

Installing vThunder on Microsoft Azure

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Introduction to Installing vThunder on Microsoft Azure

vThunder for Microsoft Azureis a fully operational, software-only version of the ACOS Series Server Load Balancer (SLB), or Application Delivery Controller (ADC) device. It is configurable by ACOS CLI, GUI, AXAPI, and Harmony Controller. For more information see Virtual Instances in Harmony Controller.

vThunder is a virtual appliance, yet it retains most of the functionality available on the hardware based ACOS appliances. Managing vThunder is the same as managing hardware based ACOS device, and vThunder has the same CLI configurations and GUI presentation.

The networking configuration for vThunder is also like hardware based ACOS devices. The maximum throughput of vThunder for Azure is variable and depends on vThunder software license purchase and type instance used to deploy vThunder.

The following topics are covered:

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Overview of Microsoft Azure

Microsoft Azure (formerly known as Windows Azure) is Microsoft's cloud computing platform. Azure is an industry leader for both infrastructure-as-a-service (IaaS) and platform-as-a-service (PaaS). Azure offers a combination of managed and unmanaged services that lets customers deploy and manage their applications as they see fit.

The Azure cloud computing platform runs on Microsoft data centers and is globally distributed across more than a dozen countries. Such global distribution helps ensure customers receive high performance, regardless of where they are located.

Azure is flexible and can support virtually any operating system, from Windows to Linux, any programming language, from Java to C++, and any database, from SQL to Oracle. Azure also offers 99.95% uptime and is the platform that Microsoft uses to run many of its popular services, such as Bing, Skype, Xbox, and Office 365.

A10 Networks vThunder virtual device can be set up as an instance in Azure's cloud and can be used to provide a robust server load balancing (SLB) service.

Microsoft Azure uses the following tools to create and manage resources:

- Azure Portal—A web console to create and monitor Azure resources. For more information, refer to https://azure.microsoft.com/en-in/features/azure-portal/.
- Azure PowerShell—A set of cmdlets used for managing Azure resources from the command line. Launch Azure PowerShell from a browser within the Azure Cloud Shell or install the software on the system to start a local PowerShell session. For more information, refer to https://docs.microsoft.com/en-us/powershell/.
- Azure CLI— Can also be launched from a browser within the Azure Cloud Shell or install the software on the system to start a local CLI session. For more information, refer to

https://docs.microsoft.com/en-us/cli/azure/overview?view=azure-cli-latest.

You can launch Cloud Shell from the top navigation bar of the Azure portal.

Figure 1 : Launching Cloud Shell





The following figure shows how vThunder fits into the Microsoft Azure infrastructure.

Figure 2 : vThunder for Microsoft Azure



Azure 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, refer to 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, refer to



https://docs.microsoft.com/en-us/azure/azure-resource-manager/resourcegroup-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, refer to https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-

group-overview.

 Virtual network — The Microsoft Azure Virtual Network service enables resources to securely communicate with other resources in an Azure network in the cloud. A virtual network is hence logical isolation of the Azure cloud for an Azure account. You can connect different virtual networks and to on-premises networks. For more information, refer to

https://docs.microsoft.com/en-us/azure/virtual-machines/windows/tutorialavailability-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.

System Requirements

The following VM sizes are supported:

Series	Size
A series	Standard/Basic A2
	Standard A2_v2
	Standard A2m_v2
	Standard A4_v2
	Standard A4m_v2
	Standard/Basic A3

Table 1 : Verified VM sizes



Table 1 :	Verified	VM	sizes
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Series	Size
	Standard/Basic A4
	Standard A8_v2
B series	Standard B2_s
	Standard B2ms
	Standard B4ms
D series	Standard D2_v2
	Standard D2s_v3
	Standard D4_v3
	Standard D4s_v3
	Standard D3_v2
	Standard Ds3_v2
	Standard D5_v2
F series	Standard F4s
	Standard F8
	Standard F16s

For more information, see <u>https://docs.microsoft.com/en-us/azure/virtual-</u>machines/sizes-general.

Global License Manager and Types of vThunder Licenses

The GLM is the master licensing system for A10 Networks. The GLM is managed by A10 Networks and is the primary portal for license management for A10 products. The GLM provides a GUI where you can view and manage advanced licensing functions. Creating a GLM account is optional. You can use the ACOS CLI or GUI to license the ACOS devices. A GLM account enables you to perform advanced licensing functions and, where applicable, view, and monitor device usage. The GLM portal is



available at https://glm.a10networks.com. If you do not yet have a GLM account, contact sales@a10networks.com.

vThunder requires a license. Without a license, the product cannot run production traffic, and the amount of bandwidth is only sufficient for testing network connectivity. After downloading and installing the vThunder software on Microsoft Azure Cloud, a vThunder license is needed to pass live traffic.

A10 Networks offers different types of licenses for the vThunder instance. vThunder supports the following licensing models:

- **Trial license**—Create a trial license in the ACOS GUI. For more information, refer to the <u>Global License Manager User Guide</u>.
- **Perpetual license**—This licensing model is based on bandwidth. It is obtained by activation key license for your A10 virtual appliance, URL Classification License installation, and GLM account management. All licenses are generated and installed manually. For more information, refer to the <u>Global License Manager</u> User Guide; chapter Obtaining your Activation Key License.
- Pay As You Go (PAYG) license—This licensing model is subscription-based. There are two types of licensing models under PAYG licenses. Both these licensing models require that the vThunder instance has internet access to request the licenses from an A10 license server. The license models are as follows:
 - The Rental Billing Model (RBM) is designed for cloud service providers (CSPs) who offer Advanced Delivery Controller (ADC) services. This model enables such providers to bill their customers for a fixed amount of bandwidth, as well as adding surcharges for extra bandwidth consumed.
 - The Utility Billing Model (UBM) is based on actual data usage, in bytes, in which unlimited vThunder instances can be deployed and in which no bandwidth settings are required. For more information, refer to the <u>vThunder Pay-as-you-Go License</u>.
- **Capacity Pool (FlexPool) license**—This licensing model enables you to subscribe to a specific bandwidth pool in the Global License Manager (GLM) for a specific time period, with an additional option of automatically renewing your license before the license expiry date. Unlike previous license models supported by A10 Networks, capacity pool (FlexPool) license is not node-locked. You can configure multiple ACOS devices to share bandwidth from the common license pool. For more information, refer to the <u>Capacity Pool License User Guide</u>.



NOTE: When a vThunder license has expired, vThunder functionality continues with reduced bandwidth.

To view any of the above license types, it features, and how to activate follow the following steps:

- 1. Sign In to *Global License Manager* through <u>https://documentation.a10networks.com/signin.html</u> page.
- 2. Enter your valid A10 **Email**, **Password**, and then click **Sign In** tab. The A10 product documentation page is displayed.
- 3. On the *A10 Products* page, go to **Installation Guides for Form Factors** section. Choose the product.
- Click the View tab. The Software Installation Guides page is displayed. (i.e.<u>https://documentation.a10networks.com/Install/Software/A10_ACOS_Install/index.html</u>).
- 5. Click the **View Licensing Guides** option. The portal displays the *Licensing User Guide* section.
- 6. Click **Download PDF** tab to open the appropriate Global License Manager guide.

Interfaces

Starting from ACOS 4.1.4 GR1 multi NIC vThunder deployment on Azure Cloud is supported. The number of interfaces that can be created is dependent on the VM size provided by Azure. For more information on different VM sizes and the number of NICs supported for each VM size, see <u>https://docs.microsoft.com/en-us/azure/virtual-machines/linux/sizes</u>.

NOTE: From 4.1.4-P3 version onwards, single NIC deployments for the vThunder on Azure Cloud are not supported.

<u>Create a Single-Interface vThunder Instance</u> in the Azure portal. After a instance or VM is created, use the Azure portal to add more interfaces to the VM. Additionally, use the Azure Power Shell or the Azure CLI to create a multiple-interface VM.

The following operations are supported for multiple NICs:



- The Azure portal can be used to instantiate a vThunder instance, which supports four NICs, but If there is only two NICs are created, then you can add two more NICs before shutting down the instance and use the Power Shell or Azure CLI to add the remaining NICs. For more information, refer to <u>Adding More NICs by Using</u> <u>the Azure CLI</u>.
- The Azure portal can be used to instantiate an instance, which supports only two NICs, and you want to add more NICs, then users first shut-down the instance and change the VM size from within the Azure Portal, as described in <u>Changing the VM</u> <u>Size</u>. After that, repeat the steps in <u>Adding More NICs by Using the Azure CLI</u>.
- The Azure portal can be used to instantiate an instance with multiple NICs, then shut down the VM and delete NICs as described in <u>Deleting NICs by Using the</u> <u>Azure CLI</u>.

NOTE: Users cannot delete all the NICs from a VM.

In the example in <u>Create a Multiple-Interface vThunder Instance</u>, a vThunder instance is created with the following interfaces, each interface is associated with a different subnet:

- Management Dedicated management interface
- Ethernet 1 Data interface
- Ethernet 2 Data interface

In a typical deployment, one of the data interfaces is connected to the server farm, and the other data interface is connected to the clients. However, one-arm deployment is also supported which requires one data port and one management port. You also can add additional data interfaces as needed.

Feature Support

vThunder for Azure supports many of the same features as the Thunder Series hardware-based models, but the exact set of supported features varies based on whether vThunder is running as an ADC, CFW, or as an SSLi solution.

Refer to the <u>vThunder Software for Virtual and Cloud Infrastructure Data Sheet</u> for a complete summary of supported features.



Limitations

The following limitations that user can encounter, while using vThunder for Azure:

• It is recommended to configure "ip address DHCP" before performing other configurations because there is no predefined DHCP in the start-up config file.

See <u>Configuring DHCP and the VIP in vThunder</u> for details.

- LACP and Static trunk groups are not supported on Azure Cloud.
- Port Mirror is not supported.
- vThunder for Azure does not support L3V partition and service partition.
- RIP (v1 and v2), OSPF, and ISIS routing protocols are not supported.
- VLAN, Tagged VLAN, and Virtual Ethernet (VE) interfaces are not supported.
- Layer 2 Switching (VLAN) is not supported.
- Layer 2 deployment is not supported.
- The Azure extensions are not supported.
- Bridge Protocol Data Unit (BPDU) Forward Group is not supported.
- When using vThunder for Azure and SLB, a VPN tunnel (IPsec) cannot be brought up if an SLB virtual server is also enabled. This limitation is because vThunder for Azure only has one data interface for ACOS releases before 4.1.4 version.

As a workaround, create loopback interfaces and use the interfaces as VPN gateway IP addresses. Then SLB and IPsec can be up at the same time. Add Azure Route Tables or User Defined Routing (UDR) on the Azure portal for the loop-back interface IP addresses to be accessible for each other.

- If the endpoint port number in the Azure portal is changed, then make sure to clear the Internet browser's cache before attempting to navigate to the vThunder GUI. If not cleared, the browser uses the previously saved public port and fails to access the vThunder GUI.
- System promiscuous mode is not supported by Microsoft Azure.



- At the interface Ethernet config level, the following commands are disabled:
 - ° mtu
 - trunk-group (command exists, but the function is disabled)
 - o device-context
 - $^{\circ}$ duplexity
 - $^{\circ}$ flow-control
 - $^{\circ}$ monitor
 - $^{\circ}$ speed
 - $^{\circ}$ use-if-ip
- The reload command causes kernel panic on Azure due to the limitation imposed by DPDK Netvsc PMD. Use the reboot command whenever reload is required. For information about the limitation, see https://doc.dpdk.org/guides/rel_notes/known_issues.html#netvsc-driver-and-application-restart.
- The maximum binding limitations are as follows:
 - For vTPS 3.2.x and 5.0.x, maximum vCPU is 48.
 - For ACOS 5.2.1-Px, maximum vCPU is 96.
- When using the serial console on the Azure portal, it is recommended to use a non-zero value for the terminal length. Printing a large amount of output on the serial console at once can result in a high CPU load and cause the system unstable. Especially, if you want to execute the show tech command on the serial console, use the show tech page command with terminal length non-zero value on the serial console.

Installing vThunder on Microsoft Azure

This chapter describes how to install vThunder on Microsoft Azure.

The following topics are covered:

Prerequisites for Installing vThunder	
Create a Single-Interface vThunder Instance	
Create a Multiple-Interface vThunder Instance	25
About Multiple IP Addresses for a Network Interface	34
Access vThunder by Using ACOS CLI	
Configure Endpoint Mapping	
Access vThunder by Using ACOS GUI	





Prerequisites for Installing vThunder

Before installing vThunder, set up an account with Microsoft Azure or use your MSDN credentials, or use a free trial account from the following location: http://azure.microsoft.com/en-us/pricing/free-trial/

List of Available Azure Images for vThunder

The following is the list of images available for vThunder:

SKUs	Offer	Publisher Name	Location
vthunder_100mbps	a10-vthunder- adc	al0networks	eastus
vthunder_10mbps	a10-vthunder- adc	al0networks	eastus
vthunder_200mbps	al0-vthunder- adc	al0networks	eastus
vthunder_410_100mbps	al0-vthunder- adc	al0networks	eastus
vthunder_410_500mbps	al0-vthunder- adc	al0networks	eastus
vthunder_410_byol	al0-vthunder- adc	al0networks	eastus
vthunder_500mbps	a10-vthunder- adc	al0networks	eastus
vthunder_50mbps	a10-vthunder- adc	al0networks	eastus
vthunder_byol	al0-vthunder- adc	alOnetworks	eastus

Table 2 : Some vThunder SKUs

For more information, contact <a>sales@a10networks.com.



Create a Single-Interface vThunder Instance

From ACOS 4.1.4-P3 version onwards, single NIC deployments for the vThunder on Azure Cloud are not supported. If the user deploys ACOS 4.1.4-P3 or higher ACOS version for single NIC deployment for vThunder, then an error "Your deployment failed" message is displayed.

Figure 3 : Error Message

<	Home > CreateVm-a10networks.vt	thunder-414-gr1-vthunder-41-2020051315	0654 Overview		
+ Create a resource	CreateVm-a10netwo	orks.vthunder-414-gr1-vthunde	er-41-20200513150654 Overvie	w	\$ ×
A Home	P Search (Cmd+/)	Cancel	Redeploy 🕐 Refresh	Tech have for statuly>	
E All services	Overview	The resource operation com	pieteo with terminal provisioning state Failed. C	lick nere for details ->	
* FAVORITES	Inputs	Your deployment	failed		
All resources	Cutputs	Deployment name: Cre	sateVm-a10networks.vthunder-414-gr1-vthu	Start time: 5/13/2020, 3:09:54 PM	-
(•) Resource groups	📄 Template	Subscription: Pay-As-Y Resource group: A10IN	ou-Go I pchavare	Correlation ID: 331f7708-c808-40ec-bdbb-7f34e17f14	м 😲
Recent					Security Center
App Services		 Deployment details (D 	iownload)		Secure your apps an Go to Azure security
Virtual machines (classic)		Resource	Type St.	atus Operation details	
Virtual machines		GR1-VM	Microsoft.Compute/virtual Co	nflict Operation details	Free Microsoft tuto Start learning today
Cloud services (classic)		gr1-vm651	Microsoft.Network/networ Cr	eated Operation details	
Subscriptions		GR1-VM-ip	Microsoft.Network/publicl Of	C Operation details	Work with an exper Azure experts are se
Marketplace					who can help mana
Azure Active Directory					and be your first lin
A					ring en recore exper

To create a single interface vThunder instance with the ACOS version that is below to ACOS 4.1.4-P3 version, perform the following steps:

 Navigate to <u>https://portal.azure.com</u>. The Microsoft Azure - Services window is displayed.



Figure 4 : Microsoft Azure - Services window

= м	Icrosoft Azure ,P Search resource	s, services, and docs (G+/)		- E & C @ ? @
	Azure services			
	Create a Virtual resource machines	App Services Storage accounts	SQL databases Azure Database Azure Cosn for PostgreS DB	nos Kubernetes Function App services
	Navigate	Resource groups	All resources	Dashboard
	Tools Microsoft Learn C* Learn Azure with free or training from Microsoft	tline Azure Monitor Monitor your apps infrastructure	and Security Center Secure your apps and infrastructure	Cost Management Analyze and optimize your cloud spend for free
	Useful links Technical Documentation <u>C</u> Azure Migration Tools	Azure Services (3 Find an Azure expert	Recent Azure Updates of Quickstart Center	Azure mobile app

2. Click **Create a resource** from the Microsoft Azure Services menu options. The **New** window with **Search the Marketplace** text box is displayed.

Figure 5 : New window

Microsoft Azure 🔎 s	earch resources, services, and docs (G+/)		Ş	Q	۲	?	٢	it-staff@a10networks.co DEMAX DIRECTORY
Home > New								
New								
Azure Marketplace See all	Popular							
Get started Recently created	Windows Server 2016 VM Quickstart tutorial							
Al + Machine Learning Analytics	O Ubuntu Server 18.04 VM Learn more							
Blockchain Compute	Sector State							
Containers Databases	SQL Database Quickstart tutorial							
Developer Tools DevOps	Serverless Function App Quickstart tutorial							
Integration	Cosmos D8 Quickstart tutorial							
Media Mixed Reality	Cuickstart tutorial							
IT & Management Tools Networking	DevOps Project Quickstart tutorial							
Software as a Service (SaaS) Security	Storage Account Quickstart tutorial							
Storage Web	Show recently created items							



- Enter the search string A10 Networks and press Enter.
 The search displays several types of images that can be grouped into two types: BYOL and fixed throughput images. As the name suggests, for BYOL images, you must contact A10 Networks Sales for the license you require. For fixed throughput images, the license is preinstalled.
- 4. Select the A10 Networks image that you require. For example, A10 vThunder ADC for Microsoft Azure.

The selected image window is displayed.

Figure 6 : A10 vThunder ADC for Microsoft Azure window

Microsoft Azure P Search resources, services, and docs (G+/)		S)			it-staff@a10networks.co
Home > New > A10 vThunder ADC for Microsoft Azure					
A10 vThunder ADC for Microsoft Azure					\$2.5
A10 vThunder ADC for Microsoft Azure Save for later					
Cverview Plans					
A10's vThunder ⁴⁴ for Microsoft Azure is purpose-built for high performance, flexibility, and easy-to-deploy application delivery and server load balanci natively within the Azure cloud. vThunder offers a comprehensive feature set across advanced Layer 4-7 services for Azure hosted workboads. Services in acceleration with caching, HTTP compression and WAN-side protocol optimization. Server availability is ensured with advanced traffic distribution, server health monitoring, persistence and server officiading. Security is enabled with SSL and DDOS protection. Multi-tenant sorarios are supported with Application Delivery Partbions (ADPs) with over 100 available in each virtual instance f Want to deploy programmatically! Get started	ig and op include ap insight, a or ultra-g	timized plication uthenti- ranular	to run n cation policy		
an all-in-one inclusive feature set and enables rapid provisioning and on-demand access. Available as either: 'Bring Your Own License' (BYOL) for custon licenses purchased via other channels from A10 Networks or as 'Pay-as-you-Go' at hourly rates. Performance levels up to 500 Mbps.	iers with a	currient			
Highlights • Consistent feature set: Same application services and security features across public and private datacenters: • Accelerated time to value: 'Thunder is a purpose-built high performance, flexible, easy-to-deploy application delivery and server load balancer solutio AZUBE within minutes. • Achieve higher availability: Native HA and GSLB feature enables disaster recovery and failover, optimizes multi-site deployments, traffic migration of to sites during maintenance or outages. • Maint brownhoute: • Want to deploy programmatically? Cert stander • Mant to deploy programmatically? Cert stander • Mant to deploy programmatically?	in. Launch raffic acro	ss mult	der on		
WAF DDoS Protection Network Acceleration support GSLB Native HA support					
For a speedy and simplified vThunder deployment in Azure cloud, customers can take help of various templates (ARM Templates) placed in A10's GitHu	b reposit	ory:			
Want to deploy programmatically? Get started					
List of ARM templates available: Deploying vThunder ADC in Azure - 2 NICs (1 Management + 1 Data) - 870C(Bring VTunder ADC in Azure - 3 NICs (1 Management + 2 Data) Deploying vThunder ADC in Azure - 3 NICs (1 Management + 2 Data) - 870C(Bring VUT Own License) - 500 Mbps					
ATO's GRHub repository					

NOTE:

Azure supports two types of deployment: Classic and Resource Manager. Classic is a legacy deployment model and is not currently support.

5. Click Create.



The **Create virtual machine** work-flow tabs are displayed.

Figure 7 : Create a virtual machine window

🔲 Microsoft Azure 🔎	Search resources, services, and docs (G+/)		6 Q	۲	? 😀	it-staff@a10networks.co (
Home > New > A10 vThunder AD0	for Microsoft Azure > Create a virtual machine					
Create a virtual machine						
Basics Disks Networking	Management Advanced Tags Review + create					
Create a virtual machine that runs Lin	tux or Windows. Select an image from Azure marketplace or use your own customized					
Complete the Basics tab then Review customization. Looking for classic VMs? Create VM	+ create to provision a virtual machine with default parameters or review each tab for full from Azure Marketolace					
Project details						
Select the subscription to manage de your resources.	ployed resources and costs. Use resource groups like folders to organize and manage all					
Subscription *	Pay-As-You-Go					
Resource group * ③						
	Create new					
Instance details						
Virtual machine name *						
Raning * ()						
ingini ()	(US) West US					
Availability options	No infrastructure redundancy required					
image * 🛈	Trowse all public and private images					
Azure Spot instance \odot	Ves No					
Size* 💿	Standard DS3 v2 4 vcpus, 14 Gill memory (\$207.58/month) Change size					
Administrator account						
Authentication type	O Password () SSH public key					
Username * 🕕						
SSH public key * ③						
	Learn more about creating and using SSH keys in Azure					
labound port rules						
Select which virtual machine network network access on the Networking ta	ports are accessible from the public internet. You can specify more limited or granular b.					
Public inbound ports * ③	None Allow selected ports					
Select inbound ports *	SSH (22)					
	▲ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.					
Review + create	< Previous Next : Disks >					
		_				

6. Click the **Basics** tab. The Basic window is displayed.

In the **Basic** window, enter the following:





a. Under the Project details section, select the correct **Subscription** and **Resource group**, or choose to **Create new** resource group.

Figure 8 : Basics window- Project details

	Microsoft Azure	${\cal P}$ Search resources, services, and docs (G+/)		Σ	Ŗ			it-staff@a10networks.co DEFAULT DIRECTORY
Но	me > New > A10 vThund	ADC for Microsoft Azure > Create a virtual machine						
Cr	eate a virtual mach	ne						:
в	asics Disks Network	ig Management Advanced Tags Review + create						
Cre imi Co cus Loi	ate a virtual machine that r age. mplete the Basics tab then I tomization. oking for classic VMs? Crea	ns Linux or Windows. Select an image from Azure marketplace or use your own customiz eview + create to provision a virtual machine with default parameters or review each tab e VM from Azure Marketplace	ed for full					
Pro	oject details							
Sel yoi	ect the subscription to man ir resources.	ge deployed resources and costs. Use resource groups like folders to organize and mana	ge all					
Su	oscription * (i)	Pay-As-You-Go	~					
	— Resource group * 🕧	Create new	\checkmark					

NOTE:

A resource group is a container that holds related resources for an Azure solution.

b. In the Instance details section, enter the Virtual machine name, select the **Region**, and choose the A10 vThunder **Image** from drop-down list.

Figure 9 : Basic window- Instance details

Virtual machine name * 🕡		
Region * 🛈	(US) West US	~
Availability options 🕕	No infrastructure redundancy required	~
Image * 🕕		~
Azure Spot instance ①	Yes No	
Size * (i)	Standard DS3 v2	
3126 ()	4 vcpus, 14 GiB memory (\$207.58/month)	

c. Click **Change Size** to select Size of virtual Machine and their features as below:



Figure 10 : Selecting a VM Size

Home > New > A10 vTh	nunder ADC for Microsof	t Azure > Create a virtua	I machine >			
Select a VM siz	ze					×
 Search by VM size Most used sizes by Azi Showing 12 of 300 VM 	Display cost ure users , Subscription: Pay-A	: Monthly VCPUs :	AII RAM (GiB) : AII	↓ + Add filter	10 vThunder ADC 414GR1	Learn more about VM
sizes.	Go	US	Standard_DS3_v2	BYOL		sizes
VM Size \uparrow_\downarrow	Family ↑↓	vCPUs ↑↓	RAM (GiB) ↑↓	Data disks ↑↓	Max IOPS ↑↓	Temp storage (GiB) ↑↓ I
DS1_v2 📌	General purpose	1	3.5	4	3200	7
D2s_v3 🛹	General purpose	2	8	4	3200	16
B2s 🛹	General purpose	2	4	4	1280	8
B1s 🛹	General purpose	1	1	2	320	4
B2ms 🕕	General purpose	2	8	4	1920	16
B1ms 🛹	General purpose	1	2	2	640	4
4						* •
See all sizes						

- In the **Select a VM size** window, select any one of the recommended options, and click **Select** button.
- **NOTE:** Each pane displays a combination of Family, vCPUs, RAM size, data disks, IOPS value, and so on. By default, the size is set to **Standard DS1 v2**.
- d. In the Administrator Account details section, the Authentication type is Password or SSH public key.



Figure 11 : Basic details - Administrator account and Inbound	port rules
---	------------

Administrator account		
Authentication type (i)	O Password 💿 SSH public key	
Username * 🕕		
SSH public key *		
SST public key		
	Learn more about creating and using SSH keys in Azure	
Inbound port rules		
Select which virtual machine networ network access on the Networking f	rk ports are accessible from the public internet. You can specify more limited or granular tab.	
Public inbound ports * ①	O None Allow selected ports	
Select inbound ports *	SSH (22)	
	This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.	
Review + create	< Previous Next : Disks >	

e. Select the **SSH Public Key** radio button to enter and Username and the SSH public key.

or

Select the **Password** radio button to enter Username and Password. The entered password must have 12 characters, one lower case, one upper case, a digit, and one special character.

NOTE: Re-entered password must match to the entered Password.

f. In the **Inbound port rules** > **Public inbound ports**, choose **Allow selected ports** radio button and then select SSH (22) and HTTP (80) from the drop-down list.

You can leave the remaining as defaults and select the **Review + create** button at the bottom of the page or, perform the following:

7. Click the **Disks** tab. The Disk option window is displayed.

Installing vThunder on Microsoft Azure



Figure 12 : Disk window

Basics D	Disks Networking	Management Adv	vanced Tags	Review + create	
Azure VMs h The size of th	ave one operating system he VM determines the	tem disk and a tempora type of storage you can	ry disk for short-ter use and the numb	m storage. You can attach additional data er of data disks allowed. <u>Learn more</u>	a disks.
Disk option	s				
OS disk type	•* 🕕	Standard HDI	>		\sim
Enable Ultra	Disk compatibility ①	high IOPS worl 99.9% connect Ves	kloads. Virtual maa ivity SLA. No	hines with Premium SSD disks qualify fo	or the
		Ultra Disk com	patibility is not ava	ilable for this VM size and location.	
Data disks					
You can add temporary di	and configure addition isk.	nal data disks for your v	irtual machine or a	tach existing disks. This VM also comes w	vith a
LUN	Name	Size (GiB)	Disk type	Host caching	
Create and a	ttach a new disk A	ttach an existing disk			

- 8. In Disk option, select OS disk type from the available list of options. Leave the remaining as defaults.
- 9. Click the **Tag** tab. The Tag window is displayed.

Figure 13 : Tag window

Create	a virtu	al machine								
Basics	Disks	Networking	Management	Advanced	Tags	Review + create				
'ags are r	name/valu	ue pairs that ena	ble you to catego	rize resources a	and view	consolidated billing	by applying	g the san	ne taq to	
nultiple r	esources	and resource gr	oups. Learn more	about tags 🖙					J. J	
nultiple r Jote that Name (esources if you cre	and resource gr eate tags and th	oups. <u>Learn more</u> en change resourc Value ①	about tags d	other tabs	, your tags will be au Resource	tomatically	v update	d.	

.



Tags enable you to categorize resources and view consolidated billing for paired with name or values.

10. Click the **Management** tab to configure monitoring and management options for your VM.

Figure 14 : Management window

Create a virtual machine			
Basics Disks Networking Ma	nagement Advanced	Tags	Review + create
Configure monitoring and management	options for your VM.		
Azure Security Center			
Azure Security Center provides unified se Learn more	curity management and ac	dvanced t	hreat protection across hybrid cloud workloads.
Your subscription is protected by Az	cure Security Center basic p	olan.	
Monitoring			
Boot diagnostics ①	● On ○ Off		
Diagnostics storage account * 🛈	(new) a10inpchavared	iag	~
	Create new		
Identity			
System assigned managed identity \bigcirc	🔿 On 🧿 Off		
Auto-shutdown			
Enable auto-shutdown ${\rm \bigcirc}$	🔵 On 💿 Off		

11. Click the **Network** tab. The Network window is displayed.



Figure 15 : Network window

Create a virtual machine	
Basics Disks Networking N	anagement Advanced Tags Review + create
Define network connectivity for your vi ports, inbound and outbound connect Learn more	rtual machine by configuring network interface card (NIC) settings. You can control vity with security group rules, or place behind an existing load balancing solution.
letwork interface	
Vhen creating a virtual machine, a net	work interface will be created for you.
Virtual network * 🕕	(new) A10IN pchavare-vnet
	Create new
Subnet * 🕕	(new) default (10.33.1.0/24)
Public IP ①	(new) vThundersin
	Create new
IIC network security group \oplus	🔿 None 💿 Basic 🔿 Advanced
ublic inbound ports * ①	None Allow selected ports
select inbound ports *	SSH (22)
	This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.
ccelerated networking \bigcirc	● On ◯ Off

12. Select Virtual Network, Subnet, NIC network security group.

NOTE: To create a new virtual network, Subscription, resource group, name, and location must be selected to select a virtual network.

- 13. Select the Public inbound ports as None.
- 14. Select inbound ports from a list of options.
- 15. Click the Advance tab to add additional details about Cloud-init or Host.

For provisioning the vThunder instance, edit the following cloud-init configuration as appropriate, copy the configuration, and paste it in the blank field:

a10_blob: | !TEST



```
ip dns pri 8.8.8.8
glm use-mgmt-port
glm token vThxxxxxxx
glm enable-requests
glm send license-request
wr mem
```

Figure 16 : Advance window

Create	e a vi	rtual m	achii	ne					
. .							_		
Basics	Disks	Networkin	g Ma	anagemen	t Monitoring	Advanced	lags	Review + create	
Add addi	tional cor	ifiguration, ag	jents, scri	pts or app	lications via virtual n	nachine extensio	ons or clo	ud-init.	
Extensio	ins								
Extension	ns provide	post-deploy	ment con	figuration	and automation.				
Extension	ns 🕕			Select a	n extension to instal	I			
VM appl	lications								
VM appli the appli your VM	cations co cation file after crea	ontain applica s, an install ar te. Learn mor	tion files nd uninst re 더	that are se all script ar	curely and reliably d e included in the ap	lownloaded on plication. You ca	your VM a an easily a	after deployment. In addition to add or remove applications on	
Select a \	/M applic	ation to insta							
Custom	data and	cloud init							
Pass a clo saved on	oud-init so the VM in	ript, configur n a known loc	ation file, ation. Le	or other d arn more a	ata into the virtual r bout custom data fo	nachine while i or VMs 며	t is being	provisioned. The data will be	
Custom d	data			a10_bl !TEST ip dn glm t glm s glm s Lear	ob: s pri 8.8.8.8 use-mgmt-port oken vTh(enable-requests uend license-request tom data on the selec n more about custom	: ted image will be i data for VMs d	e processed	d by cloud-init.	
User dat	ta								
Pass a scr machine.	ript, confi . Don't us	guration file, (e user data fo	or other o or storing	lata that w your secre	ill be accessible to y ts or passwords. Lea	our applications arn more about	s through user data	for VMs c	
Enable us	ser data								
Perform	ance (NV	(Me)							
Enable ca	apabilities	to enhance t	he perfor	mance of y	our resources.				
Higher re with NVN	emote disk /le (i)	storage per	ormance						
				🚹 The	selected size is not su	pported for NVN	/le. <u>See su</u>	pported size families 🖻	
Host									
Azure De Azure sub choose V the host.	dicated H bscription 'Ms from <u>p</u> Learn mo	osts allow yo A dedicated your subscrip ore 😅	u to prov host give tion that	ision and r 25 you assu will be pro	nanage a physical se rance that only VMs visioned on the host	rver within our from your subs and the contro	data cent scription a ol of platfe	ers that are dedicated to your are on the host, flexibility to orm maintenance at the level of	
Review	v + create		< Pre	vious	Next : Tags >	1			
					-	1			

••••



16. Click the **Review + Create tab** to view the **Product details, Terms** of use with user details.

Figure 17 : Review + create window

		Networking	Management	Advanced	Tags	Review + create
PRODUCT	DETAILS	•				
A10 vThund	ler ADC	for Microsof	t Azure Not cove	ered by credits	s ()	
by A10 Netw Terms of use	orks Priva	cy policy	0.0000	USD/hr		
Standard D	S3 v2		Subscrip	tion credits ap	oply 🕕	
by Microsoft	t		6,2796	U50/hr		
Terms of use	e Priva	cy policy	Pricing	for other VM	sizes	
TERMS						
/	unonze	Microsoft to bi	II my current payn	nent method fo	or the fee	s associated with the offering(s), with the same
billing freque information provide right	ency as r with the ts for thi	Microsoft to bi ny Azure subso provider(s) of t rd-party offerir	ill my current payn cription; and (c) ag the offering(s) for ngs. See the Azure	nent method for ree that Micro support, billing Marketplace	or the fee soft may g and oth Terms for	s associated with the offering(s), with the same share my contact, usage and transactional er transactional activities. Microsoft does not additional details.
billing freque information provide right Name	ency as r with the ts for thi	Microsoft to bi ny Azure subso provider(s) of f rd-party offerir	ill my current payn cription; and (c) ag the offering(s) for ngs. See the Azure A10 IT S	nent method fo gree that Micro support, billing Marketplace	or the fee soft may g and oth Ferms for	s associated with the offering(s), with the same share my contact, usage and transactional er transactional activities. Microsoft does not additional details.
billing freque information of provide right Name Preferred e-r	ency as r with the ts for thi mail add	Microsoft to bi ny Azure subso provider(s) of r rd-party offerir lress *	ill my current payn cription; and (c) ag the offering(s) for ngs. See the Azure A10 IT S it-staff@	nent method fø gree that Micro support, billing Marketplace 1 Staff @a10networks.	or the fee soft may g and oth Ferms for com	s associated with the offering(s), with the same share my contact, usage and transactional er transactional activities. Microsoft does not additional details.
billing freque information provide right Name Preferred e-r Preferred ph	ency as r with the ts for thi mail add	Microsoft to bi ny Azure subsc provider(s) of rd-party offerir lress * nber *	Ill my current payn cription; and (c) ag the offering(s) for ngs. See the Azure A10 IT S it-staff@	nent method fo gree that Micro support, billing Marketplace 1 Staff @a10networks.	or the fee soft may g and oth Ferms for com	s associated with the offering(s), with the same share my contact, usage and transactional er transactional activities. Microsoft does not additional details.
billing freque information · provide right Name Preferred e-I Preferred ph	mail add	Microsoft to bi ny Azure subsc provider(s) of rd-party offerin Iress * nber *	Ill my current payn cription; and (c) ag the offering(s) for ngs. See the Azure A10 IT S it-staff@ 1501131	nent method for gree that Micro support, billing Marketplace 1 Staff @a10networks. 11299 This is only rec	or the fee soft may g and oth Terms for com	s associated with the offering(s), with the same share my contact, usage and transactional er transactional activities. Microsoft does not additional details.
billing freque information provide right Name Preferred e-t Preferred ph Preferred ph <u>You h</u> back t	mail add	Microsoft to bi ny Azure subsc provider(s) of rd-party offerin Iress * nber * :SH port(s) ope tab.	Ill my current payn cription; and (c) ag the offering(s) for ngs. See the Azure A10 IT S it-staff@ 1501131	nent method for gree that Micro support, billing Marketplace 1 Staff @a10networks. 11299 This is only rec	or the fee soft may g and oth Ferms for com	s associated with the offering(s), with the same share my contact, usage and transactional er transactional activities. Microsoft does not additional details.

The preferred e-mail address and phone number display a green check. Click **Create** button to create a virtual machine. In the Azure My Dashboard window, a pane displays the VM just created.

NOTE: Creating the VM may take several minutes depending on several factors.



Figure 18 : My Dashboard - All resources window

Microsoft Azure 🔎 Search rescu	rces, services, and docs (G+/)		5 6	D 🔘 ? 😳 it-staff@a10networks.co 🧕
Create a resource	My Dashboard (16) \checkmark + Auto refresh : Off	New dashboard 🕴 Up	load 🛓 Download 🥒 Edit 🖒 Share 🖍 Full screen	Clone
Dashboard	All resources All subscriptions		Azure getting started made easy!	
All services	6. Testimet	C Refresh	4 Ne CX Launch an app of your choice on Azure in a few quick steps	
All resources	510b59-vThunder	Virtual machine	Create DevOps Starter	
(•) Resource groups	ubc704	Network interface	Nige at	
Recent	<i>♦ rp411p1-vnet</i>	Virtual network	Quickstarts a tutorials	
App Services	🐺 ubc	Virtual machine	Concestants + Constans	
Virtual machines (classic)	📮 nag-414p1	Virtual machine	Westeur Vitual Machines at	
Virtual machines	a10-np-bangalore2	Virtual machine	Provision Windows Server, SQL Server, SharePoint VMs	
Cloud services (classic)	♦ 1Test_python-vnet	Virtual network		
📍 Subscriptions	162263tac09FEBadcNOT410	Virtual machine	Linux Virtual Machines &	
Marketplace	📮 ubcanary	Virtual machine	Ja. Protochi costru, neo ner, centos, soci, concos nas	
Azure Active Directory	VMT	Virtual machine	App Service of	
Monitor	VThunder-cloud-init-vm	Virtual machine	Create Web Apps using JNET, Java, Node,js, Python, PHP	
Security Center	🜉 ubs	Virtual machine	 Exections of 	

Create a Multiple-Interface vThunder Instance

To create a multiple-interface vThunder instance, use any one of the following methods:

- Creating Multiple-Interface vThunder Instance Using Azure Portal
- <u>Creating Multiple-Interface vThunder Instance Using Azure PowerShell</u>

After a VM is created with multiple NICs, you can use the Azure portal to configure the VM.

Creating Multiple-Interface vThunder Instance Using Azure Portal

To create a multiple-interface vThunder instance by using the Azure portal, perform the steps from <u>Create a Single-Interface vThunder Instance</u>. The VM is created with one interface.

Perform the following steps:



1. Click Virtual Machines and select the VM from the right-pane.

Microsoft Azure	$\mathcal P$ documentation				
«	Home > Virtual machines				
+ Create a resource	Virtual machines itstaffa10networks (Default Directory)				
i≡ All services	🕂 Add 📰 Edit columns 🕐 Refresh 📔 🌩 Assign tags 🕨 Start 🤍 Restart 🔳 Stop 🏛 Del				
— 🛧 favorites ————	★ FAVORITES Subscriptions: Pay-As-You-Go - Don't see a subscription? Open Directory + Subscription settings				
📀 Cloud services (classic) 📩	Filter by name documentation V All types V All location				
💡 Subscriptions	NAME TO STATUS RESOURCE GROUP TO				
👱 Virtual machines	Running documentation				
当 Marketplace					
Azure Active Directory					
🕒 Monitor					

- 2. In the VM window, click **Stop** to stop the VM.
- 3. From the right pane, select **Networking > Attach network interface > Create network interface**.

Figure 20 : Attach network interface

Home > Virtual machines > rpdemo - Networkin rpdemo - Networking Virtual machine	19 1				
	🔹 Attach netw	ork interface	🐠 Detach network interface		
Q Overview	Attach netwo	ork interface			
Activity log					
Access control (IAM)	Create netw	orkintenace			
🛷 Tags	No network in	terfaces availa	ble to attach	~	
★ Diagnose and solve problems	ОК	Cancel]		
SETTINGS	Impacts 0 subnets, 1 network interfaces				
A Networking	PRIORITY	NAME	PORT	PROTOCOL	SOURC
😂 Disks					

4. In the **Create network interface** page, enter the following information:



- Name: a10-client-interface
- Virtual Network: Already filled in.
- **Subnet**: Select one of the existing subnets as appropriate. Each interface must belong to a different subnet.
- Private IP address assignment: Dynamic
- Network security group: Select one of the existing groups or create a new one.
- Private IP address (IPv6): Not required
- Subscription: Already filled in.
- **Resource group**: Select one of the existing ones or create a new one.
- Location: Already filled in.
- 5. After the network interface is created, select it from the drop-down of the rightpane, and select **OK**.

Figure 21 : VM with Two Network Interfaces

rpdemo - Networking	
	« 🗣 Attach network interface 🐠 Detach network interface
SETTINGS	rpdemo581 a10-client-interface
🙎 Networking	Network Interface: radem 591 Effective security rules Topology
😑 Disks	Virtual network/subnet: documentation-vnet/default Public IP: Private IP: 10.5.25.4
👰 Size	

- 6. Similarly, create and attach another network interface card for the server-side connection.
 - **NOTE:** Applicable for ACOS 5.0.2, the Thunder TPS supports Azure Accelerated Networking which improves network performance by using a high-performance path and reducing latency. It is also supported on the data interfaces and not supported on the management interface. See below for details for enabling Accelerated Networking.
- 7. After the interfaces are created and attached, start the VM.



Creating Multiple-Interface vThunder Instance Using Azure PowerShell

In this example, a vThunder VM with three NICs is created by using the Azure PowerShell. One NIC is used for the management interface while the other two NICs are used for data interfaces.

NOTE: Provide the inputs to the script which azure cloud portal accepts otherwise deployment fails.

To deploy Azure VM from the market place, perform the following:

1. Deploy the Azure VM from the market place:

#Deploying azure VM from marketplace

Login-AzureRmAccount

```
$location = Read-Host 'Enter the location'
$resourceGroup = Read-Host 'Enter resource group name'
$storageaccount = Read-Host 'Enter storage account name'
$vmName = Read-Host 'VM Name'
$vmSize = Read-Host 'Enter VM size'
```

2. Create a new resource for the deployment:

#Create new resource group for deployment

```
New-AzureRmResourceGroup -Name
$resourceGroup -Location
$location
```

3. Create a storage account for the new resource:

#Create storage account

```
New-AzureRmStorageAccount
-ResourceGroupName $resourceGroup
-AccountName $storageaccount
-Location $location
-SkuName Standard RAGRS
```



```
-Kind StorageV2
-AssignIdentity
```

4. Create a virtual network, subnet, and a public IP address. These resources are used to provide network connectivity to the VM and connect it to the internet:

```
# Create a subnet configuration
$mgmtsubnet = New-AzureRmVirtualNetworkSubnetConfig
-Name "subnet1"
-AddressPrefix "192.168.1.0/24"
$data1subnet = New-AzureRmVirtualNetworkSubnetConfig
-Name "subnet2" -AddressPrefix "192.168.2.0/24"
$data2subnet = New-AzureRmVirtualNetworkSubnetConfig
-Name "subnet3" -AddressPrefix "192.168.3.0/24"
# Create a virtual network
$vnet = New-AzureRmVirtualNetwork
-ResourceGroupName $resourceGroup
-Location $location
-Name "Vnet"
-AddressPrefix 192.168.0.0/16
-Subnet $mgmtsubnet,$data1subnet,$data2subnet
# Create a public IP address and specify a DNS name
$mgmtpip = New-AzureRmPublicIpAddress
-ResourceGroupName
$resourceGroup
-Location $location
-AllocationMethod Dynamic
-IdleTimeoutInMinutes 4
-Name "myip$(Get-Random)"
$data1pip = New-AzureRmPublicIpAddress
-ResourceGroupName $resourceGroup
-Location $location
-AllocationMethod Dynamic
-IdleTimeoutInMinutes 4
-Name "myip$(Get-Random)"
$data2pip = New-AzureRmPublicIpAddress
-ResourceGroupName $resourceGroup
```



```
-Location $location
-AllocationMethod Dynamic
-IdleTimeoutInMinutes 4
-Name "myip$(Get-Random)"
```

5. Create an Azure Network Security Group and traffic rule. The Network Security Group secures the VM with inbound and outbound rules. In the following example, an inbound rule is created for TCP port 22 that allows SSH connections. To allow incoming web traffic, an inbound rule for TCP port 80 is also created:

```
# Create an inbound network security group rule for port 22
$nsgRuleSSH = New-AzureRmNetworkSecurityRuleConfig
 -Name "myNetworkSecurityGroupRuleSSH"
 -Protocol "Tcp"
-Direction "Inbound"
 -Priority 1000 -SourceAddressPrefix *
-SourcePortRange *
 -DestinationAddressPrefix *
 -DestinationPortRange 22
-Access "Allow"
# Create an inbound network security group rule for port 80
$nsgRuleWeb = New-AzureRmNetworkSecurityRuleConfig
 -Name "myNetworkSecurityGroupRuleHTTP"
 -Protocol "Tcp"
 -Direction "Inbound"
-Priority 1001
 -SourceAddressPrefix *
 -SourcePortRange *
 -DestinationAddressPrefix *
 -DestinationPortRange 80
 -Access "Allow"
# Create a network security group
$nsg = New-AzureRmNetworkSecurityGroup
 -ResourceGroupName $resourceGroup
-Location $location
 -Name "myNetworkSecurityGroup"
 -SecurityRules $nsgRuleSSH,
```



\$nsgRuleWeb

a. Create a virtual network interface card (NIC) with New-AzNetworkInterface. The virtual NIC connects the VM to a subnet, Network Security Group, and public IP address.

```
# Create a virtual network card and associate with public IP
address and NSG
$mgmtsubnet = $vnet.Subnets | ?{ $_.Name -eq 'subnet1' }
$mgmtnic = New-AzureRmNetworkInterface
-ResourceGroupName $resourceGroup
-Name "nic1"
-Location $location
-SubnetId $mgmtsubnet.Id
-PublicIpAddressId $mgmtpip.Id
-NetworkSecurityGroupId
$nsg.Id
```

NOTE: Applicable for ACOS 5.0.2. Accelerated Networking is only supported on the data interfaces and not supported on the management interface.

```
$data1subnet = $vnet.Subnets | ?{ $_.Name -eq 'subnet2' }
$data1nic = New-AzureRmNetworkInterface
-ResourceGroupName $resourceGroup
-Name "nic2"
-Location $location
-SubnetId $data1subnet.Id
-PublicIpAddressId $data1pip.Id
-NetworkSecurityGroupId $nsg.Id
```

To create data interface 1 and enable Accelerated Networking on data interface 1 (nic2), use the following commands:

```
$data1nic = New-AzureRmNetworkInterface
-ResourceGroupName $resourceGroup
-Name "nic2"
-Location $location
-SubnetId $data1subnet.Id
```



```
-PublicIpAddressId $data1pip.Id
-NetworkSecurityGroupId $nsg.Id
-EnableAcceleratedNetworking
$data2subnet = $vnet.Subnets | ?{ $_.Name -eq 'subnet3' }
$data2nic = New-AzureRmNetworkInterface
-ResourceGroupName $resourceGroup
-Name "nic3"
-Location $location
-SubnetId $data2subnet.Id
-PublicIpAddressId $data2pip.Id
-NetworkSecurityGroupId $nsg.Id
```

Similarly, use the following commands to create data interface 2 (nic3) with Accelerated Networking enabled:

```
-ResourceGroupName $resourceGroup
-Name "nic3"
-Location $location
-SubnetId $data2subnet.Id
-PublicIpAddressId $data2pip.Id
-NetworkSecurityGroupId $nsg.Id
-EnableAcceleratedNetworking
```

\$data2nic = New-AzureRmNetworkInterface

NOTE: For Accelerated Networking support with multiple NICs, Accelerated Networking must be enabled on both data interfaces.

6. To create a VM in PowerShell, firstly create a configuration that has settings like the image to use, size, and authentication options. Then the configuration is used to build the VM.

```
# Define a credential object
$name= Read-Host 'Enter Username'
$securePassword = Read-Host 'Enter the password' -AsSecureString
$cred = New-Object System.Management.Automation.PSCredential ($name,
$securePassword)
```


```
# Start building the VM configuration
$vmConfig = New-AzureRmVMConfig -VMName
$vmName -VMSize
$vmSize
#Create the rest of configuration
$vmConfig = Set-AzureRmVMOperatingSystem -VM
$vmConfig
-Linux
-ComputerName
$vmName -Credential
$cred
$vmConfig = Set-AzureRmVMSourceImage -VM
$vmConfig
-PublisherName "a10networks"
-Offer "vthunder-414-gr1"
-skus "vthunder-414gr1-byol"
-Version "latest"
$vmConfig = Set-AzureRmVMPlan
-Name "vthunder-414gr1-byol"
-Product "vthunder-414-gr1"
-Publisher "alOnetworks"
-VM
$vmconfig
# for bootdiag
$vmConfig = Set-AzureRmVMBootDiagnostics -VM
$vmconfig -Enable
-ResourceGroupName $resourceGroup
-StorageAccountName $storageaccount
#Attach the NIC that are created
$vmConfig = Add-AzureRmVMNetworkInterface -VM
$vmConfig -Id
$mgmtnic.Id -Primary
$vmConfig = Add-AzureRmVMNetworkInterface -VM
$vmConfig -Id
$data1nic.Id
$vmConfig = Add-AzureRmVMNetworkInterface -VM
```

33



```
$vmConfig -Id
$data2nic.Id
#Creating VM with all configuration
New-AzureRmVM -ResourceGroupName
$resourceGroup -Location
$location -VM
$vmConfig
```

```
NOTE:
```

Starting from ACOS 4.1.4-P3, single NIC deployments for the vThunder on Azure Cloud are not supported.

About Multiple IP Addresses for a Network Interface

An Azure VM can have multiple private and public IP addresses. Guidelines for the IP addresses are:

- A network interface can have one or more static or dynamic public and private IP addresses assigned to it.
- There is a limit to how many private and public IP addresses can be assigned to a network interface. This limitation is dependent on the type of Azure subscription that you have.
- When there are multiple IP addresses assigned to a network interface, only one IP address can be a primary IP address. The other IP addresses are all secondary IP addresses.
- The secondary IP addresses can be configured as VIP. In this document, the secondary IP address is configured as the VIP.

Associating Public IP and Secondary IP address by Using Azure Portal

In this example, the primary IP address is associated with a public IP address, and the secondary IP address is associated with its public IP address. The secondary IP address is configured as a VIP for the ACOS configurations.

Perform the following steps to add a public IP address to a network interface:

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Feedbad

- 2. Under the virtual network, select the network interface card for which you want to add a public IP address.
- 3. Under Settings, select IP configurations.

a10-client-interface - IP configurations Network interface 🕂 Add 🛛 🕂 Save 🗙 Discard « IP forwarding settings 🚦 Overview IP forwarding Disabled Enabled Activity log Virtual network documentation-vnet 🛃 Access control (IAM) IP configurations Tags * Subnet default (10.5.25.0/24) SETTINGS ♀ Search IP configurations **IP** configurations NAME IP VERSION TYPE PRIVATE IP ADDRESS DNS servers ipconfig1 IPv4 Primary 10.5.25.12 (Static) 🌍 🛛 Network security group

Figure 22 : Select IP configurations

- 4. Click the **Public IP address** in the main window.
- 5. Fill in the following details, and then click **Save**:
- Public ip address: Enabled
- IP address: Select from existing or create new.
- Private IP address settings: Keep default for the subnet.
- IP address

Perform the following steps to add a secondary IP address to a network interface:

1. From the Microsoft Azure left-most pane, select **Virtual networks**, and then from the list of virtual networks, select the virtual network to which the network interface belongs.

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- 2. Under the virtual network, select the network interface for which you want to add a secondary IP address.
- 3. Under **Settings**, select **IP configurations** and then **Add** in the main window.
- 4. In the Add IP configuration window, fill in the following details and click **OK**.
- Name: Doc1
- Type: Secondary (by default)
- Private IP address settings: Static. Fill in an IP address.
- Public IP address: Disabled

Figure 23 : Add Secondary IP address

Secondary
y IP configuration already exists address settings
y IP configuration already exists address settings
y IP configuration already exists address settings Static
y IP configuration already exists address settings Static

The secondary IP address is created.



Adding a Public IP Address to a NIC Using Azure CLI

Azure resources cannot receive and send Internet communication without an assigned public IP address. Public IP addresses have a nominal charge. For more information, refer to

https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-public-ipaddress.

To add a public IP address to a NIC, perform the following steps:

1. Create the public IP address:

```
az network public-ip create -g
testResourceGroup -n testip --dns-name MyLabel --allocation-method
dynamic
```

2. Create an IP configuration on the NIC:

Adding a Secondary IP Address to a NIC by Using Azure CLI

The private IP address that is used as a VIP must be attached to the data interface in Azure Portal as a secondary (private) IP to the interface.

To create a secondary IP address, perform the following steps:

az network nic ip-config create --name ipconfigtest



```
--nic-name data1nic
--resource-group testResourceGroup
[--application-security-groups]
[--lb-address-pools]
[--lb-inbound-nat-rules]
[--lb-name]
[--make-primary]
[--private-ip-address]
[--private-ip-address-version {IPv4,
[--subnet]
[--vnet-name]
```

IPv6}]

Access vThunder by Using ACOS CLI

To connect to the VM, perform the steps:

1. After the VM is created, type the VM name in the Azure search box and click Enter.

The search results display the VM.

- 2. Click on the link to launch the VM details page.
- Wait until the Status column for the VM has changed to Running. When the status has changed to Running, you can establish a PuTTY session with the virtual machine.
- 4. Select the public IP address from the VM Overview page.



Figure 24 : VM Overview Page

rpdemo Virtual machine				*
Search (Ctrl+/)	restart Start Connect	S Capture → Move 💼 D	Delete D Refresh	
Overview	Resource group (change) documentation Status	2	Computer name rpdemo Operating system	
Activity log	Running Location		Linux Size	
Access control (IAM)	West India Subscription (change) Pay-As-You-Go		Standard A2 (2 vcpus, 3.5 GB m Public IP address	iemory)
Tags	Subscription ID dfe16a52-556b-428a-a168-91767a54c0ce		Virtual network/subnet documentation-vnet/default	
Diagnose and solve problems			DNS name Configure	
SETTINGS	Chaus data far last, di haus, di hauss, 40 hauss	a day 7 days 20 days	Â	
Networking		Tuay 7 uays 50 uays		
S Disks	CPU (average)	Network (total)	2 *	Disk bytes (total)
Extensions	100%	1008		1008
Availability set	50%	508		508
Configuration				
Properties	0%	08	2145 PM	0B 3 PM 3:15 PM 3:20 PM 3:45 PM
Locks	Percentage	In Out		Read Write

- 5. Open an SSH client and access the IP address on the client.
- Enter the following credentials to access the VM: User name: admin Password: a10 The vThunder prompt is displayed.

Configure Endpoint Mapping

To access the web GUI for configured VM images, configure endpoint mapping in the Azure management portal. The public IP address for the web GUI will NOT work unless this is set up per the procedure below.

To configure endpoint mapping:

- 1. Navigate to Virtual Machines.
- 2. Click on the configured VM and select Networking.
- 3. Select the management interface and add an inbound HTTPS rule as follows:
 - a. A high priority.
 - b. Name as HTTPS.

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c. A designated port such as 1113.

You can now access the ACOS GUI at https://<azure_public_ip>:1113.

- 4. Select the management interface and add an inbound HTTP rule as follows:
 - a. A high priority.
 - b. Name as HTTP.
 - c. A designated port such as 1115.

Now user can access the ACOS GUI at http://<azure_public_ip>:1115.

Figure 25 : Editing Endpoint Mapping within the Azure Management Portal

	🗙 Detach i	network interface						
👰 Overview 🔺	📕 Networ	k Interface: apwangp	8byol184	Effectiv	e security ru	iles To	pology 0	
Activity log	Virtual netw	ork/subnet: apwangrmv	n/default	Public IP:	apwangp8byc	ıl-ip Pri	vate IP: 10.2	24.0.6
🔮 Access control (IAM)	INBOUND P	ORT RULES 🛛						
🥔 Tags	Network	security group apw	angp8byol-	-nsg (attach	ed to netwo	ork	Add inbou	und
🗙 Diagnose and solve problems	interface Impacts 0	e: apwangp8byol184) I subnets, 1 network inte	rfaces					
SETTINGS	PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATI	ACTION	
🧟 Networking	1000	default-allow-ssh	22	ТСР	Any	Any	🗢 Allow	
😤 Disks	1010	https	1118	Any	Any	Any	🗢 Allow	
👰 Size	65000	AllowVnetInBound	Any	Any	VirtualNe	VirtualNe	🛛 Allow	
🛃 Extensions	65001	AllowAzureLoadBal	Any	Any	AzureLoa	Any	🛛 Allow	
Availability set	65500	DenyAllInBound	Any	Any	Any	Any	🕴 Deny	
🚔 Configuration								
III Properties	OUTBOUND	PORT RULES 0						
Locks	Network interface	security group apw apwangp8byol184	angp8byol-	-nsg (attach	ed to netwo	ırk	Add outbo	und
関 Automation script	Impacts 0	subnets, 1 network inte	rfaces					
		NAME	DOPT		COURCE	DECTINAT	ACTION	

Access vThunder by Using ACOS GUI

If the vThunder VM uses Network Security Group, then configure endpoint mapping to access the VM by using the ACOS GUI.



For single interface VMs, launch a web browser and enter the following URL https://public IP: 8443. The public IP portion of this URL can be obtained by looking up the public IP address, as in VM Overview Page.

For multiple-interface VMs, enter the URL https://public IP. When accessing the
web GUI, the default value is port 80.

Starting from ACOS 5.0, configuring vThunder in High Availability (HA) mode is supported for Microsoft Azure. HA is supported within the availability zone. You cannot configure HA of vThunder instances across different availability zones. vThunder already supports unicast-based VRRP to make it highly available when an active vThunder instance fails. However, in the Azure cloud, the floating IP address (FIP) is mapped to the secondary IP address (VIP) of the data interface. During failover, the floating IP (FIP) and the VIP moves from the active vThunder instance to the standby vThunder instance, making it the new active instance.

The following topics are covered:

Creating Azure Access Key	42
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Azure HA Architecture	57
Configuring HA	

Creating Azure Access Key

Configuring vThunder for HA in an Azure environment requires access to the Azure Access key. To create the Azure access key, perform the following steps:

- 1. Create a Role
- 2. Register a Service Application
- 3. Associate Service Application with a Role
- 4. Create Certificate and Secrets
- 5. <u>Collect Azure Access Key</u>

Create a Role

To create a custom role, perform the following steps:



1. Navigate to the Home > Subscriptions > Registered Subscription Name > Access control (IAM) from left panel.

Home > Subscriptions >	i e arc		
Subscriptions « A10 Networks	P Eng Azure ···		
+ Add		« 🔋 Cancel subscription 🖉 Rename → Change directory ♡ I	Feedback
View list of subscriptions for which you have	? Overview	^ Essentials	
role-based access control (RBAC) permissions to manage Azure resources. To view	Activity log	Subscription ID	Subscription name
subscriptions for which you have billing access, click here Showing subscriptions in A10 Networks	Access control (IAM)	Directory A10 Networks (a) Restworks come)	Current billing period
directory. Don't see a subscription? Switch directories	 Tags Diagnose and solve problems 	My role	Currency ISD
My role ③ Status ③ 8 selected	Security	Offer Enterprise Agreement	Status Active
Apply Showing 1 of 2 subcriptions	Events	Offer ID MS-A2R-0017P	Secure score Not available
Showing 1 of 2 subscriptions selected in the subscriptions filter ①	Cost Management	See more	
P Search	Cost alerts	Costs by resource 0 View details >	Spending rate and forecast O View details >
Subscription name ↑↓	Budgets		330
Eng Azure ***	Advisor recommendations	arageh-uni	300
	0:II	11.77 usp	250
	Banny .	Training and the second s	200
	'R Partner information	7 44.000	150
	Settings	17.44 USD	100
	Programmatic deployment		м
< Previous 1 V Next >	(•) Resource groups	14.22 USD	0

Figure 26 : Subscriptions - Access control (IAM) window

2. On the Select Access control (IAM) page, select the **Roles** tab. The Role window is displayed.

Figure	27 ·	Access	Control - Rol	e Window
inguic	Z /.	ALLUSS	Control Nor	

Home > Subscriptions > Eng Azure				
Subscriptions « A10 Networks	Reng Azure Access	s control (IAM)		×
+ Add	P Search (Ctrl+/) «	c + Add 🛓 Download role assignments 💷 Edit columns 🖒	Refresh X Remove 🗢 Got feedback?	
View list of subscriptions for which you have role-based access control (RBAC) permissions to manage Azure resources. To view	📍 Overview	Check access Role assignments Roles Roles (Preview)	Deny assignments Classic administrators	
subscriptions for which you have billing access, click here	Access control (IAM)	My access		
Showing subscriptions in A10 Networks directory. Don't see a subscription? Switch directories My role O Status O 8 selected V 3 selected V	 Tags Diagnose and solve problems Security 	View my level of access to this resource. View my access View my access Check access Review the level of access a user, aroup, service principal, or	Grant access to this resource Grant access to resources by assigning a role.	
Apply	Events	managed identity has to this resource. Learn more of		
Showing 1 of 2 subscriptions global	Cost Management	Find ①	Add role assignments Learn more 😭	
subscriptions filter ()	S. Cost analysis	User, group, or service principal 🗸 🗸	and the second sec	
P Search	Cost alerts	Search by name or email address	View access to this resource	
Subscription name 1+	Budgets		View the role assignments that grant access to this and other resources.	
Eng Azure ····	Advisor recommendations			
	Billing		View Learn more C*	
	තීද Partner information			
	Settings		View deny assignments	
< Previous. 1 V Next >	Programmatic deployment Resource groups		View the role assignments that have been denied access to specific actions at this scope.	

3. Click on the +Add tab and select Add custom role option. The Create a custom





role window is displayed.

Figure 28 : Add	custom r	ole window
-----------------	----------	------------

Home > Subscriptions > Eng Azure							
Subscriptions « A10 Networks	R Eng Azure Access	control (IAM)					>
+ Add	Search (Ctrl+/) «	🕂 Add 🞍 Download role assignment	s 🗄 Edit columns 💍 Re	efresh × Remove	Got feedback?		
View list of subscriptions for which you have role-based access control (REAC) permissions to manage Azure resources. To view	Overview Activity log	Add role assignment Add co-administrator	oles Roles (Preview)	Deny assignments	Classic administrators		
subscriptions for which you have billing access. click here	Access control (IAM)	Add custom role	ns. You can use the built-in ro	les or you can create you	ur own custom roles. Lear	n more 🖻	
Showing subscriptions in A10 Networks directory. Don't see a subscription?	🔷 Tags	Search by role name Ty	pe : All				
Switch directories	Diagnose and solve problems	Name	Туре	Isers	Groups	Service Principals	
My role U Status U R selected V 3 selected V	Security	🗌 🍰 Owner 🛈	BuiltinRole 1		0	0	
Apply	🗲 Events	Contributor 🛈	BuiltInRole 1	2	0	0	
Showing 1 of 2 subscriptions 🔽 global	Cost Management	🗌 🍰 Reader 🛈	BuiltInRole 0		0	0	
Show only subscriptions selected in the subscriptions filter ①	\$. Cost analysis	🔲 🍰 anagesh-ha ⊙	CustomRole 0		0	1	
P Search	Cost alerts	🗌 🍰 User Access Administrator 🛈	BuiltinRole 2		0	0	
Subscription name $\uparrow \downarrow$	Budgets	🔲 🍰 AcrDelete 💿	BuiltInRole 0		0	0	
Eng Azure ····	Advisor recommendations	🗌 🍰 Acr1mageSigner ⊙	BuiltInRole 0		0	0	
	Dilling	🗌 🍰 AcrPull 🔿	BuiltInRole 0		0	0	
	An Partner information	🗌 🍰 AcrPush ⊙	BuiltInRole 0		0	0	
	-X Partner information	🗌 🍰 AcrQuarantineReader 🛈	BuiltInRole 0		0	0	
	Settings	🗌 🍰 AcrQuarantineWriter 🛈	BuiltInRole 0		0	0	
	Programmatic deployment	🗌 🍰 AgFood Platform Service Adr	BuiltInRole 0		0	0	
< Previous 1 🗸 Next >	(*) Resource groups	🗌 🍰 AgFood Platform Service Cor	BuiltInRole 0		0	0	

4. Enter Customer role name and Description (optional).

Figure 29 : Create a custom role window

Home > Subscriptions >	> Eng Azure >		
Create a custo	m role		
Sot feedback?			
Basics Permissions	Assignable scopes JSON Review + create		
To create a custom role fo	or Azure resources, fill out some basic information. Learn more	đ	
Custom role name 🛈	acos-role	~	
Description	ACOS custom role		
Baseline permissions ①	Clone a role Start from scratch Start from	JSON	
Review + create	Previous Next		

5. Click on the **Next** button. The Permission window is displayed.



Figure 30 : Permission window

Home > Subscriptions > Eng Azur	re >			
Create a custom role	e			×
Sot feedback?				
Basics Permissions Assign	nable scopes JSON Review + create			
+ Add permissions + Exclude	e permissions			
Click Add permissions to select th To add a wildcard (*) permission, To exclude specific permissions fr	he permissions you want to add to this custom role. you must manually add the permission on the JSON tab. L rom a wildcard permission, click Exclude permissions. Learn	earn more d' nore d'		
Permission	↑↓ Description	↑↓ Permission type	†↓	Definitions
No permissions to display.				Management plane
	Add permi	ssions		Actions specify the operations that a role is allowed to perform. NotActions specify the operations that are excluded from the allowed Actions (this is useful if a role has wildcards). Data plane
]		DataActions specify the operations that a role is allowed to perform to the data within an object. NotDataActions specify the operations that are excluded from the allowed DataActions (this is useful if a role has wildcards).
				Wildcards (*) A wildcard (*) extends a permission to everything that matches the string you provide. To add a wildcard permission, use the JSON tab.
Review + create Previou	us Next			

- 6. Click on the **+Add Permissions** button to create a custom role.
- 7. Search for the permission to add the custom role.

For example, select **Microsoft Compute** from Add Permissions page.

Figure 31 : Add permission window

reate a custom role					
reate a custom role		Canada for manufactions to add to usual a	nation role. For example, example for "vistual era	achines" to find paramirrings seleted to vistor	Imaghinas
2 Got feedback?		Search for permissions to aud to your to	ustom role. For example, scarch nar virtuar mar	chines to find permissions related to virtual	machines.
		Microsoft Compute			
asics Permissions Assignable scopes + Add permissions + Exclude permissions	JSON Re	Azure Log Analytics Microsoft.Operationalinsights	Machine Learning Services Resource Pr ovider Enterprise-grade machine learning service to build and dening models	Microsoft AlSupercomputer Microsoft AlSupercomputer	Microsoft Azure Monitor Full observability into your applications, infrastructure, and network.
Click Add permissions to select the permissions yo To add a wildcard (*) permission, you must manual To exclude specific permissions from a wildcard pe	iu want to ade Ily add the pe ermission, clid		faster.		
Permission	↑↓ Dess	Microsoft Capacity	Microsoft ClassicCompute	Microsoft Cognitive Services	Microsoft Compute
No permissions to display.		Microsoft.Capacity	Microsoft.ClassicCompute	Add smart API capabilities to enable contextual interactions.	Access cloud compute capacity and scale on demand (such as virtual machines) and only pay for the resources you use.
		Microsoft Container Instance	Microsoft DataLakeAnalytics	Microsoft HybridCompute	Microsoft.Migrate
		Easily run containers on Azure without managing servers.	Distributed analytics service that makes big data easy.	Microsoft.HybridCompute	Easily discover, assess, right-size, and migrate your on-premises VMs to Azure.
		Microsoft.RecoveryServices Hold and organize backup data for			
		various Azure services such as laaS VMs (Linux or Windows) and Azure SQL			

The Microsoft Compute permission window is displayed.

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Figure 32 : Microsoft Compute permissions window

nome / subscriptions / thg Azure /	Microsoft.Compute permissions	
Create a custom role		
	CAll resource providers	
Sot feedback?	Search for permissions to add to your custom role. For example, search	for "virtual machines" to find permissions related to virtual machines.
	Microsoft Compute	
Basics Permissions Assignable scopes JSON Re	Actions Data Actions	
+ Add permissions + Exclude permissions	Permission	Description
Click Add permissions to select the permissions you want to ada To add a wildcard (*) permission, you must manually add the pe To exclude specific permissions from a wildcard permission, clic	V Microsoft.Compute	
Permission ↑↓ Desc	Other : Register Subscription for Compute ①	Registers Subscription with Microsoft/Compute resource provider
No permissions to display.	Cther : Unregister Subscription for Compute 💿	Unregisters Subscription with Microsoft Compute resource provider
	✓ Microsoft.Compute/availabilitySets	
	Plead : Get Availability Set ①	Get the properties of an availability set
	Vivite : Create or Update Availability Set ①	Creates a new availability set or updates an existing one
	Celete : Delete Availability Set	Deletes the availability set
	✓ Microsoft.Compute/availabilitySets/vmSizes	
	Read : List Virtual Machine Sizes for Availability Set ①	List available sizes for creating or updating a virtual machine in the availability set
	✓ Microsoft.Compute/operations	
	Read : List Available Compute Operations	Lists operations available on Microsoft.Compute resource provider

- 8. Select the **Permission** check box(es) and click **Add** button.
- 9. To add **Microsoft Network** from Add Permissions page, click on the **+Add Permissions** on Create a custom role page.

Figure 33 : Create a custom role - Add permissions

ome > Subscriptions > Eng Azure >				
Got feedback?				
Basics Permissions Assignable scopes JSON + Add permissions + Exclude permissions	Review + create			
Click Add permissions to select the permissions you wan To add a wildcard (*) permission, you must manually add To exclude specific permissions from a wildcard permissi	t to add to this custom role. I the permission on the /SON tab. Learn more G on, click Exclude permissions. Learn more G			
Permission 14	Description †↓	Permission type	Ť↓	Definitions
Microsoft.Compute/register/action	Registers Subscription with Microsoft.Compute resou	Action	自	Management plane
Microsoft.Compute/unregister/action	Unregisters Subscription with Microsoft.Compute res	Action	8	Actions specify the operations that a role is allowed to perform. NotActions specify the operations that are excluded
Microsoft.Compute/availabilitySets/read	Get the properties of an availability set	Action	8	from the allowed Actions (this is useful if a role has wildcards).
Microsoft.Compute/availabilitySets/write	Creates a new availability set or updates an existing	Action	R	Data plane
Microsoft.Compute/availabilitySets/delete	Deletes the availability set	Action	8	DataActions specify the operations that a role is allowed to perform to the data within an object. NotDataActions specify
Microsoft.Compute/availabilitySets/vmSizes/read	List available sizes for creating or updating a virtual	Action	8	the operations that are excluded from the allowed DataActions (this is useful if a role has wildcards).
Microsoft.Compute/operations/read	Lists operations available on Microsoft.Compute reso	Action	8	Wildcards (*)
Microsoft.Compute/capacityReservationGroups/read	Get the properties of a capacity reservation group	Action	8	A wildcard (") extends a permission to everything that
Microsoft Compute/capacityReservationGroups/write	Creates a new capacity reservation group or updates	Action	8	use the JSON tab.
Microsoft.Compute/capacityReservationGroups/delete	Deletes the canacity reservation group	Action	\$	

10. Search and select **Microsoft Network** from Add Permissions page.



Figure 34 : Add permissions - Microsoft Network page

Create a custom role	Add permissions			ани ону раутот инстероится уси кре.
Got feedback?				
Basics Permissions Assignable scopes JSON R + Add permissions + Exclude permissions	Microsoft Container Instance Easily run containers on Azure without managing servers.	Microsoft Container Service Accelerate your containerized application development without compromising security.	Microsoft ContainerRegistry Store and manage container images across all types of Azure deployments.	Microsoft Data Factory Hybrid data integration at enterprise scale, made easy.
Click Add permissions to select the permissions you want to To add a wildcard (*) permission, you must manually add thy	adi e pe			
To exclude specific permissions from a wedcard permission, Permission ↑ L D	clic Microsoft Databricks Fast, easy, and collaborative Apache Spark-based analytics platform.	Microsoft DataLakeAnetytics Distributed analytics service that makes big data eary.	Microsoft DataLakeStore Highly scalable and cost-effective data lake solution for big data analytics.	Microsoft DB for MariaDB Managed MariaDB database service for app developers.
Microsoft.Compute/register/action R	egis			
Microsoft.Compute/unregister/action U	Inne			
Microsoft.Compute/availabilitySets/read 6	et t Microsoft DB for MySQL	Microsoft DB for PostgreSQL	Microsoft DevTest Labs	Microsoft DocumentDB
Microsoft.Compute/availabilitySets/write C	reat Managed MySQL database service for	Managed PostgreSQL database service	Quickly create environments using	A NoSQL document database-as-
Microsoft.Compute/availabilitySets/delete D	app developers,	tor app developers.	reusable templates and artifacts.	a-service.
Microsoft.Compute/availabilitySets/vmSizes/read	ist a			
Microsoft.Compute/operations/read	sts Microsoft Key Vault	Mirrosoft Network	Microsoft Security	Microsoft SOL Database
Microsoft.Compute/capacityReservationGroups/read G	et t Safeguard and maintain control of keys	Connect cloud and on-premises	Protect your enterprise from advanced	Managed, intelligent SQL in the cloud.
Microsoft.Compute/capacityReservationGroups/write C	and other secrets.	infrastructure and services to provide your customers and users the best	threats across hybrid cloud workloads.	
Microsoft.Compute/canacityReservationGroups/delete D	ielet			

11. Select the **Permission** check box and click **Add** and **Review + create**.

Figure 35 : Microsoft Network permissions window

to your custom role. For example, search for "virtual machines" to find permissions related to virtual machines.
to your custom role. For example, search for "virtual machines" to find permissions related to virtual machines. Description
Description
Description .
Description
Registers the subscription
O Unregisters the subscription
ame Availability ① Checks the availability of a Traffic Manager Relative DNS name.
alias target ① DNS alias resource notification
vendencies (i) DNS alias resource dependency request
Joor name is available ① Checks whether a Front Door name is available
rres Internal APIs 🕥 Executes Private DNS Zones Internal APIs
onGateways
Gets an application gateway
Constant as application astrony Constant as application astrony
acon cateway C

The **Create a custom role** confirmation window is displayed.



lome > Subscript Create a cu	reate a custom role					
Got feedback?	1					
ou have successfu	fully created the custom role "acos-role" It may take the system a few minutes to display your role everywhere.					
Role name	acos-role					
Role description	ACOS custom role					
Permissions						
Action	Microsoft.Compute/register/action					
Action	Microsoft:Compute/unregister/action					
Action	Microsoft.Compute/availabilitySets/read					
Action	Microsoft.Compute/availabilitySets/write					
Action	Microsoft.Compute/availabilitySets/delete					
Action	Microsoft.Compute/availabilitySets/vmSizes/read					
Action	Microsoft.Compute/operations/read					
Action	Microsoft.Compute/capacityReservationGroups/read					

- 12. Click **OK** to successfully create the custom role with permissions.
 - **NOTE:** It may take the system a few minutes to display your role everywhere.

Register a Service Application

To register a service application, perform the following steps:





1. Navigate to the **Home > Services > Azure Active Directory** option.

Figure 30 Azure Active Directory page	Figure 3	36 : Azure	Active	Directory	page
---------------------------------------	----------	------------	--------	-----------	------

≡ Microsoft Azure		>	× Þ] 🗣	Φ	☺ ?
Azu	Services	Marketplace Active Directory Domain Deployment IaaS Active Directory Domain Controller 2016	See all			
Ret	c Activity log v Security Administrative units Automanage – Azure machine best practices	Active Directory Domain Controller on Windows 2016 Active Directory Domain Controller on Windows 2019 Documentation Azure Active Directory documentation Microsoft Docs	See all	ire Databa PostgreS.	ise 	More services
Nam •	Resources Name No results were found.	What is Azure Active Directory? - Azure Active Directory Create and manage Active Directory connections for Azure Compare Active Directory to Azure Active Directory Resource Groups		ist Viewed minutes a days ago	d go	
9 (9) (9) (9) (9) (9) (9) (9) (9) (9) (9	Didn't find what you were looking for? Didn't find what you were looking for? Try searching in Activity Log Try searching in Azure Active Directory Searching 1 of 2 subscriptions. anagesh-wnit	No results were found. Virtual machine		days ago days ago days ago days ago days ago 7 days ago		
	server-1	Virtual machine Resource group	1	7 days ago 7 days ago		
Q	a10-1 client-side-a10-2	Virtual machine Network interface	a 7	7 days ago a week ago		

2. On the Azure Active Directory page, click on the **App registrations** menu option from the left panel. The App registration window to register an application is displayed.

Figure 37 : App registrations window

Home > A10 Networks				
A10 Networks Ap	p registrations 💉 …			×
	+ New registration 🕀 Endpoints 🧷 Troubleshooting 🛓 Dor	wnload 🔢 Preview features 🛛 💝 Got feedback?		
Overview				
of Getting started	The cut the year days realitations search provided Click to proble the o	minu -		×
Preview features	 Ty out one new rep registrations search preview. Circle to enable the p 	icaim		
X Diagnose and solve problems Manage	Starting June 20th, 2020 we will no longer add any new features to Azx will no longer provide feature updates. Applications will need to be up	re Active Directory Authentication Library (ADAL) and Azure AD Graph. We will continu graded to Microsoft Authentication Library (MSAL) and Microsoft Graph. Learn more	e to provide technical support a	and security updates but we $^{\times}$
L Users				
🚨 Groups	All applications Owned applications Deleted applications (Preview)		
External Identities	Start typing a name or Application ID to filter these results			
2. Roles and administrators				
Administrative units	Display name	Application (client) ID	Created on	Certificates & secrets
Enterprise applications	anageshsapp		3/31/2021	Current
Devices	servicep		4/12/2021	3-
R App registrations				
Identity Governance				
Application proxy				
🔓 Licenses				
Azure AD Connect				
Custom domain names				

3. Click on the **+New Registration** tab. The Register an application window is



displayed.

Figure 38 : Register an application window

Home > A10 Netw	orks >				
Register an	application				
* Name					
The user-facing displ	ay name for this application (this can be changed later).				
acos-sapp	√				
Supported accou	nt types				
Who can use this app	dication or access this API?				
 Accounts in this 	Accounts in this organizational directory only (A10 Networks only - Single tenant)				
🔿 Accounts in any organizational directory (Any Azure AD directory - Multitenant)					
O Accounts in any	organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)				
O Personal Micros	oft accounts only				
Help me choose					
Redirect URI (opt	ional)				
We'll return the auth changed later, but a	entication response to this URI after successfully authenticating the user. Providing this now is optional and it can be value is required for most authentication scenarios.				
Web	✓ e.g. https://example.com/auth				
-					
By proceeding, you a	gree to the Microsoft Platform Policies (2)				
Register					

- 4. Enter the **Name** of the application. For example, acos-sapp.
- 5. Click on the **Register** button to register the application. The application gets displayed in the list of Azure Active Directory Apps registrations window.

Associate Service Application with a Role

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

 Navigate to the Home > Subscriptions > Registered Subscription Name > Access control (IAM).

The Subscription > Access control (IAM) window is displayed.



Figure 39 : Subscription - Access control (IAM) window

Subscriptions « A10 Networks	R Eng Azure Acces	s control (IAM)	
+ Add	Search (Ctrl+/)	ĸ 🕂 Add 🛓 Download role assignments 💷 Edit columns 💍) Refresh 🗙 Remove 💝 Got feedback?
View list of subscriptions for which you have role-based access control (REAC) permissions to manage Azure resources. To view	Overview Activity log	Check access Role assignments Roles Roles (Preview)	Deny assignments Classic administrators
subscriptions for which you have billing access, click here	Access control (IAM)	My access	
Showing subscriptions in A10 Networks directory. Don't see a subscription?	🔷 Tags	View my level of access to this resource.	Grant access to this resource
Switch directories	Diagnose and solve problems	View my access	Grant access to resources by assigning a role.
My role Status B selected V Apply	 Security Events 	Check access Review the level of access a user, group, service principal, or managed identity has to this resource. Learn more S	
Showing 1 of 2 subscriptions 🔽 global	Cost Management	Find O	Add role assignments Learn more 🖻
subscriptions filter O	\$. Cost analysis	User, group, or service principal 🗸 🗸	
P Search	Cost alerts	Search by name or email address	View access to this resource
Subscription name ↑↓	Budgets		View the role assignments that grant access to this and other resources.
Eng Azure ***	Advisor recommendations		
	Billing		View Learn more p?
	PR, Partner information		
	Settings		View deny assignments
	Programmatic deployment		View the role assignments that have been denied
Drandous A. Mart	(.) Resource groups		access to specific actions at this scope.

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

Figure 40 : Add a role assignment -1

Access o	control (IAM)		Add role assignment
a	+ Add 🞍 Download role assignments 🔠 Edit columns 🔘	Refresh 🗙 Remove 🗢 Go	Role () acos-role () ~
^	Check access Role assignments Roles Roles (Preview)	Deny assignments Classic ad	Assign access to ① User, group, or service principal V
blems	My access View my level of access to this resource. View my access	Grant access to this resou Grant access to resources by as	Select () acos ACOS
	Check access Review the level of access a user, group, service principal, or managed identity has to this resource. Learn more of Find	Add role assignments	ACOS-sec acos, visibility-DL acos, visibility/@a10network
	User, group, or service principal V Search by name or email address	View access to this resou View the role assignments that other resources.	acosdev-build1 ~ Selected members:
s		View	Remove
nt		View deny assignments View the role assignments that access to specific actions at this	Save

3. Select a **Role** from the drop-down list. For example, acos-role.



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

Create Certificate and Secrets

To create certificate and secrets for the assigned role, perform the following steps:

1. Navigate to the Home > Services > Azure Active Directory option.

Microsoft Azure	P Active Directory	>	< 2	1 6 7 0	
Azu	Services Azure AD Privileged Identity Management Azure Active Directory Active Interview	Marketplace Active Directory Domain Deployment IaaS Active Directory Domain Controller 2016 Active Directory Domain Controller 2016	See all	0	Ļ
Reci	Activity (og) Security Administrative units Administrative units Administrative units Activity Autorsanage – Azure machine best practices Resources	Active Directory Domain Controller on Vendova 2010 Active Directory Domain Controller on Windows 2019 Documentation Acure Active Directory documentation Microsoft Docs Web Is Acros Active Directory	See all	ire Database PostgreS	More services
Name † 1 Qu s	No results were found.	Create and manage Active Directory connections for Azure Compare Active Directory to Azure Active Directory Resource Groups No results were found.		ast Viewed minutes ago days ago days ago	
(*) . (*) . (*) . (*) .	Didn't find what you were leading for? Thy searching in Activity Log Try searching in Azure Active Directory Searching 1 of substriptions.	Vistad metrics		days ago days ago days ago days ago	
P = =	neer-1	Virtual machine Berguste conum		/ days ago	
10 al	eyeer _ re_iereering 0-1 ent-side-a10-2	Virtual machine Network interface	53 54	7 days ago a week ago	

Figure 41 : Azure Active Directory - Overview page

2. On the Azure Active Directory - Overview page, click on the **App registrations** menu option from the left panel. The App registration window with a registered application(s) is displayed.



Figure 42 : App registrations - Overall applications window

A10 Networks Ap	op registrations 🖉 …			>
Overview	K + New registration ⊕ Endpoints ✓ Troubleshooting ↓	Download 🐻 Preview features 🛛 🛇 Got feedback?		
of Getting started	Try out the new Ann resistrations search remieval (lick to enable	the newsine ->		×
Preview features	The part and their reply register and the protocol strategy of the second secon	ue preview>		
X Diagnose and solve problems				×
Manage	Starting June 30th, 2020 we will no longer add any new features to will no longer provide feature updates. Applications will need to	> Azure Active Directory Authentication Library (ADAL) and Azure AD Graph. We will contin be upgraded to Microsoft Authentication Library (MSAL) and Microsoft Graph. Learn more	we to provide technical support a	ind security updates but we
👗 Users				
A Groups	All applications Owned applications Deleted application	ons (Preview)		
🚺 External Identities	P Start typing a name or Application ID to filter these results			
2. Roles and administrators				
Administrative units	Display name	Application (client) ID	Created on	Certificates & secrets
Enternaire anofications	anageshsapp		3/31/2021	Current
enterprise applications	2 servicep		4/12/2021	
Devices				
Chebproce approximations Devices App registrations	acos-sapp		4/12/2021	54
Devices App registrations Jidentity Governance	acos-sapp		4/12/2021	
	acos-sapp		4/12/2021	
	< acos-sapp.		4/12/2021	a.
Appregistrations Appregistrations Apregistrations Apregistrations Aplication proxy Licenses Azure AD Connect	< acos-sapp.		4/12/2021	

- 3. Select a service application from list of applications. The selected service application window is displayed.
- 4. Select the **Certificates & secrets** option from the left Manage navigation pane. The acos sapp - Certificates & secrets window is displayed.
- 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.

Home > A10 Networks > acos-sapp	0			Add a client secret		×
Search (Ctrl+/)	Got feedback?			Description	acos-csec	
Overview Ouickstart Integration assistant Manage	Certificates Certificates can be used as secrets to prove the a	pplication's identity when requesting	a token. Also can be referred t	Expires	Recommended: 6 months	~
 Branding Authentication 	T Upload certificate	Start date	Expires			
Certificates & secrets Token configuration	No certificates have been added for this applicat	ion.				
AP permissions Expose an AP1 Expose an AP1 Expose an AP1 App roles Account of the AP1 Aprice Annihist Annihist Support + Troubleshoosing	Client secrets A secret string that the application uses to prove + New client secret Description No client secrets have been created for this appli	Its identity when requesting a token. Expires Value cation.	Also can be referred to as app			
Troubleshooting New support request				Add Cancel		

Figure 43 : Add a client secret window



6. Enter the New client secret **Description**, **Expires** value. The entered value is displayed on the acos-Certificates & secrets window.

Figure 44 : acos-sapp Certificates & secrets window

Home > A10 Networks > acos-sapp						
💡 acos-sapp Certific	ates & secrets 👒 …					
Search (Ctrl+/) «	🗢 Got feedback?					
 Overview Quickstart Integration assistant Manage 	Certificates Certificates can be used as secrets to	prove the application's identity	when requesting a toke	n. Also can be referred t	o as public keys.	
E Branding	Upload certificate					
Authentication	Thumbprint		Start date	Expires	ID	
Certificates & secrets	No certificates have been added for	this application.				
Token configuration API permissions Expose an API	Client secrets					
App roles	A secret string that the application u	ses to prove its identity when re	questing a token. Also c	an be referred to as appl	lication password.	
Owners Roles and administrators Pre	+ New client secret Description	Expires	Value		ID	
Support + Troubleshooting	acos-csec	10/12/2021			D	0
P Troubleshooting						
New support request						

NOTE:

Copy the new client secret value, as it is not visible once the page is refreshed.

Collect Azure Access Key

To collect Azure access keys, perform the following steps:



1. Navigate to the **Home > Azure Active Directory - App registrations**.

Figure 45 : App registrations - Azure Active Directory window

Home > A10 Networks				
A10 Networks Ap	p registrations 🖈 …			×
Overview	+ New registration 🌐 Endpoints 🤌 Troubleshooting 🛓 Downlo	oad 🐻 Preview features 🛛 🛇 Got feedback?		
of Getting started	The set the new Ann periodications search remained (first to enable the new)			×
Preview features	 Try out the new App registrations search preview; click to enable the previous 	cn7		0004
X Diagnose and solve problems Manage	Starting June 30th, 2020 we will no longer add any new features to Azure A will no longer provide feature updates. Applications will need to be upgra	ctive Directory Authentication Library (ADAL) and Azure AD Graph. We will contin ded to Microsoft Authentication Library (MSAL) and Microsoft Graph. Learn more	ue to provide technical support a	and security updates but we \times
L Users				
🚨 Groups	All applications Owned applications Deleted applications (Pre	view)		
External Identities	P Start typing a name or Application ID to filter these results			
🝰 Roles and administrators				
Administrative units	Display name	Application (client) ID	Created on	Certificates & secrets
Enterprise applications	anageshsapp		3/31/2021	Current
Devices	z servicep		4/12/2021	2
App registrations	Ac acos-sapp		4/12/2021	0
Identity Governance				
Application proxy				
Licenses				
Azure AD Connect				
Custom domain names				

2. Select service application from the list of applications. The selected service application page is displayed.

Figure 46 : Selected Service application window

Home > A10 Networks >				
acos-sapp 🖈 …				
Search (Ctrl+/)	📋 Delete 🜐 Endpoints	s 📴 Preview features		
Overview	Display pame	acos, cano D	Supported account	Mu organization only
di Quickstart	Application (client) ID :	acos-saph 4	Redirect URIs	: Add a Redirect URI
💉 Integration assistant	Directory (tenant) ID :		Application ID URI	: Add an Application ID URI
Manage	Object ID :	dd7e5272-70c5-4b2c-a6c3-3dd3199862	Se Managed applicatio	n in I : acos-sapp
Eranding	Ctasting has 20th	2020 we will be been and any new features	to Amon Active Directory Authentication Library (ADA1) and Amor	AD Graph We will continue to provide technical support and co
Authentication	but we will no longe	er provide feature updates. Applications wil	need to be upgraded to Microsoft Authentication Library (MDAL) and AZUr Need to be upgraded to Microsoft Authentication Library (MSAL)	and Microsoft Graph. Learn more
Certificates & secrets	care and pro-			
Token configuration	Get started Docum	entation		
API permissions		B. 114		
Expose an API		Build your	application with the Microsoft	identity platform
K App roles		The Microsoft identity platform is	an authentication service, open-source libraries, and applicat	ion management tools. You can create modern,
A Owners		standards-based authentic	ation solutions, access and protect APIs, and add sign-in for y	our users and customers. Learn more a
Roles and administrators Pre				
Manifest	A A A A A A A A A A A A A A A A A A A		1 in	
Support + Troubleshooting	X	a 🔍 🔶 👝		•
Troubleshooting				
New support request v	Call APIs		Sign in users in 5 minutes	Configure for your organization

3. Copy the Client ID, Tenant ID from the service application page.

client_id= 'cc4c86xx-65b3-48xx-a3xx-610cxxxxxxx'



tenant id= '91d27axx-8cxx-41xx-82xx-3d1bxxxxxxx'

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

Figure 47 : Subscriptions window

Home > Subscriptions 🖉 …					
+ Add					
View list of subscriptions for which you have Showing subscriptions in A10 Networks direc My role ①	role-based access control (RBAC) permissions to manage Azure trory. Don't see a subscription? Switch directories	resources. To view subscriptions for which you have Status ①	e billing access, click here		
8 selected		✓ 3 selected			~
Apply Showing 1 of 2 subscriptions Show only	subscriptions selected in the global subscriptions filter \odot				
Apply Showing 1 of 2 subscriptions V Show only P Search Subscription name 1	subscriptions selected in the global subscriptions filter O Subscription ID 14	My role ↑↓	Current cost	Status ↑↓	

5. Create a text file with as subscription, client_id, client_secret and tenant_id as shown below:

```
subscription='07d34bxx-61xx-47xx-abxx-006bxxxxxxx'
client_id='cc4c86xx-65xx-48xx-a3xx-610cxxxxxxx'
client_secret='G0x_hVDzZxxxx-o1Vsw.xxxx.Zxxxx-xx'
tenant_id='91d2xxxx-8xxe-41xx-82xx-3d1bxxxxxxx'
```

Importing Azure Access Key

Each vThunder instance requires a copy of the Azure Access key. The recommended method of importing the Azure Access key by using any of the file transfer methods.

Perform the following steps.

- 1. Log into the vThunder instance.
- 2. Go to the config mode.

```
vThunder>enable
Password:
vThunder#config
```

3. Go to the admin mode.



```
vThunder(config)#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.

<pre>vThunder(config-admin:admin)#azure-cred import ?</pre>					
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:				
	<pre>ftp://[user@]host[:port]/file)</pre>				
scp:	Remote file path of scp: file system(Format:				
	<pre>scp://[user@]host/file)</pre>				
sftp:	Remote file path of sftp: file system(Format:				
	<pre>sftp://[user@]host/file)</pre>				

To delete the key, use the following command:

```
azure-cred delete
```

5. Verify the imported Azure Access keys by below mentioned 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 = 'dfe16a52-556b-428a-a168-91767a54c0Ce'
client_id = 'b8d52c6f-0c65-460d-bafd-e03cc942aa66'
secret = 'bVcK_XGEd9u00r+M2Css=fmCL?8bf-0b'
tenant = 'le94d773-1e01-442d-b25d-3b3e1b64948d'
vThunder-Active(config-admin:admin)(NOLICENSE)#
```

Azure HA Architecture

Configuring of HA for vThunder instances in Microsoft Azure is supported only for the same availability zone. In a sample HA architecture, create two vThunder



instances. Both the vThunder instances require at least one management interface and one data interface. To achieve HA the following configurations are required:

- For the active vThunder only, a secondary IP address for the client-facing data interface is reassigned. Select the reassignment option to create the secondary IP address. This secondary IP address is then assigned to a standby VM during fail-over without un-assigning it from the active vThunder.
- Assign the public IP address to the management interface and to the secondary IP address assigned to the data interface (VIP). Also, assign the public IP address to the management IP address of the standby vThunder.
- Additionally, each vThunder instance requires a copy of the Azure Access key. For more information, see "<u>Importing Azure Access Key</u>."
- NOTE: In ACOS 5.2.1-P7 and later releases, the ip control-apps-use-mgmtport command controls the outgoing interface for vThunder device API calls. If this command is enabled, API uses the management interface. Otherwise, it uses the data interface. In the previous releases, the outgoing interface used the route settings for API calls.

The following is an architectural representation of the HA architecture and how the migration happens from an active HA instance to a standby HA instance.

In the figure, for the red box, which is the data port of the active vThunder, there is also a secondary IP address assigned, and the FIP is mapped to the secondary IP address. The VIP is a logical name for these IP addresses



Figure 48 : Azure HA Architecture



Configuring HA

The example discussed in this section uses two vThunder for HA. Each vThunder instance is configured to run a simple SLB configuration. Make appropriate changes in the steps if the vThunder is running a different configuration.

Perform the following steps:

- Create two vThunder in a VNET.
 Each vThunder must have one management interface and one or more data interfaces.
- 2. Launch two vThunder on Azure cloud. Each of this vThunder should have one management interface, one VRRP interface, and one or more data interfaces.
- 3. Complete the SLB configuration on both the vThunder instances.
- 4. Configure both vThunder to have unicast VRRP. One vThunder will be inactive state and other in a standby state after VRRP configuration as:



For example,

```
Running config on vThunder-1:
!
vrrp-a common
  device-id 1
  set-id 1
  enable
T.
terminal idle-timeout 0
interface management
  ip address dhcp
1
interface ethernet 1
 enable
 ip address dhcp
interface ethernet 2
 enable
 ip address dhcp
vrrp-a vrid 0
  floating-ip 10.22.3.99
vrrp-a peer-group
 peer 10.22.2.7
 peer 10.22.2.8
L
slb server s1 10.22.3.6
 port 80 tcp
    health-check-disable
slb service-group sg1 tcp
 health-check-disable
 member s1 80
slb virtual-server vip 10.22.2.99
 port 80 http
```



```
source-nat auto
service-group sgl
!
!
end
```

Running config on vThunder 2:

```
1
vrrp-a common
 device-id 2
 set-id 1
 enable
terminal idle-timeout 0
!
interface management
 ip address dhcp
interface ethernet 1
 enable
 ip address dhcp
1
interface ethernet 2
 enable
 ip address dhcp
!
vrrp-a vrid O
 floating-ip 10.22.3.99
1
vrrp-a peer-group
 peer 10.22.2.7
 peer 10.22.2.8
1
ip route 169.254.169.254 /32 10.22.1.0
1
slb server s1 10.22.3.6
port 80 tcp
```



```
health-check-disable
!
slb service-group sg1 tcp
health-check-disable
member s1 80
!
slb virtual-server vip 10.22.2.99
port 80 http
source-nat auto
service-group sg1
!
!
end
```

- Configure virtual IP address (VIP) on client-facing interface of active vThunder. Configure floating IP address (FIP) on server facing interface of active vThunder. Both IP addresses are private. To configure IP, apply the following steps:
 - a. Navigate to Azure portal. Select **network interface** which is client-facing.
 - b. Select the Ip configurations option from sidebar menu options.
 - c. Click **+Add** to add the VIP configuration which is mentioned in vThunder configuration. For outside traffic, attach public IP address. It will show the option to "enable" public IP address while creating a VIP configuration.
 - d. For floating IP, select **network interface** which is server facing and follow the same procedure mentioned in step b and c.
- 6. Configure public IP address to the client-facing VIP interface.
 - NOTE:While creating the VIP configuration from portal, you can enable
public IP address for VIP configuration and attach Public IP address
(if you have already created) if not then created new one and attach
- 7. Pass Data traffic through the active vThunder at this stage. Also, all the HTTP sessions needs to be synced on standby vThunder.
- 8. Run vrrp-a config sync command to sync the configuration between both vrrpa neighbors as:

vThunder-Active(config)(NOLICENSE)#configure sync all <mgmt-ip-address>



```
User name []?admin
Password []?
vThunder-Active(config)(NOLICENSE)#sh log
Log Buffer: 30000
Jun 13 2019 08:27:58 Notice
                                 [CLI]:Configuration sync to 10.22.1.8
succeeded
Jun 13 2019 08:27:56 Notice
                                 [CLI]:HA SYNC : prepare to send
Jun 13 2019 08:27:56 Notice
                                 [CLI]:HA SYNC : prepare completely
Jun 13 2019 08:27:56 Info
                                 [CLI]:CONFIG SYNC: prepare to send
sync package
Jun 13 2019 08:27:56 Info
                                 [CLI]:CONFIG SYNC : uuid file for
startup config [/a10data/etc/.startup-config.pri.uuid]
Jun 13 2019 08:27:56 Info
                                 [CLI]:copy startup configuration for
HA sync
Jun 13 2019 08:27:56 Info
                                 [CLI]:copy running configuration for
HA sync
Jun 13 2019 08:27:56 Info
                                 [CLI]:CONFIG SYNC : partition (shared)
Jun 13 2019 08:27:56 Info
                                 [CLI]:CONFIG SYNC : Start to prepare
Jun 13 2019 08:27:56 Info
                                 [CLI]:CONFIG SYNC: whole sync
Jun 13 2019 08:27:56 Info
                                 [SYSTEM]: config sync for partition
(shared)
```

- 9. Initiate "failover." After fail-over, the new **Active** vThunder process the VIP, FIP and public IP addresses, by following step:
 - a. Perform "vrrp-a force-self-standby enable" on active vThunder.
 - b. Verify active becomes a new standby and old standby becomes new active.
 - c. Verify migration is under process by checking the ip configuration of interfaces from Azure portal.
- 10. To verify the configuration use show run command to shows configuration on active and standby vThunder as:

Basic Configuration For Azure HA: Running config on vThunder1:

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



```
!
terminal idle-timeout 0
!
interface management
 ip address dhcp
T.
interface ethernet 1
 enable
 ip address dhcp
interface ethernet 2
 enable
 ip address dhcp
vrrp-a vrid O
 floating-ip 10.22.3.99
vrrp-a peer-group
 peer 10.22.2.7
 peer 10.22.2.8
slb server s1 10.22.3.6
 port 80 tcp
   health-check-disable
slb service-group sg1 tcp
 health-check-disable
 member s1 80
slb virtual-server vip 10.22.2.99
 port 80 http
   source-nat auto
   service-group sgl
!
!
end
```

Running config on vThunder 2:

!



```
vrrp-a common
 device-id 2
 set-id 1
  enable
terminal idle-timeout 0
interface management
 ip address dhcp
interface ethernet 1
 enable
 ip address dhcp
interface ethernet 2
 enable
 ip address dhcp
1
vrrp-a vrid O
  floating-ip 10.22.3.99
1
vrrp-a peer-group
 peer 10.22.2.7
 peer 10.22.2.8
1
ip route 169.254.169.254 /32 10.22.1.0
1
slb server s1 10.22.3.6
 port 80 tcp
   health-check-disable
slb service-group sg1 tcp
 health-check-disable
 member s1 80
1
slb virtual-server vip 10.22.2.99
 port 80 http
    source-nat auto
   service-group sgl
```





! ! end

If VM is deployed on Azure before 01/08/2019, then the following configuration for vThunder is mandatory to work with a service principal.

For example, Static Route:

ip route 168.63.129.16 /32 <mgmt g/w>

This chapter describes how to configure vThunder for Microsoft Azure.

The following topics are covered:

Configuring DHCP and the VIP in vThunder	68
Changing the VM Size	68
Changing the Disk Size	68
Adding More NICs by Using the Azure CLI	69
Deleting NICs by Using the Azure CLI	69
Initial vThunder Configuration	70
Configuring One Arm Mode SLB vThunder on Azure	72
Configuring a Multiple-Interface vThunder on Azure as an SLB	73





Configuring DHCP and the VIP in vThunder

- 1. SSH to the IP address of the vThunder instance.
- 2. Use the following CLI commands to force the interface to use the IP assigned by DHCP.

The following commands are required, and if not entered properly, other SLB-related commands may fail.

```
interface ethernet 1
ip address dhcp
```

NOTE:

Do not use the **"no ip address dhcp"** command or you will lose your SSH connection to vThunder. The workaround for a lost connection is to restart the vThunder instance.

Changing the VM Size

You can change the size of a vThunder VM by using either the Windows Azure Management Portal or Power Shell commands. The size of a virtual machine determines the vCPUs, RAM size, data disks, IOPS value, and so on for the VM.

For information on changing VM sizes, refer to Resize a Linux virtual machine using CLI 2.0 at <u>https://docs.microsoft.com/en-us/azure/virtual-machines/linux/change-vm-size</u>.

Changing the Disk Size

You can expand the existing data storage of a vThunder VM. The default virtual hard disk size is 30 GB. It can be expanded upto 2048 GB.

NOTE: Once the disk is expanded, it cannot shrink.

For information on changing disk size, refer to <u>https://docs.microsoft.com/en-us/azure/virtual-machines/windows/expand-os-disk</u>


Adding More NICs by Using the Azure CLI

You can add more NICs to a vThunder VM, if the VM size supports the NICs. If your vThunder VM does not support more NICs, you can change the VM size as described in <u>Changing the VM Size</u> and then add more NICs. For more information, refer to <u>https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-network-interface-vm</u>.

1. To add a NIC to an existing vThunder instance, first deallocate and shutdown the VM:

```
az vm deallocate --resource-group testResourceGroup --name vThunderVM
az vm stop --resource-group testResourceGroup --name vThunderVM
```

2. Add the NIC with the az vm nic add command.

```
az vm nic add \
--resource-group testResourceGroup \
--vm-name vThunderVM\
--nics myNic3
```

3. Start the VM with the following command:

az vm start --resource-group testResourceGroup --name vThunderVM

Deleting NICs by Using the Azure CLI

Before you delete a NIC from a vThunder instance, ensure that the VM is stopped and that there are at least two network interfaces attached to the VM. If you remove a primary network interface, Azure assigns the primary attribute to the network interface connected the longest to the VM. For more information, refer to https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-network-interface-vm.

1. To remove a NIC from an vThunder VM, first deallocate and stop the VM as follows:

az vm deallocate --resource-group testResourceGroup --name vThunderVM
az vm stop --resource-group testResourceGroup --name vThunderVM



2. Remove the NIC with the az vm nic remove command.

```
az vm nic remove \
    --resource-group testResourceGroup \
    --vm-name vThunderVM \
    --nics myNic3
```

3. Start the VM with the following command:

```
az vm start --resource-group testResourceGroup --name vThunderVM
```

Initial vThunder Configuration

This section describes how to configure IP connectivity on the vThunder management and data interfaces.

NOTE: To display a list of commands for a level of the CLI, enter a question mark as (?), and press **Enter**. It displays the list separately for each level. For syntax help, enter a command or keyword followed by a "space", then enter (?), then press **Enter**.

Login via ACOS CLI

- 1. Log into vThunder with the default **Username** and **Password** or the **ssh key-pair associated** with this instance.
- Enable the Privileged EXEC level by typing enable and pressing the Enter key. There is no default password for Privileged EXEC mode; just press Enter.

vThunder>enable

```
Password:(just press Enter on a new system)
vThunder#
```

3. Enable the configuration mode by typing config and pressing Enter.

vThunder#config

vThunder(config)#

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It is strongly suggested that a Privileged EXEC enable password be set up as follows:

vThunder(config) #enable-password newpassword

Changing the Admin Password

A10 Networks recommends that you change the admin password immediately for security.

```
vThunder(config)#admin admin password newpassword
vThunder(config-admin:admin)#
```

The vThunder is now network accessible for configuration under the new IP address and admin password.

Saving the Configuration Changes – write memory

Configuration changes must be saved to system memory to take effect the next time the vThunder is powered on. Otherwise, the changes are lost if the vThunder virtual machine or its host machine are powered down.

To write the current configuration to system memory:

```
vThunder(config) # write memory
Building configuration...
[OK]
```

Additional Resources – Where to go from here?

After you have logged into the vThunder GUI or CLI, you may be in need of some assistance to configure the device. More information can be found in the latest ACOS Release Notes. This document has a list of new features, known issues, and other information to help get you started.

It is recommended to use the basic deployment instructions that appear in the System Configuration and Administration Guide that is available on the <u>A10</u><u>Networks support</u> site.

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Azure Setup

Configuring One Arm Mode SLB vThunder on Azure

The following image is a simple topological example of configuring vThunder on Azure as an SLB. In this example, the vThunder device has only one interface, ethernet1. The vThunder is connected to the gateway router and the real server s1 on ethernet1. Requests from clients for the virtual server are routed by the Layer 3 router to the vThunder device, which then forwards the request on the appropriate port on the real server. The server reply passes back through the vThunder device to the client.

To configure the vThunder instance on Azure as an SLB, perform the following:

1. Instantiate a 2-NIC vthunder in Azure. For more information, see <u>Create a Single-Interface vThunder Instance</u>.

Figure 49 : Single-Interface vThunder on Azure as an SLB

eth1 Edge router eth1 VThunder on Azure VIP on eth1

ACOS Code for Single-Interface SLB

```
!Configure ethernet 1 interface.
interface ethernet 1
  enable
  ip address 10.1.0.1 255.255.255.224
```



```
! Configure the real server s1 by running the following commands.
ip nat pool p1 use-if-ip ethernet 1
slb server s1 10.1.0.4
 port 53 udp
 port 80 tcp
 port 443 tcp
!Configure the service groups and associate S1 to each service group.
slb service-group sg53 udp
 member s1 53
1
slb service-group sg80 tcp
 member s1 80
1
slb service-group sg443 tcp
 member s1 443
!Configure the virtual server vsl and configure the ports.
slb virtual-server vsl use-if-ip ethernet 1
  port 53 udp
   source-nat pool p1
    service-group sq53
  port 80 http
    source-nat pool p1
    service-group sg80
  port 443 https
    source-nat pool p1
service-group sg443
```

Configuring a Multiple-Interface vThunder on Azure as an SLB

The following image is a simple topological example of configuring vThunder on Azure as an SLB. In this example, the vThunder device is inserted directly between the gateway router and the real server. Requests from clients are routed by the Layer 3 router to the vThunder device, which then selects the real server and sends the request. The server reply passes back through the vThunder device to the client.

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Figure 50 : Configuring vThunder on Azure as an SLB



Follow the procedure in <u>Create a Multiple-Interface vThunder Instance</u> to create the vThunder instance. While creating the instance, create the two interfaces, eth1 and eth2. Make sure all the interfaces are in different subnets. Associate a secondary IP address to any one of the data interfaces so that you can create a VIP for the interface. For more information, see <u>Adding a Secondary IP Address to a NIC by Using Azure CLI</u>. Configure the vThuder as an SLB, for more information see <u>ACOS Code for Multiple-Interface SLB</u>.

For example, the VIP for this example is 10.33.0.50.

ACOS Code for Multiple-Interface SLB

```
!Enable the interfaces for vThunder by performing the following commands.
interface ethernet 1
  enable
  ip address 10.33.0.36 255.255.255.224
!
interface ethernet 2
  enable
  ip address 10.33.0.100 255.255.255.224
!
!Configure the real server www and port by performing the following
commands.
slb server www 10.33.0.101
  port 80 tcp
!
```





```
!Configure the service group and associate the real server to the service
group.
slb service-group www tcp
member www 80
!
!Configure the SLB server.
slb virtual-server www 10.33.0.50
port 53 dns-udp
gslb-enable
port 80 http
source-nat pool P2
service-group www
!
!
end
```

.

Advanced vThunder Configuration on Microsoft Azure

This chapter describes advanced vThunder configurations for Microsoft Azure.

- About Shared Polling Mode
 - Enabling Shared Polling Mode
 - Disabling Shared Polling Mode
- <u>About Jumbo Frames</u>
 - Enabling Jumbo Frames for vThunder
- Memory Support
 - vThunder Configuration on SLB or CGN

About Shared Polling Mode

ACOS release 4.1.4-GR1-P1 and later only supports shared polling mode¹ for deployments having a total number of CPUs less than four. From ACOS release 5.2.0 onwards, this support is also provided for deployments having a total number of CPUs greater than four.

When shared polling mode is enabled, both I/O and data processing both are performed by all the vCPUs except the control CPU. If there is no I/O and data processing task in the queue, then the system automatically switches the CPU to idle mode to conserve CPU cycles.

NOTE: This mode is only preferred when performance or latency is not the key criterion for the success and the user wants to maximize host CPU utilization due to multiple VMs running on it.

Table 3 : ACOS Modes and Selection Criteria

Mode	Behavior	Criteria	Additional Requirements	Performance
Polling Mode	In polling mode, both I/O and Data threads continuously poll for the packet and process it. This mode always consumes 100% of the	High performance + low latency required, combined with SR-IOV.	Configure CPU pinning with NUMA.	High Performance
	allotted CPU cycles. Note: System poll mode is default for			
	more than 4 vCPUs.			

¹This support is available on BareMetal and vThunder on KVM, ESXi, Hyper V, AWS, Azure, and OpenStack.

Mode	Behavior	Criteria	Additional Requirements	Performance
Shared Polling Mode	When the shared poll mode is enabled, I/O and data processing are both performed on all cores except the control CPU.	Maximum utilization of CPU resources with some compromise on latency and performance.	The host needs to share physical CPUs with multiple VMs.	Lower CPU cycles consumed by the host.

NOTE: The shared polling mode feature is supported for ACOS 5.2.0 and later versions.

Enabling Shared Polling Mode

By default, shared polling mode is disabled. The following procedure has to be followed to enable Shared Polling mode:

1. Use the following CLI command from global config mode:

vThunder(config)#system shared-poll-mode enable

2. Exit global config mode and reload the vThunder instance using the following command:

```
vThunder(config)#exit
vThunder#reload
```

After vThunder finishes reloading, Shared Polling Mode will be enabled.

3. To verify Shared Polling Mode is enabled on the vThunder instance, check the output from the "show system shared-poll-mode" command.

vThunder(config) # show system shared-poll-mode

For example,

```
A2# show system shared-poll-mode
Shared poll mode is enabled
A2#
```

4. CPU distribution can be viewed, with the "show cpu" command as shown below. From

the output, it can be observed that no CPU does IO processing exclusively.

For example,

vThunder#show	r cpu				
Time: Mar-2-2	2019, 01:39				
	1Sec	5Sec	10Sec	30Sec	
60Sec					
					·
Control1	15%	15%	14%	18%	
18%					
Datal	0%	0 %	0%	0%	
0%					
Data2	0%	0 %	0%	0%	
0%					
Data3	0%	0 %	0%	0%	
0%					

Disabling Shared Polling Mode

The following procedure is followed to disable Shared Polling mode:

1. Use the following command from global config mode to **disable** shared polling mode:

For example:

```
vThunder(config)#system shared-poll-mode disable
```

2. Exit global config mode and reload the vThunder instance using the following command:

```
vThunder(config)#exit
vThunder#reload
```

After vThunder finishes reloading, Shared Polling Mode will be disabled.

3. CPU distribution can be viewed, when shared poll mode is disabled with the "show cpu" command as shown below. From the output, it can be observed that some CPUs are designated for IO processing.

For example:

```
vThunder(config)#show cpu
Time: Mar-2-2019, 01:37
1Sec 5Sec 10Sec 30Sec
60Sec
```

Control1 21%	L 20%	21%	21%	21%	
Datal 0%	0 %	0%	0 %	0 %	
Data2 0%	0%	0%	0%	0 %	
I/01	0%	0%	0%	0 %	
					_

NOTE: For one vCPU, the control and data usage are shown separately, but both share the same vCPU. The actual usage of the CPU is cumulative of control and data usage.

About Jumbo Frames

A jumbo frame is an Ethernet frame with a payload greater than the standard maximum transmission unit (MTU) of 1,500 bytes. This modification improves vThunder throughput and performance. Additional advantages of enabling jumbo frames include reduced interrupts and lower RAM utilization. For vThunder, jumbo frames are supported on ACOS 2.7.x, 2.8.x, 4.x, 5.x versions, and non-FTA platforms.

The following is a list of limitations and requirements for running jumbo frames for the vThunder-Intel and ENA devices:

- The vThunder instance must be running on top of an Intel 10Gb Ethernet Controller.
- Jumbo frames are not supported on 1Gb NICs.
- Supported jumbo frame packet types include: ICMP, UDP, and TCP
- vThunder can support jumbo frame packets up to a maximum size of 9216 bytes.

Enabling Jumbo Frames for vThunder

By default, jumbo frame support is disabled. Use the following appropriate CLI command to enable jumbo frame support on a vThunder data interface:

- For ACOS version 2.7.X: enable-jumbo
- For ACOS version 4.1.X: system-jumbo-global enable-jumbo

Set the MTU size on the vThunder data interface to a value ranging from 1500 to 9216 bytes. The configured value must be larger than any jumbo packet expected to arrive on

that data interface. To disable Jumbo Frames, run the command no system-jumbo-global enable-jumbo.

Memory Support

vThunder devices support 128 GB memory and provision the resources to satisfy the high number of users and their throughput in a virtualized environment.

Both NUMAs inside the compute host are used for provisioning the resources. Memory allocation is 64 GB from NUMA0 and 64 GB from NUMA1. This feature supports all platforms with 2 NUMA, 128 GB memory, and 35 virtual CPUs.

NOTE: The memory allocation limits change according to available memory.

vThunder Configuration on SLB or CGN

To configure vThunder and validate 128 GB memory support, perform the following:

1. Configure the vThunder on SLB or CGN.

For example

Configure vThunder with SLB as:

```
slb server s1 <Server-IP>
port 80 tcp
slb server s2 <Server-IP>
port 80 tcp
slb service-group sg1 tcp
member s1 80
member s2 80
slb virtual-server Platform-vip <VIP>
port 80 tcp
source-nat auto
service-group sg1
```

Configure vThunder with CGN as:

```
interface ethernet {cli}
      enable
```

```
ip address <Data1-IP> <net mask>
ip nat inside
interface ethernet {srv}
enable
ip address <Data2-IP> 2xx.xxx.xx.0
ip nat outside
class-list cgn_test
<cli_subnet> lsn-lid 1
cgnv6 lsn inside source class-list cgn_test
cgnv6 nat pool lsn-pool {pool} netmask /<net-mask>
cgnv6 lsn-lid 1
source-nat-pool lsn-pool
```

- 2. Verify 128 GB memory support for each vThunder instance in terms of vCPUs and increased application resources such as fixed-NAT public IP addresses, private users count, etc, perform the following:
 - a. Launch the vThunder system with 128GB memory and 35 vCPUs ACOS image.
 - b. Verify the limits using show system resource-usage and show cgvn6 resourceusage command.

vThunder(NOLICENSE)#sh system resour	rce-usage			
Resource	Current	Default	Minimum	
Maximum				
14-session-count	12582912	12582912	3145728	
201326592				
nat-pool-addr-count	10	10	10	
15000				
class-list-ipv6-addr-count	524288	524288	524288	
1048576				
class-list-ac-entry-count	65536	65536	65536	
9216000				
auth-portal-html-file-size	20	20	4	120
auth-portal-image-file-size	6	6	1	80
max-aflex-file-size	32	32	16	256

aflex-table-entry-count	102400	102400	102400
15728640			
max-aflex-authz-collection-number	512	512	256
4096			
radius-table-size	12000000	12000000	200000
1200000			
monitored-entity-count	32960	32960	32816
800288			
authz-policy-number	128	128	32
2000			
ram-cache-memory-limit	27648	27648	6912
27648			
ipsec-sa-number	30000	30000	120
30000			

cgn resource-usage

vThunder#show cgn resource-usage Resource Maximum	Current	Default	Minimum	
lsn-nat-addr-count	2048	2048	2048	20000
fixed-nat-ip-addr-count	20480	20480	20480	512000
-				
fixed-nat-inside-user-count	256000	256000	256000	
800000				
radius-table-size	8000000	8000000	2000000	
800000				
vThunder#				

- c. Configure the maximum fixed-NAT IPs and inside users per the default limits and verify that they can be achieved. The default value is 30720k.
- d. Change the system resource for L4 sessions and reach the count.

NOTE:	The accumulative L4 session count should be lesser than the current
	value. Every value don't exceed the current configured value.

e. Verify that the configured limits take effect only after reboot.

NOTE:	For some of the parameter update, reboot is not required. For
	example
	- auth-portal-html-file-size
	- auth-portal-image-file-size
	- max-aflex-file-size

- f. On reboot configure the Minimum maximum number of fixed-NAT IPs and inside "User/RADIUS/IP-List" value between pre-defined range (Min-Max).
- g. Reboot or reload the system to view the updated value.

The A10 Thunder Observability Agent is introduced to monitor A10 Thunder[®] Application Delivery Agent (ADC) performance metrics and syslogs.

There are two types of A10 Thunder Observability Agent available:

- Internal Thunder Observability Agent (iTOA)
- External Thunder Observability Agent (TOA)

NOTE: It is recommended to configure any one TOA at a time.

Internal Thunder Observability Agent (iTOA)

This is an in-built Python plugin within ACOS which is configured using ACOS Command Line Interface (CLI) or aXAPI.

You can use iTOA for the following:

- For ACOS v6.0.1 or later.
- For configuring vThunder using aXAPI or CLI to publish the 14 performance metrics on on Azure Application Insights directly from vThunder with outbound internet connectivity to access '*.microsoftonline.com' and '*.azure.com'.
- For configuring vThunder using aXAPI or CLI to publish the syslogs on:
 - AWS CloudWatch directly from vThunder with outbound internet connectivity.
 - Azure Log Analytics Workspace directly from vThunder with outbound internet connectivity to access '*.microsoftonline.com' and '*.azure.com'.
 - VMware vRealize Log Insight (vRLI) which is accessible from vThunder.
- For managing the data collection, processing, aggregation, and publishing internally for configured L3V partitions.
- For supporting maximum 20 partitions per vThunder instance.
- For publishing metrics or logs every 1 minute.



To configure the Internal Thunder Observability Agent for a vThunder deployed on Azure, see Internal Thunder Observability Agent.

External Thunder Observability Agent (TOA)

This external plugin can be installed on Linux, CentOS, and Ubuntu platforms as a Python Plugin installation package and Docker containerization.

You can use TOA:

- For any ACOS deployment platform.
- For any ACOS software version.
- For a Thunder with outbound internet connectivity restrictions.

In this case, TOA can have outbound internet connectivity. It can collect data from Thunder and then publish the metrics and syslogs on the cloud monitoring tool through internet.

To install the external Thunder Observability Agent on Azure, <u>External Thunder</u> <u>Observability Agent</u>.



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