



Installing vThunder ADC using ARM Templates

Version 1.1.0

February, 2023

© 2023 A10 Networks, Inc. All rights reserved.

Information in this document is subject to change without notice.

PATENT PROTECTION

A10 Networks, Inc. products are protected by patents in the U.S. and elsewhere. The following website is provided to satisfy the virtual patent marking provisions of various jurisdictions including the virtual patent marking provisions of the America Invents Act. A10 Networks, Inc. products, including all Thunder Series products, are protected by one or more of U.S. patents and patents pending listed at:

[a10-virtual-patent-marking](#).

TRADEMARKS

A10 Networks, Inc. trademarks are listed at: [a10-trademarks](#)

CONFIDENTIALITY

This document contains confidential materials proprietary to A10 Networks, Inc. This document and information and ideas herein may not be disclosed, copied, reproduced or distributed to anyone outside A10 Networks, Inc. without prior written consent of A10 Networks, Inc.

DISCLAIMER

This document does not create any express or implied warranty about A10 Networks, Inc. or about its products or services, including but not limited to fitness for a particular use and non-infringement. A10 Networks, Inc. has made reasonable efforts to verify that the information contained herein is accurate, but A10 Networks, Inc. assumes no responsibility for its use. All information is provided "as-is." The product specifications and features described in this publication are based on the latest information available; however, specifications are subject to change without notice, and certain features may not be available upon initial product release. Contact A10 Networks, Inc. for current information regarding its products or services. A10 Networks, Inc. products and services are subject to A10 Networks, Inc. standard terms and conditions.

ENVIRONMENTAL CONSIDERATIONS

Some electronic components may possibly contain dangerous substances. For information on specific component types, please contact the manufacturer of that component. Always consult local authorities for regulations regarding proper disposal of electronic components in your area.

FURTHER INFORMATION

For additional information about A10 products, terms and conditions of delivery, and pricing, contact your nearest A10 Networks, Inc. location, which can be found by visiting www.a10networks.com.

Table of Contents

| | |
|---|-----------|
| Introduction | 10 |
| Azure Cloud Terminology | 14 |
| Prerequisites | 16 |
| Image Repository | 17 |
| Get Started | 17 |
| ARM Templates | 18 |
| Deploy ARM A10-vThunder_ADC-2NIC-1VM | 19 |
| System Requirements | 20 |
| Supported VM Sizes | 22 |
| Create vThunder Instance | 23 |
| Initial Setup | 23 |
| Deploy vThunder | 26 |
| Configure Server and Client Machine | 27 |
| Create a Server Machine | 27 |
| Create a Client Machine | 37 |
| Configure vThunder as an SLB | 45 |
| Initial Setup | 45 |
| Change Password | 48 |
| Deploy vThunder as an SLB | 49 |
| Access vThunder using CLI or GUI | 50 |
| Access vThunder using CLI | 50 |
| Access vThunder using GUI | 51 |
| Verify Deployment | 52 |
| Verify Traffic Flow | 53 |
| Deploy ARM A10-vThunder_ADC-2NIC-1VM-GLM | 55 |
| System Requirements | 56 |
| Supported VM Sizes | 58 |
| Create vThunder Instance | 59 |

| | |
|--|-----------|
| Initial Setup | 59 |
| Deploy vThunder | 62 |
| Configure Server and Client Machine | 63 |
| Create a Server Machine | 64 |
| Create a Client Machine | 73 |
| Configure vThunder as an SLB | 81 |
| Initial Setup | 81 |
| Change Password | 84 |
| Deploy vThunder as an SLB | 85 |
| Configure vThunder GLM | 86 |
| Initial Setup | 86 |
| Apply GLM License | 87 |
| Access vThunder using CLI or GUI | 87 |
| Access vThunder using CLI | 88 |
| Access vThunder using GUI | 88 |
| Verify Deployment | 89 |
| Verify Traffic Flow | 91 |
| Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA | 93 |
| System Requirements | 93 |
| Create vThunder Instances | 97 |
| Initial Setup | 98 |
| Deploy vThunder | 101 |
| Configure Server and Client Machine | 103 |
| Create a Server Machine | 103 |
| Create a Client Machine | 113 |
| Configure vThunder as an SLB | 121 |
| Initial Setup | 121 |
| Change Password | 126 |
| Deploy vThunder as an SLB | 126 |
| Configure High Availability for vThunder | 127 |

| | |
|---|------------|
| Initial Setup | 128 |
| Create High Availability for vThunder | 130 |
| Access vThunder using CLI or GUI | 130 |
| Access vThunder using CLI | 130 |
| Access vThunder using GUI | 131 |
| Verify Deployment | 132 |
| Verify Traffic Flow | 134 |
| Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PVTVIP | 136 |
| System Requirements | 137 |
| Supported VM Sizes | 140 |
| Create vThunder Instances | 141 |
| Initial Setup | 141 |
| Deploy vThunder | 145 |
| Configure Server and Client Machine | 147 |
| Create a Server Machine | 147 |
| Create a Client Machine | 156 |
| Configure vThunder as an SLB | 164 |
| Initial Setup | 164 |
| Change Password | 168 |
| Deploy vThunder as an SLB | 169 |
| Configure High Availability for vThunder | 170 |
| Initial Setup | 170 |
| Create High Availability for vThunder | 173 |
| Configure vThunder using GLM | 173 |
| Initial Setup | 173 |
| Apply GLM License | 174 |
| Access vThunder using Console/CLI | 175 |
| Access vThunder using CLI | 175 |
| Access vThunder using GUI | 175 |
| Verify Deployment | 176 |

| | |
|--|------------|
| Verify Traffic Flow | 180 |
| Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO | 182 |
| System Requirements | 183 |
| Supported VM Sizes | 187 |
| Create vThunder Instances | 188 |
| Initial Setup | 188 |
| Deploy vThunder | 192 |
| Configure Server VMSS | 193 |
| Create a Server Machine | 194 |
| Verify the Server VMSS Creation | 201 |
| Configure Client Machine | 202 |
| Create a Client Machine | 202 |
| Create Automation Account | 210 |
| Initial Setup | 210 |
| Create an Automation Account | 212 |
| Verify the Automation Account creation | 212 |
| Change Password | 213 |
| Create Runbook | 214 |
| Create Automation Account Webhook | 216 |
| Initial Setup | 216 |
| Create a Webhook | 216 |
| Verify the Runbook Job creation | 217 |
| Configure vThunder as an SLB | 218 |
| Initial Setup | 219 |
| Deploy vThunder as an SLB | 222 |
| Configure High Availability for vThunder | 223 |
| Initial Setup | 223 |
| Create High Availability for vThunder | 225 |
| Configure vThunder using GLM | 226 |
| Initial Setup | 226 |

| | |
|--|------------|
| Apply GLM License | 227 |
| Access vThunder using CLI or GUI | 227 |
| Access vThunder using CLI | 228 |
| Access vThunder using GUI | 228 |
| Verify Deployment | 229 |
| Verify Traffic Flow | 232 |
| Deploy ARM A10-vThunder_ADC-3NIC-VMSS | 235 |
| System Requirements | 236 |
| Supported VM Sizes | 240 |
| Create vThunder Instances | 241 |
| Initial Setup | 241 |
| Deploy vThunder | 245 |
| Verify Resource Creation | 246 |
| Configure Server VMSS | 250 |
| Create a Server Machine | 250 |
| Verify the Server VMSS Creation | 258 |
| Configure Automation Account | 259 |
| Create Automation Account | 259 |
| Initial Setup | 259 |
| Create an Automation Account | 265 |
| Verify the Automation Account Creation | 266 |
| Create Automation Account Webhook | 267 |
| Initial Setup | 267 |
| Create a Webhook | 267 |
| Verify the AutoScale Resource Variable creation | 268 |
| Verify the SSL File availability | 270 |
| Verify the Runbook Jobs creation | 272 |
| Enable Autoscaling | 273 |
| Autoscaling Options | 274 |
| Configure Autoscaling and Log Monitoring using Agent Setup | 274 |

| | |
|--|------------|
| Configure Autoscaling using Azure Functions Setup | 297 |
| On-demand Password Change | 302 |
| Access vThunder using CLI or GUI | 304 |
| Access vThunder using CLI | 304 |
| Access vThunder using GUI | 304 |
| Verify Deployment | 305 |
| Verify Traffic Flow | 308 |
| Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB | 310 |
| System Requirements | 311 |
| Supported VM Sizes | 317 |
| Create vThunder Instances | 318 |
| Initial Setup | 318 |
| Deploy vThunder | 325 |
| Configure vThunder as an SLB | 328 |
| Initial Setup | 329 |
| Change Password | 338 |
| Deploy vThunder as an SLB | 338 |
| Access vThunder using CLI or GUI | 339 |
| Access vThunder using CLI | 340 |
| Access vThunder using GUI | 340 |
| Access Linux Server using CLI | 341 |
| Verify Deployment | 342 |
| Verify Traffic Flow | 358 |
| DNS Lookup | 358 |
| WGET | 360 |
| Troubleshooting | 362 |
| Common Errors | 362 |
| Appendix | 366 |
| List of Custom Role Permissions | 366 |
| Azure Service Application Access Key | 371 |

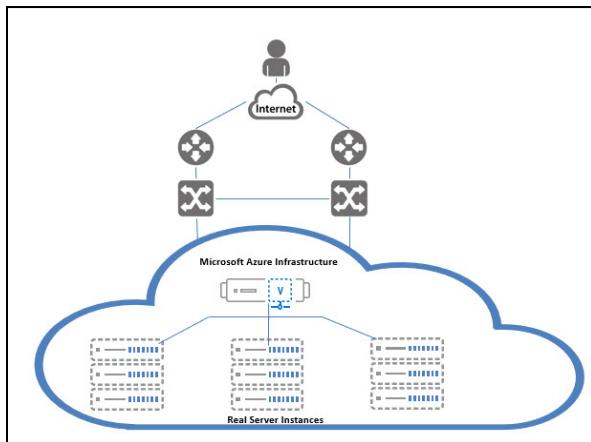
| | |
|---|-----|
| Use an existing Access Key | 371 |
| Create a new Access Key | 372 |
| Create a Role | 373 |
| Register a Service Application | 377 |
| Associate Service Application with a Role | 378 |
| Create Certificate and Secrets | 380 |
| Collect Azure Access Key | 382 |
| Import Azure Access Key | 383 |
| Default Password Policy | 384 |

Introduction

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

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

Figure 1 : vThunder for Microsoft Azure



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

Table 1 : Available ARM Templates

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

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

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

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

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

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

Azure Cloud Terminology

- **Azure account** — The Azure account created has different support plans for different regions. For more information on different Azure regions and availability of types of virtual machines in these regions, see <https://docs.microsoft.com/en-us/azure/virtual-machines/linux/overview>.
- **Resource group** — A resource group is a logical group of all the resources related to an Azure solution. Azure offers flexibility in the allocation of resources to resource groups. For more information, see <https://docs.microsoft.com/en-us/azure/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-P6, build 74 (Oct -09-2022,09:24)

- Tested with 64-bit Advanced Core OS (ACOS) version 6.0.0, build 419

Get Started

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

1. Start a CLI session.

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

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

```
A web browser has been opened at  
https://login.microsoftonline.com/organizations/oauth2/v2.0/authorize.  
Please continue the login in the web browser. If no web browser is  
available or if the web browser fails to open, use device code flow  
with `az login --use-device-code`.  
[  
 {  
   "cloudName": "AzureCloud",  
   "homeTenantId": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx",  
   "id": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx",  
   "isDefault": true,  
 }
```

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

PS C:\Users\TestUser>

2. Install Az Module.

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

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

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

ARM Templates

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

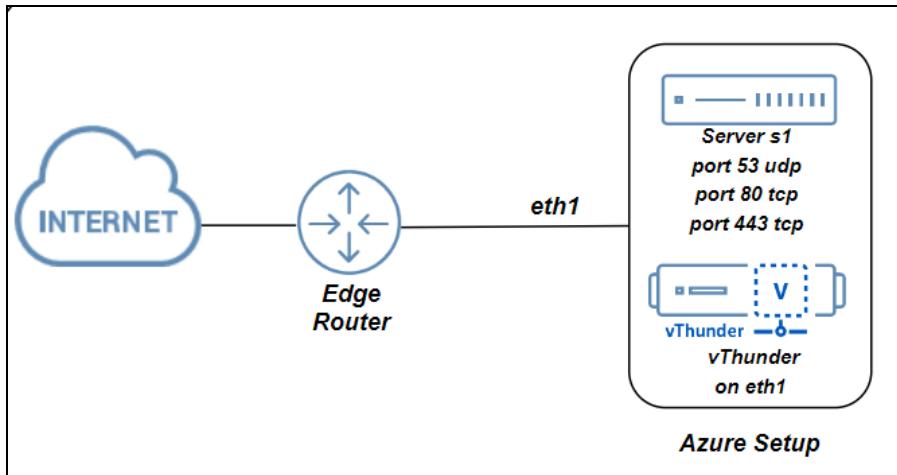
The following templates are available:

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

Deploy ARM A10-vThunder_ADC-2NIC-1VM

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

Figure 2 : 2NIC-1VM Topology



The following topics are covered:

| | |
|---|----|
| System Requirements | 20 |
| Supported VM Sizes | 22 |
| Create vThunder Instance | 23 |
| Configure Server and Client Machine | 27 |
| Configure vThunder as an SLB | 45 |
| Access vThunder using CLI or GUI | 50 |
| Verify Deployment | 52 |
| Verify Traffic Flow | 53 |

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 vth-rg1 . |
| Azure Storage Account | <p>A storage account is created inside the resource group if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | vthunderstorage |
| Virtual Machine (VM) Instance | <p>A virtual machine instance is created for vThunder.</p> <p>Product: A10 vThunder</p> | vth-inst1 |

| Resource Name | Description | Default Value |
|------------------------------|--|---|
| | <p>Operating system: Linux</p> <p>Default Size: Standard_DS2v2 (4 vCPUs, 16 GiB Memory)</p> <hr/> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 3 lists the supported VM sizes.</p> | |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance. | vth-vnet Address prefix for virtual network: 10.0.0.0/16 |
| Subnet | Two subnets are created with an address prefix each. | Subnet1: 10.0.1.0/24 Subnet2: 10.0.2.0/24 |
| Network Interface Card [NIC] | Two types of interfaces are created for each vThunder instance: <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1] | vth-inst1-mgmt-nic1 10.0.1.47 vth-inst1-data-nic2 10.0.2.47 [Primary IP] |
| Network Security Group [NSG] | A security group is created for all the associated default interfaces. | vth-nsg1 |

Supported VM Sizes

Table 3 : Supported VM sizes

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

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

For more information on Windows and Linux VM sizes, see

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

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

Create vThunder Instance

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

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

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

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

3. Configure a storage account name.

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

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

4. Configure a virtual network.

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

5. Configure a DNS label prefix.

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

6. Configure a vThunder name.

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

7. Set a VM Size for vThunder.

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

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

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

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

```

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

```

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

9. Configure two network interface cards.

```

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

```

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

```

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

```

11. Configure a public IP address.

```

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

```

12. Configure a Network Security Group.

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

13. Configure authentication type.

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

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

Deploy vThunder

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

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

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

Example:

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

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-nic2 | Network Interface | South Central US |
| vth-inst1-mgmt-nic1 | Network Interface | South Central US |
| vth-inst1_OsDisk | Disk | South Central US |
| vth-nsq1 | Network security group | South Central US |

Configure Server and Client Machine

The following topics are covered:

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

Create a Server Machine

To create a Server machine, perform the following steps:

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

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

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

Project details

- Subscription
- Resource group

Instance details

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

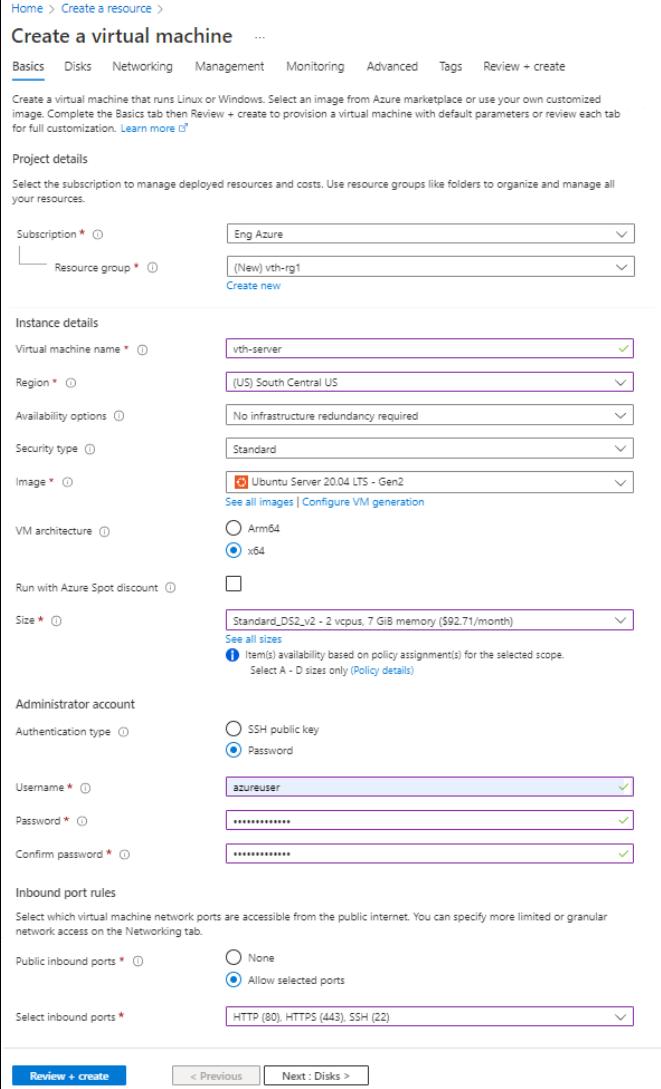
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 4 : Create a virtual machine window - Basics tab



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)

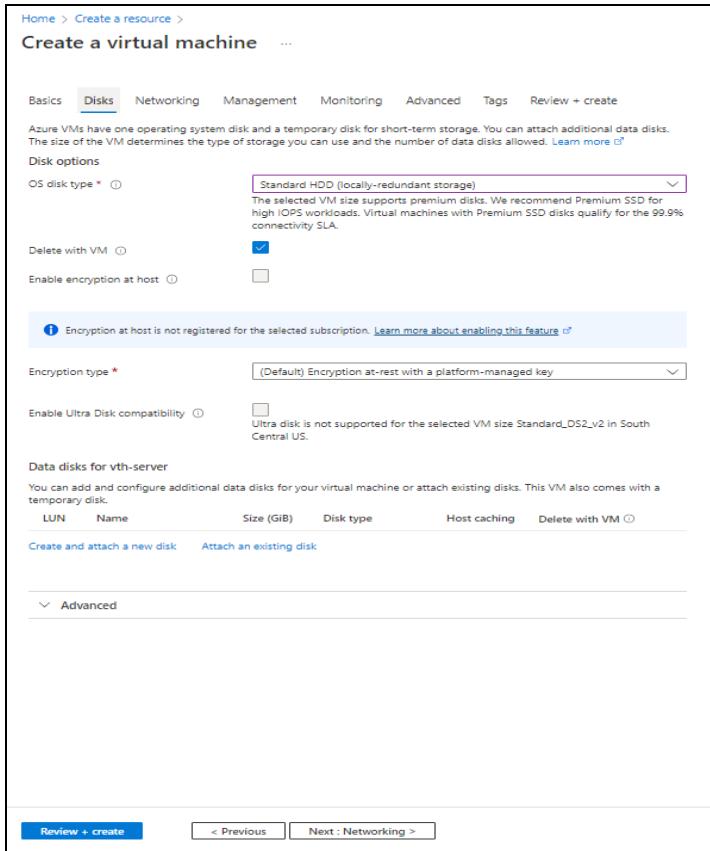
At the bottom are buttons for **Review + create**, < Previous, and Next : Disks >.

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 5 : Create a virtual machine window - Disks tab

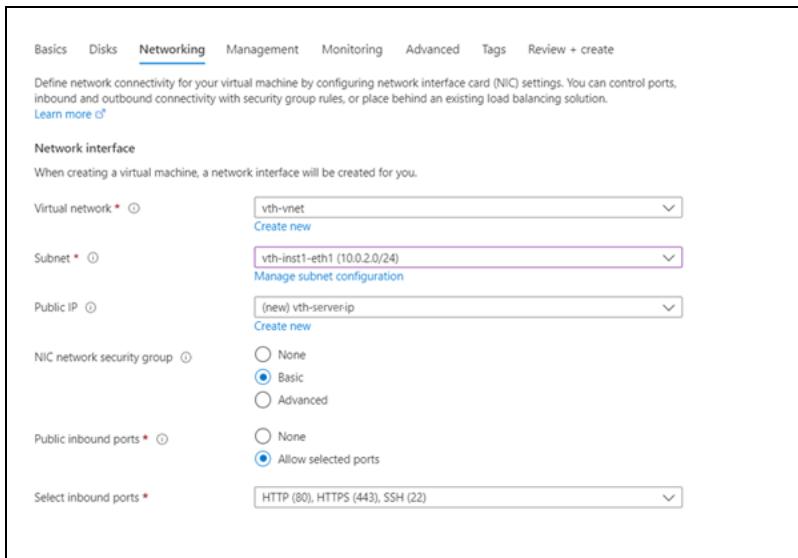


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

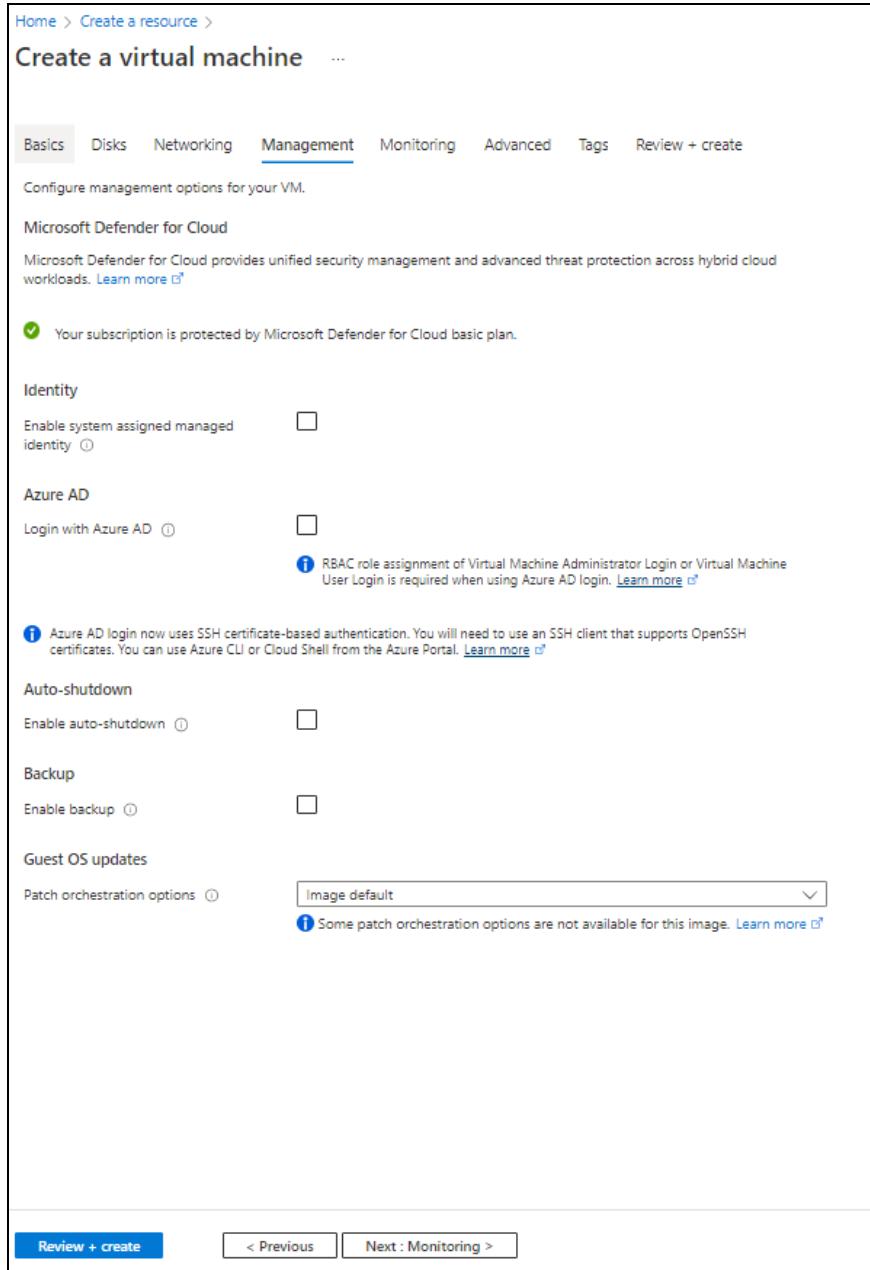
Figure 6 : Create a virtual machine window - Networking tab



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

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

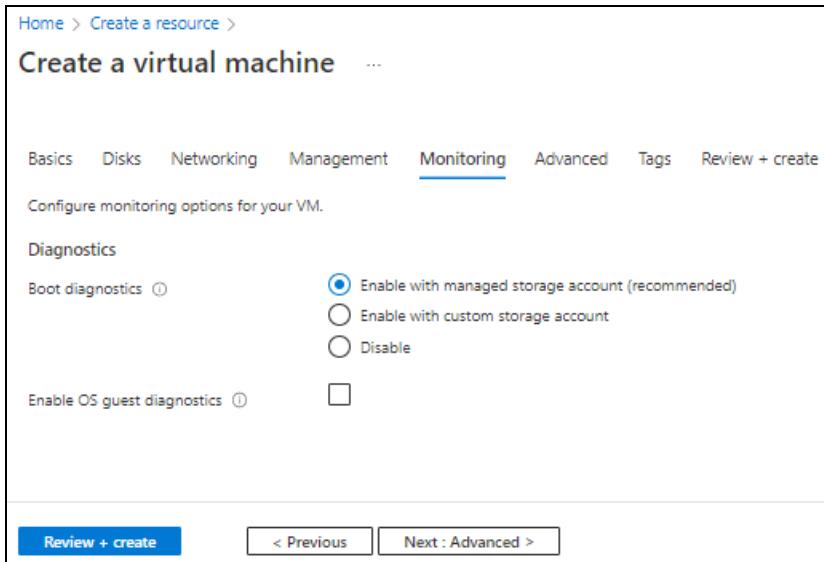
Figure 7 : Create a virtual machine window - Management tab



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

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

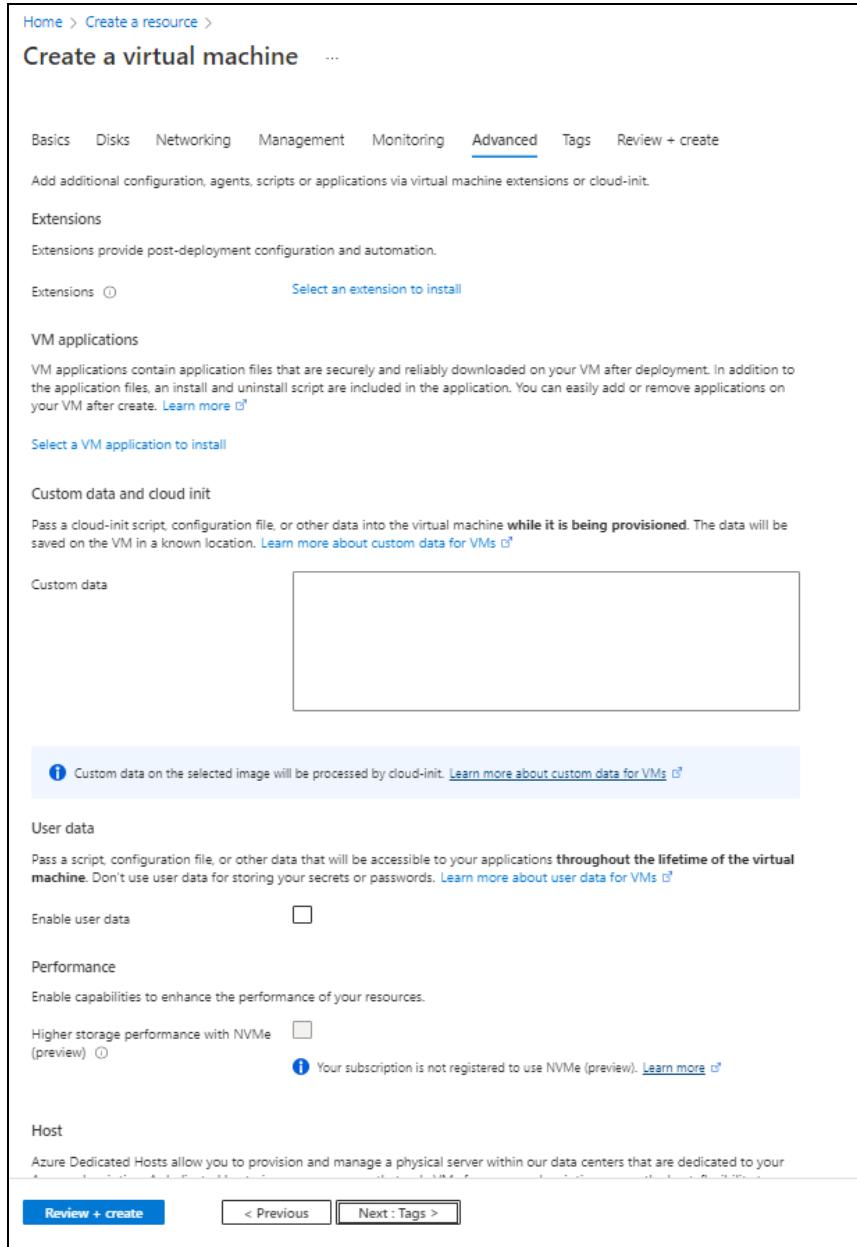
Figure 8 : Create a virtual machine window - Monitoring tab



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

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

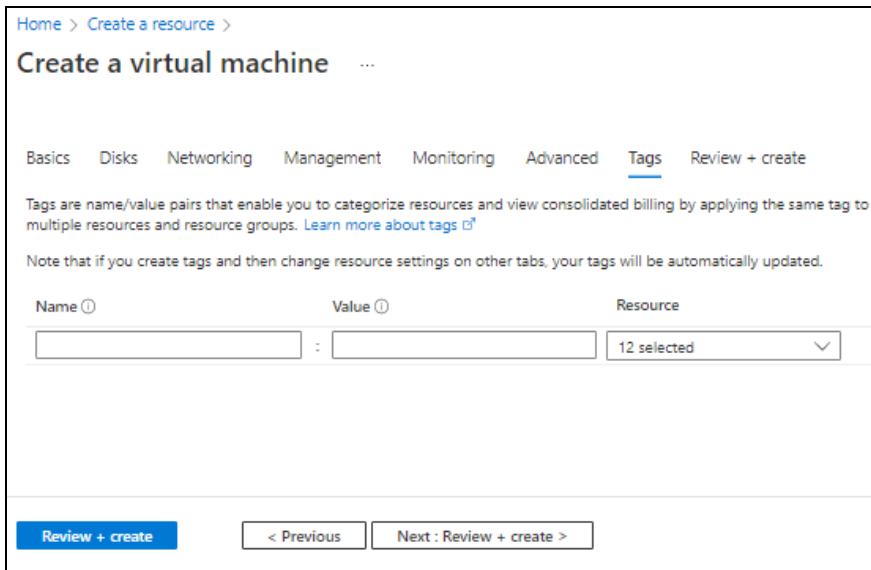
Figure 9 : Create a virtual machine window - Advanced tab



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

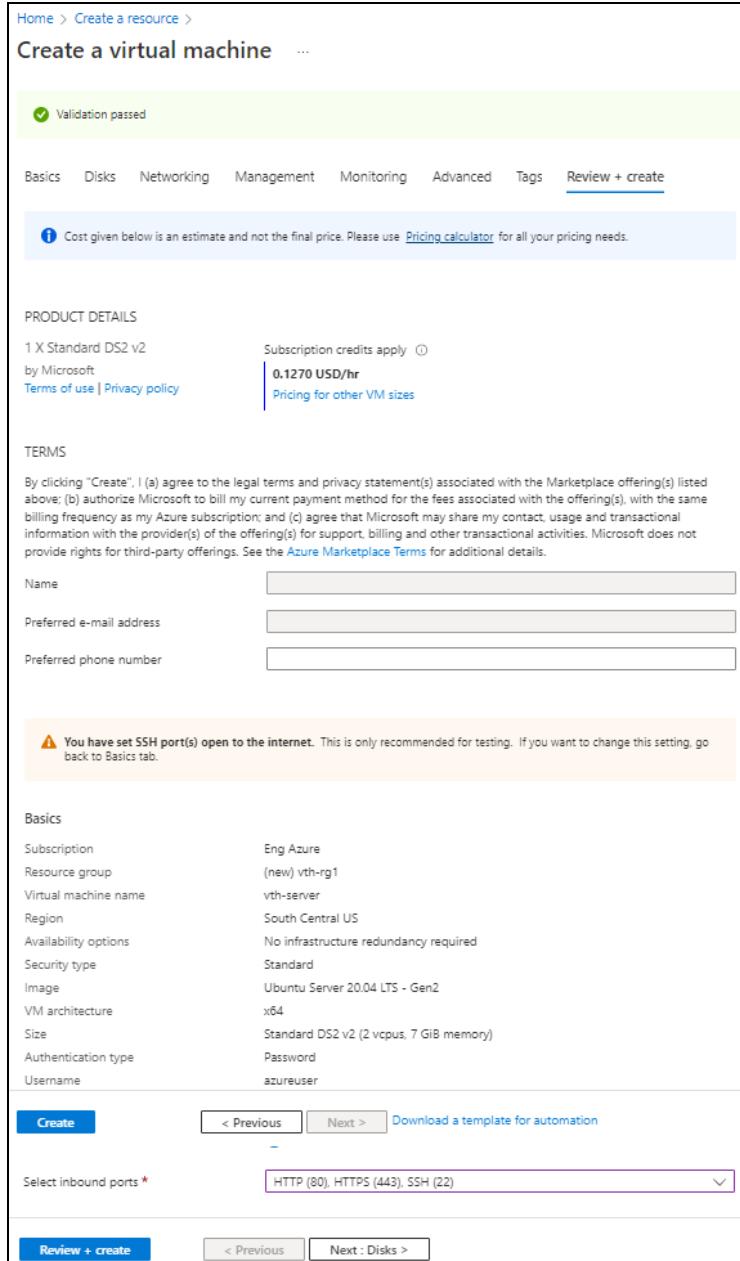
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 10 : Create a virtual machine window - Tags tab



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

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



16. Click **Create** at the bottom of the window.
The Server virtual machine gets created and listed in the **Home > Azure Services > Virtual machine** window.
17. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

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

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

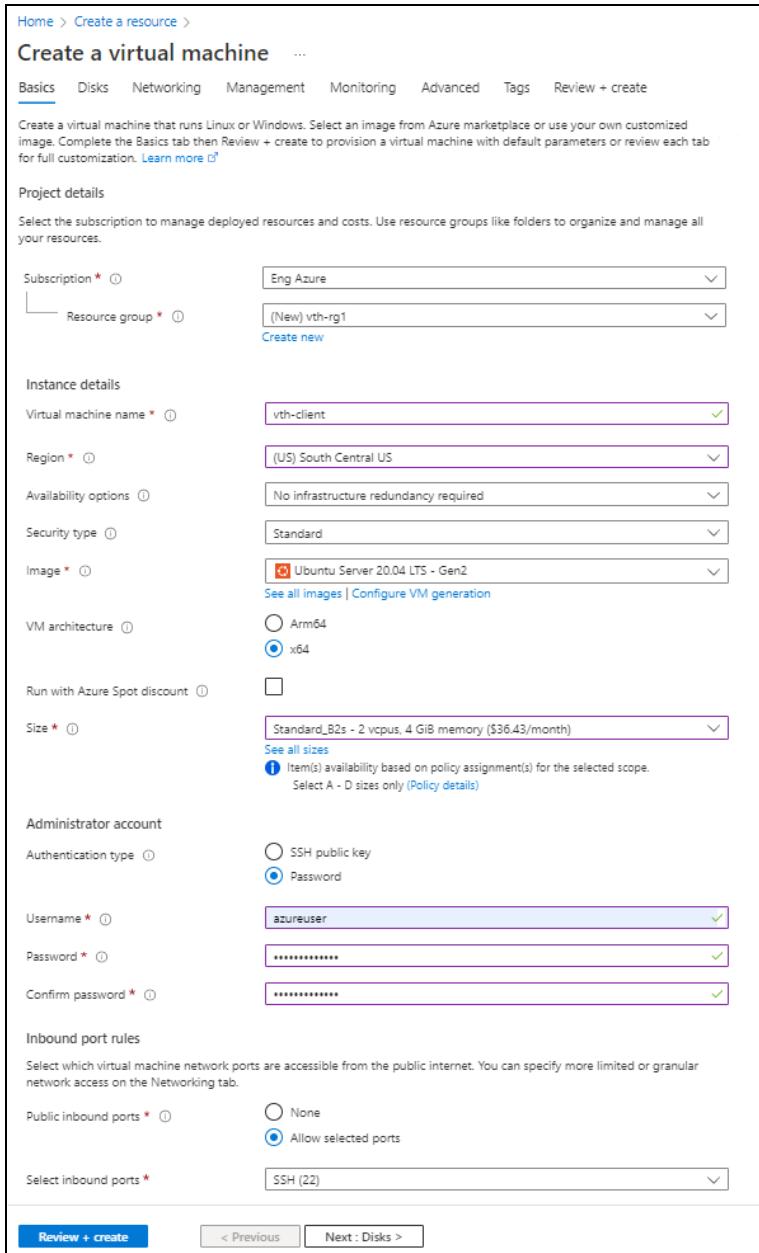
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 12 : 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 is titled 'Create a virtual machine' and includes tabs for Basics, Disks, Networking, Management, Monitoring, Advanced, Tags, and Review + create.

Project details:

- Subscription: Eng Azure
- Resource group: (New) vth-rg1

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
- VM architecture: x64 (selected)
- Run with Azure Spot discount: Unchecked
- Size: Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)

Administrator account:

- Authentication type: Password (selected)
- Username: azureuser
- Password: (redacted)
- Confirm password: (redacted)

Inbound port rules:

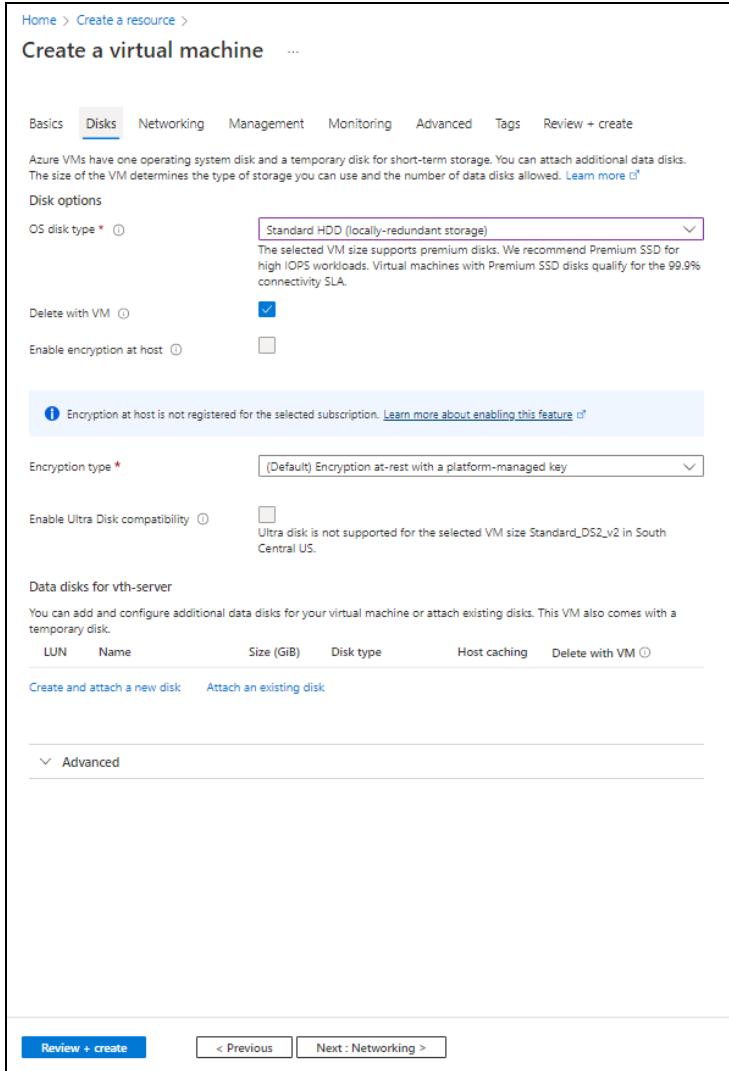
- Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.
- Public inbound ports: Allow selected ports (selected)
- Select inbound ports: SSH (22)

At the bottom of the window are buttons for 'Review + create' (highlighted in blue), '< 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 13 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine ...

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

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

Disk options

OS disk type *

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

Delete with VM

Enable encryption at host

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

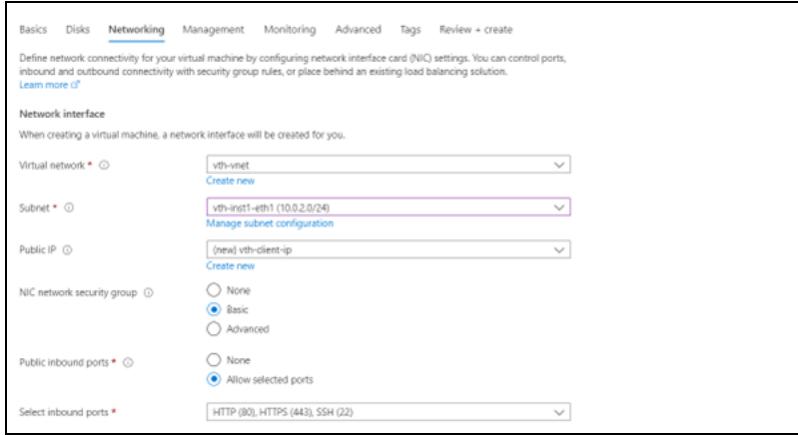
[Review + create](#) [< Previous](#) [Next : Networking >](#)

- 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

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

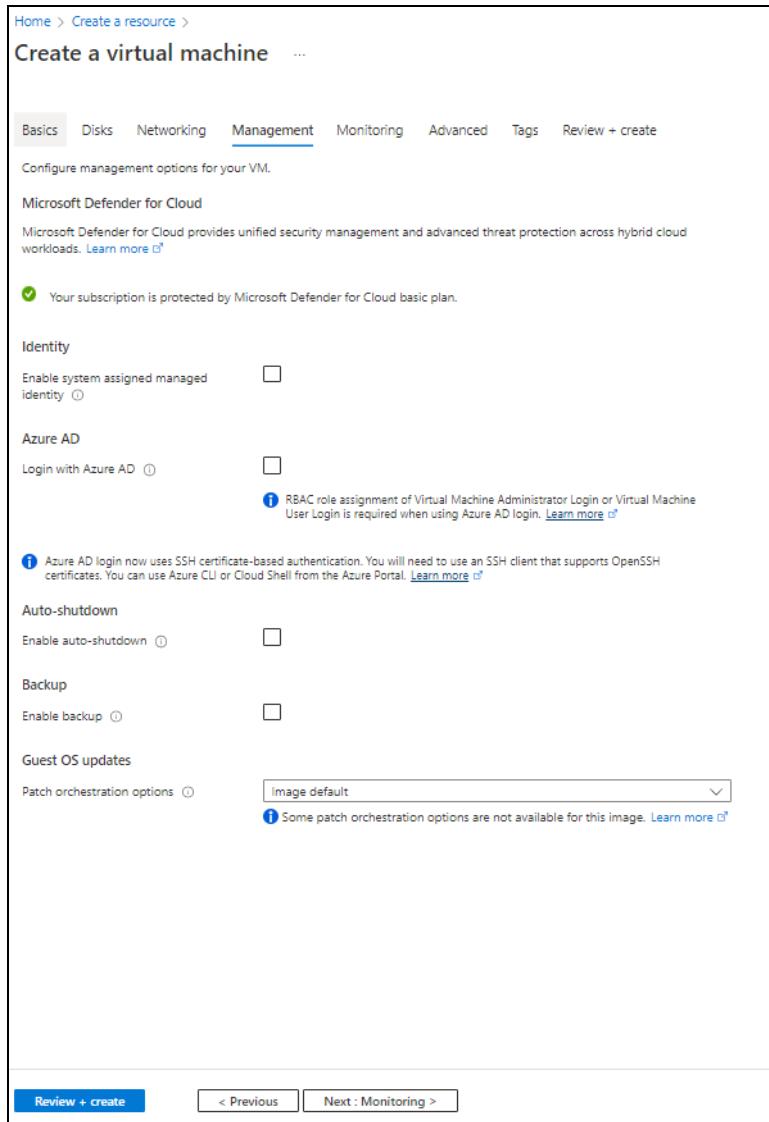
Figure 14 : Create a virtual machine window - Networking tab



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

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

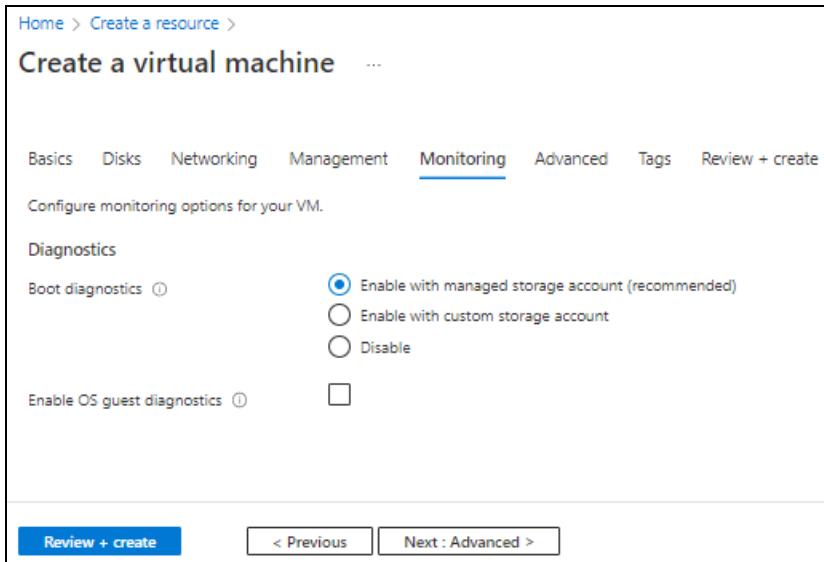
Figure 15 : Create a virtual machine window - Management tab



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

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

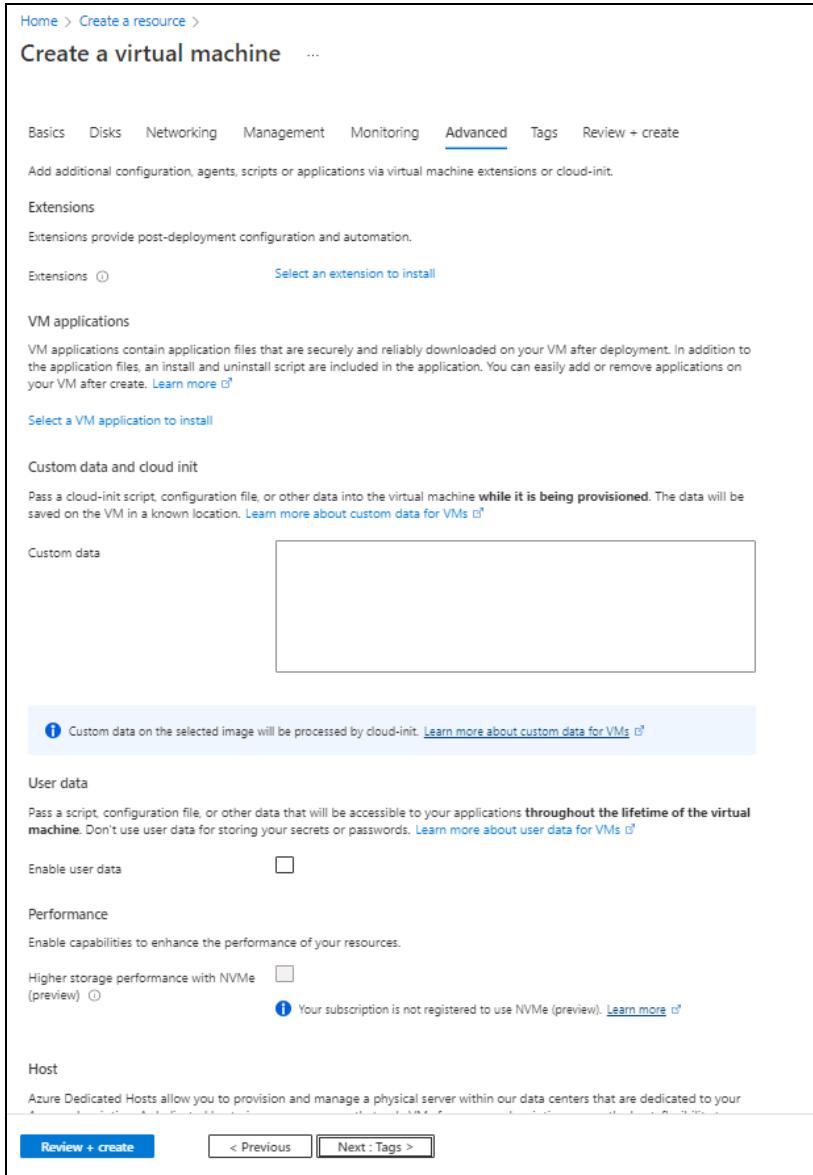
Figure 16 : Create a virtual machine window - Monitoring tab



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

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

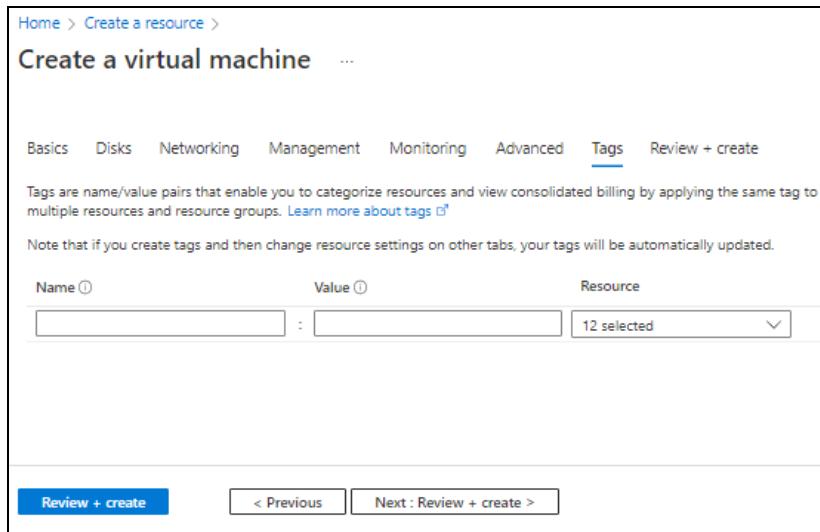
Figure 17 : Create a virtual machine window - Advanced tab



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

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

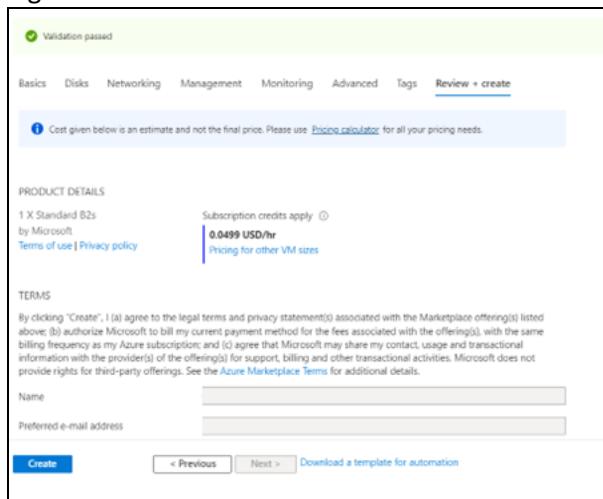
Figure 18 : Create a virtual machine window - Tags tab



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

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

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



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

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

Configure vThunder as an SLB

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

2. Configure a SLB server host or domain.

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

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

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

3. Configure SLB server ports.

```
"slbServerPortList": {
    "value": [
        {
            "port": 80,
            "protocol": "HTTP"
        },
        {
            "port": 443,
            "protocol": "HTTPS"
        }
    ]
},
```

```
        "port-number": 53,
        "protocol": "udp"
    },
    {
        "port-number": 80,
        "protocol": "tcp"
    },
    {
        "port-number": 443,
        "protocol": "tcp"
    }
],
},
}
```

4. Configure Service Group List ports.

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

```

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

5. Configure a Virtual Server.

The virtual server default name is “vs1”.

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

```

        }
    ],
},
,
```

6. Configure SSL.

```

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

```

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

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

```

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

```

7. Provide the resource group name.

```

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

```

NOTE: Do not change the vThunder instance username.

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

Change Password

To change the password, perform the following steps:

- Run the following command to change password:

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

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

- Provide the default and new password when prompted:

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

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

Deploy vThunder as an SLB

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

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

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

Example:

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

A message is prompted to upload the SSL certificate.

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

```
SLB Server Host IP: 10.0.2.8
Virtual Server Name: vs1
Resource Group Name: vth-rg1
Instance Public IP: 20.165.38.180
configured ethernet 1 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
```

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

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

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

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

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

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

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

System is ready now.

[type ? for help]

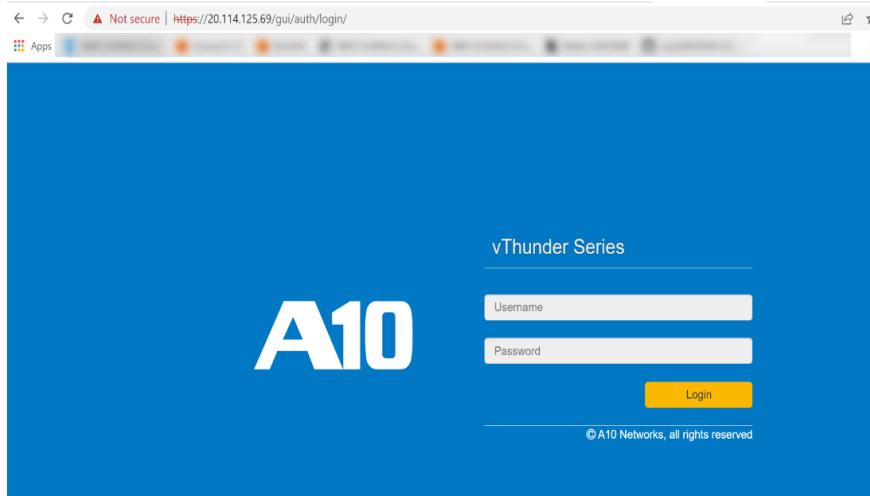
vThunder> enable <--Execute command--->
Password:<--just press Enter key--->
vThunder#config <--Configuration mode--->
```

Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

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

Figure 20 : vThunder GUI



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

Verify Deployment

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

1. Run the following command on vThunder:

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

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

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

```

    service-group sg80
    port 443 https
    source-nat auto
    service-group sg443
!
!
```

- Run the following command on vThunder:

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

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

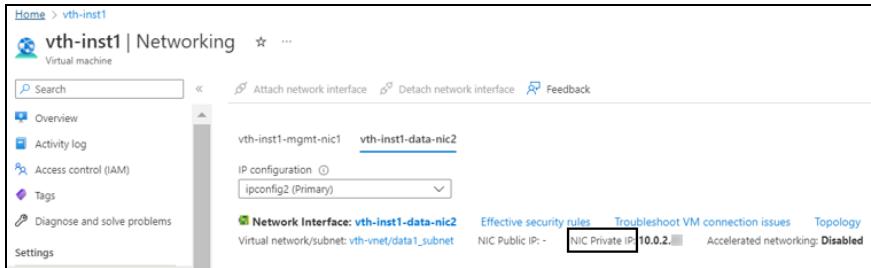
| Name | Type | Expiration | Status |
|--------------------|------|--------------------------|--------------------|
| ----- | | | |
| server certificate | | Jan 28 12:00:00 2028 GMT | [Unexpired, Bound] |

Verify Traffic Flow

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

- From **Azure Portal > Azure Services > Resource Group > <resource_group_name> > <virtual_machine_instance> > Settings > Networking**. Here, **vth-inst1** is the vThunder instance name.
- Copy the Private IP address of the data subnet.

Figure 21 : vThunder instance Data Subnet Private IP



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

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

```
curl <vThunder_instance_data_private_IPv4_Address>
```

Example

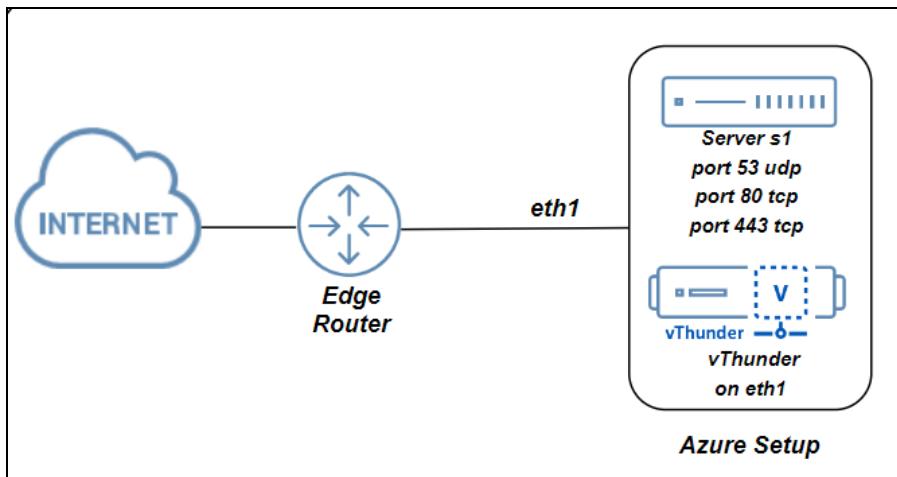
```
curl 10.0.2.47
```

Verify if a response is received.

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

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

Figure 22 : 2NIC-1VM-GLM Topology



The following topics are covered:

| | |
|---|----|
| System Requirements | 56 |
| Create vThunder Instance | 59 |
| Configure Server and Client Machine | 63 |
| Configure vThunder as an SLB | 81 |
| Configure vThunder GLM | 86 |
| Access vThunder using CLI or GUI | 87 |
| Verify Deployment | 89 |
| Verify Traffic Flow | 91 |

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 <code>vth-rg1</code> . |
| Azure Storage Account | <p>A storage account is created inside the resource group, if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | <code>vthunderstorage</code> |
| Virtual Machine (VM) Instance | <p>A virtual machine instance is created for vThunder.</p> <p>Product: A10 vThunder</p> | <code>vth-inst1</code> |

| Resource Name | Description | Default Value |
|------------------------------|--|---|
| | <p>Operating system: Linux</p> <p>Default Size: Standard_DS2v2 (4 vCPUs, 16 GiB Memory)</p> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p>Table 5 lists the supported VM sizes.</p> | |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance. | vth-vnet Address prefix for virtual network: 10.0.0.0/16 |
| Subnet | Two subnets are created with an address prefix each. | Subnet1: 10.0.1.0/24 Subnet2: 10.0.2.0/24 |
| Network Interface Card [NIC] | Two types of interfaces are created for each vThunder instance: <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1] | vth-inst1-mgmt-nic1 10.0.1.47 vth-inst1-data-nic2 10.0.2.47 [Primary IP] |
| Network Security Group | A security group is created for all the associated default interfaces. | vth-nsgr |

| Resource Name | Description | Default Value |
|---------------|-------------|---------------|
| [NSG] | | |

Supported VM Sizes

Table 5 : Supported VM sizes

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

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

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

For more information on Windows and Linux VM sizes, see

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

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

Create vThunder Instance

The following topics are covered:

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

Initial Setup

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

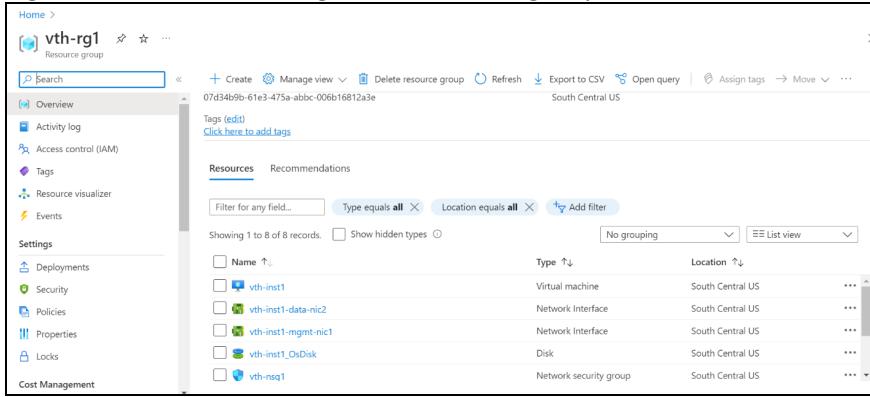
```
PS C:\Users\TestUser\Templates> az deployment group create -g  
<resource_group_name> --template-file <template_name> --parameters  
<param_template_name>
```

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 23 : Resource listing in the resource group



The screenshot shows the Azure portal interface for the resource group 'vth-rg1'. The left sidebar includes links for Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Deployments, Security, Policies, Properties, Locks, and Cost Management. The main area displays a table of resources with the following data:

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

Configure Server and Client Machine

The following topics are covered:

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

Create a Server Machine

To create a Server machine, perform the following steps:

1. From **Home**, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

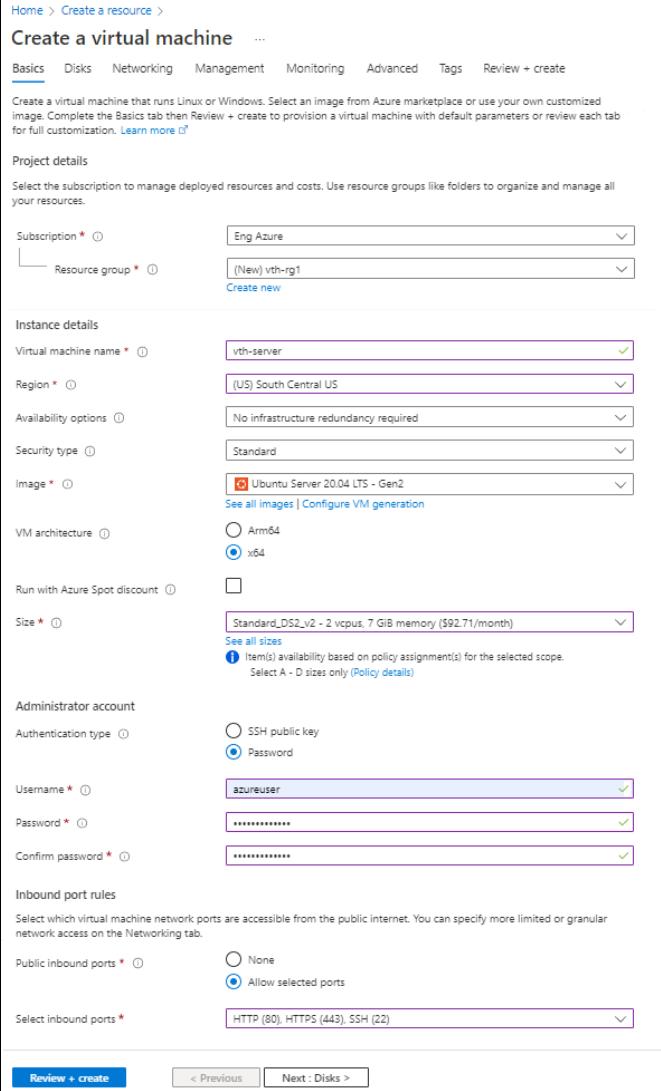
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 24 : Create a virtual machine window - Basics tab



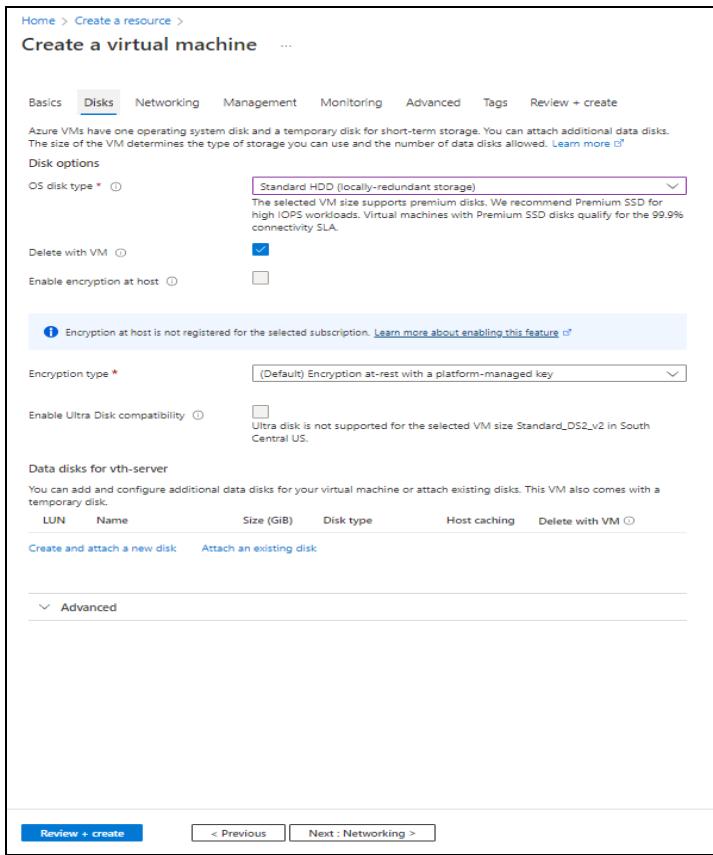
The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields filled in include:

- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- Virtual machine name:** vth-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, the 'Review + create' button is visible.

3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.
4. Select or enter the following mandatory information in the **Disks** tab:
 - Disk options
 - OS disk type
 - Encryption type

Figure 25 : Create a virtual machine window - Disks tab

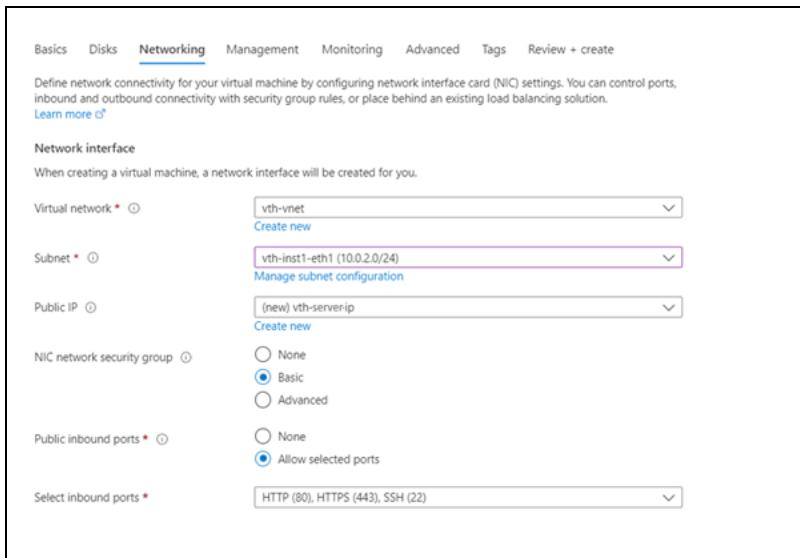


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

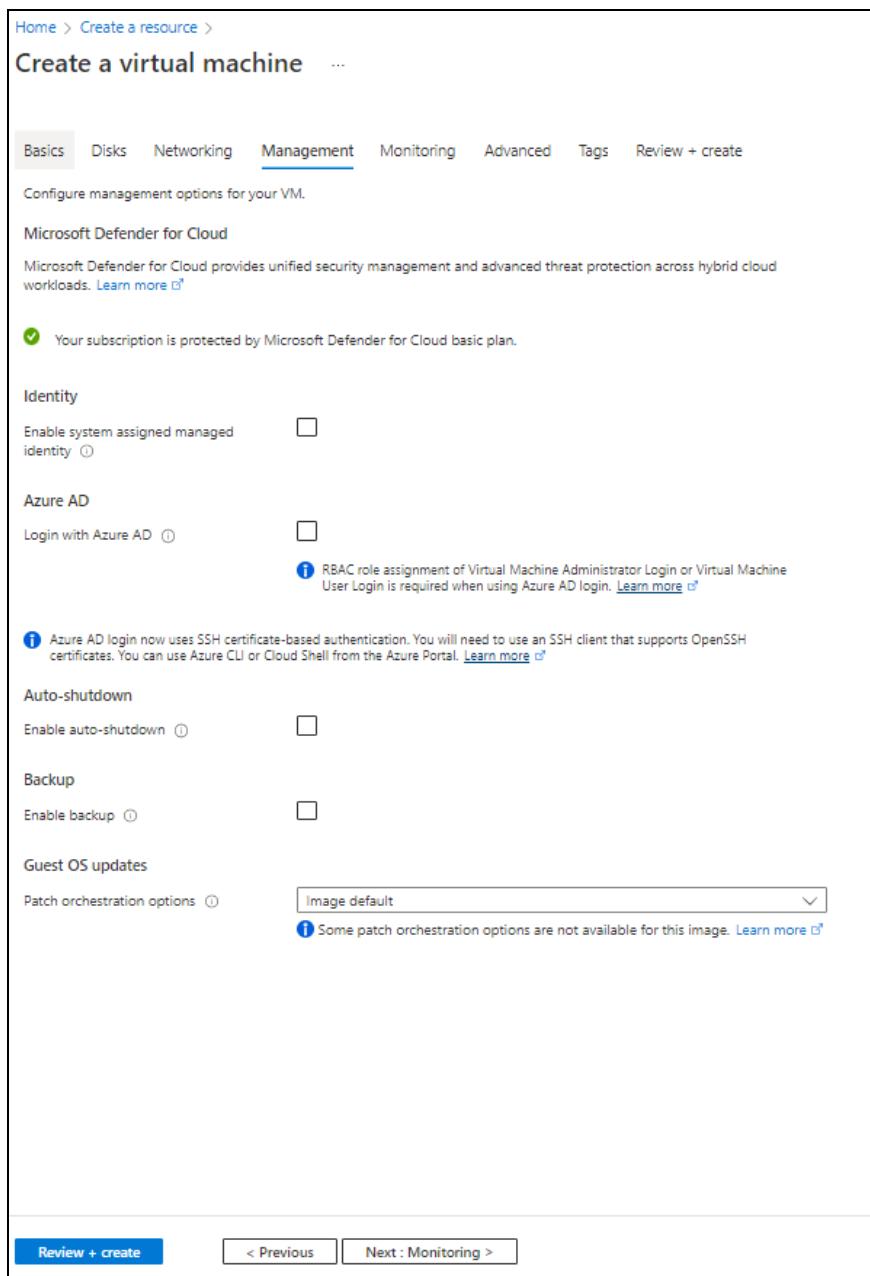
Figure 26 : Create a virtual machine window - Networking tab



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

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

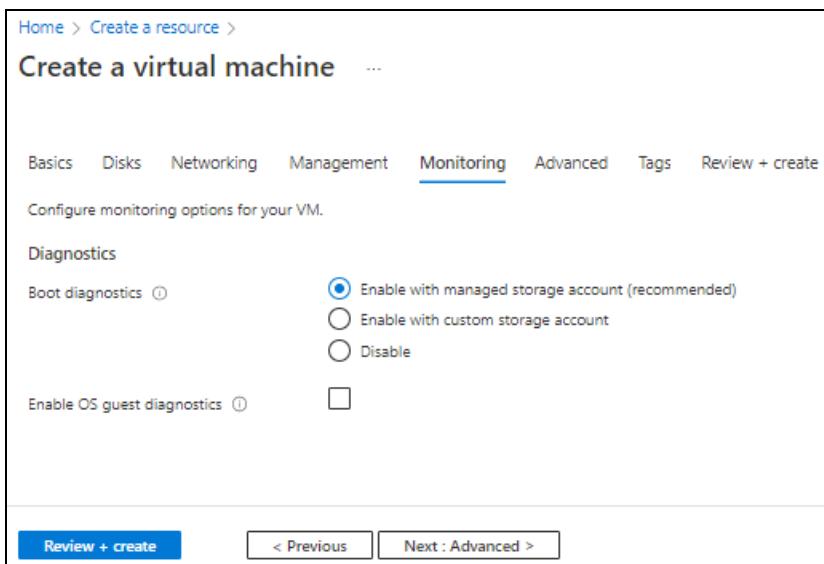
Figure 27 : Create a virtual machine window - Management tab



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

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

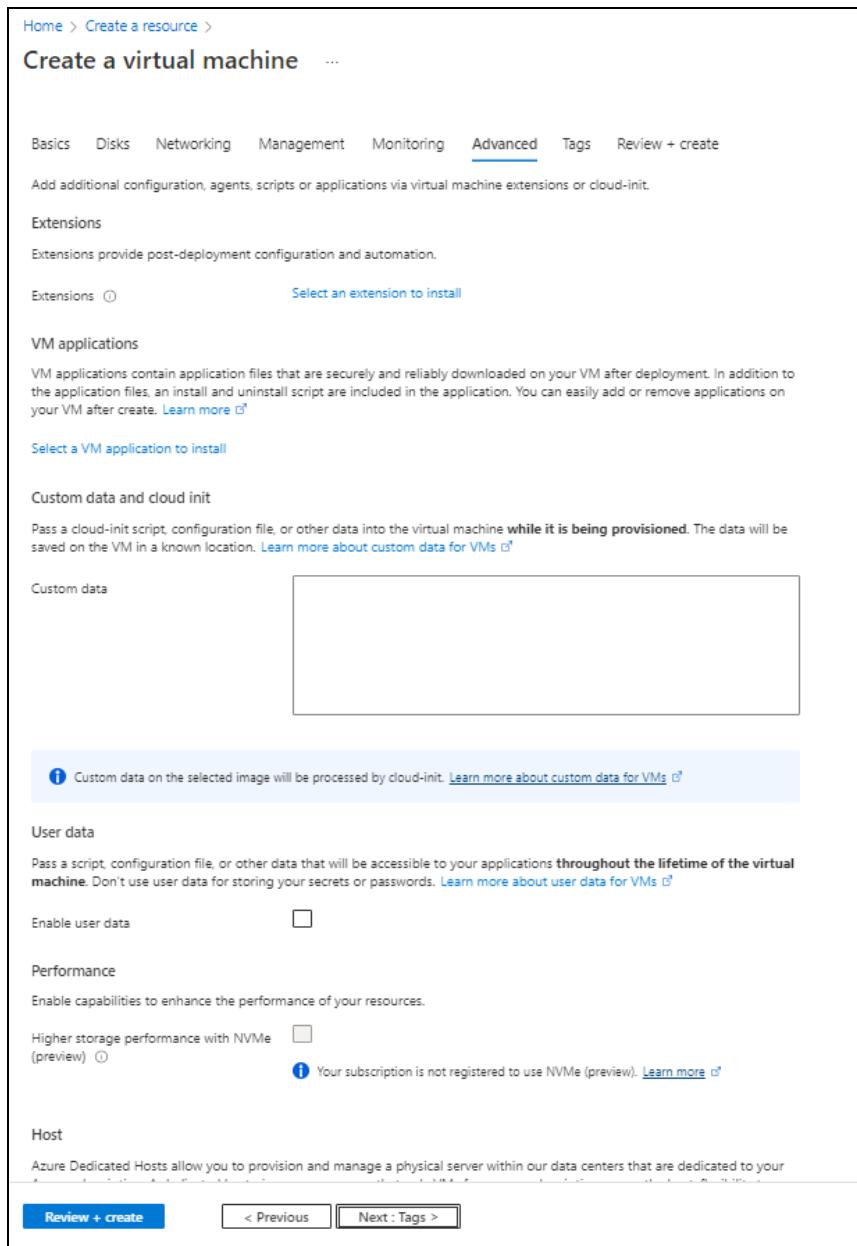
Figure 28 : Create a virtual machine window - Monitoring tab



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

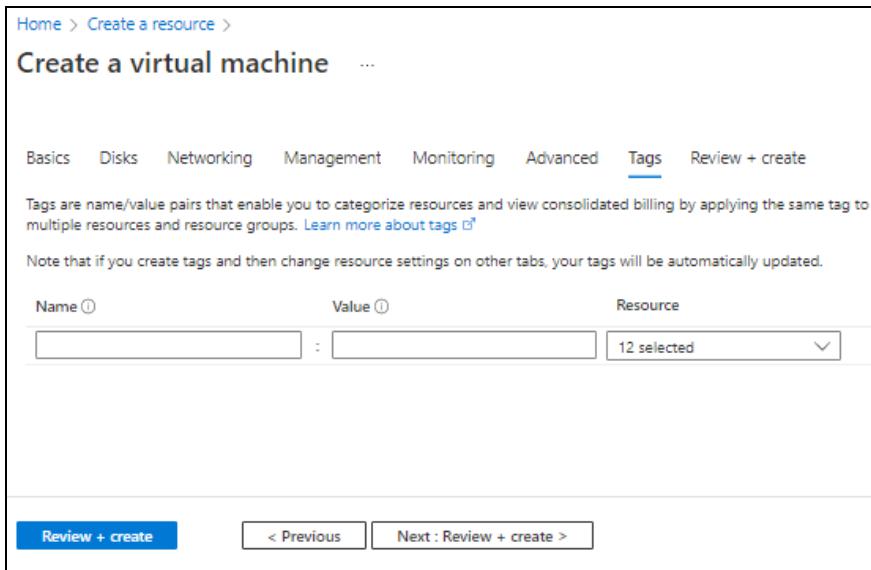
12. Select or enter the additional configuration in the **Advanced** tab as needed.

Figure 29 : Create a virtual machine window - Advanced tab



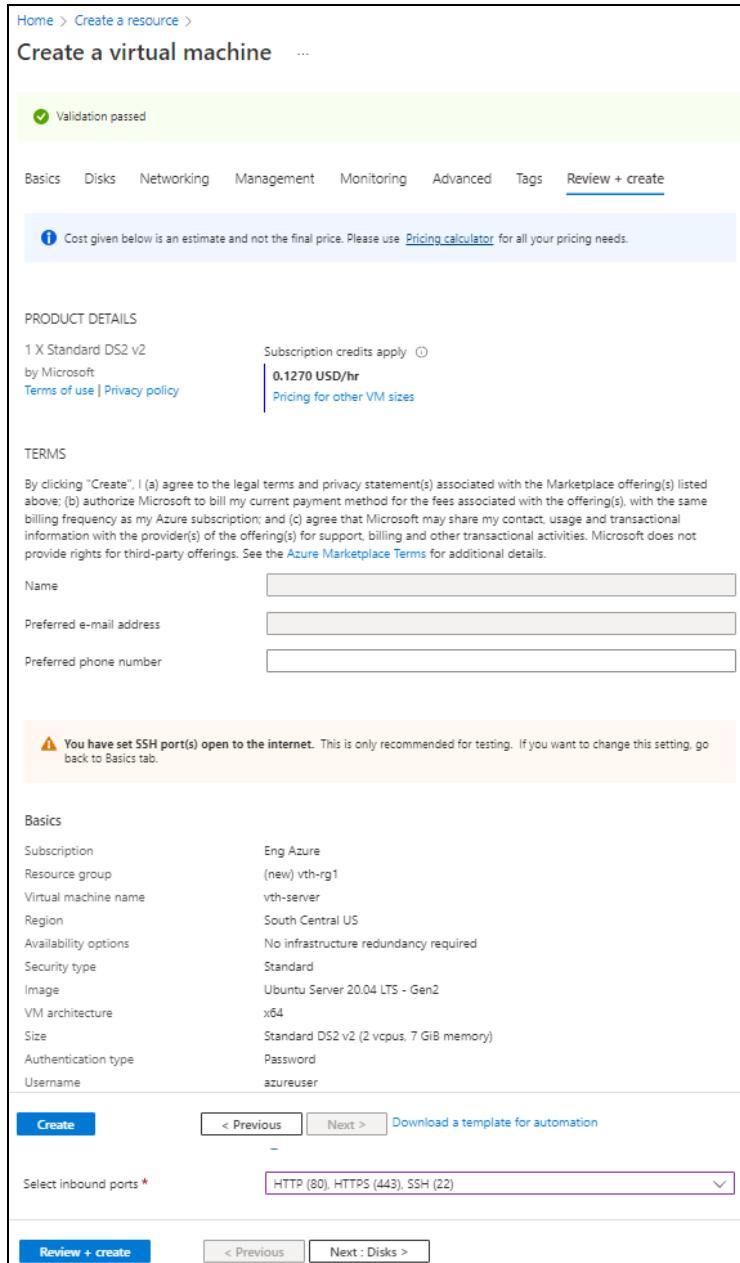
13. Click **Next : Tags** at the bottom of the window.
14. Select or enter the information to categorized resources in the **Tags** tab as needed.

Figure 30 : Create a virtual machine window - Tags tab



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

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



16. Click **Create** at the bottom of the window.
The Server virtual machine gets created and listed in the **Home > Azure Services > Virtual machine** window.
17. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

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

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

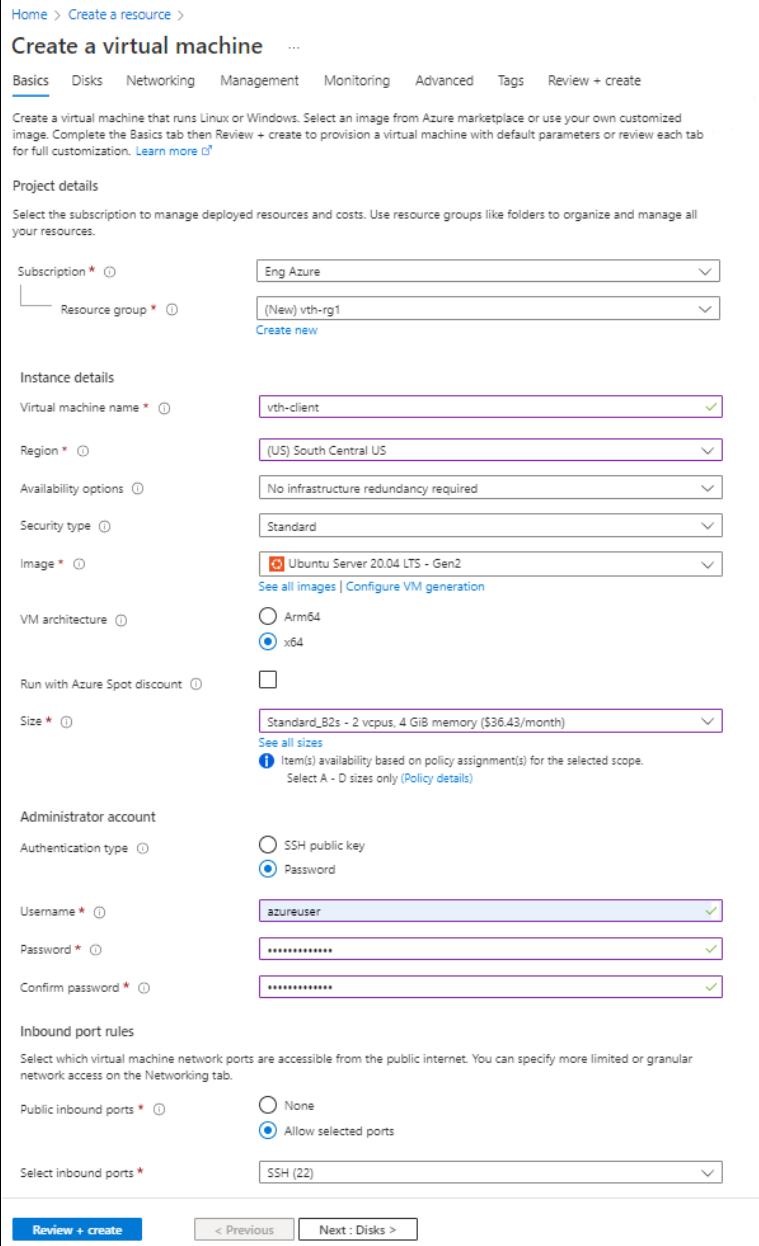
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 32 : Create a virtual machine window - Basics tab



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

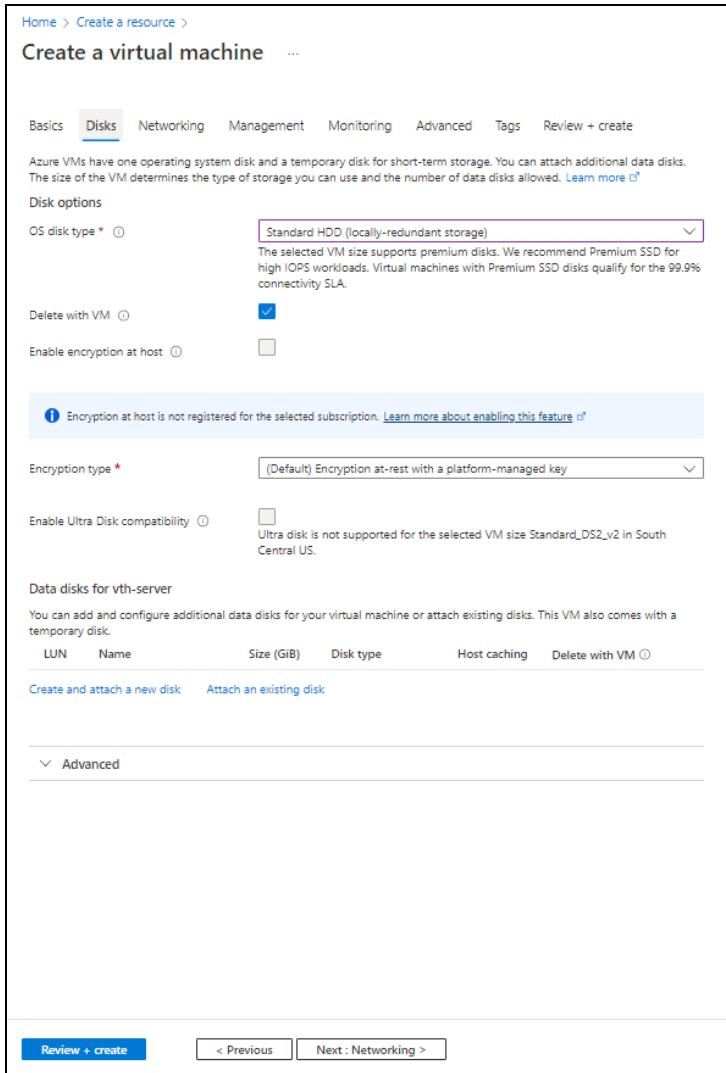
- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- Virtual machine name:** vth-client
- Region:** (US) South Central US
- Availability options:** No infrastructure redundancy required
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Size:**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

At the bottom, there are 'Review + create' and navigation buttons ('< Previous', 'Next : Disks >').

3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.
4. Select or enter the following mandatory information in the **Disks** tab:
Disk options

- OS disk type
- Encryption type

Figure 33 : Create a virtual machine window - Disks tab



The screenshot shows the 'Create a virtual machine' wizard in the 'Disks' tab. At the top, there are tabs for Basics, Disks, Networking, Management, Monitoring, Advanced, Tags, and Review + create. The Disks tab is selected.

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 (Note: 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 |
|-----|------|------------|-----------|--------------|----------------|
| | | | | | unchecked |

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

Advanced: (button to expand)

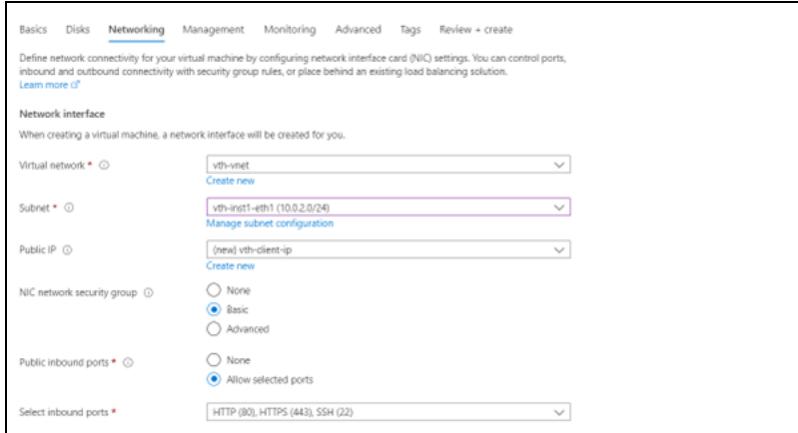
At the bottom are buttons for [Review + create](#), [< Previous](#), and [Next : Networking >](#).

- 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 A10-vThunder_ADC-2NIC-1VM-GLM](#)

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

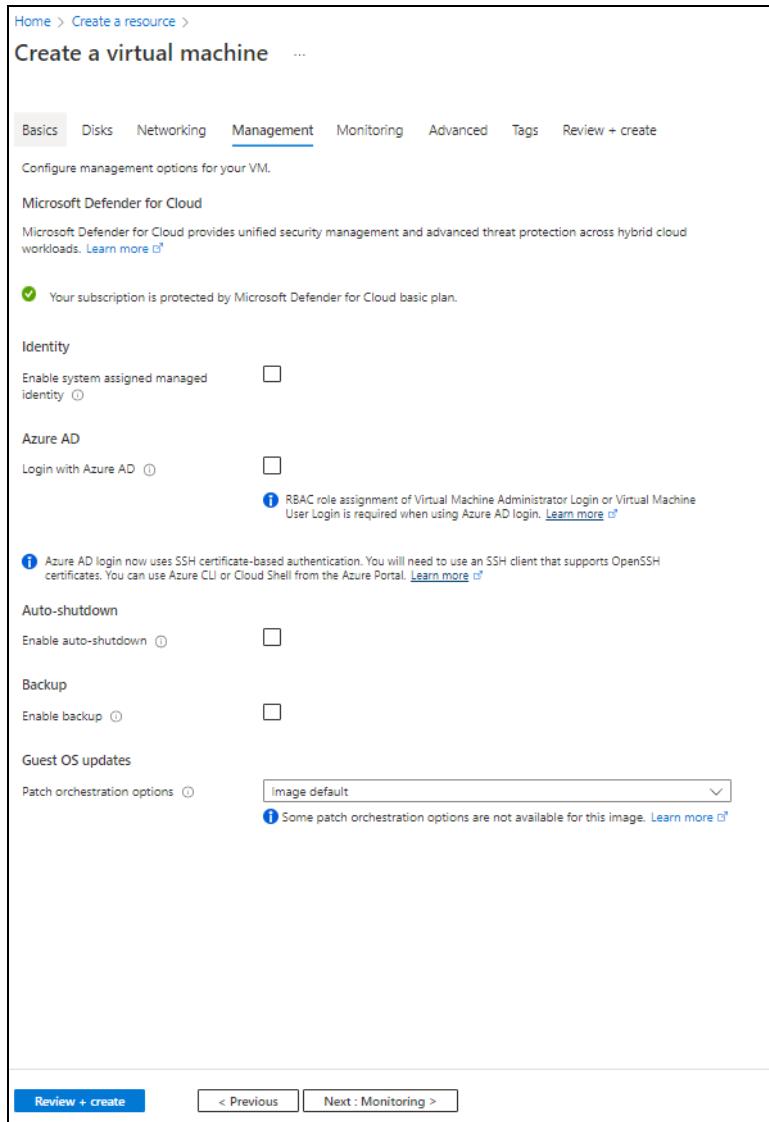
Figure 34 : Create a virtual machine window - Networking tab



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

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

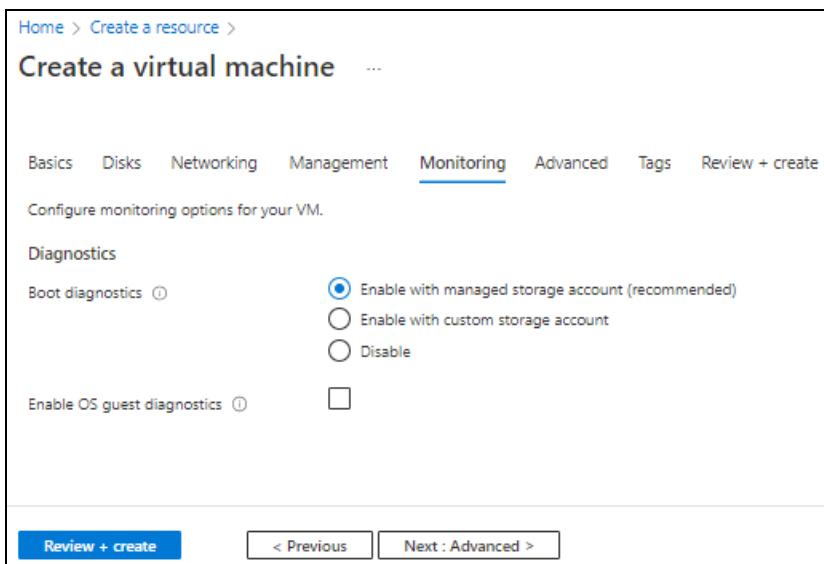
Figure 35 : Create a virtual machine window - Management tab



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

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

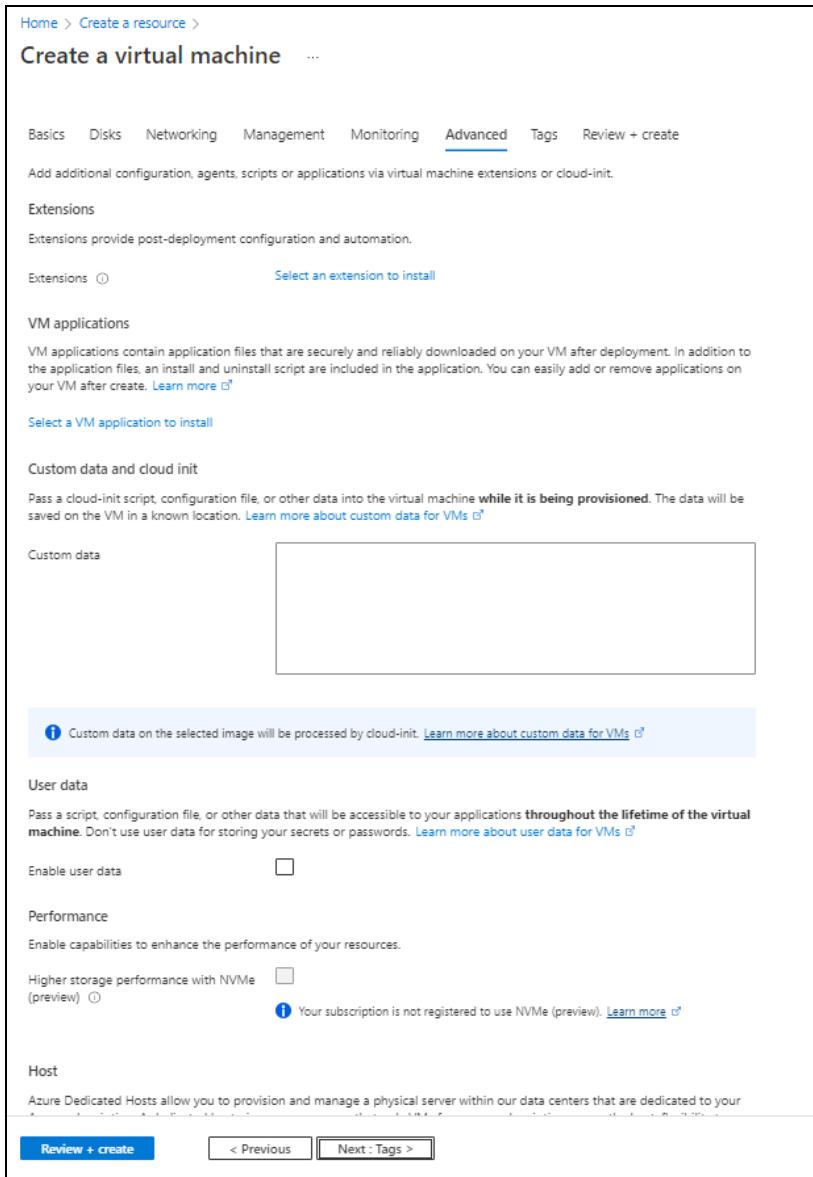
Figure 36 : Create a virtual machine window - Monitoring tab



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

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

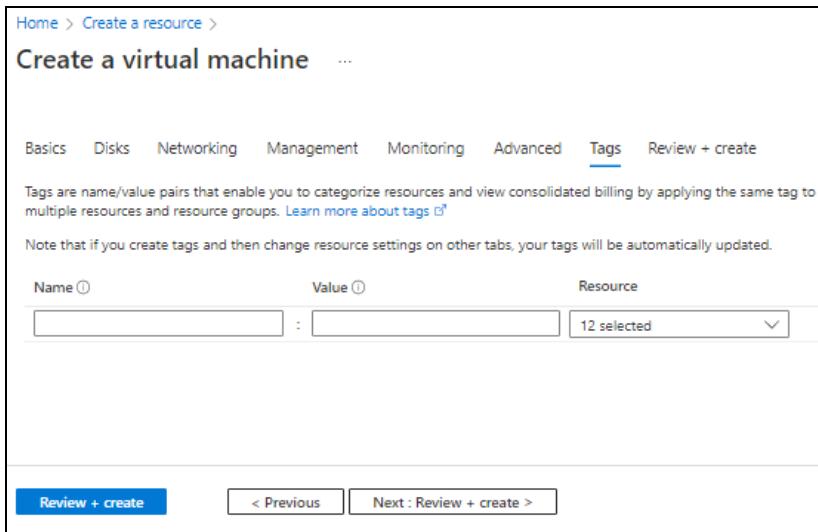
Figure 37 : Create a virtual machine window - Advanced tab



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

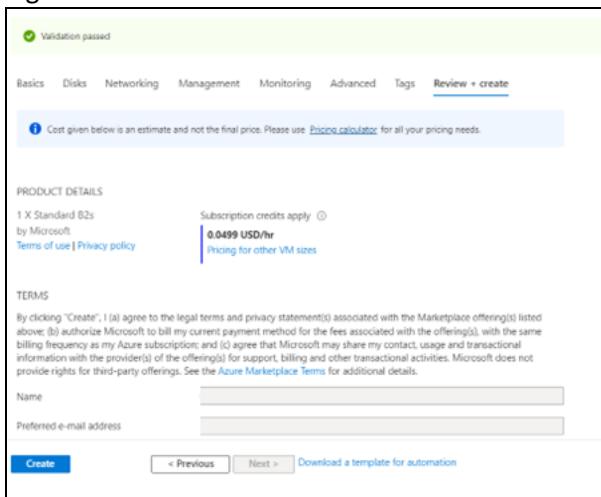
14. Select or enter the information to categorized resources in the **Tags tab as needed.**

Figure 38 : Create a virtual machine window - Tags tab



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

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



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

Configure vThunder as an SLB

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

2. Configure a SLB server host or domain.

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

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

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

3. Configure SLB server ports.

```
"slbServerPortList": {  
    "value": [  
        {
```

```

        "port-number": 53,
        "protocol": "udp"
    },
    {
        "port-number": 80,
        "protocol": "tcp"
    },
    {
        "port-number": 443,
        "protocol": "tcp"
    }
],
},

```

4. Configure service group list ports.

```

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

```

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

5. Configure a virtual server.

The virtual server default name is “vs1”.

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

```
        }  
    ]  
,
```

6. Configure SSL.

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

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

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

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

7. Provide the resource group name.

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

NOTE: Do not change the vThunder instance username.

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

Change Password

To change the password, perform the following steps:

1. Run the following command to change password:

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

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

2. Provide the default and new password when prompted:

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

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

Deploy vThunder as an SLB

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

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

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

Example:

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

A message is prompted to upload the SSL certificate.

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

```
SLB Server Host IP: 10.0.2.8
Virtual Server Name: vs1
Resource Group Name: vth-rg1
Instance Public IP: 20.165.38.180
configured ethernet 1 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
```

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

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

Configure vThunder GLM

The following topics are covered:

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

Initial Setup

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

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

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

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

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

Apply GLM License

To apply GLM license, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_2NIC_1VM_GLM_CONFIG_4.ps1
```
3. If the GLM license is applied successfully, a message is displayed.

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

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

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

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

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

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

System is ready now.

[type ? for help]

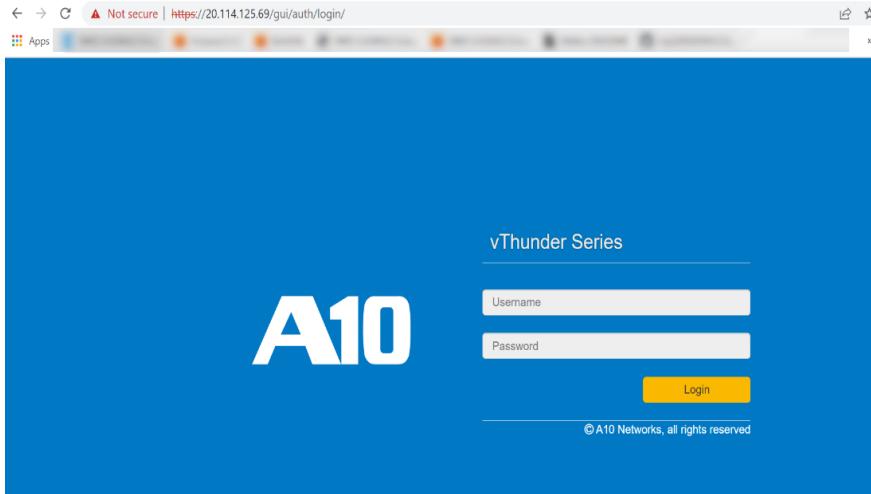
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

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

Figure 40 : vThunder GUI



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

Verify Deployment

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

1. Run the following command on vThunder:

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

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

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

```

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

```

2. Run the following command on vThunder:

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

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

| | | |
|------------------|------------------|--|
| Host ID | : | 5DCB01EC264BECCCFECB3C2ED42E02384EE8C527 |
| USB ID | : | Not Available |
| Billing Serials: | A10f771cecbe0000 | |
| Token | : | A10f771cecbe |
| Product | : | ADC |
| Platform | : | vThunder |

| | | |
|------------------------------------|-------------|--|
| Burst | : Disabled | |
| GLM Ping Interval In Hours | : 24 | |
| <hr/> | | |
| Enabled Licenses | Expiry Date | |
| <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] | | | |

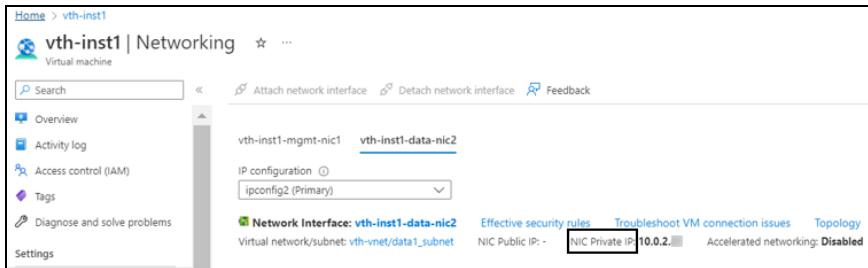
Verify Traffic Flow

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

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

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

Figure 41 : vThunder instance Data Subnet Private IP



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

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

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

```
curl <vThunder_instance_data_private_IPv4_Address>
```

Example

```
curl 10.0.2.47
```

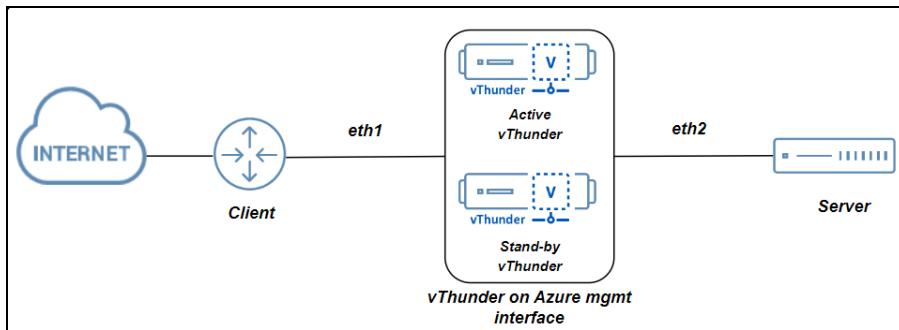
Verify if a response is received.

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

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

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

Figure 42 : 3NIC-2VM-HA Topology



The following topics are covered:

| | |
|---|-----|
| System Requirements | 93 |
| Create vThunder Instances | 97 |
| Configure Server and Client Machine | 103 |
| Configure vThunder as an SLB | 121 |
| Access vThunder using CLI or GUI | 130 |
| Verify Deployment | 132 |
| Verify Traffic Flow | 134 |

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

| Resource Name | Description | Default Value | |
|------------------------------|---|---|---|
| | <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 7 lists the supported VM sizes.</p> | | |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance. | vth-vnet Address prefix for virtual network: 10.0.0.0/16 | |
| Subnet | Three subnets are created with an address prefix each. | Subnet1: 10.0.1.0/24 Subnet2: 10.0.2.0/24 Subnet3: 10.0.3.0/24 | |
| Network Interface Card [NIC] | <p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1, Ethernet 2] <hr/> <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> <hr/> | vth-inst1-mgmt-nic1 <hr/> vth-inst1-data-nic2 <hr/> <hr/> vth-inst1-data-nic3 <hr/> | 10.0.1.35 <hr/> 10.0.2.35 [Primary IP] <hr/> 10.0.2.X [Secondary IP] <hr/> 10.0.3.35 [Primary IP] <hr/> 10.0.3.X [Secondary IP] |

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

Supported VM Sizes

Table 7 : Supported VM sizes

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

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

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

For more information on Windows and Linux VM sizes, see

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

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

Create vThunder Instances

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

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

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

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

3. Configure a storage account name.

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

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

4. Configure a virtual network.

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

5. Configure DNS label prefixes.

```

    "dnsLabelPrefix_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 43 : Resource listing in the resource group

| Name | Type | Resource group | Location |
|---|------------------------|----------------|------------------|
| vth-inst1 | Virtual machine | vth-rg1 | South Central US |
| vth-inst1-data-nic2 | Network Interface | vth-rg1 | South Central US |
| vth-inst1-data-nic3 | Network Interface | vth-rg1 | South Central US |
| vth-inst1-mgmt-nic1 | Network Interface | vth-rg1 | South Central US |
| vth-inst1-nsg | Network security group | vth-rg1 | South Central US |
| vth-inst1_OsDisk_1_f48f71dbca44808b0ce946c42725bf | 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_3516bf85f2cc44738afcfb90acdeca2f | Disk | VTH-RG1 | South Central US |
| vth-net | Virtual network | vth-rg1 | South Central US |
| vThunderP2013698007 | Public IP address | vth-rg1 | South Central US |
| vThunderP388625422 | Public IP address | vth-rg1 | South Central US |
| vthunstorage | Storage account | vth-rg1 | South Central US |

Configure Server and Client Machine

The following topics are covered:

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

Create a Server Machine

To create a Server machine, perform the following steps:

1. From **Home**, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

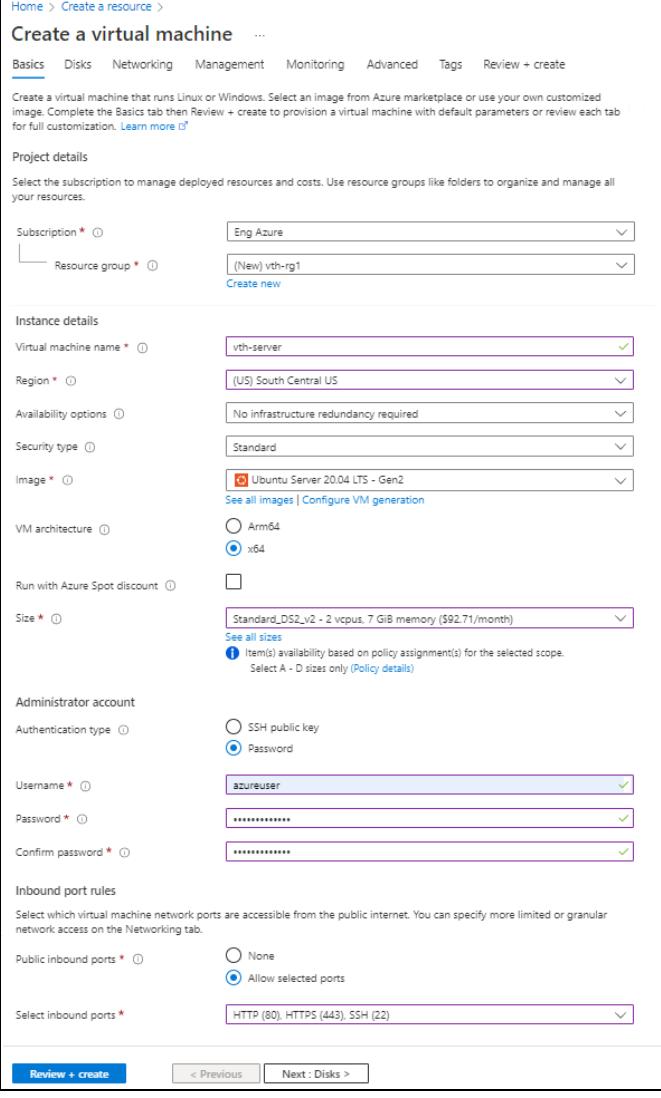
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 44 : Create a virtual machine window - Basics tab



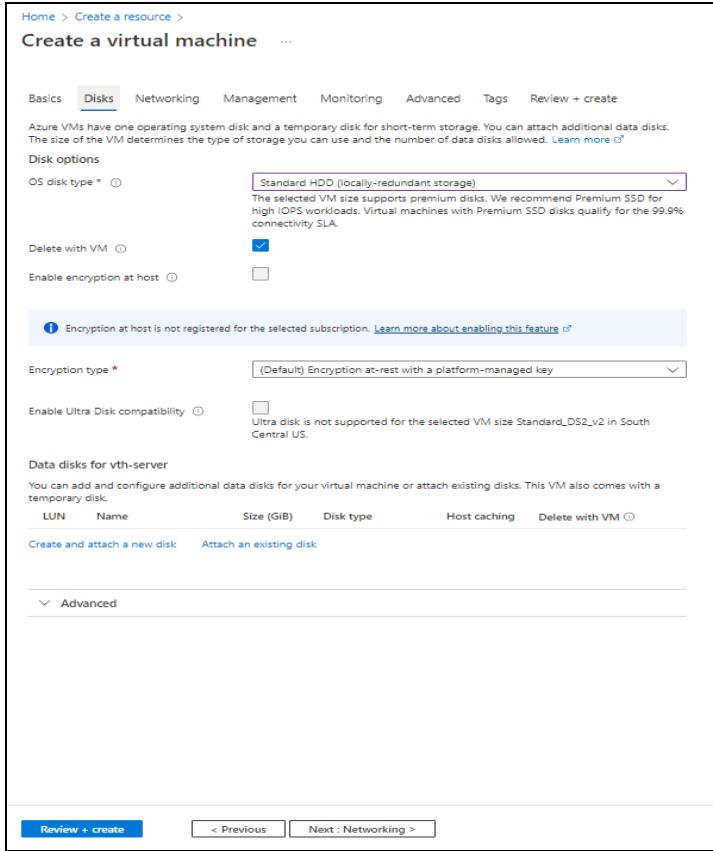
The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields filled in include:

- Subscription:** Eng Azure
- Resource group:** (New) vth-rg1
- Virtual machine name:** vth-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, the 'Review + create' button is visible.

3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.
4. Select or enter the following mandatory information in the **Disks** tab:
 - Disk options
 - OS disk type
 - Encryption type

Figure 45 : Create a virtual machine window - Disks tab

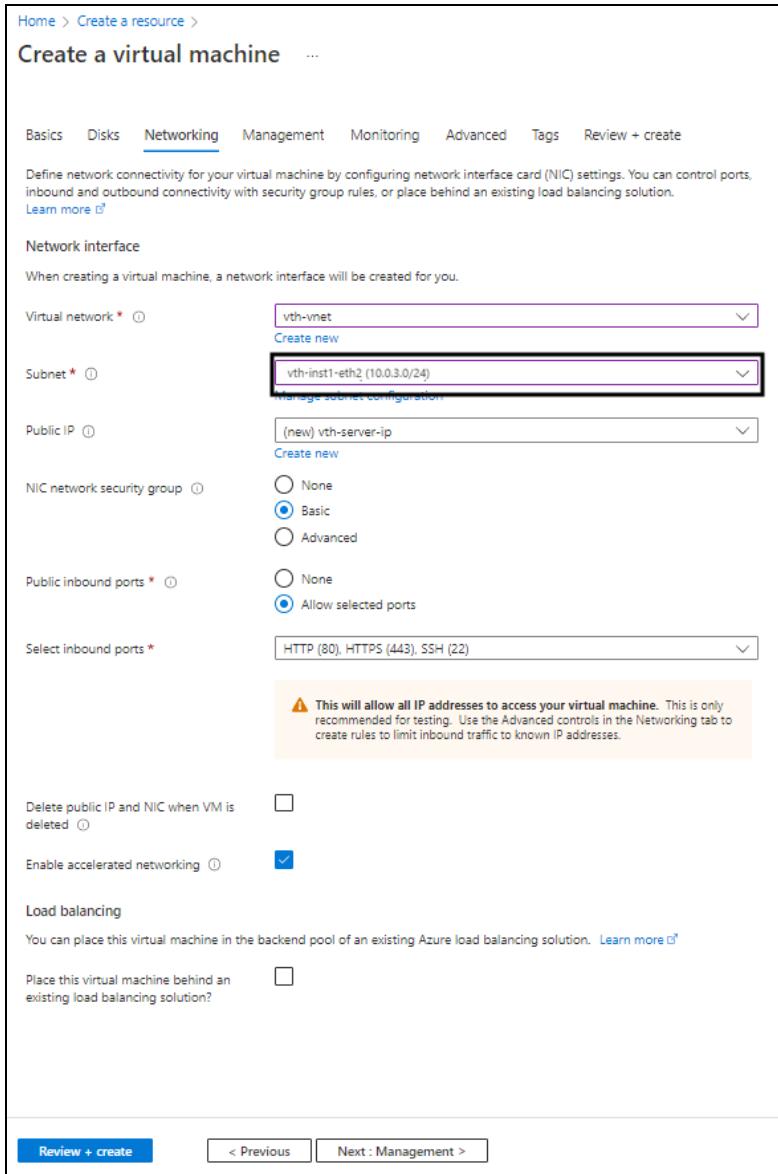


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

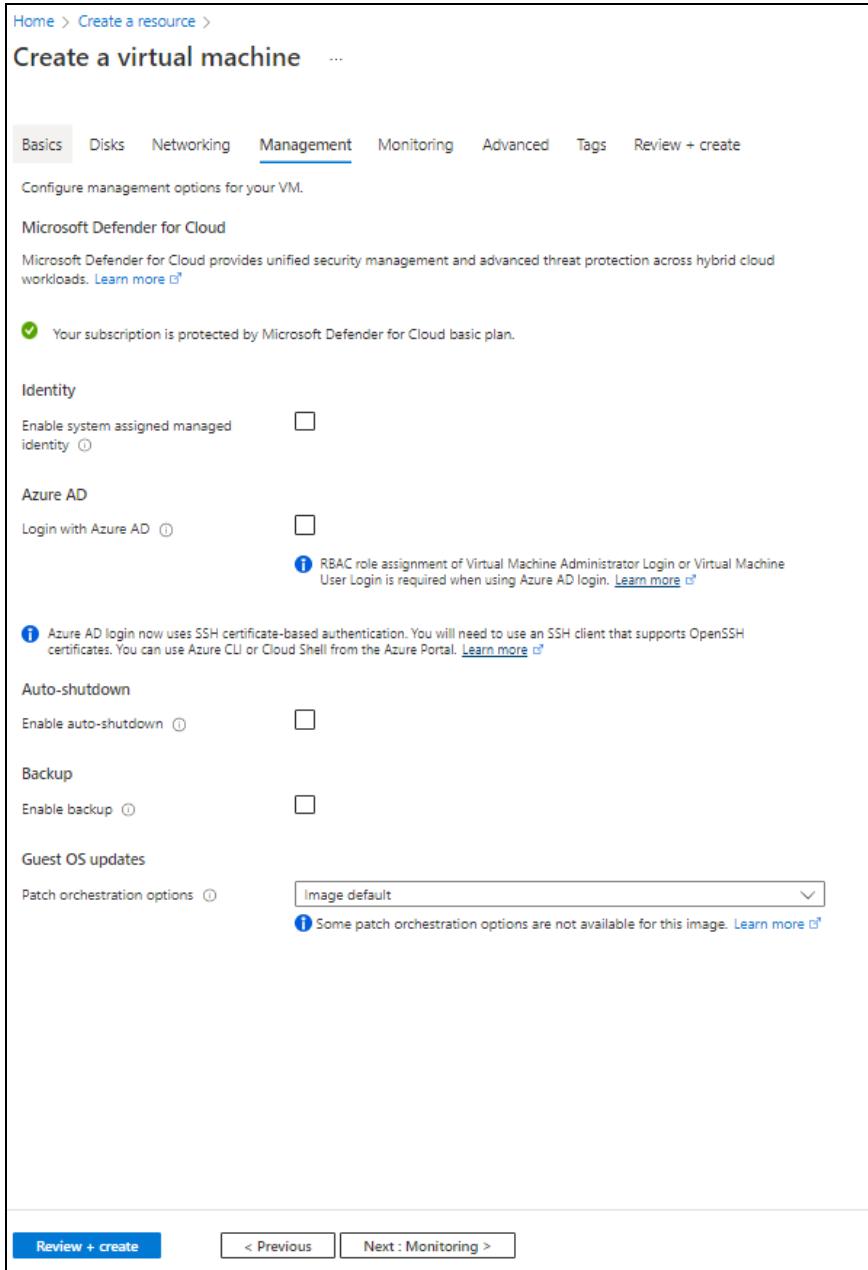
Figure 46 : Create a virtual machine window - Networking tab



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

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

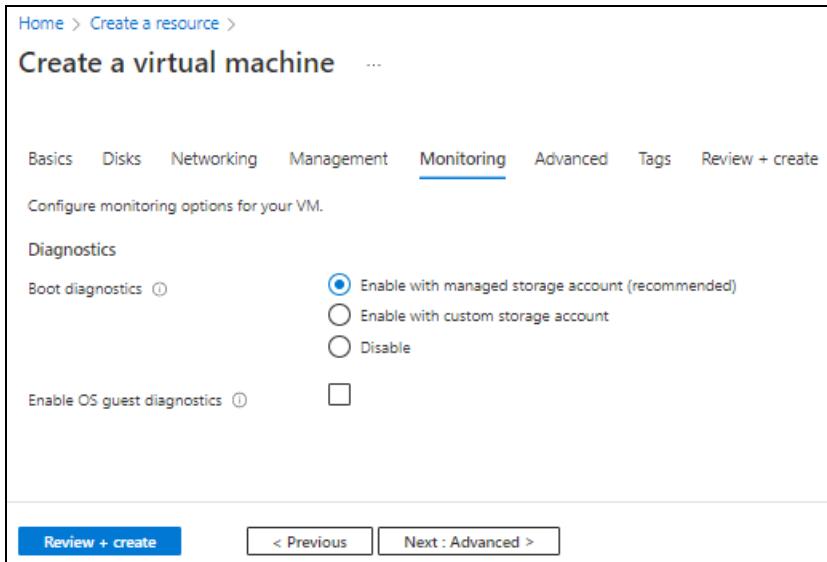
Figure 47 : Create a virtual machine window - Management tab



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

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

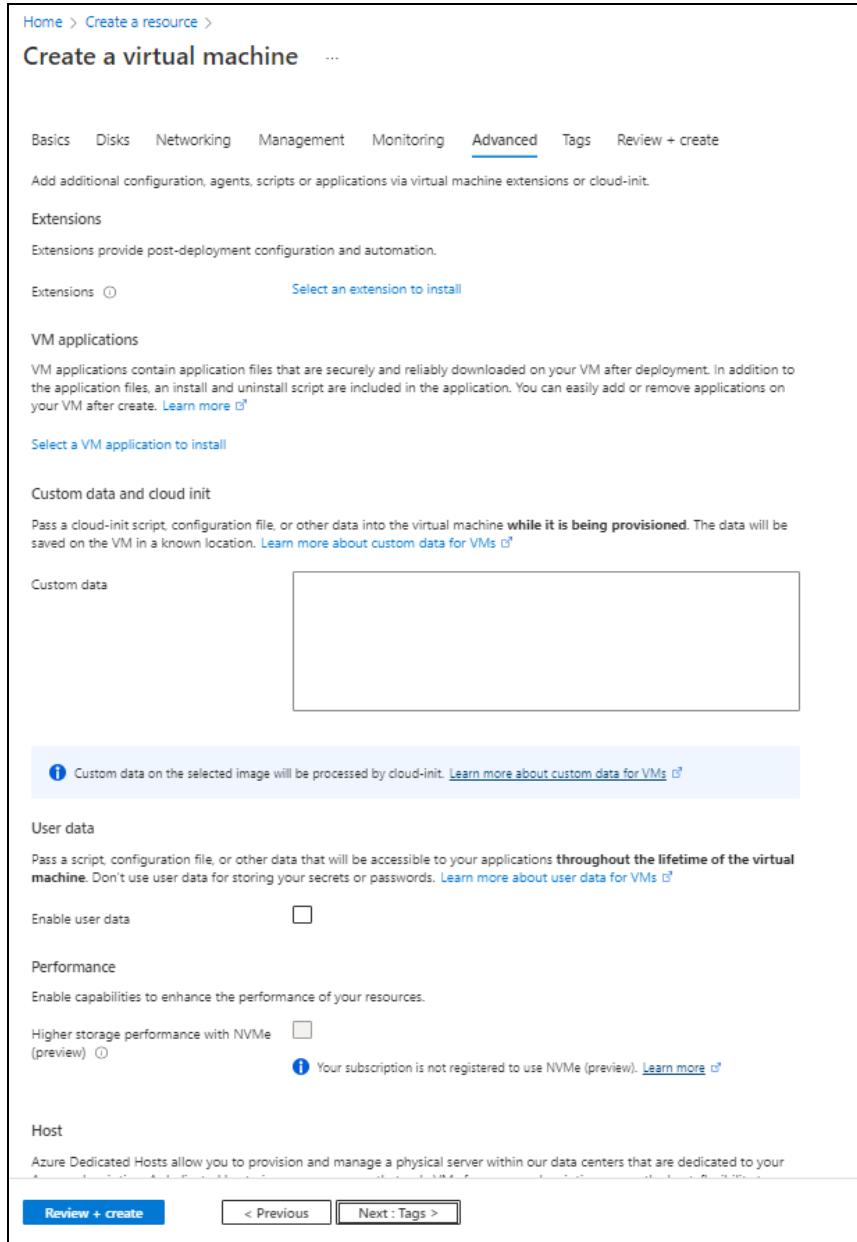
Figure 48 : Create a virtual machine window - Monitoring tab



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

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

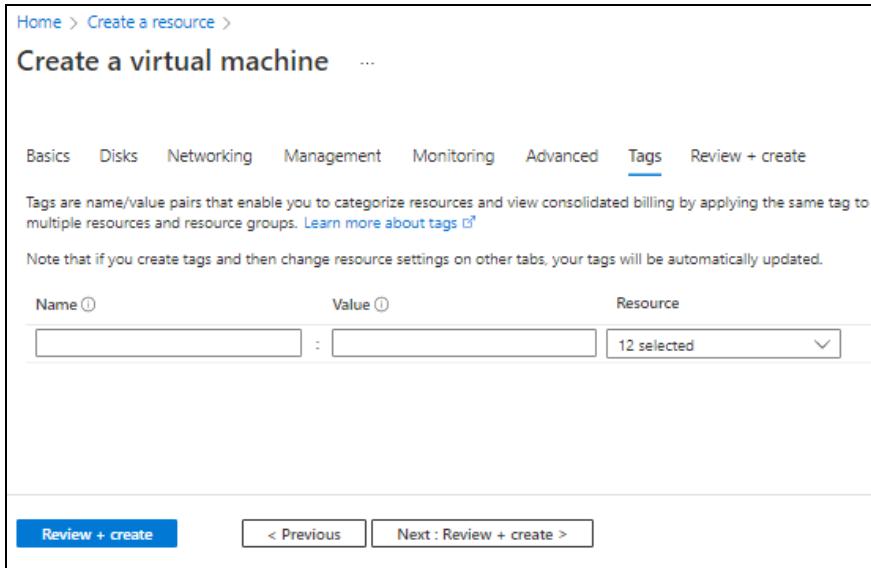
Figure 49 : Create a virtual machine window - Advanced tab



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

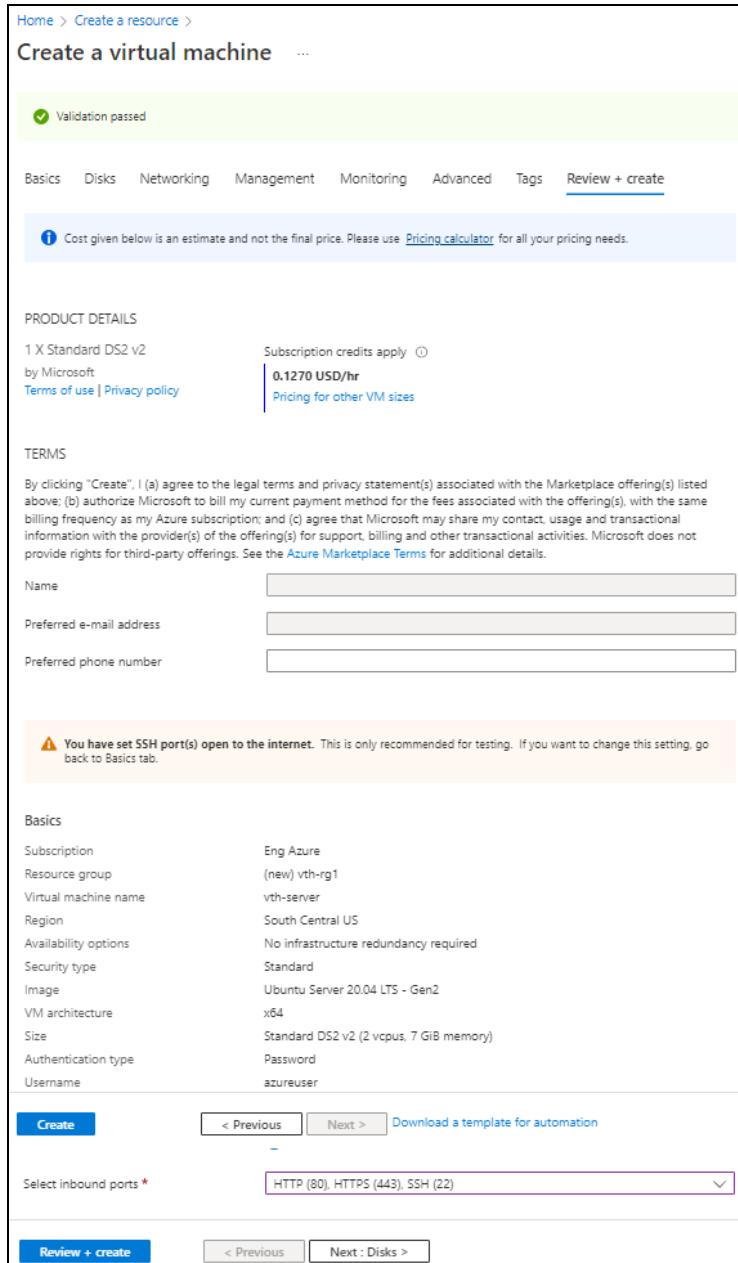
14. Select or enter the information to categorized resources in the **Tags tab as needed.**

Figure 50 : Create a virtual machine window - Tags tab



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

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



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

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

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

```
sudo apt install apache2
```

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

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

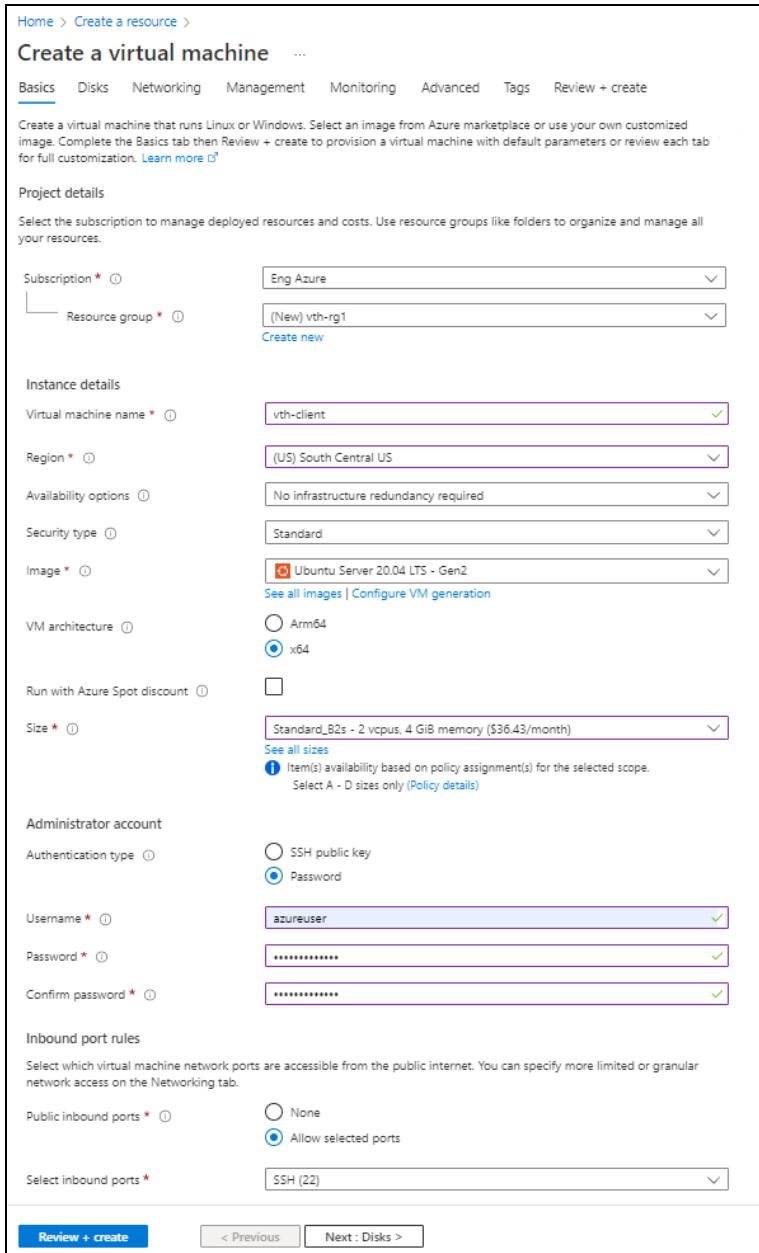
Administrator account

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

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 52 : 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:

- Subscription: Eng Azure
- Resource group: (New) vth-rg1

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
- VM architecture: x64 (selected)
- Run with Azure Spot discount: Unchecked
- Size: Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)

Administrator account:

- Authentication type: Password (selected)
- Username: azureuser
- Password: (redacted)
- Confirm password: (redacted)

Inbound port rules:

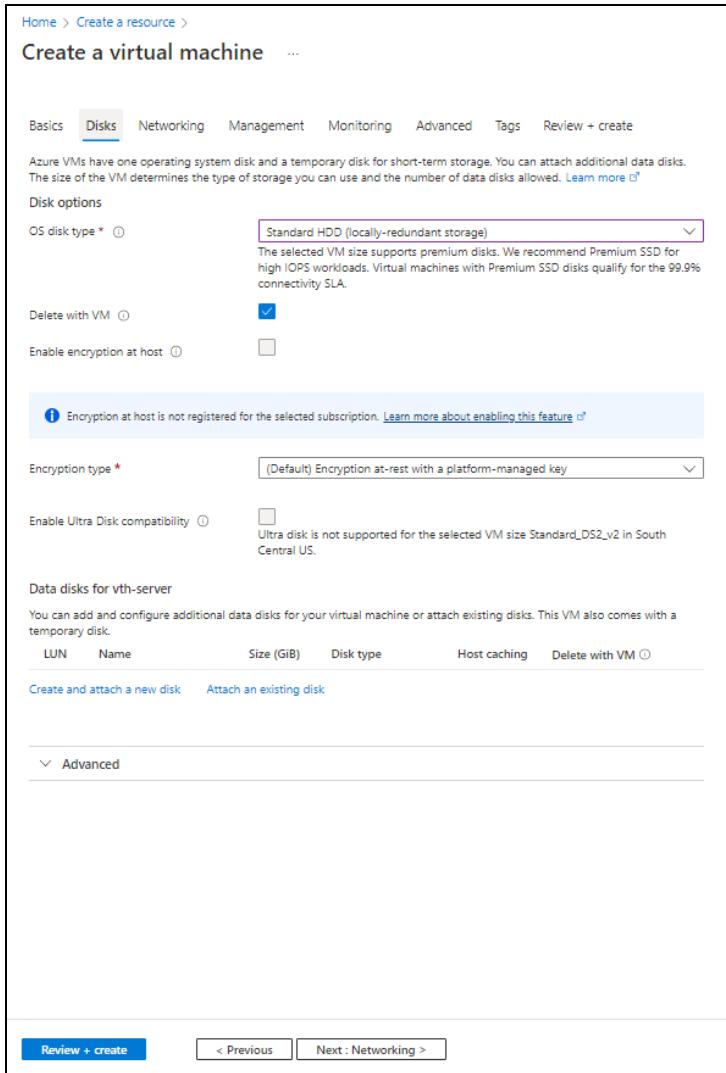
- Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.
- Public inbound ports: Allow selected ports (selected)
- Select inbound ports: SSH (22)

At the bottom of the window are buttons for 'Review + create' (highlighted in blue), '< 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 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](#)

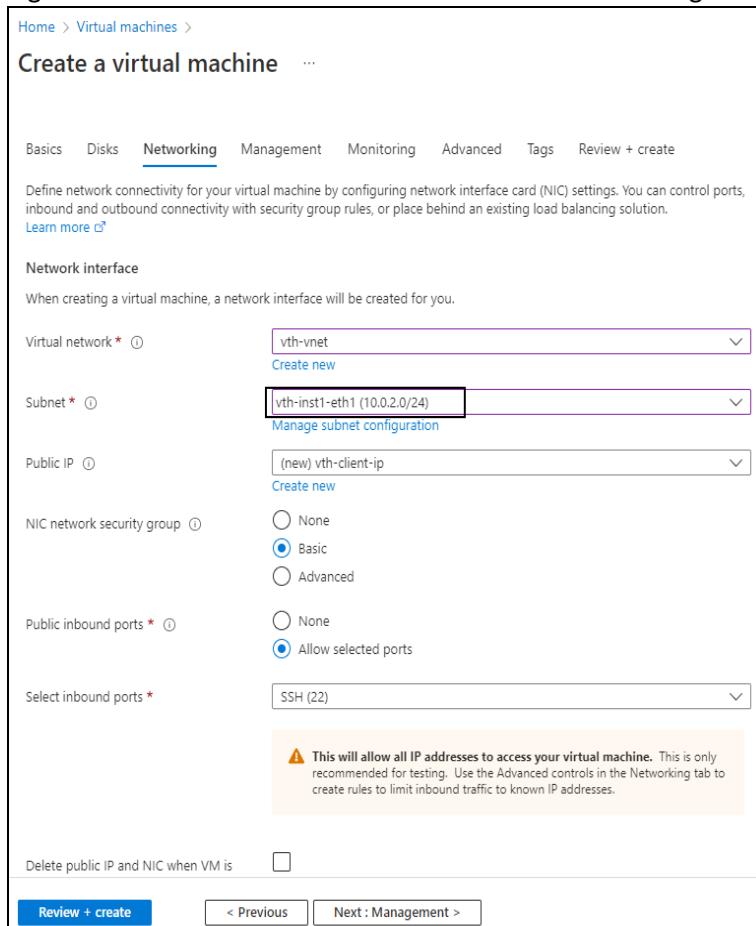
! Advanced

[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

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

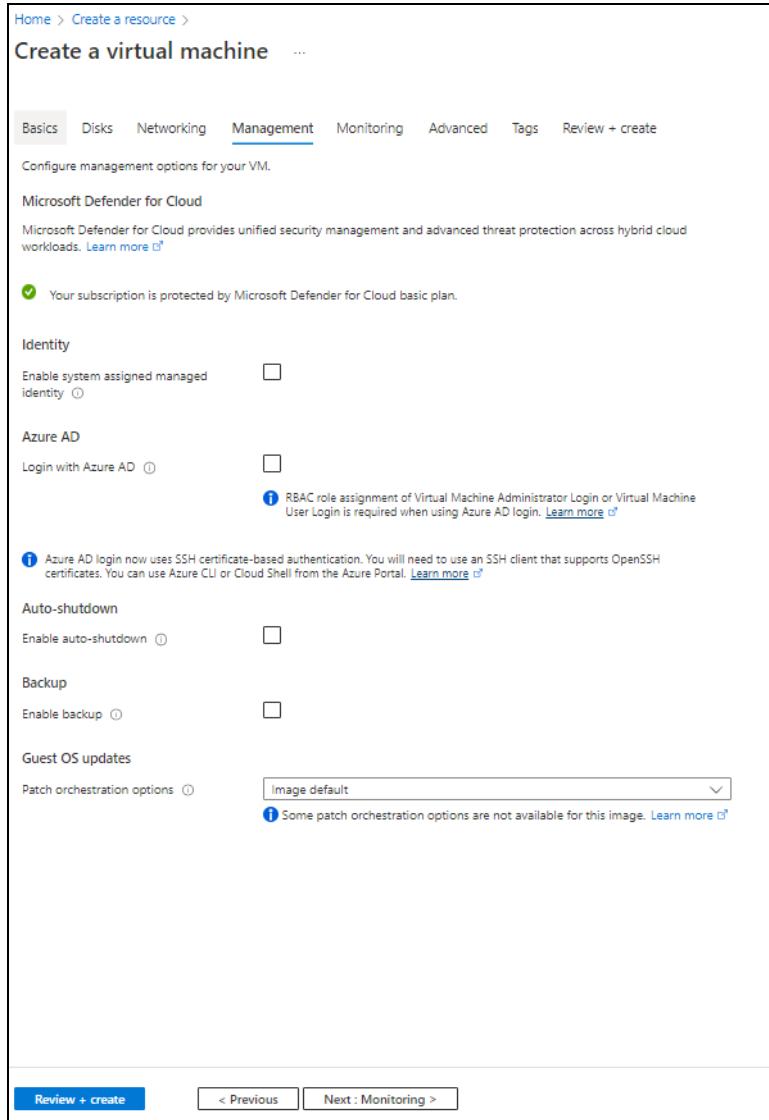
Figure 54 : Create a virtual machine window - Networking tab



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

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

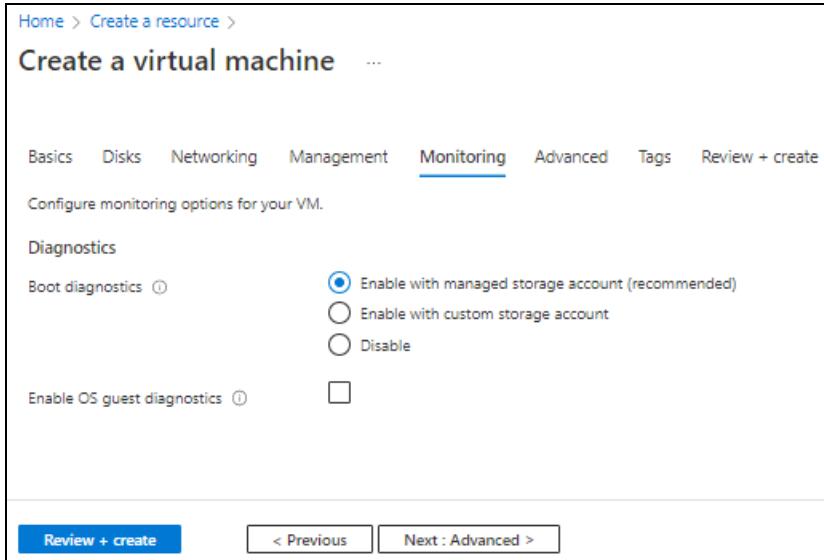
Figure 55 : Create a virtual machine window - Management tab



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

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

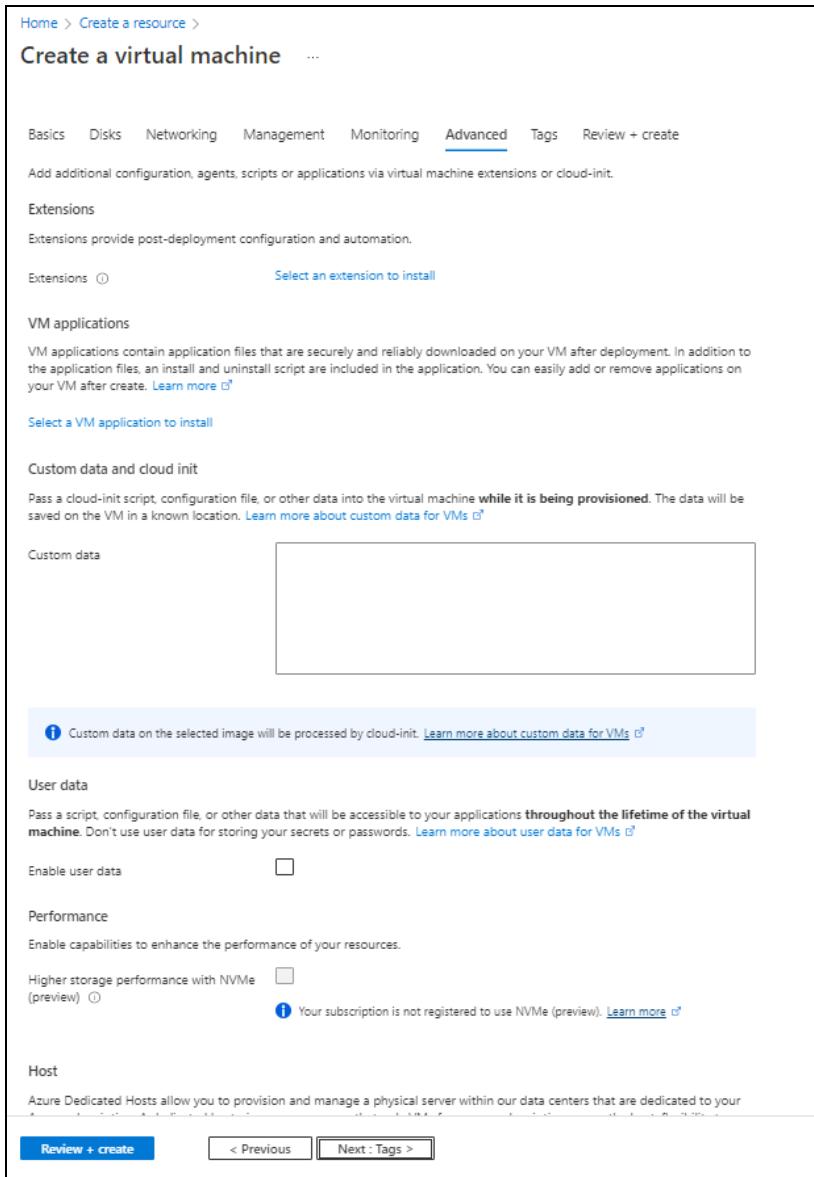
Figure 56 : Create a virtual machine window - Monitoring tab



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

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

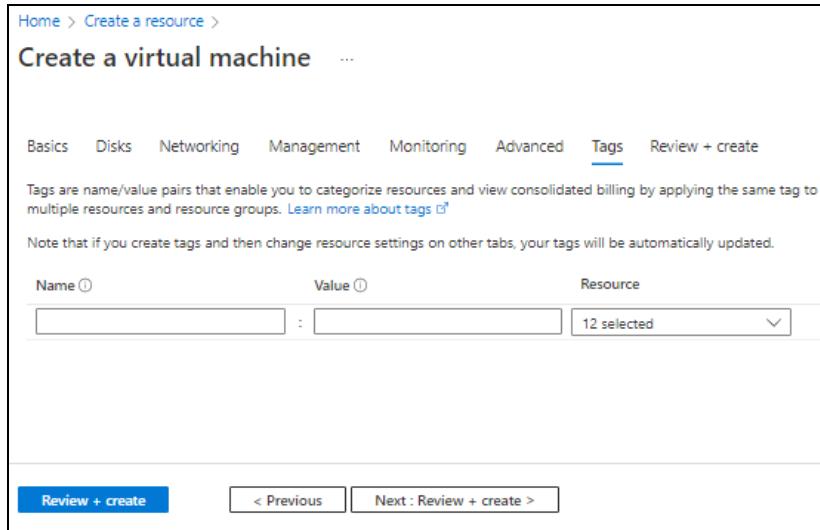
Figure 57 : Create a virtual machine window - Advanced tab



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

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

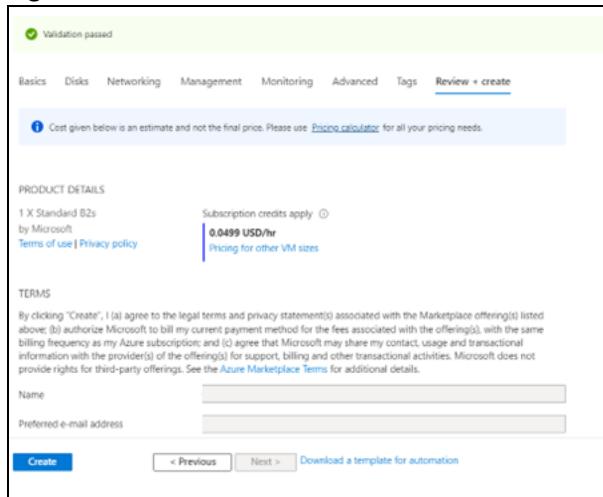
Figure 58 : Create a virtual machine window - Tags tab



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

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

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



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

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

Configure vThunder as an SLB

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

2. Configure a SLB server host or domain.

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

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

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

3. Configure SLB server ports.

```
"slbServerPortList": {
    "value": [
```

```
{
    "port-number": 53,
    "protocol": "udp",
    "health-check-disable":1
},
{
    "port-number": 80,
    "protocol": "tcp",
    "health-check-disable":1
},
{
    "port-number": 443,
    "protocol": "tcp",
    "health-check-disable":1
}
],
},
}
```

4. Configure service group list ports.

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

```

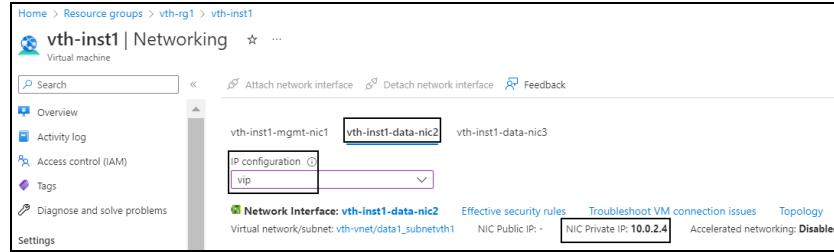
```
        "name":"s1",
        "port":53
    }
]
},
{
    "name":"sg80",
    "protocol":"tcp",
    "health-check-disable":1
    "member-list": [
        {
            "name":"s1",
            "port":80
        }
    ]
}
],
```

5. Configure a virtual server.

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

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

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



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

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

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

```

        }
    ],
},

```

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

6. Configure SSL.

```

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

```

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

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

```

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

```

7. Provide the resource group name.

```

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

```

NOTE: Do not change the vThunder instance username.

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

Change Password

To change the password, perform the following steps:

- Run the following command to change password:

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

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

- Provide the default and new password when prompted:

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

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

Deploy vThunder as an SLB

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

- From PowerShell, navigate to the folder where you have downloaded the 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_3.ps1  
-resourceGroup <resource_group_name>
```

Example:

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

A message is prompted to upload the SSL certificate.

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

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

Configure High Availability for vThunder

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

2. Configure DNS.

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

3. Configure a Network Gateway IP.

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

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

4. Set VRRP-A.

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

5. Set a Terminal Idle Timeout.

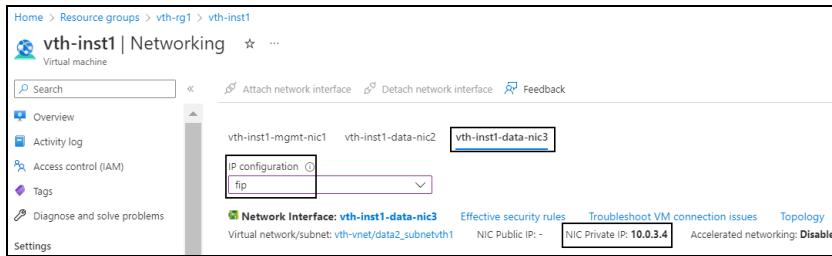
```
"terminal": {
    "idle-timeout": 0
},
```

6. Configure the VRID details.

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

- From the **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- Go to the first virtual machine instance. Here, first virtual machine instance is **vth-inst1**.
- Select **Networking** from the left **Settings** panel.
- Select the Data NIC 3 tab > **IP configuration**. Here, **vth-inst1-data-nic3**.

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



- Select the **NIC Private IP**.

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

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

```

    }
]
```

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

Create High Availability for vThunder

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

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

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

Example:

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

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

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

Access vThunder using CLI

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

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance
Here, Public IP of **vth-inst1**, **vth-inst2**

- Connection Type: SSH
3. Click **Open**.
 4. In the active PuTTY session, login with the recently changed password:

```

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

System is ready now.

[type ? for help]

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

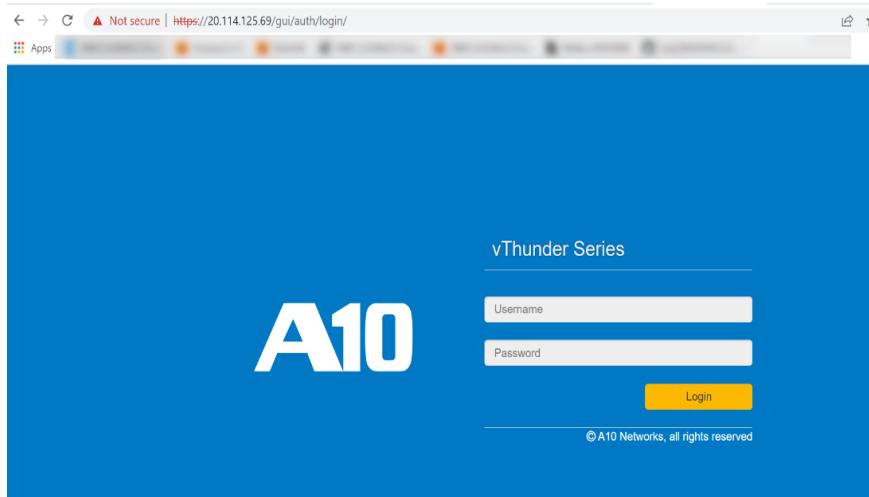
```

Access vThunder using GUI

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

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

Figure 62 : vThunder GUI



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

Verify Deployment

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

1. Run the following command on vThunder:

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

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

```
!Section configuration: 602 bytes
!
slb server s1 10.0.3.7
    port 53 udp
        health-check-disable
    port 80 tcp
        health-check-disable
    port 443 tcp
        health-check-disable
!
slb service-group sg443 tcp
    health-check-disable
    member s1 443
!
slb service-group sg53 udp
    health-check-disable
    member s1 53
!
slb service-group sg80 tcp
    health-check-disable
    member s1 80
!
slb virtual-server vip 10.0.2.4
    port 53 udp
```

```

    ha-conn-mirror
    source-nat auto
    service-group sg53
    port 80 http
        source-nat auto
        service-group sg80
    port 443 https
        source-nat auto
        service-group sg443
!

```

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

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

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

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

- Run the following command on vThunder to verify HA:

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

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

```

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

!
vrrp-a common
  device-id 1
  set-id 1
  enable
!
terminal idle-timeout 0
!
```

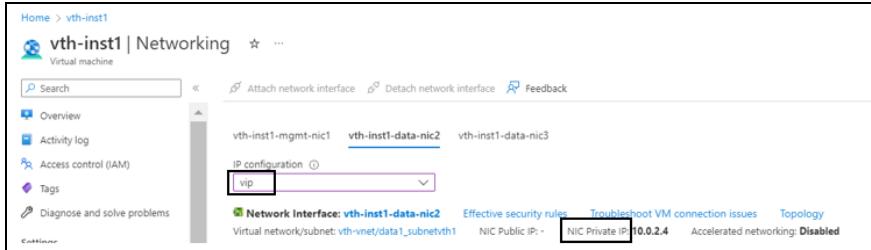
```
ip dns primary 8.8.8.8
!
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.1.1
!
```

Verify Traffic Flow

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

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

Figure 63 : Active vThunder instance 1 VIP



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

```
curl <VIP>
```

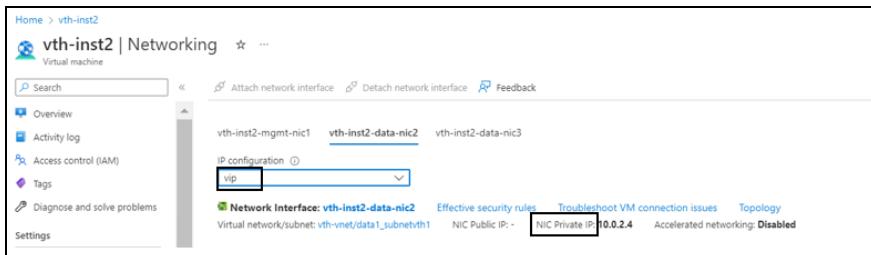
Example

```
curl 10.0.2.4
```

Verify if a response is received.

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

Figure 64 : Active vThunder instance 2 VIP



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

```
curl <VIP>
```

Example

```
curl 10.0.2.4
```

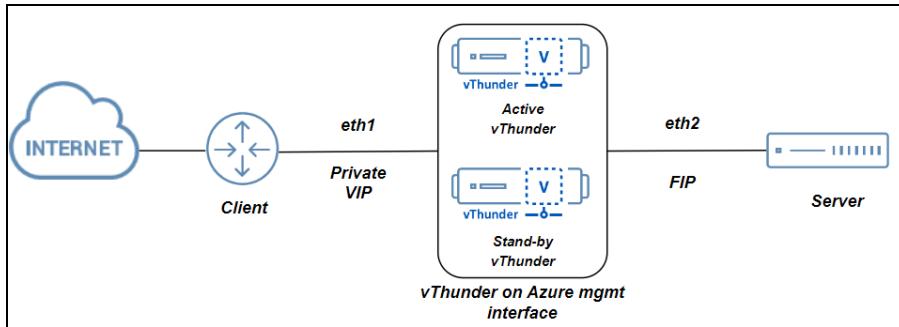
Verify if a response is received.

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

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

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

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



The following topics are covered:

| | |
|---|-----|
| System Requirements | 137 |
| Create vThunder Instances | 141 |
| Configure Server and Client Machine | 147 |
| Configure vThunder as an SLB | 164 |
| Configure vThunder using GLM | 173 |
| Verify Deployment | 176 |
| Verify Traffic Flow | 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 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 vth-rg1 . |
| Azure Storage Account | <p>A storage account is created inside the resource group, if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p>Performance: Standard Replication: Read-</p> | vthunderstorage |

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

| Resource Name | Description | Default Value | |
|------------------------------|---|--|----------------------------|
| work [VCN] | machine instance. | Address prefix for virtual network: 10.0.0.0/16 | |
| Subnet | Three subnets are created with an address prefix each. | Subnet1: <code>vth-vnet1-mgmt-sub1 10.0.1.0/24</code> Subnet2: <code>vth-vnet1-data-sub2 10.0.2.0/24</code> Subnet3: <code>vth-vnet1-data-sub3 10.0.3.0/24</code> | |
| Public IP | A public IP address is assigned to the management interface of each vThunder instance. | <code>vth-inst1-mgmt-nic1-ip</code> <code>vth-inst2-mgmt-nic1-ip</code> | |
| Network Interface Card [NIC] | <p>Two types of interfaces are created for each vThunder instance:</p> <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1, Ethernet 2] <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> | <code>vth-inst1-mgmt-nic1</code> | 10.0.1.35 |
| | | <code>vth-inst1-data-nic2</code> | 10.0.2.35 [Primary IP] |
| | | | 10.0.2.X [Secondary IP] |
| | | <code>vth-inst1-data-nic3</code> | 10.0.3.35 [Primary IP] |
| | | | 10.0.3.X [Secondary IP] |
| | | <code>vth-inst2-mgmt-nic1</code> | 10.0.1.36 |
| | | <code>vth-inst2-data-nic2</code> | 10.0.2.36 [Primary IP] |
| | | | 10.0.2.X [Secondary IP] |
| | | <code>vth-inst2-</code> | 10.0.3.36 |
| | | | |

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

Supported VM Sizes

Table 9 : Supported VM sizes

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

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

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

For more information on Windows and Linux VM sizes, see

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

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

Create vThunder Instances

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

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

```

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

```

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

3. Configure a storage account name.

```

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

```

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

4. Configure a virtual network.

```

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

```

5. Configure DNS label prefixes.

```

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

```

6. Configure vThunder instance names.

```

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

```

```

        "value": "vth-inst2"
    },

```

7. Set VM size for vThunder.

```

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

```

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

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

```

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

```

NOTE: Do not change the publisher name.

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

```

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

```

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

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

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

```

        "value": "10.0.3.36"
    },

```

11. Configure public IP address for each vThunder instances.

```

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

```

12. Configure network security group for two vThunder instances.

```

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

```

13. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_HA_GLMPVTVIP_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",
```

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

```

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

```

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

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

Example:

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

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

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

Figure 66 : Resource listing in the resource group

| All resources > ... | | | | |
|---|------------------------|----------------|------------------|--|
| A10 Networks (a10networks.com) | | | | |
| Create Manage view Refresh Export to CSV Open query Assign tags Delete | | | | |
| <input type="text" value="vth-rg1"/> Subscription equals all Resource group equals all Type equals all Location equals all Add filter | | | | |
| Name | Type | Resource group | Location | |
| <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-msg | Network security group | vth-rg1 | South Central US | |
| <input type="checkbox"/> vth-inst1_OsDisk_1_f48f71dbcaa4480b0ceef946c42f25bf | 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-msg | Network security group | vth-rg1 | South Central US | |
| <input type="checkbox"/> vth-inst2_OsDisk_1_5516bf85f2cc44738afcd890acdeca7f | Disk | VTH-RG1 | South Central US | |
| <input type="checkbox"/> vth-net | Virtual network | vth-rg1 | South Central US | |
| <input type="checkbox"/> vThunderP2013698007 | Public IP address | vth-rg1 | South Central US | |
| <input type="checkbox"/> vThunderP388625422 | 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 to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

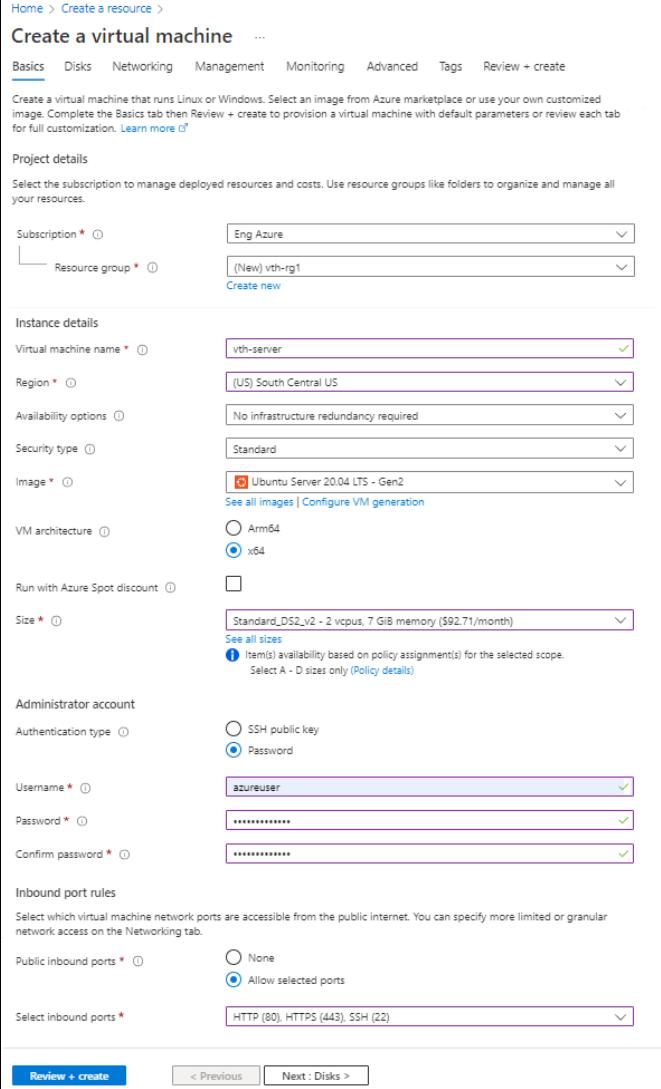
Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 67 : Create a virtual machine window - Basics tab



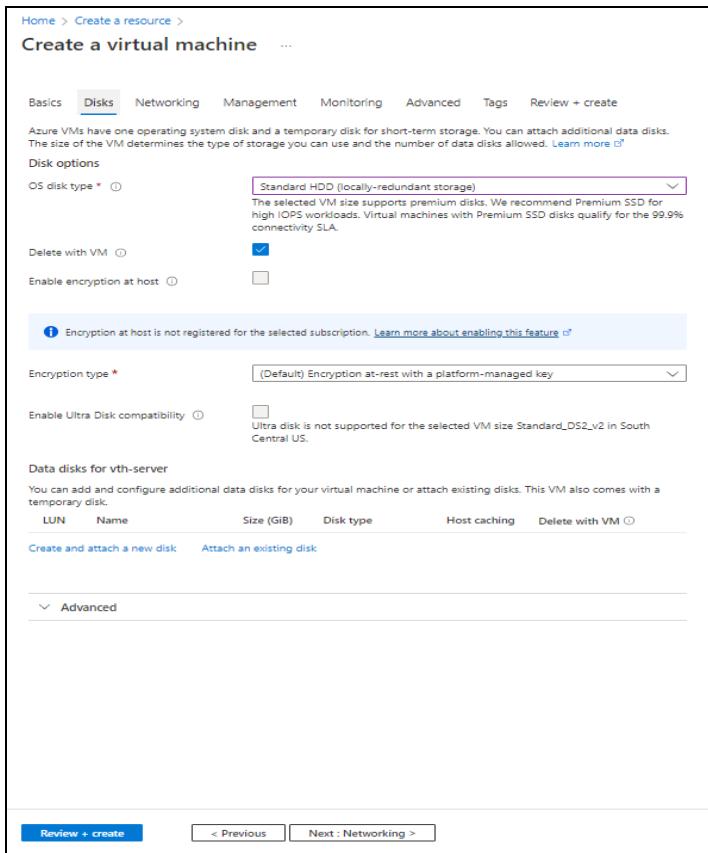
The screenshot shows the 'Create a virtual machine' Basics tab configuration window. Key fields include:

- 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 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 68 : Create a virtual machine window - Disks tab

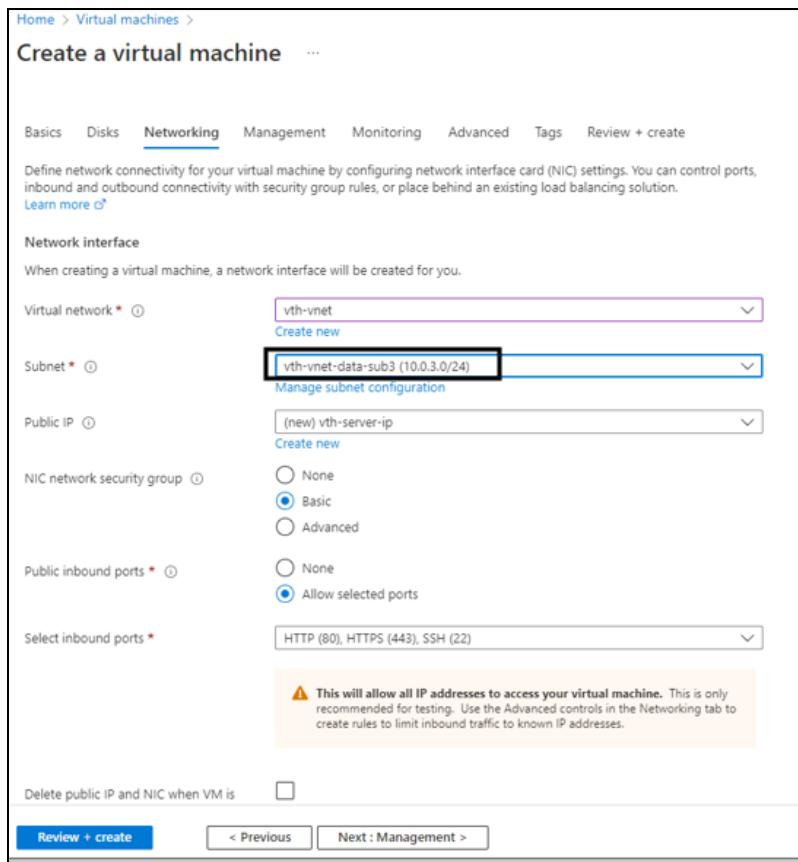


5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.
6. Select or enter the following mandatory information in the **Networking** tab:

Network interface

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

Figure 69 : Create a virtual machine window - Networking tab

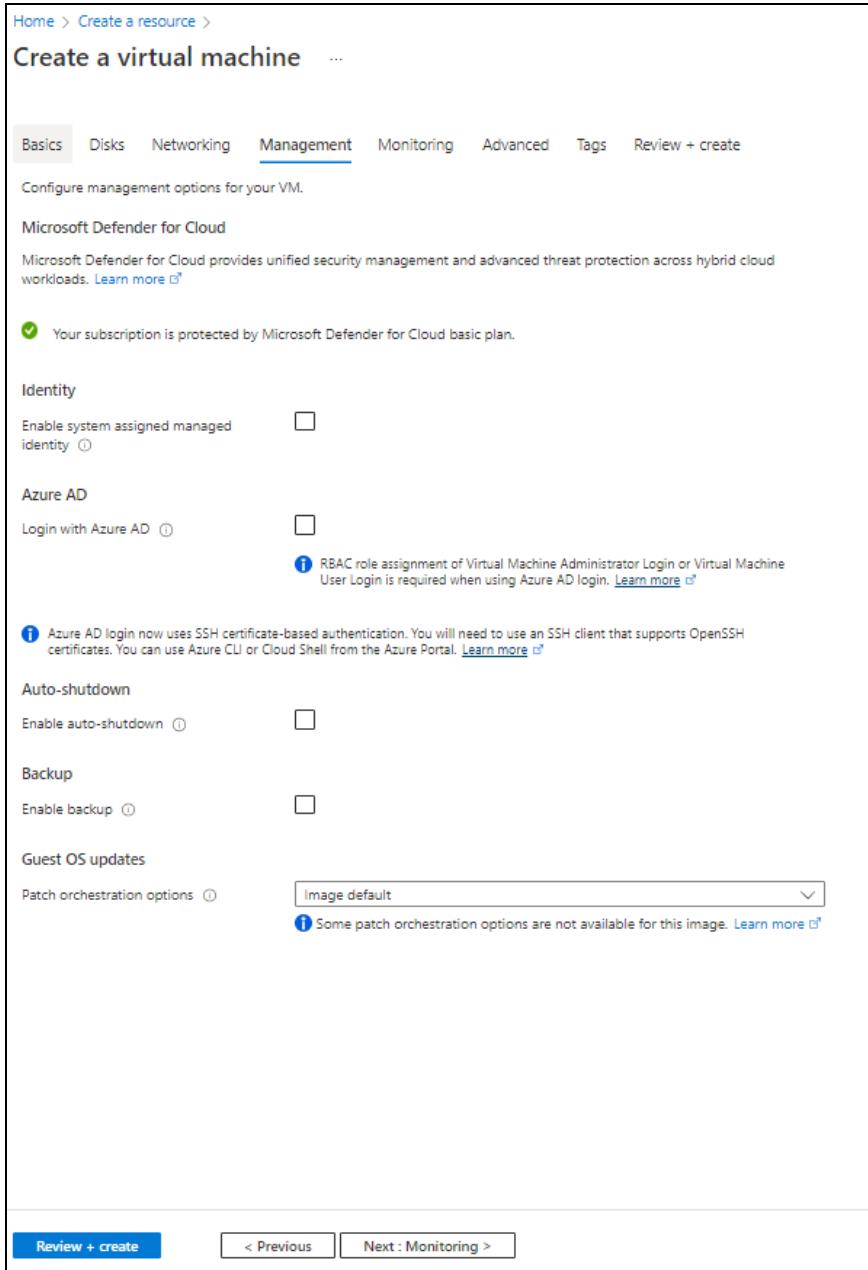


- Leave the remaining fields as is and click **Next : Management** at the bottom of the window.

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PVTVIP](#)

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

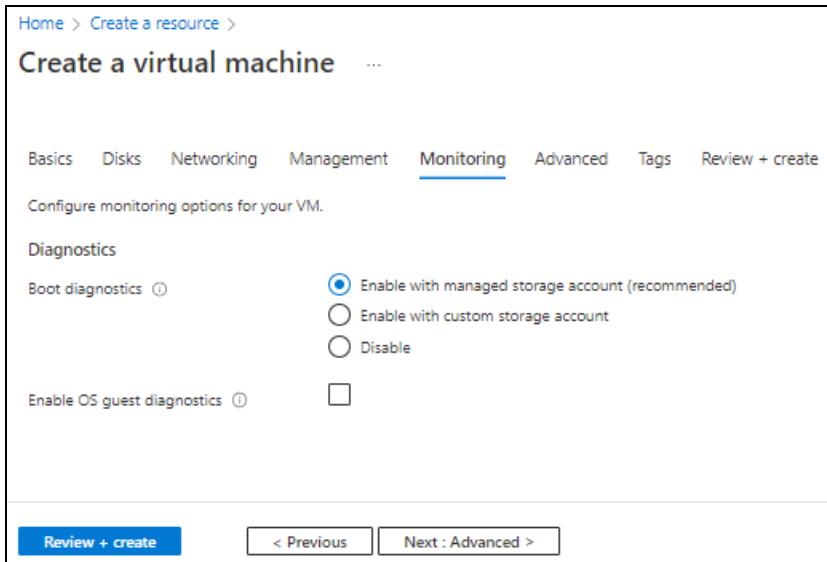
Figure 70 : Create a virtual machine window - Management tab



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

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

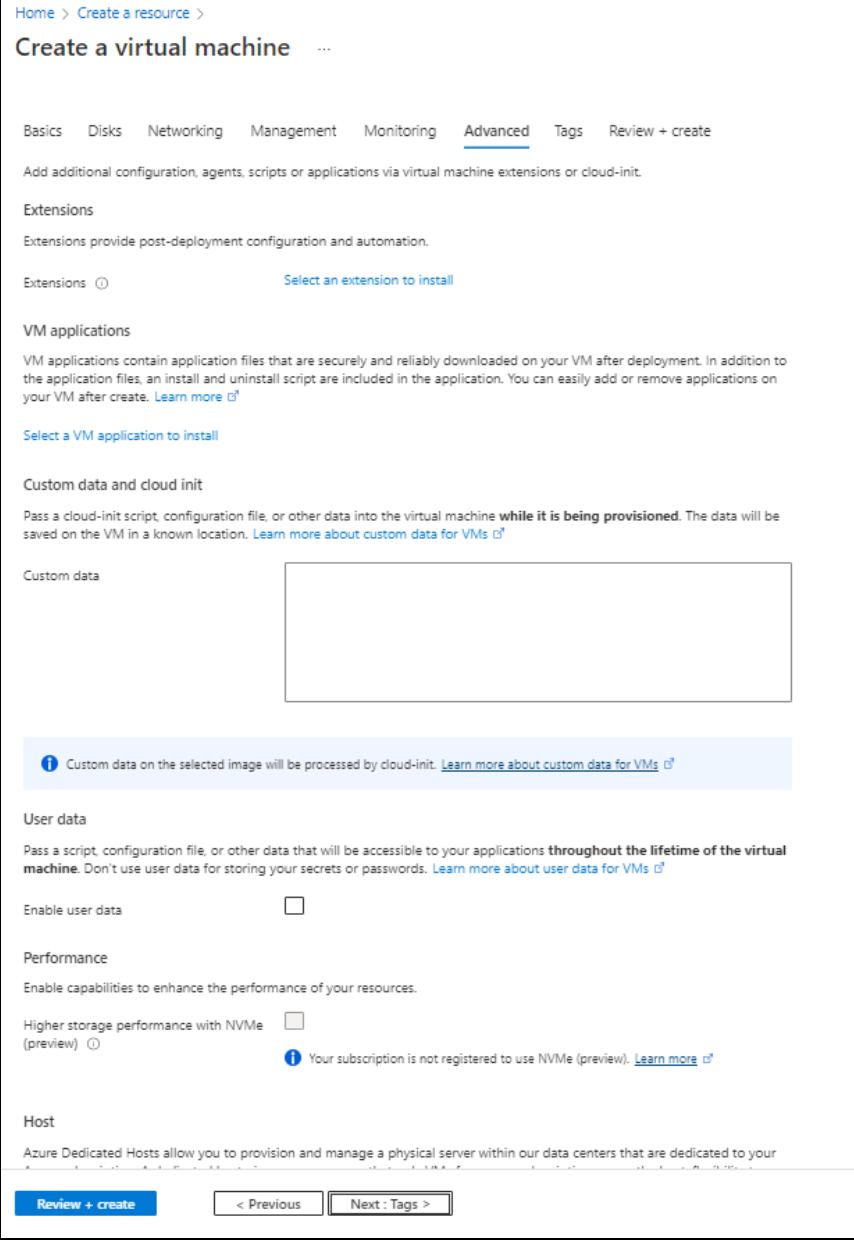
Figure 71 : Create a virtual machine window - Monitoring tab



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

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

Figure 72 : Create a virtual machine window - Advanced tab



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The 'Advanced' tab is selected. Key sections visible include:

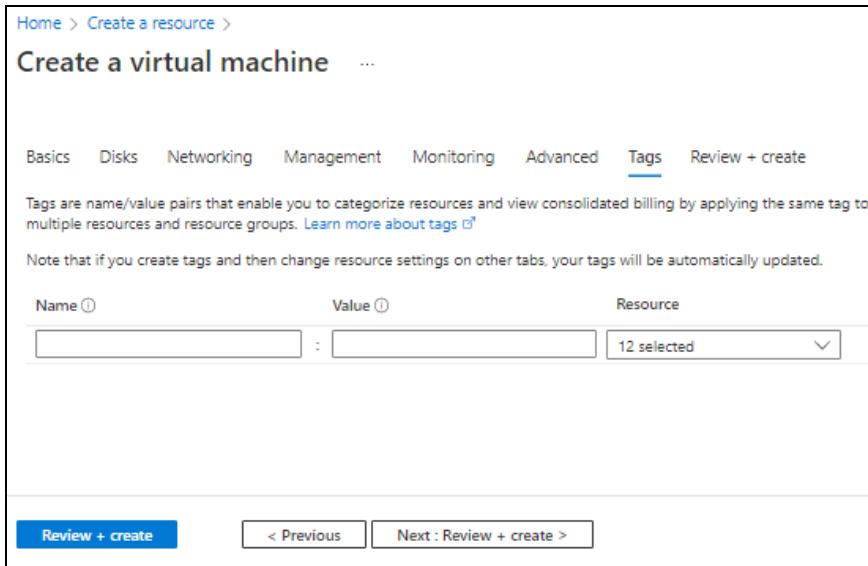
- Extensions:** A section for adding extensions via virtual machine extensions or cloud-init. It includes a link to 'Select an extension to install'.
- VM applications:** A section for adding VM applications. It includes a link to 'Select a VM application to install'.
- Custom data and cloud init:** A section for providing custom data to the VM during provisioning. It includes a note about using cloud-init and a link to 'Learn more about custom data for VMs'.
- Custom data:** A large text input field for entering custom data.
- User data:** A section for providing user data that can be accessed by applications throughout the lifetime of the virtual machine. It includes a note about not using user data for secrets and a link to 'Learn more about user data for VMs'.
- Performance:** A section for enabling capabilities to enhance performance.
- Host:** A section for Azure Dedicated Hosts, noting they allow provisioning and managing a physical server within data centers dedicated to your organization.

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

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

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

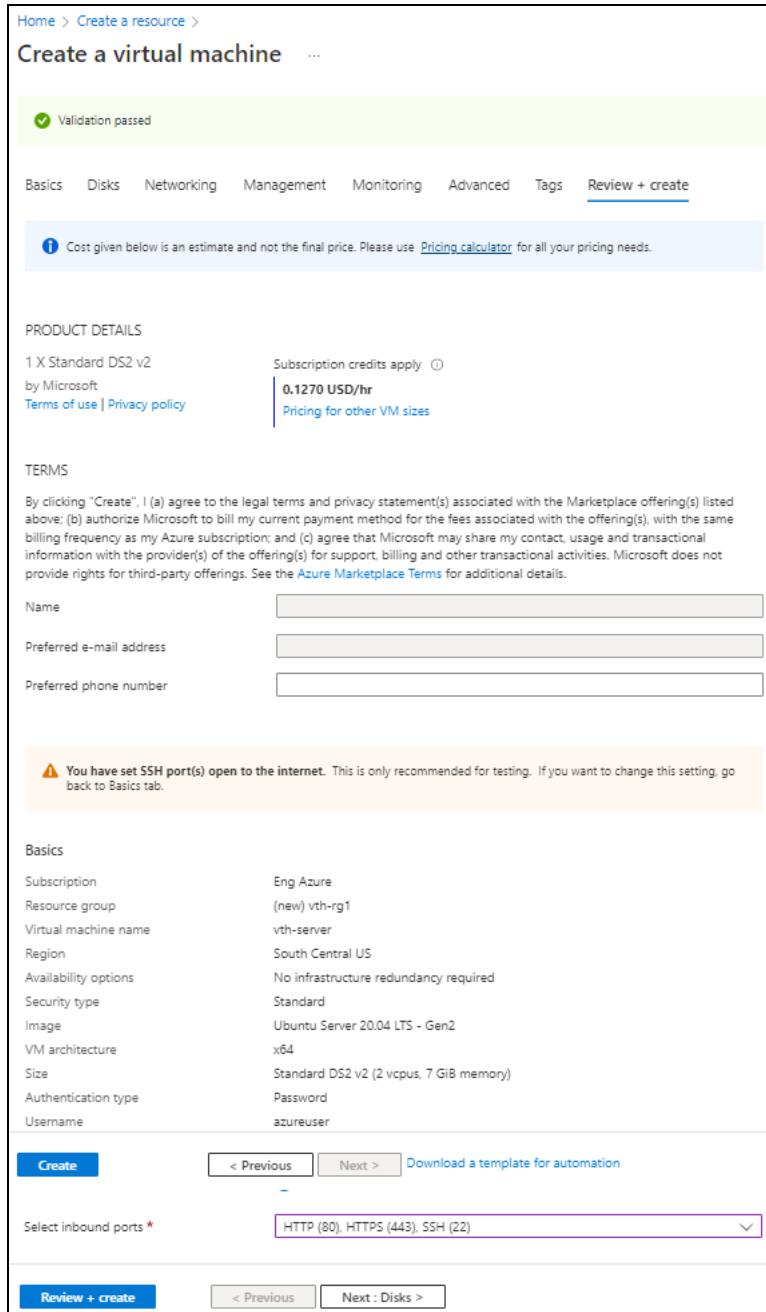
Figure 73 : Create a virtual machine window - Tags tab



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

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

Figure 74 : Create a virtual machine window - Review + create tab



16. Click **Create** at the bottom of the window.
The Server machine gets created.
17. SSH the Server virtual machine and run the following command to install Apache:

```
sudo apt install apache2
```

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

Create a Client Machine

To create a Client machine, perform the following steps:

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

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

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

Project details

- Subscription
- Resource group

Instance details

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

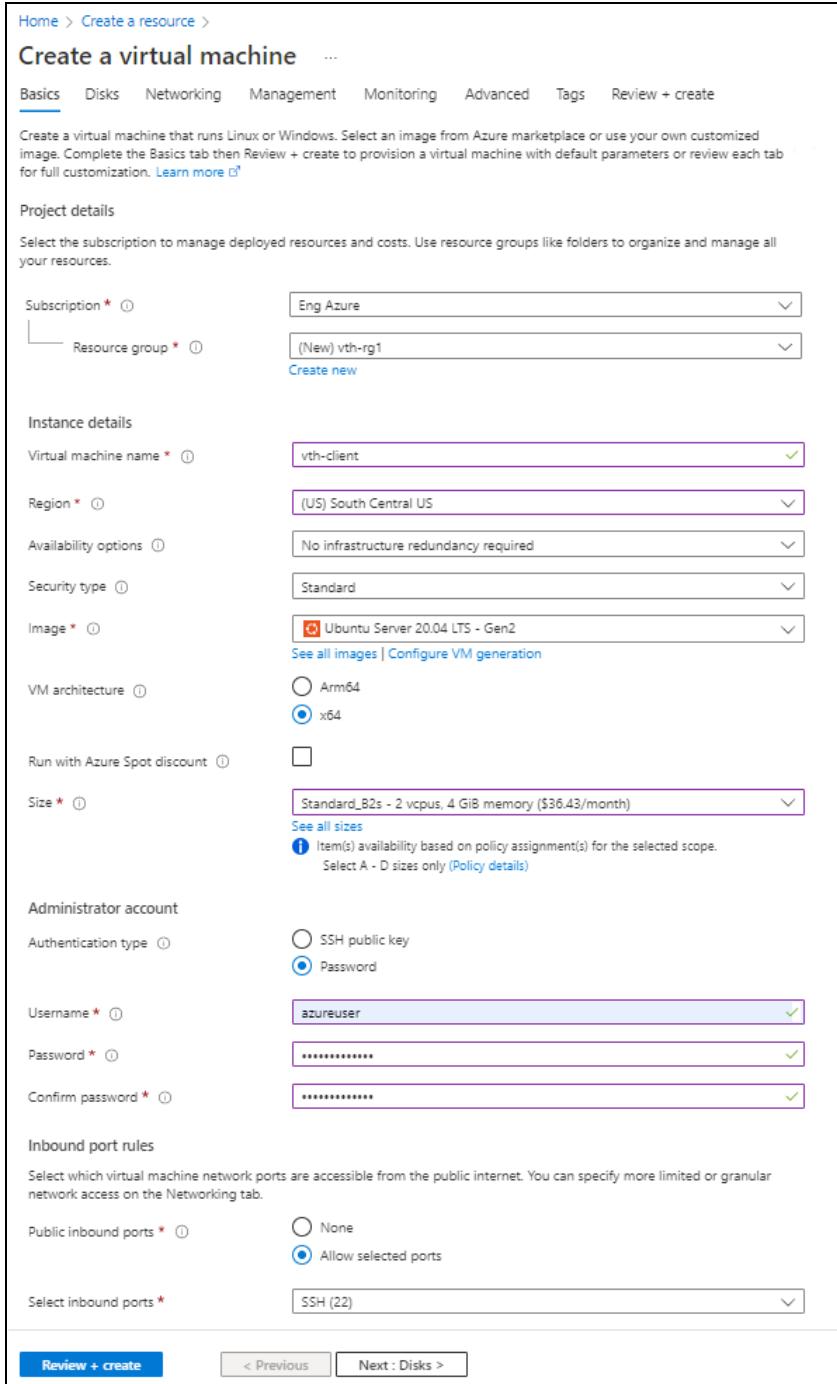
Administrator account

- Depending upon the Authentication type, provide the information.

Inbound port rules

- Public inbound ports
- Select inbound ports

Figure 75 : Create a virtual machine window - Basics tab



The screenshot shows the 'Create a virtual machine' Basics tab configuration window. The 'Subscription' dropdown is set to 'Eng Azure'. The 'Resource group' dropdown shows '(New) vth-rg1' with a 'Create new' link. The 'Virtual machine name' is 'vth-client'. The 'Region' is '(US) South Central US'. Under 'Availability options', 'No infrastructure redundancy required' is selected. The 'Security type' is 'Standard'. The 'Image' dropdown shows 'Ubuntu Server 20.04 LTS - Gen2' with 'See all images | Configure VM generation' links. The 'VM architecture' is 'x64'. The 'Size' dropdown shows 'Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)' with 'See all sizes' and a note about policy assignment(s). The 'Administrator account' section shows 'Authentication type' as 'Password' with 'Username' 'azureuser', 'Password' masked, and 'Confirm password' also masked. Under 'Inbound port rules', 'Public inbound ports' is set to 'Allow selected ports' with 'Select inbound ports' showing 'SSH (22)'. At the bottom, there are 'Review + create', '< Previous', and 'Next : Disks >' buttons.

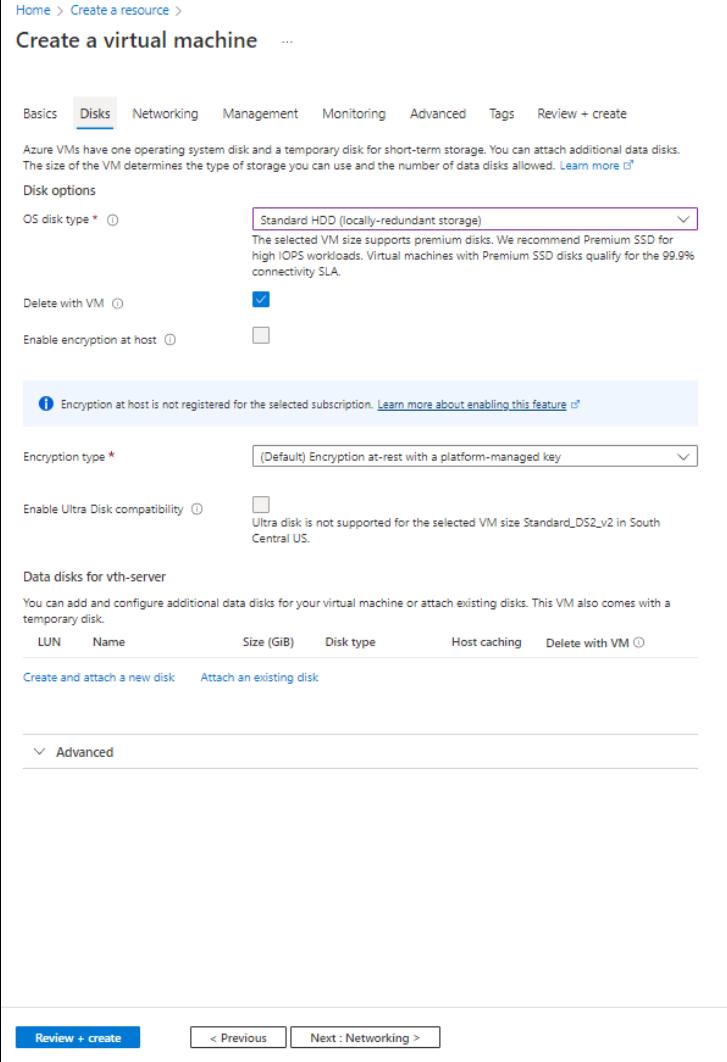
- Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.

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

Disk options

- OS disk type
- Encryption type

Figure 76 : Create a virtual machine window - Disks tab



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Disks' tab. The '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 >

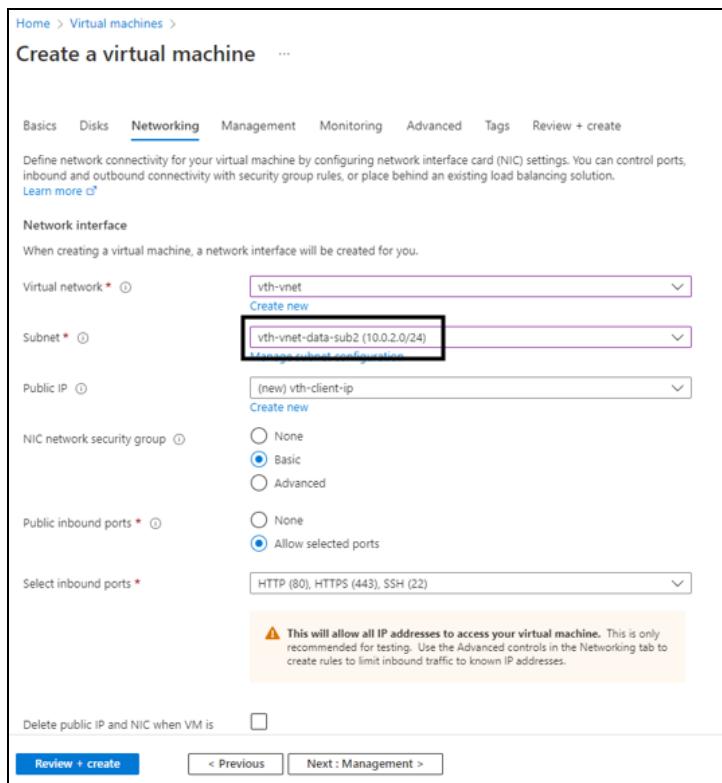
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

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 77 : Create a virtual machine window - Networking tab

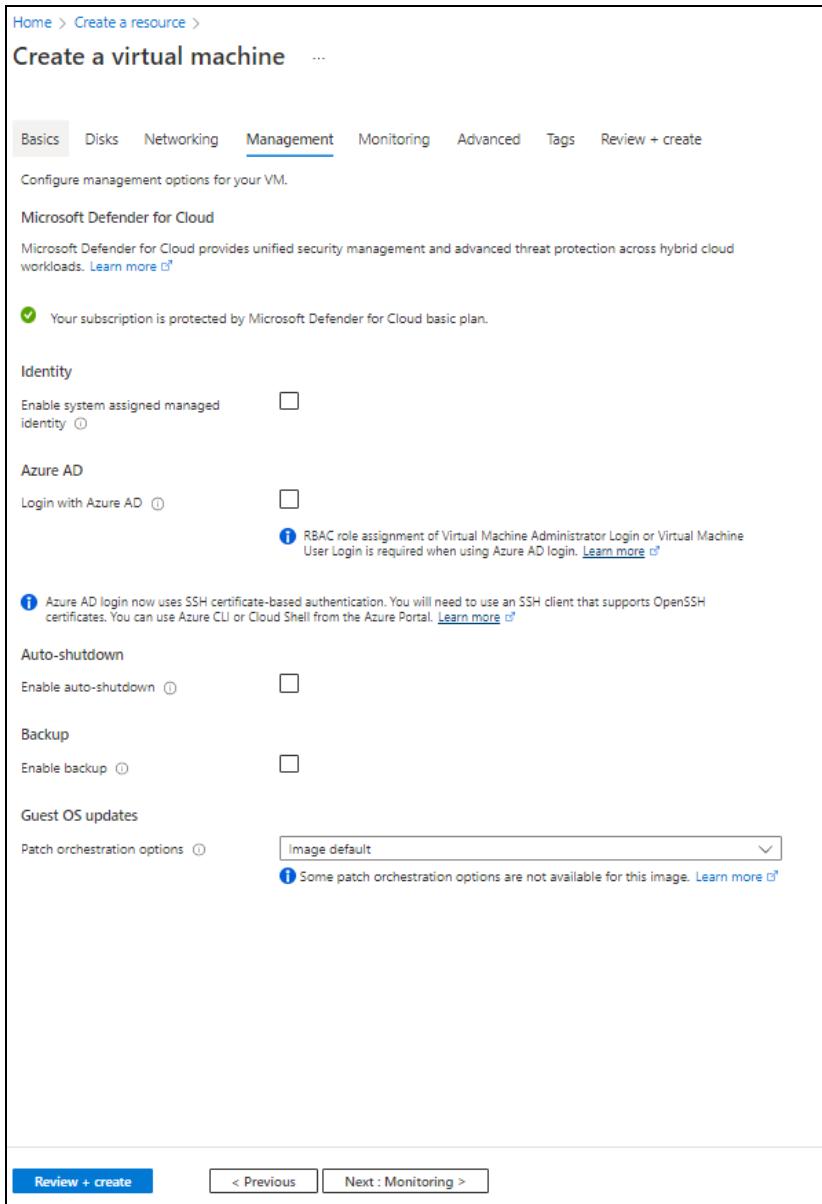


7. Leave the remaining fields as is and click **Next : Management at the bottom of the window.**

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PVTVIP](#)

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

Figure 78 : Create a virtual machine window - Management tab



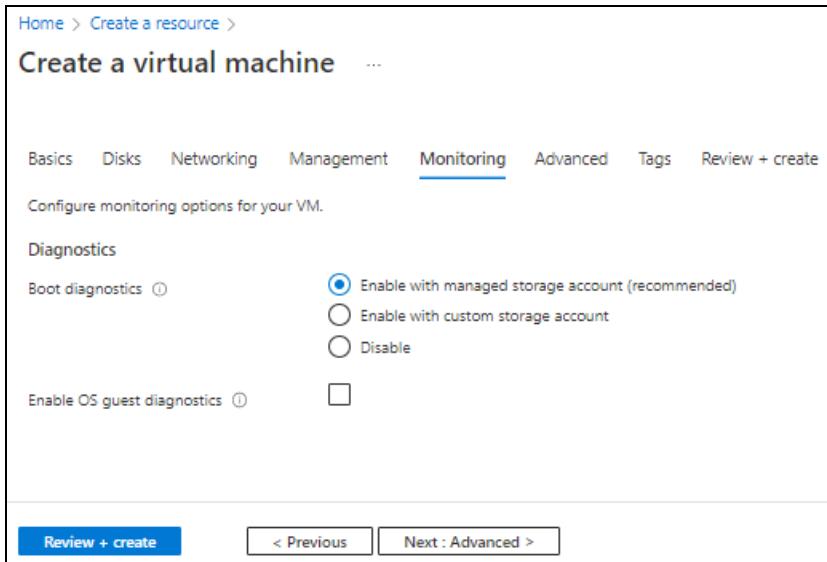
The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The 'Management' tab is selected. The interface includes:

- Microsoft Defender for Cloud:** Provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)
- Identity:** Options for system assigned managed identity and Azure AD login.
- Azure AD:** Information about RBAC role assignment for VM Administrator Login or User Login.
- Auto-shutdown:** Option to enable auto-shutdown.
- Backup:** Option to enable backup.
- Guest OS updates:** Patch orchestration options set to 'Image default'. Note: Some patch orchestration options are not available for this image.
- Bottom navigation:** Buttons for 'Review + create', '< Previous', and 'Next : Monitoring >'.

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

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

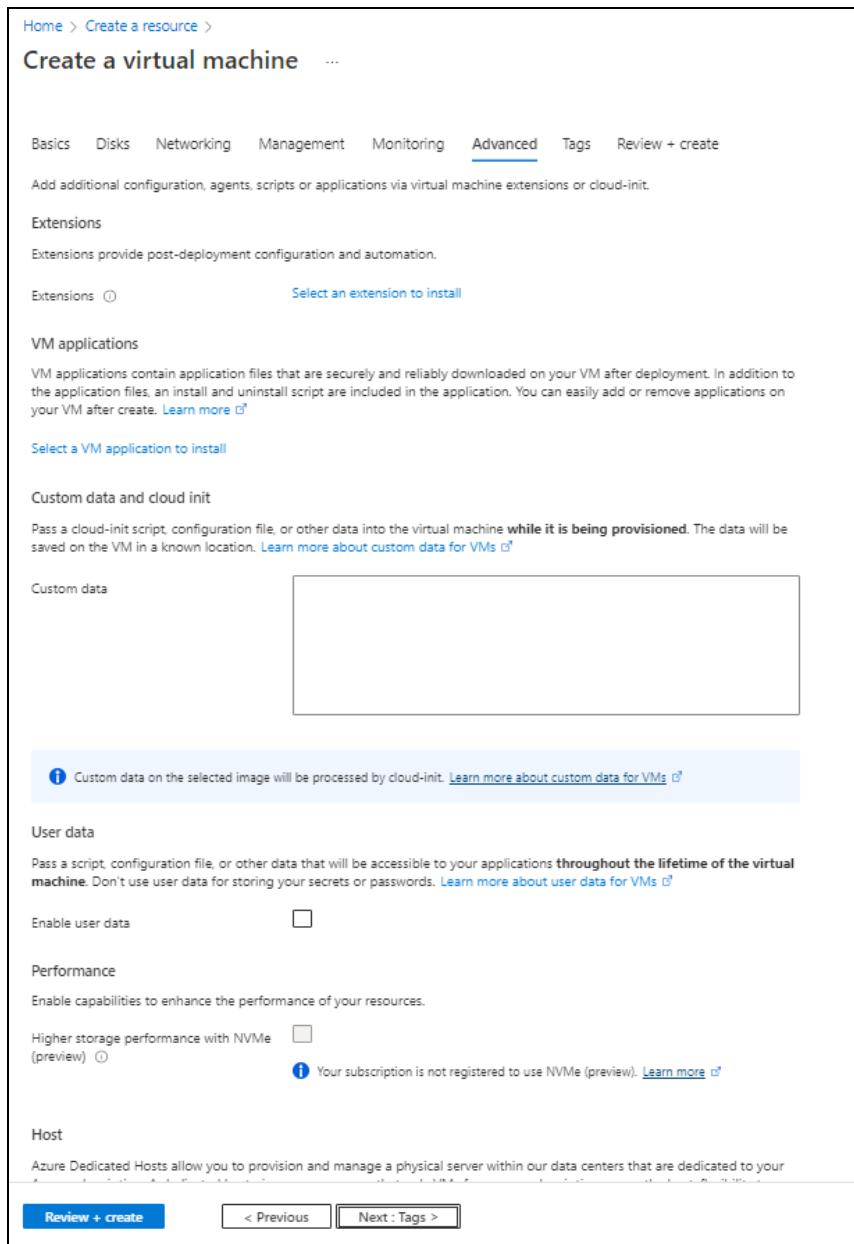
Figure 79 : Create a virtual machine window - Monitoring tab



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

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

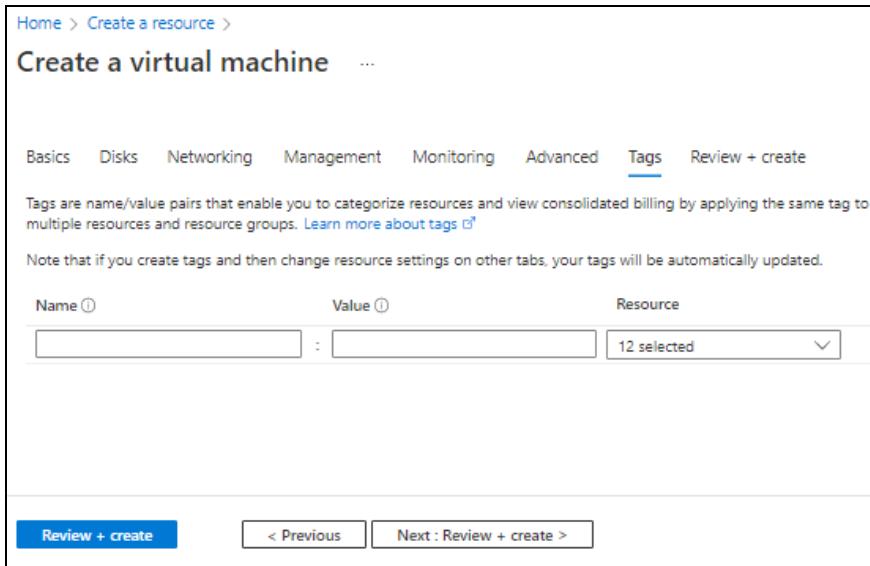
Figure 80 : Create a virtual machine window - Advanced tab



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

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

Figure 81 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine

...

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

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

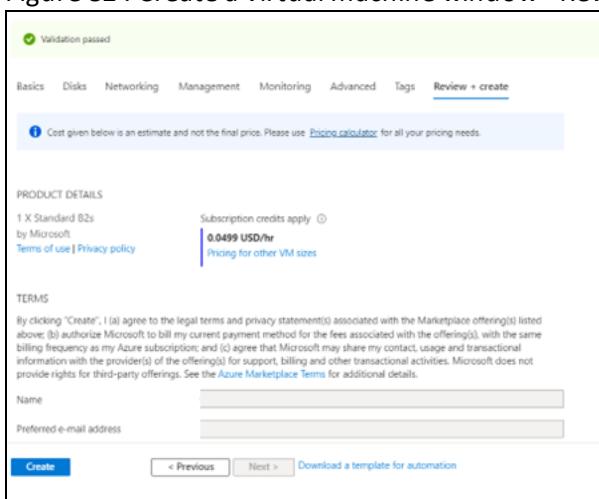
| Name ⓘ | Value ⓘ | Resource |
|--------|---------|---------------|
| | | 12 selected ▾ |

Review + create < Previous Next : Review + create >

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

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

Figure 82 : Create a virtual machine window - Review + create tab



Validation passed

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

PRODUCT DETAILS

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

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

TERMS

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

Name

Preferred e-mail address

Create < Previous / Next > Download a template for automation

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

The Client machine gets created.

Configure vThunder as an SLB

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_SLB_CONFIG_PARAM.json with a text editor.

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

2. Configure SLB server host or domain.

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

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

```

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

```

3. Configure SLB server ports.

```

"slbServerPortList": {
    "value": [
        {

```

```
        "port-number": 53,
        "protocol": "udp",
        "health-check-disable":1
    },
    {
        "port-number": 80,
        "protocol": "tcp",
        "health-check-disable":1
    },
    {
        "port-number": 443,
        "protocol": "tcp",
        "health-check-disable":1
    }
]
```

4. Configure service group list ports.

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

```

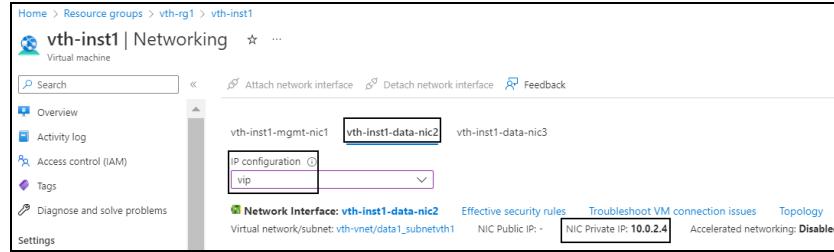
```
        "port":53
    }
]
},
{
    "name":"sg80",
    "protocol":"tcp",
    "health-check-disable":1
    "member-list": [
        {
            "name":"s1",
            "port":80
        }
    ]
}
]
```

5. Configure virtual server.

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

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

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



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

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

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

```

        }
    ],
},

```

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

6. Configure SSL.

```

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

```

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

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

```

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

```

7. Provide the resource group name.

```

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

```

NOTE: Do not change the vThunder instance username.

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

Change Password

To change the password, perform the following steps:

- Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_GL_M_CHANGE_
PASSWORD_2.ps1
```

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

- Provide the default and new password when prompted:

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

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

Deploy vThunder as an SLB

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

- From PowerShell, navigate to the folder where you have downloaded the 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_3.ps1 -
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_3.ps1 -
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

```
SSL Certificate
Do you want to upload ssl certificate ?
[Y] Yes [N] No [?] Help (default is "N") : Y
SLB Server Host IP: 10.0.3.7
Virtual Server Name: vip
```

```
Resource Group Name: vth-rg1
vThunder1 Public IP: 13.85.81.137
vThunder2 Public IP: 13.85.81.113
Configuring vm: vth-inst1
configured ethernet- 1 ip
configured ethernet- 2 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 1
Configuring vm: vth-inst2
configured ethernet- 1 ip
configured ethernet- 2 ip
Configured server
Configured service group
0
Configured virtual server
SSL Configured.
Configurations are saved on partition: shared
Configured vThunder Instance 2
```

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

Configure High Availability for vThunder

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

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

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

2. Configure DNS.

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

3. Configure a Network Gateway IP.

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

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

4. Set VRRP-A.

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

5. Set a Terminal Idle Timeout.

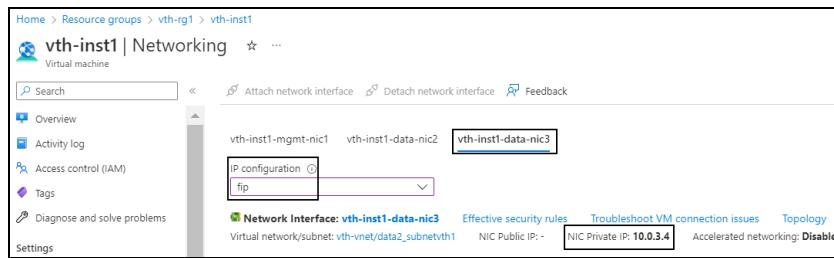
```
"terminal": {
    "idle-timeout": 0
},
```

6. Configure the VRID details.

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

- a. From the **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
- b. Go to the first virtual machine instance. Here, first virtual machine instance is **vth-inst1**.
- c. Select **Networking** from the left **Settings** panel.
- d. Select the Data NIC 3 tab > **IP configuration**. Here, **vth-inst1-data-nic3**.

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



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

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

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

Create High Availability for vThunder

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

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

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

Example:

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

Configure vThunder using GLM

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json with a text editor.
2. Configure GLM account details.

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

```

        },
        "entitlement_token": {
            "value": "token"
        }
    }
}

```

3. Verify if the configurations in the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json file are correct and then save the changes.

Apply GLM License

To apply GLM License, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_5.ps1 -resourceGroupName <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_5.ps1 -resourceGroup vth-rg1
```

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

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

Access vThunder using Console/CLI

vThunder can be accessed using any of the following ways:

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

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

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

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

System is ready now.

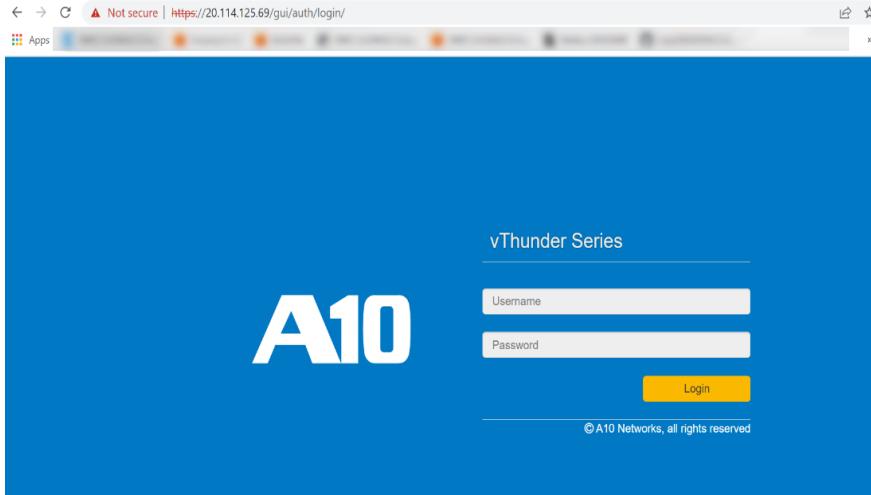
[type ? for help]

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

Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

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



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

Verify Deployment

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

1. Run the following command on vThunder:

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

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

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

```

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

```

- 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:

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

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

!
vrrp-a common
    device-id 1
    set-id 1
    enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
glm use-mgmt-port
glm enable-requests
glm token A10f771cecbe
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
```

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

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

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

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

| | | |
|------------------------------|-------------|---|
| Host ID | : | 5DCB01EC264BECCCFECB3C2ED42E02384EE8C527 |
| USB ID | : | Not Available |
| Billing Serials: | | A10f771cecbe0000 |
| Token | : | A10f771cecbe |
| Product | : | ADC |
| Platform | : | vThunder |
| Burst | : | Disabled |
| GLM Ping Interval In Hours : | | 24 |
| <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 license. | N/A | Requires an additional Webroot Threat Intel |
| CYLANCE | N/A | Requires an additional Cylance license. |

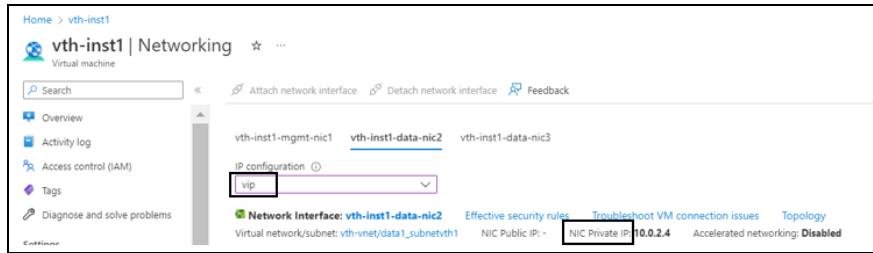
| | | |
|-------------------|------------------|---|
| IPSEC_VPN | N/A | Requires an additional IPsec VPN license. |
| 25 Mbps Bandwidth | 21-December-2022 | |

Verify Traffic Flow

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

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

Figure 85 : Active vThunder instance 1 VIP



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

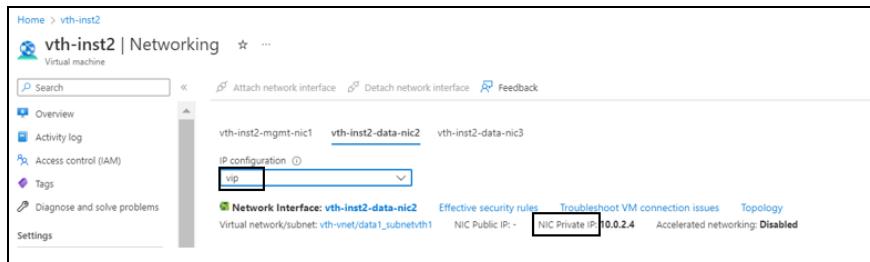
Example

```
curl 10.0.2.4
```

Verify if a response is received.

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

Figure 86 : Active vThunder instance 2 VIP



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

```
curl <VIP>
```

Example

```
curl 10.0.2.4
```

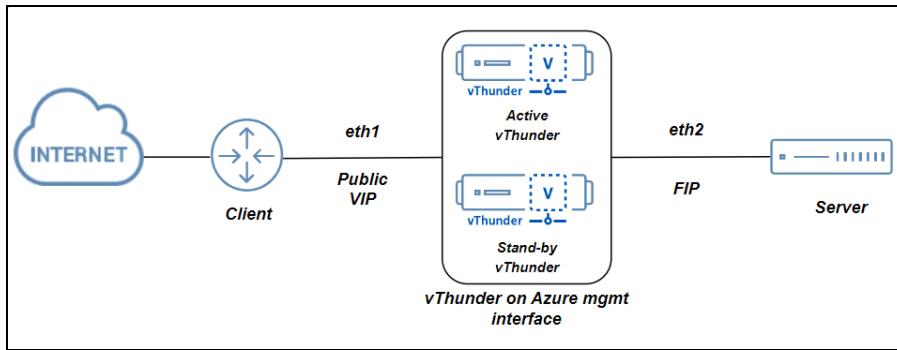
Verify if a response is received.

Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO

[Figure 87](#) shows the 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO deployment topology. Using this template, two vThunder instances can be deployed containing:

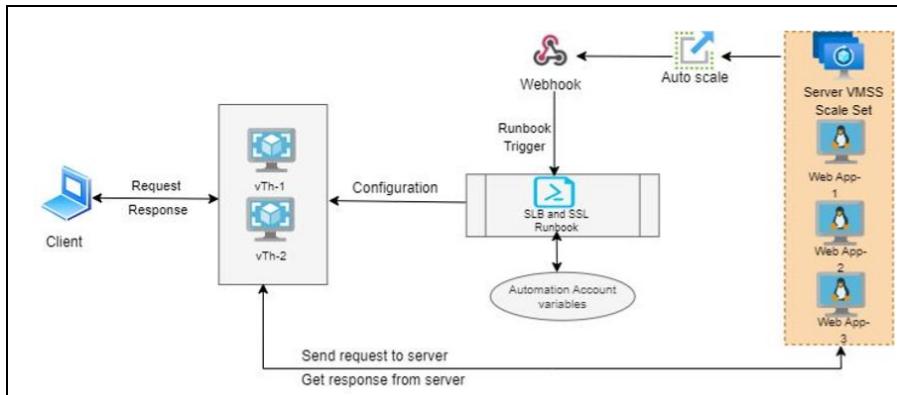
- One management interface and two data interfaces each
- HA support
- GLM integration
- Backend server autoscaling support.

Figure 87 : 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO Topology



[Figure 88](#) shows the process flow when different Azure resources and system components are connected to each other in the 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO topology.

Figure 88 : 3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO Process Flow



The following topics are covered:

| | |
|--|-----|
| System Requirements | 183 |
| Create vThunder Instances | 188 |
| Configure Server VMSS | 193 |
| Configure Client Machine | 202 |
| Configure vThunder as an SLB | 218 |
| Configure High Availability for vThunder | 223 |
| Configure vThunder using GLM | 226 |
| Access vThunder using CLI or GUI | 227 |
| Verify Deployment | 229 |
| Verify Traffic Flow | 232 |

System Requirements

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

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

Table 10 : System Requirements

| Resource Name | Description | Default Value |
|----------------------|---|--|
| Azure Resource Group | A resource group with the specified name and location is created, if it doesn't exist. All the resources required for this template is created under the resource group. | Here, the Azure resource group name used is vth-rg1 . |
| Azure Stor- | A storage account is | vthunderstorage |

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

| Resource Name | Description | Default Value |
|----------------------------------|---|--|
| | <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <p>Table 11 lists the supported VM sizes.</p> | |
| Azure Automation Account | An automation account is created under the resource group. | vth-amt-acc |
| Azure Run-book with Webhook | <p>A custom runbook is created under the automation account: SLB-Config</p> <p>A webhook is created for SLB.</p> | |
| Virtual Machine Scale Set [VMSS] | A virtual machine scale set is created. | vth-server-vmss |
| Virtual Cloud Network [VCN] | A virtual network is assigned to the virtual machine instance. | vth-vmss-vnet Address prefix for virtual network: |

| Resource Name | Description | Default Value | |
|------------------------------|---|--|----------------------------|
| | | 10.0.0.0/16 | |
| Subnet | Three subnets are created with an address prefix each. | Subnet1: vth-vnet1-mgmt-sub1 10.0.1.0/24 Subnet2: vth-vnet1-data-sub2 10.0.2.0/24 Subnet3: vth-vnet1-data-sub3 10.0.3.0/24 | |
| Public IP | A public IP address is assigned to the management interface of each vThunder instance. | vth-inst1-mgmt-nic1-ip vth-inst2-mgmt-nic1-ip | |
| Network Interface Card [NIC] | Two types of interfaces are created for each vThunder instance: <ul style="list-style-type: none"> Management Interface with public IP Data Interface with primary private IP [Ethernet 1, Ethernet 2] <p>NOTE: The secondary IP of data interface is taken from DHCP server.</p> | vth-inst1-mgmt-nic1 | 10.0.1.35 |
| | | vth-inst1-data-nic2 | 10.0.2.35 [Primary IP] |
| | | | 10.0.2.X [Secondary IP] |
| | | vth-inst1-data-nic3 | 10.0.3.35 [Primary IP] |
| | | | 10.0.3.X [Secondary IP] |
| | | vth-inst2-mgmt-nic1 | 10.0.1.36 |
| | | vth-inst2-data-nic2 | 10.0.2.36 [Primary IP] |
| | | | 10.0.2.X [Secondary IP] |
| | | vth-inst2- | 10.0.3.36 |
| | | | |

| Resource Name | Description | Default Value | |
|--------------------------------------|---|------------------------|--|
| | | <code>data-nic3</code> | [Primary IP] 10.0.3.x [Secondary IP] |
| Network Security Group [NSG] | A security group is created for all the associated default interfaces. | <code>vth-nsg1</code> | <code>vth-nsg2</code> |
| Azure Service Application Access Key | An existing key can be used or a new key can be created. For more information, refer Azure Service Application Access Key . | | |

Supported VM Sizes

Table 11 : Supported VM sizes

| Series | Size | Qualified Name |
|----------|-------------------|-----------------|
| A series | Standard A4v2 | Standard_A4_v2 |
| | Standard A4mv2 | Standard_A4m_v2 |
| | Standard/Basic A4 | Standard_A4 |
| | Standard A8v2 | Standard_A8_v2 |
| B series | Standard B2s | Standard_B2_s |
| | Standard B2ms | Standard_B2ms |
| | Standard B4ms | Standard_B4ms |
| D series | Standard D3v2 | Standard_D3_v2 |
| | Standard DS3v2 | Standard_DS3_v2 |
| | Standard D5v2 | Standard_D5_v2 |

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

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

For more information on Windows and Linux VM sizes, see

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

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

Create vThunder Instances

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_3NIC_2VM_PARAM.json with a text editor.

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

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

```
"adminUsername": {
    "value": "vth-user"
```

```

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

```

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

3. Configure a storage account name.

```

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

```

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

4. Configure a virtual network.

```

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

```

5. Configure DNS label prefixes.

```

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

```

6. Configure vThunder instance names.

```

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

```

7. Set VM size for vThunder.

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

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

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

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

NOTE: Do not change the publisher name.

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

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

```

        "value": "vth-inst2-data-nic3"
    },

```

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

```

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

```

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

```

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

```

```

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

```

12. Configure network security group for two vThunder instances.

```

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

```

13. Verify if all the configurations in the ARM_TMPL_3NIC_2VM_PARAM.json file are correct and then save the changes.

Deploy vThunder

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

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

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

Example:

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

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

```

        "tags": null,
        "type": "Microsoft.Resources/resourceGroups"
    }
}
```

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

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

Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 --template-file ARM_TMPL_3NIC_2VM_1.json --parameters ARM_TMPL_3NIC_2VM_PARAM.json
```

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

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

Figure 89 : Resource listing in the resource group

| Name | Type | Resource group | Location |
|---|------------------------|----------------|------------------|
| vth-inst1 | Virtual machine | vth-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_OoDisk_1_bca879dbf43b4d57842bed846a4b4288 | 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_OoDisk_1_63675204a29e416a9fbcd39ab695e28 | Disk | vth-rg11 | South Central US |
| vth-rg1 | Network security group | vth-rg11 | South Central US |
| vth-rg2 | Network security group | vth-rg11 | South Central US |
| vth-vmss-vnet | 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 to **Azure Services > Virtual machine scale sets** and click **Create**.

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

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

Project details

- Subscription
- Resource group

Scale set details

- Virtual machine scale set name - Server machine
- Region

Orchestration

- Orchestration mode

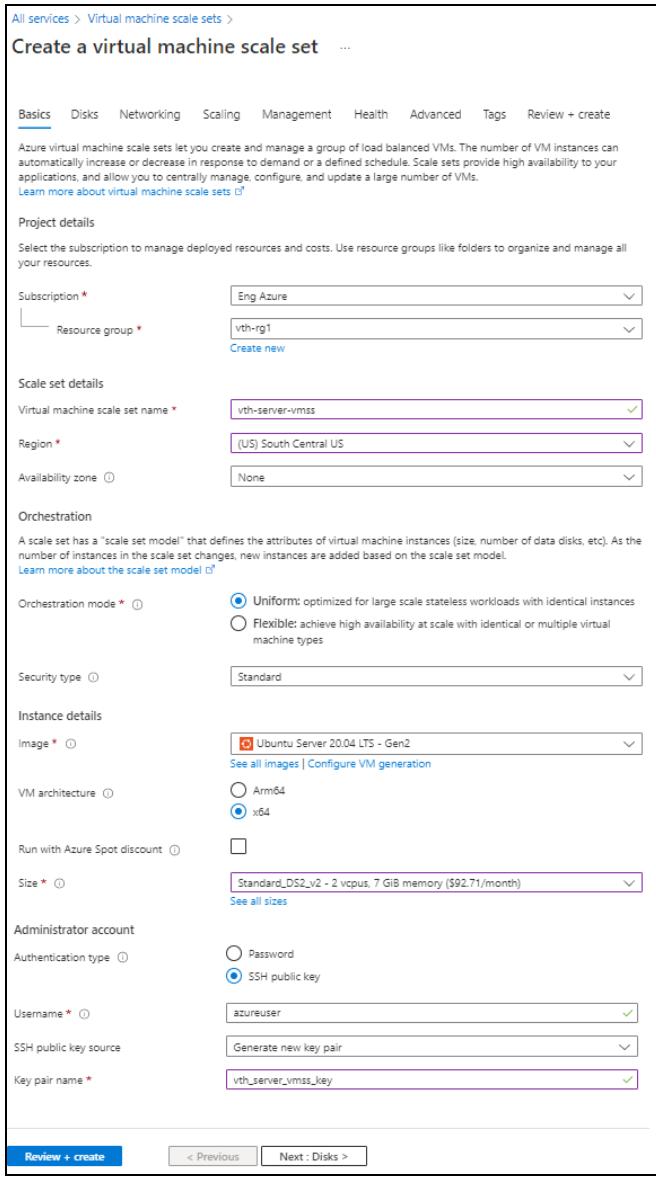
Instance details

- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

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



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

- Subscription:** Eng Azure
- Resource group:** vth-rg1
- Virtual machine scale set name:** vth-server-vmss
- Region:** (US) South Central US
- Availability zone:** None
- Orchestration mode:** Uniform (selected)
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:** x64
- Run with Azure Spot discount:** Unchecked
- Size:** Standard_DS2_v2 - 2 vcpus, 7 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

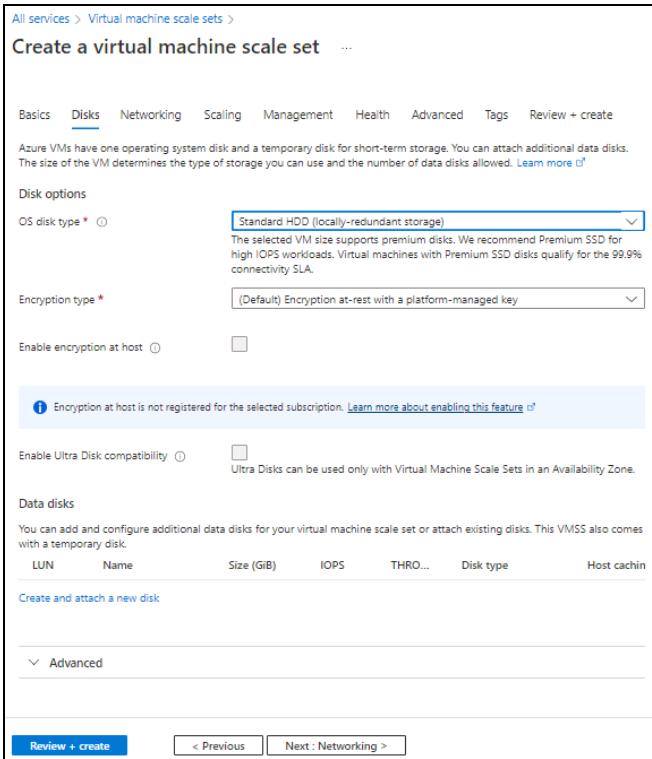
At the bottom, there are buttons for **Review + create**, < Previous, and Next : Disks >.

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 A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

- OS disk type
- Encryption type

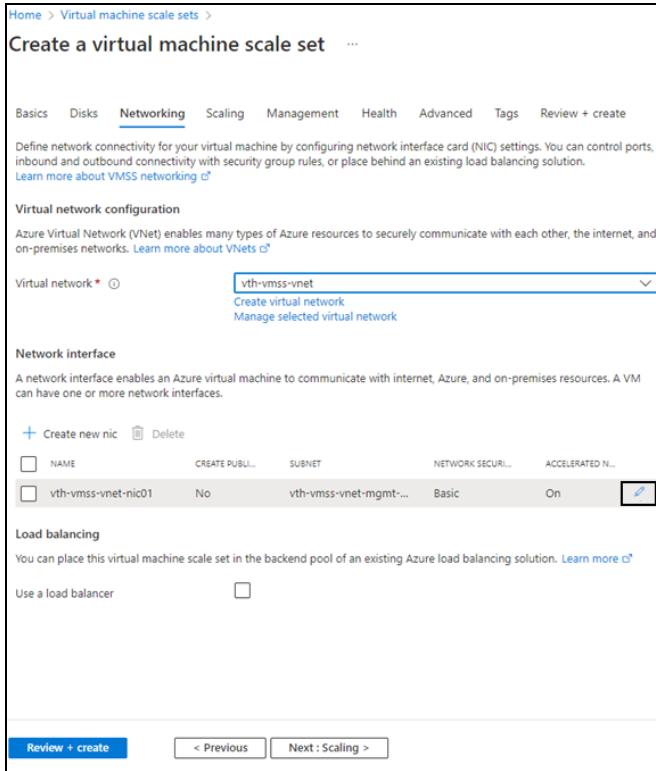
Figure 91 : Create a virtual machine scale set window - Disks tab



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

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

Figure 92 : Create a virtual machine scale set window - Networking tab

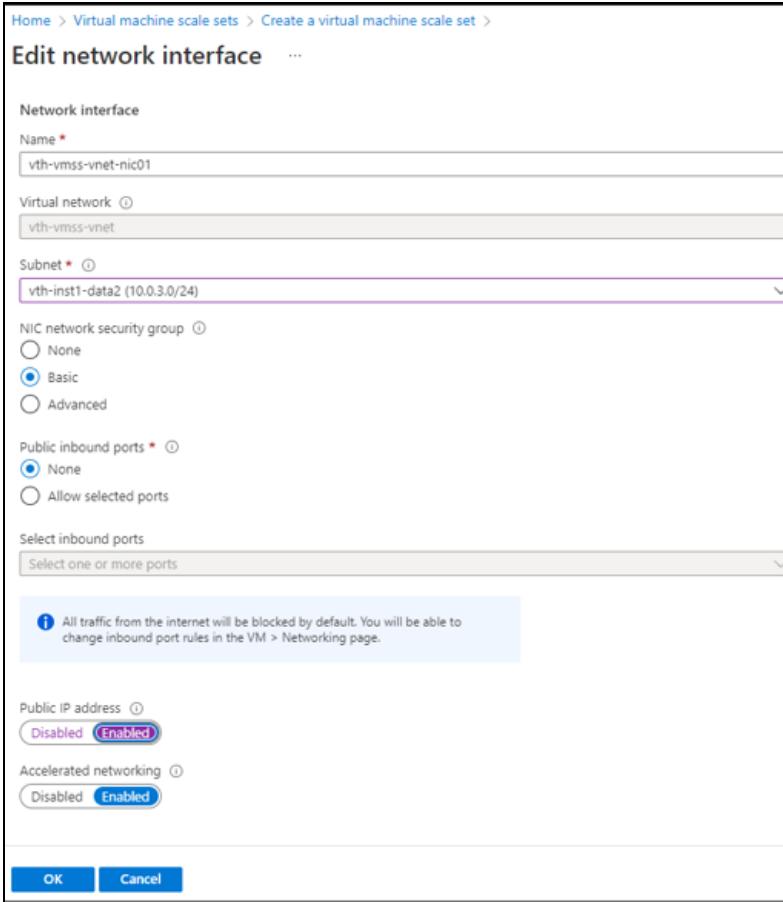


- If Data subnet 2 (Ethernet 2) value is not assigned to management NIC 1, click the edit button corresponding to it.

The **Edit Network Interface** window appears.

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

Figure 93 : Edit network interface window



The screenshot shows the 'Edit network interface' configuration page. At the top, the URL is: Home > Virtual machine scale sets > Create a virtual machine scale set > Edit network interface ...

Network interface

Name *: vth-vmss-vnet-nic01

Virtual network: vth-vmss-vnet

Subnet *: vth-inst1-data2 (10.0.3.0/24)

NIC network security group: Basic (selected)

Public inbound ports: None (selected)

Select inbound ports: Select one or more ports

Public IP address: Enabled (selected)

Accelerated networking: Enabled (selected)

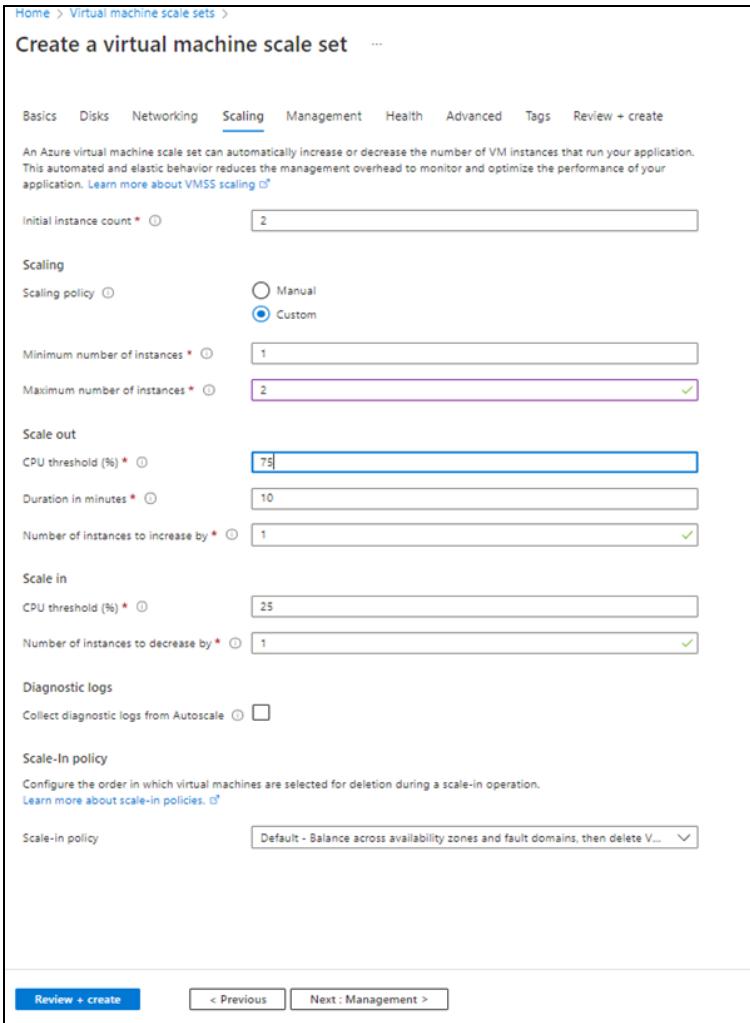
Buttons: OK, Cancel

A note at the bottom left of the form area 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."

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

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

Figure 94 : Create a virtual machine scale set window - Scaling tab



The screenshot shows the 'Create a virtual machine scale set' wizard 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'. Initial instance count is 2. Minimum number of instances is 1. Maximum number of instances is 2.

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

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

Diagnostic Logs: Collect diagnostic logs from Autoscale is unchecked.

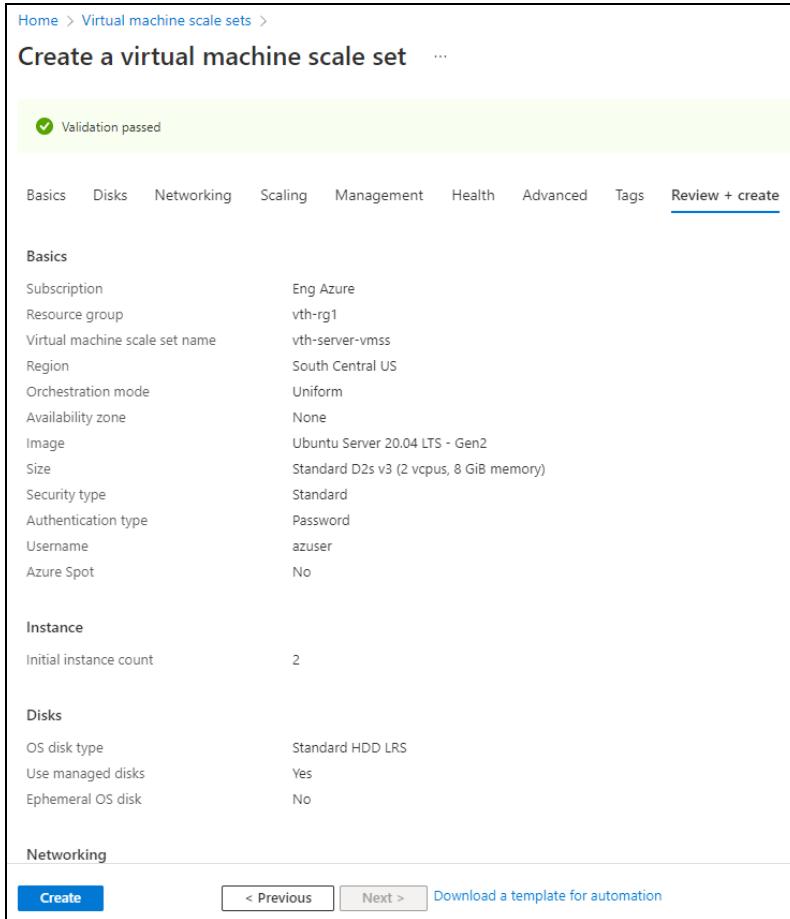
Scale-In Policy: Configure the order in which virtual machines are selected for deletion during a scale-in operation. The policy is set to 'Default - Balance across availability zones and fault domains, then delete V...'. Other options include 'Delete oldest VMs first' and 'Delete VMs in reverse order'.

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

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

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

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

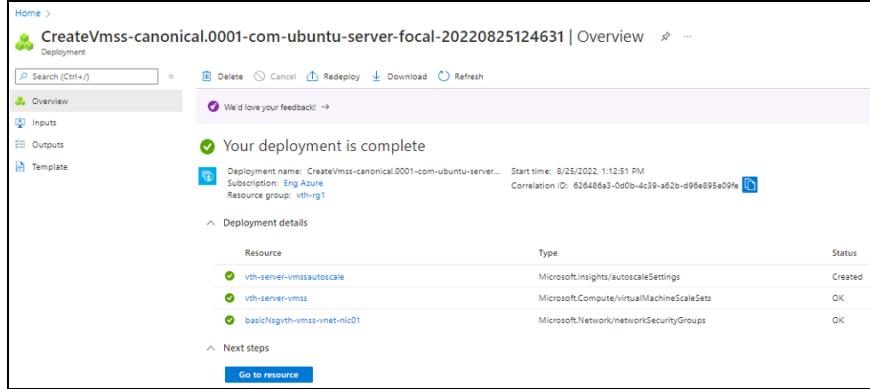


12. Click **Create** at the bottom of the window.

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

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

Figure 96 : Create VMSS window



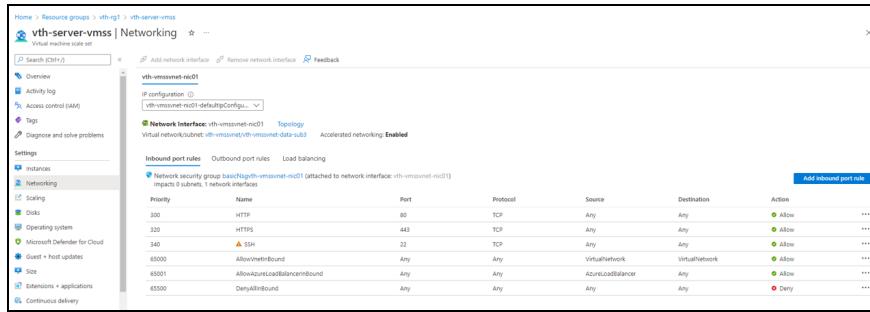
NOTE: It may take the system several minutes to display your resources.

Verify the Server VMSS Creation

To verify the creation of server VMSS, perform the following steps:

1. In the Create VMSS > **Deployment details** section, click the server VMSS resource. Here, the VMSS resource is **vth-server-vmss**. The VMSS resource details window is displayed.
2. Select **Networking** from the left **Settings** panel. VMSS has only one interface. The ports 80 and 443 are available in the **Inbound port rules** tab.

Figure 97 : VMSS > Inbound port rules



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

```
sudo apt install apache2
```

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

Configure Client Machine

The following topics are covered:

- [Create a Client Machine](#)

Create a Client Machine

To create a Client machine, perform the following steps:

1. From Home, navigate to **Azure Services > Create a resource > Virtual machine** and click **Create**.
The **Create a virtual machine** window is displayed.
2. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

Instance details

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

Administrator account

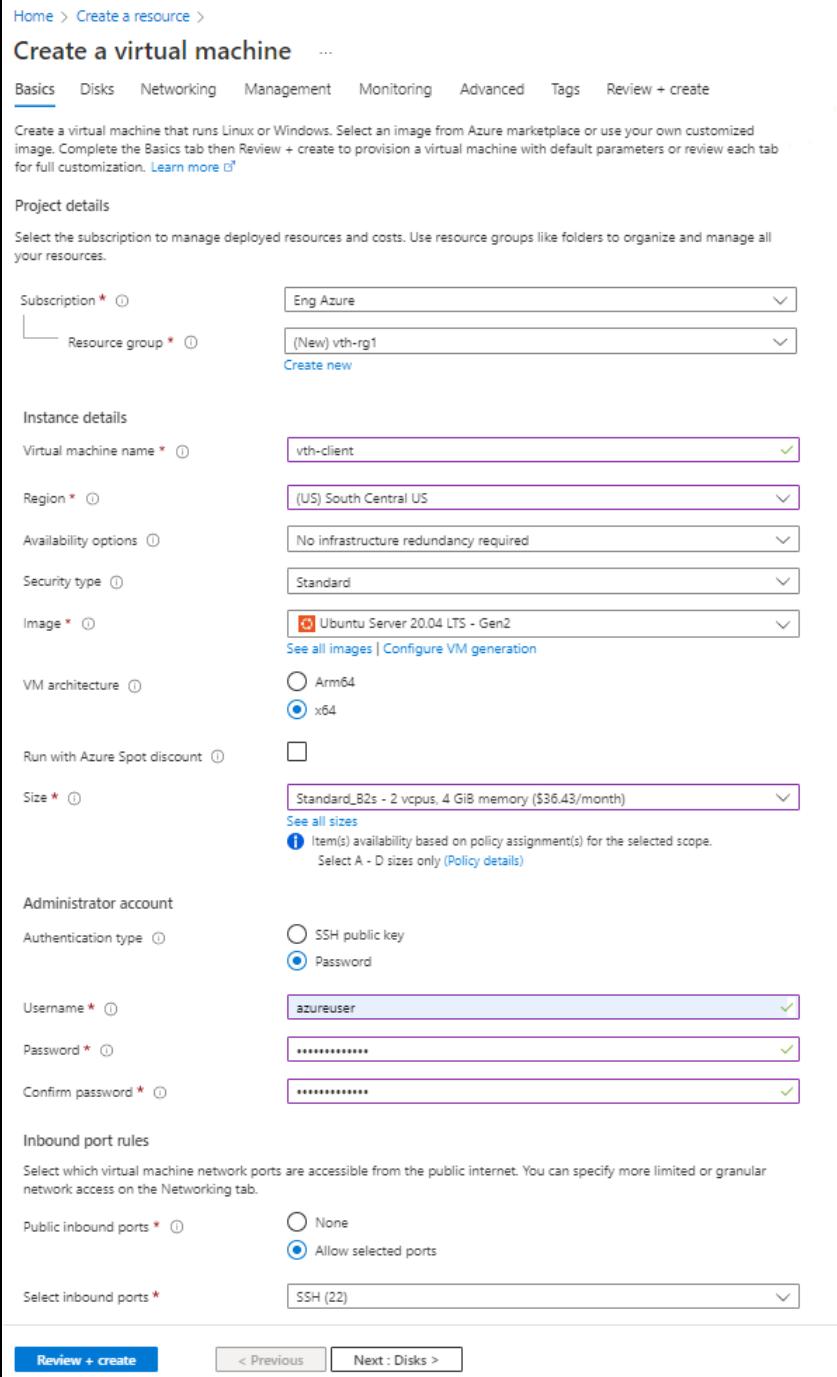
- Depending upon the Authentication type, provide the information.

Inbound port rules

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

- Public inbound ports
- Select inbound ports

Figure 98 : Create a virtual machine window - Basics tab



The screenshot shows the 'Create a virtual machine' Basics tab in the Azure portal. The page title is 'Create a virtual machine' with a 'Basics' tab selected. Below the title, there's a brief description: 'Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization.' A 'Learn more' link is also present.

Project details:

- Subscription: Eng Azure
- Resource group: (New) vth-rg1

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
- VM architecture: x64
- Run with Azure Spot discount: Unchecked
- Size: Standard_B2s - 2 vcpus, 4 GiB memory (\$36.43/month)

Administrator account:

- Authentication type: Password
- Username: azureuser
- Password: (Redacted)
- Confirm password: (Redacted)

Inbound port rules:

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
- Select inbound ports: SSH (22)

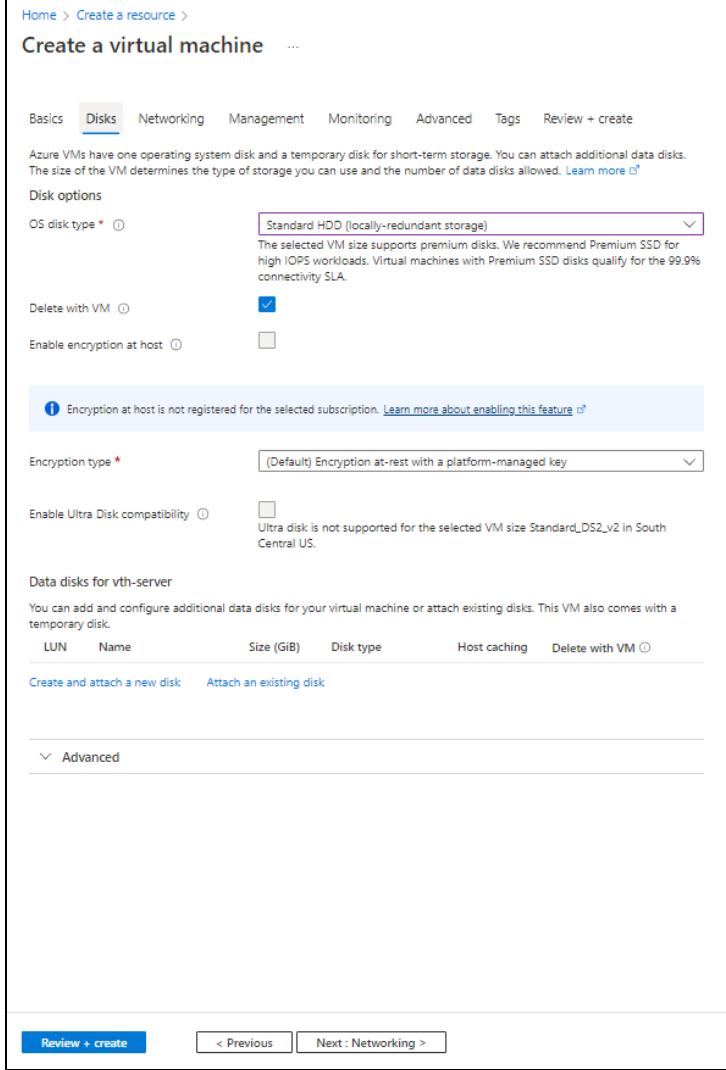
At the bottom, there are navigation buttons: 'Review + create' (highlighted in blue), '< Previous', and 'Next : Disks >'.

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 99 : Create a virtual machine window - Disks tab



Home > Create a resource >

Create a virtual machine ...

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

Disk options

OS disk type * Standard HDD (locally-redundant storage) Premium SSD (high IOPS)

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

Delete with VM

Enable encryption at host

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

Encryption type * (Default) Encryption at-rest with a platform-managed key Custom managed key

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 |
|-----|------|------------|-----------|--------------|-----------------------|
| | | | | | <input type="radio"/> |

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

v Advanced

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

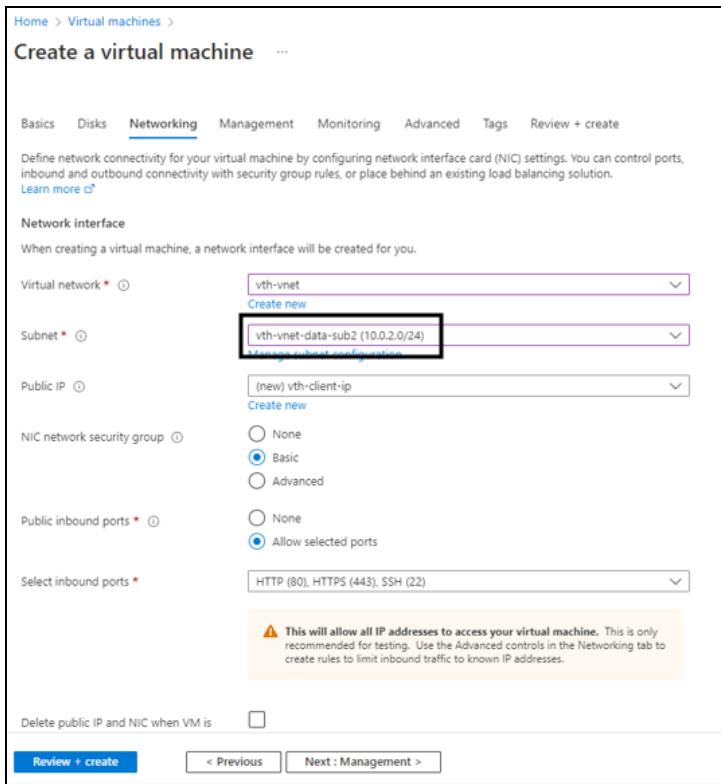
5. Leave the remaining fields as is and click **Next : Networking** at the bottom of the window.

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

Network interface

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

Figure 100 : Create a virtual machine window - Networking tab



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

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

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

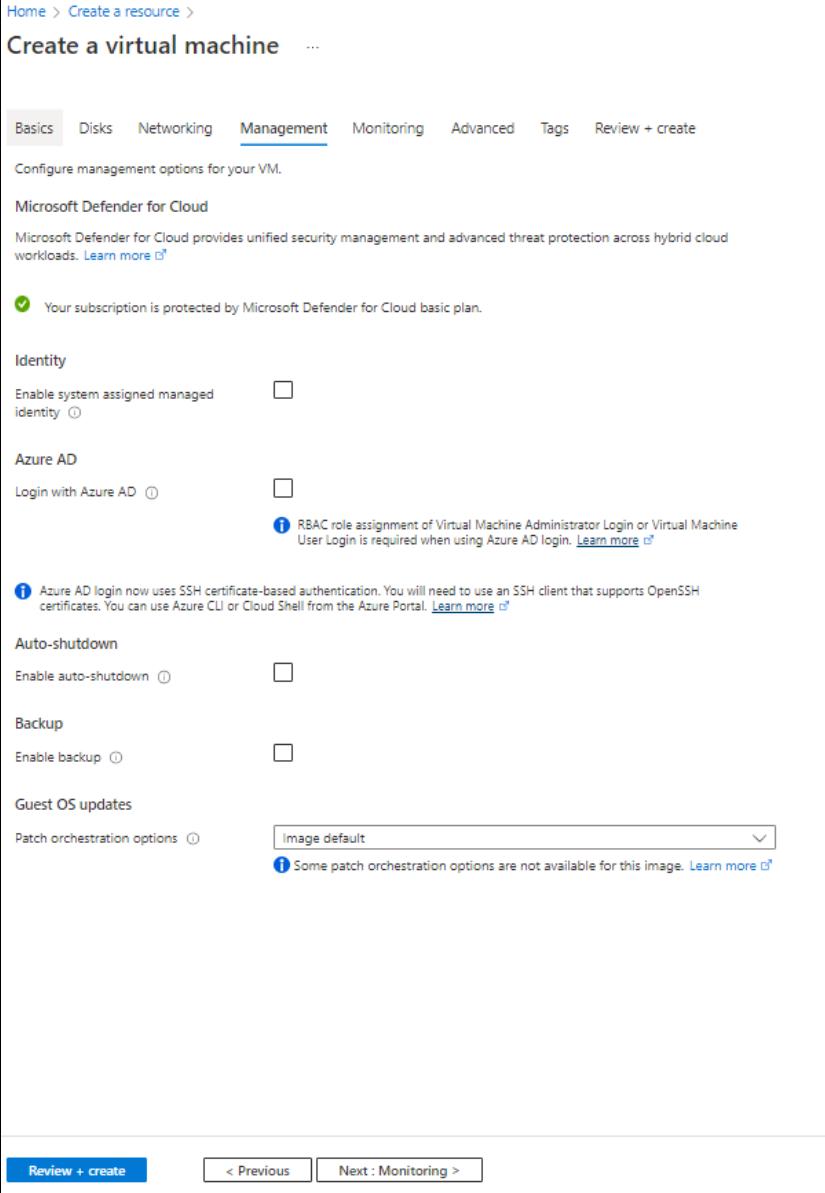
At the bottom of the window, there are buttons for 'Review + create', '< Previous', and 'Next : Management >'.

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

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

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

Figure 101 : Create a virtual machine window - Management tab

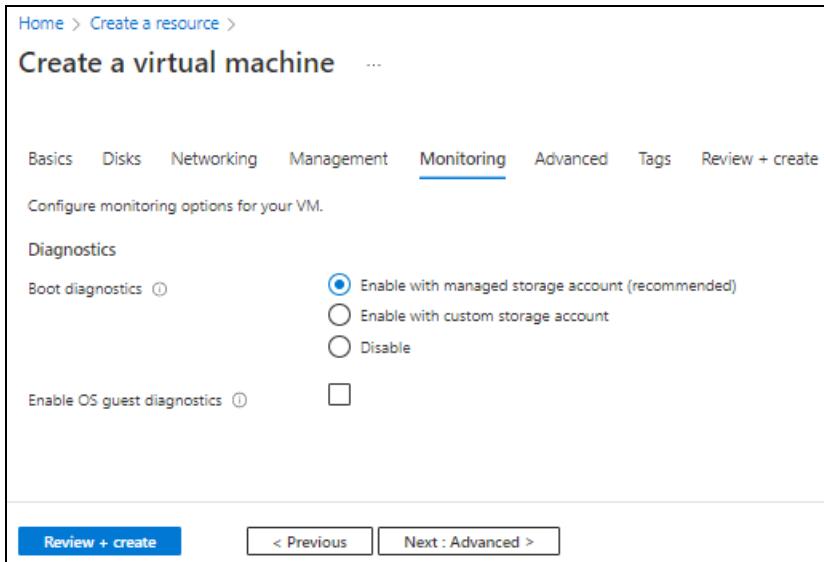


The screenshot shows the 'Create a virtual machine' wizard in the Azure portal, specifically the 'Management' tab. The tab navigation bar includes 'Basics', 'Disks', 'Networking', 'Management' (which is underlined in blue), 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The main content area is titled 'Configure management options for your VM.' It features sections for 'Microsoft Defender for Cloud', 'Identity', 'Azure AD', 'Auto-shutdown', 'Backup', 'Guest OS updates', and a 'Patch orchestration options' dropdown set to 'Image default'. At the bottom, there are buttons for 'Review + create', '< Previous', and 'Next : Monitoring >'.

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

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

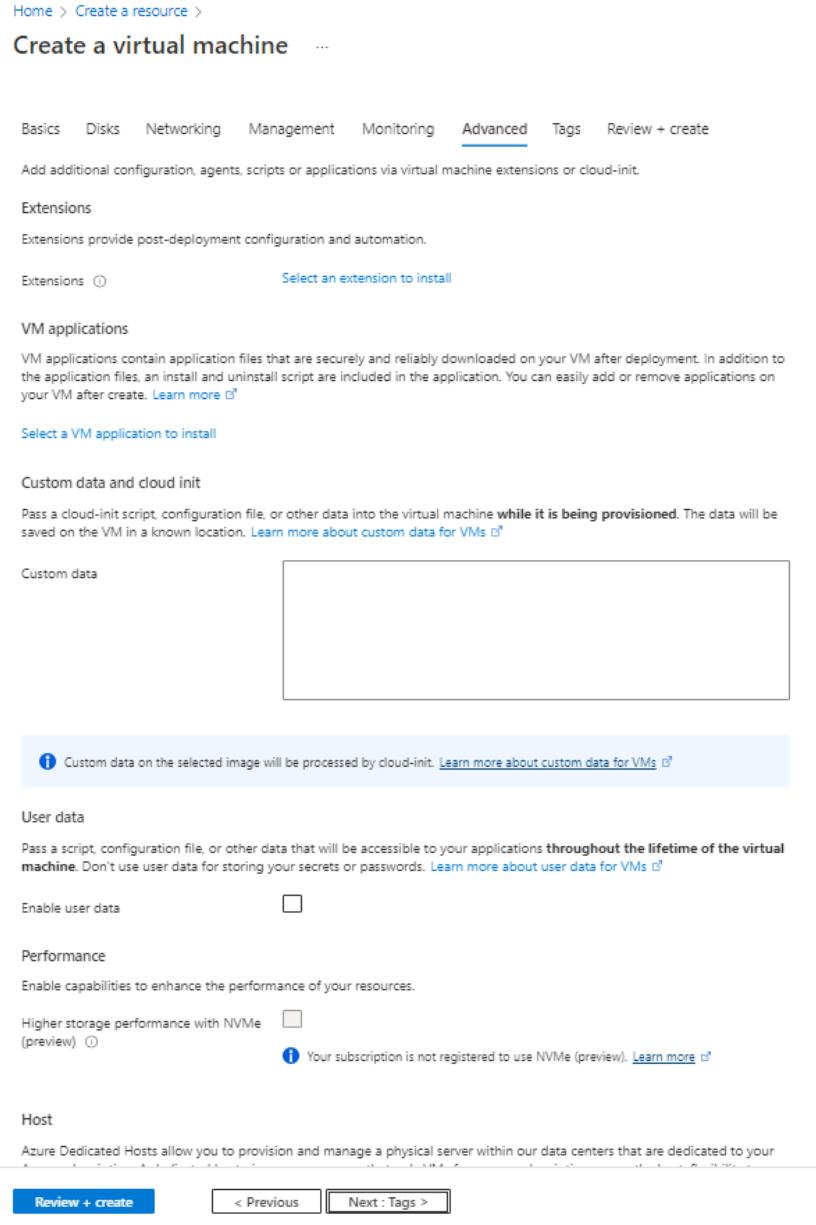
Figure 102 : Create a virtual machine window - Monitoring tab



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

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

Figure 103 : Create a virtual machine window - Advanced tab



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The 'Advanced' tab is selected. Key sections include:

- Extensions:** A note about adding configuration via extensions or cloud-init.
- VM applications:** A note about VM applications containing application files and scripts.
- Custom data and cloud init:** A note about passing a cloud-init script during provisioning.
- Custom data:** A large text input field.
- User data:** A note about accessible data throughout the virtual machine's lifetime.
- Performance:** A note about enabling capabilities to enhance performance.
- Host:** A note about Azure Dedicated Hosts.

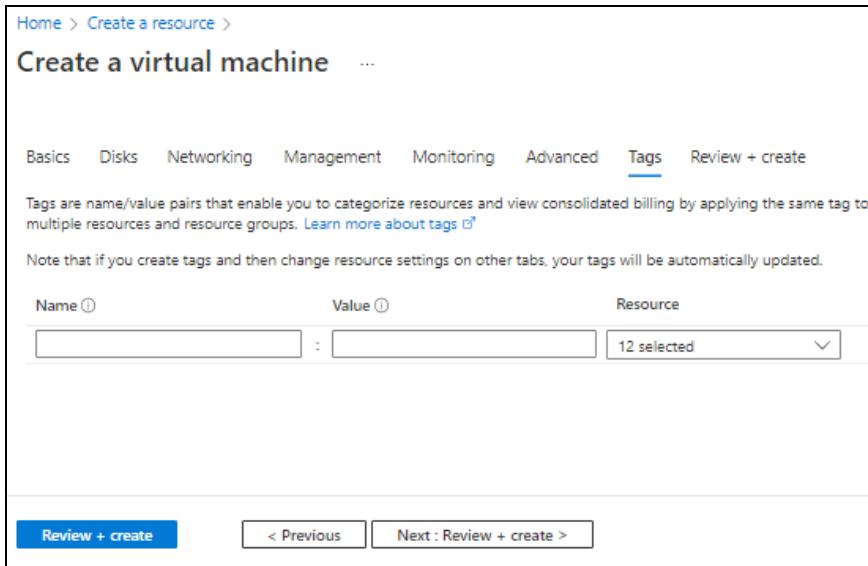
At the bottom, there are buttons for 'Review + create' and navigation links '< Previous' and 'Next : Tags >'.

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

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

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

Figure 104 : Create a virtual machine window - Tags tab



Home > Create a resource >

Create a virtual machine

...

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

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

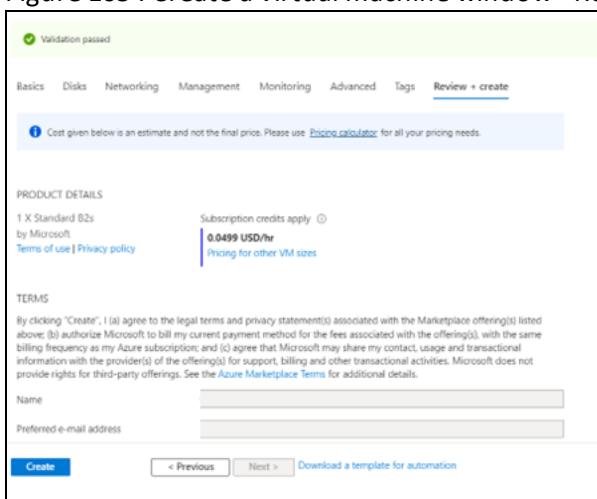
| Name ⓘ | Value ⓘ | Resource |
|--------|---------|---------------|
| | | 12 selected ▾ |

Review + create < Previous Next : Review + create >

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

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

Figure 105 : Create a virtual machine window - Review + create tab



Validation passed

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

PRODUCT DETAILS

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

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

TERMS

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

Name

Preferred e-mail address

Create < Previous / Next > Download a template for automation

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

The Client machine gets created.

Create Automation Account

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_PARAM.json with a text editor.

2. Configure Automation Account.

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

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

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

3. Configure location.

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

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

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

5. Configure VMSS.

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

6. Configure network interface cards.

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

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

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

8. Provide the vThunder instance username.

```
"vThUsername": "admin",
```

NOTE: Do not change the vThunder instance username.

9. Configure ports.

```
"portList": {
  "value": [
    {
      "port-number": 53,
      "protocol": "udp",
      "health-check-disable": 1
    },
    {
      "port-number": 80,
      "protocol": "tcp",
      "health-check-disable": 1
    },
    {
      "port-number": 443,
      "protocol": "tcp",
      "health-check-disable": 1
    }
  ]
}
```

10. Verify if all the configurations in the **ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_PARAM.json** file are correct and then save the changes.

Create an Automation Account

To create an automation account, run the following command:

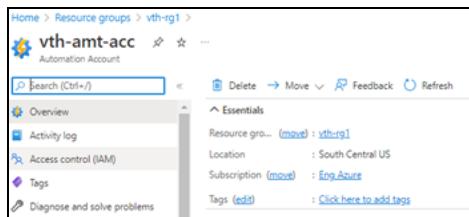
```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_AUTOMATION_ACCOUNT_2.ps1
```

Verify the Automation Account creation

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

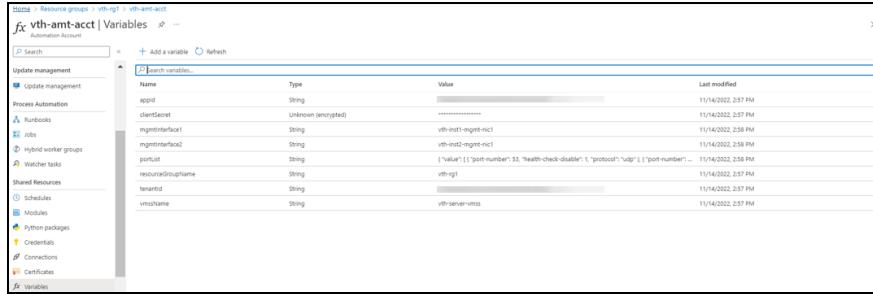
1. From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
The selected resource group - Overview window is displayed.
2. Under **Resources** tab, group the resources based on the resource type.
3. Verify if the recently created automation account is listed under **Automation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

Figure 106 : Selected automation account - Overview window



5. Click **Variables** from the left **Shared Resources** panel.
The selected automation account - Variables window is displayed.

Figure 107 : Selected automation account - Variables window



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

Change Password

To change the vThunder instance password for the first-time, perform the following steps:

- Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_GL_M_CHANGE_PASSWORD_3.ps1
```

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

- Provide the default and new password when prompted:

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

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

Figure 108 : Updated Variables window

Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO

| Name | Type | Value | Last modified |
|-------------------|---------------------|---|-------------------|
| appid | String | 00000000-0000-0000-0000-000000000000 | 2/7/2023, 9:53 PM |
| clientSecret | Unknown (encrypted) | ***** | 2/7/2023, 9:53 PM |
| mgmtInterface1 | String | vth-inet1 mgmt nic1 | 2/7/2023, 9:53 PM |
| mgmtInterface2 | String | vth-inet1 mgmt nic2 | 2/7/2023, 9:53 PM |
| portList | String | [{"value": "1", "port-number": 53, "protocol": "udp", "health-check-disable": 1}, {"port-number": 1, "value": "1"}] | 2/7/2023, 9:53 PM |
| resourceGroupName | String | 00000000-0000-0000-0000-000000000000 | 2/7/2023, 9:53 PM |
| tenantId | String | 00000000-0000-0000-0000-000000000000 | 2/7/2023, 9:53 PM |
| vmName | String | vth-server-vn001 | 2/7/2023, 9:54 PM |
| vThAddress | Unknown (encrypted) | ***** | 2/7/2023, 9:54 PM |
| vThPassword | Unknown (encrypted) | ***** | 2/7/2023, 9:54 PM |
| vThUsername | String | admin | 2/7/2023, 9:53 PM |

To change the password subsequently, perform the following steps:

1. Change the password in vThunder instance.
2. Update the same password in the **Azure Services > Resource Group > <resource_group_name> > <automation_account> > Variables > vThPassword** variable manually.

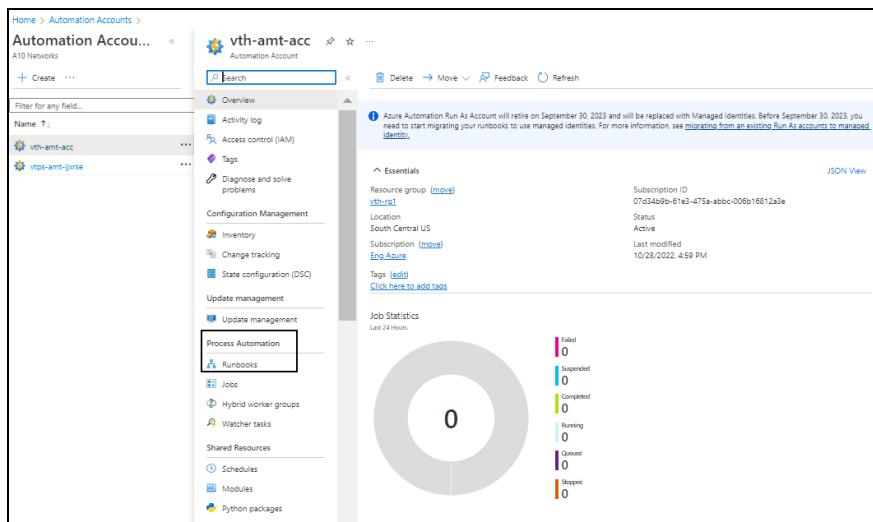
Create Runbook

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

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

The selected automation account window is displayed.

Figure 109 : Selected automation account window



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

The <automation_account_name> - Runbooks window is displayed.

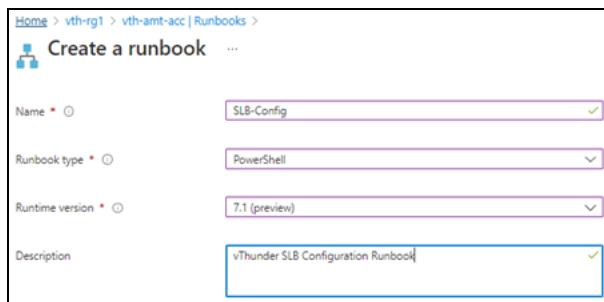
Figure 110 : Selected automation account - Runbooks window



3. Click **Create a runbook.**

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

Figure 111 : Create a runbook window



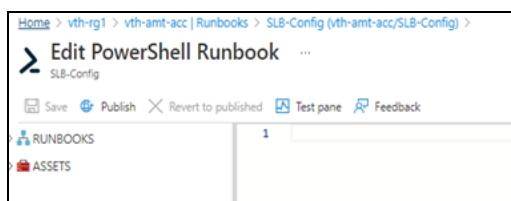
4. Select or enter the following information:

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

5. Click **Create.**

The **Edit PowerShell Runbook** is displayed.

Figure 112 : Edit PowerShell Runbook window



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

6. From the downloaded template folder, open **ARM_TMPL_3NIC_2VM_SLB_SERVER_RUNBOOK.ps1 with a text editor and copy the entire content of the runbook.**

7. Paste this content in the right panel of the **Edit PowerShell Runbook** window.
8. Click **Save** and then click **Publish**.
The runbook gets created for the selected automation account.

Create Automation Account Webhook

The following topics are covered:

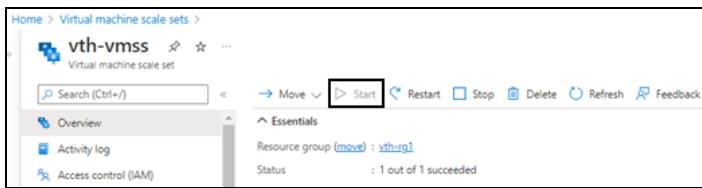
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the Runbook Job creation](#)

Initial Setup

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

1. From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
The selected resource group - Overview window is displayed.
2. Under **Resources** tab, group the resources based on the resource type.
3. Select the virtual machine scale set instance under **Virtual machine scale set** type and verify that the instance is in **Start** mode.

Figure 113 : VMSS window



Create a Webhook

To create a webhook, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.

2. Run the following command to create the webhook:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_WEBHOOK_4.ps1 -runBookName "<runbook_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_WEBHOOK_4.ps1 -runBookName "SLB-Config"
```

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

Save this URL :

https://fa72c8e5-xxxx-xxxx-9dc5-b4a71eec0a95.webhook.scus.azure-automation.net/webhooks?token=Q*****pG4UEOScfqdEGEAKqJPgdK%2bOpusoUAWk*****%3d

3. Save this webhook url for future purpose.

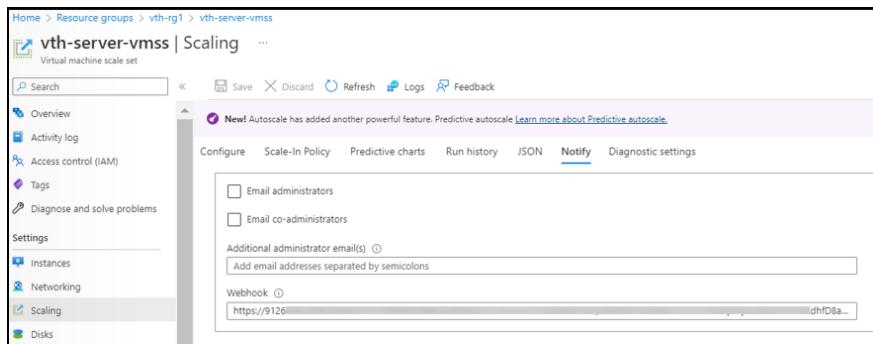
4. From Home, navigate to Azure Services > Virtual machine scale set > <vmss_name>.

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

5. Click Scaling from the left Settings panel.

The selected VMSS - Scaling window is displayed.

Figure 114 : VMSS-Scaling - Notify tab



6. Select **Notify tab.**

7. Copy the saved webhook url and paste it in the **Webhook field.**

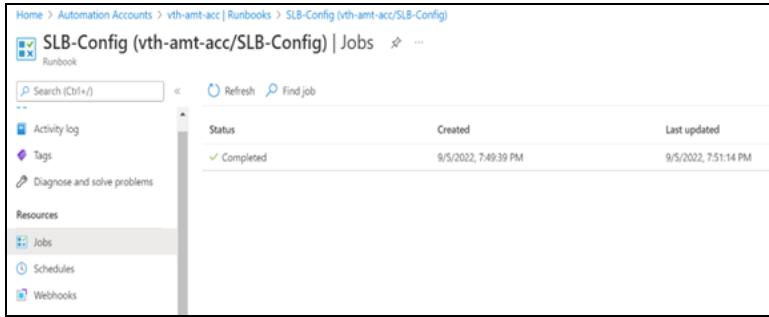
8. Click **Save to save the changes.**

Verify the Runbook Job creation

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

1. From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.
The selected automation account - Overview window is displayed.
2. Click **Jobs** from the left **Process Automation** panel.
The selected automation account - Jobs window is displayed. Here, the job is **SLB-Config**.

Figure 115 : Selected automation account - Jobs window



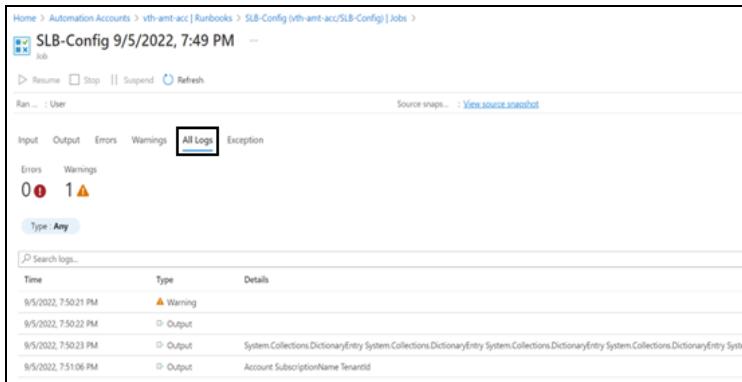
The screenshot shows the 'Jobs' section of the Automation Account overview. A single job entry is listed:

| 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 116 : Selected runbook job window



The screenshot shows the 'All Logs' tab for the 'SLB-Config' runbook. It displays log entries with the following details:

| Time | Type | Details |
|----------------------|---------|---|
| 9/5/2022, 7:50:21 PM | Warning | System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System. |
| 9/5/2022, 7:50:22 PM | Output | |
| 9/5/2022, 7:50:23 PM | Output | System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System.Collections.DictionaryEntry System. |
| 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
        }
    ]
},
```

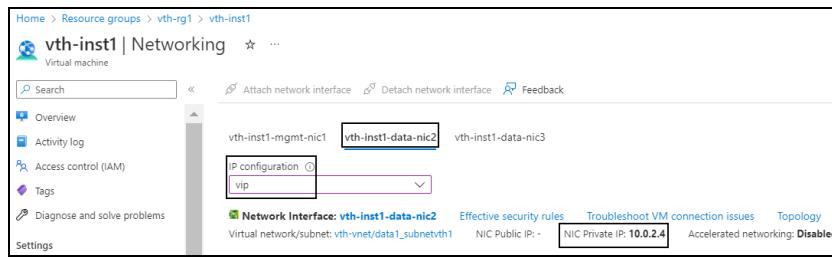
3. Configure virtual server.

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:

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

Figure 117 : Virtual machine - Networking window - Data NIC 2 tab



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

```

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

```

[Deploy ARM A10-vThunder_ADC-3NIC-2VM-HA-GLM-PUBVIP-BACKAUTO](#)

```

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

```

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

4. Configure SSL.

```

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

```

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

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

```

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

```

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

Deploy vThunder as an SLB

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

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_5.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_SLB_CONFIG_5.ps1 -  
resourceGroup vth-rg1
```

A message is prompted to upload the SSL certificate.

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

```

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

```

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

Configure High Availability for vThunder

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM_TMPL_3NIC_2VM_HA_CONFIG_PARAM.json with a text editor.
2. Configure DNS.

```

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

```

3. Configure a Network Gateway IP.

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

```

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

```

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

4. Set a VRRP-A.

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

5. Set a Terminal Idle Timeout.

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

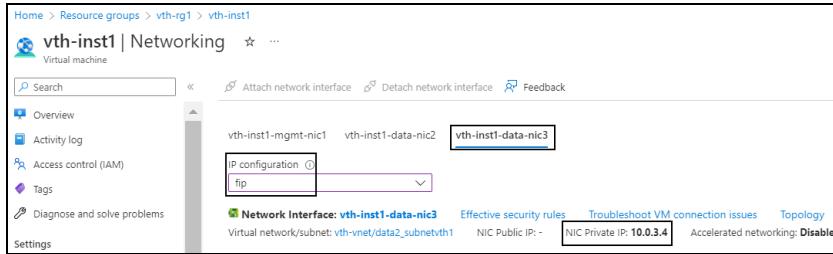
6. Configure VRID details.

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

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

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

Figure 118 : Virtual machine - Networking tab - Data NIC 3 tab



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

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

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

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

Create High Availability for vThunder

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

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

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

```
S C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_6.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_HA_CONFIG_6.ps1 -  
resourceGroup vth-rg1
```

Configure vThunder using GLM

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. From the downloaded ARM template folder, open the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json with a text editor.
2. Configure GLM account details.

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

```

    }
}
```

3. Verify if the configurations in the ARM_TMPL_3NIC_2VM_GLM_CONFIG_PARAM.json file are correct and then save the changes.

Apply GLM License

To apply GLM License, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_7.ps1 -resourceGroupName <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_2VM_GLM_CONFIG_7.ps1 -resourceGroup vth-rg1
```

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

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

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

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

Access vThunder using CLI

To access the two vThunder instances using CLI, perform the following steps:

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

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

Password: xxxx <--Enter password provided by A10 Networks Support-->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

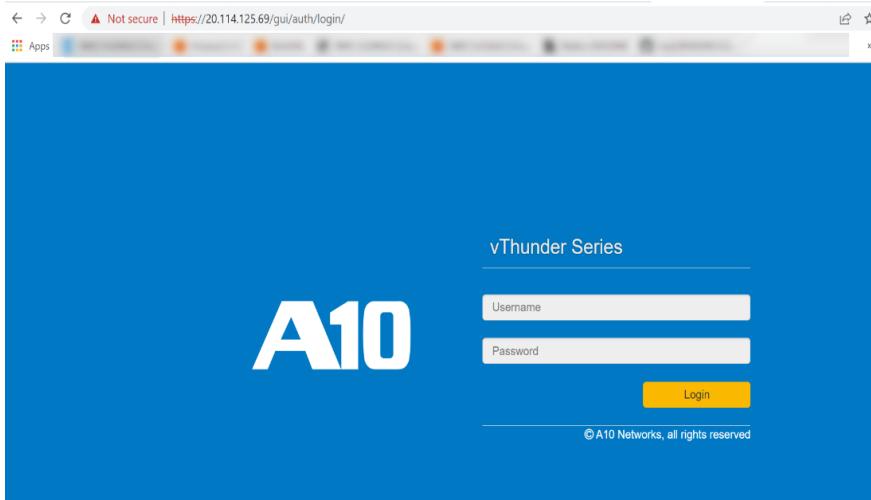
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

Access vThunder using GUI

To access the two vThunder instances using GUI, perform the following steps:

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

Figure 119 : vThunder GUI



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

Verify Deployment

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

1. Run the following command on vThunder:

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

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

```
slb service-group sg443 tcp
  health-check-disable
!
slb service-group sg53 udp
  health-check-disable
!
slb service-group sg80 tcp
  health-check-disable
!
```

```

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

```

2. Run the following command to verify HA:

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

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

```

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

!
vrrp-a common
  device-id 1
  set-id 1
  enable
!
multi-config enable
!
terminal idle-timeout 0
!
ip dns primary 8.8.8.8
!
!
glm use-mgmt-port

```

```

glm enable-requests
glm token vTh11e089e10
!
interface management
    ip address dhcp
!
interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
vrrp-a vrid 0
    floating-ip 10.0.3.4
    floating-ip 10.0.2.4
    blade-parameters
        priority 100
!
vrrp-a peer-group
    peer 10.0.2.35
    peer 10.0.2.36
!
ip route 0.0.0.0 /0 10.0.2.1
!
```

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

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

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

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

4. Run the following command to force stop the active vThunder and make standby vThunder as active device:

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

```
vThunder-ForcedStandby(config) #
```

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

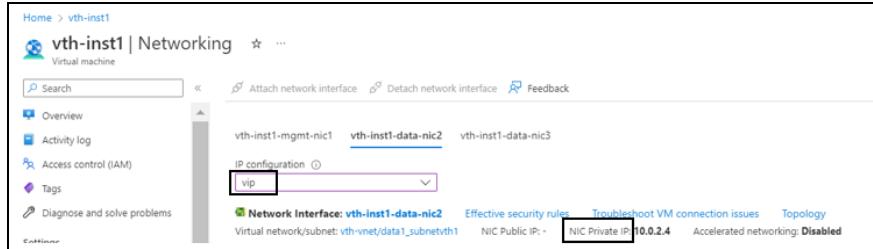
```
vThunder-ForcedStandby(config) #vrrp-a force-self-standby disable
vThunder-Active(config) #
```

Verify Traffic Flow

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

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

Figure 120 : Active vThunder instance 1 VIP



- Select your client instance from the **Virtual machine** list. Here, **vth-client** is the client instance name.
- SSH your client machine and run the following command to verify the traffic flow:

```
curl <VIP>
```

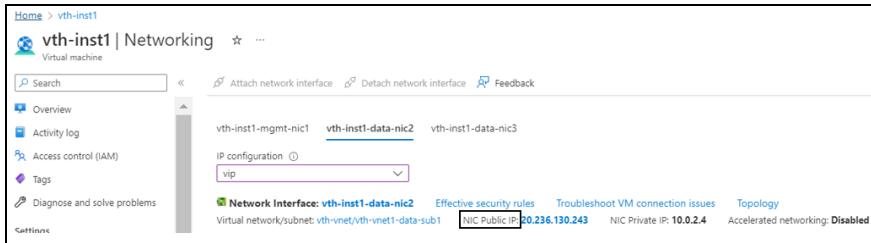
Example

```
curl 10.0.2.4
```

Verify if a response is received.

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

Figure 121 : Active vThunder instance 1 Public IP address



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

```
curl <public_ip_of_data_nic2>
```

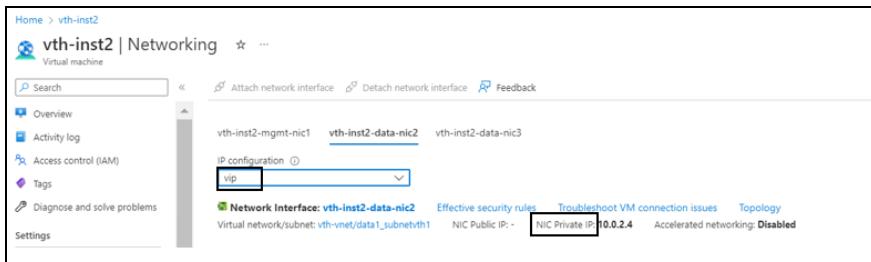
Example

```
curl 20.236.130.243
```

Verify if a response is received.

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

Figure 122 : Active vThunder instance 2 VIP



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

```
curl <VIP>
```

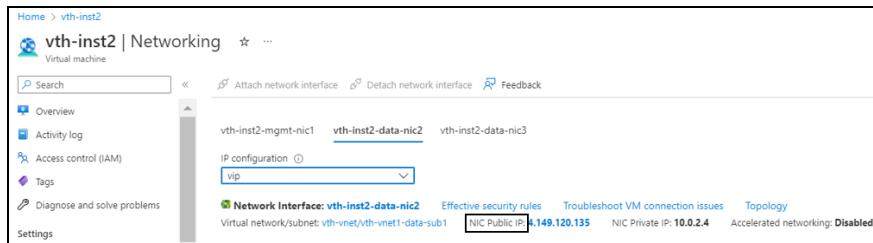
Example

```
curl 10.0.2.4
```

Verify if a response is received.

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

Figure 123 : Active vThunder instance 2 Public IP address



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

```
curl <public_ip_of_data_nic2>
```

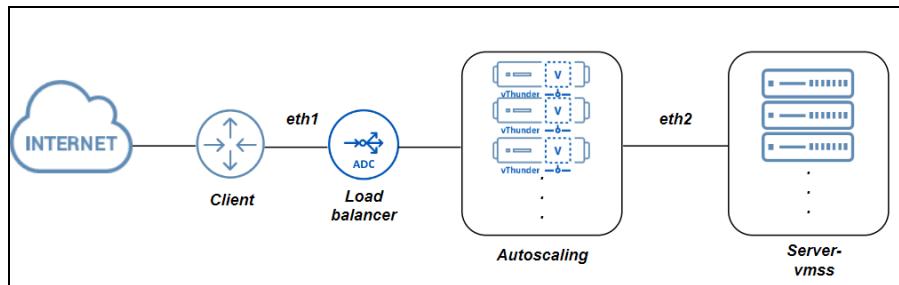
Verify if a response is received.

Deploy ARM A10-vThunder_ADC-3NIC-VMSS

[Figure 124](#) shows the 3NIC-NVM-VMSS deployment topology. Using this template, multiple vThunder instances in a Virtual Machine scale set using CPU Matrix-based autoscaling can be deployed containing:

- One management interface and two data interfaces each
- GLM integration
- SSL Certificate support
- Server Load Balancer
- Log Analysis using Azure Log Analytics integration
- Azure Application Insight integration

Figure 124 : 3NIC-NVM-VMSS Topology



The following topics are covered:

| | |
|--|-----|
| System Requirements | 236 |
| Create vThunder Instances | 241 |
| Configure Server VMSS | 250 |
| Configure Automation Account | 259 |
| Enable Autoscaling | 273 |
| On-demand Password Change | 302 |
| Access vThunder using CLI or GUI | 304 |
| Verify Deployment | 305 |
| Verify Traffic Flow | 308 |

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 vth-rg1 . |
| Azure Storage Account | <p>A storage account is created inside the resource group, if it doesn't exist.</p> <p>If the storage name already exists, the following error is displayed "The storage account named vthunderstorage already exists under the subscription".</p> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | <p>Azure Storage Account: vthunderstorage</p> <p>SSL Container: ssl</p> <p>Log Agent Container: vth-agent-cont</p> |
| Virtual Machine (VM) Instance | Two virtual machine instances are created, vThunder and monitoring agent. | <p>A10 vThunder instance: vth-vmss_0</p> <p>A10 Monitoring Agent: vth-</p> |

| Resource Name | Description | Default Value |
|----------------------------|--|---------------|
| | <p>Product: A10 vThunder</p> <p>Operating system: Linux</p> <p>Default Size: Standard_B4ms (4 vCPUs, 16 GiB Memory)</p> <p>Product: A10 Monitoring Agent</p> <p>Operating system: Linux</p> <p>Default Size: Standard_DS2_V2 (2 vCPUs, 7 GiB Memory)</p> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 13 lists the supported VM sizes.</p> | 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"> • Change-Password-Config • Event-Config | |

| Resource Name | Description | Default Value |
|-------------------------------|---|---|
| | <ul style="list-style-type: none"> • GLM-Config • GLM-Revoke-Config • Master-Runbook • SLB-Config • SSL-Config <p>A webhook is created under the Master-Runbook.</p> | |
| Azure Log Analytics Workspace | A log analytics workspace is created. A custom agent, fluentbit, sends all logs to log analytics. | vth-vmss-log-workspace |
| Azure Application Insights | The custom metrics are created. Depending upon the configured threshold values, it is considered for autoscaling. | <p>Default application insight name: vth-vmss-app-insights</p> <p>Default custom metrics name: vth-cpu-metrics</p> <p>Default threshold for autoscale-in is 25%.</p> <p>Default threshold for autoscale-out is 80%.</p> |
| Azure Load Balancer [LB] | <p>A load balancer with an interface is created under the automation account if it does not exist. The creation of LB is optional, and it can be skipped during the execution.</p> <p>One backend pool is created, and it gets attached to the Network Interface Card 2 (NIC2).</p> <p>Three default LB rules are</p> | <p>Azure Load Balancer: vth-lb1</p> <p>Backend Pool: vth-lb1-bck-pool1</p> <p>Three default rules are created:</p> <ul style="list-style-type: none"> • rulePort80 • rulePort443 • rulePort53 <p>Three default probes are created:</p> |

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

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

Supported VM Sizes

Table 13 : Supported VM sizes

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

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

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

For more information on Windows and Linux VM sizes, see

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

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

Create vThunder Instances

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template, and open the ARM_TMPL_3NIC_NVM_VMSS_PARAM.json with a text editor.

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

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

```

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

```

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

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

```

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

```

4. Configure a virtual network scale set.

```

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

```

5. Set a VMSS size for vThunder.

```

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

```

6. Set a VM size for Agent.

```

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

```

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

7. Set an instance count.

```

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

```

NOTE: The instance count cannot be less than 1.

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

```

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

```

NOTE: Do not change the publisher name.

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

```

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

```

10. Configure network interface cards for each vThunder instances.

```

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

```

```

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

```

11. Configure NIC1 public IP name for vThunder.

```

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

```

12. Configure a network security group.

```

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

```

13. Configure a storage account name.

```

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

```

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

14. Configure SSL container name.

```

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

```

NOTE: Do not change the SSL container name.

15. Configure storage account type.

```

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

```

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

```

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

```

```

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

```

17. Configure vThunder monitoring VM name.

```

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

```

18. Configure log agent container name.

```

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

```

19. Verify if all the configurations in the ARM_TMPL_3NIC_NVM_VMSS_PARAM.json file are correct and then save the changes.

Deploy vThunder

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

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

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

Example:

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

```

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

```

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

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

Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g vth-rg1 --template-file ARM_TMPL_3NIC_NVM_VMSS_1.json --parameters ARM_TMPL_3NIC_NVM_VMSS_PARAM.json
```

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

Verify Resource Creation

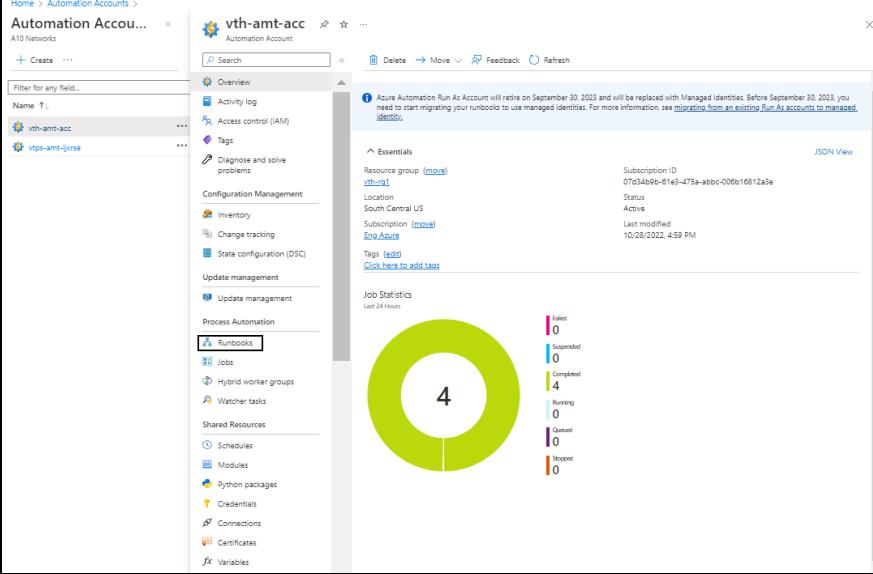
Runbook

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

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

The selected automation account - Overview window is displayed.

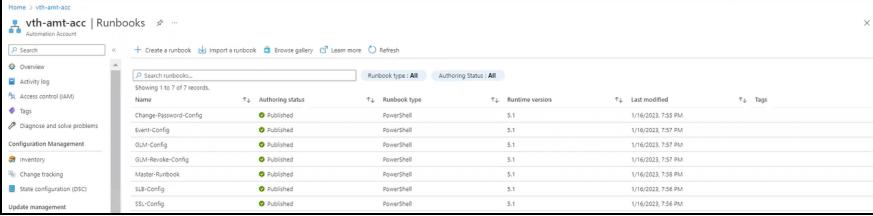
Figure 125 : Selected automation account - Overview window



| Status | Count |
|-----------|-------|
| Failed | 0 |
| Suspended | 0 |
| Completed | 4 |
| Burning | 0 |
| Owed | 0 |
| Staged | 0 |

- Click **Runbooks** from the left **Process Automation** panel.
- The selected automation account - Jobs window is displayed.

Figure 126 : Selected automation account - Runbooks window



| Name | Authoring status | Runbook type | Runtime version | Last modified | Tags |
|------------------------|------------------|--------------|-----------------|-------------------|------|
| Change-Password-Config | Published | PowerShell | 5.1 | 5/16/2023 7:55 PM | |
| Event-Config | Published | PowerShell | 5.1 | 5/16/2023 7:57 PM | |
| GCM-Config | Published | PowerShell | 5.1 | 5/16/2023 7:57 PM | |
| GCM-Invoke-Config | Published | PowerShell | 5.1 | 5/16/2023 7:58 PM | |
| Master-Runbook | Published | PowerShell | 5.1 | 5/16/2023 7:58 PM | |
| Ssl-Config | Published | PowerShell | 5.1 | 5/16/2023 7:58 PM | |
| SSL-Config | Published | PowerShell | 5.1 | 5/16/2023 7:58 PM | |

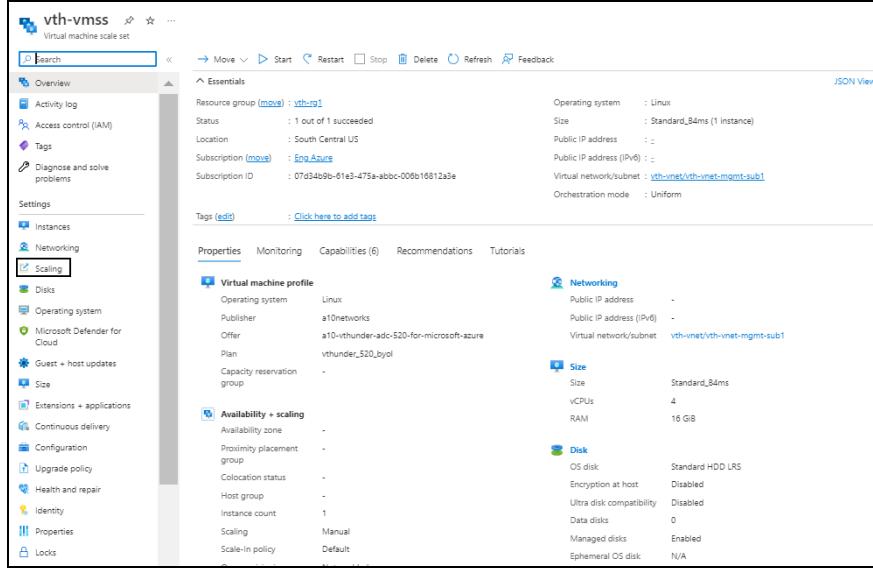
Instance Count

To verify the instance count, perform the following steps:

- From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.

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

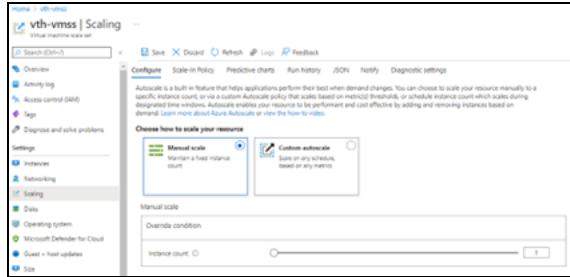
Figure 127 : Virtual machine scale set - Overview window



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

The selected VMSS - Scaling window is displayed.

Figure 128 : Virtual machine scale set - Scaling window - Configure tab



3. Verify the configured instance count.

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

LB creation

To verify LB resource creation, perform the following steps:

- From **Home**, navigate to **Azure Services > Load balancer > <lb_name>**.
The selected LB - Overview window is displayed. Here, the LB name is **vth-lb1**.
- Click **Frontend IP configuration** from the left **Settings** panel to verify if the LB frontend IP is created.

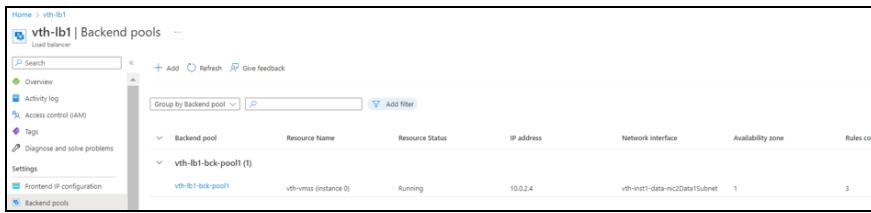
Figure 129 : Selected Frontend IP configuration window



| 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.

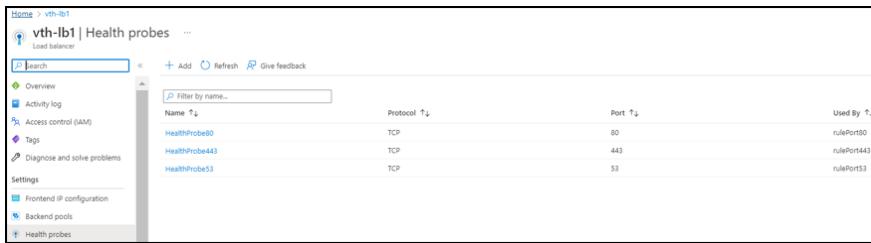
Figure 130 : Selected Backend pools window



| Backend pool | Resource Name | Resource Status | IP address | Network interface | Availability zone | Rules count |
|-------------------|-----------------------|-----------------|------------|--------------------------------|-------------------|-------------|
| vth-lb1-bck-pool1 | vth-vms1 (instance 0) | Running | 10.0.2.4 | vth-inst1-data-nic2Data/Subnet | 1 | 3 |

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

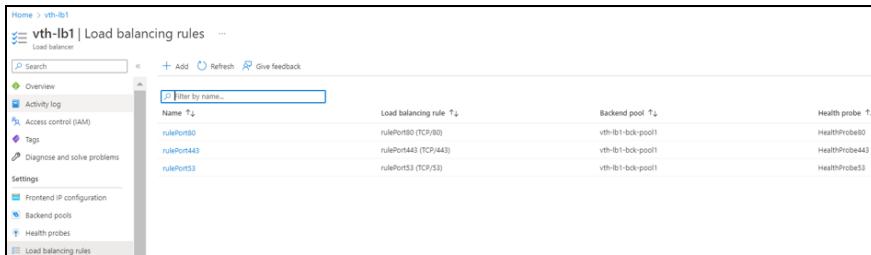
Figure 131 : Selected Health Probes window



| 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 132 : Selected load balancing rules window



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

Storage Account Container

To verify storage account container, perform the following steps:

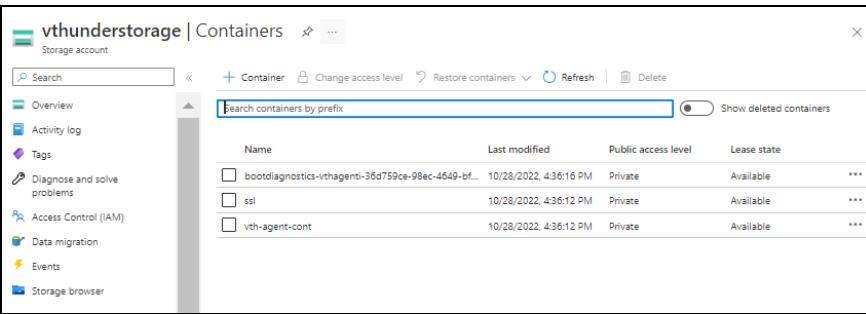
- From **Home**, navigate to **Azure Services > Storage account > <storage_account_name>**.

The selected storage account - Overview window is displayed. Here, the storage account name is **vthunderstorage**.

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

The selected storage account - Containers window is displayed.

Figure 133 : 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:

- From Home, navigate to **Azure Services > Virtual machine scale sets** and click **Create**.
The **Create a virtual machine** window is displayed.
- Select or enter the following mandatory information in the **Basics** tab:
Project details

- Subscription
- Resource group

Scale set details

- Virtual machine scale set name - Server machine
- Region

Orchestration

- Orchestration mode

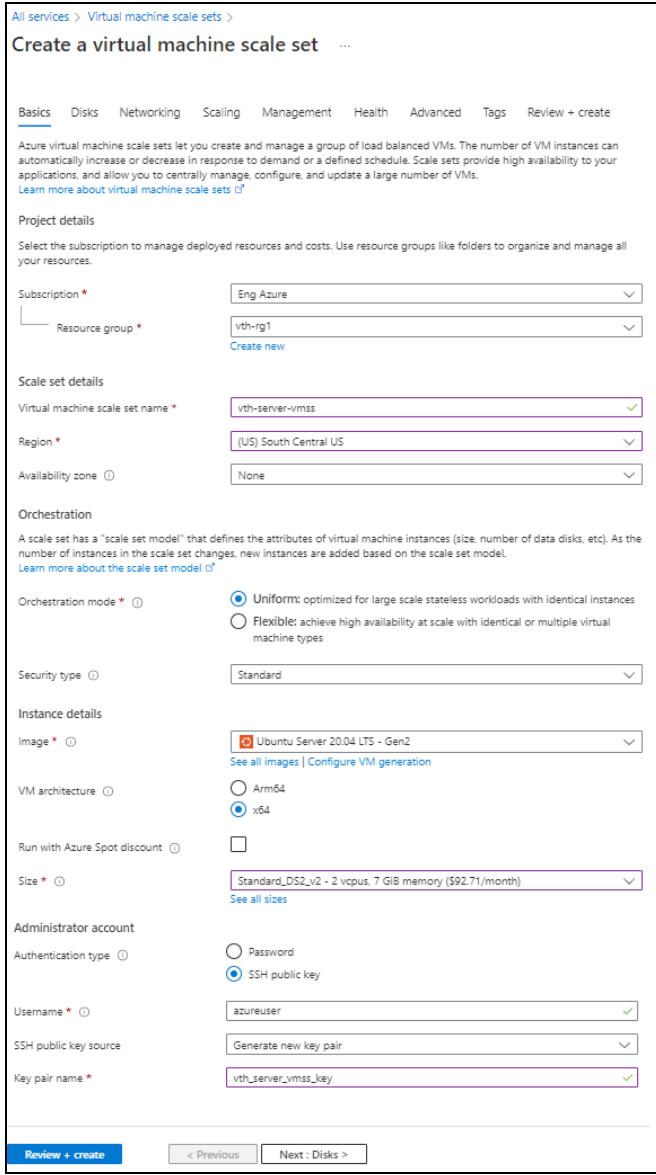
Instance details

- Image
- Size

Administrator account

- Depending upon the Authentication type, provide the information.

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



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

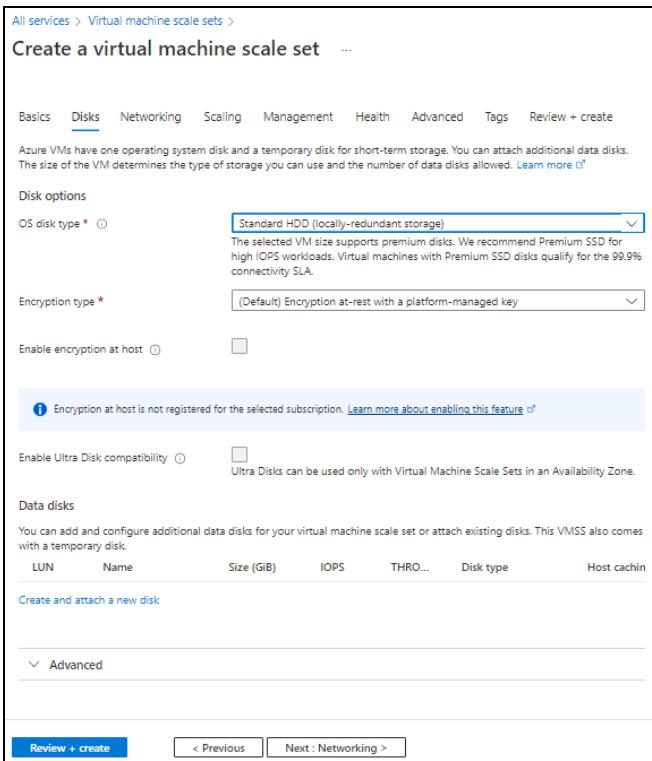
- Subscription:** Eng Azure
- Resource group:** vth-rg1
- Virtual machine scale set name:** vth-server-vmss
- Region:** (US) South Central US
- Availability zone:** None
- Orchestration mode:** Uniform (selected)
- Security type:** Standard
- Image:** Ubuntu Server 20.04 LTS - Gen2
- VM architecture:**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

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

3. Leave the remaining fields as is and click **Next : Disks** at the bottom of the window.
4. Select or enter the following mandatory information in the **Disks** tab:
Disk options

- OS disk type
- Encryption type

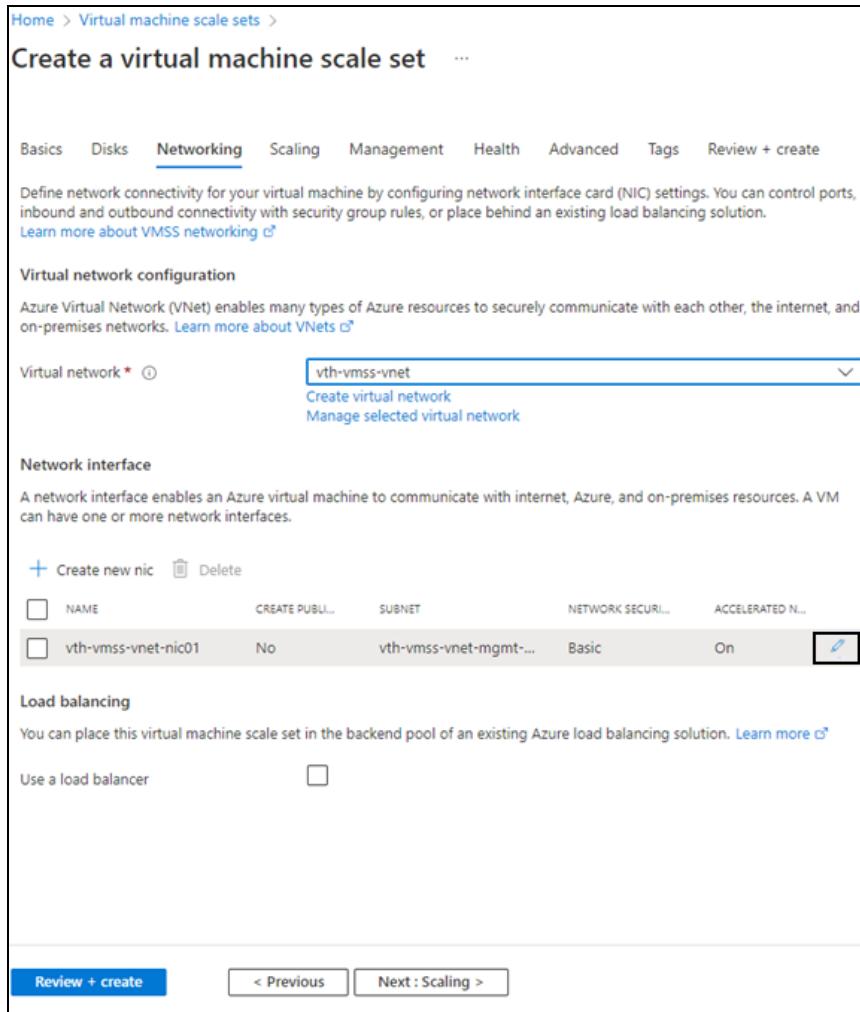
Figure 135 : Create a virtual machine scale set window - Disks tab



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

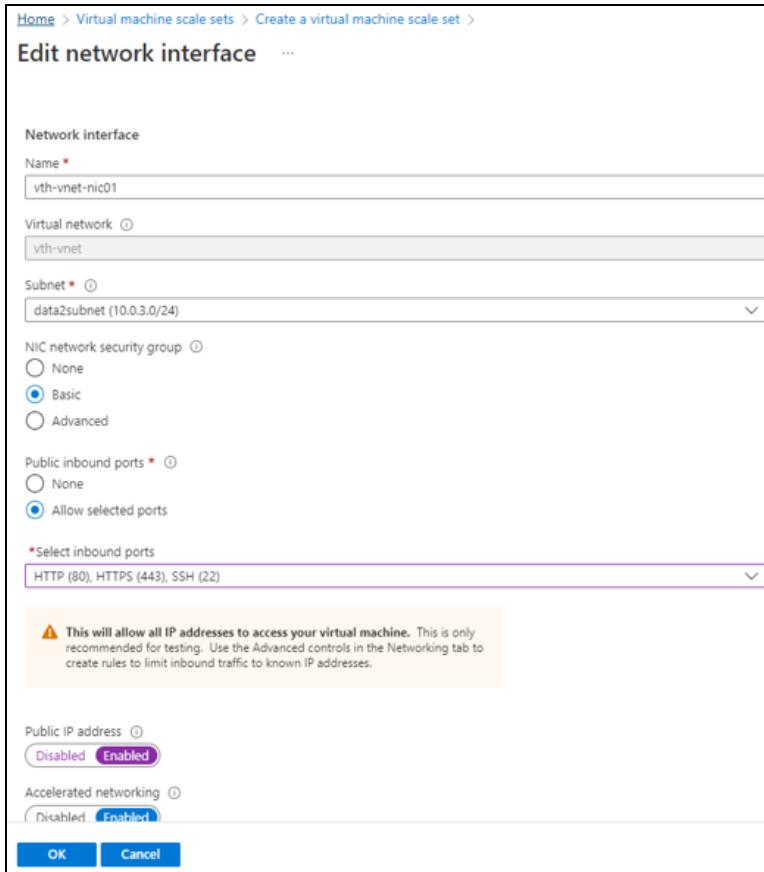
6. Select the Virtual network in the **Networking** tab.

Figure 136 : 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 137 : 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 138 : Create a virtual machine scale set window - Scaling tab

The screenshot shows the 'Create a virtual machine scale set' wizard in the Azure portal, with the 'Scaling' tab selected. The 'Scaling' tab is highlighted in blue at the top of the navigation bar. Below the tabs, there is a note about VMSS scaling: "An Azure virtual machine scale set can automatically increase or decrease the number of VM instances that run your application. This automated and elastic behavior reduces the management overhead to monitor and optimize the performance of your application. [Learn more about VMSS scaling](#)".

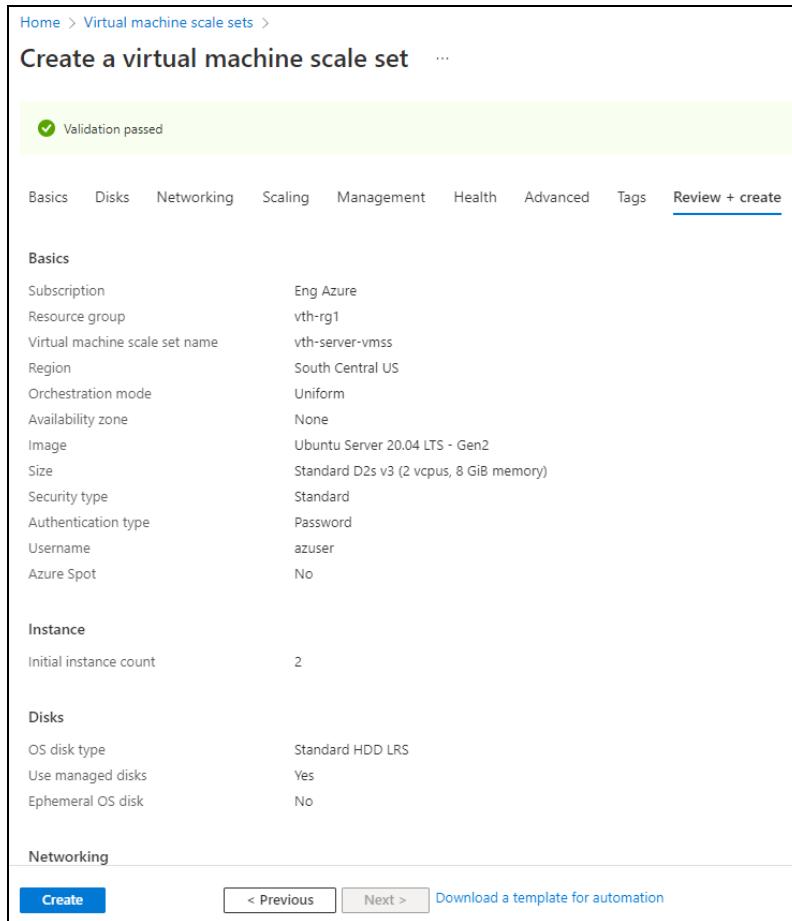
The 'Scaling' tab contains several configuration sections:

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

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

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

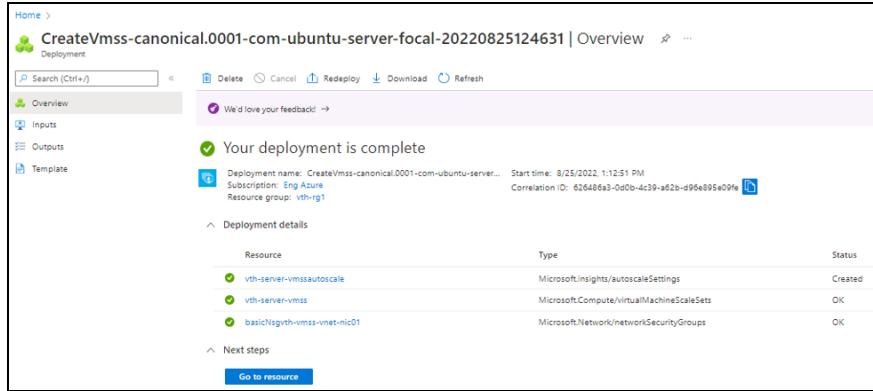
Figure 139 : Create a virtual machine scale set window - Review + create tab



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

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

Figure 140 : Create VMSS window



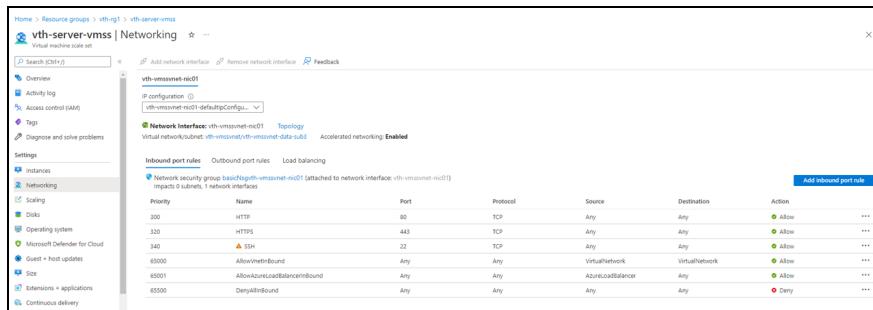
NOTE: It may take the system several minutes to display your resources.

Verify the Server VMSS Creation

To verify the creation of server VMSS, perform the following steps:

1. In the Create VMSS > **Deployment details** section, click the server VMSS resource. Here, the VMSS resource is **vth-server-vmss**. The VMSS resource details window is displayed.
2. Select **Networking** from the left panel. VMSS has only one interface. The ports 80 and 443 are available in the **Inbound port rules** tab.

Figure 141 : VMSS > Inbound port rules



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

```
sudo apt install apache2
```

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

Configure Automation Account

The following topics are covered:

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

Create Automation Account

The following topics are covered:

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

Initial Setup

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

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_3NIC_NVM_VMSS_RUNBOOK_VARIABLES.json with a text editor.
2. Configure the Azure autoscale resources.

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

If the automation account variable does not exist, then a new automation

account variable gets created inside the automation account. If an automation account variable already exists, an error is displayed "The variable already exists".

Provide the application/client ID and tenant ID saved in the [Collect Azure Access Key](#) step or you can get these values from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application_name>**.

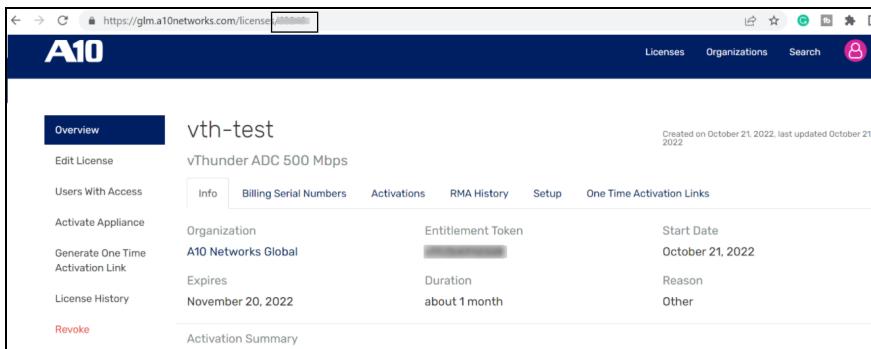
```
"azureAutoScaleResources": {
    "resourceGroupName": "vth-rg1",
    "automationAccountName": "vth-amt-acc",
    "vThunderScaleSetName": "vth-vmss",
    "serverScaleSetName": "vth-server-vmss",
    "storageAccountName": "vthunderstorage",
    "appId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
    "tenantId": "xxxxxxxx-xxx-xxxx-xxxx-xxxxxxxxxxxx",
    "masterWebhookUrl": "<master-runbook-webhook-url>",
    "location": "South Central US"
},
```

NOTE: Do not change the **Master Webhook url**. It gets updated automatically.

3. Configure the GLM parameters.

```
"glmParam": {
    "userName": "youremail@a10networks.com",
    "userPassword": "your_password",
    "entitlementToken": "A10xxa2fxxxx",
    "licenseId": "59xxx"
},
```

You can get the license ID from [GLM Portal](#). Select your license and go to the URL. The license ID is at the end of the URL. For example,
glm.a10networks.com/license/12345



4. Configure SSL parameters.

```

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

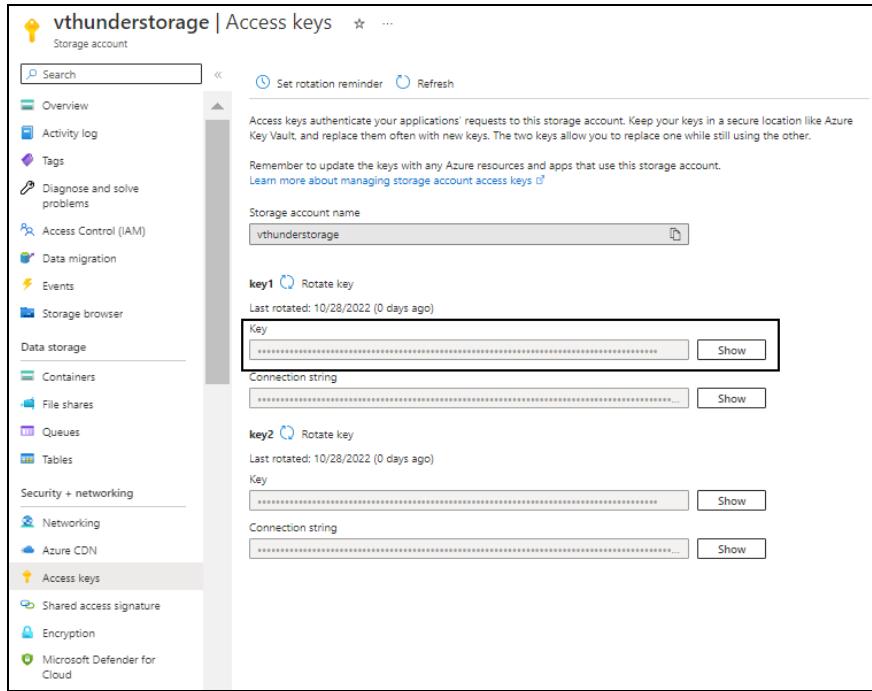
    "storageAccountKey": "LX6z8xxxxxxehXx0xxxv7xxxx/xxxOfxxxxxxxxR0xxx5gXxxxx
xfhxcx0gxxxxx9rxxASxxxxs=="
},

```

NOTE: The `server.pem` file should be placed in the same downloaded folder from which your are executing the scripts. For example, the `server.pem` should be placed in '`C:\Users\TestUser\Templates\`' folder.

You can get the storage account key from **Azure Portal > Azure Services > Storage accounts > <storage_account_name> > Access Keys > Key1 > Key**.

Figure 142 : Selected storage account - Access keys window



5. Configure SLB parameters.

```
"slbParam": {
  "slb_port": [
    {
      "value": [
        {
          "port-number": 53,
          "protocol": "udp",
          "health-check-disable": 1
        },
        {
          "port-number": 80,
          "protocol": "tcp",
          "health-check-disable": 1
        },
        {
          "port-number": 443,
          "protocol": "tcp",
          "health-check-disable": 1
        }
      ]
    }
  ]
}
```

```
        }
    ],
},
"vip_port": {
    "value": [
        {
            "port-number":53,
            "protocol":"udp",
            "ha-conn-mirror":1,
            "auto":1,
            "service-group":"sg53"
        },
        {
            "port-number":80,
            "protocol":"http",
            "auto":1,
            "service-group":"sg80"
        },
        {
            "port-number":443,
            "protocol":"https",
            "auto":1,
            "service-group":"sg443"
        }
    ]
},
"rib_list": [
    {
        "ip-dest-addr":"0.0.0.0",
        "ip-mask":"/0",
        "ip-nexthop-ipv4": [
            {
                "ip-next-hop":"10.0.2.1"
            }
        ]
    }
]
```

```
},
```

6. Configure AutoScale parameters.

```
"autoScaleParam": {  
    "maxScaleOutLimit": 10,  
    "minScaleInLimit": 1,  
    "scaleInThreshold": 25,  
    "scaleOutThreshold": 80  
},
```

NOTE:

These parameters are applied only for the function-based autoscaling. Skip these parameters for Agent-based autoscaling.

7. Provide the client secret ID from **Azure Portal > Azure Services > Azure Active Directory > App Registration > Owned applications > <application_name> > Certificates & secrets**.

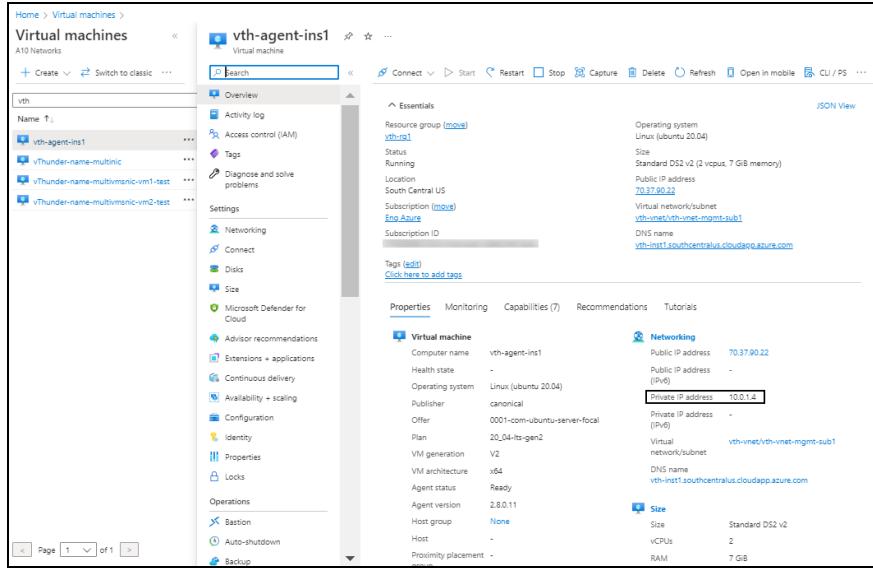
```
"clientSecret": "9-xxxx~jIxxxEVyxxxxHNxxxOwv_xxxxZLxxxTM",
```

8. Configure private IP of agent VM.

```
"agentPrivateIP": "10.0.1.4"
```

You get this value from **Azure Portal > Azure Services > Virtual machine > <virtual_machine> > Overview > Properties > Private IP address**.

Figure 143 : Selected virtual machine - Overview window



9. Verify the vThunder instance username.

```
"vThUsername": "admin"
```

NOTE: Do not change the vThunder instance username.

10. Retain the vThunder new password application flag initially as 'False'.

```
"vThNewPassApplyFlag": "False"
```

11. Verify if all the configurations in the ARM_TMPL_3NIC_NVM_VMSS_RUNBOOK_VARIABLES.json file are correct and then save the changes.

Create an Automation Account

To create an automation account, perform the following steps:

1. Run the following command:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_AUTOMATION_ACCOUNT_2.ps1
```

2. Provide the default and new password when prompted:

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

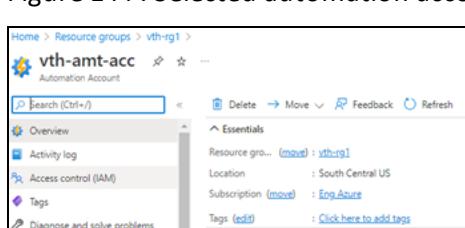
The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Verify the Automation Account Creation

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

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

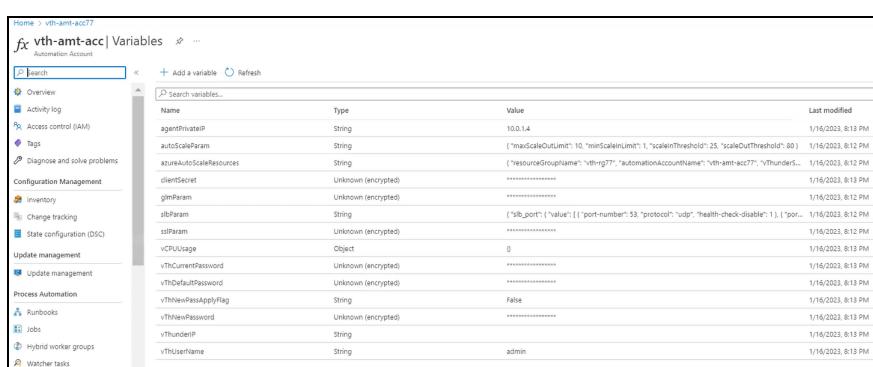
Figure 144 : Selected automation account - Overview window



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

The selected automation account - Variables window is displayed

Figure 145 : Selected automation account - Variables window



| Name | Type | Value | Last modified |
|-------------------------|---------------------|---|--------------------|
| agentPrivateIP | String | 10.0.1.4 | 1/16/2023, 8:13 PM |
| autoScaleParam | String | {"maxCalcOutLimit": 10, "minCalcInLimit": 1, "scaleInThreshold": 25, "scaleOutThreshold": 80} | 1/16/2023, 8:12 PM |
| azureAutoScaleResources | String | {"resourceGroupName": "vthrg77", "automationAccountName": "vth-amt-acc77", "vThunderIP": "10.0.1.4", "vThunderPort": 53, "portNumber": 53, "protocol": "udp", "healthCheckDisable": 1, "pollingInterval": 10, "idleTimeout": 10, "minScaleIn": 1, "maxScaleOut": 10, "scaleInThreshold": 25, "scaleOutThreshold": 80} | 1/16/2023, 8:12 PM |
| clientSecret | Unknown (encrypted) | ***** | 1/16/2023, 8:13 PM |
| gmrParam | Unknown (encrypted) | ***** | 1/16/2023, 8:12 PM |
| idbParam | String | {"idb_port": {"value": 111, "port_number": 53, "protocol": "udp", "health-check-disable": 1}, {"port": 111, "value": 111}} | 1/16/2023, 8:12 PM |
| zfParam | Unknown (encrypted) | ***** | 1/16/2023, 8:12 PM |
| vCPUUsage | Object | 0 | 1/16/2023, 8:13 PM |
| vTHCurrentPassword | Unknown (encrypted) | ***** | 1/16/2023, 8:13 PM |
| vTHDefaultPassword | Unknown (encrypted) | ***** | 1/16/2023, 8:13 PM |
| vTHNewPassApplyFlag | String | False | 1/16/2023, 8:13 PM |
| vTHNewPassword | Unknown (encrypted) | ***** | 1/16/2023, 8:13 PM |
| vTHOldIP | String | 10.0.1.4 | 1/16/2023, 8:13 PM |
| vTHUsername | String | admin | 1/16/2023, 8:13 PM |

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

Create Automation Account Webhook

The following topics are covered:

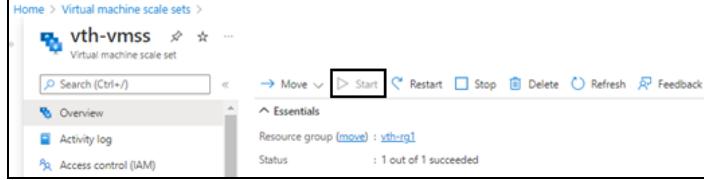
- [Initial Setup](#)
- [Create a Webhook](#)
- [Verify the AutoScale Resource Variable creation](#)
- [Verify the SSL File availability](#)
- [Verify the Runbook Jobs creation](#)

Initial Setup

To verify that the virtual machine scale set resources are running, perform the following steps:

1. From **Home**, navigate to **Azure Services > Resource Group > <resource_group_name>**.
The selected resource group - Overview window is displayed.

Figure 146 : VMSS window



2. Under **Resources** tab, group the resources based on the resource type.
3. Select the virtual machine scale set instance under **Virtual machine scale set** type and verify that the instance is in **Start** mode.

Create a Webhook

To create a webhook, perform the following steps:

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

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_WEBHOOK_3.ps1
```

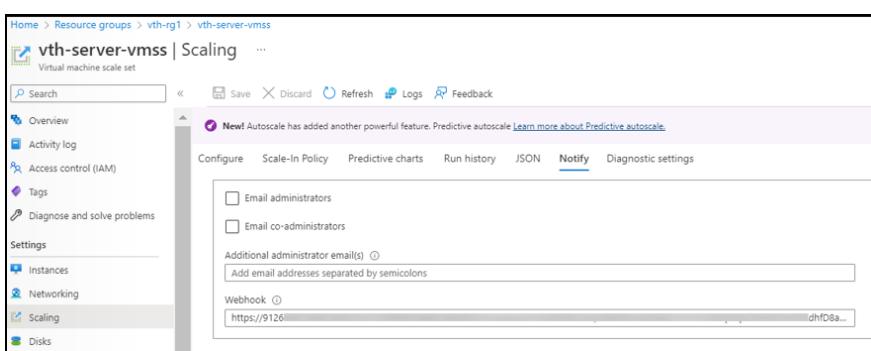
3. After the webhook installation is complete, the webhook url is displayed.

Save this URL :

```
https://fa72c8e5-xxxx-xxxx-9dc5-b4a71eec0a95.webhook.scus.azure-
automation.net/webhooks?token=Q*****pG4UEOScfqdEGEAKqJPgdK%2bOpusoUAWk
*****%3d
```

4. Save this webhook url for future purpose.
5. From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.
The selected VMSS - Overview window is displayed. Here, the VMSS name is **vth-server-vmss**.
6. Click **Scaling** from the left **Settings** panel.
The selected VMSS - Scaling window is displayed.

Figure 147 : VMSS-Scaling - Notify tab



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

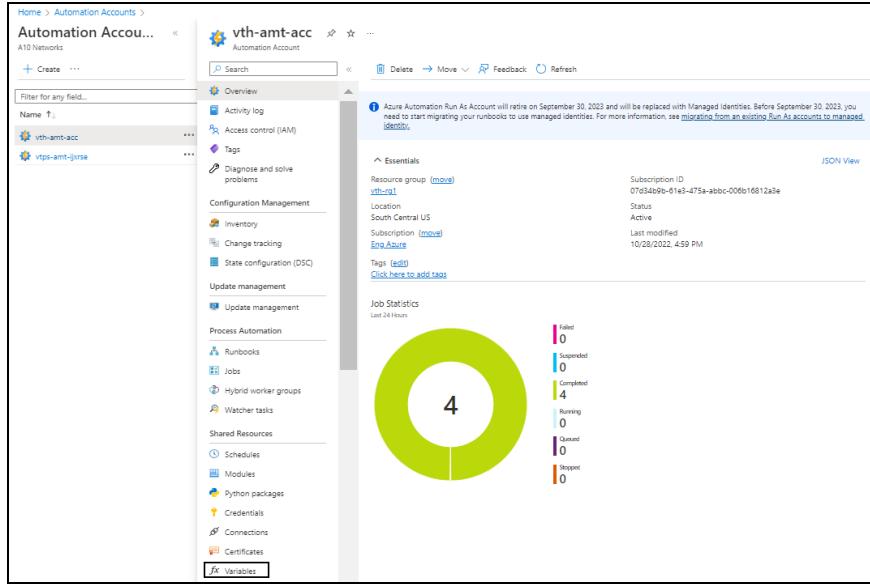
Verify the AutoScale Resource Variable creation

To verify the creation of an autoscale resource variable, perform the following steps:

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

The selected automation account - Overview window is displayed.

Figure 148 : Selected automation account - Overview window



2. Click Variables from the left Shared Resources panel.

The selected automation account - Variables window is displayed.

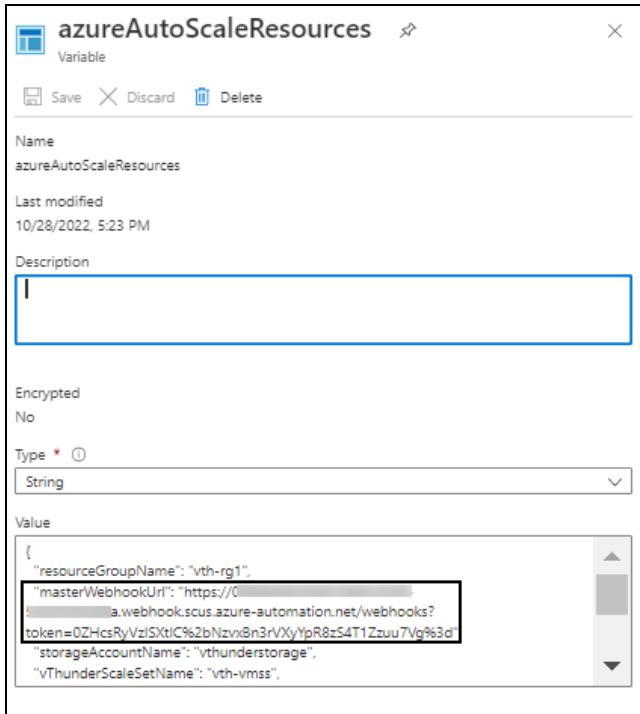
Figure 149 : Selected automation account - Variables window

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

3. Select the azureAutoScaleResources variable.

The azureAutoScaleResources variable window is displayed.

Figure 150 : AzureAutoScaleResources variable window



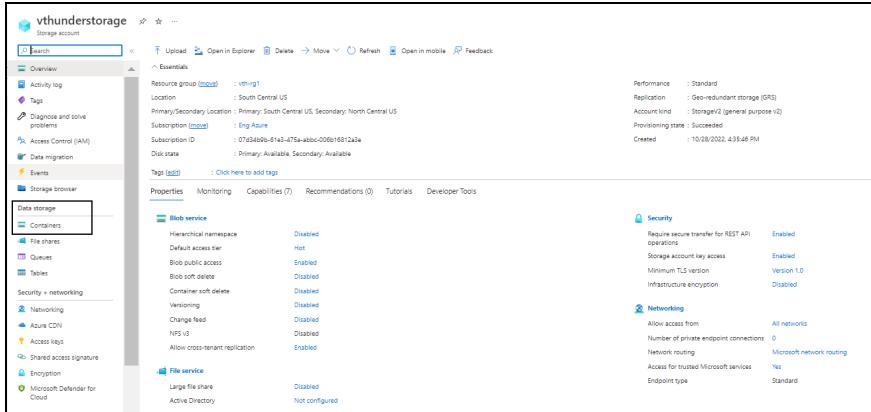
- Verify the master webhook URL in the **Value** field.

Verify the SSL File availability

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

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

Figure 151 : Selected storage account - Overview window



Storage account

Essentials

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

Properties **Monitoring** **Capabilities (7)** **Recommendations (0)** **Tutorials** **Developer Tools**

blob service

| | |
|--------------------------------|----------|
| Hierarchical namespace | Disabled |
| Default access tier | Hot |
| Blob public access | Enabled |
| Blob soft delete | Disabled |
| Container soft delete | Disabled |
| Versioning | Disabled |
| Change feed | Disabled |
| NFS v3 | Disabled |
| Allow cross-tenant replication | Enabled |

file service

| | |
|------------------|----------------|
| Large file share | Disabled |
| Active Directory | Not configured |

Security

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

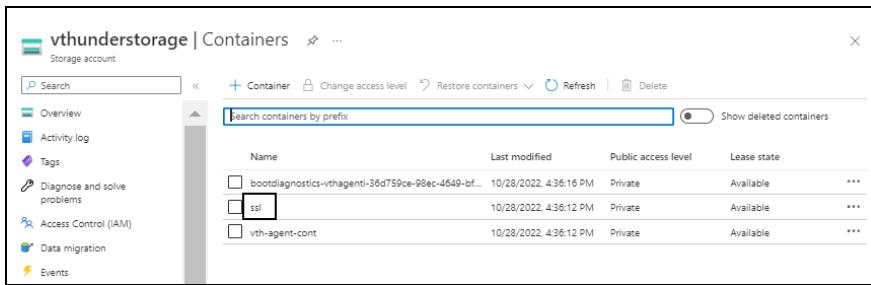
Networking

- Allow access from : All networks
- Number of private endpoint connections : 0
- Network routing : Microsoft network routing
- Access for trusted Microsoft services : Yes
- Endpoint type : Standard

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

The selected storage account - Containers window is displayed.

Figure 152 : Selected storage account - Containers window



vthunderstorage | Containers

Storage account

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

Search **Container** **Change access level** **Restore containers** **Refresh** **Delete**

Search containers by prefix

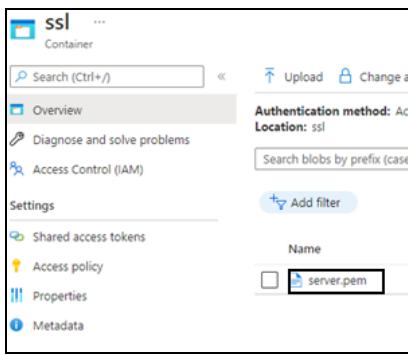
Show deleted containers

| Name | Last modified | Public access level | Lease state |
|---|------------------------|---------------------|-------------|
| bootdiagnostics-ithagent-36d759ce-98ec-4649-bf... | 10/28/2022, 4:36:16 PM | Private | Available |
| ssl | 10/28/2022, 4:36:12 PM | Private | Available |
| vth-agent-cont | 10/28/2022, 4:36:12 PM | Private | Available |

3. Select the SSL container.

The SSL container window is displayed.

Figure 153 : SSL Container window



ssl

Container

Search (Ctrl+ /) **Upload** **Change access level**

Authentication method: Account
Location: ssl

Search blobs by prefix (case-sensitive)

Add filter

Shared access tokens

Access policy

Properties

Metadata

Name

server.pem

4. Verify if the SSL config file is listed. Here, the SSL config file is **server.pem**.

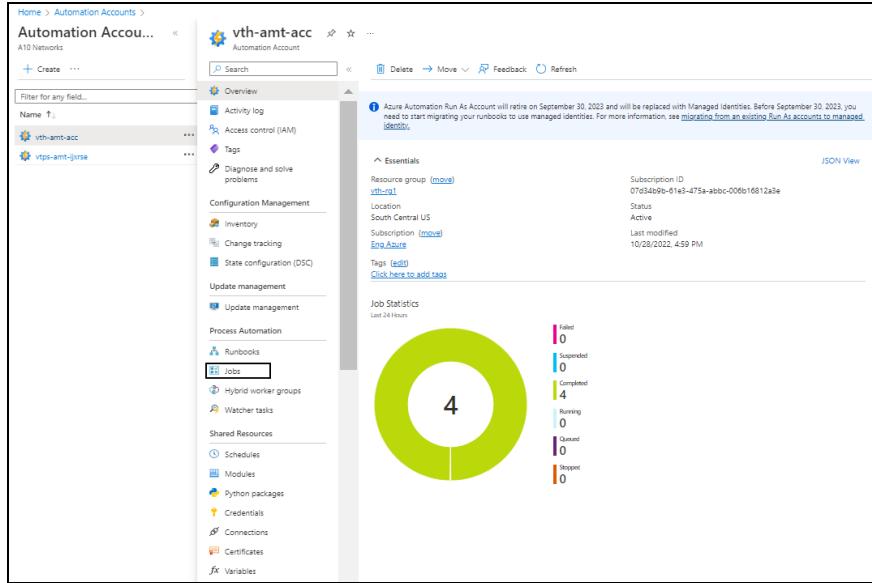
Verify the Runbook Jobs creation

To verify the creation of runbook jobs, perform the following steps:

- From **Home**, navigate to **Azure Services > Automation Accounts > <automation_account_name>**.

The selected automation account - Overview window is displayed.

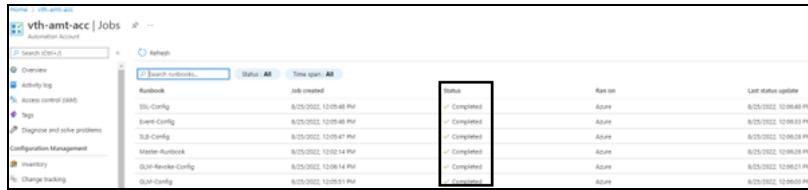
Figure 154 : Selected automation account - Overview window



- Click **Jobs** from the left **Process Automation** panel.

The selected automation account - Jobs window is displayed.

Figure 155 : Selected automation account - Jobs window



- Verify if all the runbook jobs have completed status.

The master runbook automatically triggers all the jobs one-by-one.

NOTE:

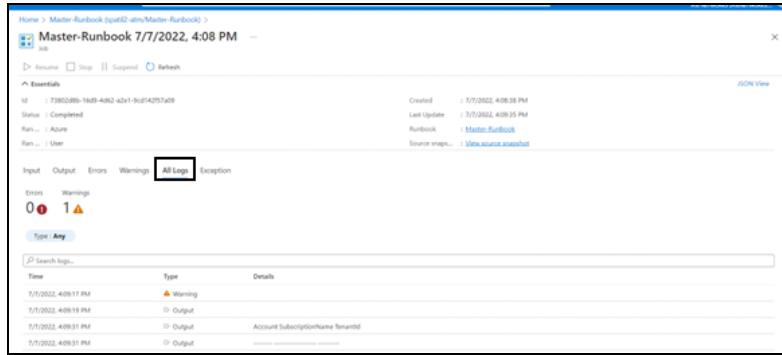
It may take the system a few minutes to display the completed status.

If any job has failed or if it is not working, refer [Common Errors](#).

4. Select each runbook job > **All Logs** tab to verify the logs.

The selected automation account - selected job - Jobs window is displayed.

Figure 156 : Selected runbook job window



Enable Autoscaling

An Azure virtual machine scale set can automatically increase or decrease the number of vThunder VM instances to meet the changing demand.

To enable autoscaling, use any of the following two options:

1. AutoScaling and Log Monitoring using Agent Setup

Using this option:

- Custom metrics of vThunder can be collected and published into Azure application insight service and same metrics can be used along with vmss rule for autoscaling.
- CPU utilization alerts can be scheduled using vmss alert rule.
- CPU utilization of vThunder can be viewed in Azure application insight console.
- vThunder logs can be viewed in Azure log analytics workspace.

NOTE: ACOS supports and recommends **AutoScaling and Log Monitoring using Agent Setup** option.

2. AutoScaling using Azure Function Setup

Using this option:

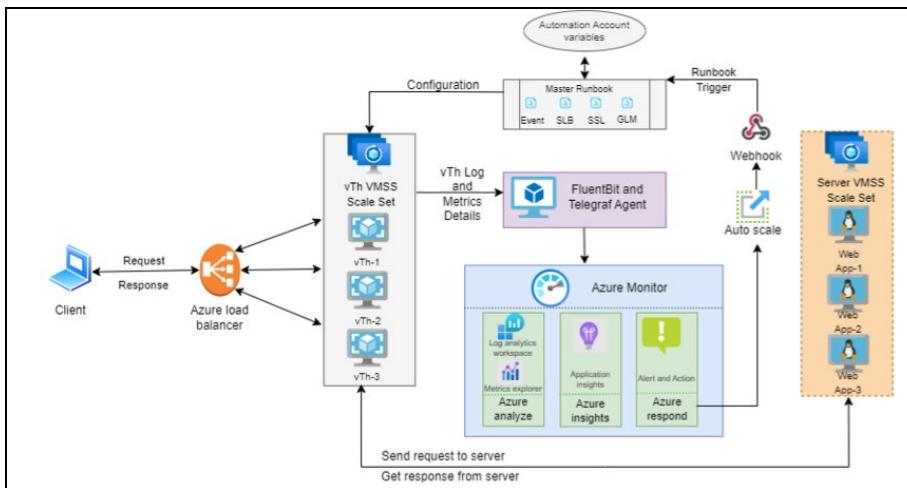
- CPU utilization metrics can be collected by the Custom Azure functions. The function periodically maintains vThunder CPU Utilization.
- AutoScaling can be done as per the automation account threshold configuration with variable name **ThresholdForScaleOut** and **ThresholdForScaleIn** for Scale Out and Scale In respectively.
- vThunder logs cannot be viewed in Azure log analytics workspace. For more information, see [Azure Log Function](#).
- CPU utilization of vThunder cannot be viewed in Azure application insight console.

Autoscaling Options

Configure Autoscaling and Log Monitoring using Agent Setup

[Figure 157](#) shows the process flow when different Azure resources and system components are connected to each other in the 3NIC-NVM-VMSS Autoscaling and Log Monitoring using Agent Setup.

Figure 157 : 3NIC-NVM-VMSS Autoscaling and Log Monitoring using Agent Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Fluentbit and Telegraf Agent](#)

- [Verify Log Agent file upload](#)
- [Access vThunder Agent using CLI](#)
- [Create Autoscale Rule](#)
- [Create Autoscale Alert](#)
- [Verify Logs in Log Analytics Workspace](#)
- [Verify Metrics in Application Insights](#)

Initial Setup

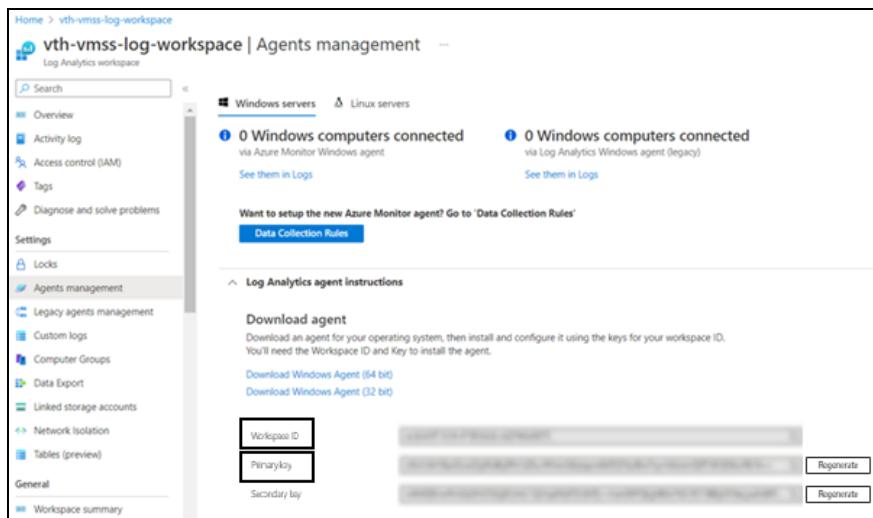
To configure autoscaling and log monitoring using the ARM template, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open ARM_TMPL_3NIC_NVM_VMSS_LOG_AGENT_SHELL_SCRIPT.sh with a text editor.
2. Update the customer ID with the workspace ID and shared key with primary key.

```
# azure log workspace id
customer_id="d1c8985b-xxxx-xxxx-xxxx-12868ad9d740"
# azure log Primary Key
shared_key="tewPsyMYkdGOThRjEyl*****F8CzJ49ZRgw=="
```

You can get these values from **Home > Azure Services > Log Analytics workspaces > <log_analytics_workspace> Settings > Agents management**.

Figure 158 : Agents management window

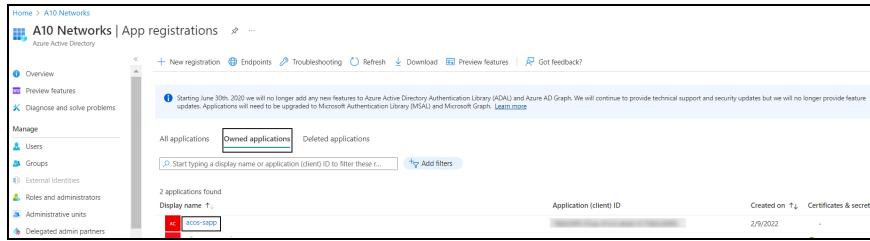


3. Update client ID, tenant ID, and client secret.

```
(cat /etc/environment; echo "AZURE_CLIENT_ID=10724xxx-xxxx-xxxx-xxxx-xxxx-xxxxc14726d"; echo "AZURE_TENANT_ID=91d27xxx-xxxx-xxxx-xxxx-xxxxbf81fcb2f"; echo "AZURE_CLIENT_SECRET=9-xxx~jxxOREVyxxxxxHNxxxOwv_xxxxxZLIYxxx")
```

You can get these values from **Home > Azure Services > Azure Active Directory > App Registration > Owned applications > <application_name>**.

Figure 159 : Azure active directory - App registrations window



4. Update app insights key with instrumentation key.

```
app_insights_Key="37b1aea5-xxxx-xxxx-xxxx-f2c012bccd93"
```

You can get this value from **Home > Azure Services > Application Insights > <application_insight> > Overview**.

Figure 160 : Selected application insight - Overview window

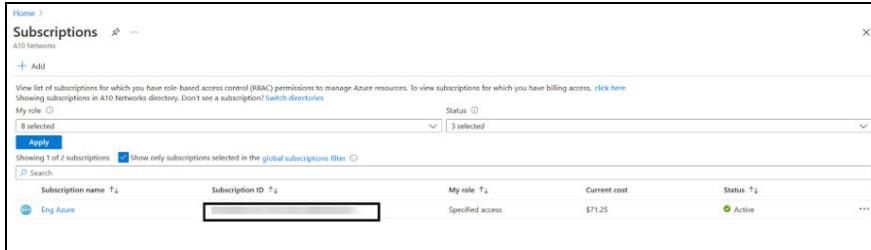


5. Navigate to the folder where you have downloaded the ARM template > plugins > telegraf > plugins > inputs > customplugin and open **get_cpu_param.json** file with a text editor to configure the CPU parameters.

```
{
  "Subscription_Id": "07d3xxxx-xxxx-xxxx-xxxx-xxxx6812a3e",
  "ResourceGroupName": "vth-rg1",
  "VmssName": "vth-vmss"
}
```

You can get the Subscription ID value from **Home > Azure Services > Subscriptions > <subscription_name>**.

Figure 161 : 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.

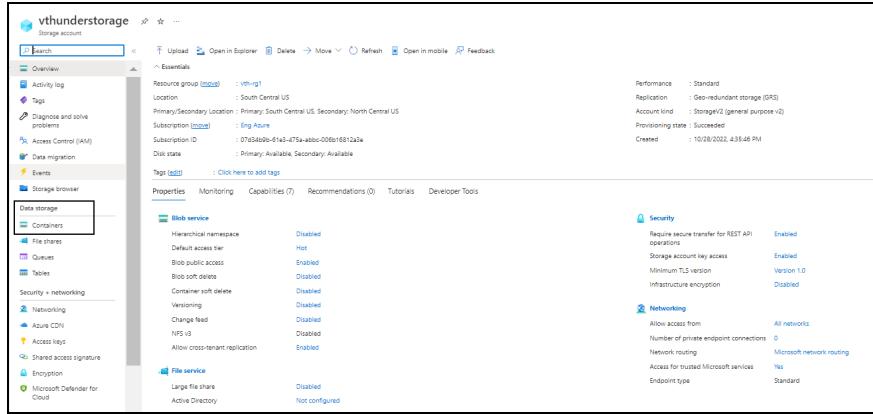
The fluentbit [2.0.3] and telegraf [1.23.4] agents are created.

Verify Log Agent file upload

To verify if the log agent file is uploaded, perform the following steps:

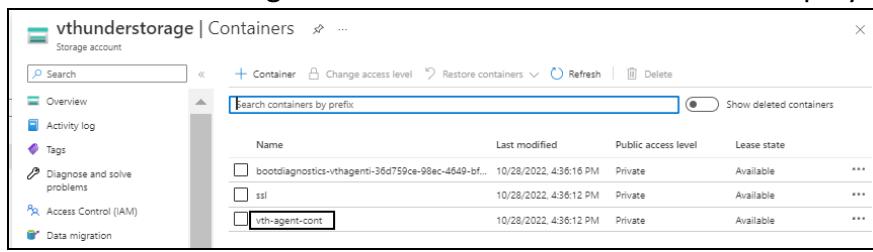
- From **Home**, navigate to **Azure Services > Storage Accounts > <storage_account_name>**.
- The selected storage account - Overview window is displayed.

Figure 162 : Selected storage account - Overview window



2. Click **Containers** from the left **Data Storage** panel.

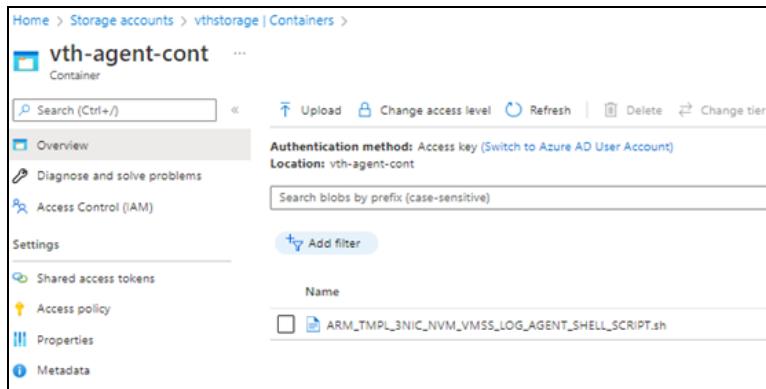
The selected storage account - Containers window is displayed.



3. Select the agent container.

The agent container window is displayed.

Figure 163 : Agent container window



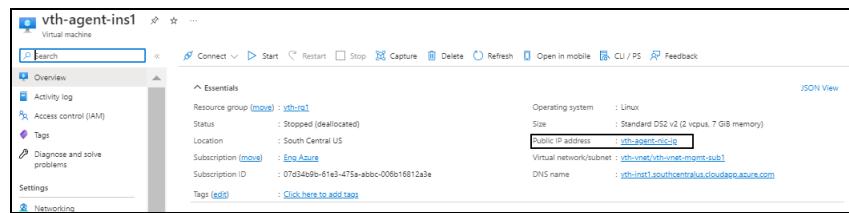
4. Verify if **ARM_TMPL_3NIC_NVM_VMSS_LOG_AGENT_SHELL_SCRIPT.sh** file is uploaded.

Access vThunder Agent using CLI

To access the vThunder agent instance using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of the agent virtual machine instance
 - Connection Type: SSH

Figure 164 : Virtual machine - Agent instance window



3. Click **Open**.
4. In the active PuTTY session, enter the following:

```

login as: vth-user <---adminUsername value configured in ARM_TMPL_3NIC_
NVM_VMSS_PARAM.json--->
Using keyboard-interactive authentication.

Password: vth-Password <---adminPassword value configured in ARM_TMPL_
3NIC_NVM_VMSS_PARAM.json--->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vth-agent-inst> enable <---Execute command--->
Password:<---just press Enter key--->
vth-agent-inst#config <---Configuration mode--->
vth-agent-inst(config)#
  
```

5. Run the following command to check the status of the agent service.

```
vth-agent-inst(config)# systemctl status telegraf.service
```

The following output is displayed.

```

● telegraf.service - The plugin-driven server agent for reporting
metrics into InfluxDB
   Loaded: loaded (/lib/systemd/system/telegraf.service; enabled;
   vendor preset: enabled)
     Active: active (running) since Thu 2022-08-25 10:24:26 UTC; 18min
ago
       Docs: https://github.com/influxdata/telegraf
      Main PID: 17855 (telegraf)
        Tasks: 9 (limit: 8321)
       Memory: 43.6M
      CGroup: /system.slice/telegraf.service
              └─17855 /usr/bin/telegraf - config /etc/telegraf/telegraf.conf
                -config-directory /etc/telegraf/telegraf.d

Aug 25 10:42:16 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:16 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:26 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:26 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:36 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:36 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address
Aug 25 10:42:46 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:46 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any

```

```

address
Aug 25 10:42:56 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [outputs.influxdb] When writing to [http://localhost:8086] : failed
doing req: Post ">
Aug 25 10:42:56 vth-agent-ins1 telegraf[17855]: 2022-08-25T10:42:16Z
E! [agent] Error writing to outputs.influxdb: could not write any
address

```

There is a possibility that the command might return few errors. The errors displayed in the above output can be ignored.

Create Autoscale Rule

To create autoscale rule, perform the following steps:

- From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.

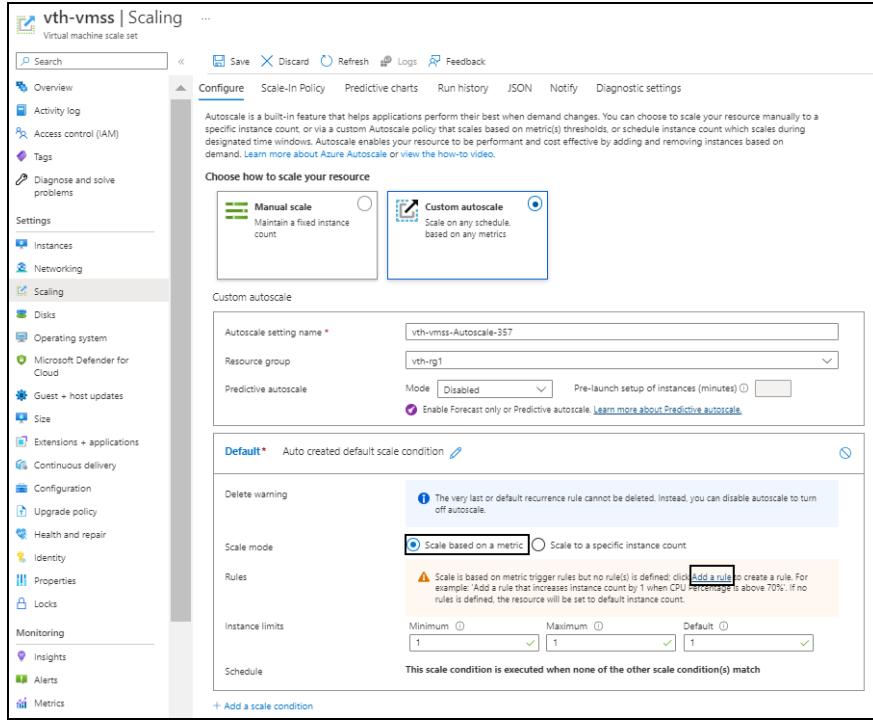
The selected vmss - Overview window is displayed.

Figure 165 : Selected VMSS - Overview window

- Click **Scaling** from the left **Settings** panel.

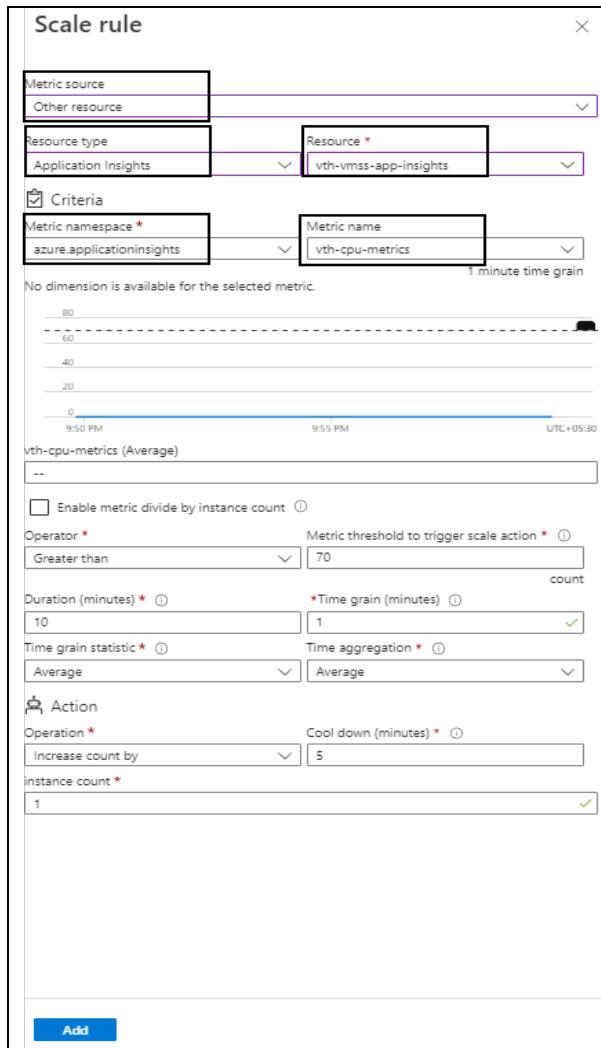
The selected vmss - Scaling window is displayed.

Figure 166 : Selected VMSS - Scaling window



3. Under **Configure** tab, select **Custom autoscale** option.
The fields relevant to this option are displayed.
4. Select the **Scale mode** as **Scale based on a metric**.
5. Click **Add a rule**.
The **Scale rule** window is displayed.

Figure 167 : Scale rule window



6. Select or enter the information in the following fields:

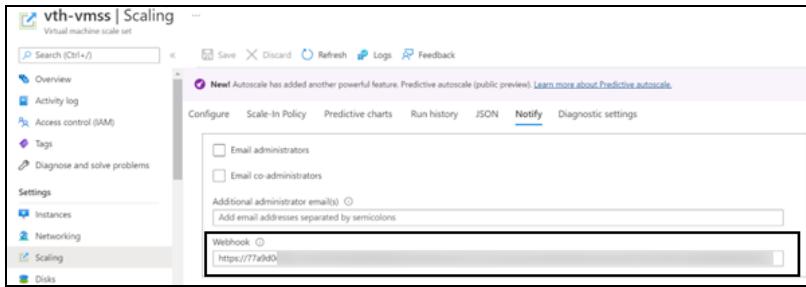
- Metric source: Other resource
- Resource type: Application Insights
- Resource
- Time aggregation
- Metric namespace
- Metric name

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 168 : Selected VMSS - Scaling window - Notify tab

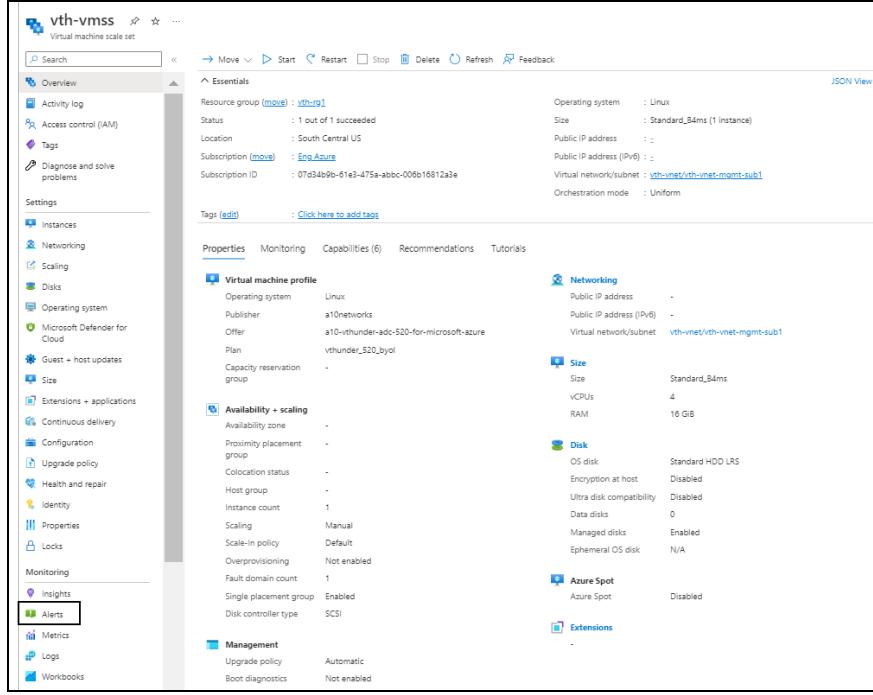


Create Autoscale Alert

1. From **Home**, navigate to **Azure Services > Virtual machine scale set > <vmss_name>**.

The selected vmss - Overview window is displayed.

Figure 169 : Selected VMSS - Overview window



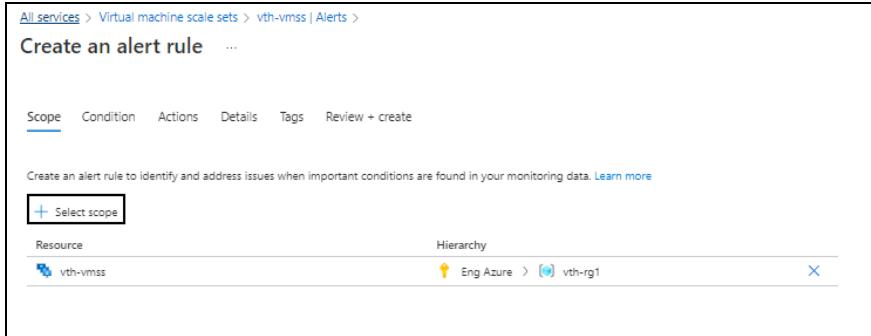
2. Click **Alerts** from the left **Monitoring** panel.
- The selected vmss - Alerts window is displayed.

Figure 170 : Selected VMSS - Alerts window



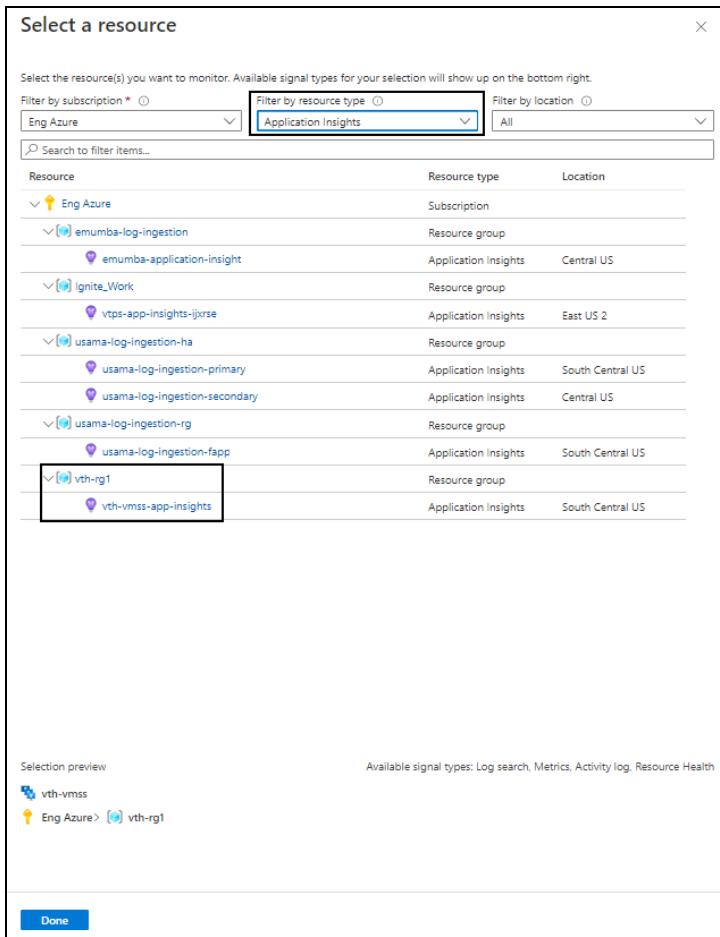
3. Click **Create > Alert rule**.
- The Create an alert rule - Scope window is displayed.

Figure 171 : Create an alert rule window - Scope tab



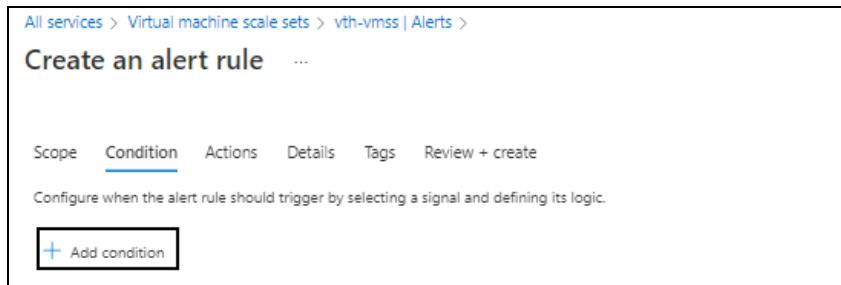
4. Click **Select scope** in the **Scope** tab.
 The **Select a resource** window is displayed.

Figure 172 : Select a resource window



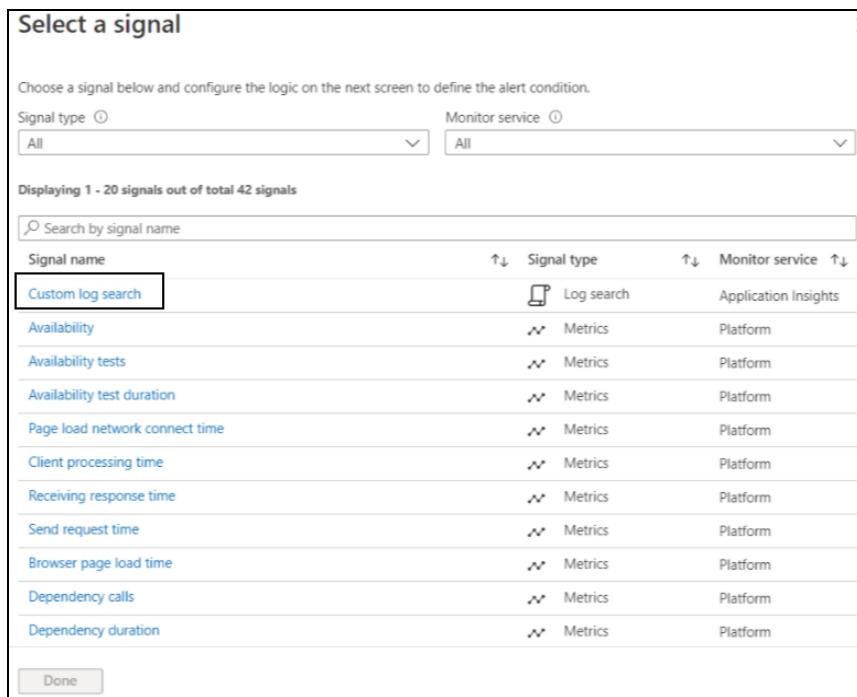
5. From **Filter by resource type**, select **Application Insights**.
The resource group having application insight resources are displayed.
6. Select the required application insight resource and click **Done**.
The selected application insight resource is listed under the alert rule scope.
7. Click **Next : Condition** at the bottom of the window.
The **Create an alert rule - Condition** tab window is displayed.

Figure 173 : Create an alert rule window - Condition tab



8. Click **Add condition** in the **Condition** tab.
The **Select a signal** window is displayed.

Figure 174 : Select a signal window



9. Select **Custom log search as the signal.**

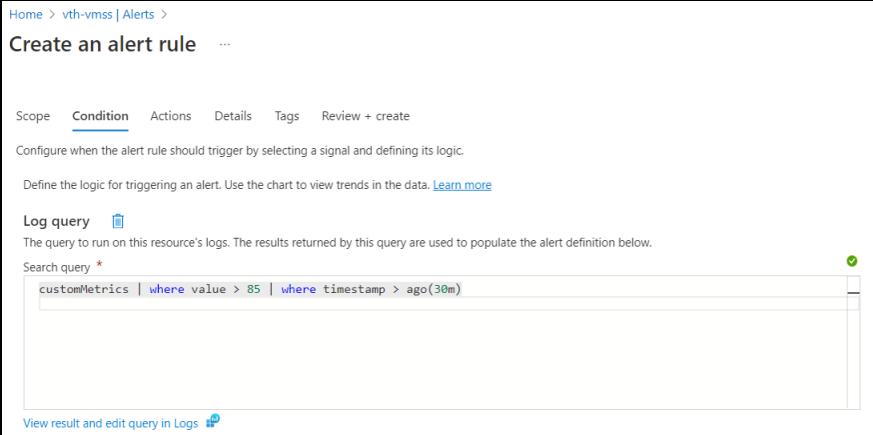
The window to define the signal's logic is displayed in the alert rule condition.

10. Enter any of the following query to fetch the data in the **Search query field:**

```
customMetrics | where value > 85 | where timestamp > ago(30m)
customMetrics | where value > 85 | where timestamp > ago(24h)
customMetrics | where value > 85 | where timestamp > ago(7d)
```

The above query specifies the frequency for alert data.

Figure 175 : Create an alert rule window - Condition tab



Home > vth-vmss | Alerts >

Create an alert rule ...

Scope Condition Actions Details Tags Review + create

Configure when the alert rule should trigger by selecting a signal and defining its logic.

Define the logic for triggering an alert. Use the chart to view trends in the data. [Learn more](#)

Log query 

The query to run on this resource's logs. The results returned by this query are used to populate the alert definition below.

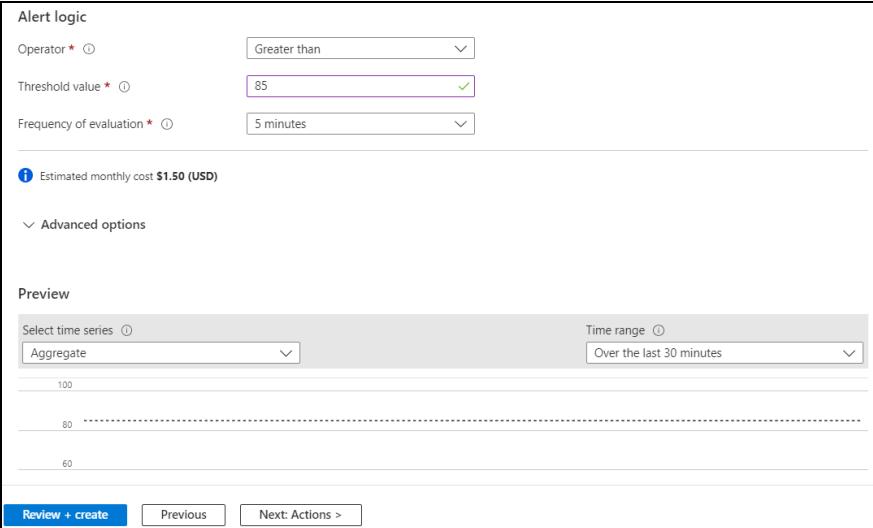
Search query *

```
customMetrics | where value > 85 | where timestamp > ago(30m)
```

[View result and edit query in Logs](#) 

11. Configure alert logic in the **Alert logic section.**

Figure 176 : Alert logic section



Alert logic

Operator * ⓘ Greater than

Threshold value * ⓘ 85

Frequency of evaluation * ⓘ 5 minutes

ⓘ Estimated monthly cost \$1.50 (USD)

Advanced options

Preview

Select time series ⓘ Aggregate Time range ⓘ Over the last 30 minutes

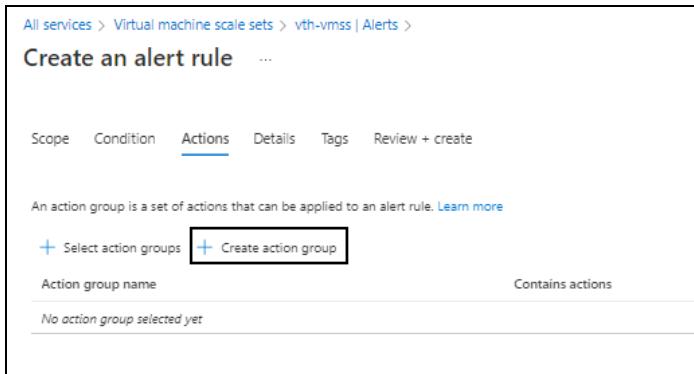
| |
|-----|
| 100 |
| 80 |
| 60 |

[Review + create](#) [Previous](#) [Next: Actions >](#)

Depending upon the signal logic configuration, the monthly cost for the alert is displayed.

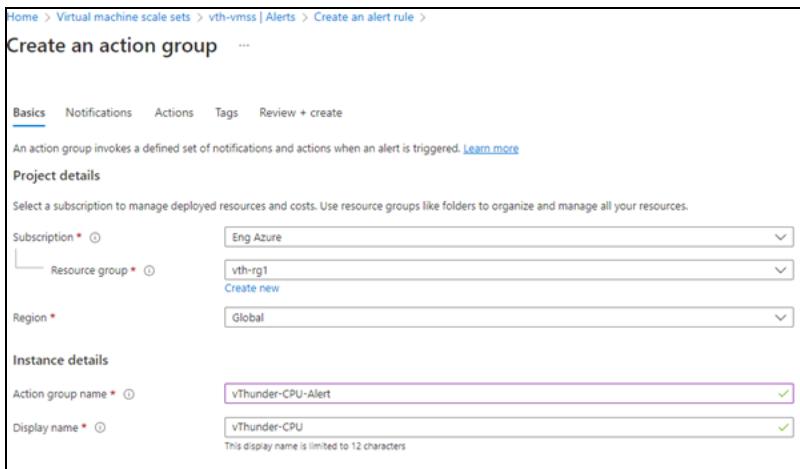
12. Click **Next : Actions** at the bottom of the window.
The **Create an alert rule - Actions** window is displayed.

Figure 177 : Create an alert rule window - Actions tab



13. Click **Create action group**.
The **Create an action group - Basics** window is displayed.

Figure 178 : Create an action group window - Basics tab



- a. Select or enter the following mandatory information in the **Basics** tab:

Project details

- Subscription
- Resource group

- Region

Instance details

- Action group name
- Display name

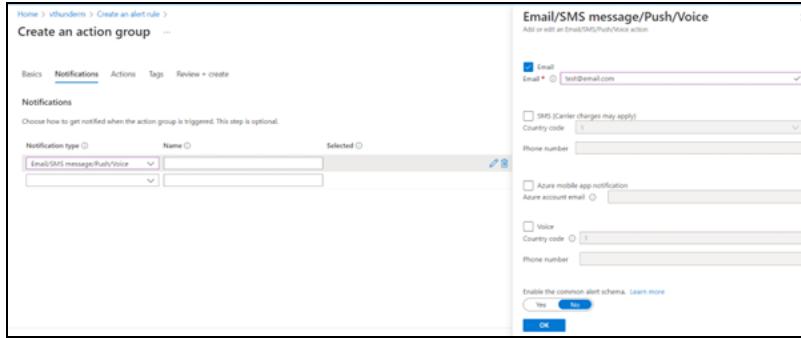
b. Click **Next : Notifications** at the bottom of the window.

The **Create an action group - Notifications** window is displayed.

c. Select the **Notification type**.

The corresponding window to configure the notification type is displayed.

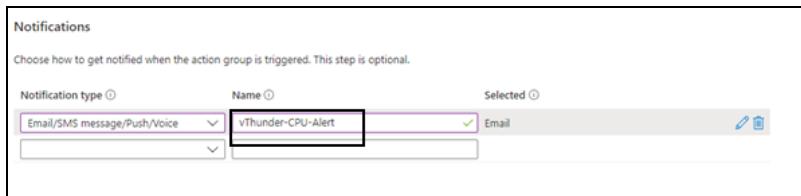
Figure 179 : Create an action group window - Notifications tab - Type



d. Select the **Email** option and provide the correct email ID in the **Email** field and then click **OK**.

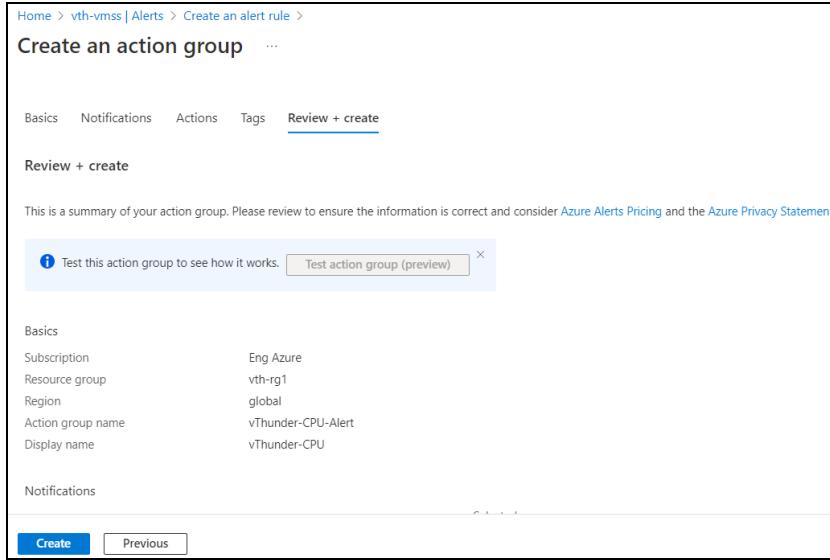
e. Enter a unique name for the notification in the **Name** field.

Figure 180 : Create an action group window - Notifications tab



f. Skip the other tabs and click **Review + create** at the bottom of the window. The **Create an action group - Review + create** window is displayed.

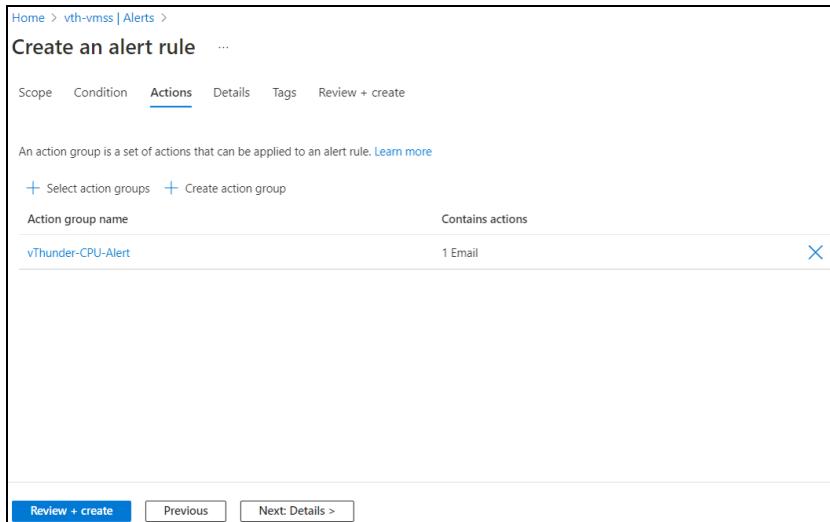
Figure 181 : Create an action group window - Review + create tab



g. Click **Create**.

The action group is listed under **Actions** tab.

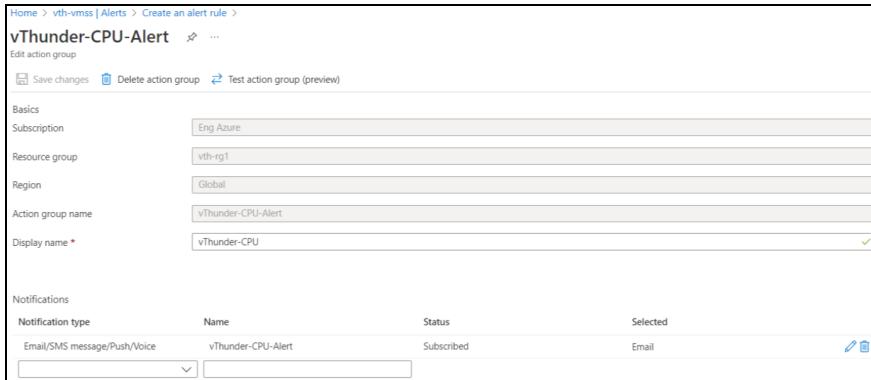
Figure 182 : Create an alert rule window - Actions tab



14. Select the recently created action group.

The selected action group is displayed.

Figure 183 : Selected action group



Home > vth-vmss | Alerts > Create an alert rule >
vThunder-CPU-Alert  ...
 Edit action group

Basics

| | |
|-------------------|--------------------|
| Subscription | Eng Azure |
| Resource group | vth-rg1 |
| Region | Global |
| Action group name | vThunder-CPU-Alert |
| Display name * | vThunder-CPU |

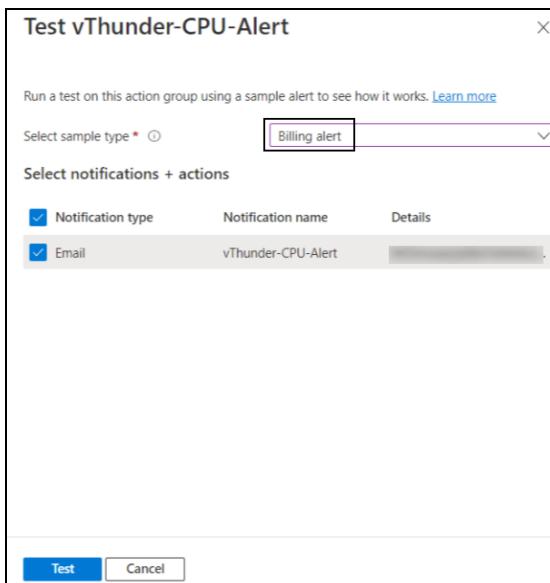
Notifications

| Notification type | Name | Status | Selected |
|------------------------------|--------------------|------------|---|
| Email/SMS message/Push/Voice | vThunder-CPU-Alert | Subscribed |   |

15. Click **Test action group (preview).**

The Test <action_group_name>-alert window is displayed.

Figure 184 : Test <action_group_name>-alert window



Test vThunder-CPU-Alert 

Run a test on this action group using a sample alert to see how it works. [Learn more](#)

Select sample type * 

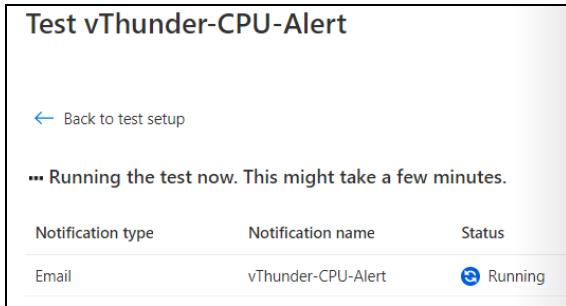
Select notifications + actions

| Notification type | Notification name | Details |
|-------------------------------------|--------------------|---|
| <input checked="" type="checkbox"/> | vThunder-CPU-Alert |  |
| <input checked="" type="checkbox"/> | Email | |

16. Select **Billing alert as the Sample type and click **Test**.**

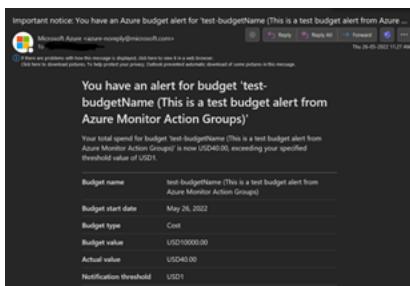
The running status for the test rule is displayed.

Figure 185 : Test <action_group_name>-alert window - Running status



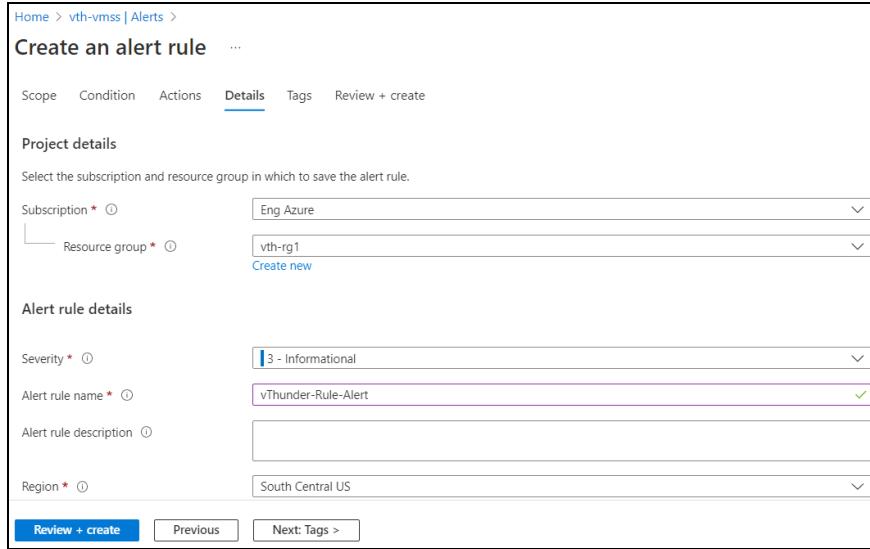
When the success status is displayed, an email notification is triggered to the email ID provided in the [Email Notification](#) step.

Figure 186 : Email Notification



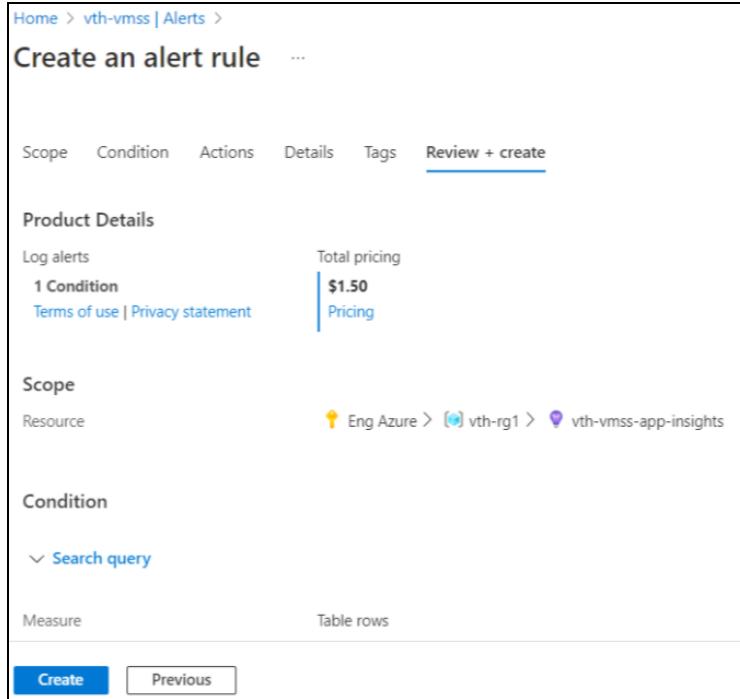
17. Click **Done** on Test <action_group_name>-alert window.
The selected action group is displayed.
18. Close the selected action group window.
The Create an alert rule - Actions window is displayed.
19. Click **Next : Details** at the bottom of the window.
The Create an alert rule - Details window is displayed.

Figure 187 : Create an alert rule window - Details tab



20. Enter the Alert rule name and provide the other mandatory details.
21. Skip the other tabs and click **Review + create** at the bottom of the window.
The **Create an alert rule - Review + create** window is displayed.

Figure 188 : Create an alert rule window - Review + create tab



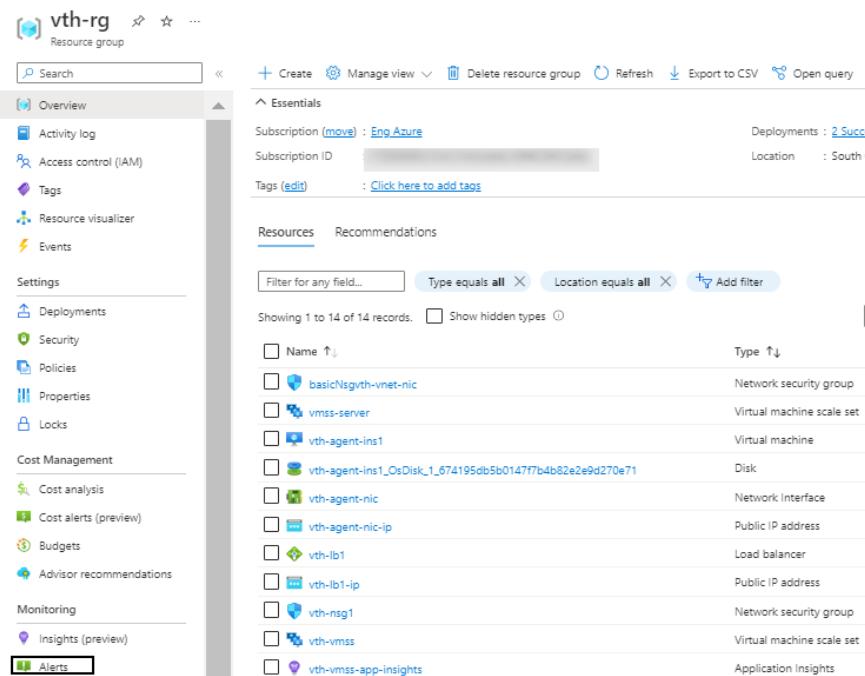
22. Click **Create**.

The alert rule is created.

23. From **Home**, navigate to **Azure Services > Resource groups > <resource_group_name>**.

The selected resource group - Overview window is displayed.

Figure 189 : Selected resource group - Overview window



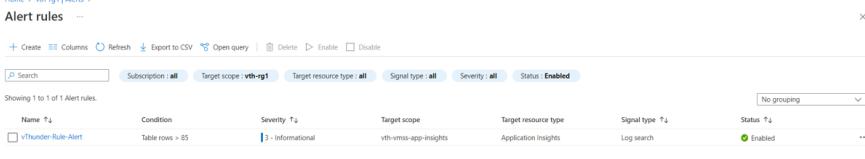
24. Click **Alerts** from the left **Monitoring** panel.

The selected alert window is displayed.

25. Click **Alert rules**.

The alert rules for the selected resource group is displayed.

Figure 190 : Selected resource group - Alert rules window



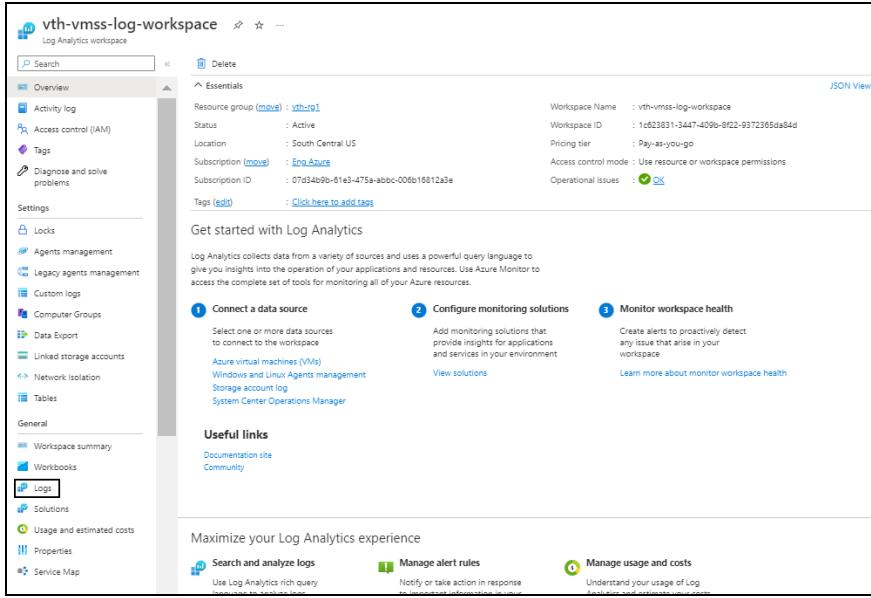
Verify Logs in Log Analytics Workspace

To verify the logs in log analytics workspace, perform the following steps:

- a. From **Home**, navigate to **Azure Services > Log Analytics workspaces > <log_workspace_name>**.

The selected log workspace - Overview window is displayed.

Figure 191 : Selected log workspace - Overview window



Essentials

- Resource group (more) : [vth-rg1](#)
- Status : Active
- Location : South Central US
- Subscription (more) : [Eng Azure](#)
- Subscription ID : 07d34b9b-61e3-475a-abbc-006b16812a3e
- Tags (edit) : Click here to add tags

Workspace Name : vth-vmss-log-workspace
Workspace ID : 1cf23831-3447-409b-8f22-9372365da84d
Pricing tier : Pay-as-you-go
Access control mode : Use resource or workspace permissions
Operational issues :

Get started with Log Analytics

Log Analytics collects data from a variety of sources and uses a powerful query language to give you insight 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.

Connect a data source

Select one or more data sources to connect to the workspace

Configure monitoring solutions

Add monitoring solutions that provide insights for applications and services in your environment

Monitor workspace health

Create alerts to proactively detect any issue that arise in your workspace

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 specific events [Learn more about alert rules](#)

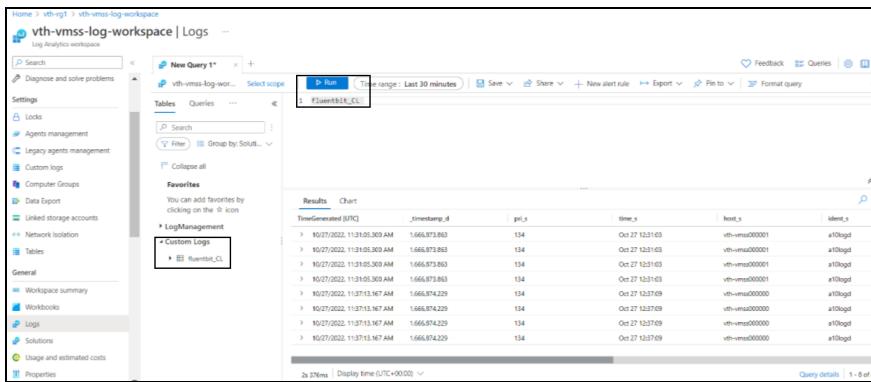
Manage usage and costs

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 192 : Selected log analytics workspace - Logs window



| TimeGenerated (UTC) | _IngestTime | pt | time_s | host_s | ident_s |
|-----------------------------|-------------|-----|-----------------|----------------|---------|
| 2027/2022/11/31 05:30:47 AM | 16668731863 | 134 | Oct 27 12:31:03 | vth-vmss000001 | a10bgd |
| 2027/2022/11/31 05:30:47 AM | 16668731863 | 134 | Oct 27 12:31:03 | vth-vmss000001 | a10bgd |
| 2027/2022/11/31 05:30:47 AM | 16668731863 | 134 | Oct 27 12:31:03 | vth-vmss000001 | a10bgd |
| 2027/2022/11/31 05:30:47 AM | 16668731863 | 134 | Oct 27 12:31:03 | vth-vmss000001 | a10bgd |
| 2027/2022/11/31 05:31:17 AM | 16668742299 | 134 | Oct 27 12:31:09 | vth-vmss000000 | a10bgd |
| 2027/2022/11/31 05:31:17 AM | 16668742299 | 134 | Oct 27 12:31:09 | vth-vmss000000 | a10bgd |
| 2027/2022/11/31 05:31:17 AM | 16668742299 | 134 | Oct 27 12:31:09 | vth-vmss000000 | a10bgd |
| 2027/2022/11/31 05:31:17 AM | 16668742299 | 134 | Oct 27 12:31:09 | vth-vmss000000 | a10bgd |

- c. Expand **Custom Logs** in the left **Tables** tab panel.

- d. Double-click **fluentbit_CL**.

The fluentbi_CL query window is displayed.

e. Click **Run**.

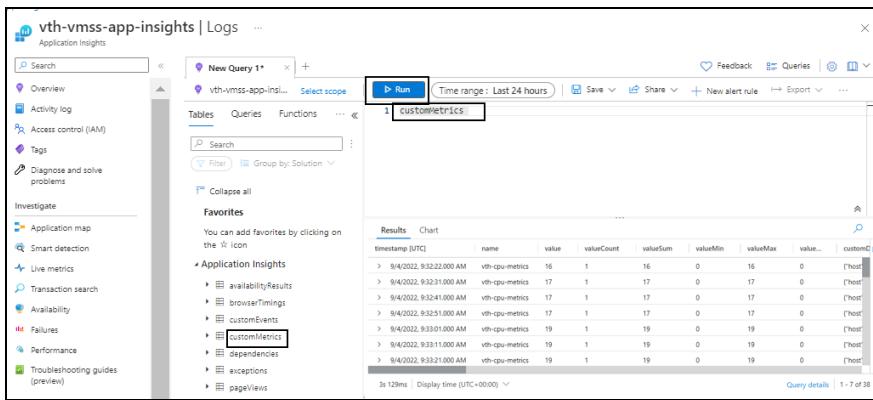
All logs are displayed in tabular format with expandable details.

Verify Metrics in Application Insights

To verify if the metrics in application insights, perform the following steps:

- From **Home**, navigate to **Azure Services > Application Insights > <application_insight_name>**.
The selected application insight - Overview window is displayed.
- Click **Logs** from the left **Monitoring** panel.
The selected log query window is displayed.
- Expand **Application Insights** in the left **Tables** tab panel.
- Double-click **customMetrics**.
The customMetrics query window is displayed.

Figure 193 : Selected application insight - Logs window



The screenshot shows the Azure Application Insights Logs interface. The left sidebar lists various monitoring categories like Overview, Activity log, and Application map. The main area has a search bar and a 'Run' button. Below it, there's a table titled 'Results' with columns for timestamp, name, value, valueCount, valueSum, valueMin, valueMax, and customID. The table contains several rows of data, each representing a timestamp and a metric name (vth-cpu-metrics) with its corresponding value (e.g., 16, 17, 19). At the bottom, there are navigation links for 'Query details' and '1 - 7 of 10'.

| timestamp [UTC] | name | value | valueCount | valueSum | valueMin | valueMax | customID |
|--------------------------|-----------------|-------|------------|----------|----------|----------|----------|
| 9/4/2022, 9:32:22.000 AM | vth-cpu-metrics | 16 | 1 | 16 | 0 | 16 | {host} |
| 9/4/2022, 9:32:31.000 AM | vth-cpu-metrics | 17 | 1 | 17 | 0 | 17 | {host} |
| 9/4/2022, 9:32:41.000 AM | vth-cpu-metrics | 17 | 1 | 17 | 0 | 17 | {host} |
| 9/4/2022, 9:32:51.000 AM | vth-cpu-metrics | 17 | 1 | 17 | 0 | 17 | {host} |
| 9/4/2022, 9:33:01.000 AM | vth-cpu-metrics | 19 | 1 | 19 | 0 | 19 | {host} |
| 9/4/2022, 9:33:11.000 AM | vth-cpu-metrics | 19 | 1 | 19 | 0 | 19 | {host} |
| 9/4/2022, 9:33:21.000 AM | vth-cpu-metrics | 19 | 1 | 19 | 0 | 19 | {host} |

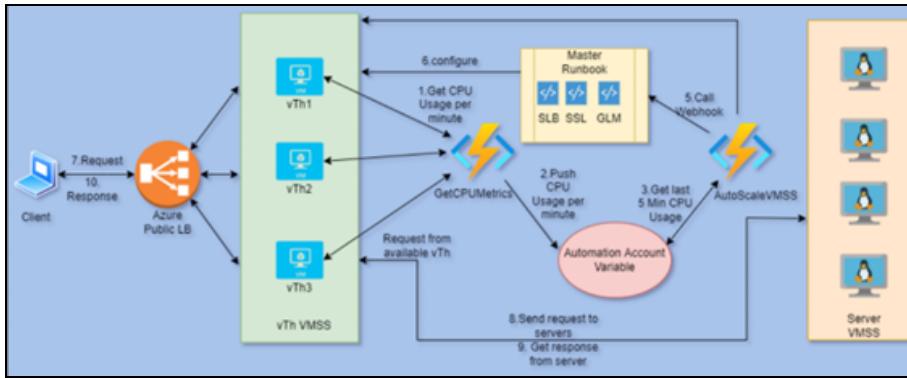
e. Click **Run**.

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 194](#) shows the process flow when different Azure resources and system components are connected to each other in the 3NIC-NVM-VMSS Autoscaling using Azure Functions Setup.

Figure 194 : 3NIC-NVM-VMSS Autoscaling using Azure Functions Setup Process Flow



The following topics are covered:

- [Initial Setup](#)
- [Create Autoscale Function](#)
- [Verify Autoscale Function Creation](#)
- [AutoScale Function On-demand Password Change](#)

Initial Setup

To configure autoscaling using Azure functions setup, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM_TMPL_3NIC_NVM_VMSS_FUNCTION_APP_PARAM.json with a text editor.
2. Configure function application name, application insight name, and subscription ID.

```
{
    "functionAppName": "vth-auto-func-app",
    "applicationInsightsName": "vth-vmss-app-insights",
    "subscriptionId": "07d3xxxx-xxxx-xxxx-xxxx-xxxxx6812a3e",
    "filePath": "AZURE_FUNCTIONS\\GetMetrics.zip",
    "vThUserName": "admin"
}
```

NOTE: Do not change the vThunder instance username.

You can get the application insight name from **Home > Azure Services > Application Insights**.

You can get subscription ID value from **Home > Azure Services > Subscriptions > Subscription name**.

Provide the absolute file path of the folder where you have downloaded the ARM template > **AZURE_FUNCTIONS > GetMetrics.zip**.

3. Verify if all the configurations in the **ARM_TMPL_3NIC_NVM_VMSS_FUNCTION_APP_PARAM.json** file are correct and then save the changes.

Create Autoscale Function

To create autoscale function using CLI, perform the following steps:

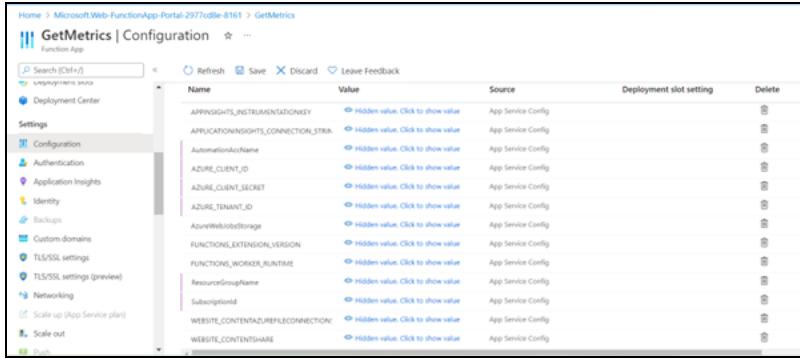
1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create autoscale function:
PS C:\Users\TestUser\Templates> .\ARM_TMPL_3NIC_NVM_VMSS_FUNCTION_APP_4.ps1
3. Provide the updated password of existing vThunder instances and then confirm the same password when prompted.

Verify Autoscale Function Creation

To verify autoscale function creation, perform the following steps:

1. From **Home**, navigate to **Azure Services > Function App**.
The Function App window is displayed.
2. Select GetMetrics function from the list.
The GetMetrics function - Overview window is displayed.
3. Click **Configuration** from the left **Settings** panel.
The GetMetrics function - Configuration window is displayed.

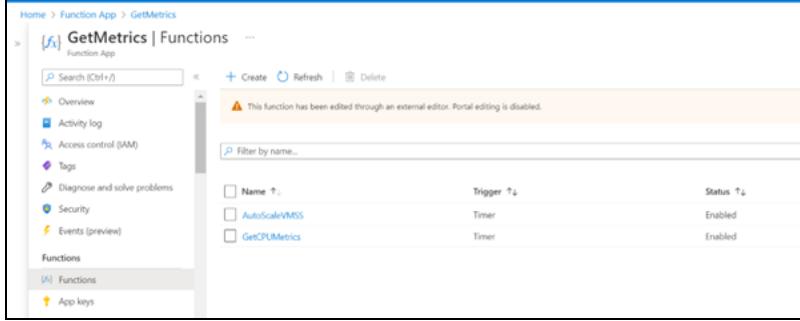
Figure 195 : GetMetrics function - Configuration window



The screenshot shows the 'Configuration' tab for the 'GetMetrics' function. It lists various application settings with their values and sources. Some values are marked as 'Hidden value. Click to show value'. The settings include:

| Name | Value | Source | Deployment slot setting | Delete |
|--|-------------------------------------|--------------------|-------------------------|--------|
| APPLICATIONINSIGHTS_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.



The screenshot shows the 'Functions' tab for the 'GetMetrics' function. It lists two functions: 'AutoScaleVMSS' and 'GetCPUMetrics'. Both are triggered by 'Timer' and are in 'Enabled' status.

| 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 196 : GetCPUMetrics function - Monitor window



The screenshot shows the 'Monitor' tab for the 'GetCPUMetrics' function. It displays invocation traces and logs.

Invocation Traces:

| Date | Status | Count | Trace ID |
|-------------------------|---------|-------|----------------------------------|
| 2022-06-23 10:40:00.000 | Success | 0 | 3f95215dcb013433809844a65539ff0 |
| 2022-06-23 10:44:39.999 | Success | 0 | 243c19064443710196010fa33fa1123 |
| 2022-06-23 10:44:00.001 | Error | 68 | 90d0fb170eab00001e1359998002e40 |
| 2022-06-23 10:43:00.000 | Success | 0 | d01ee79f81f81a7a1f80cc0f1bdbe8e7 |
| 2022-06-23 10:42:00.001 | Success | 0 | 051d52994bed5ef7d832927e905810 |
| 2022-06-23 10:41:00.000 | Success | 0 | 77096d2140f5ebf7c75b346cc0fe9316 |

9. Verify if the logs are generated by the functions.

AutoScale Function On-demand Password Change

If you are changing the vThunder instance password using [On-demand Password Change](#), perform the following steps else skip them:

1. Run the following script to get the encryption key and encrypted password:

```
PS C:\Users\TestUser\Templates> python .\utils\Encrypt_Password.py
```

2. Provide the recently updated password of existing vThunder instances and then confirm the same password when prompted:

Password:

Confirm Password:

<encrypted_key> <encrypted_password>

Figure 197 : Encrypted Key and Encrypted Password



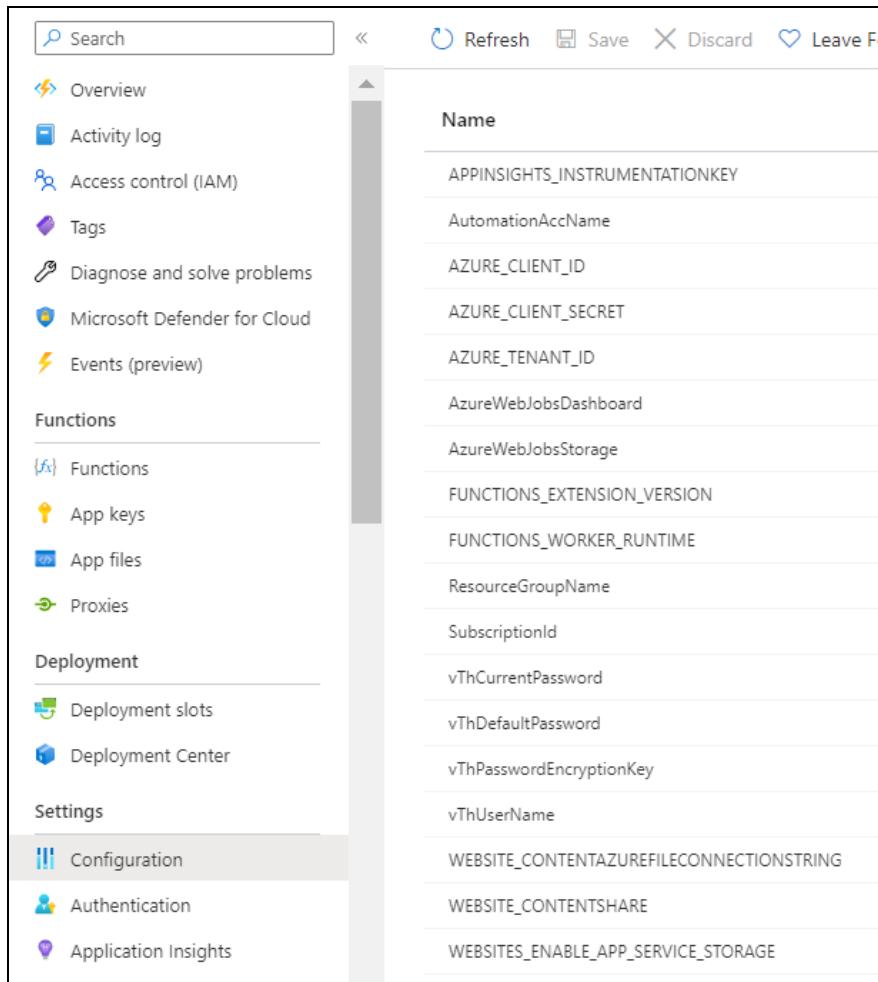
Encrypted Key
Encrypted Password

The encrypted key and encrypted password are displayed.

3. From **Home**, navigate to **Azure Services > Function App > Settings > Configuration** and enter the encrypted key in the **vThPasswordEncryptionKey** field and encrypted password in the **vThCurrentPassword** value field.

The function starts using the password provided in the **vThCurrentPassword** field to get the metric data from VMSS vThunder instances.

Figure 198 : Configuration window



On-demand Password Change

The on-demand password change allows you to change the password for all the existing vThunder instances in the VMSS at one go.

To change the on-demand password, perform the following steps:

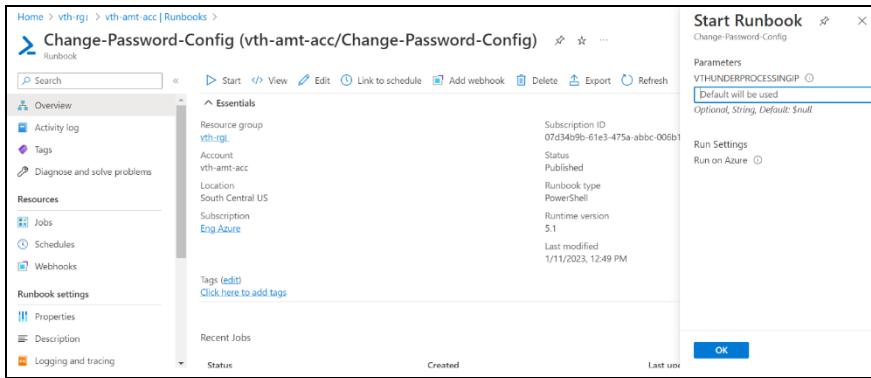
- From **Home**, navigate to **Azure Services > Automation Accounts > Variables**.

Figure 199 : On-demand Password Change Variables

| | | |
|---------------------|---------------------|-------|
| vThNewPassApplyFlag | String | True |
| vThNewPassword | Unknown (encrypted) | ***** |

- Set **vThNewPassApplyFlag** to **True**.
- Update **vThNewPassword** with the new password.
- Navigate to **Azure Services > Automation Accounts > <automation_account_name> > Runbooks**.
- Select the **Change-Password-Config** runbook and click **Start**.
- Leave the **vTHUNDERPROCESSINGIP** parameter empty so that it takes the default value.

Figure 200 : Change-Password-Config runbook



- Navigate to **Azure Services > Automation Accounts > <automation_account_name> > Jobs**.
- Verify if the **Change-Password-Config** runbook job has completed status.
- Navigate to **Azure Services > Automation Accounts > Variables**, verify if the **vThNewPassApplyFlag** flag is set to **False** after the execution of the Change-Password-Config runbook is successful. The **vThNewPassApplyFlag** flag should be set to false after the password is updated for all vThunder instances in VMSS.

If you are autoscaling using Azure Function setup, you need to also change the password in the autoscale function. For more information, see [AutoScale Function On-demand Password Change](#).

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access the vThunder instances using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance under the VMSS
Here, Public IP of **vth-vmss**
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <--Enter username provided by A10 Networks Support-->
Using keyboard-interactive authentication.
Password: xxxx <--Enter your password>
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

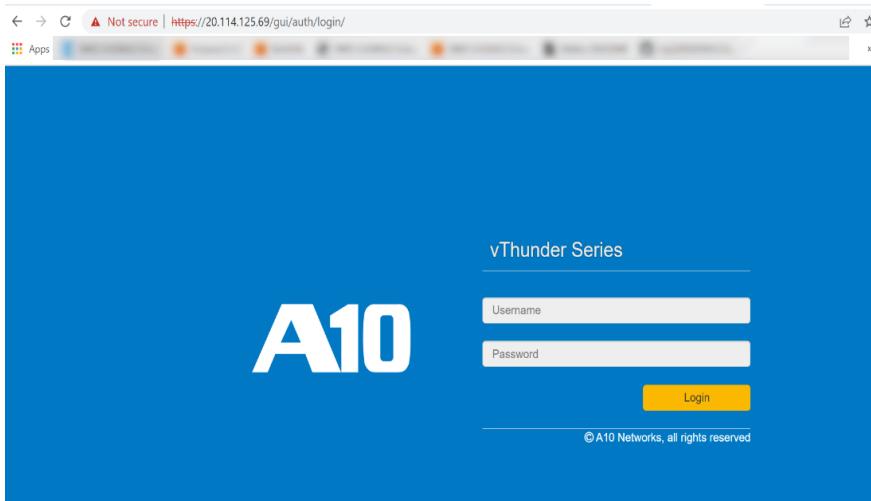
vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

Access vThunder using GUI

To access the vThunder instances using GUI, perform the following steps:

1. Open any browser.
2. Enter `https://<vthunder_public_IP>/gui/auth/login/` in the address bar.

Figure 201 : vThunder GUI



3. Enter the username provided by A10 Networks Support and recently changed password.

The home page gets displayed.

Verify Deployment

To verify deployment using the ARM template, perform the following steps:

1. Run the following command on vThunder:

```
vThunder(config)#show running-config slb
```

If the deployment is successful, the following configuration is displayed:

```
!Section configuration: 711 bytes
!
slb server vth-server-vmss_0 10.0.3.5
  port 53 udp
    health-check-disable
  port 80 tcp
    health-check-disable
  port 443 tcp
```

```

    health-check-disable
!
slb service-group sg443 tcp
    health-check-disable
    member vth-server-vmss_0 443
!
slb service-group sg53 udp
    health-check-disable
    member vth-server-vmss_0 53
!
slb service-group sg80 tcp
    health-check-disable
    member vth-server-vmss_0 80
!
slb virtual-server vip use-if-ip ethernet 1
    port 53 udp
        ha-conn-mirror
        source-nat auto
        service-group sg53
    port 80 http
        source-nat auto
        service-group sg80
    port 443 https
        source-nat auto
        service-group sg443
!
slb virtual-server vip2 10.0.2.10
!
```

- 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 | |
| <hr/> | | |
| Enabled Licenses | Expiry Date (UTC) | 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. |
| 500 Mbps Bandwidth 14-November-2022 | | |

3. From vThunder Console, navigate to **Home > License History** to verify your license:

Figure 202 : License History



4. Run the following command on vThunder to verify the SSL Certificate configuration:

```
vThunder(config)#show pki cert
```

If the SSL Certificate configuration is correct and applied successfully, the following SSL configuration is displayed:

| Name | Type | Expiration | Status |
|-------|------|------------|--------|
| ----- | | | |

server certificate Jan 28 12:00:00 2028 GMT [Unexpired, Bound]

- Run the following command to verify vThunder logs sync-up configuration:

```
vThunder(config)#show running-configacos-events
```

If the vThunder logs sync-up configuration is correct, the following configuration is displayed:

```
!Section configuration: 467 bytes
!
acos-events message-selector vThunderLog
rule 1
    severity equal-and-higher debugging
!
acos-events log server fluentBitLogAgent 10.0.1.4
    health-check-disable
    port 514 udp
        health-check-disable
!
acos-events collector-group vThunderSyslog udp
    log-server fluentBitLogAgent 514
!
acos-events template fluentBitRemoteServer
    message-selector vThunderLog
    collector-group vThunderSyslog
!
acos-events active-template fluentBitRemoteServer
!
```

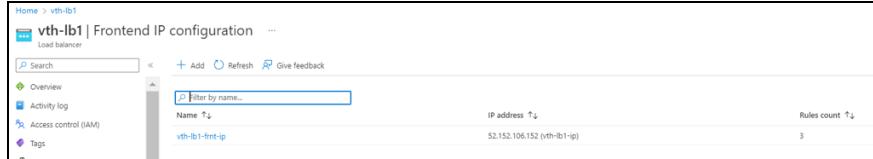
Verify Traffic Flow

To verify the traffic flow from client machine to server machine via vThunder, perform the following:

- From **Azure Portal > Azure Services > Resource Group > <resource_group_name> > <load_balancer> > Settings > Frontend IP configuration.**
Here, **vth-1b1** is the load balancer.

2. Copy the frontend IP address.

Figure 203 : Load balancer frontend IP address



The screenshot shows the 'vth-lb1 | Frontend IP configuration' page. It lists a single frontend IP entry: 'vth-lb1-fnt-ip' with 'IP address' 52.152.106.152 (vth-lb1-ip). There are 3 rules associated with this IP.

3. Select your client instance from the **Virtual machine** list.

Here, **vth-client** is the client instance name.

4. SSH your client machine and run the following command to verify the traffic flow:

```
curl <vth-lb1-font-ip>
```

Example

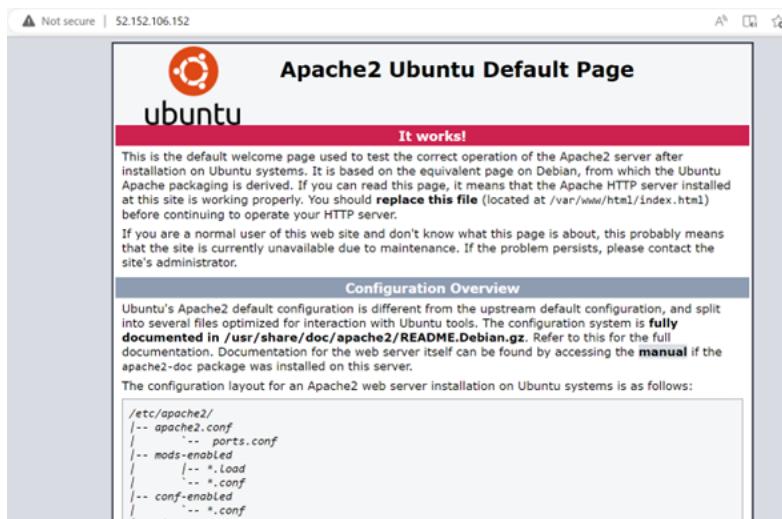
```
curl 52.152.106.152
```

Verify if a response is received.

or

Copy the load balancer frontend IP address in the browser.

Figure 204 : API response



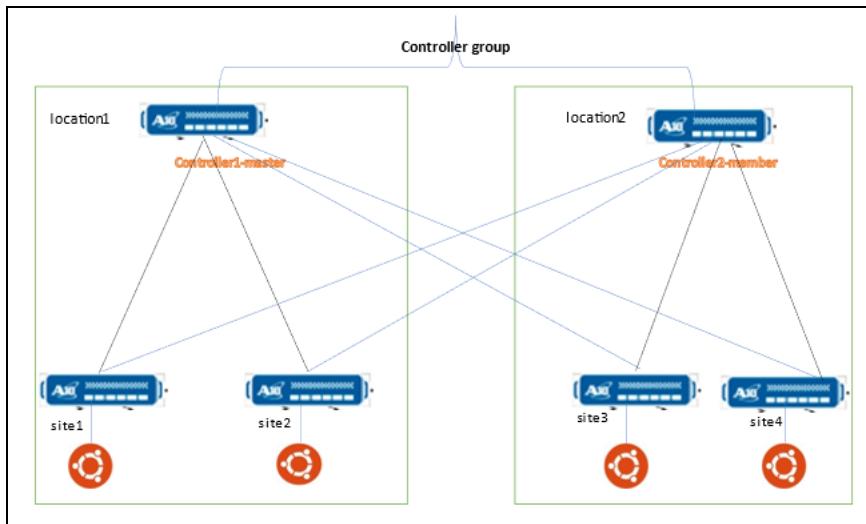
The screenshot shows a web browser window displaying the Apache2 Ubuntu Default Page. The page features the Ubuntu logo and the text 'Apache2 Ubuntu Default Page'. Below this, a red bar displays 'It works!'. The main content area explains the purpose of the page and provides configuration details. It includes a 'Configuration Overview' section with a code snippet showing the directory structure of the Apache2 configuration files: /etc/apache2/, -- apache2.conf, -- ports.conf, -- mods-enabled, -- *.Load, -- *.conf, -- conf-enabled, -- *.conf.

Verify if the API response is received.

Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB

[Figure 205](#) shows the GSLB deployment topology. Using this template, two regions each containing one GSLB controller and two site devices can be deployed. A server is assigned to each site devices.

Figure 205 : 3NIC-6VM-2RG-GSLB Topology



The following topics are covered:

| | |
|--|-----|
| System Requirements | 311 |
| Create vThunder Instances | 318 |
| Configure vThunder as an SLB | 328 |
| Access vThunder using CLI or GUI | 339 |
| Access Linux Server using CLI | 341 |
| Verify Deployment | 342 |
| Verify Traffic Flow | 358 |

System Requirements

The ARM template will display the default values when you download and save the files on your local machine. You can modify the default values as required for your deployment.

You need the following resources to deploy vThunder on the Azure cloud:

Table 14 : System Requirements

| Resource Name | Description | Default Value |
|-----------------------|--|---|
| Azure Resource Group | A resource group with the specified name and location is created, if it doesn't exist. | Here, the Azure resource group name used is <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". | <code>solutiontestingeastus</code> <code>solutiontestingeastus2</code> |

| Resource Name | Description | Default Value |
|-------------------------------|---|---|
| | <p>One storage account is created in each GSLB region. So, total two storage accounts are created.</p> <p>Performance: Standard</p> <p>Replication: Read-access geo-redundant storage (RA-GRS)</p> <p>Account kind: Storagev2 (general purpose v2)</p> | |
| Virtual Machine (VM) Instance | <p>Six vThunder instances are created:</p> <p>Image: a10-vthunder-adc-520-for-microsoft-azure</p> <p>Size: Standard_A4_v2</p> <p>Four Real servers are created:</p> | <p>vThunder instances</p> <pre>\$vmName+\$region1+"1" region1 controller \$vmName+\$region1+"2" region1 site device 1 \$vmName+\$region1+"3" region1 site device 2 \$vmName+\$region2+"1" region2 controller \$vmName+\$region2+"2" region2 site device 1 \$vmName+\$region2+"3" region2 site device 2</pre> <p>Real Servers</p> <pre>\$linuxName+\$region1+"1" region1 linux 1 \$linuxName+\$region1+"2" region1 linux 2 \$linuxName+\$region2+"1" region2 linux 1 \$linuxName+\$region2+"2" region2 linux 2</pre> |

| Resource Name | Description | Default Value |
|-----------------------------|--|---|
| | <p>Version: Linux Ubuntu 16.04.0-LTS</p> <p>Size: Standard_B2s</p> <hr/> <p>NOTE: Before selecting any VM size, it is highly recommended to do an assessment of your projected traffic.</p> <hr/> <p>Table 15 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> |

| Resource Name | Description | Default Value |
|---------------|--|---------------|
| Public IP | <p>Each A10 device is assigned a public IP address to its management interface as a primary IP configuration and to its data interface on client-side as a secondary IP configuration.</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 | Each A10 device is assigned a private IP address to its management | |

| Resource Name | Description | Default Value | | |
|------------------------------|--|--|--|--|
| | <p>interface as a primary IP configuration and to its client-side and server-side data interfaces as a secondary IP configuration.</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"> • Management Interface with | Management Interface for Region 1 10.1.10.5 10.1.10.6 10.1.10.7 | Data Interface 1 for Region 1 10.1.20.5 10.1.20.6 10.1.20.7 | Data Interface 2 for Region 1 10.1.30.5 10.1.30.6 10.1.30.7 |

| Resource Name | Description | Default Value | | | |
|------------------------------|--|--|--|--|--|
| | <p>public IP</p> <ul style="list-style-type: none"> • Data Interface with primary private IP [Ethernet 1, Ethernet 2] <p>Two types of interfaces are created for each Real server:</p> <ul style="list-style-type: none"> • Management Interface with public IP • Data Interface with primary private IP [Ethernet 1] | 10.1.10.8 10.1.10.9 Management Interface for Region 2 10.2.10.5 10.2.10.6 10.2.10.7 10.2.10.8 10.2.10.9 10.2.20.10 | 10.1.20.8 10.1.20.9 10.1.20.10 Data Interface 1 for Region 2 10.2.20.5 10.2.20.6 10.2.20.7 10.2.20.8 10.2.20.9 10.2.20.10 | 10.1.30.8 10.1.30.9 Data Interface 2 for Region 2 10.2.30.5 10.2.30.6 10.2.30.7 10.2.30.8 10.2.30.9 | |
| 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),</p> | <pre>nsgman1region1 nsgdata1region1 nsgdata2region1 nsgman1region2 nsgdata1region2 nsgdata2region2</pre> | | | |

| Resource Name | Description | Default Value |
|---------------|---|---|
| | management interface and data interfaces with Allow permissions for relevant ports are created. | |
| Region | Two regions are created. | <code>eastus</code> <code>eastus2</code> |

Supported VM Sizes

Table 15 : Supported VM sizes

| Series | Size | Qualified Name |
|----------|----------------|-----------------|
| A series | Standard A2 | Standard_A2 |
| | Standard A2v2 | Standard_A2_v2 |
| | Standard A2mv2 | Standard_A2m_v2 |
| | Standard A4v2 | Standard_A4_v2 |
| | Standard A4mv2 | Standard_A4m_v2 |
| | Standard A3 | Standard_A3 |
| | Standard A4 | Standard_A4 |
| | Standard A8v2 | Standard_A8_v2 |
| B series | Standard B2s | Standard_B2_s |
| | Standard B2ms | Standard_B2ms |
| | Standard B4ms | Standard_B4ms |
| D series | Standard D2v2 | Standard_D2_v2 |

| Series | Size | Qualified Name |
|----------|----------------|-----------------|
| | Standard DS2v2 | Standard_DS2_v2 |
| | Standard D4v3 | Standard_D4_v3 |
| | Standard D4sv3 | Standard_D4s_v3 |
| | Standard D3v2 | Standard_D3_v2 |
| | Standard Ds3v2 | Standard_Ds3_v2 |
| | Standard D5v2 | Standard_D5_v2 |
| F series | Standard F4s | Standard_F4s |
| | Standard F8 | Standard_F8 |
| | Standard F16s | Standard_F16s |

Azure is going to retire few of the above listed VM sizes soon, see [Virtual Machine series | Microsoft Azure](#).

For more information on Windows and Linux VM sizes, see

<https://docs.microsoft.com/en-us/azure/virtual-machines/sizes-general>

<https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes>.

Create vThunder Instances

The following topics are covered:

- [Initial Setup](#)
- [Deploy vThunder](#)

Initial Setup

Before deploying vThunder on Azure cloud, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Navigate to the folder where you have downloaded the ARM template and open the ARM_TMPL_GSLB_PARAM.json with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Provision the vThunder instance by entering the default admin credentials as follows:

```
"adminUsername": {
    "value": "vth-user"
},
"adminPassword": {
    "value": "vth-Password"
},
```

NOTE: This is a mandatory step during VM creation. Once the device is provisioned, vThunder auto-deletes all users except the default user.

3. Configure authentication type.

```
"authenticationType": {
    "value": "password"
},
```

4. Configure a DNS label prefix.

```
"dnsLabelPrefix": {
    "value": "vthunderipbare"
},
```

5. Configure a VM name.

```
"vmName": {
    "value": "vthunder"
},
```

6. Copy the desired vThunder Image Name and Product Name from the [Azure Marketplace](#) for A10 vThunder and update the details in the parameter file as follows:

```
"vThunderImage": {
    "value": "vthunder_520_byol"
},
"imagePublisher_vthunder": {
```

```
        "value": "a10networks"
    },
    "imageOffer_vthunder":{
        "value": "a10-vthunder-adc-520-for-microsoft-azure"
    },
}
```

NOTE: Do not change the publisher name.

7. Set a VM size for vThunder instance.

```
"vmSize": {
    "value": "Standard_A4_v2"
},
```

Use a suitable VM size that supports at least 3 NICs. For VM sizes, see [System Requirements](#) section.

8. Configure a Linux machine name.

```
"linuxName": {
    "value": "linux"
},
```

9. Configure Linux machine details.

```
"linuxName": {
    "value": "linux"
},
"ubuntuOSVersion": {
    "value": "16.04.0-LTS"
},
"imagePublisher_linux":{
    "value": "Canonical"
},
"imageOffer_linux":{
    "value": "UbuntuServer"
},
"vmSize_linux": {
    "value": "Standard_B2s"
},
```

10. Configure regions.

```

"region1": {
    "value": "eastus"
},
"region2": {
    "value": "eastus2"
}
,
```

11. Configure a network security group for the two regions.

```

"networkSecurityGroupName_region1_Management1": {
    "value": "nsgman1region1"
},
"networkSecurityGroupName_region1_Data1": {
    "value": "nsgdata1region1"
},
"networkSecurityGroupName_region1_Data2": {
    "value": "nsgdata2region1"
},
"networkSecurityGroupName_region2_Management1": {
    "value": "nsgman1region2"
},
"networkSecurityGroupName_region2_Data1": {
    "value": "nsgdata1region2"
},
"networkSecurityGroupName_region2_Data2": {
    "value": "nsgdata2region2"
}
,
```

12. Configure storage account names.

```

"storageAccountName1": {
    "value": "solutiontestingeastus"
},
"storageAccountName2": {
    "value": "solutiontestingeastus2"
}
,
```

13. Configure an address prefix and subnet values for each of the two regions' management interface and data interfaces.

```

    "addressPrefix1": {
        "value": "10.1.0.0/16"
    },
    "region1_mgmt_prefix": {
        "value": "10.1.10.0/24"
    },
    "region1_data1_prefix": {
        "value": "10.1.20.0/24"
    },
    "region1_data2_prefix": {
        "value": "10.1.30.0/24"
    },
    "addressPrefix2": {
        "value": "10.2.0.0/16"
    },
    "region2_mgmt_prefix": {
        "value": "10.2.10.0/24"
    },
    "region2_data1_prefix": {
        "value": "10.2.20.0/24"
    },
    "region2_data2_prefix": {
        "value": "10.2.30.0/24"
    },
}

```

14. Configure network interface cards for the two regions.

```

    "vnetName1_mgmt_region1_PrivateAddress1" :{
        "value": "10.1.10.5"
    },
    "vnetName1_mgmt_region1_PrivateAddress2" :{
        "value": "10.1.10.6"
    },
    "vnetName1_mgmt_region1_PrivateAddress3" :{
        "value": "10.1.10.7"
    },
    "vnetName1_mgmt_region1_PrivateAddress4" :{
        "value": "10.1.10.8"
    },
}

```

```
"vnetName1_mgmt_region1_PrivateAddress5" :{
    "value": "10.1.10.9"
},
"vnetName1_data1_region1_PrivateAddress1" :{
    "value": "10.1.20.5"
},
"vnetName1_data1_region1_PrivateAddress2" :{
    "value": "10.1.20.6"
},
"vnetName1_data1_region1_PrivateAddress3" :{
    "value": "10.1.20.7"
},
"vnetName1_data1_region1_PrivateAddress_secondary1" :{
    "value": "10.1.20.8"
},
"vnetName1_data1_region1_PrivateAddress_secondary2" :{
    "value": "10.1.20.9"
},
"vnetName1_data1_region1_PrivateAddress_secondary3" :{
    "value": "10.1.20.10"
},
"vnetName1_data2_region1_PrivateAddress1" :{
    "value": "10.1.30.5"
},
"vnetName1_data2_region1_PrivateAddress2" :{
    "value": "10.1.30.6"
},
"vnetName1_data2_region1_PrivateAddress3" :{
    "value": "10.1.30.7"
},
"vnetName1_data2_region1_PrivateAddress4" :{
    "value": "10.1.30.8"
},
"vnetName1_data2_region1_PrivateAddress5" :{
    "value": "10.1.30.9"
},
"vnetName2_mgmt_region2_PrivateAddress1" :{
```

```
        "value": "10.2.10.5"
    },
    "vnetName2_mgmt_region2_PrivateAddress2" :{
        "value": "10.2.10.6"
    },
    "vnetName2_mgmt_region2_PrivateAddress3" :{
        "value": "10.2.10.7"
    },
    "vnetName2_mgmt_region2_PrivateAddress4" :{
        "value": "10.2.10.8"
    },
    "vnetName2_mgmt_region2_PrivateAddress5" :{
        "value": "10.2.10.9"
    },
    "vnetName2_data1_region2_PrivateAddress1" :{
        "value": "10.2.20.5"
    },
    "vnetName2_data1_region2_PrivateAddress2" :{
        "value": "10.2.20.6"
    },
    "vnetName2_data1_region2_PrivateAddress3" :{
        "value": "10.2.20.7"
    },
    "vnetName2_data1_region2_PrivateAddress_secondary1" :{
        "value": "10.2.20.8"
    },
    "vnetName2_data1_region2_PrivateAddress_secondary2" :{
        "value": "10.2.20.9"
    },
    "vnetName2_data1_region2_PrivateAddress_secondary3" :{
        "value": "10.2.20.10"
    },
    "vnetName2_data2_region2_PrivateAddress1" :{
        "value": "10.2.30.5"
    },
    "vnetName2_data2_region2_PrivateAddress2" :{
        "value": "10.2.30.6"
```

```

    },
    "vnetName2_data2_region2_PrivateAddress3" : {
        "value": "10.2.30.7"
    },
    "vnetName2_data2_region2_PrivateAddress4" : {
        "value": "10.2.30.8"
    },
    "vnetName2_data2_region2_PrivateAddress5" : {
        "value": "10.2.30.9"
    }
}
}

```

15. Verify if all the configurations in the ARM_TMPL_GSLB_PARAM.json file are correct and then save the changes.
16. Open the ARM_TMPL_GSLB_1.json from the downloaded folder with a text editor.
17. Update the following variables:

```

"vnetName1": "vnet1",
...
...
"vnetName2": "vnet2",

```

18. Verify if all the configurations in the ARM_TMPL_GSLB_1.json file are correct and then save the changes.

Deploy vThunder

To deploy vThunder on Azure cloud, perform the following steps:

1. From Start menu, open PowerShell and navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create a Azure resource group:

```
PS C:\Users\TestUser\Templates> az group create --name <resource_group_name> --location "<location_name>"
```

Example:

```
PS C:\Users\TestUser\Templates> az group create --name gslb-rg1 --location "south central us"
```

```
{
  "id": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-
xxxxxxxx/resourceGroups/vth-rg1",
  "location": "southcentralus",
  "managedBy": null,
  "name": "gslb-rg1",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

Here, **gslb-rg1** resource group is created.

3. Run the following command to create a Azure deployment group.

```
PS C:\Users\TestUser\Templates> az deployment group create -g
<resource_group_name> --template-file <template_name> --parameters
<param_template_name>
```

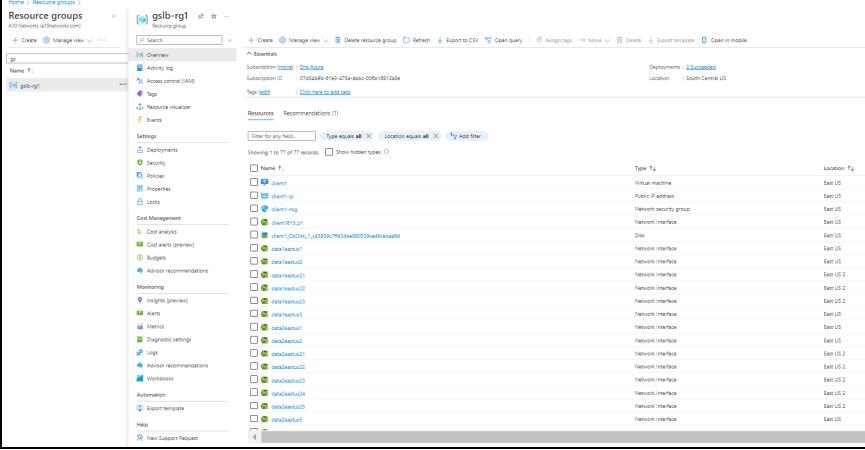
Example:

```
PS C:\Users\TestUser\Templates> az deployment group create -g gslb-rg1
--template-file ARM_TMPL_GSLB_1.json --parameters ARM_TMPL_GSLB_
PARAM.json
```

4. Verify if all the above listed resources are created in the **Home > Azure Services > Resource Group > <resource_group_name>**.

In total, ten virtual machine instances is created i.e. six vThunder instances and four Linux real servers.

Figure 206 : Resource listing in the resource group

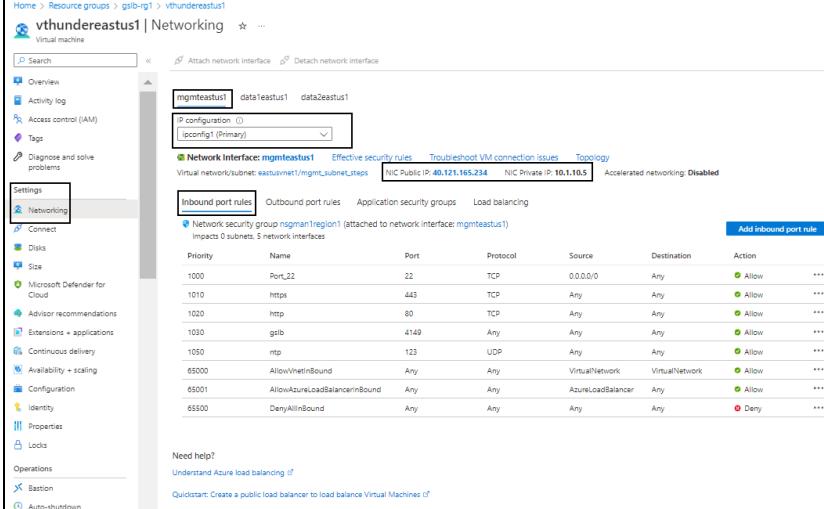


| Name | Type | Location |
|--------------|------------------------|----------|
| client1 | Virtual machine | East US |
| client1-ip | Public IP address | East US |
| client1-nsg | Network security group | East US |
| client1t1_1 | Network interface | East US |
| client1t1_2 | Network interface | East US |
| client1t1_3 | Network interface | East US |
| client1t1_4 | Network interface | East US |
| client1t1_5 | Network interface | East US |
| client1t1_6 | Network interface | East US |
| client1t1_7 | Network interface | East US |
| client1t1_8 | Network interface | East US |
| client1t1_9 | Network interface | East US |
| client1t1_10 | Network interface | East US |
| client1t1_11 | Network interface | East US |
| client1t1_12 | Network interface | East US |
| client1t1_13 | Network interface | East US |
| client1t1_14 | Network interface | East US |
| client1t1_15 | Network interface | East US |
| client1t1_16 | Network interface | East US |
| client1t1_17 | Network interface | East US |
| client1t1_18 | Network interface | East US |
| client1t1_19 | Network interface | East US |
| client1t1_20 | Network interface | East US |

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.

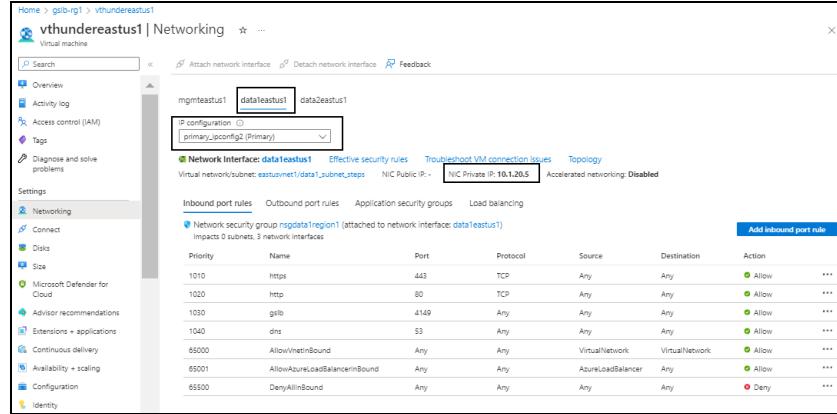
Figure 207 : Selected virtual machine - Networking window - Management interface tab



| Priority | Name | Port | Protocol | Source | Destination | Action |
|----------|-------------------------------|------|----------|-------------------|----------------|--------|
| 1000 | Port_22 | 22 | TCP | 0.0.0.0/0 | Any | Allow |
| 1010 | https | 443 | TCP | Any | Any | Allow |
| 1020 | http | 80 | TCP | Any | Any | Allow |
| 1030 | telnet | 4149 | Any | Any | Any | Allow |
| 1050 | ntp | 123 | UDP | Any | Any | Allow |
| 65000 | AllowVhInBound | Any | Any | VirtualNetwork | VirtualNetwork | Allow |
| 65001 | AllowAzureLoadBalancerInBound | Any | Any | AzureLoadBalancer | Any | Allow |
| 65500 | DenyAllInBound | Any | Any | Any | Any | Deny |

- b. Select the data interface tab to verify the primary private IP.

Figure 208 : Data interface tab - Primary configuration



The screenshot shows the Azure portal interface for a virtual machine named 'vthundereastus1'. In the left sidebar, under 'Networking', the 'dataInterface' tab is selected. The main pane displays the 'Primary configuration' for the 'dataInterface1' network interface. Key details shown include:

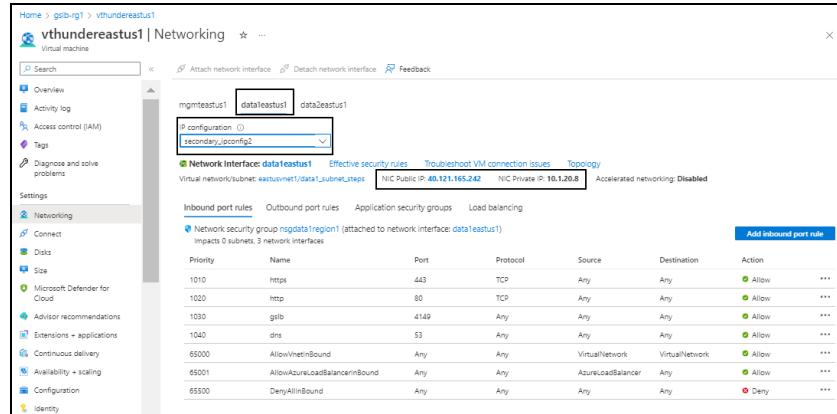
- Virtual network/subnet:** eastus1internal / data1_subnet_steps
- NIC Public IP:** 40.121.161.242
- NIC Private IP:** 10.1.20.5
- Accelerated networking:** Disabled

The 'Effective security rules' section shows a table of inbound port rules:

| Priority | Name | Port | Protocol | Source | Destination | Action |
|----------|-------------------------------|------|----------|-------------------|----------------|--------|
| 1010 | https | 443 | TCP | Any | Any | Allow |
| 1020 | http | 80 | TCP | Any | Any | Allow |
| 1030 | grub | 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 209 : Data interface tab - Secondary configuration



The screenshot shows the Azure portal interface for the same virtual machine 'vthundereastus1'. The 'dataInterface' tab is selected, but the dropdown menu shows 'secondary.jsonconfig2' is selected. The main pane displays the 'Secondary configuration' for the 'dataInterface1' network interface. Key details shown include:

- Virtual network/subnet:** eastus1internal / data1_subnet_steps
- NIC Public IP:** 40.121.161.242
- NIC Private IP:** 10.1.20.6
- Accelerated networking:** Disabled

The 'Effective security rules' section shows a table of inbound port rules, identical to the primary configuration:

| Priority | Name | Port | Protocol | Source | Destination | Action |
|----------|-------------------------------|------|----------|-------------------|----------------|--------|
| 1010 | https | 443 | TCP | Any | Any | Allow |
| 1020 | http | 80 | TCP | Any | Any | Allow |
| 1030 | grub | 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](#)
- [Change Password](#)
- [Deploy vThunder as an SLB](#)

Initial Setup

Before deploying vThunder on Azure cloud as an SLB, configure the corresponding parameters in the ARM template.

To configure the parameters, perform the following steps:

1. Open the ARM_TMPL_GSLB_SLB_PARAM.json file with a text editor.

NOTE: Each parameter has a default value mentioned in the parameter file.

2. Configure SLB server host or domain for site devices.

```
{  
    "slbServerHostOrDomain1": {  
        "servername": "s1",  
        "host": "10.1.30.8",  
        "health-check-disable":1,  
        "action": "enable"  
    },  
    "slbServerHostOrDomain2": {  
        "servername": "s1",  
        "host": "10.1.30.9",  
        "health-check-disable":1,  
        "action": "enable"  
    },  
    "slbServerHostOrDomain3": {  
        "servername": "s1",  
        "host": "10.2.30.8",  
        "health-check-disable":1,  
        "action": "enable"  
    },  
    "slbServerHostOrDomain4": {  
        "servername": "s1",  
        "host": "10.2.30.9",  
        "health-check-disable":1,  
        "action": "enable"  
    },  
}
```

3. Configure SLB server port for site devices.

```
"slbServerPortList1": {  
    "value": [  
        {  
            "port-number": 80,  
            "protocol": "tcp",  
            "health-check-disable":1  
        }  
    ]  
,  
    "slbServerPortList2": {  
        "value": [  
            {  
                "port-number": 80,  
                "protocol": "tcp",  
                "health-check-disable":1  
            }  
        ]  
,  
        "slbServerPortList3": {  
            "value": [  
                {  
                    "port-number": 80,  
                    "protocol": "tcp",  
                    "health-check-disable":1  
                }  
            ]  
,  
            "slbServerPortList4": {  
                "value": [  
                    {  
                        "port-number": 80,  
                        "protocol": "tcp",  
                        "health-check-disable":1  
                    }  
                ]  
,  
            }  
        }  
    }  
},
```

4. Configure service group port for site devices.

```
"serviceGroupList1": {  
    "value": [  
        {  
            "name": "sg",  
            "protocol": "tcp",  
            "health-check-disable": 0,  
            "member-list": [  
                {  
                    "name": "s1",  
                    "port": 80  
                }  
            ]  
        }  
    ]  
,  
    "serviceGroupList2": {  
        "value": [  
            {  
                "name": "sg",  
                "protocol": "tcp",  
                "health-check-disable": 0,  
                "member-list": [  
                    {  
                        "name": "s1",  
                        "port": 80  
                    }  
                ]  
            }  
        ]  
,  
        "serviceGroupList3": {  
            "value": [  
                {  
                    "name": "sg",  
                    "protocol": "tcp",  
                    "health-check-disable": 0,
```

```

        "member-list": [
            {
                "name": "s1",
                "port": 80
            }
        ]
    }
},
"serviceGroupList4": {
    "value": [
        {
            "name": "sg",
            "protocol": "tcp",
            "health-check-disable": 0,
            "member-list": [
                {
                    "name": "s1",
                    "port": 80
                }
            ]
        }
    ]
},

```

5. Configure SLB virtual server for site devices.

The virtual server's default name is "vs1".

```

"virtualServerList1": {
    "virtual-server-name": "vs1",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 80,
            "protocol": "tcp",
            "auto": 1,

```

```
        "service-group": "sg"
    }
]
},
"virtualServerList2": {
    "virtual-server-name": "vs1",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 80,
            "protocol": "tcp",
            "auto": 1,
            "service-group": "sg"
        }
    ]
},
"virtualServerList3": {
    "virtual-server-name": "vs1",
    "metadata": {
        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number": 80,
            "protocol": "tcp",
            "auto": 1,
            "service-group": "sg"
        }
    ]
},
"virtualServerList4": {
    "virtual-server-name": "vs1",
    "metadata": {
```

```

        "description": "virtual server is using VIP from
ethernet 1 secondary subnet"
    },
    "value": [
        {
            "port-number":80,
            "protocol":"tcp",
            "auto":1,
            "service-group":"sg"
        }
    ]
},

```

6. Configure GSLB service IP address for controller.

```

"serviceipList1": {
    "node-name": "vs1",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
},
"serviceipList2": {
    "node-name": "vs2",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
},
"serviceipList3": {
    "node-name": "vs3",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
}

```

```

        }
    ],
},
"serviceipList4": {
    "node-name": "vs4",
    "value": [
        {
            "port-num": 80,
            "port-proto": "tcp"
        }
    ]
},

```

7. Configure GSLB site details for controller.

```

"siteList1": {
    "site-name": "eastus_1",
    "vip-name": "vs1",
    "device-name": "slb1",
    "geo-location": "North America,United States"
},
"siteList2": {
    "site-name": "eastus_2",
    "vip-name": "vs2",
    "device-name": "slb2",
    "geo-location": "North America,United States"
},
"siteList3": {
    "site-name": "eastus2_1",
    "vip-name": "vs3",
    "device-name": "slb3",
    "geo-location": "North America.United States.California.San
Jose"
},
"siteList4": {
    "site-name": "eastus2_2",
    "vip-name": "vs4",
    "device-name": "slb4",
    "geo-location": "North America.United States.California.San
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"
    }

```

15. Provide the resource group name.

```

"resourceGroupName": "gslb-test-rg"
"vThUsername": "admin"

```

NOTE: Do not change the vThunder instance username.

16. Verify if all the configurations in the ARM_TMPL_GSLB_SLB_PARAM.json file are correct and then save the changes.

Change Password

To change the password for the vThunder instances, site devices, and servers, perform the following steps:

1. Run the following command to change password:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_GSLB_CHANGE_PASSWORD_2.ps1
```

NOTE: It is highly recommended to change the default password provided by the A10 Networks Support when you log in the vThunder instance for the first time.

2. Provide the default and new password when prompted:

```

Enter Default Password: ***
Enter New Password: ***
Confirm New Password: ***

```

The default password is provided by the A10 Networks Support. The new password should follow the Default password policy. For more information, see [Default Password Policy](#).

Deploy vThunder as an SLB

To deploy vThunder on Azure cloud as an SLB, perform the following steps:

1. From PowerShell, navigate to the folder where you have downloaded the ARM template.
2. Run the following command to create vThunder SLB instance using the same resource group:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_GSLB_CONFIG_3.ps1 -  
resourceGroup <resource_group_name>
```

Example:

```
PS C:\Users\TestUser\Templates> .\ARM_TMPL_GSLB_CONFIG_3.ps1 -  
resourceGroup gslb-rg1
```

NOTE: Except for the real server ip addresses, all other IP addresses are dynamically obtained from user environment.

3. Verify the following for each site devices:
 - Interfaces are enabled
 - SLB is configured
 - Site device is enabled to be a GSLB device.
 - Default route is configured pointing to the client-side data interface for traffic to exit the vThunder.
4. Verify the following for each GSLB controller:
 - Interfaces are enabled
 - vThunder device is configured with the required GSLB configuration
 - Geo location is enabled.
 - Default route is configured pointing to the client-side data interface for traffic to exit the vThunder.

Access vThunder using CLI or GUI

vThunder can be accessed using any of the following ways:

- [Access vThunder using CLI](#)
- [Access vThunder using GUI](#)

Access vThunder using CLI

To access vThunder using CLI, perform the following steps:

1. Open PuTTY.
2. Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Virtual Machine Instance
Here, Public IP of **vthundereastus1**,
vthundereastus2,**vthundereastus3**,**vthundereastus21**,
vthundereastus22,**vthundereastus23**
 - Connection Type: SSH
3. Click **Open**.
4. In the active PuTTY session, login with the recently changed password:

```
login as: xxxx <--Enter username provided by A10 Networks Support-->
Using keyboard-interactive authentication.
Password: xxxx <--Enter your password-->
Last login: Day MM DD HH:MM:SS from a.b.c.d

System is ready now.

[type ? for help]

vThunder> enable <--Execute command-->
Password:<--just press Enter key-->
vThunder#config <--Configuration mode-->
```

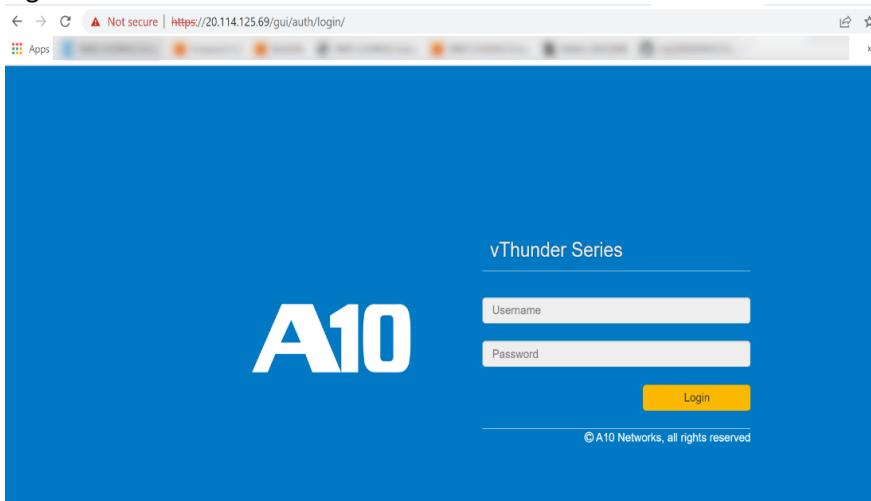
Access vThunder using GUI

To access vThunder using GUI, perform the following steps:

1. Open any browser.

- Enter `https://<vt thunder_public_IP>` in the address bar.

Figure 210 : vThunder GUI



- Enter the recently configured user credentials.
The home gets displayed.

Access Linux Server using CLI

To access Real Server using CLI, perform the following steps:

- Open PuTTY.
- Enter or select the following basic information in the PuTTY Configuration window:
 - Hostname: Public IP of Linux Ubuntu machine
Here, Public IP of `linuxeastus1`, `linuxeastus2`, `linuxeastus21`, `linuxeastus22`
 - Connection Type: SSH
- Click **Open**.
- In the active PuTTY session, enter the following:

```
ubuntu login: vth-user <--Username-->
Password: vth-Password <--Password-->
.
.
.
```

```
.  
vth-user@vth-user:~$
```

Verify Deployment

To verify deployment using the ARM template, perform the following steps:

1. Verify SLB configuration on the following vThunder instances:

CONTROLLER 1 - Master configuration

Run the following command:

```
vThunder-gslb:Master (config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder master controller:

```
no system geo-location load iana  
system geo-location load GeoLite2-City  
!  
!  
interface management  
    ip address dhcp  
!  
interface ethernet 1  
    enable  
    ip address dhcp  
!  
interface ethernet 2  
    enable  
    ip address dhcp  
!  
!  
ip route 0.0.0.0 /0 10.1.20.1  
!  
slb virtual-server gslb-server 10.1.20.8  
    port 53 udp
```

[Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB](#)

```
gslb-enable
!
gslb service-ip vs1 10.1.20.9
    external-ip 137.117.81.170
    port 80 tcp
!
gslb service-ip vs2 10.1.20.10
    external-ip 137.117.81.196
    port 80 tcp
!
gslb service-ip vs3 10.2.20.9
    external-ip 20.246.2.117
    port 80 tcp
!
gslb service-ip vs4 10.2.20.10
    external-ip 20.230.84.149
    port 80 tcp
!
gslb group default
    enable
    priority 255
!
gslb site eastus_1
    geo-location "North America,United States"
    slb-dev slb1 104.211.58.124
    vip-server vs1
!
gslb site eastus_2
    geo-location "North America,United States"
    slb-dev slb2 104.211.58.122
    vip-server vs2
!
gslb site eastus2_1
    geo-location "North America.United States.California.San Jose"
    slb-dev slb3 20.230.76.141
    vip-server vs3
```

```

!
gslb site eastus2_2
    geo-location "North America.United States.California.San Jose"
    slb-dev slb4 20.230.78.91
        vip-server vs4
!
gslb policy a10
    metric-order health-check geographic
    dns server authoritative
!
gslb zone gslb.a10.com
    policy a10
    service 80 www
        dns-a-record vs1 static
        dns-a-record vs2 static
        dns-a-record vs3 static
        dns-a-record vs4 static
!
gslb protocol status-interval 1
!
gslb protocol enable controller

```

CONTROLLER 2 - Member configuration

Run the following command:

```
vThunder-gslb:Member(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder member controller:

```

interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
```

Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB

```
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb virtual-server gslb-server 10.2.20.8
    port 53 udp
    gslb-enable
!
gslb service-ip vs1 10.1.20.9
    external-ip 137.117.81.170
    port 80 tcp
!
gslb service-ip vs2 10.1.20.10
    external-ip 137.117.81.196
    port 80 tcp
!
gslb service-ip vs3 10.2.20.9
    external-ip 20.246.2.117
    port 80 tcp
!
gslb service-ip vs4 10.2.20.10
    external-ip 20.230.84.149
    port 80 tcp
!
gslb group default
    enable
    primary 20.232.185.150
!
gslb site eastus_1
    geo-location "North America,United States"
    slb-dev slb1 104.211.58.124
        vip-server vs1
!
gslb site eastus_2
    geo-location "North America,United States"
    slb-dev slb2 104.211.58.122
        vip-server vs2
```

```
!
gslb site eastus2_1
    geo-location "North America.United States.California.San Jose"
    slb-dev slb3 20.230.76.141
        vip-server vs3
!
gslb site eastus2_2
    geo-location "North America.United States.California.San Jose"
    slb-dev slb4 20.230.78.91
        vip-server vs4
!
gslb policy a10
    metric-order health-check geographic
    dns server authoritative
!
gslb zone gslb.a10.com
    policy a10
    service 80 www
        dns-a-record vs1 static
        dns-a-record vs2 static
        dns-a-record vs3 static
        dns-a-record vs4 static
!
gslb protocol status-interval 1
!
gslb protocol enable controller
```

SITE1 REGION1 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site1 region1:

```
interface management
    ip address dhcp
!
```

```

interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb server s1 10.1.30.8
    health-check disable
    port 80 tcp
        health-check disable
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.1.20.9
    port 80 tcp
        source-nat auto
        service-group sg
!
!
gslb protocol enable device

```

SITE2 REGION1 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site1 region2:

```

interface management
    ip address dhcp
!
```

```

interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.1.20.1
!
slb server s1 10.1.30.9
    health-check disable
    port 80 tcp
        health-check disable
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.1.20.10
    port 80 tcp
        source-nat auto
        service-group sg
!
!
gslb protocol enable device

```

SITE1 REGION2 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site1 region2:

```

interface management
    ip address dhcp
!
```

```

interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb server s1 10.2.30.8
    health-check disable
    port 80 tcp
        health-check disable
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.2.20.9
    port 80 tcp
        source-nat auto
        service-group sg
!
!
gslb protocol enable device

```

SITE2 REGION2 configuration

Run the following command:

```
vThunder(config) (NOLICENSE) #show running-config
```

If the deployment is successful, the following controller and site configuration is displayed on vThunder site2 region2:

```

interface management
    ip address dhcp
!
```

```

interface ethernet 1
    enable
    ip address dhcp
!
interface ethernet 2
    enable
    ip address dhcp
!
!
ip route 0.0.0.0 /0 10.2.20.1
!
slb server s1 10.2.30.9
    health-check disable
    port 80 tcp
        health-check disable
!
slb service-group sg tcp
    member s1 80
!
slb virtual-server vs1 10.2.20.10
    port 80 tcp
        source-nat auto
        service-group sg
!
!
gslb protocol enable device

```

- Run the following command on vThunder to verify the GSLB group information:

CONTROLLER - Master configuration

Run the following command:

```
vThunder-gslb:Master (NOLICENSE) #show gslb group
```

If the deployment is successful, the following configuration is displayed:

```

Pri = Priority, Attrs = Attributes
S-Cfg = Secure Config

```

```

S-State = Secure Status
D = Disabled, L = Learn
P = Passive, * = Master
E = Enabled, EF = Enable-Fallback
Unsec = Unsecure, Unkwn = Unknown
Estng = Establishing, Estd = Established

Group: default, Master: local

Member           Sys-ID   Pri Attrs  Status    S-Cfg
S-State Address
-----
-----
local           e592163a 255 L*      OK
vThunder        58547cbd 100 L      Synced     D
Unsec   20.109.98.187

```

CONTROLLER - Member configuration

Run the following command:

```
vThunder-gslb:Member (NOLICENSE) #show gslb group
```

If the deployment is successful, the following configuration is displayed:

```

Pri = Priority, Attrs = Attributes
S-Cfg = Secure Config
S-State = Secure Status
D = Disabled, L = Learn
P = Passive, * = Master
E = Enabled, EF = Enable-Fallback
Unsec = Unsecure, Unkwn = Unknown
Estng = Establishing, Estd = Established

Group: default, Master: vThunder

Member           Sys-ID   Pri Attrs  Status    S-Cfg
S-State Address
-----
-----
local           58547cbd 100 L      OK
vThunder        e592163a 255 PL*    Synced     D
Unsec   20.232.185.150

```

3. Run the following command on vThunder to verify the GSLB protocol information:

CONTROLLER - Master configuration

Run the following command:

```
vThunder-gslb:Master (NOLICENSE) #show gslb protocol
```

If the deployment is successful, the following configuration is displayed:

```
GSLB site: eastus_1
  SLB device: slb1 (10.1.20.5:4108) Established
  Session ID: 2869
  Secure Config: Disable |Current SSL State:
                    Unsecure
  Connection succeeded: 1 |Connection failed:
                        1
  Open packet sent: 1 |Open packet received:
                     1
  Open session succeeded: 1 |Open session failed:
                         0
  Sessions Dropped: 0 |Update packet received:
                     7346
  Keepalive packet sent: 123 |Keepalive packet
  received: 122
  Notify packet sent: 0 |Notify packet received:
                     0
  Message Header Error: 0 |Protocol RDT(ms):
                     40
  GSLB Protocol Version: 2 |Peer ACOS Version:
                     5.2.0 Build 155
  Secure negotiation Success: 0 |Secure negotiation
  Failures: 0
  SSL handshake Success: 0 |SSL handshake Failures:
                     0

GSLB site: eastus_2
  SLB device: slb2 (10.1.20.5:2260) Established
```

```

Session ID:      7186
Secure Config:          Disable | Current SSL State:
                        Unsecure
Connection succeeded:    1 | Connection failed:
                        1
Open packet sent:        1 | Open packet received:
                        1
Open session succeeded:  1 | Open session failed:
                        0
Sessions Dropped:       0 | Update packet received:
                        7344
Keepalive packet sent:   123 | Keepalive packet
received:                122
Notify packet sent:      0 | Notify packet received:
                        0
Message Header Error:   0 | Protocol RDT(ms):
                        32
GSLB Protocol Version:  2 | Peer ACOS Version:
                        5.2.0 Build 155
Secure negotiation Success:  0 | Secure negotiation
Failures:                 0
SSL handshake Success:    0 | SSL handshake Failures:
                        0

GSLB site: eastus2_1
SLB device: slb3 (10.1.20.5:6668) Established
Session ID:      1353
Secure Config:          Disable | Current SSL State:
                        Unsecure
Connection succeeded:    1 | Connection failed:
                        0
Open packet sent:        1 | Open packet received:
                        1
Open session succeeded:  1 | Open session failed:
                        0
Sessions Dropped:       0 | Update packet received:

```

```

    7346
Keepalive packet sent:           123 | Keepalive packet
received:                      122
Notify packet sent:             0 | Notify packet received:
                                0
Message Header Error:          0 | Protocol RDT(ms):
                                20
GSLB Protocol Version:         2 | Peer ACOS Version:
                                5.2.0 Build 155
Secure negotiation Success:    0 | Secure negotiation
Failures:                      0
SSL handshake Success:         0 | SSL handshake Failures:
                                0

GSLB site: eastus2_2
SLB device: slb4 (10.1.20.5:12936) Established
Session ID:      46932
Secure Config:   Disable | Current SSL State:
                  Unsecure
Connection succeeded:          1 | Connection failed:
                                0
Open packet sent:              1 | Open packet received:
                                1
Open session succeeded:        1 | Open session failed:
                                0
Sessions Dropped:             0 | Update packet received:
                                7348
Keepalive packet sent:          124 | Keepalive packet
received:                      123
Notify packet sent:             0 | Notify packet received:
                                0
Message Header Error:          0 | Protocol RDT(ms):
                                20
GSLB Protocol Version:         2 | Peer ACOS Version:
                                5.2.0 Build 155
Secure negotiation Success:    0 | Secure negotiation

```

```

Failures: 0
SSL handshake Success: 0 | SSL handshake Failures: 0

GSLB protocol is disabled for site devices.

```

CONTROLLER - Member configuration

Run the following command on vThunder to verify the GSLB protocol information:

```
vThunder-gslb:Member (NOLICENSE) #show gslb protocol
```

If the deployment is successful, the following configuration is displayed:

```

GSLB site: eastus_1
SLB device: slb1 (10.2.20.5:4626) GroupControl
Session ID: Not Available
Secure Config: None | Current SSL State:
                None
Connection succeeded: 1 | Connection failed:
                    1
Open packet sent: 1 | Open packet received:
                    1
Open session succeeded: 1 | Open session failed:
                    0
Sessions Dropped: 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

```

Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB

```

GSLB site: eastus_2
  SLB device: slb2 (10.2.20.5:18556) GroupControl
  Session ID: Not Available
  Secure Config: None | Current SSL State:
    None
  Connection succeeded: 1 | Connection failed:
    1
  Open packet sent: 1 | Open packet received:
    1
  Open session succeeded: 1 | Open session failed:
    0
  Sessions Dropped: 1 | Update packet received:
    14
  Keepalive packet sent: 2 | Keepalive packet
  received: 1
  Notify packet sent: 0 | Notify packet received:
    0
  Message Header Error: 0 | Protocol RDT(ms):
    0
  GSLB Protocol Version: 2
  Secure negotiation Success: 0 | Secure negotiation
  Failures: 0
  SSL handshake Success: 0 | SSL handshake Failures:
    0

GSLB site: eastus2_1
  SLB device: slb3 (10.2.20.5:13002) GroupControl
  Session ID: Not Available
  Secure Config: None | Current SSL State:
    None
  Connection succeeded: 1 | Connection failed:
    1
  Open packet sent: 1 | Open packet received:
    1
  Open session succeeded: 1 | Open session failed:
    0

```

```

Sessions Dropped:           1 | Update packet received:
                           10

Keepalive packet sent:      2 | Keepalive packet
received:                  1

Notify packet sent:         0 | Notify packet received:
                           0

Message Header Error:       0 | Protocol RDT(ms):
                           0

GSLB Protocol Version:     2

Secure negotiation Success: 0 | Secure negotiation

Failures:                  0

SSL handshake Success:      0 | SSL handshake Failures:
                           0

GSLB site: eastus2_2
  SLB device: slb4 (10.2.20.5:1200) GroupControl
  Session ID: Not Available
  Secure Config: None | Current SSL State:
                     None
  Connection succeeded:    1 | Connection failed:
                           0

  Open packet sent:        1 | Open packet received:
                           1

  Open session succeeded:  1 | Open session failed:
                           0

Sessions Dropped:           1 | Update packet received:
                           18

Keepalive packet sent:      2 | Keepalive packet
received:                  1

Notify packet sent:         0 | Notify packet received:
                           0

Message Header Error:       0 | Protocol RDT(ms):
                           0

GSLB Protocol Version:     2

Secure negotiation Success: 0 | Secure negotiation

Failures:                  0

```

```
SSL handshake Success: 0 | SSL handshake Failures: 0
GSLB protocol is disabled for site devices.
```

Verify Traffic Flow

The traffic flow can be tested using the following:

- [DNS Lookup](#)
- [WGET](#)

DNS Lookup

To verify the traffic flow from via vThunder, perform the following:

1. Perform a DNS lookup on server1 of region1 using the master controller's client-side data interface public IP in the following command:

```
$ dig @master_controller_data_public_IP www.gslb.a10.com
```

The master controller's client-side data interface public IP is used as DNS server IP. You can get the public IP from **Azure Portal > Azure Services > Resource Group > <resource_group_name> > <master_controller_region1> > Settings > Networking**.

Figure 211 : Master Controller Data Interface Public IP



The following response is received:

```
$ dig @20.232.184.46 www.gslb.a10.com
; <>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.8 <>> @20.232.184.46
www.gslb.a10.com
```

```

; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 11393
;; flags: qr rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1400
;; QUESTION SECTION:
;www.gslb.a10.com.           IN      A

;; ANSWER SECTION:
www.gslb.a10.com.      10      IN      A      20.1.129.29
www.gslb.a10.com.      10      IN      A      20.97.231.193
www.gslb.a10.com.      10      IN      A      20.232.22.199
www.gslb.a10.com.      10      IN      A      20.232.18.146

;; Query time: 82 msec
;; SERVER: 20.232.184.46#53(20.232.184.46)
;; WHEN: Wed Aug 31 00:11:40 PDT 2022
;; MSG SIZE  rcvd: 125

```

2. Perform the DNS lookup again.

```

$ dig @20.232.184.46 www.gslb.a10.com

; <>>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.8 <>>> @20.232.184.46
www.gslb.a10.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57272
;; flags: qr rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1400
;; QUESTION SECTION:

```

```
;www.gslb.a10.com.          IN      A

;; ANSWER SECTION:
www.gslb.a10.com.    10      IN      A      20.97.231.193
www.gslb.a10.com.    10      IN      A      20.1.129.29
www.gslb.a10.com.    10      IN      A      20.232.22.199
www.gslb.a10.com.    10      IN      A      20.232.18.146

;; Query time: 85 msec
;; SERVER: 20.232.184.46#53(20.232.184.46)
;; WHEN: Wed Aug 31 00:11:46 PDT 2022
;; MSG SIZE  rcvd: 125
```

The response is received with shuffled server IP addresses.

WGET

To verify the traffic flow via vThunder, perform the following:

- Run the following command in the Terminal window of the Linux server1 of region1 instance to create an Apache Server virtual machine:

```
$ sudo apt install apache2
```

While the Apache server is getting installed, you get a prompt to continue further. Enter 'Y' to continue. After the installation is complete, a newline prompt is displayed.

- From **Azure Portal > Azure Services > Resource Group > <resource_group_name> > <site_device_region1>** > **Settings > Networking**, select the secondary data interface public IP.
- Run the following command on the Linux server1 of region1:

```
$ wget site_device_secondary_data_public_ip
```

The following response is received:

```
$ wget 20.232.22.199
--2023-01-09 17:49:47--  http://20.232.22.199/
Connecting to 20.232.22.199:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11321 (11K) [text/html]
```

[Deploy ARM A10-vThunder_ADC-3NIC-6VM-2RG-GSLB](#)

```
Saving to: 'index.html.4'

index.html.4                                100%
[=====] 10.42K  --.-KB/s    in 0s

2023-01-09 17:49:47 (63.8 MB/s) - 'index.html.4' saved [1067
```

Troubleshooting

Common Errors

While deploying the templates, you might encounter some errors or issues. The common errors and issues are listed below:

Unauthorized

This error is encountered when your credentials are incorrect or missing. Provide the correct credentials in the respective powershell script.

Given below is an example of the error:

```
Line |  
149 | ... $response = Invoke-RestMethod -SkipCertificateCheck -Uri $Url -  
Method ...  
|  
~~~~~  
| { "response": { "status": "fail", "err": {  
"code": 1208008960, "from": "HTTP", "msg": "Unauthorized"  
} } }
```

The storage account named vthunderstorage already exists under the subscription.

This error is encountered if the storage account name is already in use. Provide a unique storage account name in the parameter json file.

Given below is an example of the error:

```
{"status":"Failed","error": {"code":"DeploymentFailed","message":"At  
least one resource deployment operation failed. Please list deployment  
operations for details. Please see https://aka.ms/DeployOperations for  
usage details.", "details": [{"code": "BadRequest", "message": "\r\n",  
"error": "\r\n", "code": "DnsRecordInUse", "\r\n", "message": "\r\n",  
"\r\n", "code": "Conflict", "message": "\r\n", "error": "\r\n", "code": "  
DNS record vth-inst1.southcentralus.cloudapp.azure.com is already used  
by another public IP.\r\n", "\r\n", "details": []}\r\n}], "code": "Conflict", "message": "\r\n", "error": "\r\n", "code": "  
DNS record vth-inst1.southcentralus.cloudapp.azure.com is already used  
by another public IP.\r\n", "\r\n", "details": []}}
```

```
\\"StorageAccountAlreadyExists\\", \r\n      \"message\": \"The storage
account named vthunderstorage already exists under the
subscription.\\"\\r\\n  }\\r\\n\"}}}}
```

Cannot bind argument to parameter 'Container' because it is null

This error is encountered if the 'server.pem' is not available at the mentioned path or if the path format is incorrect. Provide a correct path of the 'server.pem' in the parameter json file.

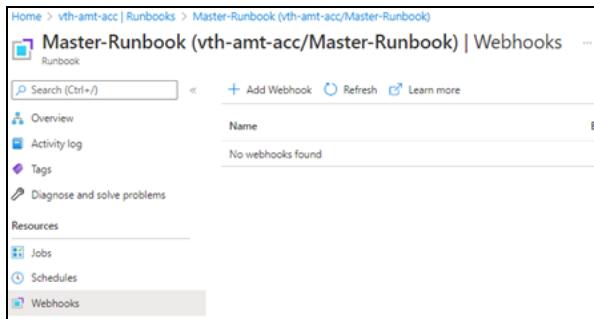
Given below is an example of the error:

```
Set -AzStorageBlobContent @blobSSL
Cannot bind argument to parameter 'Container' because it is null.
```

Cannot validate argument on parameter 'Uri'

This error is encountered if webhook URL is not configured or it already exists. Delete 'master-webhook' from **Azure Portal > Automation Account > Runbooks** and ensure it is empty before the running webhook script.

Figure 212 : Master Runbook



Given below is an example of the error:

```
... -Invoke-WebRequest -Method Post -Uri $webHookURL.WebhookURI -UseBas
...
Cannot validate argument on parameter 'Uri'. The argument is null or
empty. Provide an argument that is not null or empty, and then try the
command again.
```

Runbook Job failed or not working

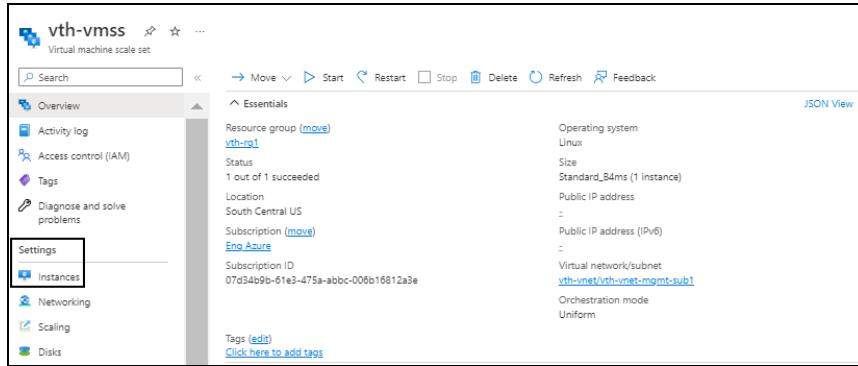
If the Runbook job has failed or is not working, re-run the master runbook.

To re-run the master runbook, perform the following steps:

- From **Azure Portal**, navigate to **Azure Services > Virtual machine scale sets > <vmss_name>**.

The selected vmss - Overview window is displayed.

Figure 213 : Selected vmss - Overview window



vth-vmss Virtual machine scale set

Overview

Resource group (move) [vth-rq1](#)

Status: 1 out of 1 succeeded

Location: South Central US

Subscription (move) [Eng_Azure](#)

Subscription ID: 07d34b9b-61e3-475a-abbc-006b16812a3e

Tags (edit) [Click here to add tags](#)

Operating system: Linux

Size: Standard_B4ms (1 instance)

Public IP address: [\(None\)](#)

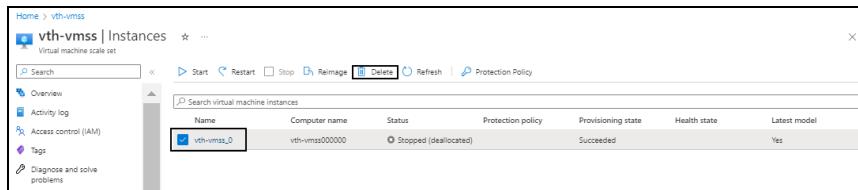
Virtual network/subnet: [vth-vnet/vth-vnet-mgmt-sub1](#)

Orchestration mode: Uniform

- Click **Instances** from the left **Settings** panel.

The selected vmss - Instances window is displayed.

Figure 214 : Selected vmss - Instances window



Home > vth-vmss

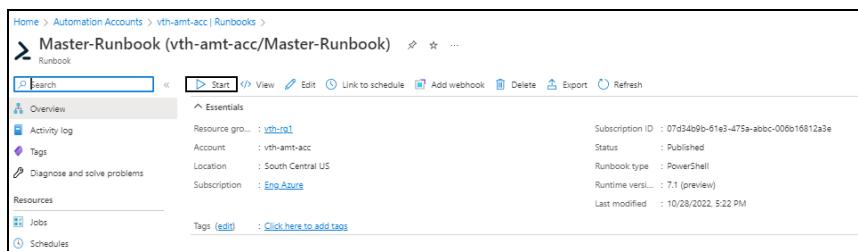
vth-vmss | Instances

| Name | Computer name | Status | Protection policy | Provisioning state | Health state | Latest model |
|------------|----------------|-----------------------|-------------------|--------------------|--------------|--------------|
| vth-vmss_0 | vth-vmss000000 | Stopped (deallocated) | | Succeeded | | Yes |

- Click **Delete** to delete all the vmss instances.

- From the Master-Runbook Job window, click **Start** to re-run the master runbook.

Figure 215 : Master-Runbook Job window



Home > Automation Accounts > vth-amt-acc | Runbooks

Master-Runbook (vth-amt-acc/Master-Runbook)

Runbook

Start View Edit Link to schedule Add webhook Delete Export Refresh

Overview

Resource group: [vth-rq1](#)

Account: vth-amt-acc

Location: South Central US

Subscription: [Eng_Azure](#)

Subscription ID: 07d34b9b-61e3-475a-abbc-006b16812a3e

Status: Published

Runbook type: PowerShell

Runtime vers...: 7.1 (preview)

Last modified: 10/28/2022, 5:22 PM

Tags (edit) [Click here to add tags](#)

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:

| | |
|--|-----|
| List of Custom Role Permissions | 366 |
| Azure Service Application Access Key | 371 |
| Default Password Policy | 384 |

List of Custom Role Permissions

The following is the list of custom role permissions:

```
"Microsoft.Automation/automationAccounts/variables/read",
"Microsoft.Automation/automationAccounts/variables/write",
"Microsoft.Automation/automationAccounts/variables/delete",
"Microsoft.Automation/automationAccounts/runbooks/read",
"Microsoft.Automation/automationAccounts/runbooks/content/read",
"Microsoft.Automation/automationAccounts/jobs/write",
"Microsoft.Automation/automationAccounts/jobSchedules/write",
"Microsoft.Automation/automationAccounts/jobs/read",
"Microsoft.Automation/automationAccounts/jobs/output/read",
"Microsoft.Automation/automationAccounts/runbooks/operationResults/read",
"Microsoft.Automation/automationAccounts/jobs/streams/read",
"Microsoft.Automation/automationAccounts/jobSchedules/read",
"Microsoft.OperationalInsights/workspaces/sharedKeys/action",
"Microsoft.OperationalInsights/workspaces/read"

"Microsoft.Compute/virtualMachineScaleSets/read",
"Microsoft.Compute/virtualMachineScaleSets/write",
"Microsoft.Compute/virtualMachineScaleSets/delete",
"Microsoft.Compute/virtualMachineScaleSets/delete/action",
"Microsoft.Compute/virtualMachineScaleSets/start/action",
"Microsoft.Compute/virtualMachineScaleSets/powerOff/action",
"Microsoft.Compute/virtualMachineScaleSets/restart/action",
"Microsoft.Compute/virtualMachineScaleSets/deallocate/action",
"Microsoft.Compute/virtualMachineScaleSets/scale/action",
```

```
"Microsoft.Compute/virtualMachineScaleSets/networkInterfaces/read",
"Microsoft.Compute/virtualMachineScaleSets/publicIPAddresses/read",

"Microsoft.Compute/virtualMachineScaleSets/providers/Microsoft.Insights/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/networkInterfaces/ipConfigurations/read",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/networkInterfaces/ipConfigurations/publicIPAddresses/read",
"Microsoft.Compute/virtualMachineScaleSets/virtualMachines/providers/Microsoft.Insights/metricDefinitions/read",
"Microsoft.Compute/locations/vmSizes/read",
"Microsoft.Compute/virtualMachines/read",
"Microsoft.Compute/virtualMachines/write",
"Microsoft.Compute/virtualMachines/delete",
"Microsoft.Compute/virtualMachines/start/action",
"Microsoft.Compute/virtualMachines/powerOff/action",
"Microsoft.Compute/virtualMachines/deallocate/action",
"Microsoft.Compute/virtualMachines/restart/action",
"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/logDefinitions/read",
"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/diagnosticSettings/read",
"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/diagnosticSettings/write",
"Microsoft.Compute/virtualMachines/instanceView/read",
"Microsoft.Compute/virtualMachines/providers/Microsoft.Insights/metricDefinitions/read",
"Microsoft.Compute/virtualMachines/vmSizes/read",
"Microsoft.Network/operations/read",
"Microsoft.Network/loadBalancers/read",
"Microsoft.Network/loadBalancers/write",
"Microsoft.Network/loadBalancers/delete",
"Microsoft.Network/loadBalancers/backendAddressPools/read",
```

```
"Microsoft.Network/loadBalancers/backendAddressPools/write",
"Microsoft.Network/loadBalancers/backendAddressPools/delete",
"Microsoft.Network/loadBalancers/backendAddressPools/join/action",

"Microsoft.Network/loadBalancers/backendAddressPools/backendPoolAddresses/
read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/diagnosticSe
ttings/read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/diagnosticSe
ttings/write",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/read",
"Microsoft.Network/loadBalancers/frontendIPConfigurations/join/action",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/read",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/write",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/delete",

"Microsoft.Network/loadBalancers/frontendIPConfigurations/loadBalancerPool
s/join/action",
"Microsoft.Network/loadBalancers/inboundNatPools/read",
"Microsoft.Network/loadBalancers/inboundNatPools/join/action",
"Microsoft.Network/loadBalancers/inboundNatRules/read",
"Microsoft.Network/loadBalancers/inboundNatRules/write",
"Microsoft.Network/loadBalancers/inboundNatRules/delete",
"Microsoft.Network/loadBalancers/inboundNatRules/join/action",
"Microsoft.Network/loadBalancers/loadBalancingRules/read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/logDefinitio
ns/read",
"Microsoft.Network/loadBalancers/networkInterfaces/read",
"Microsoft.Network/loadBalancers/outboundRules/read",
```

```
"Microsoft.Network/loadBalancers/probes/read",
"Microsoft.Network/loadBalancers/probes/join/action",
"Microsoft.Network/loadBalancers/virtualMachines/read",

"Microsoft.Network/loadBalancers/providers/Microsoft.Insights/metricDefinitions/read",

"Microsoft.Network/networkSecurityGroups/read",
"Microsoft.Network/networkSecurityGroups/write",
"Microsoft.Network/networkSecurityGroups/delete",
"Microsoft.Network/networkSecurityGroups/defaultSecurityRules/read",
"Microsoft.Network/networkSecurityGroups/securityRules/read",
"Microsoft.Network/networkSecurityGroups/securityRules/write",
"Microsoft.Network/networkSecurityGroups/securityRules/delete",

"Microsoft.Network/publicIPAddresses/read",
"Microsoft.Network/publicIPAddresses/write",
"Microsoft.Network/publicIPAddresses/delete",

"Microsoft.Network/virtualNetworks/read",
"Microsoft.Network/virtualNetworks/write",
"Microsoft.Network/virtualNetworks/delete",

"Microsoft.Network/virtualNetworks/subnets/read",
"Microsoft.Network/virtualNetworks/subnets/write",
"Microsoft.Network/virtualNetworks/subnets/delete",

"Microsoft.Network/virtualNetworks/subnets/virtualMachines/read",
"Microsoft.Network/virtualNetworks/virtualMachines/read",

"Microsoft.Network/virtualNetworkGateways/read",
"Microsoft.Network/virtualNetworkGateways/write",
"Microsoft.Network/virtualNetworkGateways/delete",
"microsoft.network/virtualNetworkGateways/natRules/read",
"microsoft.network/virtualNetworkGateways/natRules/write",
"microsoft.network/virtualNetworkGateways/natRules/delete",

"Microsoft.Network/networkInterfaces/read",
```

```
"Microsoft.Network/networkInterfaces/write",
"Microsoft.Network/networkInterfaces/delete",

"Microsoft.Network/networkProfiles/read",
"Microsoft.Network/networkProfiles/write",
"Microsoft.Network/networkProfiles/delete",

"Microsoft.Network/networkInterfaces/ipconfigurations/read",

"Microsoft.Network/networkSecurityGroups/join/action",
"Microsoft.Network/virtualNetworks/subnets/join/action",
"Microsoft.Network/networkInterfaces/ipconfigurations/join/action",
"Microsoft.Network/publicIPAddresses/join/action",
"Microsoft.Network/virtualNetworks/join/action",
```

Azure Service Application Access Key

The Azure service application access key is required to access the Azure resources.

The following topics are covered:

- [Use an existing Access Key](#)
- [Create a new Access Key](#)

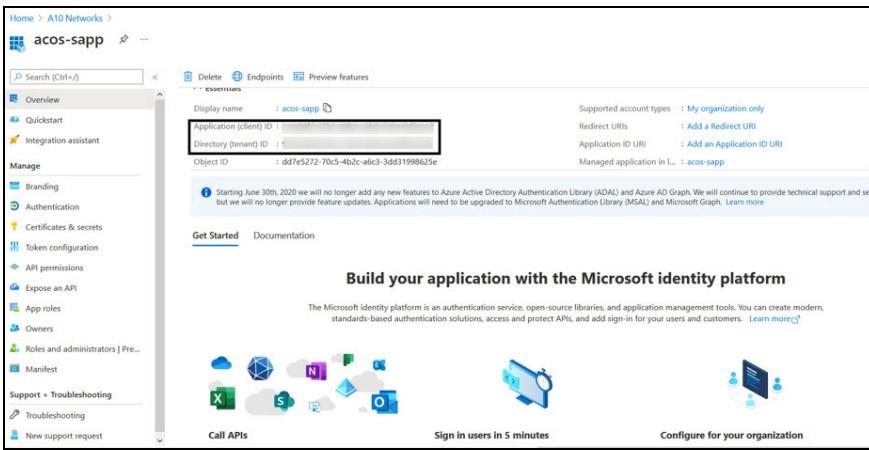
Use an existing Access Key

To use an existing Azure service application access key, perform the following steps:

1. From **Azure Portal**, navigate to **Azure Services > Azure Active Directory > App Registration**.
The list of service applications are displayed under **Owned applications** tab.
2. If you are the owner of the required service application, the required service application would be listed under the **Owned applications** tab. If not, perform the below steps with Administrator privileges:

- a. Select **Owners** from the left **Manage** panel.
The Owners window appears.
 - b. Select **Add** to get a list of user accounts.
 - c. Search and select your user account.
 - d. Click **Select** to add the user account to your owned application.
3. Select your service application from the list of applications.
The selected service application window is displayed.

Figure 216 : Selected Service application window



4. Copy and save the Client ID, Tenant ID from the service application window.

```
client_id= 'cc4c86xx-65b3-48xx-a3xx-610cxxxxxxxx'
tenant_id= '91d27axx-8cxx-41xx-82xx-3d1bxxxxxxx'
```

Create a new Access Key

To create a new Azure service application access key, perform the following steps with Administrator privileges:

1. [Create a Role](#)
2. [Register a Service Application](#)
3. [Associate Service Application with a Role](#)
4. [Create Certificate and Secrets](#)

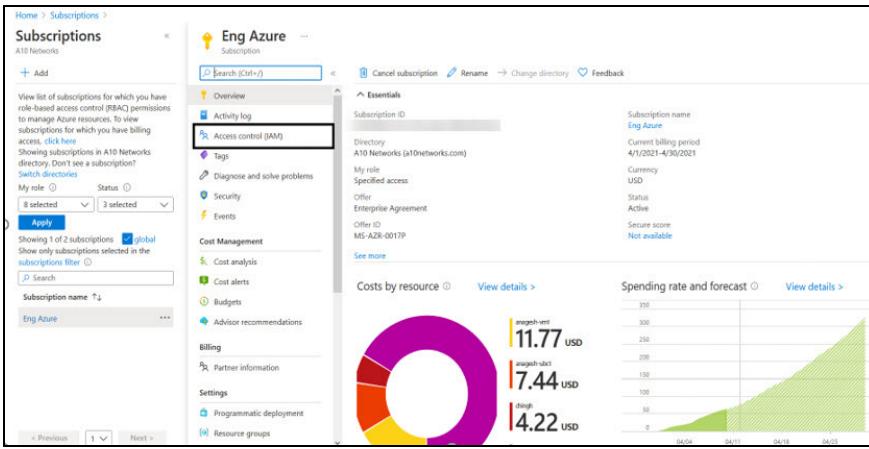
5. [Collect Azure Access Key](#)
6. [Import Azure Access Key](#)

Create a Role

To create a custom role, perform the following steps:

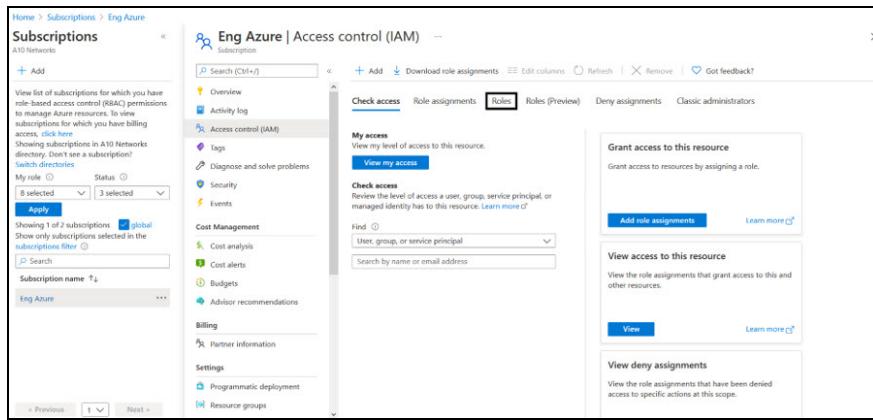
1. From **Home**, navigate to **Azure Services > Subscriptions > <subscription_name>**.
The selected Subscription - Overview window is displayed. Here, the subscription is Eng Azure.

Figure 217 : Subscriptions - Overview window



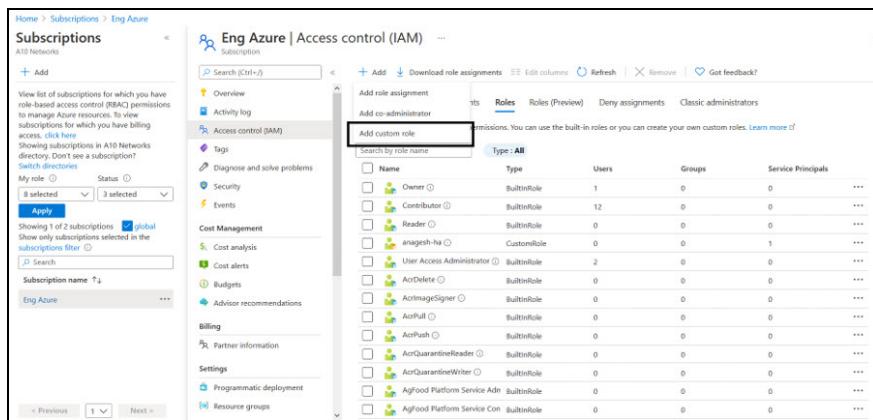
2. Click **Access control (IAM)** from left panel.
The selected Subscription - Access control (IAM) window is displayed.
3. Select the **Roles** tab.
The Roles window is displayed.

Figure 218 : Access Control - Role Window



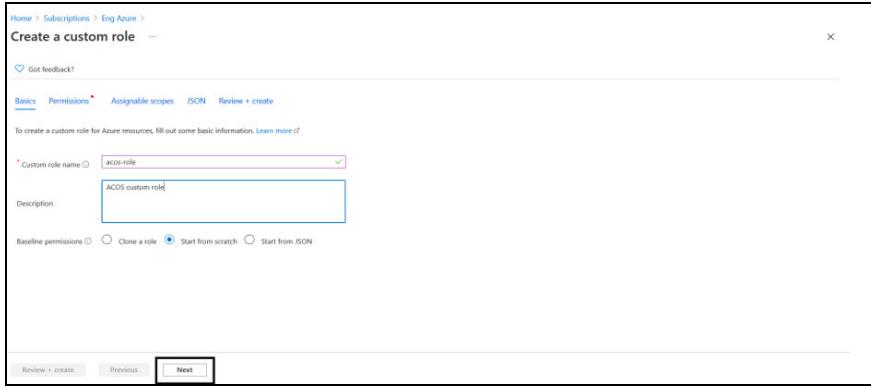
4. Click **Add** to select **Add custom role** option.
The Create a custom role window is displayed.

Figure 219 : Add custom role window



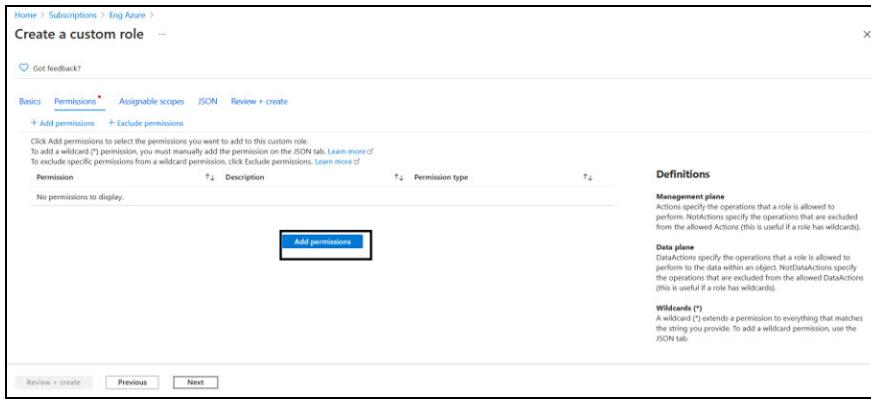
5. Enter **Customer role name** and **Description** (optional) in the **Basics** tab.

Figure 220 : Create a custom role window



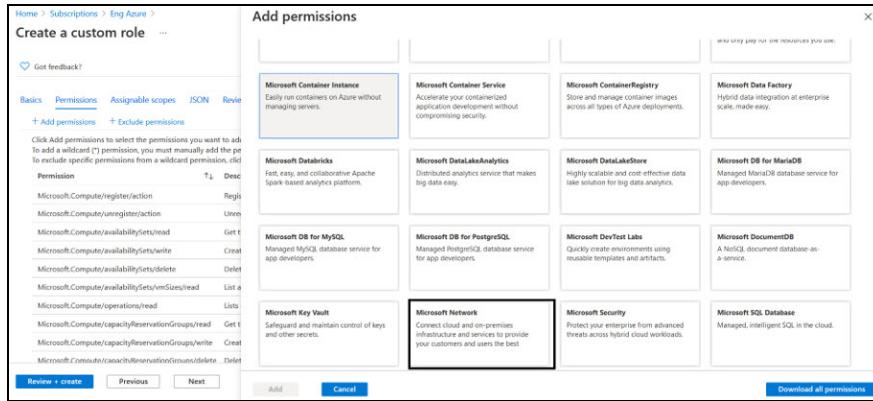
- Click **Next** at the bottom of the window.
The Permissions window is displayed.

Figure 221 : Permission window



- Click **Add Permissions** to add permissions to the custom role.
The Add Permissions window is displayed.

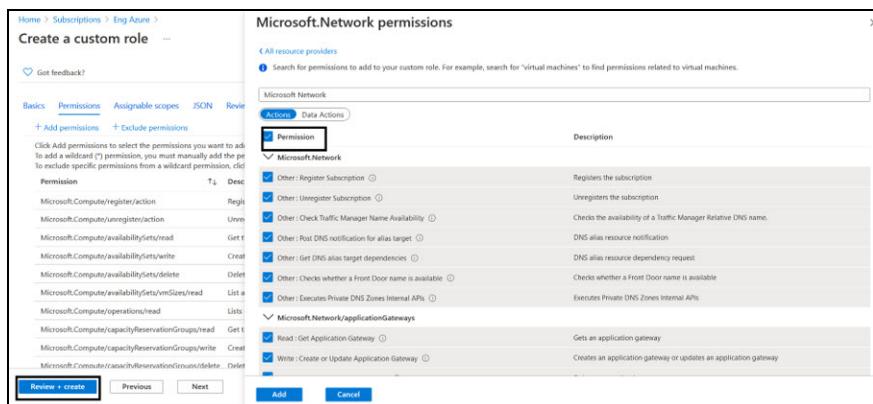
Figure 222 : Add permissions window



6. Search the following permission groups from the Add Permissions window and select the corresponding permissions listed in the [List of Custom Role Permissions](#):

- Microsoft Automation
- Microsoft Operational Insights
- Microsoft Compute
- Microsoft Network

Figure 223 : Microsoft Network permissions window



The selected permissions are listed under **Create a custom role > Permissions** tab.

8. Click **Review + create** at the bottom of the window to skip the other tabs. The **Create a custom role** confirmation window is displayed.



- Click **OK** to successfully create the custom role with permissions.

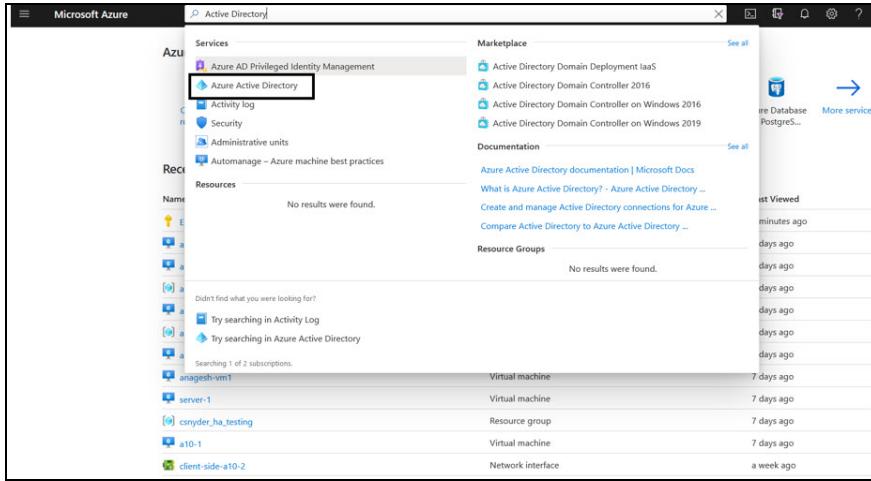
NOTE: It may take the system a few minutes to display your role everywhere.

Register a Service Application

To register a service application, perform the following steps:

- From **Home**, navigate to **Azure Services > Azure Active Directory** option.

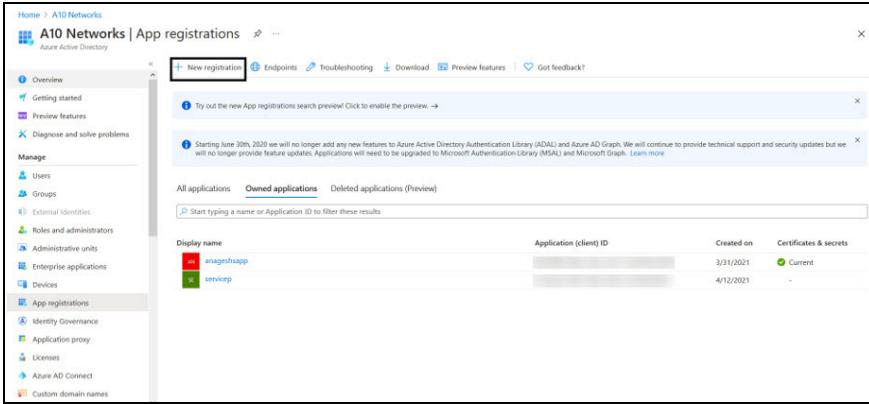
Figure 224 : Azure Active Directory window



- On the Azure Active Directory window, click **App registrations** menu option from the left **Manage** panel.

The App registration window to register an application is displayed.

Figure 225 : App registrations window

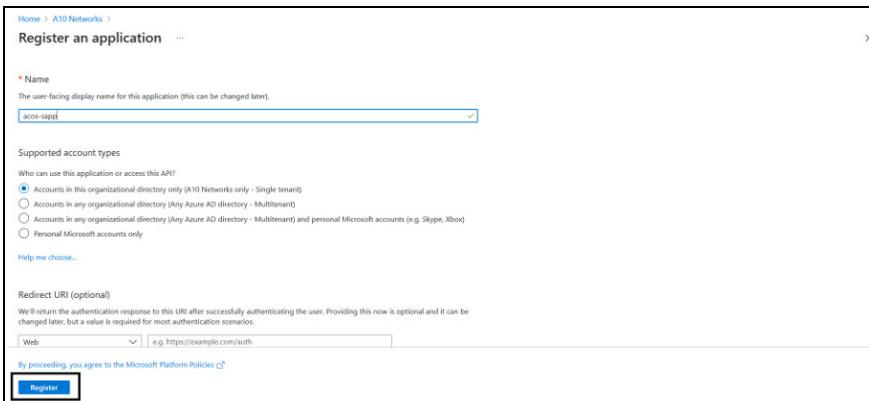


The screenshot shows the A10 Networks interface for managing app registrations. The left sidebar includes options like Overview, Getting started, Preview features, Diagnose and solve problems, Manage (Users, Groups, External Identities, Roles and administrators, Administrative units, Enterprise applications, Devices), App registrations, Identity Governance, Application proxy, Licenses, Azure AD Connect, and Custom domain names. The main area is titled 'A10 Networks | App registrations' and shows the 'Owned applications' tab selected. It displays a table with columns for Display name, Application (client) ID, Created on, and Certificates & secrets. Two entries are listed: 'anagroshapp' and 'serviceapp'. A message at the top indicates that starting June 30th, 2020, they will no longer add any new features to Azure Active Directory Authentication Library (ADAL) and Azure AD Graph.

3. Click **New Registration**.

The Register an application window is displayed.

Figure 226 : Register an application window



This screenshot shows the 'Register an application' dialog box. It requires entering a 'Name' (e.g., 'acos-sapp'), selecting 'Supported account types' (e.g., 'Accounts in this organizational directory only'), and providing a 'Redirect URI' (e.g., 'Web, e.g., https://example.com/auth'). A checkbox for accepting platform policies is present, and a 'Register' button is at the bottom.

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.

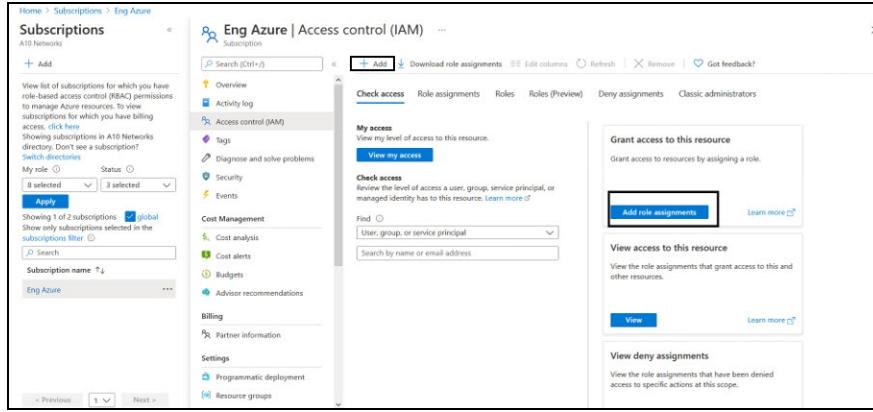
Associate Service Application with a Role

To associate service application with a role, perform the following steps:

- From **Home**, navigate to **Azure Services > Subscriptions > <subscription_name>**. The selected Subscription - Overview window is displayed. Here, the subscription is Eng Azure.
- Click **Access control (IAM)** from left panel.

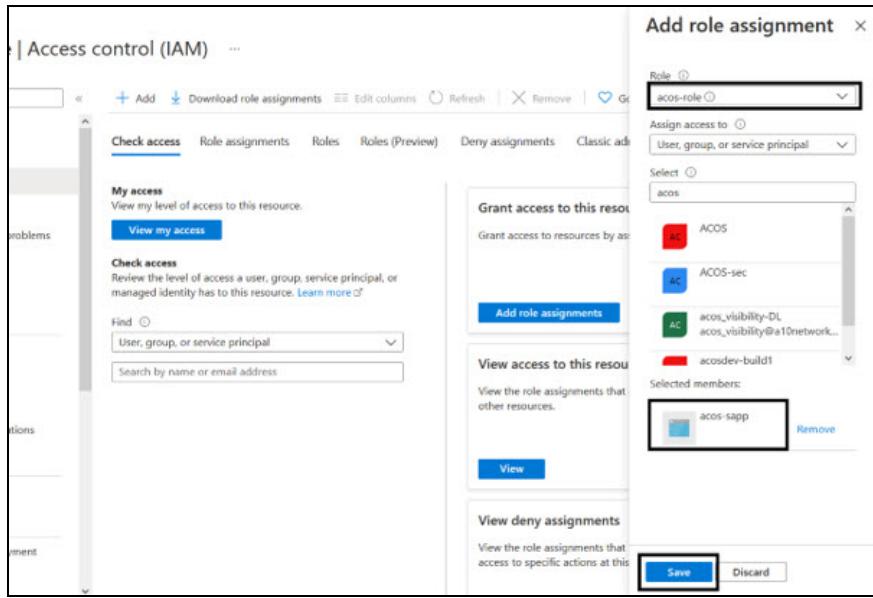
The selected Subscription - Access control (IAM) window is displayed.

Figure 227 : Subscription - Access control (IAM) window



- To assign a role to the above scope, click **Add** from the main menu options. The Add role assignment window is displayed.

Figure 228 : Add a role assignment -1



- Select a **Role** from the drop-down list. For example, acos-role.
- Select the required **Assign Access to** option from the drop-down list.
- Enter a string to search and select for a name or email address. For example, acos.

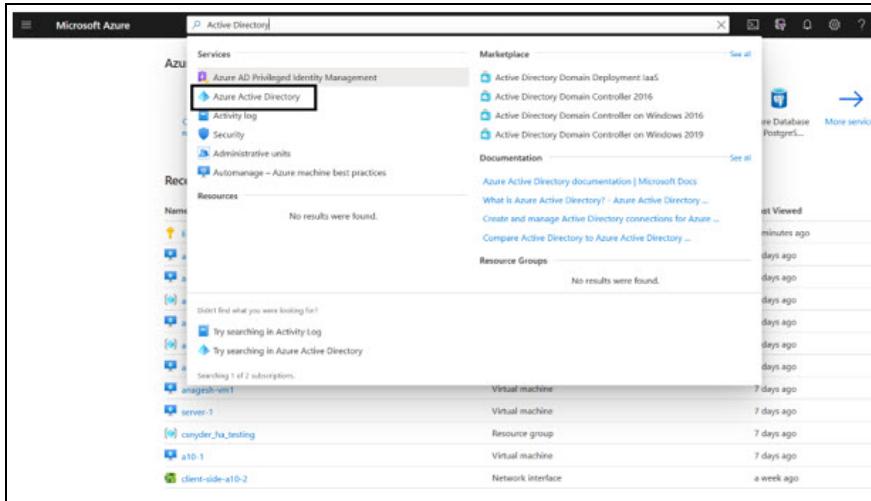
- Click the **Save** button to save the configuration.

Create Certificate and Secrets

To create certificate and secrets for the assigned role, perform the following steps:

- From **Home**, navigate to **Azure Services > Azure Active Directory** option.

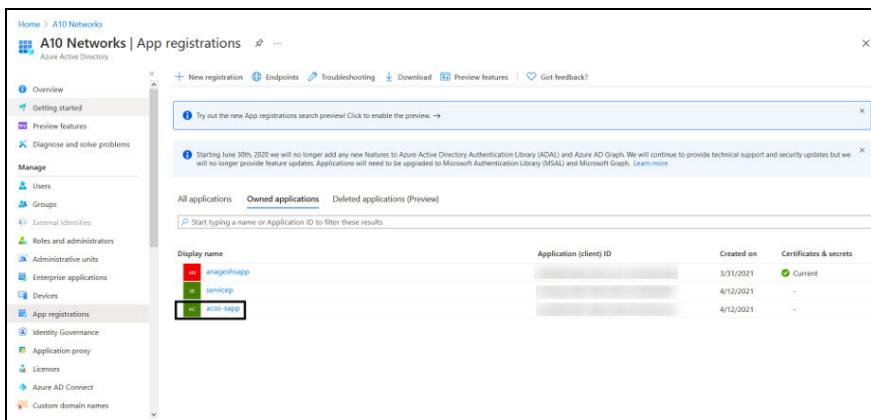
Figure 229 : Azure Active Directory - Overview window



- On the Azure Active Directory - Overview window, click **App registrations** menu option from the left panel.

The App registration window with a registered application(s) is displayed.

Figure 230 : App registrations - Overall applications window



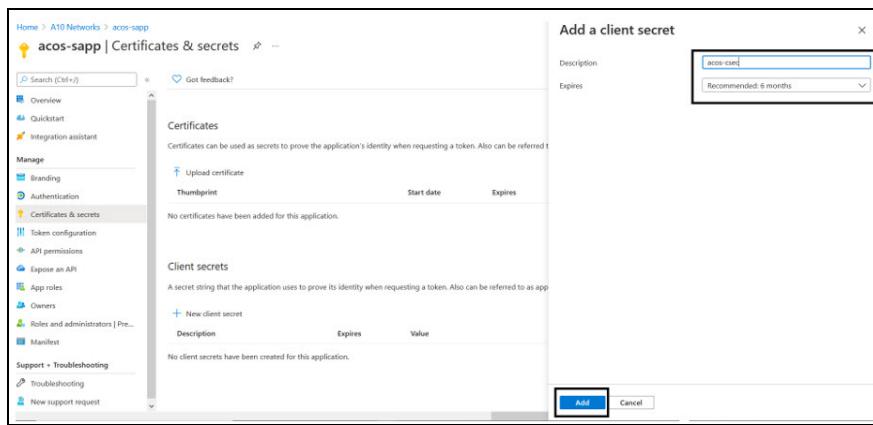
| Display name | Application (client) ID | Created on | Certificates & secrets |
|--------------|-------------------------|------------|------------------------|
| anagethisapp | [Redacted] | 3/31/2021 | Current |
| serviceapp | [Redacted] | 4/12/2021 | - |
| a10-app | [Redacted] | 4/12/2021 | - |

- 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.
Theacos sapp - Certificates & secrets window is displayed.
5. Browse and upload certificates.
6. Select the **Start date** and **Expires** date from the date picker or click the **New client secret** button.
The Add a client secret window is displayed.

Figure 231 : Add a client secret window



7. Enter the New client secret **Description**, **Expires** value.
The entered value is displayed on theacos-Certificates & secrets window.

Figure 232 :acos-sapp Certificates & secrets window



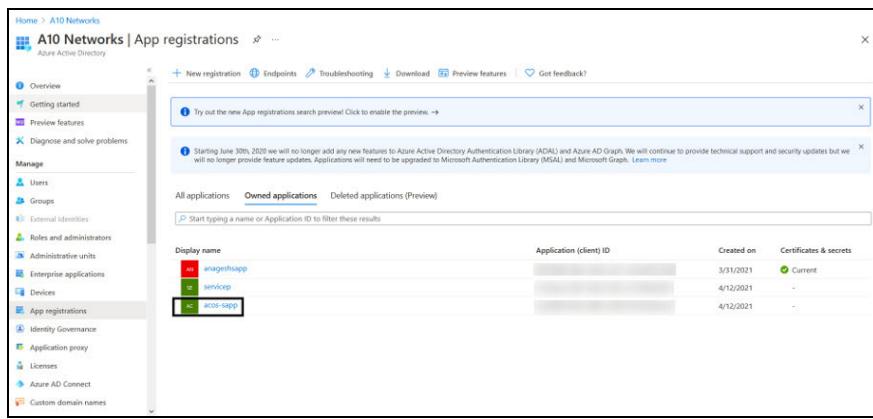
NOTE: Save the new client secret value in a text file, as it is not visible once the window is refreshed.

Collect Azure Access Key

To collect Azure access keys, perform the following steps:

1. From **Home**, navigate to **Azure Services > Azure Active Directory > App registrations**.

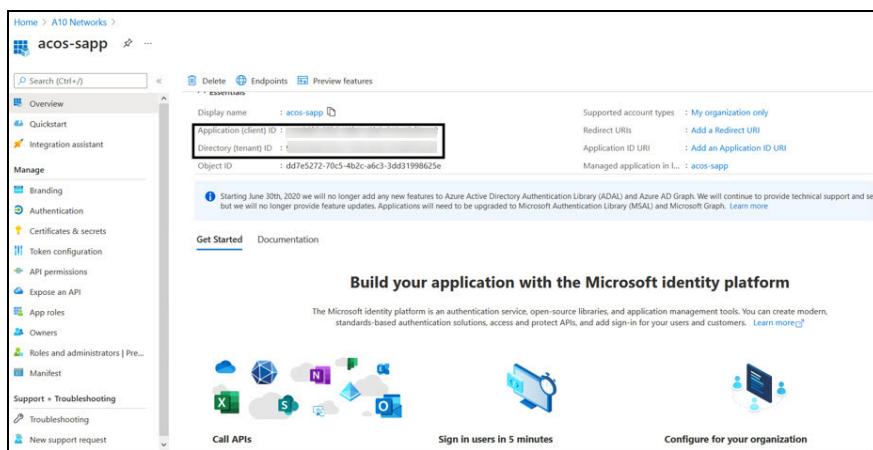
Figure 233 : Azure Active Directory - App registrations window



2. From the **Owned applications** tab, select service application from the list of applications.

The selected service application window is displayed.

Figure 234 : Selected Service application window

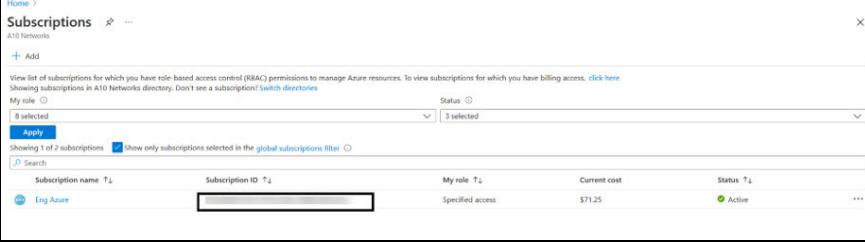


3. Copy the Client ID, Tenant ID from the service application window.

```
client_id= 'cc4c86xx-65b3-48xx-a3xx-610xxxxxxxx'
tenant_id= '91d27axx-8cxx-41xx-82xx-3d1xxxxxxxx'
```

4. Navigate to the **Home > Subscriptions > Registered Subscription Name**, and copy subscription ID value.

Figure 235 : Subscriptions window



| 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) #
```

Default Password Policy

The default password policy has the following criteria:

- The password should be at least nine characters in length.
- The password should contain at least one number, an uppercase letter (English), a lowercase letter (English), and a special character.

- The password should have at least one letter or number different from the previous password.
- The password should not contain its corresponding username with the same capitalization of letters.
- The password should not contain repeated characters of the same letter or number with the same capitalization of letters.
- The password should not contain the sequential row keyboard input of four letters or numbers with the same capitalization of letters.

