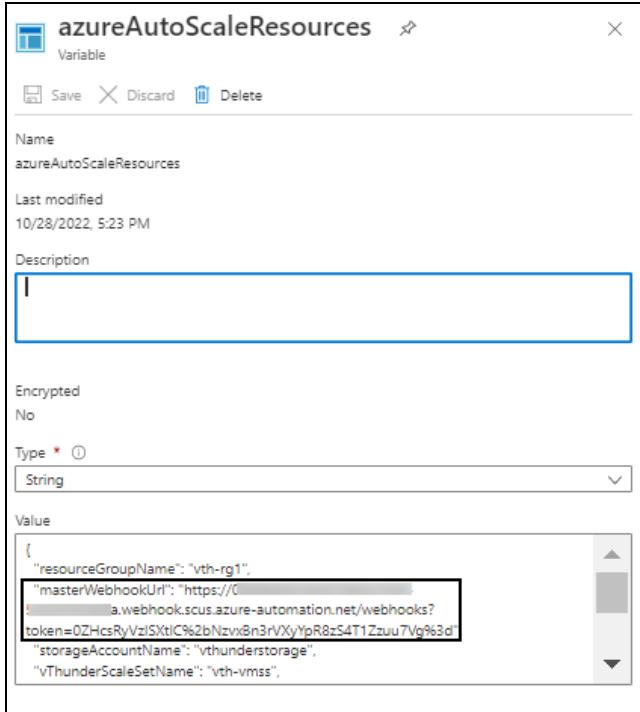
Figure 99 : Selected automation account - Variables window



**3. Select the **azureAutoScaleResources** variable.**

The **azureAutoScaleResources** variable window is displayed.

Figure 100 : AzureAutoScaleResources variable window



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

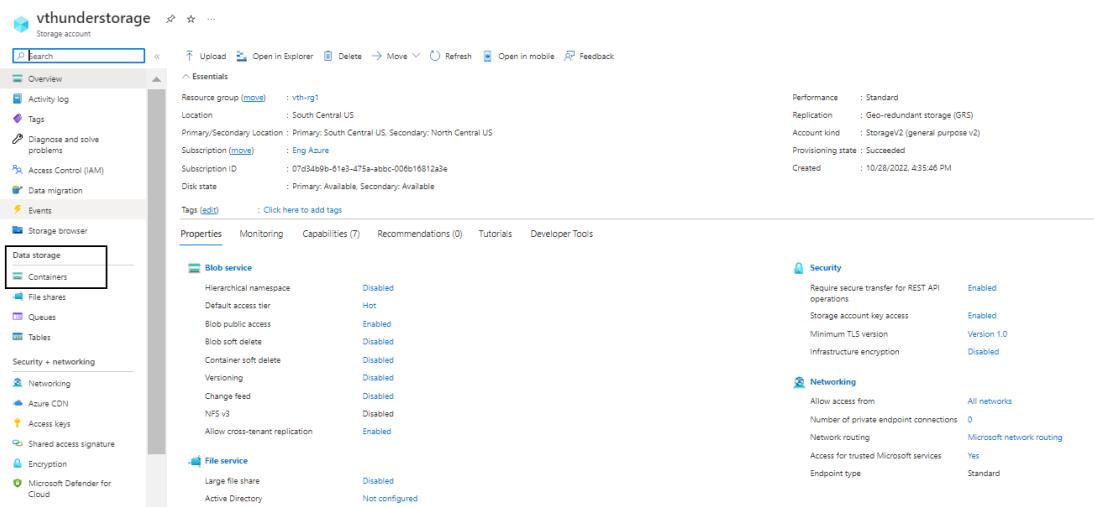
## Verify the SSL File availability

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

- From **Home**, navigate thru **Azure Services > Storage Accounts > <storage\_account\_name>**.  
The selected storage account - Overview window is displayed.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 101 : Selected storage account - Overview window



**Essentials**

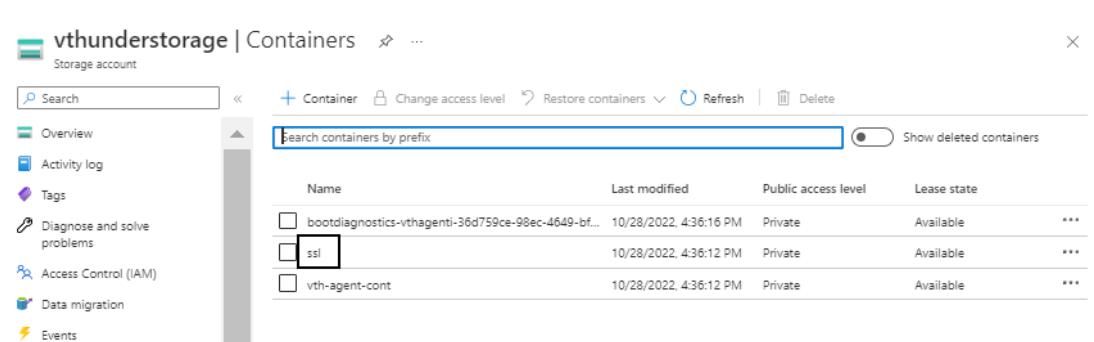
- Resource group (move) : vthrg1
- Location : South Central US
- Primary/Secondary Location : Primary: South Central US; Secondary: North Central US
- Subscription (move) : Eng Azure
- Subscription ID : 07d34b9b-81e3-475a-abb0-00b616812a3e
- Disk state : Primary Available, Secondary: Available
- Tags (edit) : Click here to add tags

Properties		Monitoring		Capabilities (7)		Recommendations (0)		Tutorials		Developer Tools	
<b>Blob service</b>		<b>File service</b>		<b>Security</b>		<b>Networking</b>					
Hierarchical namespace	Disabled	Large file share	Disabled	Require secure transfer for REST API operations	Enabled	Allow access from	All networks	Number of private endpoint connections	0	Network routing	Microsoft network routing
Default access tier	Hot	Active Directory	Not configured	Storage account key access	Enabled	Access for trusted Microsoft services	Yes	Endpoint type	Standard	Minimum TLS version	Version 1.0
Blob public access	Enabled			Infrastructure encryption	Disabled						
Blob soft delete	Disabled										
Container soft delete	Disabled										
Versioning	Disabled										
Change feed	Disabled										
NFS v3	Disabled										
Allow cross-tenant replication	Enabled										

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

The selected storage account - Containers window is displayed.

Figure 102 : Selected storage account - Containers window

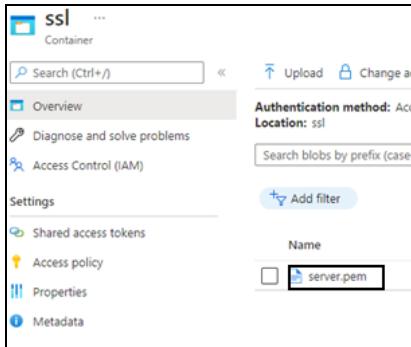


Name	Last modified	Public access level	Lease state
bootdiagnostics-vthagenti-36d759ce-98ec-4649-bf...	10/28/2022, 4:36:16 PM	Private	Available ***
ssl	10/28/2022, 4:36:12 PM	Private	Available ***
vth-agent-cont	10/28/2022, 4:36:12 PM	Private	Available ***

## 3. Select the SSL container.

The SSL container window is displayed.

Figure 103 : SSL Container window



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

## Verify the Runbook Jobs creation

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

1. From **Home**, navigate thru **Azure Services > Automation Accounts > <automation\_account\_name>**.

The selected automation account - Overview window is displayed.

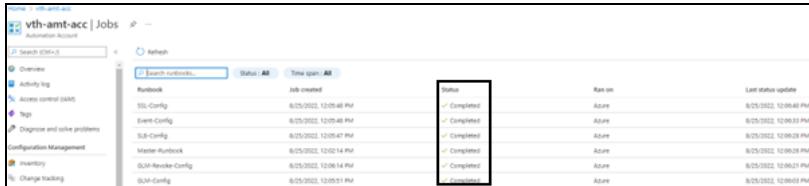
Figure 104 : Selected automation account - Overview window

migrating from an existing Run As accounts to managed identities'." data-bbox="170 131 845 481"/&gt;

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

The selected automation account - Jobs window is displayed.

Figure 105 : Selected automation account - Jobs window



Runbook	Job created	Status	Last run	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, 12:05:49 PM	Completed	Azure	8/25/2022, 12:06:33 PM
SUB-Config	8/25/2022, 12:05:49 PM	Completed	Azure	8/25/2022, 12:06:29 PM
Master-Runbook	8/25/2022, 12:05:14 PM	Completed	Azure	8/25/2022, 12:06:28 PM
QoS-Reader-Config	8/25/2022, 12:06:14 PM	Completed	Azure	8/25/2022, 12:06:21 PM
QoS-Config	8/25/2022, 12:05:51 PM	Completed	Azure	8/25/2022, 12:06:09 PM

3. Verify if all the runbook jobs have completed status.

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

---

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

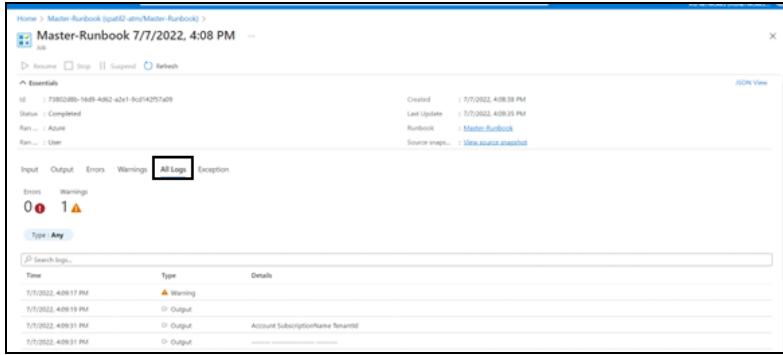
---

If any job has failed or if it is not working, refer [Common Errors](#).

4. Select each runbook job > **All Logs** tab to verify the logs.

The selected automation account - selected job - Jobs window is displayed.

Figure 106 : 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.

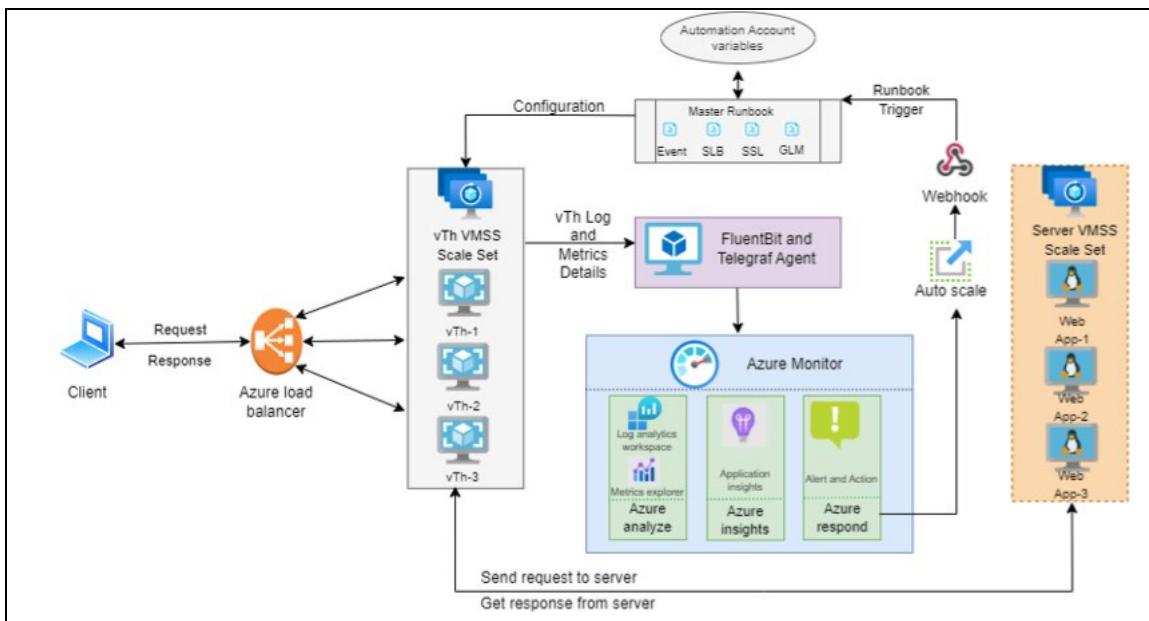
- AutoScaling can be done as per the automation account threshold configuration with variable name **ThresholdForScaleOut** and **ThresholdForScaleIn** for Scale Out and Scale In respectively.
- vThunder logs cannot be viewed in Azure log analytics workspace. For more information, see [Azure Log Function](#).
- CPU utilization of vThunder cannot be viewed in Azure application insight console.

## Autoscaling Options

### Configure Autoscaling and Log Monitoring using Agent Setup

[Figure 107](#) 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 107 : 3NIC-NVM-VMSS Autoscaling and Log Monitoring using Agent Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Fluentbit and Telegraf Agent](#)
- [Verify Log Agent file upload](#)
- [Access vThunder Agent using CLI](#)
- [Create Autoscale Rule](#)
- [Create Autoscale Alert](#)
- [Verify Logs in Log Analytics Workspace](#)
- [Verify Metrics in Application Insights](#)

## Initial Setup

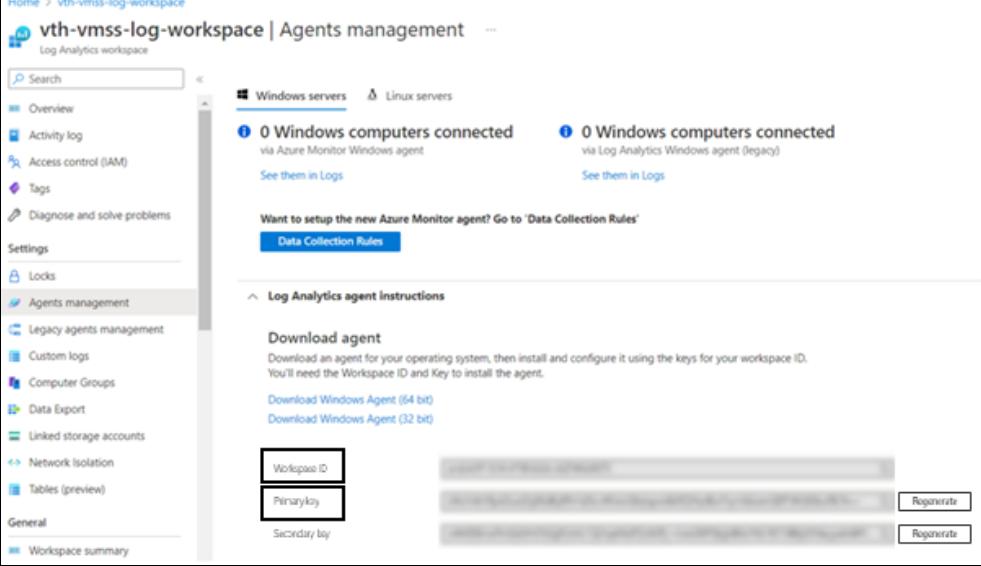
To configure autoscaling and log monitoring using the ARM template, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open ARM\_TMPL\_3NIC\_NVM\_VMSS\_LOG\_AGENT\_SHELL\_SCRIPT.sh with a text editor.
2. Update the customer ID with the workspace ID and shared key with primary key.

```
# azure log workspace id  
customer_id="d1c8985b-xxxx-xxxx-xxxx-12868ad9d740"  
# azure log Primary Key  
shared_key="tewPsyMYkdGOThRjEyl*****F8CzJ49ZRgw=="
```

You can get these values from **Home > Azure Services > Log Analytics workspaces > <log\_analytics\_workspace> Settings > Agents management**.

Figure 108 : Agents management window



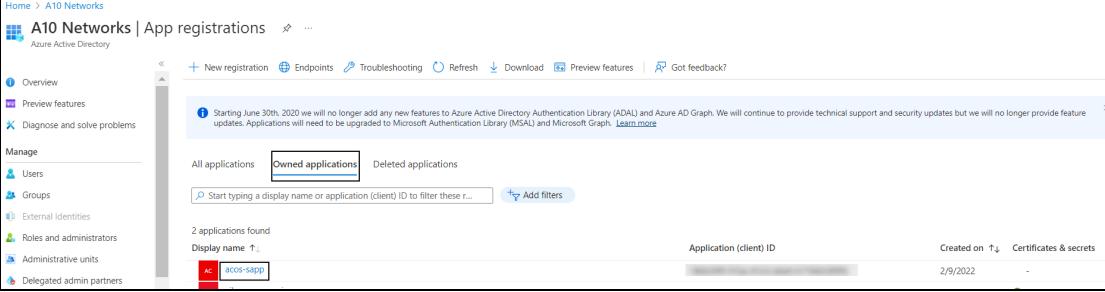
The screenshot shows the 'Agents management' page for the 'vth-vmss-log-workspace'. On the left, there's a sidebar with options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (with Agents management selected), Locks, Legacy agents management, Custom logs, Computer Groups, Data Export, Linked storage accounts, Network Isolation, Tables (preview), General, and Workspace summary. The main area has tabs for Windows servers and Linux servers. Under Windows servers, it says '0 Windows computers connected via Azure Monitor Windows agent' and '0 Windows computers connected via Log Analytics Windows agent (legacy)'. There are 'See them in Logs' links. A button for 'Data Collection Rules' is present. Below that, under 'Log Analytics agent instructions', there's a 'Download agent' section with links for Windows Agent (64 bit) and Windows Agent (32 bit). It also shows workspace keys: Primary key and Secondary key, each with a 'Regenerate' button.

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

```
(cat /etc/environment; echo "AZURE_CLIENT_ID=10724xxx-xxxx-xxxx-xxxx-xxxxc14726d"; echo "AZURE_TENANT_ID=91d27xxx-xxxx-xxxx-xxxx-xxxxbf81fc82f"; echo "AZURE_CLIENT_SECRET=9-xxx~jxxOREVyxxxxxHNxxxOwv_xxxxxZLIYxxx")
```

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

Figure 109 : Azure active directory - App registrations window



The screenshot shows the 'App registrations' page for the 'A10 Networks' tenant in Azure Active Directory. The sidebar includes Overview, Preview features, and Manage sections for Users, Groups, External identities, Roles and administrators, Administrative units, and Delegated admin partners. The main area has tabs for 'All applications', 'Owned applications' (which is selected), and 'Deleted applications'. A search bar allows filtering by display name or application (client) ID. The table lists two applications: 'a10c-sapp' (selected) and another entry whose details are partially obscured. Columns include Application (client) ID, Created on, and Certificates & secrets. A note at the top states: 'Starting June 30th, 2020 we will no longer add 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.' with a 'Learn more' link.

### 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 110 : Selected application insight - Overview window

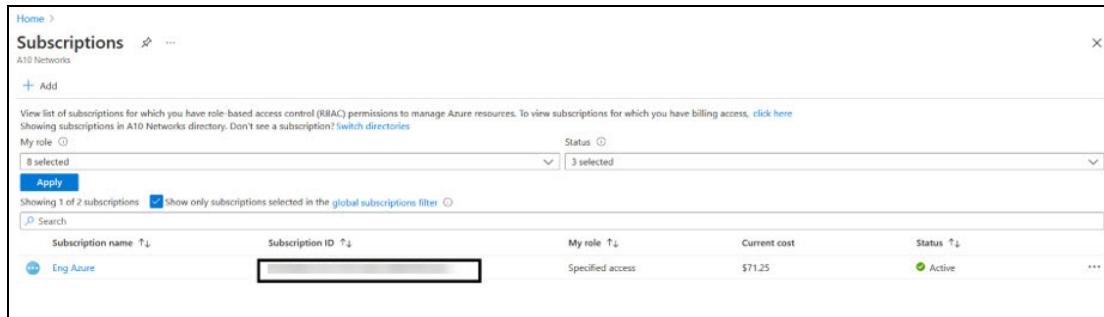


- Navigate to the folder where you have downloaded the ARM template > plugins > telegraf > plugins > inputs > customplugin and open **get\_cpu\_param.json** file with a text editor to configure the CPU parameters.

```
{
    "Subscription_Id": "07d3xxxx-xxxx-xxxx-xxxx-xxxxx6812a3e",
    "ResourceGroupName": "vth-rg1",
    "VmssName": "vth-vmss"
}
```

You can get the Subscription ID value from **Home > Azure Services > Subscriptions > <subscription\_name>**.

Figure 111 : Subscriptions window



- Verify if all the configurations in the **ARM\_TMPL\_3NIC\_NVM\_VMSS\_LOG\_AGENT\_SHELL\_SCRIPT.sh** file are correct and then save the changes.

## Create Fluentbit and Telegraf Agent

To create fluentbit and telegraf agent in virtual machine, perform the following steps:

- From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
- Run the following command to create fluentbit and telegraf agents in VM:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_LOG_AGENT_VM_5.ps1
```

**NOTE:** It may take the system a few minutes to display the resources.

The fluentbit [2.0.3] and telegraf [1.23.4] agents are created.

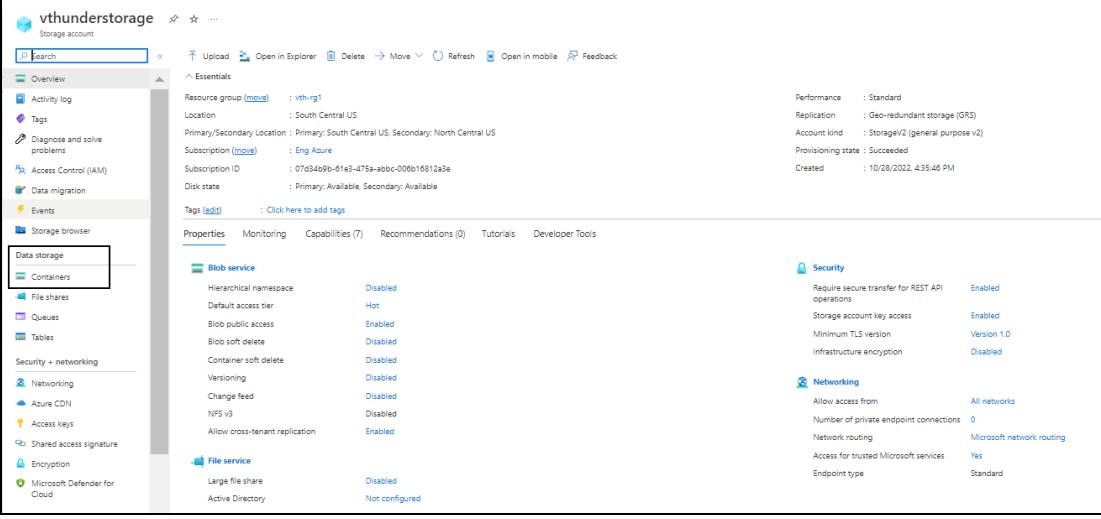
## Verify Log Agent file upload

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

- From **Home**, navigate thru **Azure Services > Storage Accounts > <storage\_account\_name>**.

The selected storage account - Overview window is displayed.

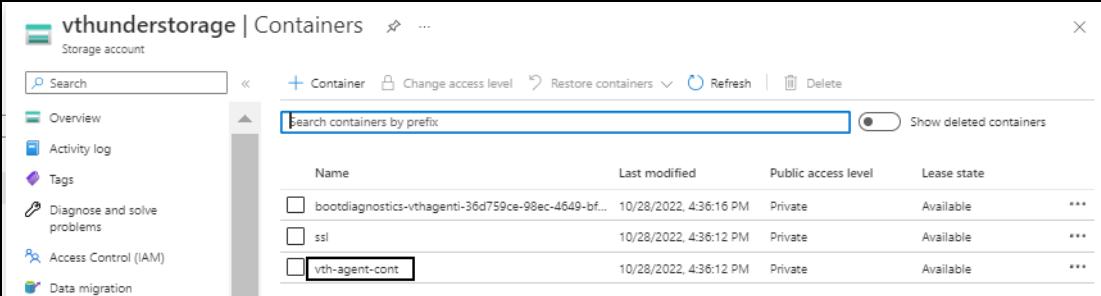
Figure 112 : Selected storage account - Overview window



Properties		Monitoring		Capabilities (7)		Recommendations (0)		Tutorials		Developer Tools	

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

The selected storage account - Containers window is displayed.

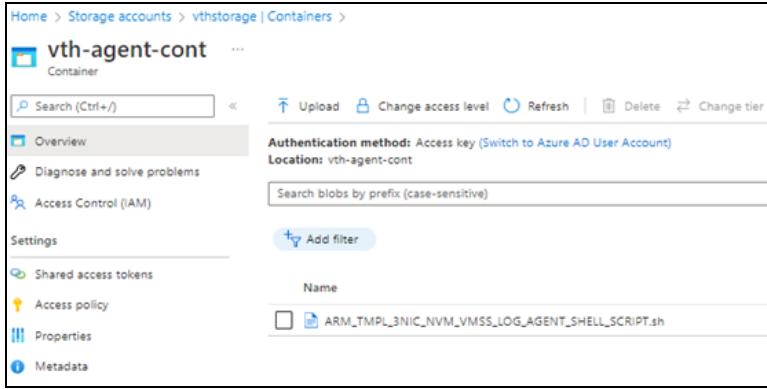


Name	Last modified	Public access level	Lease state
bootdiagnostics-vthagenti-36d759ce-90ec-4649-bf...	10/28/2022, 4:36:16 PM	Private	Available
ssl	10/28/2022, 4:36:12 PM	Private	Available
vth-agent-cont	10/28/2022, 4:36:12 PM	Private	Available

- Select the agent container.

The agent container window is displayed.

Figure 113 : Agent container window



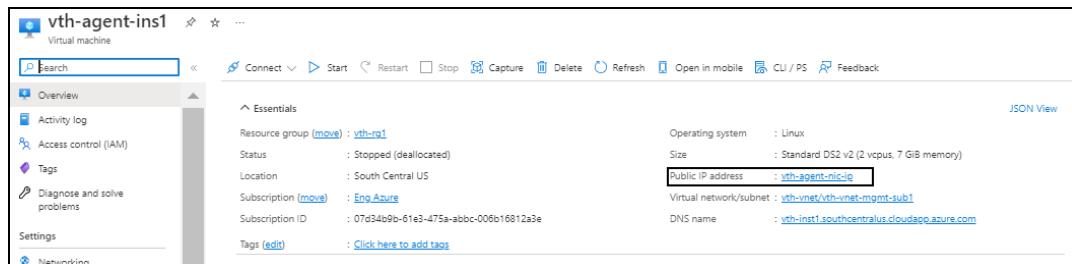
- Verify if `ARM_TMPL_3NIC_NVM_VMSS_LOG_AGENT_SHELL_SCRIPT.sh` file is uploaded.

## Access vThunder Agent using CLI

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

- 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 114 : Virtual machine - Agent instance window



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

```
login as: vth-user <---adminUsername value configured in ARM_TMPL_3NIC_
NVM_VMSS_PARAM.json--->
Using keyboard-interactive authentication.
```

```

Password: vth-Password <---adminPassword value configured in ARM_TMPL_
3NIC_NVM_VMSS_PARAM.json--->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vth-agent-inst> enable <---Execute command--->
Password:<---just press Enter key--->
vth-agent-inst#config <---Configuration mode--->
vth-agent-inst(config)#

```

**5. Run the following command to check the status of the agent service.**

```
vth-agent-inst(config)# systemctl status telegraf.service
```

The following output is displayed.

```

● telegraf.service - The plugin-driven server agent for reporting
metrics into InfluxDB
   Loaded: loaded (/lib/systemd/system/telegraf.service; enabled;
   vendor preset: enabled)
     Active: active (running) since Thu 2022-08-25 10:24:26 UTC; 18min
ago
       Docs: https://github.com/influxdata/telegraf
      Main PID: 17855 (telegraf)
        Tasks: 9 (limit: 8321)
       Memory: 43.6M
      CGroup: /system.slice/telegraf.service
              └─17855 /usr/bin/telegraf - config /etc/telegraf/telegraf.conf
                -config-directory /etc/telegraf/telegraf.d

Aug 25 10:42:16 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:16 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:26 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed

```

```
doing req: Post ">
Aug 25 10:42:26 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:36 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:36 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:46 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:46 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:56 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:56 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
```

There is a possibility that the command might return few errors. The errors displayed in the above output can be ignored.

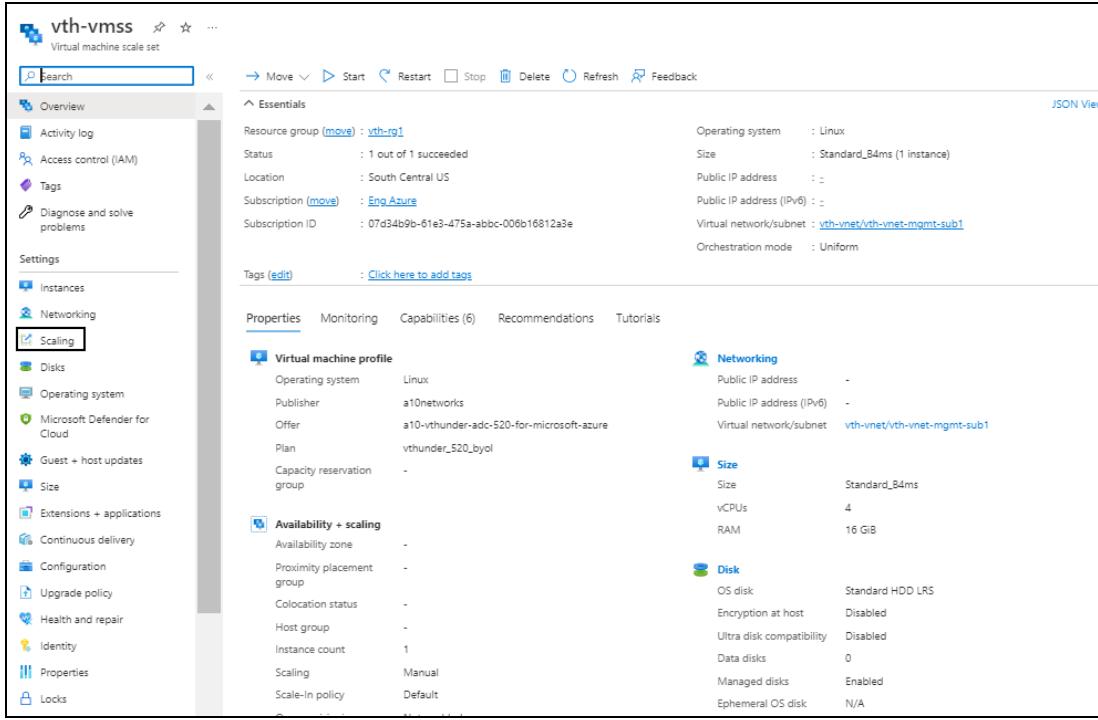
## Create Autoscale Rule

To create autoscale rule, perform the following steps:

1. From **Home**, navigate thru **Azure Services > Virtual machine scale set > <vmss\_name>**.  
The selected vmss - Overview window is displayed.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 115 : Selected VMSS - Overview window



The screenshot shows the Azure portal interface for managing a Virtual Machine Scale Set (vth-vmss). The left sidebar lists several settings categories, with 'Scaling' currently selected. The main content area displays the following details:

- Essentials:**
  - Resource group: vth-rg1
  - Status: 1 out of 1 succeeded
  - Location: South Central US
  - Subscription: Eng\_Azure
  - Subscription ID: 07a34b9b-61e3-475a-abbc-006b16812a3e
  - Tags: Click here to add tags
- Properties:**
  - Virtual machine profile:** Operating system: Linux, Publisher: a10networks, Offer: a10-vthunder-adc-520-for-microsoft-azure, Plan: vthunder\_520\_byol, Capacity reservation group: -.
  - Networking:** Public IP address: -, Public IP address (IPv6): -, Virtual network/subnet: vth-vnet/vth-vnet-mgmt-sub1
  - Size:** Size: Standard\_B4ms, vCPUs: 4, RAM: 16 GiB
  - Disk:** OS disk: Standard HDD LRS, Encryption at host: Disabled, Ultra disk compatibility: Disabled, Data disks: 0, Managed disks: Enabled, Ephemeral OS disk: N/A
- Monitoring, Capabilities (6), Recommendations, Tutorials:** These tabs are also present in the top navigation bar.

- Click **Scaling** from the left **Settings** panel.  
The selected vmss - Scaling window is displayed.

Figure 116 : Selected VMSS - Scaling window

**vth-vmss | Scaling** ...

Virtual machine scale set

Search Save Discard Refresh Logs Feedback

Configure Scale-In Policy Predictive charts Run history JSON Notify Diagnostic settings

Autoscale is a built-in feature that helps applications perform their best when demand changes. You can choose to scale your resource manually to a specific instance count, or via a custom Autoscale policy that scales based on metric(s) thresholds, or schedule instance count which scales during designated time windows. Autoscale enables your resource to be performant and cost effective by adding and removing instances based on demand. [Learn more about Azure Autoscale](#) or [view the how-to video](#).

Choose how to scale your resource

Manual scale Maintain a fixed instance count

Custom autoscale Scale on any schedule, based on any metrics

Custom autoscale

Autoscale setting name \* vth-vmss-Autoscale-357

Resource group vth-rg1

Predictive autoscale Mode Disabled Pre-launch setup of instances (minutes)

Enable Forecast only or Predictive autoscale. [Learn more about Predictive autoscale](#).

**Default \*** Auto created default scale condition

Delete warning ! The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode  Scale based on a metric  Scale to a specific instance count

Rules ! Scale is based on metric trigger rules but no rule(s) is defined; click [Add a rule](#) to create a rule. For example: Add a rule that increases instance count by 1 when CPU percentage is above 70%. If no rules is defined, the resource will be set to default instance count.

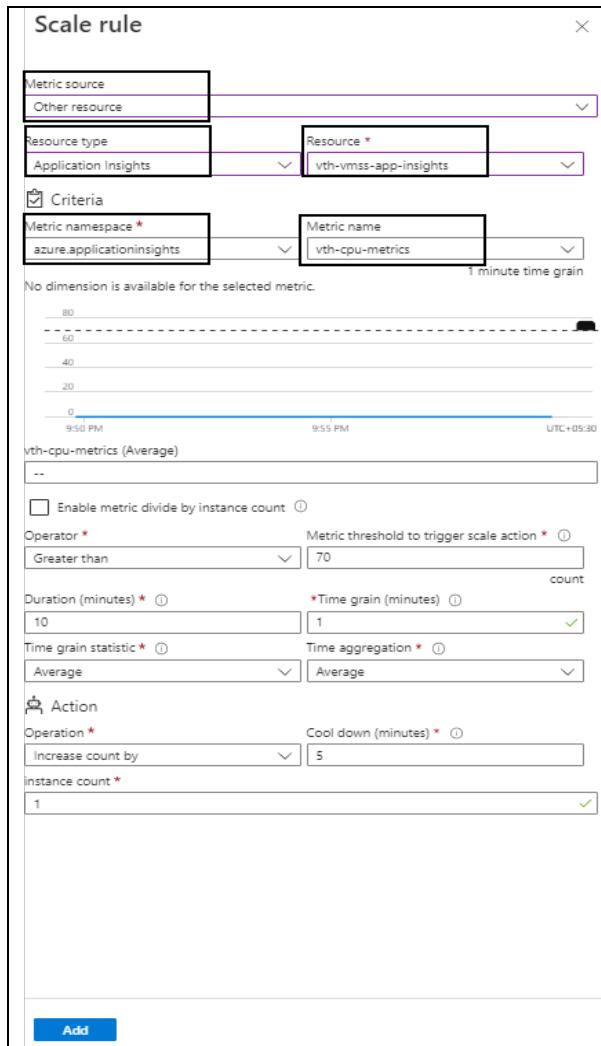
Instance limits Minimum  Maximum  Default

Schedule This scale condition is executed when none of the other scale condition(s) match

+ Add a scale condition

3. Under **Configure** tab, select **Custom autoscale** option.  
The fields relevant to this option are displayed.
4. Select the **Scale mode** as **Scale based on a metric**.
5. Click **Add a rule**.  
The **Scale rule** window is displayed.

Figure 117 : Scale rule window



6. Select or enter the information in the following fields:

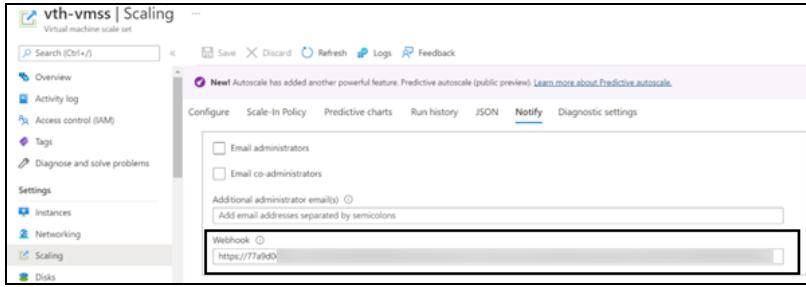
- Metric source: Other resource
- Resource type: Application Insights
- Resource
- Time aggregation
- Metric namespace
- Metric name

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 118 : Selected VMSS - Scaling window - Notify tab

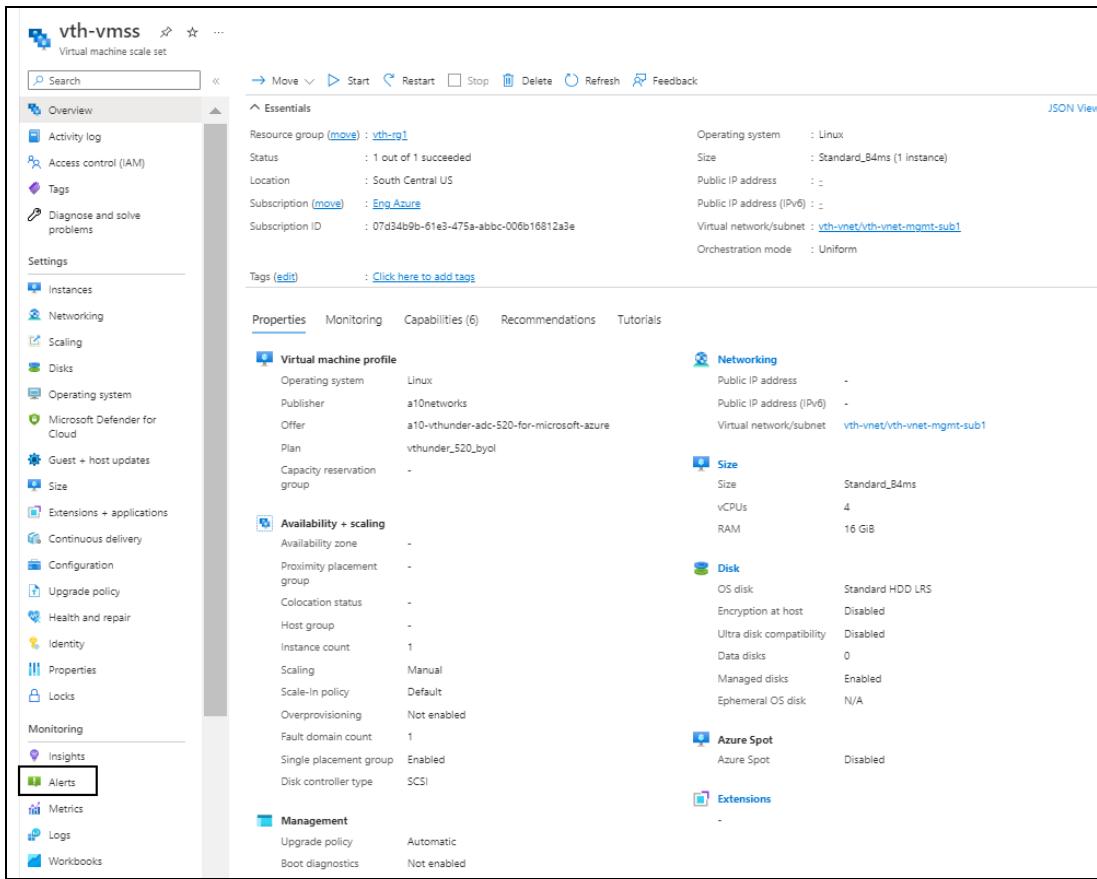


## Create Autoscale Alert

1. From **Home**, navigate thru **Azure Services > Virtual machine scale set > <vmss\_name>**.  
The selected vmss - Overview window is displayed.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 119 : Selected VMSS - Overview window



The screenshot shows the Azure portal interface for a Virtual Machine Scale Set named 'vth-vmss'. The left sidebar contains navigation links for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Instances, Networking, Scaling, Disks, Operating system, Microsoft Defender for Cloud, Guest + host updates, Size, Extensions + applications, Continuous delivery, Configuration, Upgrade policy, Health and repair, Identity, Properties, Locks, Monitoring, and Insights. The 'Alerts' link under Monitoring is highlighted with a red box.

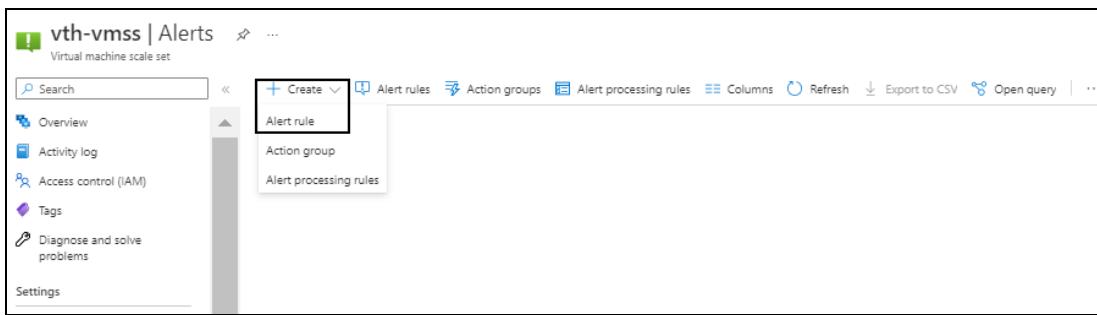
The main content area displays the 'Essentials' section with details like Resource group (vth-rg1), Status (1 out of 1 succeeded), Location (South Central US), Subscription (Eng\_Azure), and Subscription ID (07d34b9b-61e3-475a-abbc-006b16812a3e). It also shows Tags (Click here to add tags) and a JSON View link.

The 'Properties' tab is selected, showing the following configuration details:

- Virtual machine profile:** Operating system: Linux, Publisher: a10networks, Offer: a10-vthunder-adc-s20-for-microsoft-azure, Plan: vthunder\_s20\_byol, Capacity reservation group: -.
- Availability + scaling:** Availability zone: -, proximity placement group: -, Colocation status: -, Host group: -, Instance count: 1, Scaling: Manual, Scale-in policy: Default, Overprovisioning: Not enabled, Fault domain count: 1, Single placement group: Enabled, Disk controller type: SCSI.
- Networking:** Public IP address: -, Public IP address (IPv6): -, Virtual network/subnet: vth-vnet/vth-vnet-mgmt-sub1.
- Size:** Size: Standard\_B4ms, vCPUs: 4, RAM: 16 GB.
- Disk:** OS disk: Standard HDD LRS, Encryption at host: Disabled, Ultra disk compatibility: Disabled, Data disks: 0, Managed disks: Enabled, Ephemeral OS disk: N/A.
- Azure Spot:** Azure Spot: Disabled.
- Extensions:** -

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

Figure 120 : Selected VMSS - Alerts window

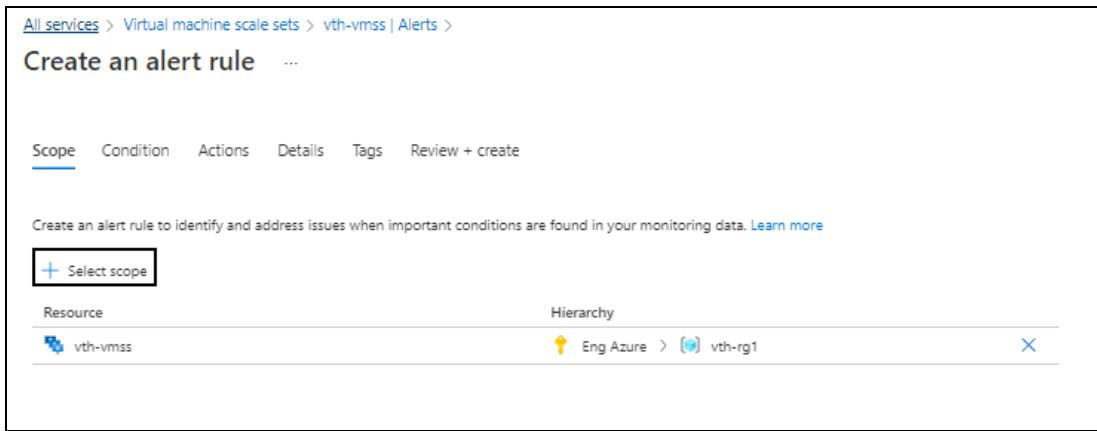


The screenshot shows the Azure portal interface for the 'vth-vmss' Virtual Machine Scale Set under the 'Alerts' section. The left sidebar includes Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, and Settings. The 'Alert rule' link is highlighted with a red box.

The main content area features a toolbar with 'Create' (with dropdown for Alert rules, Action groups, Alert processing rules), Alert rules, Action groups, Alert processing rules, Columns, Refresh, Export to CSV, Open query, and more. Below the toolbar, there are three sub-sections: 'Alert rule', 'Action group', and 'Alert processing rules'.

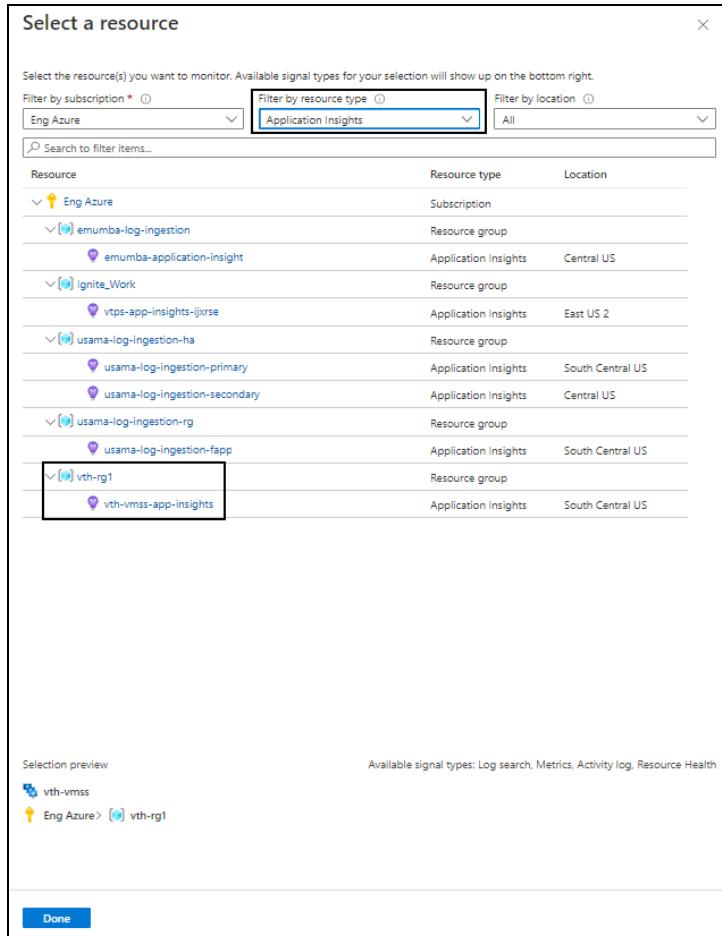
- Click **Create > Alert rule**.
- The Create an alert rule - Scope window is displayed.

Figure 121 : Create an alert rule window - Scope tab



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

Figure 122 : Select a resource window



**5. From Filter by resource type, select Application Insights.**

The resource group having application insight resources are displayed.

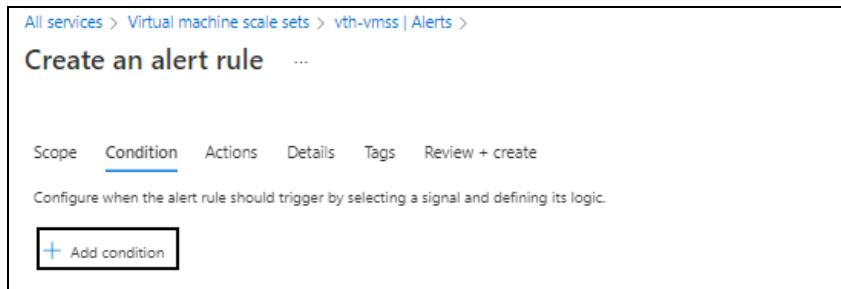
**6. Select the required application insight resource and click Done.**

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.

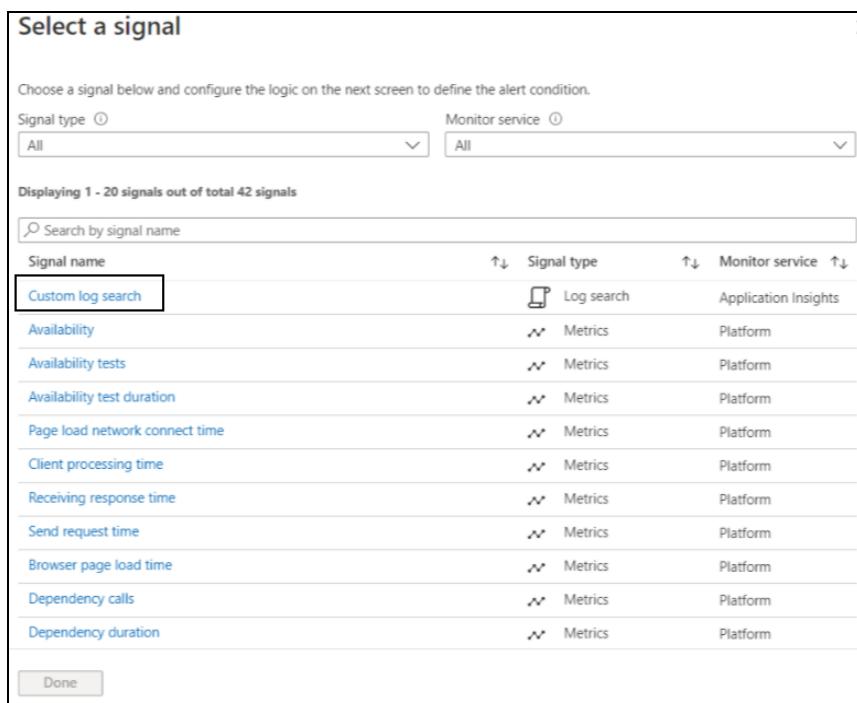
Figure 123 : Create an alert rule window - Condition tab



- Click **Add condition** in the **Condition** tab.

The **Select a signal** window is displayed.

Figure 124 : Select a signal window



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

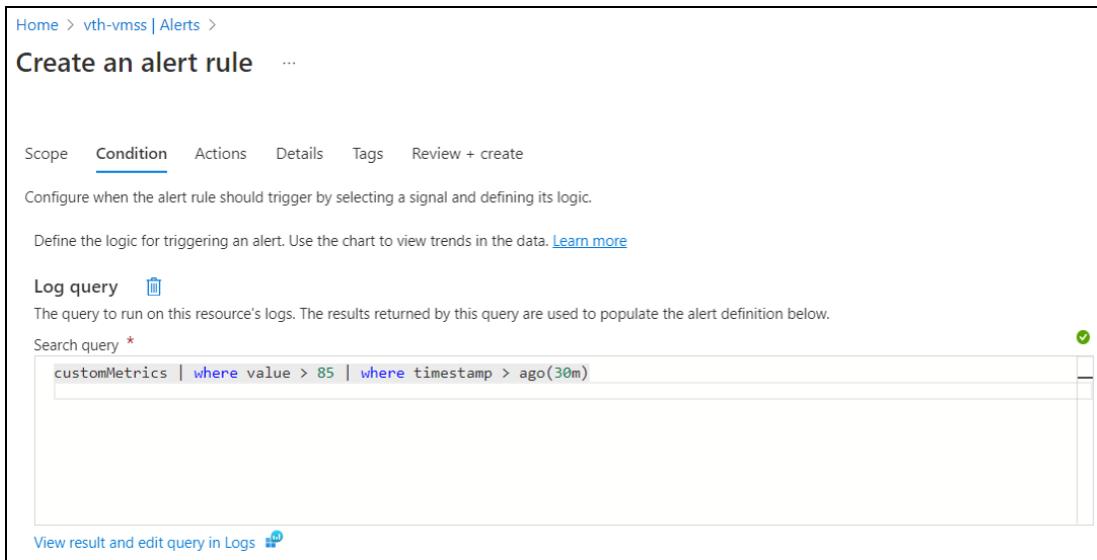
The window to define the signal's logic is displayed in the alert rule condition.

- 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 125 : Create an alert rule window - Condition tab



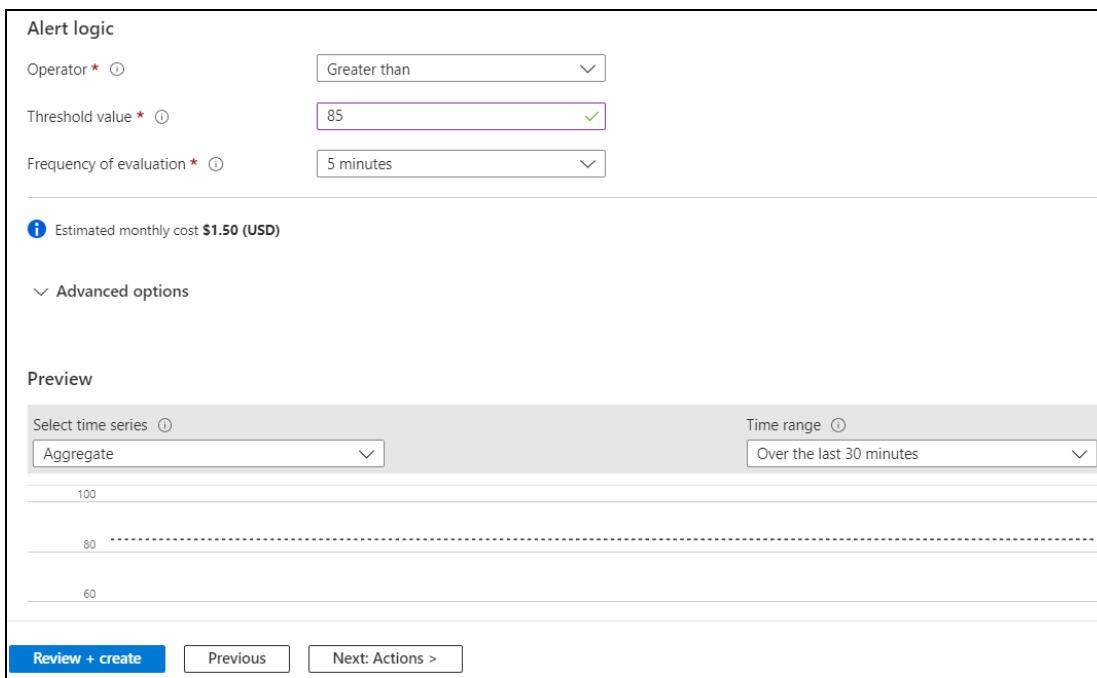
The screenshot shows the 'Create an alert rule' interface. The 'Condition' tab is selected. A log query editor is present, showing the following query:

```
customMetrics | where value > 85 | where timestamp > ago(30m)
```

A green checkmark is displayed next to the query, indicating it is valid. Below the editor, there is a link: 'View result and edit query in Logs'.

## 11. Configure alert logic in the Alert logic section.

Figure 126 : Alert logic section



**Alert logic**

Operator **\***

Threshold value **\***  ✓

Frequency of evaluation **\***

i Estimated monthly cost **\$1.50 (USD)**

✓ Advanced options

**Preview**

Select time series (i)

Aggregate	Time range <span style="color: blue;">(i)</span>
Over the last 30 minutes	<input type="button" value="▼"/>

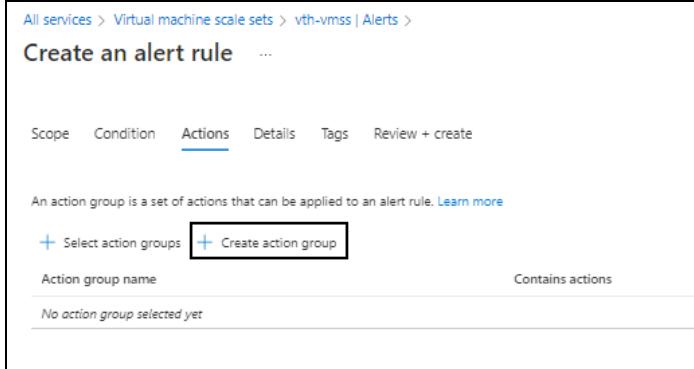
100  
80  
60

Review + create Previous Next: Actions >

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

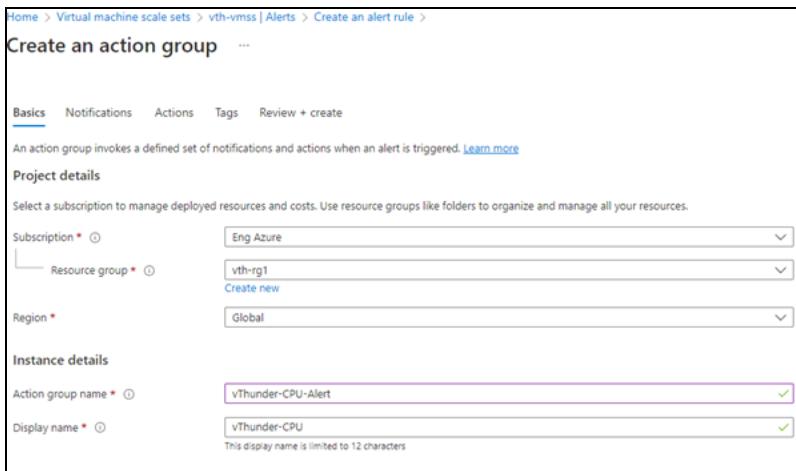
12. Click **Next : Actions** at the bottom of the window.  
 The **Create an alert rule - Actions** window is displayed.

Figure 127 : Create an alert rule window - Actions tab



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

Figure 128 : Create an action group window - Basics tab



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

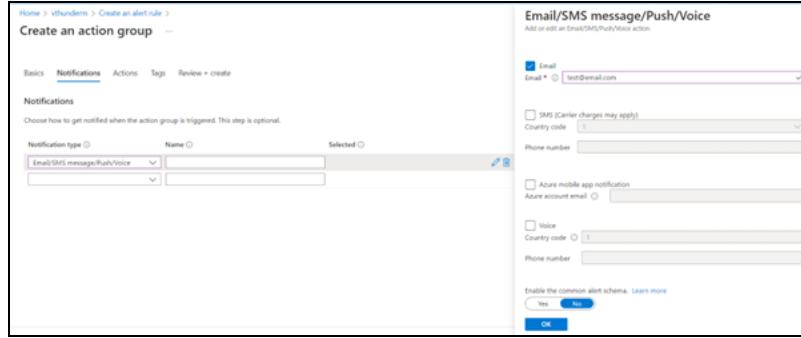
**Project details**

- Subscription
- Resource group
- Region

**Instance details**

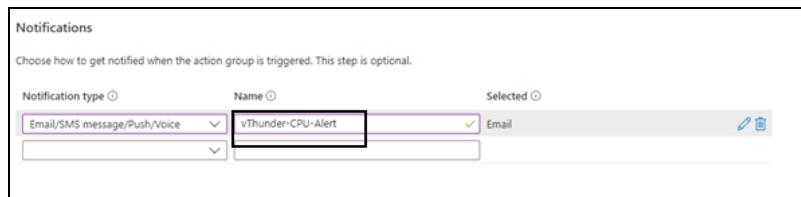
- Action group name
  - Display name
- b. Click **Next : Notifications** at the bottom of the window.  
The **Create an action group - Notifications** window is displayed.
- c. Select the **Notification type**.  
The corresponding window to configure the notification type is displayed.

Figure 129 : Create an action group window - Notifications tab - Type



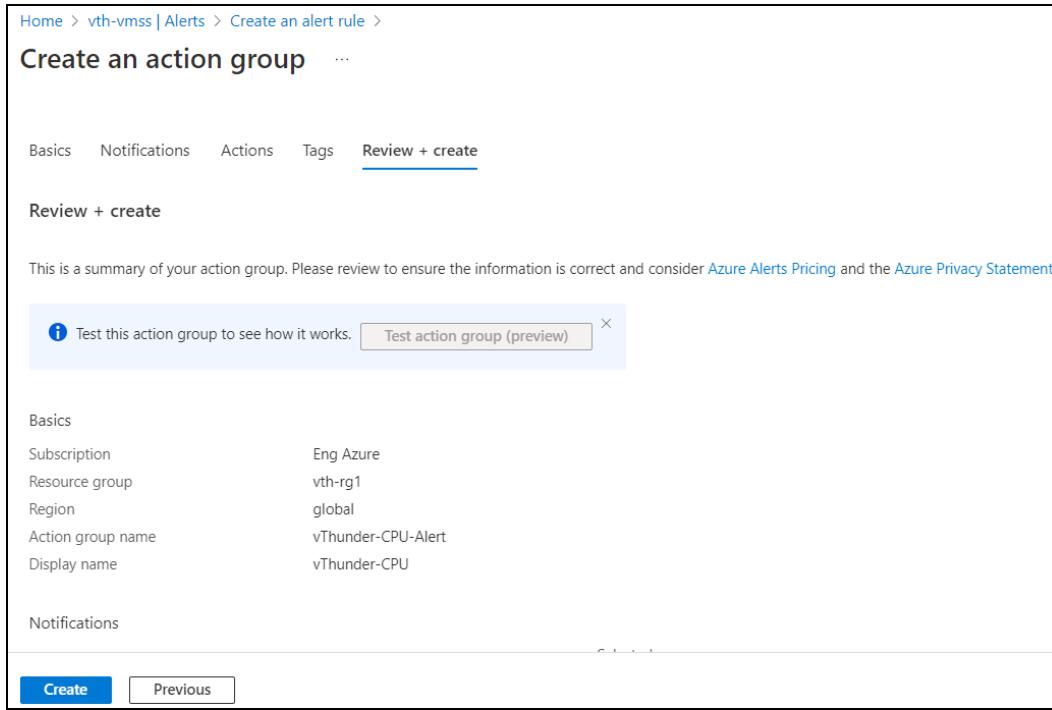
- d. Select the **Email** option and provide the correct email ID in the **Email** field and then click **OK**.
- e. Enter a unique name for the notification in the **Name** field.

Figure 130 : 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.

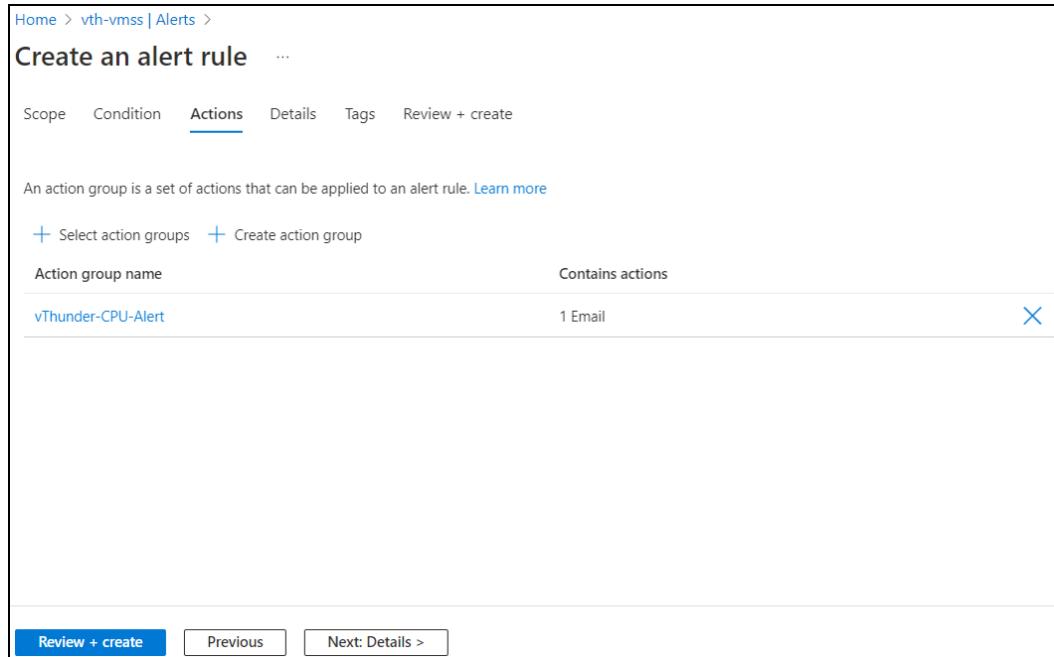
Figure 131 : Create an action group window - Review + create tab



g. Click **Create**.

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

Figure 132 : Create an alert rule window - Actions tab

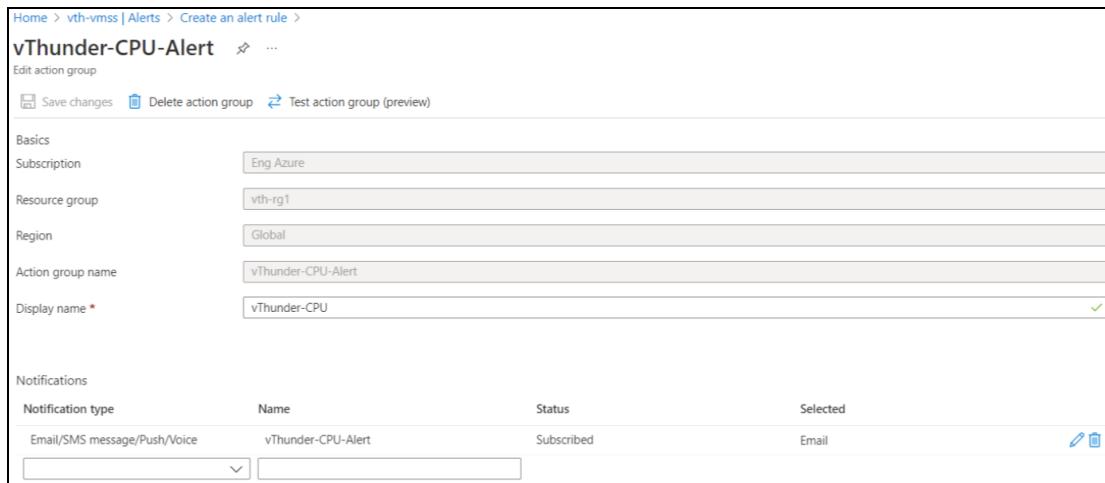


The screenshot shows the 'Create an alert rule' window with the 'Actions' tab selected. At the top, there are tabs for Scope, Condition, Actions (which is underlined), Details, Tags, and Review + create. Below the tabs, a note states: 'An action group is a set of actions that can be applied to an alert rule.' with a 'Learn more' link. There are two buttons: '+ Select action groups' and '+ Create action group'. A table lists an action group named 'vThunder-CPU-Alert' which 'Contains actions' (1 Email). At the bottom, there are buttons for 'Review + create', 'Previous', and 'Next: Details >'.

14. Select the recently created action group.

The selected action group is displayed.

Figure 133 : Selected action group

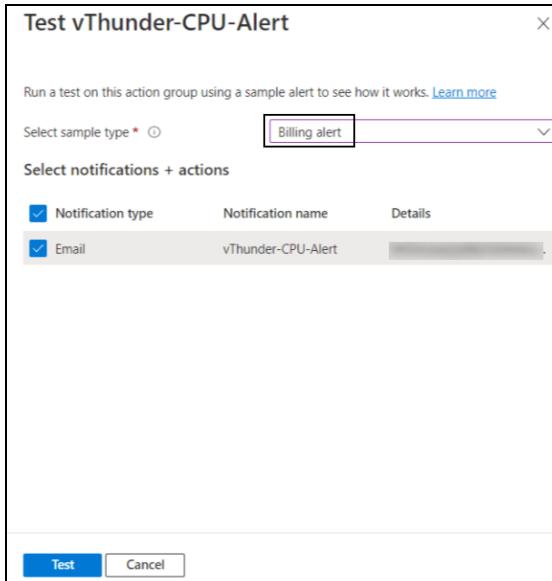


The screenshot shows the 'Edit action group' window for 'vThunder-CPU-Alert'. It has sections for Basics (Subscription: Eng Azure, Resource group: vth-rg1, Region: Global, Action group name: vThunder-CPU-Alert, Display name: vThunder-CPU) and Notifications (Notification type: Email/SMS message/Push/Voice, Name: vThunder-CPU-Alert, Status: Subscribed, Selected: Email). Buttons at the top include Save changes, Delete action group, and Test action group (preview).

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

The Test <action\_group\_name>-alert window is displayed.

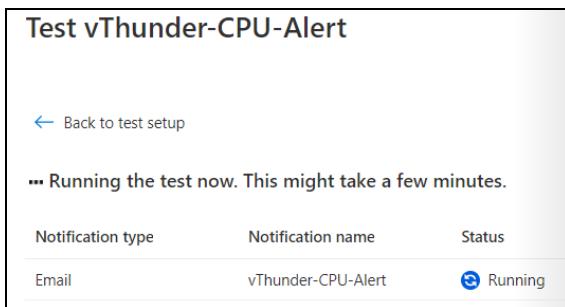
Figure 134 : Test &lt;action\_group\_name&gt;-alert window



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

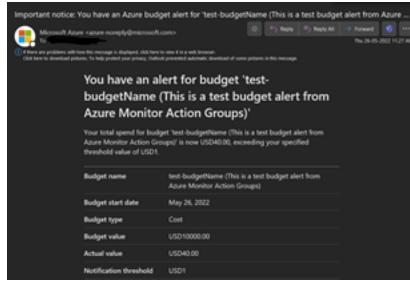
The running status for the test rule is displayed.

Figure 135 : Test &lt;action\_group\_name&gt;-alert window - Running status



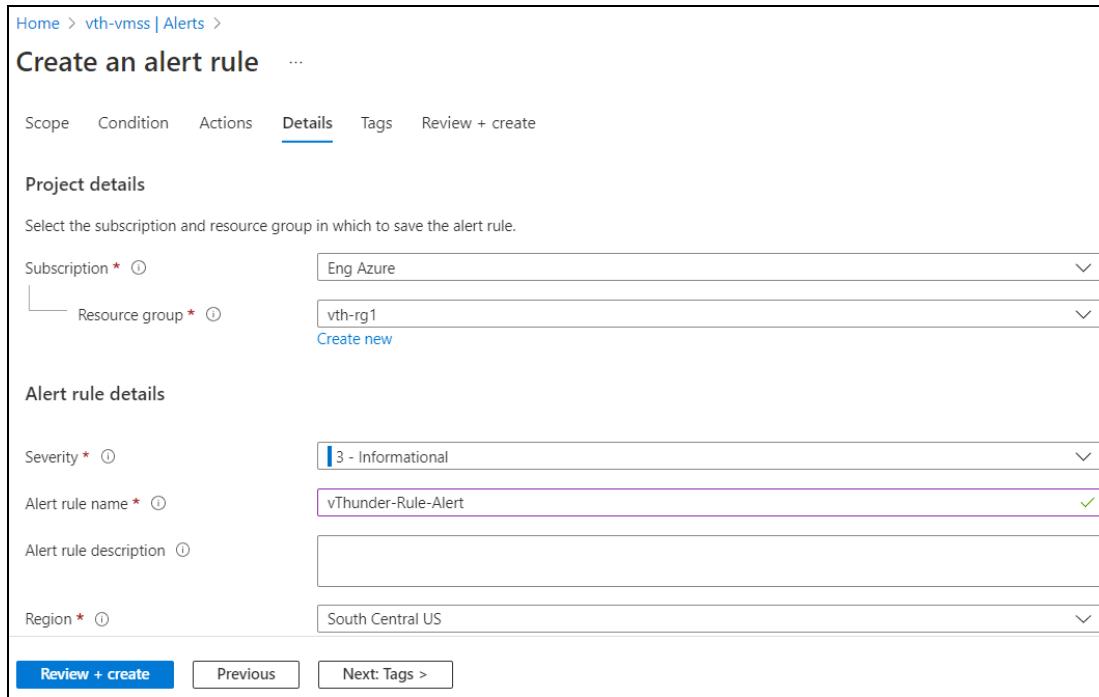
When the success status is displayed, an email notification is triggered to the email ID provided in the [Email Notification](#) step.

Figure 136 : 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 137 : Create an alert rule window - Details tab

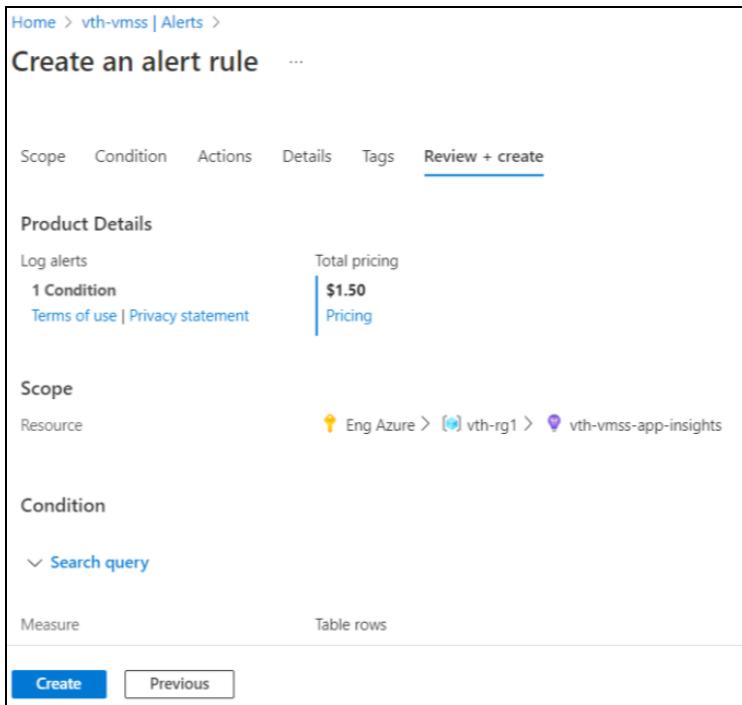


The screenshot shows the 'Create an alert rule - Details' window in the Azure portal. The 'Details' tab is selected. The window is divided into several sections:

- Project details:** Selects the subscription ('Eng Azure') and resource group ('vth-rg1').
- Alert rule details:** Sets the severity to '3 - Informational', names the alert rule as 'vThunder-Rule-Alert', and provides a description. The region is set to 'South Central US'.
- Buttons at the bottom:** 'Review + create' (highlighted in blue), 'Previous', and 'Next: Tags >'.

20. Enter the Alert rule name and provide the other mandatory details.
21. Skip the other tabs and click **Review + create** at the bottom of the window.  
The **Create an alert rule - Review + create** window is displayed.

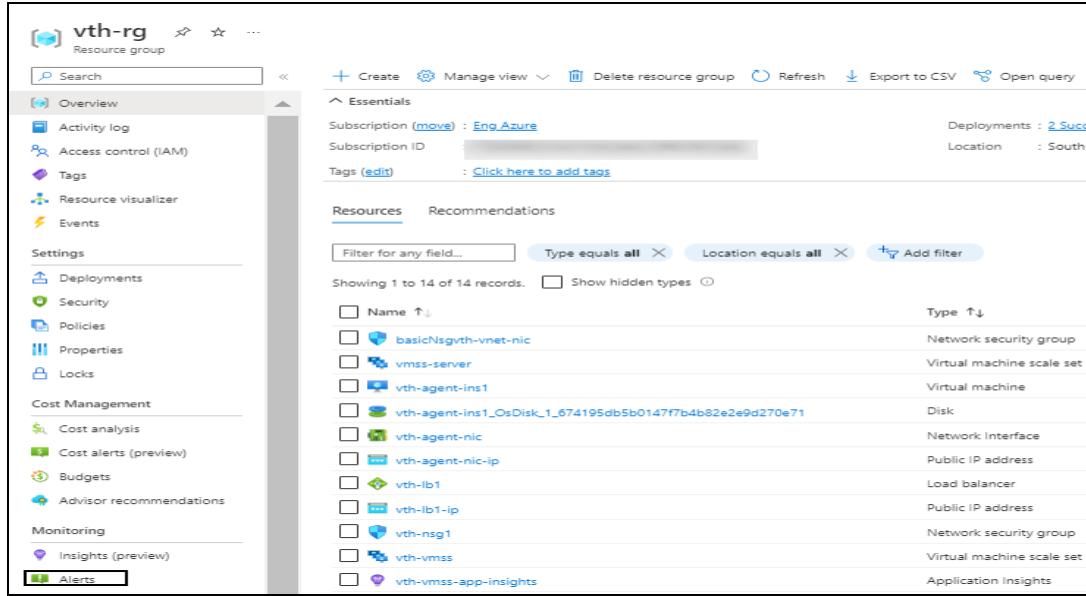
Figure 138 : Create an alert rule window - Review + create tab



22. Click **Create**.  
The alert rule is created.
23. From **Home**, navigate thru **Azure Services > Resource groups > <resource\_group\_name>**.  
The selected resource group - Overview window is displayed.

[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 139 : Selected resource group - Overview window



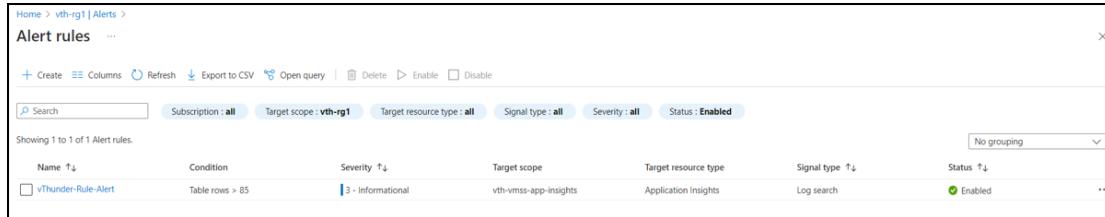
24. Click **Alerts** from the left **Monitoring** panel.

The selected alert window is displayed.

25. Click **Alert rules**.

The alert rules for the selected resource group is displayed.

Figure 140 : Selected resource group - Alert rules window



Name	Condition	Severity	Target scope	Target resource type	Signal type	Status
vThunder-Rule-Alert	Table rows > 85	Informational	vth-vmss-app-insights	Application Insights	Log search	Enabled

## Verify Logs in Log Analytics Workspace

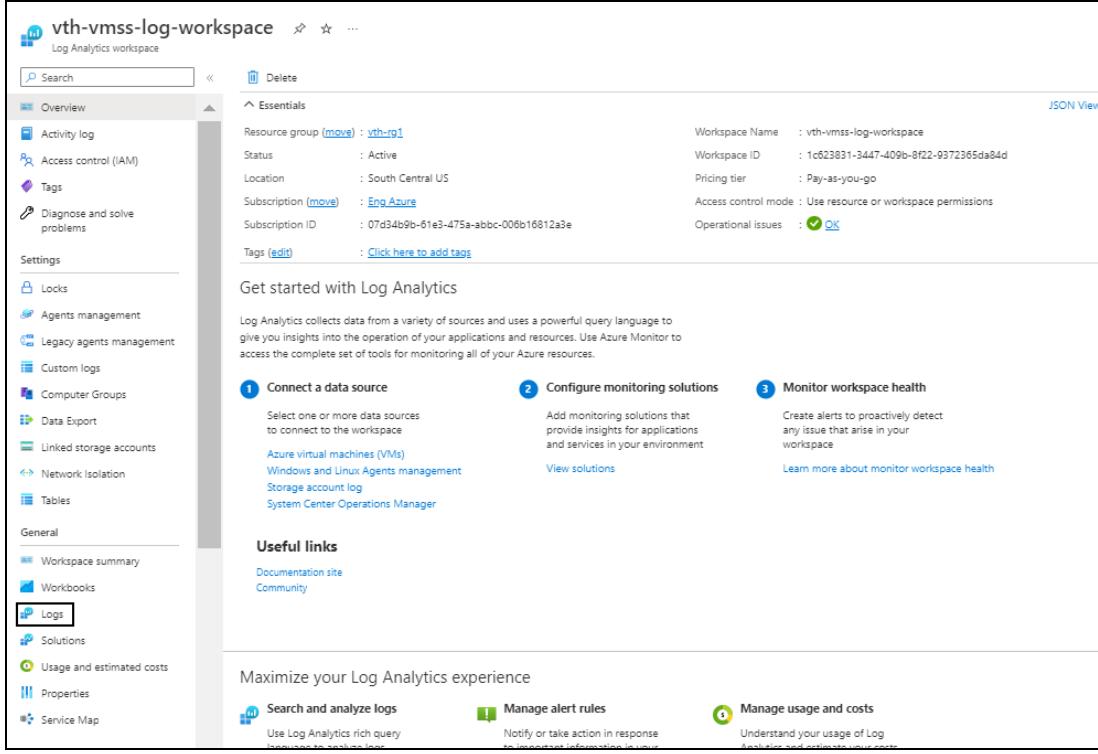
To verify the logs in log analytics workspace, perform the following steps:

- From **Home**, navigate thru **Azure Services > Log Analytics workspaces > <log\_workspace\_name>**.

The selected log workspace - Overview window is displayed.

## Deploy ARM Template 3NIC-NVM-VMSS

Figure 141 : Selected log workspace - Overview window



**vth-vmss-log-workspace** Log Analytics workspace

**Overview**

**Essentials**

Resource group ([move](#)) : [vth-rg1](#) Workspace Name : vth-vmss-log-workspace  
 Status : Active Workspace ID : 1c623831-3447-409b-8f22-9372365da84d  
 Location : South Central US Pricing tier : Pay-as-you-go  
 Subscription ([move](#)) : [Eng\\_Azure](#) Access control mode : Use resource or workspace permissions  
 Subscription ID : 07a34b9b-61e3-475a-abbc-006b16812a3e Operational issues : OK  
 Tags ([edit](#)) : [Click here to add tags](#)

**Get started with Log Analytics**

Log Analytics collects data from a variety of sources and uses a powerful query language to give you insights into the operation of your applications and resources. Use Azure Monitor to access the complete set of tools for monitoring all of your Azure resources.

**1 Connect a data source** Select one or more data sources to connect to the workspace  
 Azure virtual machines (VMs) Windows and Linux Agents management  
 Storage account log System Center Operations Manager

**2 Configure monitoring solutions** Add monitoring solutions that provide insights for applications and services in your environment  
 View solutions

**3 Monitor workspace health** Create alerts to proactively detect any issue that arise in your workspace  
[Learn more about monitor workspace health](#)

**Useful links**

[Documentation site](#) [Community](#)

**Maximize your Log Analytics experience**

**Search and analyze logs** Use Log Analytics rich query [Learn more about rich queries](#)

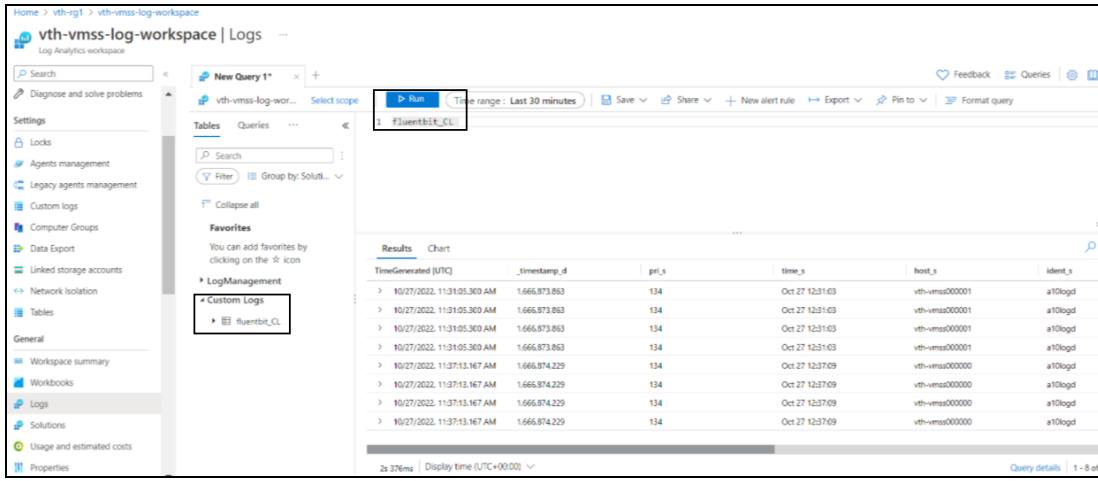
**Manage alert rules** Notify or take action in response to important information in your logs [Learn more about alert rules](#)

**Manage usage and costs** Understand your usage of Log Analytics [Learn more about usage and costs](#)

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

The selected log window is displayed.

Figure 142 : Selected log analytics workspace - Logs window



**vth-vmss-log-workspace | Logs**

**New Query 1\*** [+](#) [Run](#) [Save](#) [Share](#) [New alert rule](#) [Export](#) [Pin to](#) [Format query](#)

**Tables** **Queries** ...

**Fluentbit\_CL**

**Results** **Chart**

TimeGenerated (UTC)	_timestamp_d	pri_s	time_s	host_s	ident_s
> 10/27/2022, 11:31:05,300 AM	1666873863	134	Oct 27 12:31:03	vth-vmss000001	a10logd
> 10/27/2022, 11:31:05,300 AM	1666873863	134	Oct 27 12:31:03	vth-vmss000001	a10logd
> 10/27/2022, 11:31:05,300 AM	1666873863	134	Oct 27 12:31:03	vth-vmss000001	a10logd
> 10/27/2022, 11:31:05,300 AM	1666873863	134	Oct 27 12:31:03	vth-vmss000001	a10logd
> 10/27/2022, 11:31:13,167 AM	1666874229	134	Oct 27 12:37:09	vth-vmss000000	a10logd
> 10/27/2022, 11:31:13,167 AM	1666874229	134	Oct 27 12:37:09	vth-vmss000000	a10logd
> 10/27/2022, 11:31:13,167 AM	1666874229	134	Oct 27 12:37:09	vth-vmss000000	a10logd

2s 376ms | Display time (UTC+00:00) ↴ [Query details](#) | 1-8 of 8

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 thru **Azure Services > Application Insights > <application\_insight\_name>**.

The selected application insight - Overview window is displayed.

- Click **Logs** from the left **Monitoring** panel.

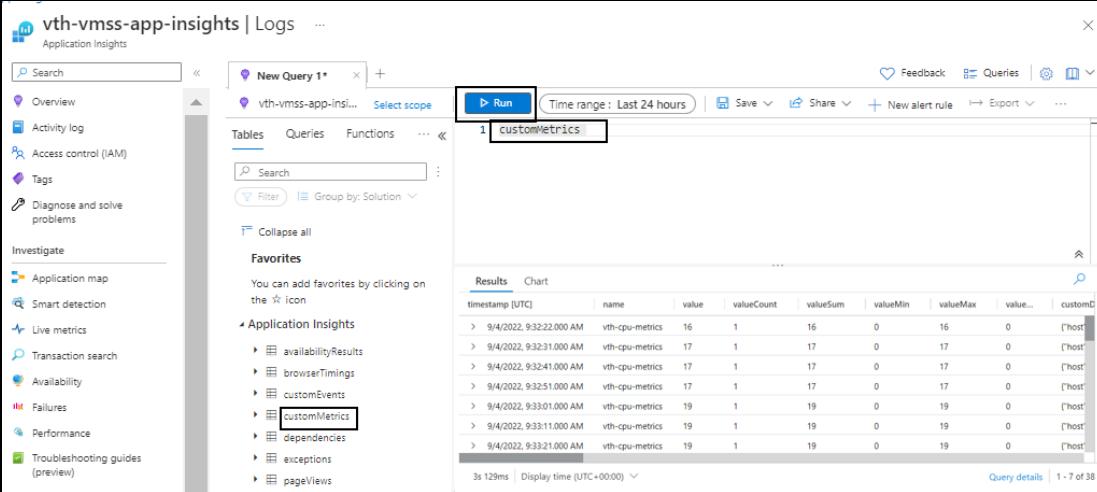
The selected log query window is displayed.

- Expand **Application Insights** in the left **Tables** tab panel.

- Double-click **customMetrics**.

The customMetrics query window is displayed.

Figure 143 : Selected application insight - Logs window



The screenshot shows the Azure Application Insights Logs interface. On the left, the navigation pane includes sections like Overview, Activity log, Access control (IAM), Tags, and Diagnose and solve problems. Under Investigate, there are links for Application map, Smart detection, Live metrics, Transaction search, Availability, Failures, Performance, and Troubleshooting guides (preview). The main area shows a query editor with a search bar, a 'Run' button, and a time range set to 'Last 24 hours'. A dropdown menu says 'Select scope' with 'vth-vmss-app-insights' selected. Below the editor, under 'Tables', the 'customMetrics' table is expanded. The results section displays a table of data with columns: timestamp (UTC), name, value, valueCount, valueSum, valueMin, valueMax, value... (truncated), and customC (truncated). 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+0:00)' and 'Query details | 1 - 7 of 38'.

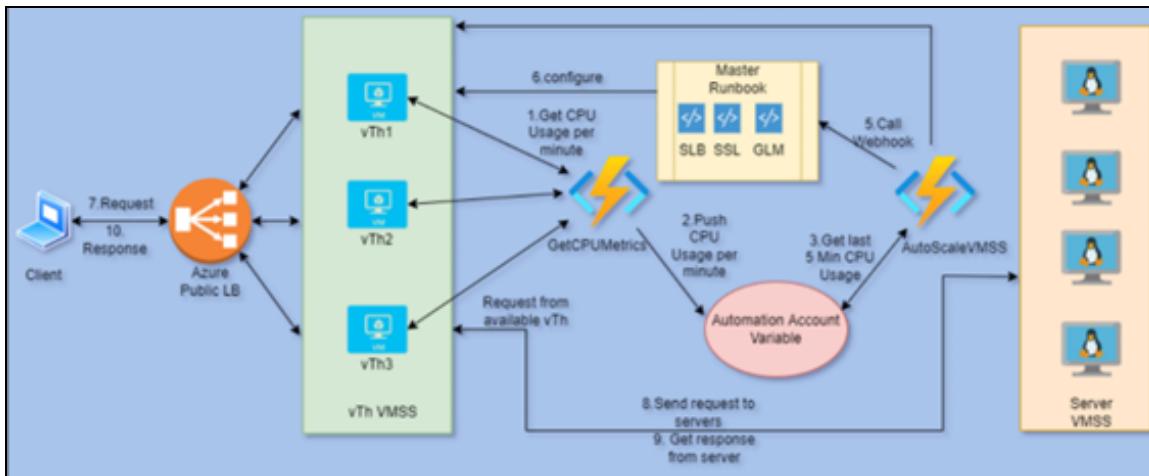
- e. Click **Run**.

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 144](#) 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 144 : 3NIC-NVM-VMSS Autoscaling using Azure Functions Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Autoscale Function](#)
- [Verify Autoscale Function Creation](#)

### Initial Setup

To configure autoscaling using Azure functions setup, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the **ARM\_TMPL\_3NIC\_NVM\_VMSS\_FUNCTION\_APP\_PARAM.json** with a text editor.
2. Configure function application name, application insight name, and subscription ID.

```
{
  "functionAppName": "vth-auto-func-app",
```

```

    "applicationInsightsName": "vth-vmss-app-insights",
    "subscriptionId": "07d3xxxx-xxxx-xxxx-xxxx-xxxx6812a3e",
    "filePath": "AZURE_FUNCTIONS\\GetMetrics.zip"
}

```

You can get the application insight name from **Home > Azure Services > Application Insights**.

You can get subscription ID value from **Home > Azure Services > Subscriptions > Subscription name**.

Provide the absolute file path of the folder where you have downloaded the ARM template > AZURE\_FUNCTIONS > GetMetrics.zip.

- Verify if all the configurations in the refer ARM\_TMPL\_3NIC\_NVM\_VMSS\_FUNCTION\_APP\_PARAM.json file are correct and then save the changes.

## Create Autoscale Function

To create autoscale function using CLI, perform the following steps:

- From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
- Run the following command to create autoscale function:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_FUNCTION_APP_4.ps1
```

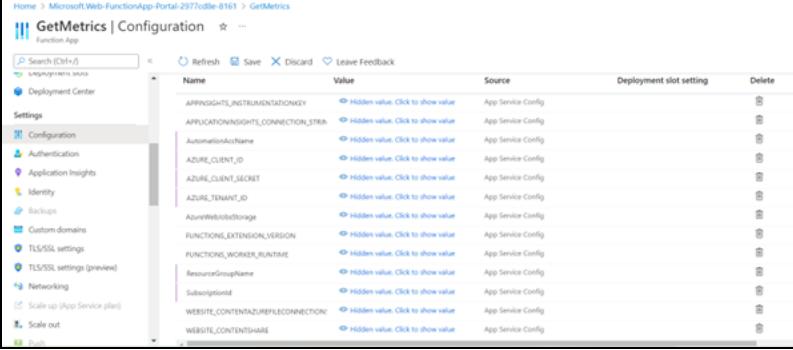
## Verify Autoscale Function Creation

To verify autoscale function creation, perform the following steps:

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

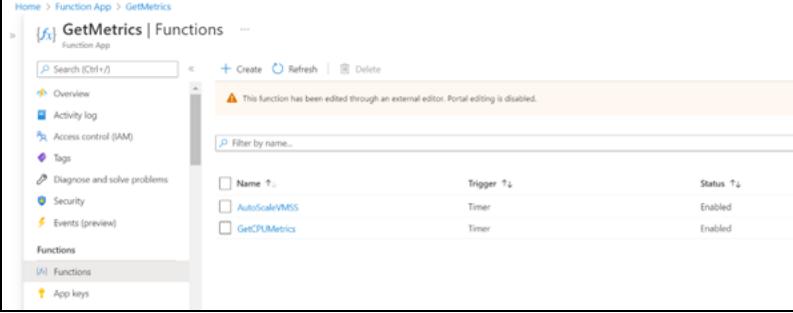
[Deploy ARM Template 3NIC-NVM-VMSS](#)

Figure 145 : GetMetrics function - Configuration window



Name	Value	Source	Deployment slot setting	Delete
APPINSIGHTS_INSTRUMENTATIONKEY	(Hidden value. Click to show value)	App Service Config		
APPLICATIONINSIGHTS_CONNECTION_STRING	(Hidden value. Click to show value)	App Service Config		
AutomationAccountName	(Hidden value. Click to show value)	App Service Config		
AZURE_CLIENT_ID	(Hidden value. Click to show value)	App Service Config		
AZURE_CLIENT_SECRET	(Hidden value. Click to show value)	App Service Config		
AZURE_TENANT_ID	(Hidden value. Click to show value)	App Service Config		
AzureWebJobsStorage	(Hidden value. Click to show value)	App Service Config		
FUNCTIONS_EXTENSION_VERSION	(Hidden value. Click to show value)	App Service Config		
FUNCTIONS_WORKER_RUNTIME	(Hidden value. Click to show value)	App Service Config		
ResourceGroupName	(Hidden value. Click to show value)	App Service Config		
SubscriptionId	(Hidden value. Click to show value)	App Service Config		
WEBSITE_CONTENTAZUREFILECONNECTION	(Hidden value. Click to show value)	App Service Config		
WEBSITE_CONTENTSHARE	(Hidden value. Click to show value)	App Service Config		

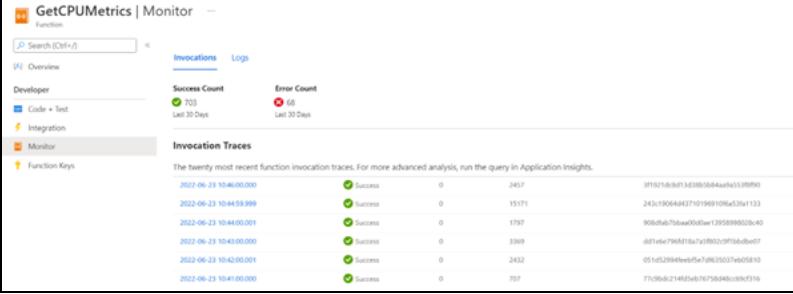
4. Verify if all the function configurations are listed under Application settings.
5. Select **Functions** from left **Functions** panel.  
The GetMetrics function - Functions window is displayed.



Name	Trigger	Status
AutoScaleVMSS	Timer	Enabled
GetCPUMetrics	Timer	Enabled

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 146 : GetCPUMetrics function - Monitor window



Success Count	Error Count
703	68

Invocation Traces

Date	Status	Count	Trace ID
2022-06-23 10:44:00.000	Success	0	3f95215dcb0134338f0844aef5539ff0
2022-06-23 10:44:39.999	Success	0	243c19064443710196010fa33fa1123
2022-06-23 10:44:00.001	Success	0	90d0fb170e00001e1359998002e40
2022-06-23 10:43:00.000	Success	0	d01ee79f81f81a7af080cc0f3bdbe8e7
2022-06-23 10:42:00.001	Success	0	051d52994bed5ef7d832927e905810
2022-06-23 10:41:00.000	Success	0	77096d2140f5ebf7c75b348cc0fe9316

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

## Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

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

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

## 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 under the VMSS  
Here, Public IP of **vth-vmss**
  - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```

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--->
vThunder(config)#admin <admin_username> password <new_password>
```

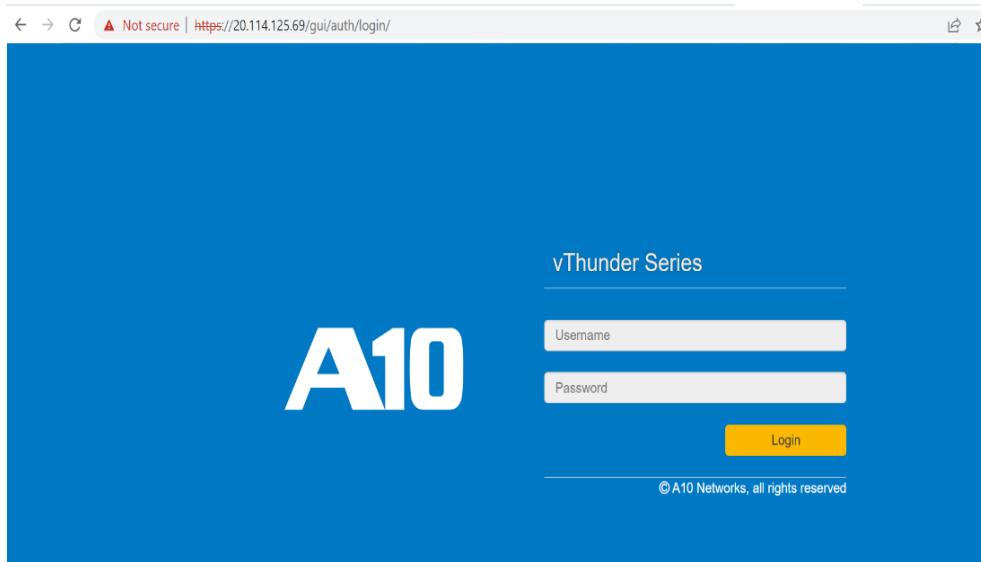
**NOTE:** It is highly recommended to change the default password when you login for the first time.

## 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 147 : vThunder GUI



3. Enter the user credentials provided by A10 Networks Support.  
The home page gets displayed.

## Verify Deployment

To verify deployment thru the ARM template, perform the following steps:

1. Run the following command on vThunder:

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

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

```
!Section configuration: 711 bytes
!
slb server vth-server-vmss_0 10.0.0.3.5
    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
```

- From vThunder Console, navigate thru **Home > License History** to verify your

license:

Figure 148 : License History



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

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

If the SSL Certificate configuration is correct and applied successfully, the following SSL configuration is displayed:

Name	Type	Expiration	Status
<hr/>			
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
```

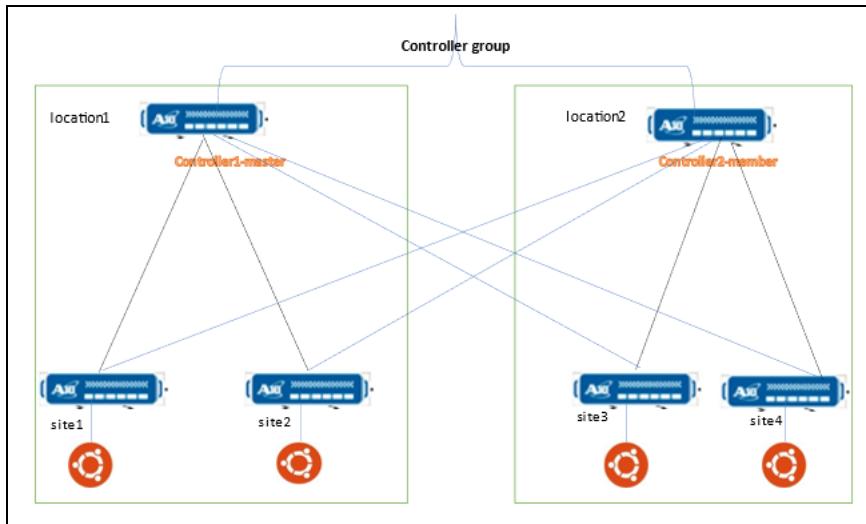
Deploy ARM Template 3NIC-NVM-VMSS

```
!
acos-events active-template fluentBitRemoteServer
!
```

# Deploy ARM Template 3NIC-6VM-2RG-GSLB

[Figure 149](#) shows the GSLB deployment topology. Using this template, one GSLB controller and two site devices containing a Real server each for two regions can be deployed.

Figure 149 : 3NIC-6VM-2RG-GSLB Topology



The following topics are covered:

<a href="#">System Requirements</a> .....	264
<a href="#">Create vThunder Instances</a> .....	272
<a href="#">Configure vThunder as an SLB</a> .....	282
<a href="#">Access vThunder using CLI or GUI</a> .....	293
<a href="#">Access Linux Server using CLI</a> .....	295
<a href="#">Verify Deployment</a> .....	295

## System Requirements

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

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

Table 14 : System Requirements

<b>Resource Name</b>	<b>Description</b>	<b>Default Value</b>
Azure Resource Group	A resource group with the specified name and location is created, if it doesn't exist.	Here, the Azure resource group name used is <code>gslb-rg1</code> .
Azure Storage Account	A storage account is created inside the resource group, if it doesn't exist.  If the storage name already exists, the following error is displayed "The storage account named <code>vthunderstorage</code> already exists under the subscription".  One storage account is created in each GSLB region. So, total two storage accounts are created.	<code>solutiontestingeastus</code> <code>solutiontestingeastus2</code>

Resource Name	Description	Default Value
	<p><b>Performance:</b> Standard</p> <p><b>Replication:</b> Read-access geo-redundant storage (RA-GRS)</p> <p><b>Account kind:</b> Storagev2 (general purpose v2)</p>	
Virtual Machine (VM) Instance	<p>Six vThunder instances are created:</p> <p><b>Image:</b> a10-vthunder-adc-520-for-microsoft-azure</p> <p><b>Size:</b> Standard_A4_v2</p> <p>Four Real servers are created:</p> <p><b>Version:</b> Linux Ubuntu 16.04.0 LTS</p> <p><b>Size:</b> Standard_B2s</p>	<p>vThunder instances</p> <pre>\$vmName+\$region1+"1" region1 controller \$vmName+\$region1+"2" region1 site device 1 \$vmName+\$region1+"3" region1 site device 2 \$vmName+\$region2+"1" region2 controller \$vmName+\$region2+"2" region2 site device 1 \$vmName+\$region2+"3" region2 site device 2</pre> <p>Real Servers</p> <pre>\$linuxName+\$region1+"1" region1 linux 1 \$linuxName+\$region1+"2" region1 linux 2 \$linuxName+\$region2+"1" region2 linux 1 \$linuxName+\$region2+"2" region2 linux 2</pre>

Resource Name	Description	Default Value
	<p><b>NOTE:</b> Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p><a href="#">Table 15</a> lists the supported VM sizes.</p>	
Virtual Cloud Network [VCN]	A virtual network is assigned to the virtual machine instance in each GSLB region.	<pre>\$region1+vnet1, \$region2+vnet2</pre> <p>Address prefix for virtual network are 10.1.0.0/16 and 10.2.0.0/16</p>
Subnet	Three subnets with an address prefix are created in each GSLB region.	<pre>mgmt_subnet_steps</pre> <pre>data1_subnet_steps</pre> <pre>data2_subnet_steps</pre>
Public IP	Each A10 device is assigned a public IP address to its management interface as a primary IP con-	

Resource Name	Description	Default Value
	<p>figuration and to its data interface on client-side as a secondary IP configuration.</p> <p>The public IP address for secondary IP configuration is used in GSLB configuration by the controller.</p> <p>Each Real server (Linux) is assigned a public IP address to its management interface.</p> <p>The public IP addresses are dynamic.</p>	
Private IP	<p>Each A10 device is assigned a private IP address to its management interface as a primary IP configuration and to its client-side and server-side data</p>	

Resource Name	Description	Default Value		
	<p>interfaces as a secondary IP configuration.</p> <p>The secondary IP configuration for client-side data interface is used as a VIP address in SLB or GSLB configuration.</p> <p>Each Real server (Linux) is assigned a private IP address to its data interface.</p> <p>The private IP addresses are static.</p>			
Network Interface Card [NIC]	<p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> <li>Management Interface with public IP</li> <li>Data Interface with primary private IP [Ethernet 1,</li> </ul>	Management Interface for Region 1 10.1.10.5 10.1.10.6 10.1.10.7 10.1.10.8 10.1.10.9  Management	Data Interface 1 for Region 1 10.1.20.5 10.1.20.6 10.1.20.7 10.1.20.8 10.1.20.9  10.1.20.10	Data Interface 2 for Region 1 10.1.30.5 10.1.30.6 10.1.30.7 10.1.30.8 10.1.30.9  Data Interface 1 Data Interface 2

Resource Name	Description	Default Value		
	<p>Ethernet 2]</p> <p>Two types of interfaces are created for each Real server:</p> <ul style="list-style-type: none"> <li>• Management Interface with public IP</li> <li>• Data Interface with primary private IP [Ethernet 1]</li> </ul>	Interface for Region 2 10.2.10.5 10.2.10.6 10.2.10.7 10.2.10.8 10.2.10.9	for Region 2 10.2.20.5 10.2.20.6 10.2.20.7 10.2.20.8 10.2.20.9	for Region 2 10.2.30.5 10.2.30.6 10.2.30.7 10.2.30.8 10.2.30.9 10.2.20.10
Network Security Group [NSG]	<p>For each A10 device, management interface, client-side data interface, and server-side data interface with Allow permissions for relevant ports are created.</p> <p>For each Real Server (Linux), management interface and data interfaces with Allow permissions for</p>	<pre>nsgman1region1 nsgdata1region1 nsgdata2region1 nsgman1region2 nsgdata1region2 nsgdata2region2</pre>		

<b>Resource Name</b>	<b>Description</b>	<b>Default Value</b>
	relevant ports are created.	
Region	Two regions are created.	<code>eastus</code> <code>eastus2</code>

## Supported VM Sizes

Table 15 : Supported VM sizes

<b>Series</b>	<b>Size</b>	<b>Qualified Name</b>
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

Series	Size	Qualified Name
	Standard D4sv3	Standard_D4s_v3
	Standard D3v2	Standard_D3_v2
	Standard Ds3v2	Standard_Ds3_v2
	Standard D5v2	Standard_D5_v2
F series	Standard F4s	Standard_F4s
	Standard F8	Standard_F8
	Standard F16s	Standard_F16s

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

For more information on Windows and Linux VM sizes, see

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

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

## Create vThunder Instances

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM\_TMPL\_GSLB\_PARAM.json with a text editor.

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

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

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

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

3. Configure authentication type.

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

4. Configure a DNS label prefix.

```
"dnsLabelPrefix": {
    "value": "vthunderipbare"
},
```

5. Configure a VM name.

```
"vmName": {
    "value": "vthunder"
},
```

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

```
"vThunderImage": {
    "value": "vthunder_520_byol"
},
"imagePublisher_vthunder": {
    "value": "a10networks"
},
```

```

    "imageOffer_vthunder": {
        "value": "a10-vthunder-adc-520-for-microsoft-azure"
    },

```

**NOTE:** Do not change the publisher name.

#### 7. Set a VM size for vThunder instance.

```

    "vmSize": {
        "value": "Standard_A4_v2"
    },

```

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

#### 8. Configure a Linux machine name.

```

    "linuxName": {
        "value": "linux"
    },

```

#### 9. Configure Linux machine details.

```

    "linuxName": {
        "value": "linux"
    },
    "ubuntuOSVersion": {
        "value": "16.04.0-LTS"
    },
    "imagePublisher_linux": {
        "value": "Canonical"
    },
    "imageOffer_linux": {
        "value": "UbuntuServer"
    },
    "vmSize_linux": {
        "value": "Standard_B2s"
    },

```

#### 10. Configure regions.

```

    "region1": {
        "value": "eastus"
    },

```

```

    "region2": {
        "value": "eastus2"
    },

```

### 11. Configure a network security group for the two regions.

```

"networkSecurityGroupName_region1_Management1": {
    "value": "nsgman1region1"
},
"networkSecurityGroupName_region1_Data1": {
    "value": "nsgdata1region1"
},
"networkSecurityGroupName_region1_Data2": {
    "value": "nsgdata2region1"
},
"networkSecurityGroupName_region2_Management1": {
    "value": "nsgman1region2"
},
"networkSecurityGroupName_region2_Data1": {
    "value": "nsgdata1region2"
},
"networkSecurityGroupName_region2_Data2": {
    "value": "nsgdata2region2"
},

```

### 12. Configure storage account names.

```

"storageAccountName1": {
    "value": "solutiontestingeastus"
},
"storageAccountName2": {
    "value": "solutiontestingeastus2"
},

```

### 13. Configure an address prefix and subnet values for each of the two regions' management interface and data interfaces.

```

"addressPrefix1": {
    "value": "10.1.0.0/16"
},
"region1_mgmt_prefix": {
    "value": "10.1.10.0/24"
}

```

```

},
"region1_data1_prefix": {
    "value": "10.1.20.0/24"
},
"region1_data2_prefix": {
    "value": "10.1.30.0/24"
},
"addressPrefix2": {
    "value": "10.2.0.0/16"
},
"region2_mgmt_prefix": {
    "value": "10.2.10.0/24"
},
"region2_data1_prefix": {
    "value": "10.2.20.0/24"
},
"region2_data2_prefix": {
    "value": "10.2.30.0/24"
},

```

#### 14. Configure network interface cards for the two regions.

```

"vnetName1_mgmt_region1_PrivateAddress1" :{
    "value": "10.1.10.5"
},
"vnetName1_mgmt_region1_PrivateAddress2" :{
    "value": "10.1.10.6"
},
"vnetName1_mgmt_region1_PrivateAddress3" :{
    "value": "10.1.10.7"
},
"vnetName1_mgmt_region1_PrivateAddress4" :{
    "value": "10.1.10.8"
},
"vnetName1_mgmt_region1_PrivateAddress5" :{
    "value": "10.1.10.9"
},
"vnetName1_data1_region1_PrivateAddress1" :{
    "value": "10.1.20.5"
}

```

```
},
"vnetName1_data1_region1_PrivateAddress2" :{
    "value": "10.1.20.6"
},
"vnetName1_data1_region1_PrivateAddress3" :{
    "value": "10.1.20.7"
},
"vnetName1_data1_region1_PrivateAddress_secondary1" :{
    "value": "10.1.20.8"
},
"vnetName1_data1_region1_PrivateAddress_secondary2" :{
    "value": "10.1.20.9"
},
"vnetName1_data1_region1_PrivateAddress_secondary3" :{
    "value": "10.1.20.10"
},
"vnetName1_data2_region1_PrivateAddress1" :{
    "value": "10.1.30.5"
},
"vnetName1_data2_region1_PrivateAddress2" :{
    "value": "10.1.30.6"
},
"vnetName1_data2_region1_PrivateAddress3" :{
    "value": "10.1.30.7"
},
"vnetName1_data2_region1_PrivateAddress4" :{
    "value": "10.1.30.8"
},
"vnetName1_data2_region1_PrivateAddress5" :{
    "value": "10.1.30.9"
},
"vnetName2_mgmt_region2_PrivateAddress1" :{
    "value": "10.2.10.5"
},
"vnetName2_mgmt_region2_PrivateAddress2" :{
    "value": "10.2.10.6"
},
```

```
"vnetName2_mgmt_region2_PrivateAddress3" :{
    "value": "10.2.10.7"
},
"vnetName2_mgmt_region2_PrivateAddress4" :{
    "value": "10.2.10.8"
},
"vnetName2_mgmt_region2_PrivateAddress5" :{
    "value": "10.2.10.9"
},
"vnetName2_data1_region2_PrivateAddress1" :{
    "value": "10.2.20.5"
},
"vnetName2_data1_region2_PrivateAddress2" :{
    "value": "10.2.20.6"
},
"vnetName2_data1_region2_PrivateAddress3" :{
    "value": "10.2.20.7"
},
"vnetName2_data1_region2_PrivateAddress_secondary1" :{
    "value": "10.2.20.8"
},
"vnetName2_data1_region2_PrivateAddress_secondary2" :{
    "value": "10.2.20.9"
},
"vnetName2_data1_region2_PrivateAddress_secondary3" :{
    "value": "10.2.20.10"
},
"vnetName2_data2_region2_PrivateAddress1" :{
    "value": "10.2.30.5"
},
"vnetName2_data2_region2_PrivateAddress2" :{
    "value": "10.2.30.6"
},
"vnetName2_data2_region2_PrivateAddress3" :{
    "value": "10.2.30.7"
},
"vnetName2_data2_region2_PrivateAddress4" :{
```

```

        "value": "10.2.30.8"
    },
    "vnetName2_data2_region2_PrivateAddress5" :{
        "value": "10.2.30.9"
    }
}

```

15. Verify if all the configurations in the ARM\_TMPL\_GSLB\_PARAM.json file are correct and then save the changes.
16. Open the ARM\_TMPL\_GSLB.json from the downloaded folder with a text editor.
17. Update the following variables:

```

"vnetName1": "vnet1",
...
...
"vnetName2": "vnet2",

```

18. Verify if all the configurations in the ARM\_TMPL\_GSLB.json file are correct and then save the changes.

## Deploy vThunder

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

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

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

**Example:**

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

## Deploy ARM Template 3NIC-6VM-2RG-GSLB

```

    "properties": {
        "provisioningState": "Succeeded"
    },
    "tags": null,
    "type": "Microsoft.Resources/resourceGroups"
}

```

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

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

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

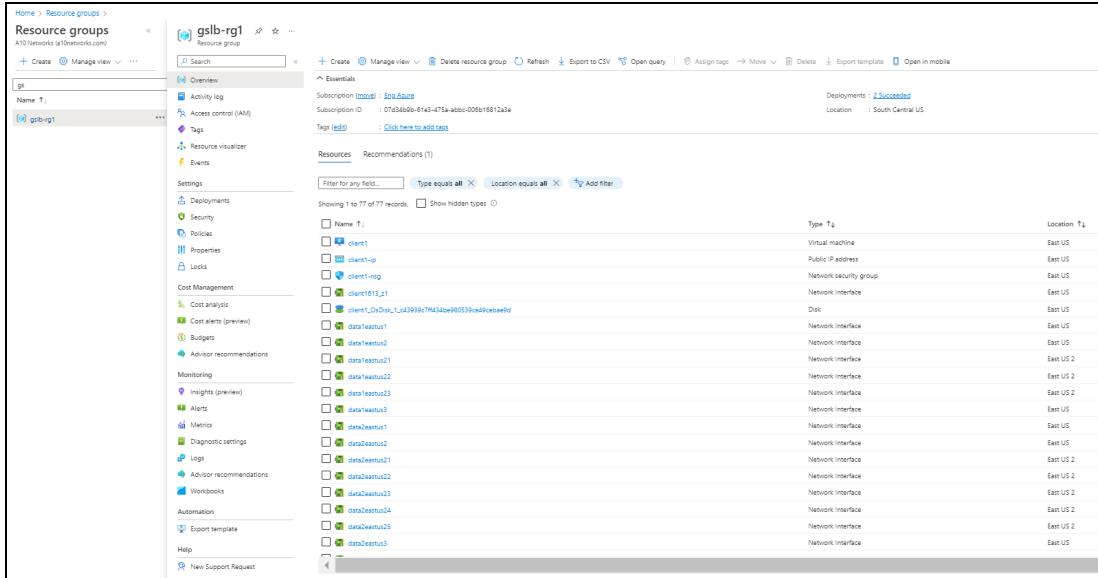
**Example:**

```
PS C:\Users\TestUser\Templates> az deployment group create -g gslb-rg1 --template-file ARM_TMPL_GSLB.json --parameters ARM_TMPL_GSLB_PARAM.json
```

### 4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource\_group\_name>**.

In total, ten virtual machine instances is created i.e. six vThunder instances and four Linux real servers.

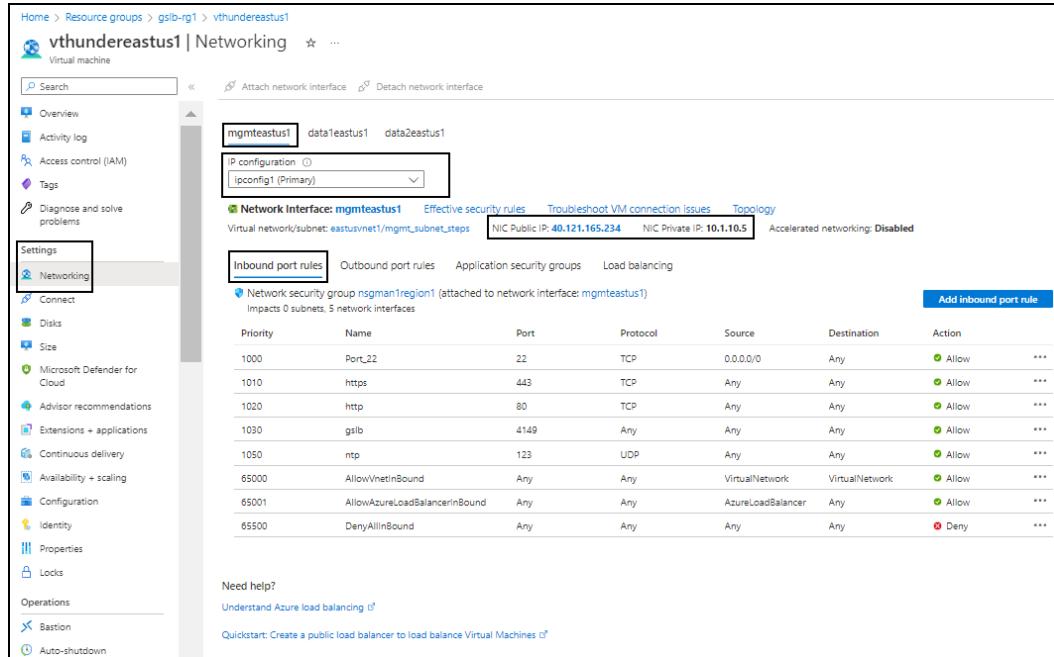
Figure 150 : Resource listing in the resource group



Name	Type	Location	Status
client1	Virtual machine	East US	Succeeded
client2	Virtual machine	East US	Succeeded
client1-nsg	Network security group	East US	Succeeded
client1013_21	Network interface	East US	Succeeded
client1_Ovhk_1_c2f99c79434be90539e42ebe9d	Network interface	East US	Succeeded
dataTeatustu1	Network interface	East US	Succeeded
dataTeatustu2	Network interface	East US	Succeeded
dataTeatustu21	Network interface	East US	Succeeded
dataTeatustu22	Network interface	East US 2	Succeeded
dataTeatustu23	Network interface	East US 2	Succeeded
dataTeatustu3	Network interface	East US	Succeeded
dataTeatustu4	Network interface	East US	Succeeded
dataTeatustu5	Network interface	East US 2	Succeeded
dataTeatustu6	Network interface	East US 2	Succeeded
dataTeatustu7	Network interface	East US	Succeeded
dataTeatustu8	Network interface	East US	Succeeded
dataTeatustu9	Network interface	East US	Succeeded
dataTeatustu10	Network interface	East US	Succeeded
dataTeatustu11	Network interface	East US	Succeeded
dataTeatustu12	Network interface	East US	Succeeded
dataTeatustu13	Network interface	East US	Succeeded
dataTeatustu14	Network interface	East US	Succeeded
dataTeatustu15	Network interface	East US	Succeeded
dataTeatustu16	Network interface	East US	Succeeded
dataTeatustu17	Network interface	East US	Succeeded
dataTeatustu18	Network interface	East US	Succeeded
dataTeatustu19	Network interface	East US	Succeeded
dataTeatustu20	Network interface	East US	Succeeded
dataTeatustu21	Network interface	East US	Succeeded
dataTeatustu22	Network interface	East US	Succeeded
dataTeatustu23	Network interface	East US	Succeeded
dataTeatustu24	Network interface	East US	Succeeded
dataTeatustu25	Network interface	East US	Succeeded
dataTeatustu26	Network interface	East US	Succeeded

5. Verify if the private IP and public IP for each of the ten virtual machine instances are assigned correctly in the <resource\_group\_name> > <virtual\_machine\_name> > **Settings** > **Networking**. To do so, perform the following steps:
- Select the management interface tab to verify the primary public IP, private IP, and security rule.

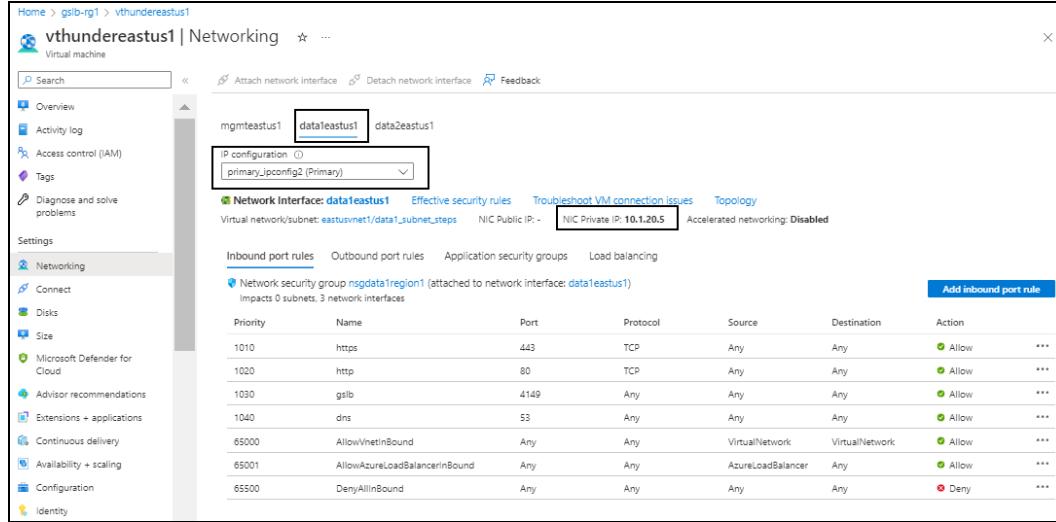
Figure 151 : Selected virtual machine - Networking window - Management interface tab



Priority	Name	Port	Protocol	Source	Destination	Action
1000	Port_22	22	TCP	0.0.0.0/0	Any	<span>Allow</span>
1010	https	443	TCP	Any	Any	<span>Allow</span>
1020	http	80	TCP	Any	Any	<span>Allow</span>
1030	gslb	4149	Any	Any	Any	<span>Allow</span>
1050	rtp	123	UDP	Any	Any	<span>Allow</span>
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	<span>Allow</span>
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	<span>Allow</span>
65500	DenyAllInBound	Any	Any	Any	Any	<span>Deny</span>

- b. Select the data interface tab to verify the primary private IP.

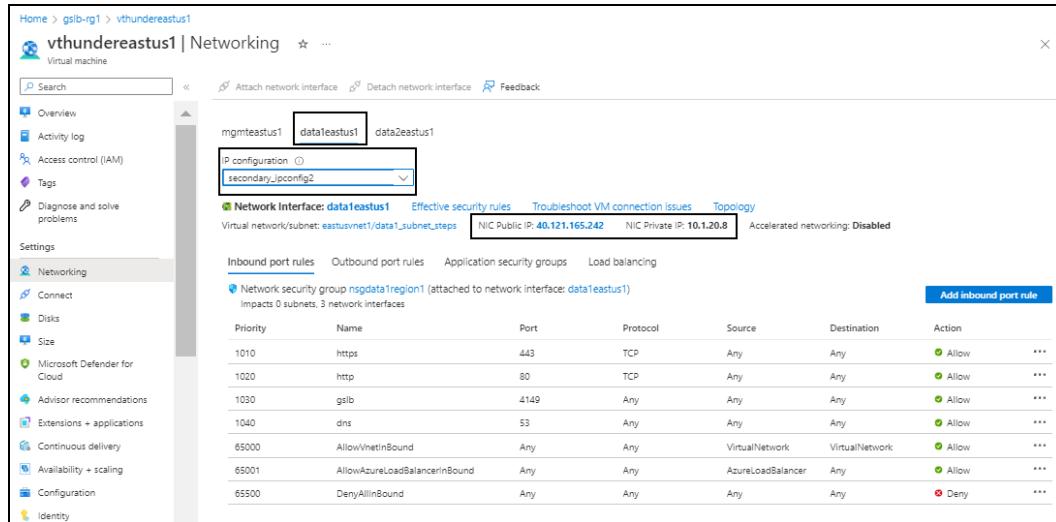
Figure 152 : Data interface tab - Primary configuration



Priority	Name	Port	Protocol	Source	Destination	Action
1010	https	443	TCP	Any	Any	Allow
1020	http	80	TCP	Any	Any	Allow
1030	gslb	4149	Any	Any	Any	Allow
1040	dns	53	Any	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

- c. On the data interface tab, verify the secondary private IP and public IP.

Figure 153 : Data interface tab - Secondary configuration



Priority	Name	Port	Protocol	Source	Destination	Action
1010	https	443	TCP	Any	Any	Allow
1020	http	80	TCP	Any	Any	Allow
1030	gslb	4149	Any	Any	Any	Allow
1040	dns	53	Any	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

## Configure vThunder as an SLB

The following topics are covered:

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

## Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM\_TMPL\_GSLB\_SLB\_PARAM.json file with a text editor.

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

2. Configure SLB server host or domain for site devices.

```
{  
    "slbServerHostOrDomain1": {  
        "servername": "s1",  
        "host": "10.1.30.8",  
        "action": "enable"  
    },  
    "slbServerHostOrDomain2": {  
        "servername": "s1",  
        "host": "10.1.30.9",  
        "action": "enable"  
    },  
    "slbServerHostOrDomain3": {  
        "servername": "s1",  
        "host": "10.2.30.8",  
        "action": "enable"  
    },  
    "slbServerHostOrDomain4": {  
        "servername": "s1",  
        "host": "10.2.30.9",  
        "action": "enable"  
    },  
}
```

### 3. Configure SLB server port for site devices.

```
"slbServerPortList1": {  
    "value": [  
        {  
            "port-number": 80,  
            "protocol": "tcp",  
            "health-check-disable":0  
        }  
    ]  
,  
    "slbServerPortList2": {  
        "value": [  
            {  
                "port-number": 80,  
                "protocol": "tcp",  
                "health-check-disable":0  
            }  
        ]  
,  
        "slbServerPortList3": {  
            "value": [  
                {  
                    "port-number": 80,  
                    "protocol": "tcp",  
                    "health-check-disable":0  
                }  
            ]  
,  
            "slbServerPortList4": {  
                "value": [  
                    {  
                        "port-number": 80,  
                        "protocol": "tcp",  
                        "health-check-disable":0  
                    }  
                ]  
,  
            }  
        }  
    }  
},
```

#### 4. Configure service group port for site devices.

```
"serviceGroupList1": {
    "value": [
        {
            "name": "sg",
            "protocol": "tcp",
            "health-check-disable": 0,
            "member-list": [
                {
                    "name": "s1",
                    "port": 80
                }
            ]
        }
    ],
    "serviceGroupList2": {
        "value": [
            {
                "name": "sg",
                "protocol": "tcp",
                "health-check-disable": 0,
                "member-list": [
                    {
                        "name": "s1",
                        "port": 80
                    }
                ]
            }
        ]
    },
    "serviceGroupList3": {
        "value": [
            {
                "name": "sg",
                "protocol": "tcp",
                "health-check-disable": 0,
```

```

        "member-list": [
            {
                "name": "s1",
                "port": 80
            }
        ]
    }
},
"serviceGroupList4": {
    "value": [
        {
            "name": "sg",
            "protocol": "tcp",
            "health-check-disable": 0,
            "member-list": [
                {
                    "name": "s1",
                    "port": 80
                }
            ]
        }
    ]
},

```

## 5. Configure SLB virtual server for site devices.

The virtual server's default name is "vs1".

```

"virtualServerList1": {
    "virtual-server-name": "vs1",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 80,
            "protocol": "tcp",
            "auto": 1,

```

```
        "service-group": "sg"
    }
]
},
"virtualServerList2": {
    "virtual-server-name": "vs1",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 80,
            "protocol": "tcp",
            "auto": 1,
            "service-group": "sg"
        }
    ]
},
"virtualServerList3": {
    "virtual-server-name": "vs1",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 80,
            "protocol": "tcp",
            "auto": 1,
            "service-group": "sg"
        }
    ]
},
"virtualServerList4": {
    "virtual-server-name": "vs1",
    "metadata": {
```

```

        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number":80,
            "protocol":"tcp",
            "auto":1,
            "service-group":"sg"
        }
    ]
},

```

## 6. Configure GSLB service IP address for controller.

```

"serviceipList1": {
    "node-name": "vs1",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
},
"serviceipList2": {
    "node-name": "vs2",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
},
"serviceipList3": {
    "node-name": "vs3",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
}

```

```

        }
    ],
},
"serviceipList4": {
    "node-name": "vs4",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
},

```

## 7. Configure GSLB site details for controller.

```

"siteList1": {
    "site-name": "eastus_1",
    "vip-name": "vs1",
    "device-name": "slb1",
    "geo-location": "North America,United States"
},
"siteList2": {
    "site-name": "eastus_2",
    "vip-name": "vs2",
    "device-name": "slb2",
    "geo-location": "North America,United States"
},
"siteList3": {
    "site-name": "eastus2_1",
    "vip-name": "vs3",
    "device-name": "slb3",
    "geo-location": "North America.United States.California.San
Jose"
},
"siteList4": {
    "site-name": "eastus2_2",
    "vip-name": "vs4",
    "device-name": "slb4",
    "geo-location": "North America.United States.California.San
Francisco"
}

```

```
Jose"
```

```
},
```

#### 8. Configure system geo location details for controller.

```
"geolocation": {
    "geo-location-iana": "0",
    "geo-location-geolite2-city": "1",
    "geolite2-city-include-ipv6": "0",
    "geo-location-geolite2-country": "0"
},
```

#### 9. Configure GSLB DNS policy for controller.

```
"dnsPolicy": {
    "policy-name": "a10",
    "type": "health-check, geographic"
},
```

#### 10. Configure GSLB virtual server for controller.

```
"gslbserverList1": {
    "virtual-server-name": "gslb-server",
    "ip-address": "10.1.20.8",
    "metadata": {
        "description": "gslb virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 53,
            "protocol": "udp",
            "gslb-enable": 1
        }
    ]
},
"gslbserverList2": {
    "virtual-server-name": "gslb-server",
    "ip-address": "10.2.20.8",
    "metadata": {
        "description": "gslb virtual server is using VIP from
ethernet 1 secondary subnet"
    }
}
```

```

        },
        "value": [
            {
                "port-number":53,
                "protocol":"udp",
                "gslb-enable": 1
            }
        ]
    },

```

**11. Configure GSLB protocol status for controller.**

```

    "gslbprotocolStatus": {
        "status-interval": 1
    },

```

**12. Configure GSLB group for controller.**

```

    "gslbcontrollerGroup1": {
        "name": "default",
        "priority": 255
    },
    "gslbcontrollerGroup2": {
        "name": "default",
        "priority": 100
    },

```

**13. Configure GSLB zone for controller.**

```

    "gslbzone": {
        "service-port": 80,
        "service-name": "www",
        "name" : "gslb.a10.com"
    },

```

**14. Configure default route for vThunder instances.**

```

    "defaultroute1":
    {
        "next-hop": "10.1.20.1"
    },
    "defaultroute2":
    {

```

```

        "next-hop": "10.2.20.1"
    }
}
```

- Verify if all the configurations in the ARM\_TMPL\_GSLB\_SLB\_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:

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

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

**Example:**

```
PS C:\Users\TestUser\Templates> ARM_TMPL_GSLB_CONFIG.ps1 -resourceGroup gslb-rg1
```

---

<b>NOTE:</b>	Except for the real server ip addresses, all other IP addresses are dynamically obtained from user environment.
--------------	---

---

- Verify the following for each site devices:
  - Interfaces are enabled
  - SLB is configured
  - Site device is enabled to be a GSLB device.
  - Default route is configured pointing to the client-side data interface for traffic to exit the vThunder.
- Verify the following for each GSLB controller:
  - Interfaces are enabled
  - vThunder device is configured with the required GSLB configuration

- Geo location is enabled.
- Default route is configured pointing to the client-side data interface for traffic to exit the vThunder.

## Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

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

---

**NOTE:** For A10 vThunder default login credentials, send a request to [A10 Networks Support](#).

---

## Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
  - Hostname: Public IP of Virtual Machine Instance  
Here, Public IP of **vthundereastus1**,  
**vthundereastus2**,**vthundereastus3**,**vthundereastus21**,  
**vthundereastus22**,**vthundereastus23**
  - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the default login credentials provided by A10 Networks Support and change the default password as soon as you login for the first time:

```
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--->
vThunder(config)#admin <admin_username> password <new_password>
```

---

**NOTE:** It is highly recommended to change the default password when you login for the first time.

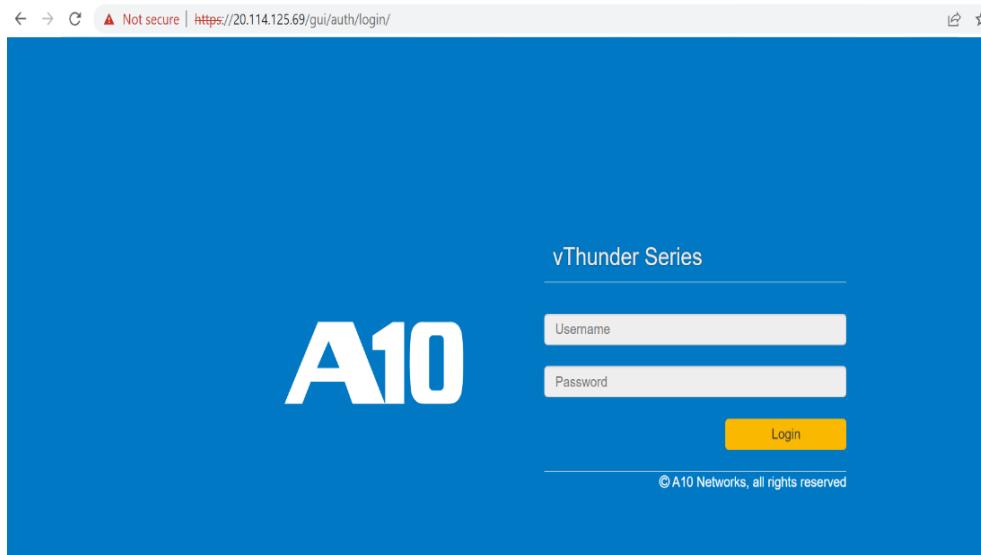
---

## Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

1. Open any browser.
2. Enter *https://<vthunder\_public\_IP>* in the address bar.

Figure 154 : vThunder GUI



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

## Access Linux Server using CLI

To access Real Server using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
  - Hostname: Public IP of Linux Ubuntu machine  
Here, Public IP of `linukeastus1`, `linukeastus2`, `linukeastus21`,  
`linukeastus22`
  - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, enter the following:

```
ubuntu login: vth-user <--Username-->
Password: vth-Password <--Password-->
.
.
.
.
vth-user@vth-user:~$
```

## Verify Deployment

To verify deployment thru the ARM template, perform the following steps:

1. Run the following command on vThunder:

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

If the deployment is successful, the following controller and site configuration is displayed on vThunder controller and site devices respectively:

CONTROLLER 1 - Master configuration

```
no system geo-location load iana
system geo-location load GeoLite2-City
!
```

```
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb virtual-server gslb-server 10.1.20.8
    port 53 udp
    gslb-enable
!
gslb service-ip vs1 10.1.20.9
    external-ip 137.117.81.170
    port 80 tcp
!
gslb service-ip vs2 10.1.20.10
    external-ip 137.117.81.196
    port 80 tcp
!
gslb service-ip vs3 10.2.20.9
    external-ip 20.246.2.117
    port 80 tcp
!
gslb service-ip vs4 10.2.20.10
    external-ip 20.230.84.149
    port 80 tcp
!
gslb group default
    enable
```

```
primary 20.242.96.218
priority 255
!
gslb site eastus_1
    geo-location "North America,United States"
    slb-dev slb1 104.211.58.124
    vip-server vs1
!
gslb site eastus_2
    geo-location "North America,United States"
    slb-dev slb2 104.211.58.122
    vip-server vs2
!
gslb site eastus2_1
    geo-location "North America.United States.California.San Jose"
    slb-dev slb3 20.230.76.141
    vip-server vs3
!
gslb site eastus2_2
    geo-location "North America.United States.California.San Jose"
    slb-dev slb4 20.230.78.91
    vip-server vs4
!
gslb policy a10
    metric-order health-check geographic
    dns server
!
gslb zone gslb.a10.com
    policy a10
    service 80 www
        dns-a-record vs1 static
        dns-a-record vs2 static
        dns-a-record vs3 static
        dns-a-record vs4 static
!
gslb protocol status-interval 1
!
```

```
gslb protocol enable controller
```

### CONTROLLER 2 - Member configuration

```
no system geo-location load iana
system geo-location load GeoLite2-City
!
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb virtual-server gslb-server 10.2.20.8
    port 53 udp
        gslb-enable
!
gslb service-ip vs1 10.1.20.9
    external-ip 137.117.81.170
    port 80 tcp
!
gslb service-ip vs2 10.1.20.10
    external-ip 137.117.81.196
    port 80 tcp
!
gslb service-ip vs3 10.2.20.9
    external-ip 20.246.2.117
    port 80 tcp
!
```

```
gslb service-ip vs4 10.2.20.10
    external-ip 20.230.84.149
    port 80 tcp
!
gslb group default
    enable
    primary 137.117.81.78
!
gslb site eastus_1
    geo-location "North America,United States"
    slb-dev slb1 104.211.58.124
        vip-server vs1
!
gslb site eastus_2
    geo-location "North America,United States"
    slb-dev slb2 104.211.58.122
        vip-server vs2
!
gslb site eastus2_1
    geo-location "North America.United States.California.San Jose"
    slb-dev slb3 20.230.76.141
        vip-server vs3
!
gslb site eastus2_2
    geo-location "North America.United States.California.San Jose"
    slb-dev slb4 20.230.78.91
        vip-server vs4
!
gslb policy a10
    metric-order health-check geographic
    dns server
!
gslb zone gslb.a10.com
    policy a10
    service 80 www
        dns-a-record vs1 static
        dns-a-record vs2 static
```

```
    dns-a-record vs3 static
    dns-a-record vs4 static
!
gslb protocol status-interval 1
!
gslb protocol enable controller
```

### SITE 1 (eastus\_1) configuration

```
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb server s1 10.1.30.8
    port 80 tcp
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.1.20.9
    port 80 tcp
        source-nat auto
        service-group sg
!
!
gslb protocol enable device
```

### SITE 2 (eastus\_2) configuration

```
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb server s1 10.1.30.9
    port 80 tcp
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.1.20.10
    port 80 tcp
    source-nat auto
    service-group sg
!
!
gslb protocol enable device
```

### SITE 3 (eastus2\_1) configuration

```
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
```

```
enable
ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb server s1 10.2.30.8
port 80 tcp
!
slb service-group sg tcp
member s1 80
!
slb virtual-server vs1 10.2.20.9
port 80 tcp
source-nat auto
service-group sg
!
!
gslb protocol enable device
```

### SITE 2 (eastus2\_2) configuration

```
interface management
ip address dhcp
!
interface ethernet 1
enable
ip address dhcp
!
interface ethernet 2
enable
ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb server s1 10.2.30.9
port 80 tcp
```

```
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.2.20.10
    port 80 tcp
    source-nat auto
    service-group sg
!
!
gslb protocol enable device
```

2. Run the following command on vThunder to verify the GSLB group information:

```
vThunder-gslb:Master(NOLICENSE) #show gslb group
```

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

```
Pri = Priority, Attrs = Attributes
S-Cfg = Secure Config
S-State = Secure Status
D = Disabled, L = Learn
P = Passive, * = Master
E = Enabled, EF = Enable-Fallback
Unsec = Unsecure, Unkwn = Unknown
Estng = Establishing, Estd = Established

Group: default, Master: local
Member           Sys-ID   Pri Attrs  Status      S-Cfg
S-State Address
-----
-----
local           e592163a 255 L*      OK
vThunder        58547cbd 100 L       Synced      D
Unsec          20.109.98.187
```

3. Run the following command on vThunder to verify the GSLB group information:

```
vThunder-gslb:Member(NOLICENSE) #show gslb group
```

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

```

Pri = Priority, Attrs = Attributes
S-Cfg = Secure Config
S-State = Secure Status
D = Disabled, L = Learn
P = Passive, * = Master
E = Enabled, EF = Enable-Fallback
Unsec = Unsecure, Unkwn = Unknown
Estng = Establishing, Estd = Established
Group: default, Master: vThunder
Member           Sys-ID   Pri Attrs  Status      S-Cfg
S-State Address
-----
-----
local           58547cbd 100 L      OK
20.232.17.155                         Idle      D
Unsec
vThunder        e592163a 255 PL*    Synced    D
Unsec   20.232.185.150

```

4. Run the following command on vThunder to verify the GSLB protocol information:

```
vThunder-gslb:Master(NOLICENSE) #show gslb protocol
```

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

```

GSLB site: eastus_1
  SLB device: slb1 (10.1.20.5:4108) Established
  Session ID: 2869
  Secure Config: Disable |Current SSL State:
                  Unsecure
  Connection succeeded: 1 |Connection failed:
                        1
  Open packet sent: 1 |Open packet received:
                    1
  Open session succeeded: 1 |Open session failed:
                        0
  Sessions Dropped: 0 |Update packet received:
                     7346
  Keepalive packet sent: 123 |Keepalive packet received:

```

```

        122
Notify packet sent:          0 |Notify packet received:
                            0
Message Header Error:       0 |Protocol RDT(ms):
                            40
GSLB Protocol Version:      2 |Peer ACOS Version:
                            5.2.0 Build 155
Secure negotiation Success:  0 |Secure negotiation
Failures:                  0
SSL handshake Success:      0 |SSL handshake Failures:
                            0

GSLB site: eastus_2
SLB device: slb2 (10.1.20.5:2260) Established
Session ID:    7186
Secure Config:           Disable |Current SSL State:
                            Unsecure
Connection succeeded:      1 |Connection failed:
                            1
Open packet sent:          1 |Open packet received:
                            1
Open session succeeded:    1 |Open session failed:
                            0
Sessions Dropped:          0 |Update packet received:
                            7344
Keepalive packet sent:     123 |Keepalive packet received:
                            122
Notify packet sent:          0 |Notify packet received:
                            0
Message Header Error:       0 |Protocol RDT(ms):
                            32
GSLB Protocol Version:      2 |Peer ACOS Version:
                            5.2.0 Build 155
Secure negotiation Success:  0 |Secure negotiation
Failures:                  0
SSL handshake Success:      0 |SSL handshake Failures:
                            0

```

```

GSLB site: eastus2_1
    SLB device: slb3 (10.1.20.5:6668) Established
    Session ID:      1353
    Secure Config:           Disable | Current SSL State:
                                Unsecure
    Connection succeeded:          0 | Connection failed:
                                    0
    Open packet sent:            1 | Open packet received:
                                    1
    Open session succeeded:      0 | Open session failed:
                                    0
    Sessions Dropped:          7346 | Update packet received:
                                    123
    Keepalive packet sent:       122 | Keepalive packet received:
                                    0
    Notify packet sent:          0 | Notify packet received:
                                    0
    Message Header Error:        20 | Protocol RDT(ms):
                                    20
    GSLB Protocol Version:      5.2.0 Build 155 | Peer ACOS Version:
    Secure negotiation Success: 0 | Secure negotiation
    Failures:                  0 | SSL handshake Failures:
                                    0

GSLB site: eastus2_2
    SLB device: slb4 (10.1.20.5:12936) Established
    Session ID:      46932
    Secure Config:           Disable | Current SSL State:
                                Unsecure
    Connection succeeded:          0 | Connection failed:
                                    0
    Open packet sent:            1 | Open packet received:
                                    1
    Open session succeeded:      1 | Open session failed:
                                    1

```

```

          0
Sessions Dropped:           0 | Update packet received:
    7348

Keepalive packet sent:      124 | Keepalive packet received:
    123

Notify packet sent:         0 | Notify packet received:
    0

Message Header Error:      0 | Protocol RDT(ms):
    20

GSLB Protocol Version:     2 | Peer ACOS Version:
    5.2.0 Build 155

Secure negotiation Success: 0 | Secure negotiation

Failures:                  0

SSL handshake Success:     0 | SSL handshake Failures:
    0

GSLB protocol is disabled for site devices.

```

5. Run the following command on vThunder to verify the GSLB protocol information:

```
vThunder-gslb:Member (NOLICENSE) #show gslb protocol
```

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

```

GSLB site: eastus_1
  SLB device: slb1 (10.2.20.5:4626) GroupControl
Session ID: Not Available
Secure Config:           None | Current SSL State:
                           None
Connection succeeded:    1 | Connection failed:
                           1

Open packet sent:        1 | Open packet received:
                           1

Open session succeeded:  1 | Open session failed:
                           0

Sessions Dropped:        1 | Update packet received:
                           12

Keepalive packet sent:   2 | Keepalive packet received:
                           1

```

```

Notify packet sent:          0 |Notify packet received:
                             0
Message Header Error:       0 |Protocol RDT(ms):
                             0
GSLB Protocol Version:      2
Secure negotiation Success: 0 |Secure negotiation
Failures:                  0
SSL handshake Success:      0 |SSL handshake Failures:
                             0

GSLB site: eastus_2
  SLB device: slb2 (10.2.20.5:18556) GroupControl
  Session ID: Not Available
  Secure Config: None |Current SSL State:
                    None
  Connection succeeded: 1 |Connection failed:
                    1
  Open packet sent:     1 |Open packet received:
                    1
  Open session succeeded: 1 |Open session failed:
                    0
  Sessions Dropped:    1 |Update packet received:
                    14
  Keepalive packet sent: 2 |Keepalive packet received:
                    1
  Notify packet sent:   0 |Notify packet received:
                    0
  Message Header Error: 0 |Protocol RDT(ms):
                    0
  GSLB Protocol Version: 2
  Secure negotiation Success: 0 |Secure negotiation
  Failures:              0
  SSL handshake Success: 0 |SSL handshake Failures:
                    0

GSLB site: eastus2_1
  SLB device: slb3 (10.2.20.5:13002) GroupControl

```

```

Session ID: Not Available
Secure Config: None | Current SSL State:
                None
Connection succeeded: 1 | Connection failed:
                1
Open packet sent: 1 | Open packet received:
                1
Open session succeeded: 1 | Open session failed:
                0
Sessions Dropped: 1 | Update packet received:
                10
Keepalive packet sent: 2 | Keepalive packet received:
                1
Notify packet sent: 0 | Notify packet received:
                0
Message Header Error: 0 | Protocol RDT(ms):
                0
GSLB Protocol Version: 2
Secure negotiation Success: 0 | Secure negotiation
Failures: 0
SSL handshake Success: 0 | SSL handshake Failures:
                0

GSLB site: eastus2_2
SLB device: slb4 (10.2.20.5:1200) GroupControl
Session ID: Not Available
Secure Config: None | Current SSL State:
                None
Connection succeeded: 1 | Connection failed:
                0
Open packet sent: 1 | Open packet received:
                1
Open session succeeded: 1 | Open session failed:
                0
Sessions Dropped: 1 | Update packet received:
                18
Keepalive packet sent: 2 | Keepalive packet received:

```

```

1
Notify packet sent:          0 | Notify packet received:
0
Message Header Error:       0 | Protocol RDT(ms):
0
GSLB Protocol Version:      2
Secure negotiation Success: 0 | Secure negotiation
Failures:                   0
SSL handshake Success:      0 | SSL handshake Failures:
0

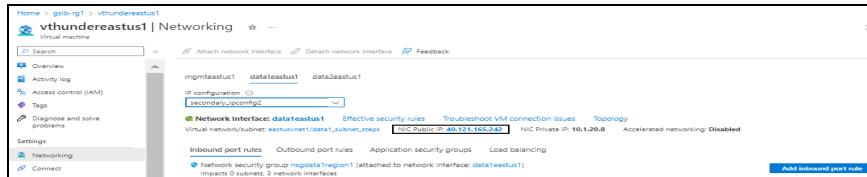
GSLB protocol is disabled for site devices.

```

## 6. Perform a DNS lookup using the master controller's public IP.

The master controller's public IP of client-side data interface is used as DNS server IP. You can get the public IP from **Azure Portal > Azure Services > Resource Group > <resource\_group\_name> > <virtual\_machine\_name> > Settings > Networking**.

Figure 155 : Master Controller Public IP



```

$ dig @20.232.184.46 www.gslb.a10.com

; <>>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.8 <>>> @20.232.184.46
www.gslb.a10.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 11393
;; flags: qr rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1400

```

```

;; QUESTION SECTION:
;www.gslb.a10.com.           IN      A

;; ANSWER SECTION:
www.gslb.a10.com.      10      IN      A      20.1.129.29
www.gslb.a10.com.      10      IN      A      20.97.231.193
www.gslb.a10.com.      10      IN      A      20.232.22.199
www.gslb.a10.com.      10      IN      A      20.232.18.146

;; Query time: 82 msec
;; SERVER: 20.232.184.46#53(20.232.184.46)
;; WHEN: Wed Aug 31 00:11:40 PDT 2022
;; MSG SIZE  rcvd: 125

$ dig @20.232.184.46 www.gslb.a10.com

; <>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.8 <>> @20.232.184.46
www.gslb.a10.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57272
;; flags: qr rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1400
;; QUESTION SECTION:
;www.gslb.a10.com.           IN      A

;; ANSWER SECTION:
www.gslb.a10.com.      10      IN      A      20.97.231.193
www.gslb.a10.com.      10      IN      A      20.1.129.29
www.gslb.a10.com.      10      IN      A      20.232.22.199
www.gslb.a10.com.      10      IN      A      20.232.18.146

;; Query time: 85 msec

```

```
;; SERVER: 20.232.184.46#53(20.232.184.46)
;; WHEN: Wed Aug 31 00:11:46 PDT 2022
;; MSG SIZE  rcvd: 125
```

# 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:

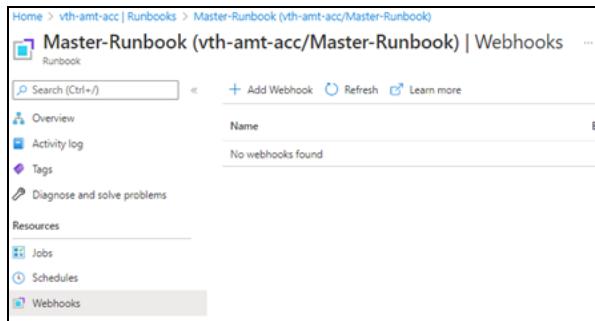
```
Set -AzStorageBlobContent @blobSSL
Cannot bind argument to parameter 'Container' because it is null.
```

### **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 156 : 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 thru **Azure Services > Virtual machine scale sets > <vmss\_name>**.

The selected vmss - Overview window is displayed.

Figure 157 : Selected vmss - Overview window

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

The selected vmss - Instances window is displayed.

Figure 158 : 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 159 : Master-Runbook Job window

---

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

---

5. Verify if all the runbook jobs have completed status.

# Appendix

---

The following topics are covered:

<a href="#">List of Custom Role Permissions</a> .....	317
<a href="#">Azure Service Application Access Key</a> .....	322

## 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/lo
gDefinitions/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/di
agnosticSettings/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/di
agnosticSettings/write",
"Microsoft.Compute/virtualMachineScaleSets/instanceView/read",
"Microsoft.Compute/virtualMachineScaleSets/skus/read",

,

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/me
tricDefinitions/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/actio
n",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/restart/actio
n",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/deallocate/acti
on",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/instanceView/re
ad",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/networkInterfac
es/read",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/networkInterfac
es/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.

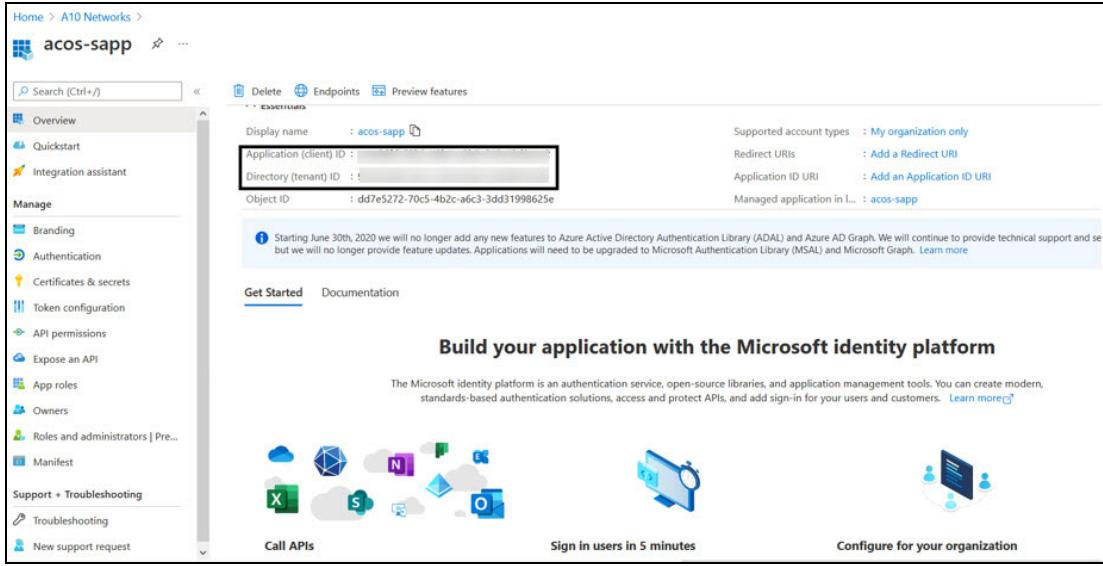
### Use an existing Access Key

---

To use an existing Azure service application access key, perform the following steps:

1. From **Azure Portal**, navigate thru **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 160 : 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-3d1bxxxxxxxx'
```

## Create a new Access Key

To create a new Azure service application access key, perform the following steps with Administrator privileges:

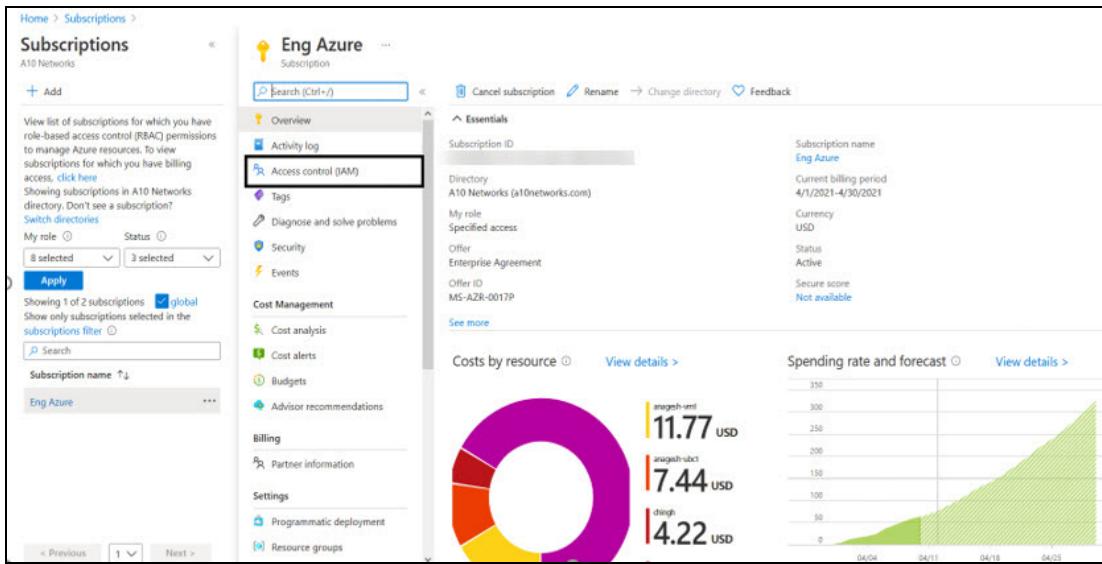
1. [Create a Role](#)
2. [Register a Service Application](#)
3. [Associate Service Application with a Role](#)
4. [Create Certificate and Secrets](#)
5. [Collect Azure Access Key](#)
6. [Import Azure Access Key](#)

### Create a Role

To create a custom role, perform the following steps:

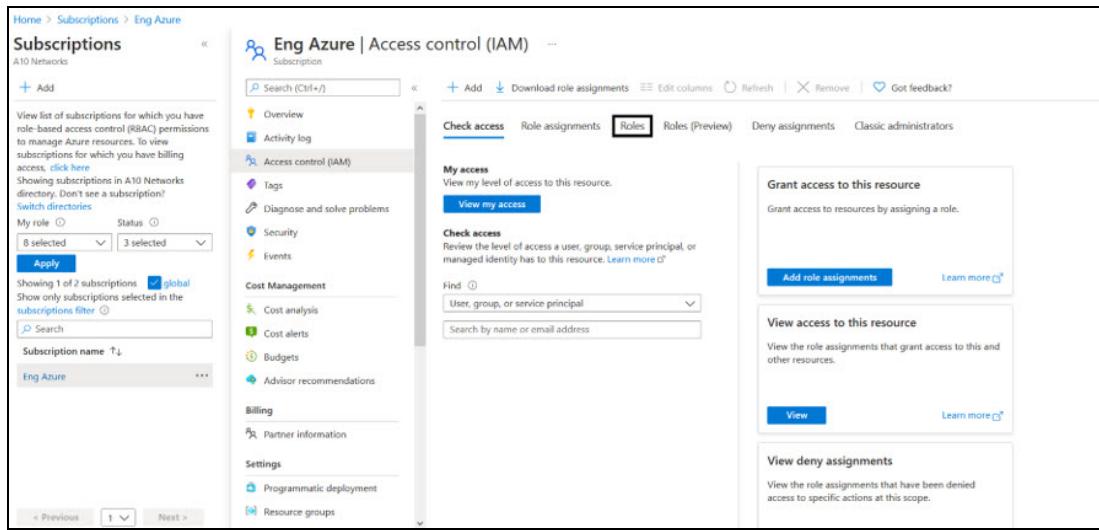
- From **Home**, navigate thru **Azure Services > Subscriptions > <subscription\_name>**.  
The selected Subscription - Overview window is displayed. Here, the subscription is Eng Azure.

Figure 161 : Subscriptions - Overview window



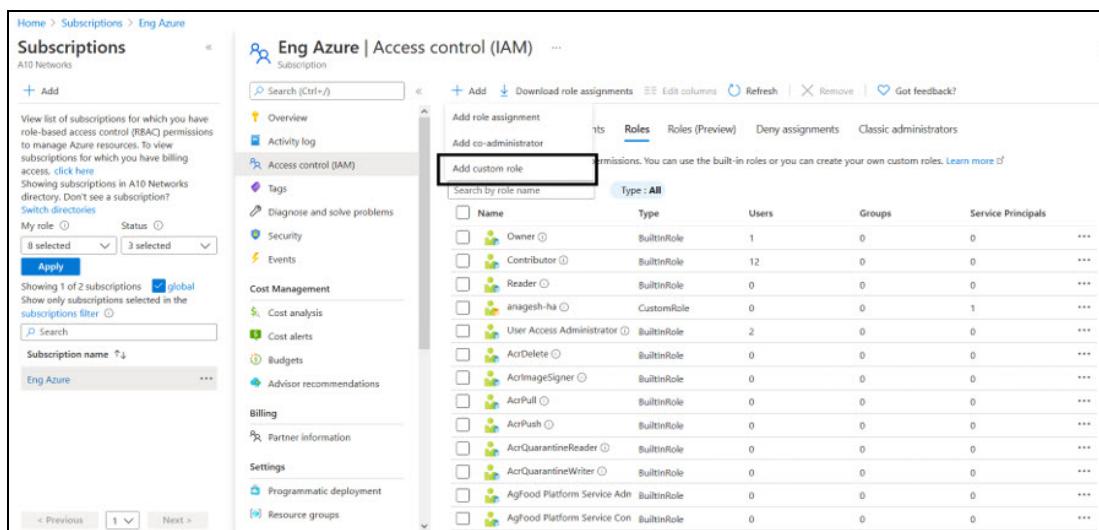
- Click **Access control (IAM)** from left panel.  
The selected Subscription - Access control (IAM) window is displayed.
- Select the **Roles** tab.  
The Roles window is displayed.

Figure 162 : Access Control - Role Window



4. Click **Add** to select **Add custom role** option.  
The Create a custom role window is displayed.

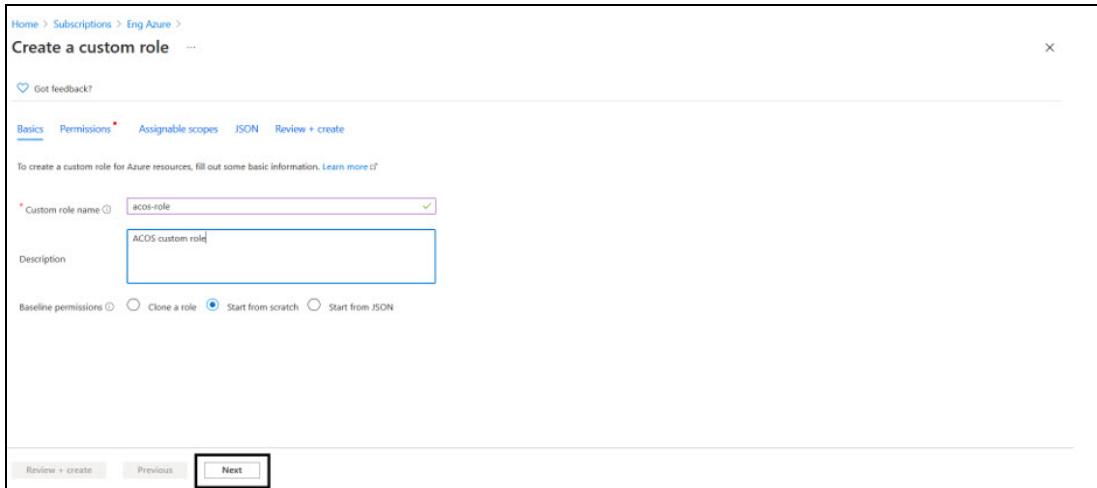
Figure 163 : Add custom role window



Name	Type	Users	Groups	Service Principals
Owner	BuiltinRole	1	0	0
Contributor	BuiltinRole	12	0	0
Reader	BuiltinRole	0	0	0
amagesh-ha	CustomRole	0	0	1
User Access Administrator	BuiltinRole	2	0	0
AcDelete	BuiltinRole	0	0	0
AcImageSigner	BuiltinRole	0	0	0
AcPull	BuiltinRole	0	0	0
AcPush	BuiltinRole	0	0	0
AcQuarantineReader	BuiltinRole	0	0	0
AcQuarantineWriter	BuiltinRole	0	0	0
AgFood Platform Service Admin	BuiltinRole	0	0	0
AgFood Platform Service Consumer	BuiltinRole	0	0	0

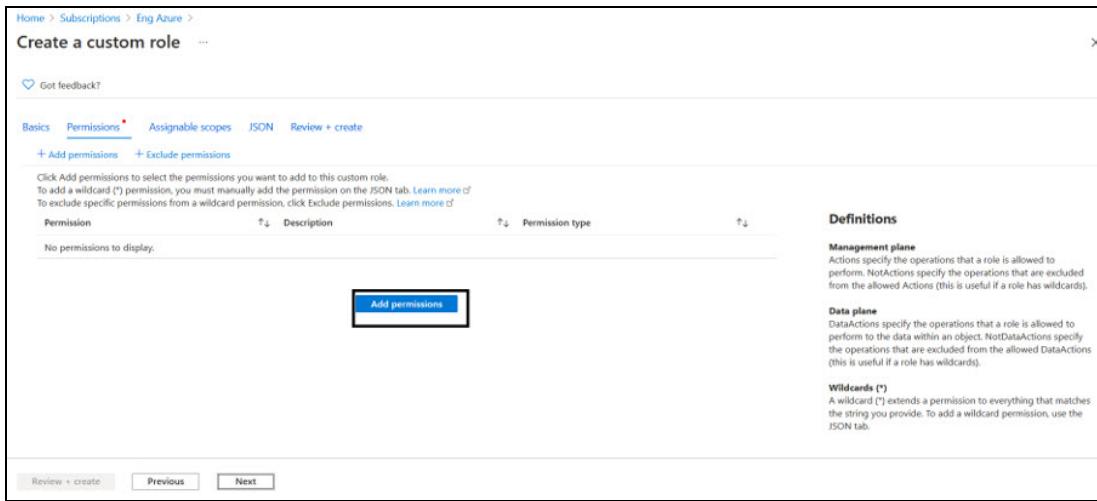
5. Enter **Customer role name** and **Description** (optional) in the **Basics** tab.

Figure 164 : Create a custom role window



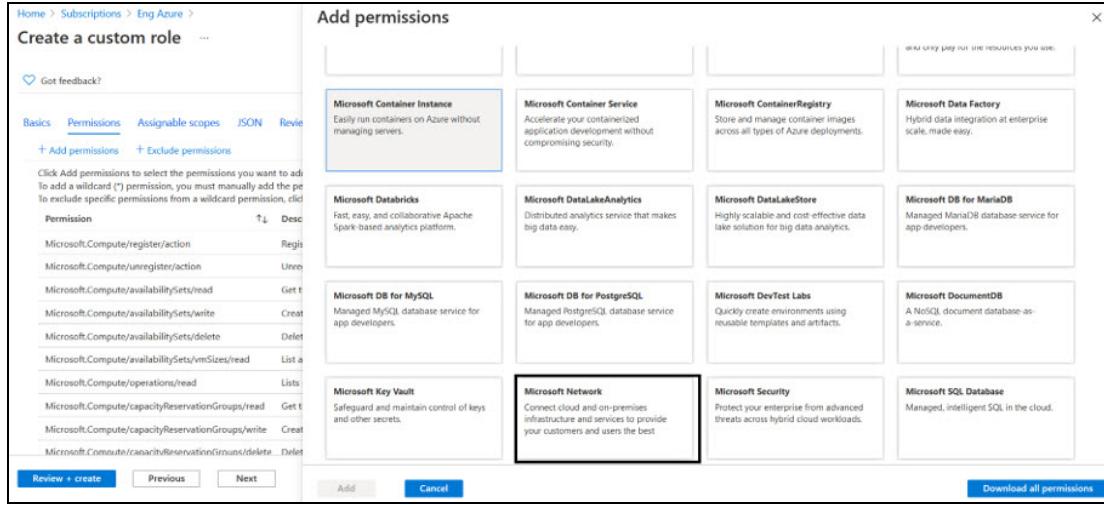
6. Click **Next** at the bottom of the window.  
The Permissions window is displayed.

Figure 165 : Permission window



7. Click **Add Permissions** to add permissions to the custom role.  
The Add Permissions window is displayed.

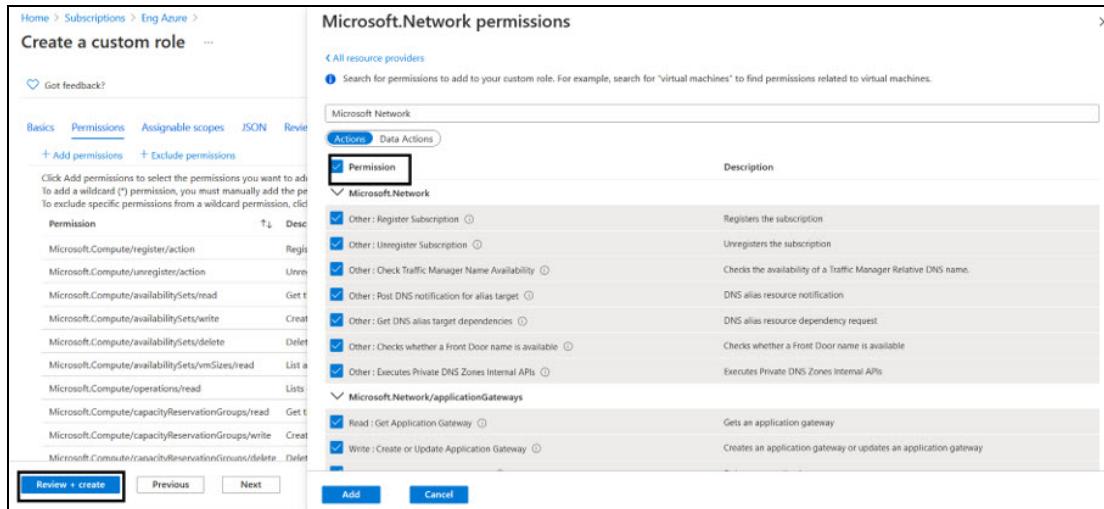
Figure 166 : Add permissions window



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 167 : 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.

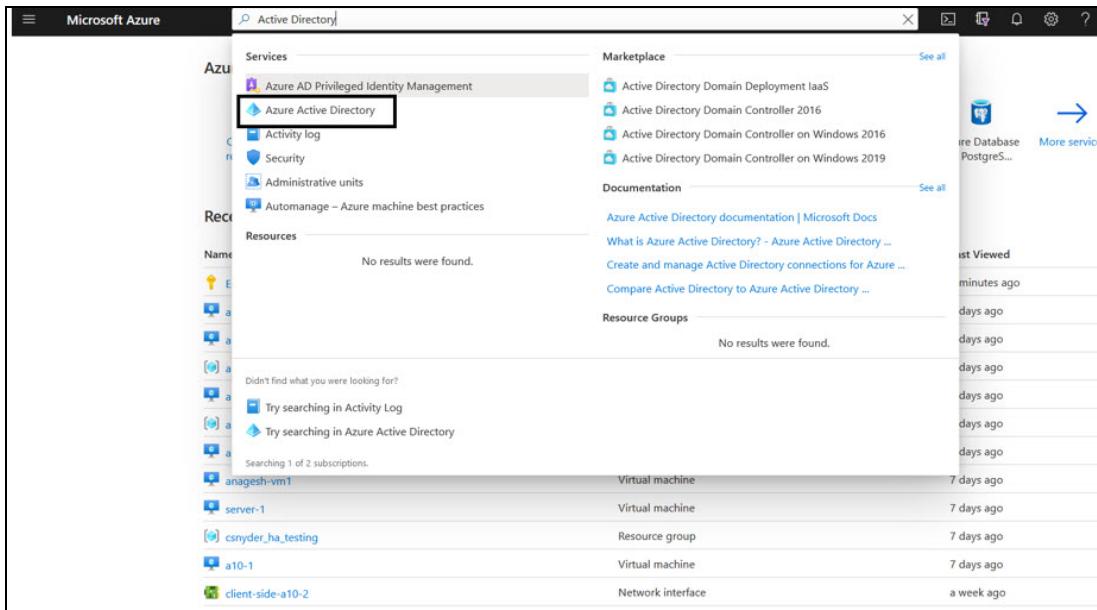
---

## Register a Service Application

To register a service application, perform the following steps:

## 1. From Home, navigate thru Azure Services > Azure Active Directory option.

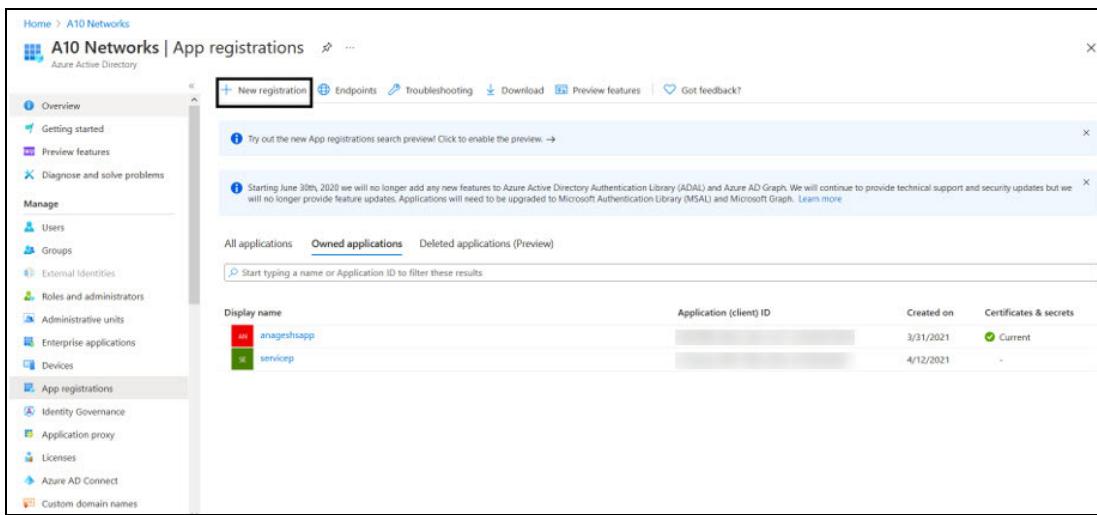
Figure 168 : Azure Active Directory window



## 2. 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.

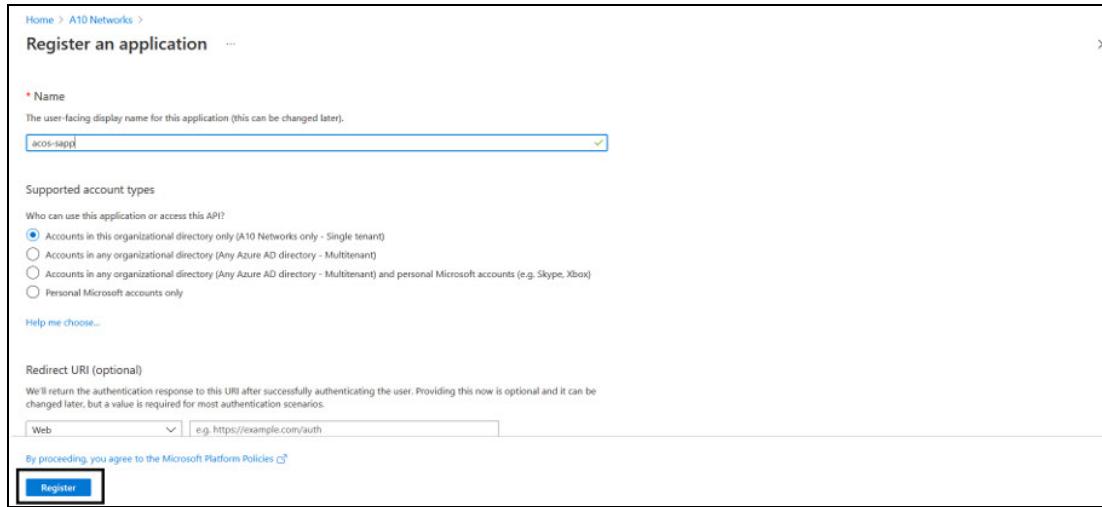
Figure 169 : App registrations window



## 3. Click New Registration.

The Register an application window is displayed.

Figure 170 : Register an application window



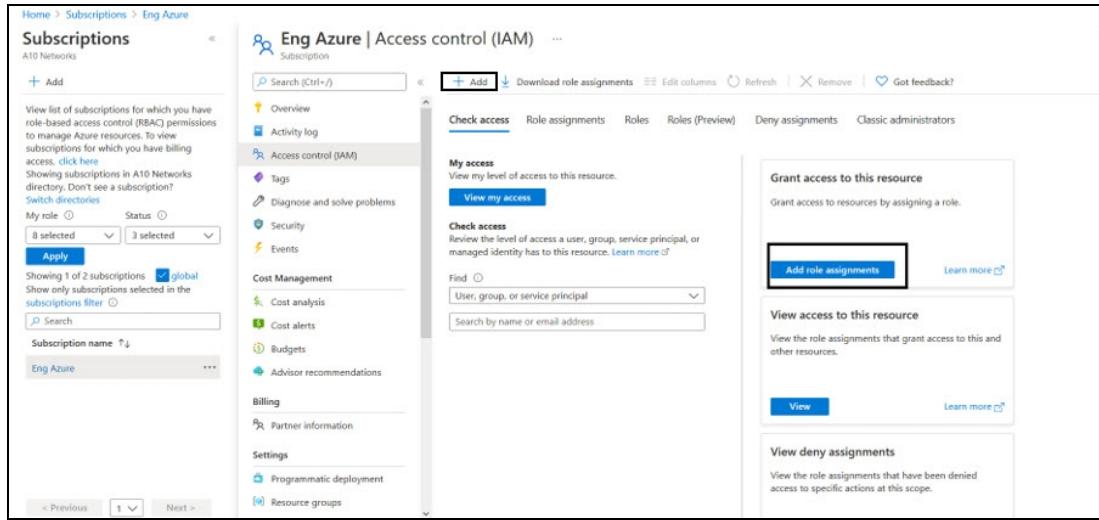
4. Enter the **Name** of the application. For example, acos-sapp.
5. Click **Register** to register the application. The application gets listed under Azure Active Directory - Apps registrations window.

## Associate Service Application with a Role

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

1. From **Home**, navigate thru **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.

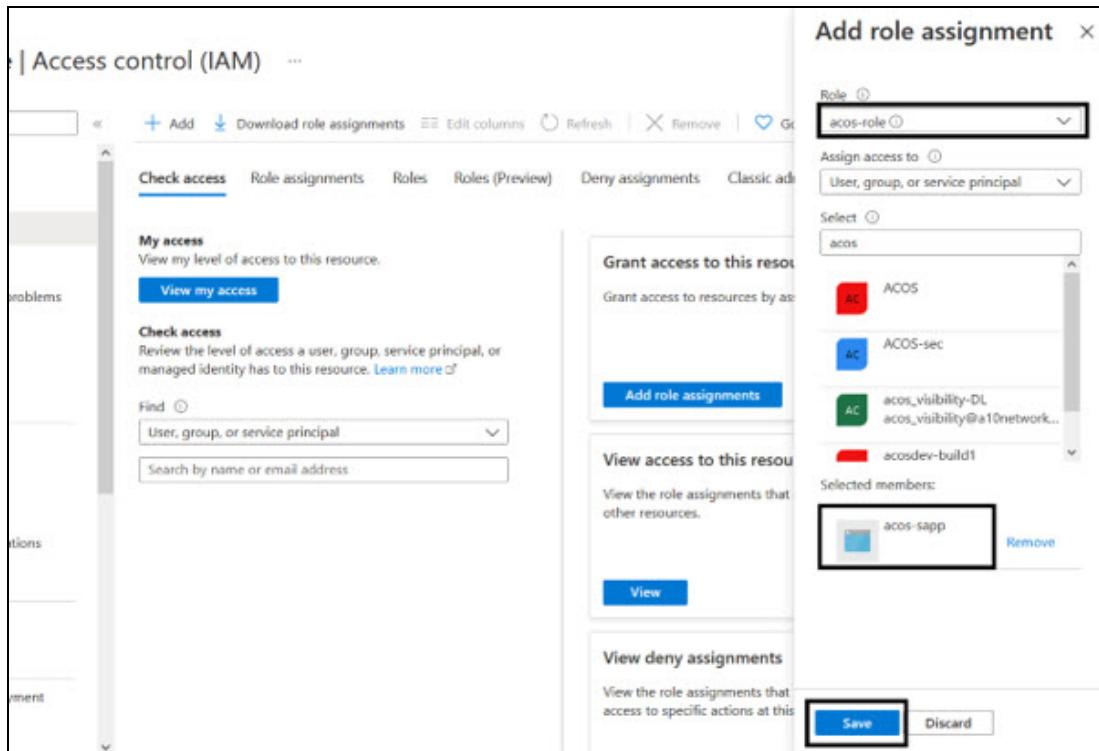
Figure 171 : Subscription - Access control (IAM) window



The screenshot shows the Azure Subscriptions - Access control (IAM) interface. The left sidebar lists 'Subscriptions' under 'A10 Networks'. The main area shows 'Eng Azure | Access control (IAM)' with the 'Check access' tab selected. On the right, there are three main sections: 'Grant access to this resource', 'View access to this resource', and 'View deny assignments'. The 'Add role assignments' button is highlighted.

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

Figure 172 : Add a role assignment -1



The screenshot shows the 'Add role assignment' dialog box. The 'Role' dropdown is set to 'acos-role'. The 'Assign access to' dropdown is set to 'User, group, or service principal'. The 'Select' dropdown shows 'acos'. Under 'Selected members', 'acos-sapp' is listed with a 'Remove' link. The 'Save' button is highlighted.

- Select a **Role** from the drop-down list. For example, acos-role.

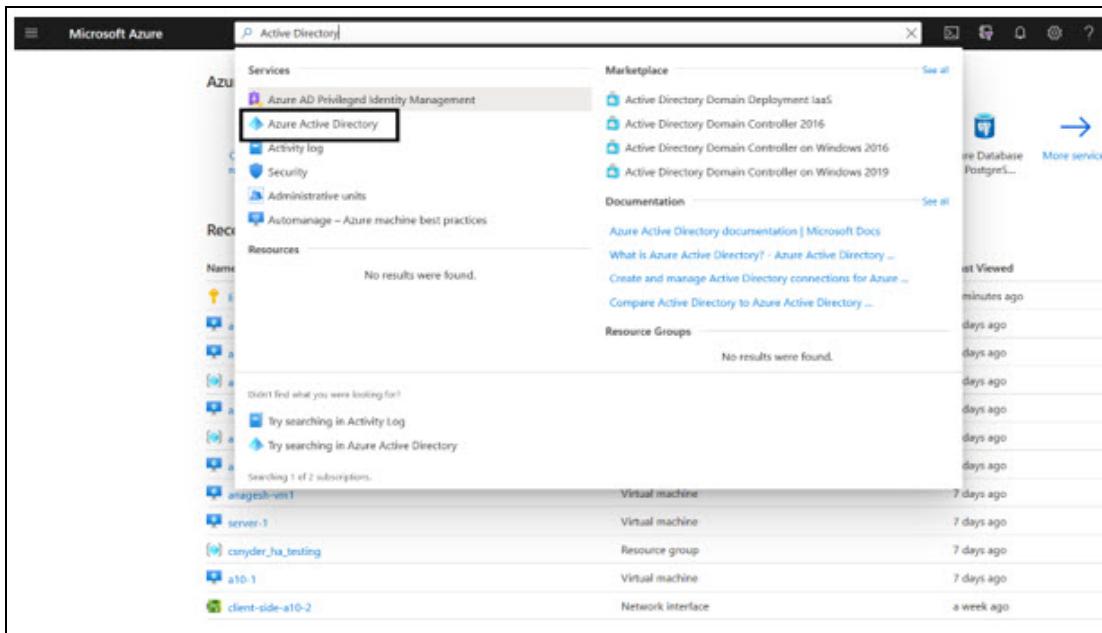
5. Select the required **Assign Access to** option from the drop-down list.
6. Enter a string to search and select for a name or email address. For example, acos.
7. Click the **Save** button to save the configuration.

## Create Certificate and Secrets

To create certificate and secrets for the assigned role, perform the following steps:

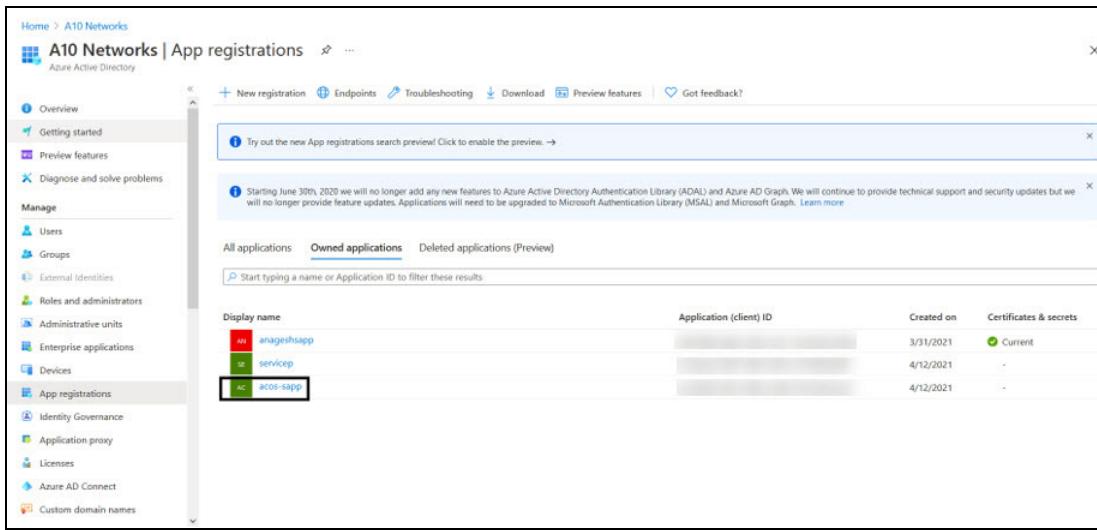
1. From **Home**, navigate thru **Azure Services > Azure Active Directory** option.

Figure 173 : Azure Active Directory - Overview window



2. 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 174 : App registrations - Overall applications window

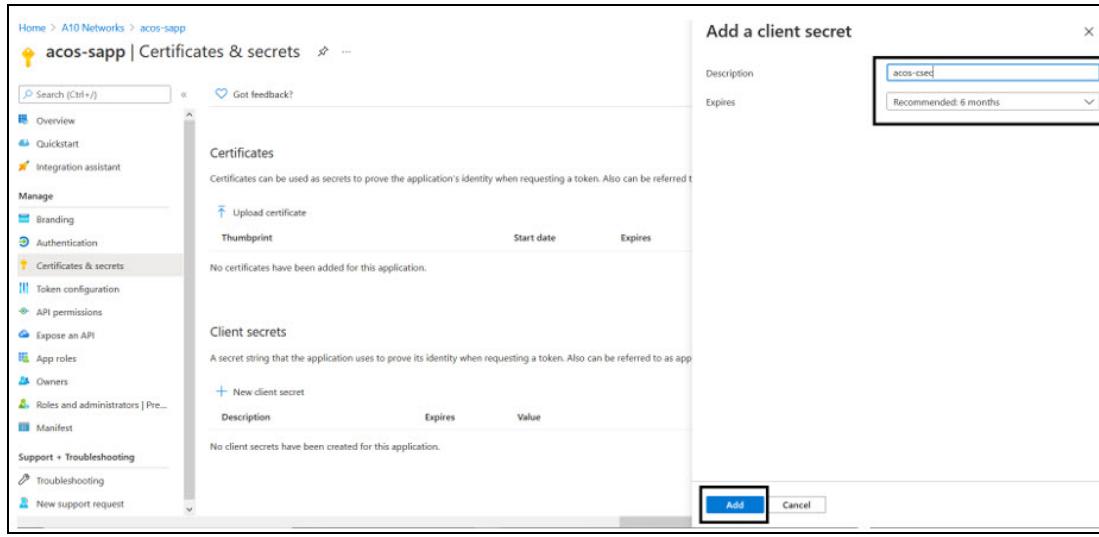


The screenshot shows the 'App registrations' section of the Azure Active Directory portal. The left sidebar includes options like Overview, Getting started, Preview features, Diagnose and solve problems, Manage (with sub-options: Users, Groups, External identities, Roles and administrators, Administrative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

Display name	Application (client) ID	Created on	Certificates & secrets
anagnishapp	[Redacted]	3/31/2021	Current
servicecp	[Redacted]	4/12/2021	-
acos-sapp	[Redacted]	4/12/2021	-

3. Select a service application from list of applications.  
The selected service application window is displayed.
4. Select the **Certificates & secrets** option from the left Manage navigation pane.  
The acos sapp - Certificates & secrets window is displayed.
5. Browse and upload certificates.
6. Select the **Start date** and **Expires** date from the date picker or click the **New client secret** button.  
The Add a client secret window is displayed.

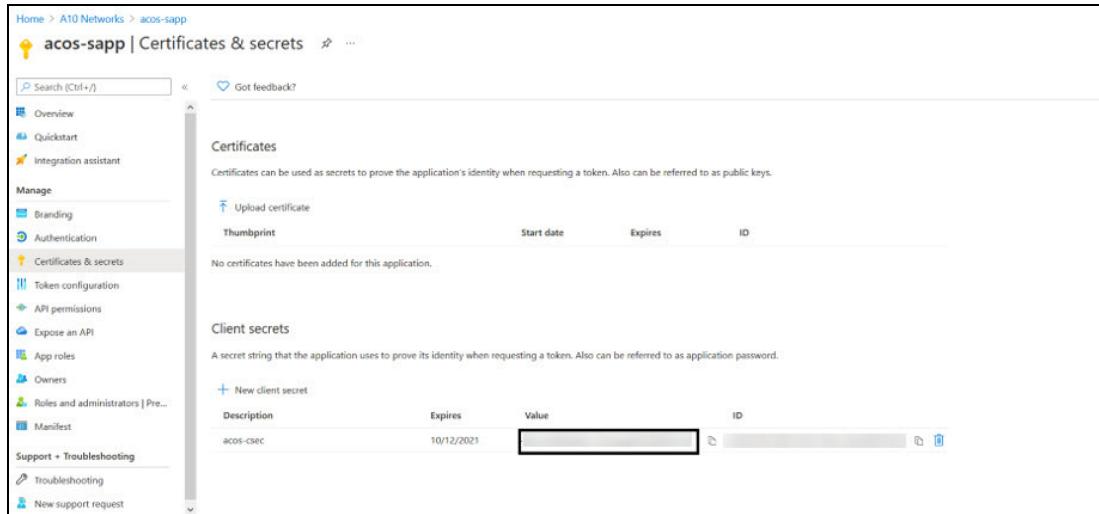
Figure 175 : Add a client secret window



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

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

Figure 176 : acos-sapp Certificates &amp; secrets window



### NOTE:

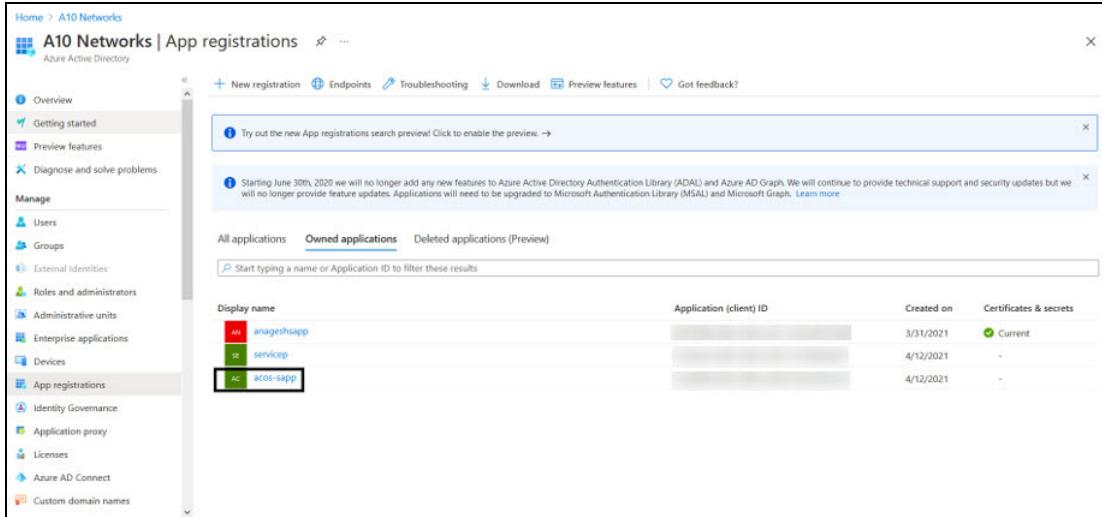
Save the new client secret value in a text file, as it is not visible once the window is refreshed.

## Collect Azure Access Key

To collect Azure access keys, perform the following steps:

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

Figure 177 : Azure Active Directory - App registrations window

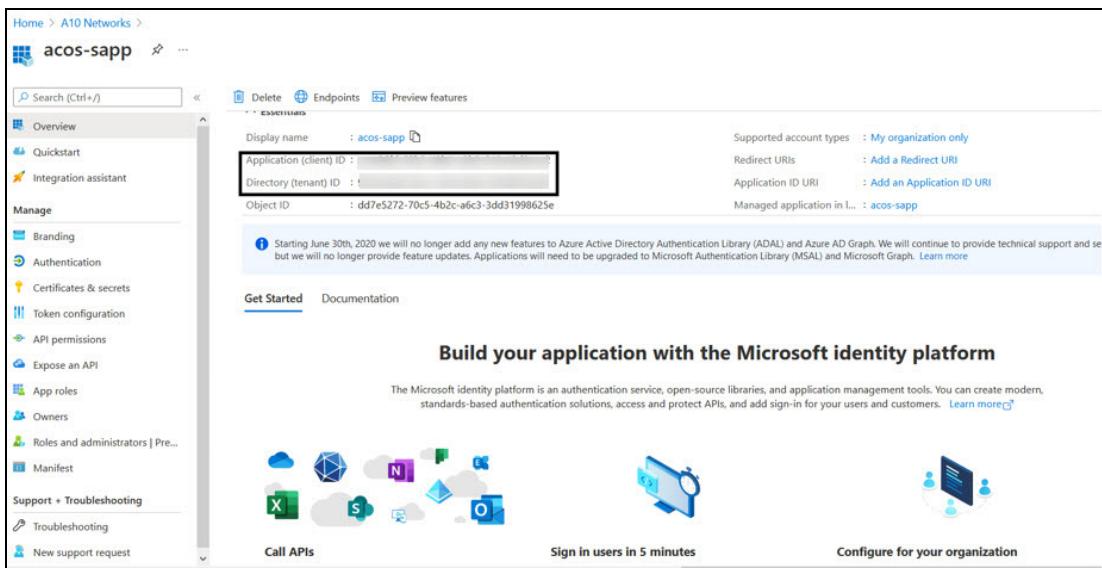


The screenshot shows the 'App registrations' page under 'Azure Active Directory'. The left sidebar includes 'Overview', 'Getting started', 'Preview features', 'Diagnose and solve problems', 'Manage' (with options like 'Users', 'Groups', 'External identities', 'Administrative units', 'Enterprise applications', 'Devices', 'App registrations', 'Identity Governance', 'Application proxy', 'Licenses', 'Azure AD Connect', and 'Custom domain names'), and a 'New registration' button. The main area has tabs for 'All applications', 'Owned applications' (which is selected), and 'Deleted applications (Preview)'. A search bar allows filtering by application name or ID. Below the search bar is a table listing three applications: 'acoshapp' (disabled), 'serviceapp' (disabled), and 'acos-sapp' (selected). The 'acos-sapp' row shows details: Application (client) ID: [redacted], Created on: 3/31/2021, Certificates & secrets: Current. A note at the top of the main area 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.' A 'Learn more' link is provided.

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

The selected service application window is displayed.

Figure 178 : Selected Service application window



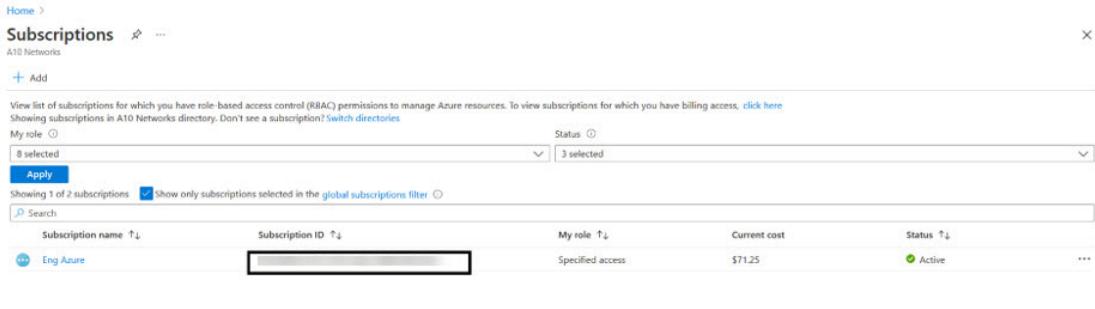
The screenshot shows the 'acos-sapp' service application page. The left sidebar includes 'Overview', 'Quickstart', 'Integration assistant', 'Manage' (with options like 'Branding', 'Authentication', 'Certificates & secrets', 'Token configuration', 'API permissions', 'Expose an API', 'App roles', 'Owners', 'Roles and administrators | Pre...', 'Manifest', 'Support + Troubleshooting', 'Troubleshooting', and 'New support request'), and a 'Get Started' button. The main area displays application details: Display name: 'acos-sapp', Application (client) ID: [redacted], Directory (tenant) ID: [redacted], Object ID: dd7e5272-70c5-4b2c-a6c3-3dd31998625e. It also lists supported account types (My organization only), redirect URIs, application ID URIs, and managed application links. A note at the top 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 se but we will no longer provide feature updates. Applications will need to be upgraded to Microsoft Authentication Library (MSAL) and Microsoft Graph.' A 'Learn more' link is provided. Below the details is a section titled 'Build your application with the Microsoft identity platform' which describes the Microsoft identity platform as an authentication service, open-source libraries, and application management tools. It includes links to 'Call APIs', 'Sign in users in 5 minutes', and 'Configure for your organization'. Icons for these features are shown.

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

```
client_id= 'cc4c86xx-65b3-48xx-a3xx-610xxxxxxxx'
tenant_id= '91d27axx-8cxx-41xx-82xx-3d1xxxxxxxx'
```

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

Figure 179 : Subscriptions window



The screenshot shows the 'Subscriptions' page in the Azure portal. It displays a single subscription named 'Eng Azure'. The table includes columns for Subscription name, Subscription ID, My role, Current cost, and Status. The status is shown as 'Active'.

Subscription name	Subscription ID	My role	Current cost	Status
Eng Azure		Specified access	\$71.25	Active

5. Create a text file having subscription, client\_id, client\_secret, and tenant\_id information as shown below:

```
subscription='07d34bxx-61xx-47xx-abxx-006xxxxxxxx'
client_id='cc4c86xx-65xx-48xx-a3xx-610xxxxxxxx'
client_secret='G0x_hVDzZxxxx-o1Vsw.xxxx.Zxxxx-xx'
tenant_id='91d2xxxx-8xxe-41xx-82xx-3d1xxxxxxxx'
```

## 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 = '*****_XGEdu0Or+M2Css=*****-0b'
tenant = '1e94d773-****-****-b25d-3b3e1b64948d'
vThunder-Active(config-admin:admin) (NOLICENSE) #
```

