

# **Surviving a Ransomware Attack with Azure Site Recovery**

**Volume 1**

By Microsoft MVP's:

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### **Feedback Information**

We'd like to hear from you! If you have any comments about how we could improve the quality of this book, please don't hesitate to contact us by visiting [www.checkyourlogs.net](http://www.checkyourlogs.net) or sending an email to [dave@mvpdays.com](mailto:dave@mvpdays.com).



# Foreword by

# Acknowledgments

## From Dave

Cristal, you are my rock and my source of inspiration. For the past 20 + years you have been there with me every step of the way. Not only are you the “BEST Wife” in the world you are my partner in crime. Christian, Trinity, Keira, Serena, Mickaila, Mackenzie, and Rycker, you kids, are so patient with your dear old dad when he locks himself away in the office for yet another book. Taking the time to watch you grow in life, sports, and become little leaders of this new world is incredible to watch.

Thank you, Mom and Dad, (Frank and Audry) and my brother Joe. You got me started in this crazy IT world when I was so young. Brother, you mentored me along the way both coaching me in hockey and helping me learn what you knew about PCs and Servers. I’ll never forget us as teenage kids working the IT Support contract for the local municipal government. Remember dad had to drive us to site because you weren’t old enough to drive ourselves yet. A great career starts with the support of your family, and I’m so lucky because I have all the support one could ever want.

Last but not least, the MVPDays volunteers, you have donated your time and expertise and helped us run the event in over 20 cities across North America. Our latest journey has us expanding the conference worldwide as a virtual conference. For those of you that will read this book, your potential is limitless just expand your horizons, and you never know where life will take you.

# About the Authors

## Dave Kawula – Microsoft MVP

Dave is a Microsoft Most Valuable Professional (MVP) with over 20 years of experience in the IT industry. His background includes data communications networks within multi-server environments, and he has led architecture teams for virtualization, System Center, Exchange, Active Directory, and Internet gateways. Very active within the Microsoft technical and consulting teams, Dave has provided deep-dive technical knowledge and subject matter expertise on various System Center and operating system topics.

Dave is well-known in the community as an evangelist for Microsoft, 1E, and Veeam technologies. Locating Dave is easy as he speaks at several conferences and sessions each year, including TechEd, Ignite, MVP Days Community Roadshow, and VeeamOn.

Recently Dave has been honored to take on the role of Conference Co-Chair of TechMentor with fellow MVP Sami Laiho. The lineup of speakers and attendees that have been to this conference over the past 20 years is fantastic. Come down to Redmond or Orlando in 2018, and you can meet him in person. Checkout his speaking site at [www.davekawula.com](http://www.davekawula.com)

He recently tied for 1<sup>st</sup> place out of 1800 speakers at the Microsoft Ignite Conference in Orlando.

As the founder and Managing Principal Consultant at TriCon Elite Consulting, Dave is a leading technology expert for both local customers and large international enterprises, providing optimal guidance and methodologies to achieve and maintain an efficient infrastructure.

BLOG: [www.checkyourlogs.net](http://www.checkyourlogs.net)

Twitter: @DaveKawula



## Cristal Kawula – Microsoft MVP

Cristal Kawula is the co-founder of MVPDays Community Roadshow and #MVPHour live Twitter Chat. She was also a member of the Technical Advisory board and is the President of TriCon Elite Consulting. Cristal is also only the 2nd Woman in the world to receive the prestigious Veeam Vanguard award.

Cristal can be found speaking at Microsoft Ignite, MVPDays, and other local user groups. She is extremely active in the community and has recently helped publish a book for other Women MVP's called Voices from the Data Platform.

This year at Microsoft Ignite she lead community meetups for various topics such as Women in IT, Parenting in IT, Diversity in Tech, and becoming a Community Rockstar.

BLOG: <http://www.checkyourlogs.net>

Twitter: @supercristal1



## Emile Cabot – Microsoft MVP

Emile started in the industry during the mid-90s working at an ISP and designing celebrity web sites. He has a strong operational background specializing in Systems Management and collaboration solutions and has spent many years performing infrastructure analyses and solution implementations for organizations ranging from 20 to over 200,000 employees. Coupling his wealth of experience with a small partner network, Emile works very closely with TriCon Elite, 1E, and Veeam to deliver low-cost solutions with minimal infrastructure requirements.

He actively volunteers as a member of the Canadian Ski Patrol, providing over 250 hours each year for first aid services and public education at Castle Mountain Resort and in the community.

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Twitter: @ecabot



## Cary Sun – Microsoft MVP

Cary Sun is CISCO CERTIFIED INTERNETWORK EXPERT (CCIE No.4531) and MCSE, MCIP, Citrix CCA with over twenty years in the planning, design, and implementation of network technologies and Management and system integration. Background includes hands-on experience with multi-platform, all LAN/WAN topologies, network administration, E-mail and Internet systems, security products, PCs and Servers environment. Expertise is analyzing user's needs and coordinating system designs from concept through implementation. Exceptional analysis, organization, communication, and interpersonal skills. Demonstrated ability to work independently or as an integral part of a team to achieve objectives and goals. Specialties: CCIE /CCNA / MCSE / MCITP / MCTS / MCSA / Solution Expert / CCA

Cary's is a very active blogger at [checkyourlogs.net](http://www.checkyourlogs.net) and always available online for questions from the community. He passion for technology is contagious, and he makes everyone around him better at what they do.

Blog:<http://www.checkyourlogs.net>

Twitter:@SifuSun



## **John O'Neill Sr – Re-Connect Microsoft MVP**

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## Contents

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## Introduction

# MVPDays Online

The purpose of this book is to showcase the fantastic expertise of our guest speakers of MVPDays Online. They have so much passion, expertise, and expert knowledge that it only seemed fitting to write it down in a book.

MVPDays was founded by Cristal and Dave Kawula back in 2013. It started as a simple idea; “There’s got to be a good way for Microsoft MVPs to reach the IT community and share their vast knowledge and experience in a fun and engaging way” I mean, what is the point in recognizing these bright and inspiring individuals, and not leveraging them to inspire the community that they are a part of.

We often get asked the question “Who should attend MVPDays”?

Anyone that has an interest in technology is eager to learn and wants to meet other like-minded individuals. This Roadshow is not just for Microsoft MVP’s it is for anyone in the IT Community.

Make sure you check out the MVPDays website [www.mvpdays.com](http://www.mvpdays.com). You never know maybe the roadshow will be coming to a city near you.

The goal of this particular book is to show you how to survive a Ransomware Attack using Azure Site Recovery. Each chapter is broken down into a unique tip, and we hope you find some immense value in what we have written.

## Sample Files

All sample files for this book can be downloaded from [www.checkyourlogs.net](http://www.checkyourlogs.net) and <https://github.com/dkawula/Surviving-a-Ransomware-Attack-Using-Azure-Site-Recovery>

## Additional Resources

In addition to all the tips and tricks provided in this book, you can find extra resources like articles and video recordings on our blog <http://www.checkyourlogs.net>



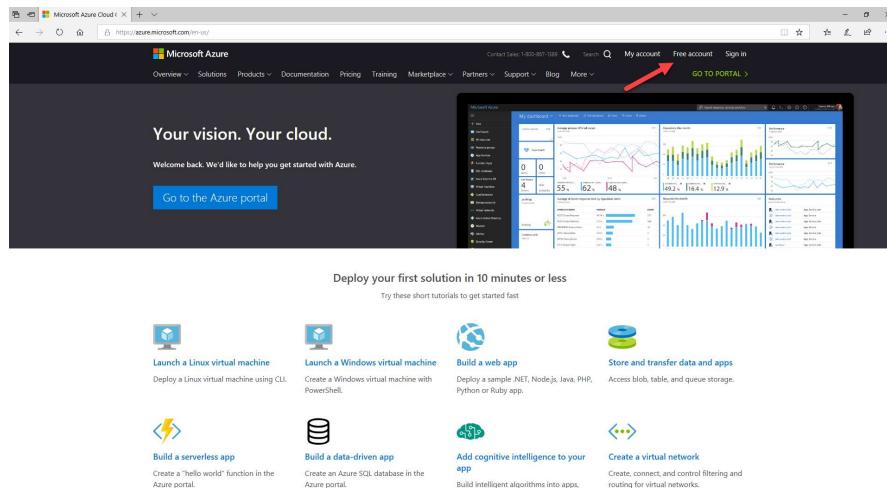
## Chapter 1

# Setting up your Azure Subscription from Scratch

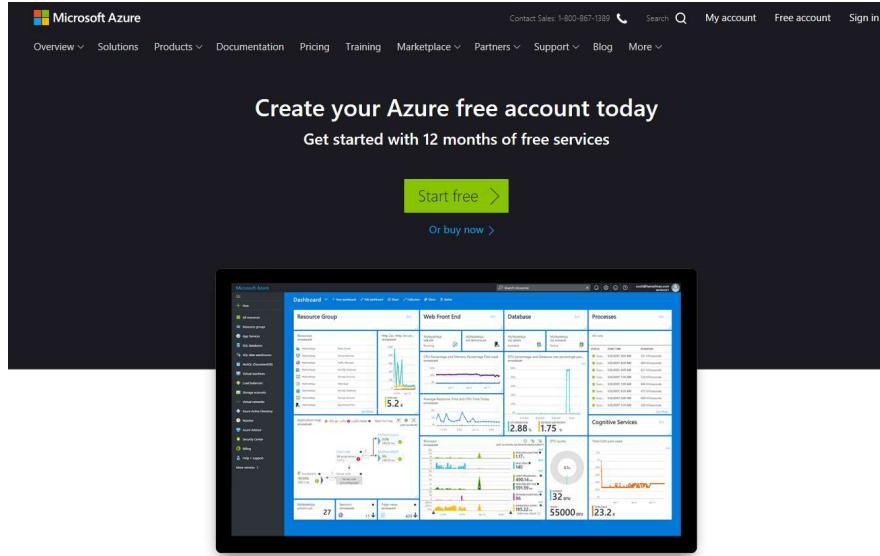
As we know, there are lots of features in Microsoft Azure, to use those features, you need to create a Microsoft Azure account, it's straightforward to create, also you will get \$200 credits at the first month.

If you are a newcomer on Microsoft Azure, no worry, I am going to show you how to create Azure free account with \$200 credit today, follow the steps as below.

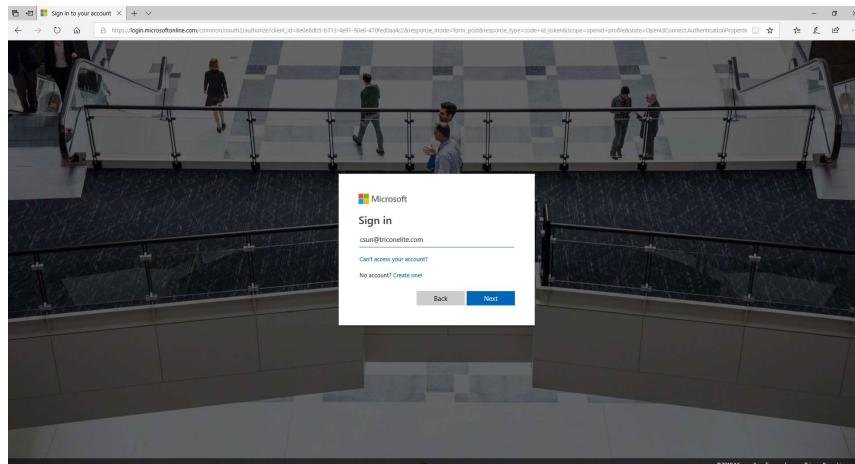
1. Go to <https://www.azure.com> and then click Free account.



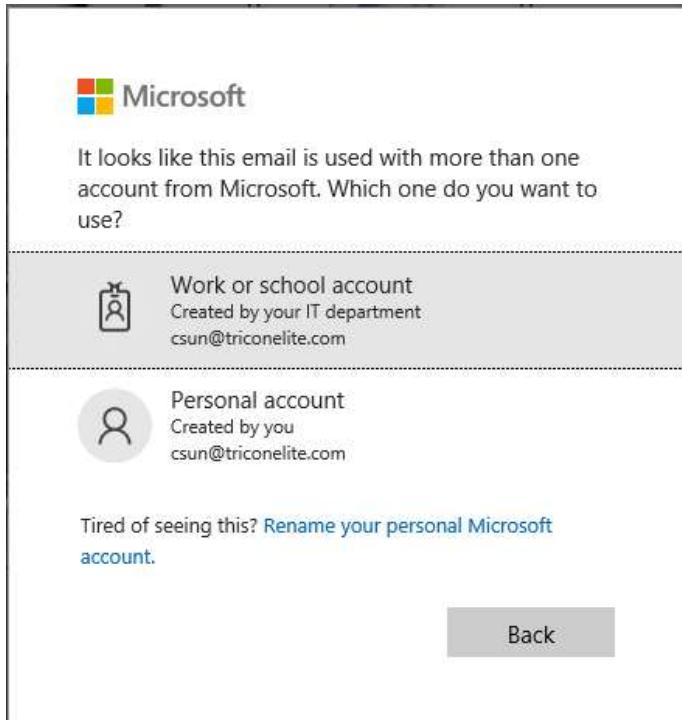
2. On the free account page, click Start free.



3. If you have an account with Microsoft already (e.g., office 365, outlookf.com .... ), enter your email address and then click Next. If you don't have Microsoft account, please click Create one.



4. If your email address is used with more than one account from Microsoft, you need to select which account do you want to use.



5. Enter your password and then click Sign in



6. On the About you page, enter your personal information and then click Next.

privacy statement and [subscription agreement](#)'. A 'Next' button is at the bottom." data-bbox="199 145 714 456"/>

Microsoft Azure

cary1109@outlook.com Sign out

Azure free account sign up  
Start with a \$250 credit for 30 days, and keep going for free

1 About you

Country/Region ?  
Canada

First name  
cary

Last name  
sun

Email address ?  
csun@triconelite.com

Phone  
(778) 5 [redacted]

By proceeding you acknowledge the [privacy statement](#) and [subscription agreement](#)

Next

2 Identity verification by card

3 Agreement

7. On the Identity verification by card page, you need to enter your credit card information and then click Next. Don't worry, Microsoft won't charge you until you upgrade your free

account to pay as you go or others account type.

### Identity verification by card

^

Why is credit card information necessary for a free account?

- To keep out spam and bots
- To verify your identity

**You won't be charged unless you upgrade.**



Card number

4 [redacted]

Expiration date CVV i

[redacted] 20 [redacted] [redacted]

Name on card

[redacted] Sun

Address line 1

156 [redacted]

Address line 2

- Optional -

City

[redacted]

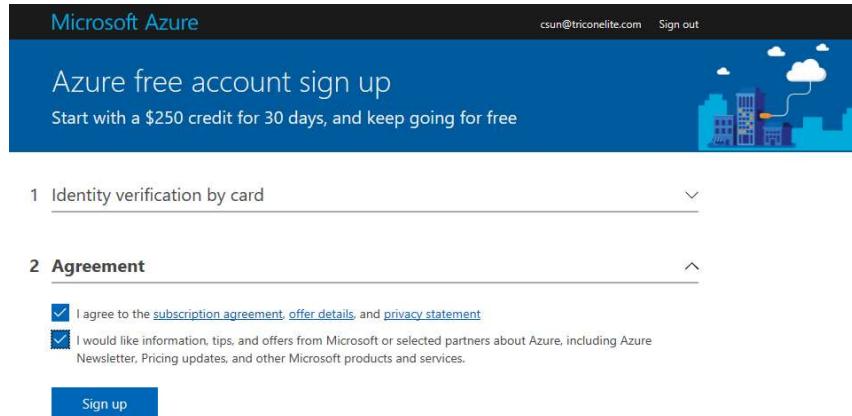
Province

B [redacted] [redacted] X

Next

8. On the Agreement page, select I agree to the subscription agreement, offer details, and privacy statement and I would like information, tips, and offers from Microsoft or selected partners about Azure, including Azure Newsletter, Pricing updates, and other

Microsoft products and services, and then click Sign up.



1 Identity verification by card

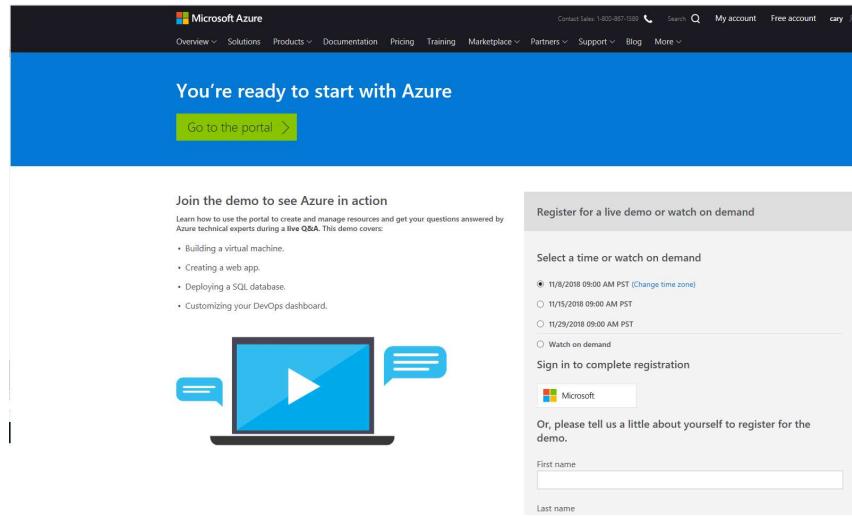
2 Agreement

I agree to the [subscription agreement](#), [offer details](#), and [privacy statement](#)

I would like information, tips, and offers from Microsoft or selected partners about Azure, including Azure Newsletter, Pricing updates, and other Microsoft products and services.

**Sign up**

9. Congratulations! You're ready to start with Azure and get \$250 credit for free. You need to click Go to the portal and enjoy Azure features there.



You're ready to start with Azure

Join the demo to see Azure in action

Learn how to use the portal to create and manage resources and get your questions answered by Azure technical experts during a live Q&A. This demo covers:

- Building a virtual machine.
- Creating a web app.
- Deploying a SQL database.
- Customizing your DevOps dashboard.

Register for a live demo or watch on demand

Select a time or watch on demand

11/8/2018 09:00 AM PST (Change time zone)

11/15/2018 09:00 AM PST

11/29/2018 09:00 AM PST

Watch on demand

Sign in to complete registration

Or, please tell us a little about yourself to register for the demo.

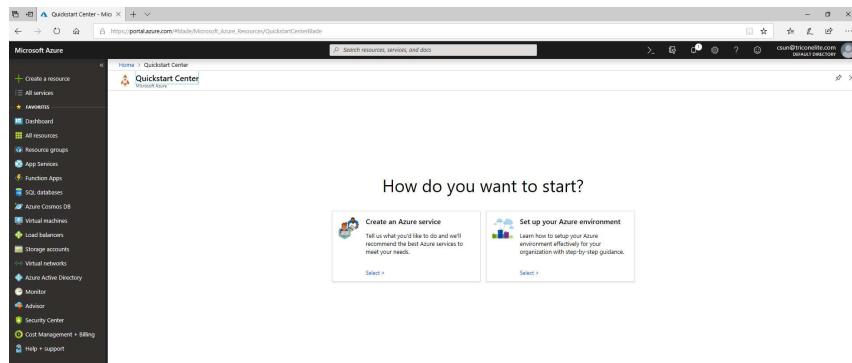
First name:

Last name:

10. That's it you have now successfully setup your first Azure Tenant and have access to the Azure Portal.

## Chapter 1 Setting up your Azure Subscription from Scratch

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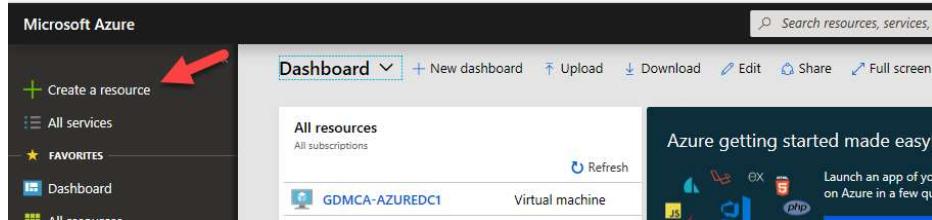
## Chapter 2

# Building a Hyper-V Nested VM with Multiple Public IP Addresses in Azure

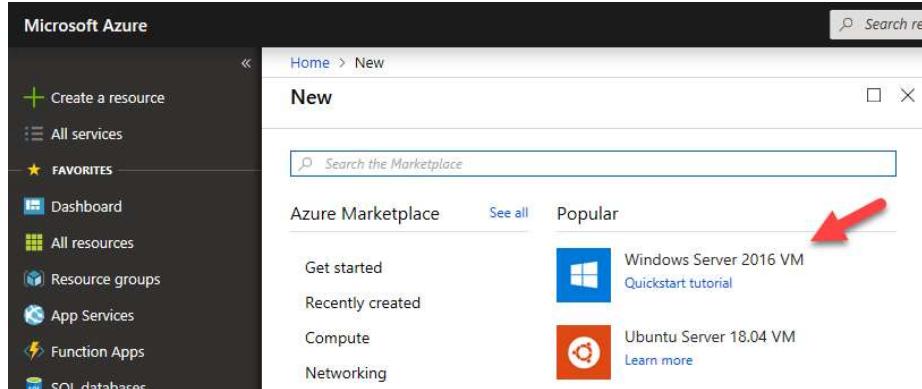
In this chapter, we are going to show you how to build a Hyper-V nested VM with multiple public IP addresses. In this lab configuration, you only need to pay Microsoft for one Hyper-V host (VM) with storage and public IP addresses. After it is configured, you can install a firewall, create VMs, a load balancer, configure customer routing, port forwarding and so on. These scenarios can be used to build up real-world labs for Test, Development, or even proof of concepts.

## Building a Windows Server 2016 Virtual Machine

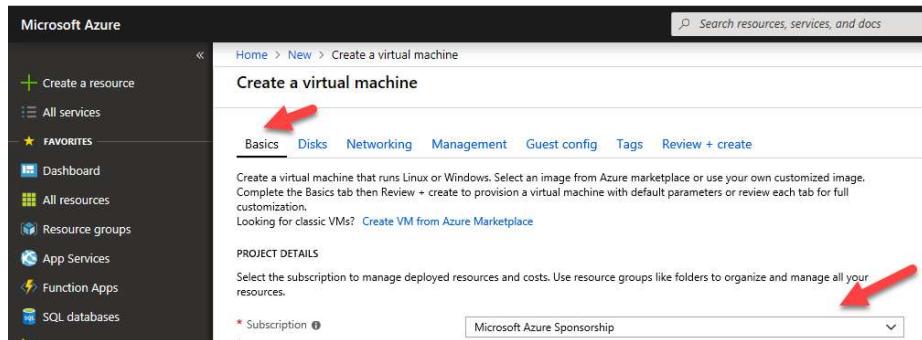
1. Logon to your Microsoft Azure Account and select Create a resource.



2. On the New page, select Windows Server 2016 VM

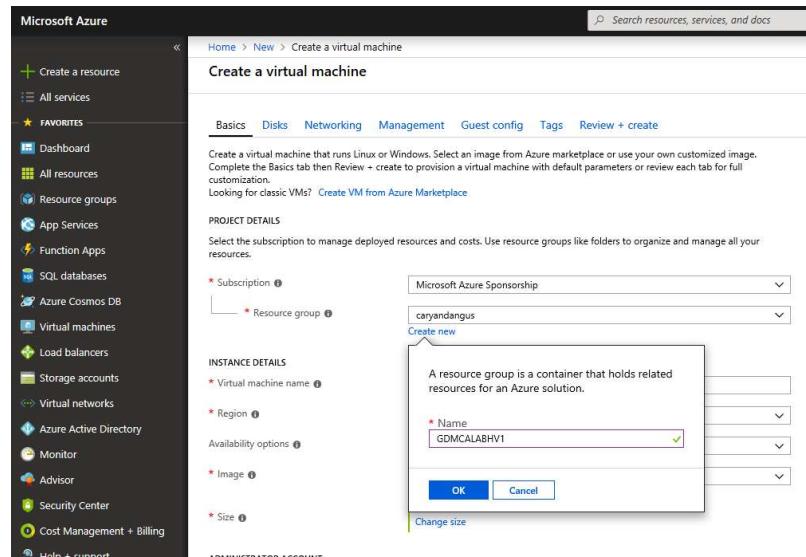


3. On the Create a virtual machine page, click Basics and select your Azure Subscription to pay for this virtual machine.



4. Select Create new under the Resource group and enter resource group name, I will recommend it as your virtual machine name, because it will easy to maintain your

resources, and then click OK.



5. **Virtual Machine Name:** Enter Virtual Machine Name as your resource group name.
- Region:** Select Region for the virtual machine. For my case, I am using West US 2.
- Availability options:** keep the default setting
- Image:** select Windows Server 2016 Datacenter
- Size:** click change size and select the Dv3 and Ev3 VM sizes. Because we need to enable nested virtualization.
- Username:** Enter login user name
- Password:** Enter login password

**Confirm password:** Reenter login password

Microsoft Azure

Home > New > Create a virtual machine

Search resources, services, and docs

Create a virtual machine

Basics Disks Networking Management Guest config Tags Review + create

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

PROJECT DETAILS

Subscription: Microsoft Azure Sponsorship

Resource group: (New) GDMCALABHV1

Virtual machine name: GDMCALABHV1

Region: West US 2

Availability options: No infrastructure redundancy required

Image: Windows Server 2016 Datacenter

Size: Standard D16s v3

Administrator Account

Username:

Password:

Confirm password:

**Public inbound ports:** Select Allow selected ports.

**Select inbound ports:** Select RDP (3389)

**Already have a Windows license:** Select Yes if you have a license already.

**Confirmation:** select I confirm I have an eligible Windows license with Software Assurance or Windows Server subscription to apply for this Azure Hybrid Benefit.

**INBOUND PORT RULES**

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

\* Public inbound ports  None  Allow selected ports

\* Select inbound ports  RDP

**These ports will be exposed to the internet. Use the Advanced controls to limit inbound traffic to known IP addresses. You can also update inbound traffic rules later.**

**SAVE MONEY**

Save up to 49% with a license you already own using Azure Hybrid Benefit. [Learn more](#)

\* Already have a Windows license?  Yes  No

\* License type  Windows Server

\* Confirmation  I confirm I have an eligible Windows license with Software Assurance or Windows Server subscription to apply this Azure Hybrid Benefit.

[Review Azure hybrid benefit compliance](#)

### 6. On the Create a Virtual Machine page, click Disks.

Microsoft Azure

Home > New > Create a virtual machine

Create a virtual machine

Basics  Disks Networking Management Guest config Tags Review + create

DISK OPTIONS

\* OS disk type  Premium SSD

DATA DISKS

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

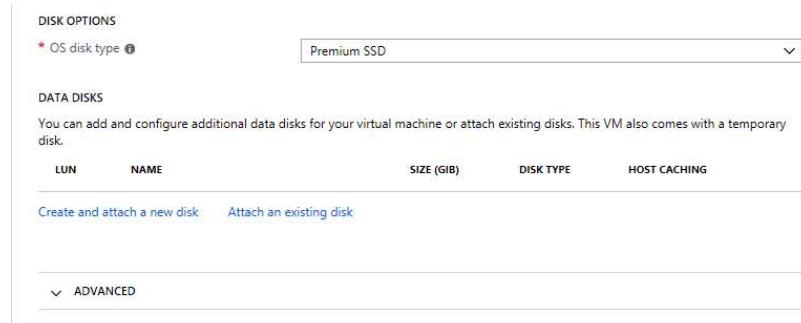
LUN	NAME	SIZE (GB)	DISK TYPE	HOST CACHING

Create and attach a new disk  Attach an existing disk

▼ ADVANCED

OS disk type: Select Premium SSD

DATA DISKS: Select Create and attach a new disk (this storage space is for your nested VMs)



7. On the Create a new disk page, settings as follow and then click OK.

**Disk type:** Select Premium SSD

**Name:** keep the default name

**Size(GiB):** 4095

**Source type:** None

**Create a new disk**

□ X

Create a new disk to store applications and data on your VM. Disk pricing varies based on factors including disk size, storage type, and number of transactions. [Learn more about Azure Managed Disks](#)

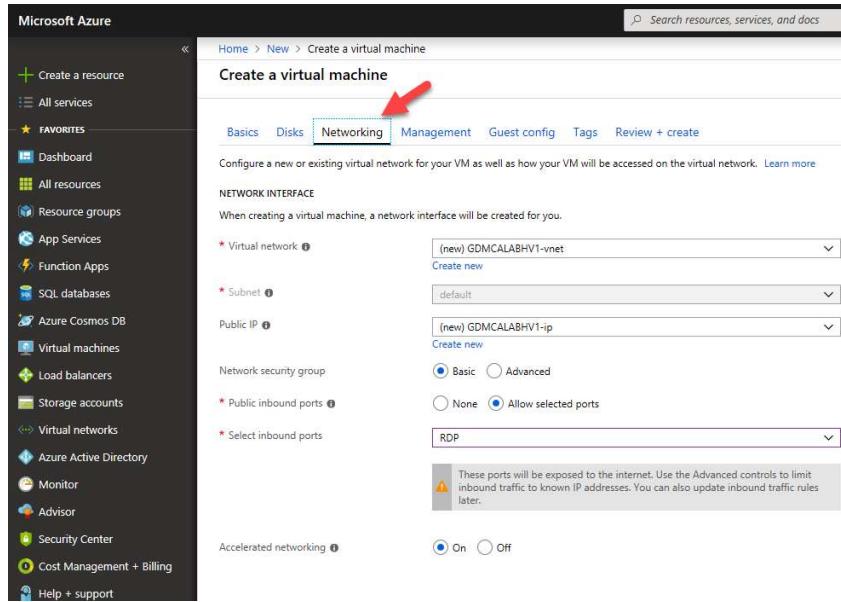
* Disk type <small>?</small>	Premium SSD
* Name	GDMCALABHV1_DataDisk_0
* Size (GiB) <small>?</small>	4095
* Source type <small>?</small>	None (empty disk)

**ESTIMATED PERFORMANCE ?**

IOPS limit 7500

Throughput limit (MB/s) 250

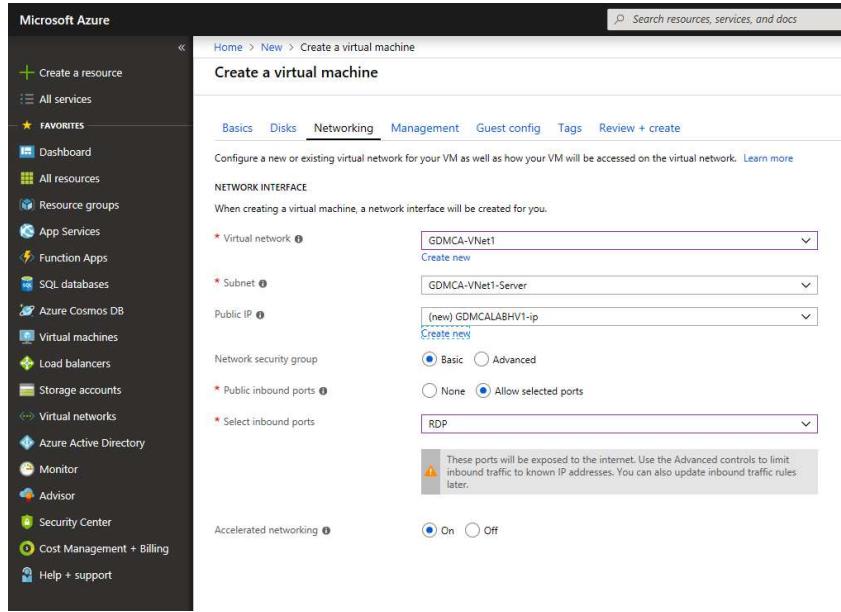
8. On the Create a virtual machine page, click Networking.



**Virtual network:** Select vnet if you have existing vnet if not, you can keep the default settings.

**Subnet:** Select subnet name if you have an existing subnet; if not, you can keep the default settings.

**Public IP:** click Create new



9. On the Create Public IP address page, the settings are as follows

**Name:** Enter the Public IP address name.

**SKU:** Basic

**Assignment:** Static

10. To complete Networking settings as follow:

**Network security group:** Basic

**Public inbound ports:** Allow selected ports

**Select inbound ports:** RDP

### Accelerated networking: On

Home > New > Create a virtual machine

Create a virtual machine

Networking

Configure a new or existing virtual network for your VM as well as how your VM will be accessed on the virtual network. [Learn more](#)

**NETWORK INTERFACE**

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

\* Virtual network [?](#) GDMCA-VNet1 [Create new](#)

\* Subnet [?](#) GDMCA-VNet1-Server [Create new](#)

Public IP [?](#) (new) GDMCALABHV1-PublicIP1 [Create new](#)

Network security group [Basic](#) [Advanced](#)

\* Public inbound ports [?](#) [None](#) [Allow selected ports](#)

\* Select inbound ports RDP

These ports will be exposed to the internet. Use the Advanced controls to limit inbound traffic to known IP addresses. You can also update inbound traffic rules later.

Accelerated networking [?](#) [On](#) [Off](#)

1. On the Create a virtual machine page, click Management and keep the settings as default.

Microsoft Azure

Home > New > Create a virtual machine

Create a virtual machine

Management

Configure monitoring and management options for your VM.

**MONITORING**

Boot diagnostics [?](#) [On](#) [Off](#)

OS guest diagnostics [?](#) [On](#) [Off](#)

\* Diagnostics storage account [?](#) (new) 1diag440 [Create new](#)

**IDENTITY**

System assigned managed identity [?](#) [On](#) [Off](#)

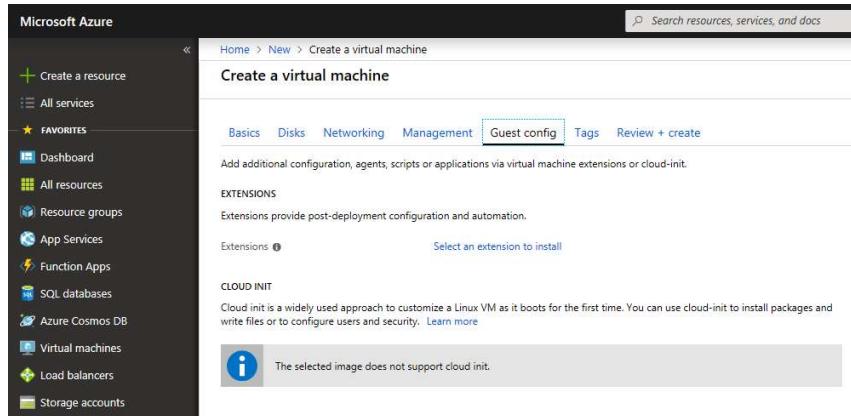
**AUTO-SHUTDOWN**

Enable auto-shutdown [?](#) [On](#) [Off](#)

**BACKUP**

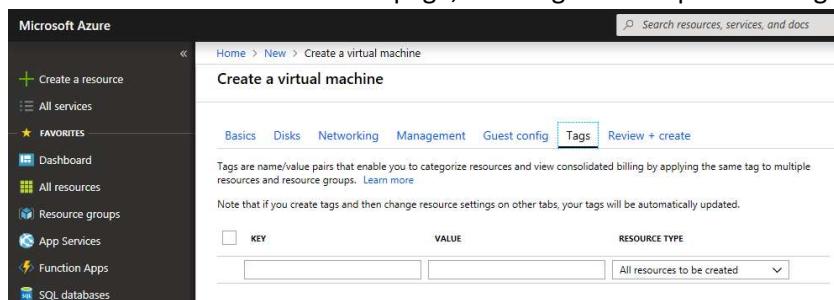
Enable backup [?](#) [On](#) [Off](#)

11. On the Create a virtual machine page, click Guest config and keep the settings as default.



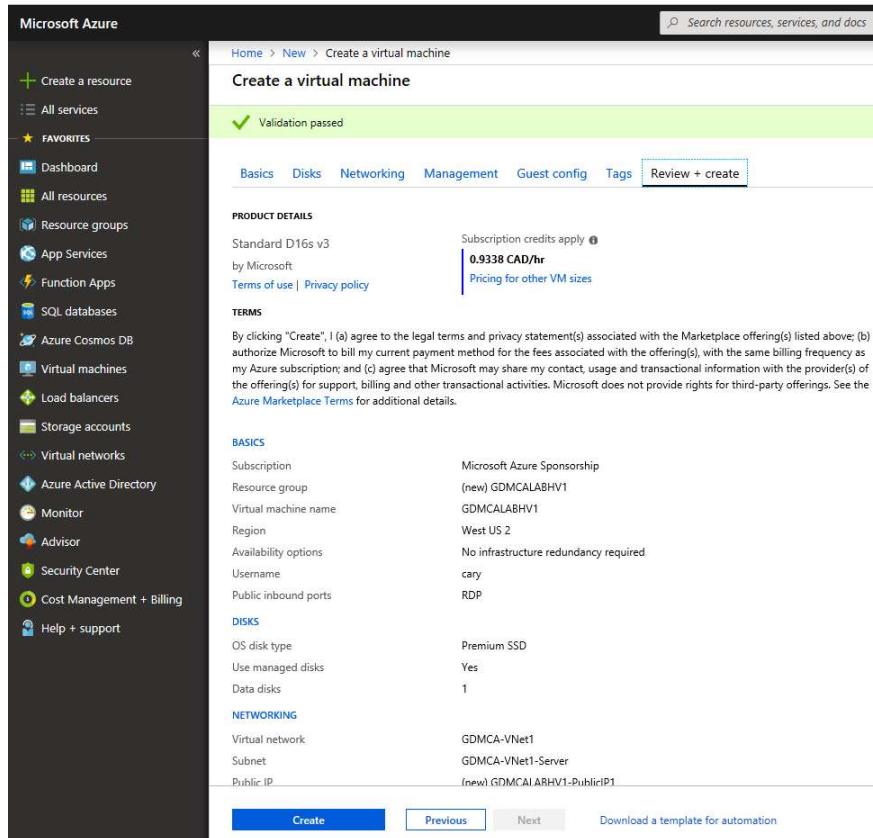
The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The 'Guest config' tab is selected. The 'Guest config' section contains a note: 'Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.' Below this are sections for 'EXTENSIONS' and 'CLOUD INIT'. A note in the 'CLOUD INIT' section states: 'Cloud init is a widely used approach to customize a Linux VM as it boots for the first time. You can use cloud-init to install packages and write files or to configure users and security.' A message box indicates: 'The selected image does not support cloud init.'

12. On the Create a virtual machine page, click Tags and keep the settings as default.



The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The 'Tags' tab is selected. The 'Tags' section contains a note: 'Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups.' Below this is a note: 'Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.' A table for adding tags is shown, with columns for KEY, VALUE, and RESOURCE TYPE, and a dropdown for RESOURCE TYPE set to 'All resources to be created'.

13. On the Create a virtual machine page, click Review + create and make sure Validation passed and then click Create.



The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The validation status is 'Validation passed'. The configuration details are as follows:

Category	Setting	Value
BASIC	Subscription	Microsoft Azure Sponsorship
	Resource group	(new) GDMCALABHV1
	Virtual machine name	GDMCALABHV1
	Region	West US 2
DISKS	Availability options	No infrastructure redundancy required
	Username	gary
	Public inbound ports	RDP
NETWORKING	OS disk type	Premium SSD
	Use managed disks	Yes
	Data disks	1
Virtual network	GDMCA-VNet1	
Subnet	GDMCA-VNet1-Server	
Public IP	(new) GDMCA1ABHV1-PublicIP1	

At the bottom, there are 'Create', 'Previous', and 'Next' buttons, along with a link to 'Download a template for automation'.

## Creating Multiple Internal and External IP's for the Lab

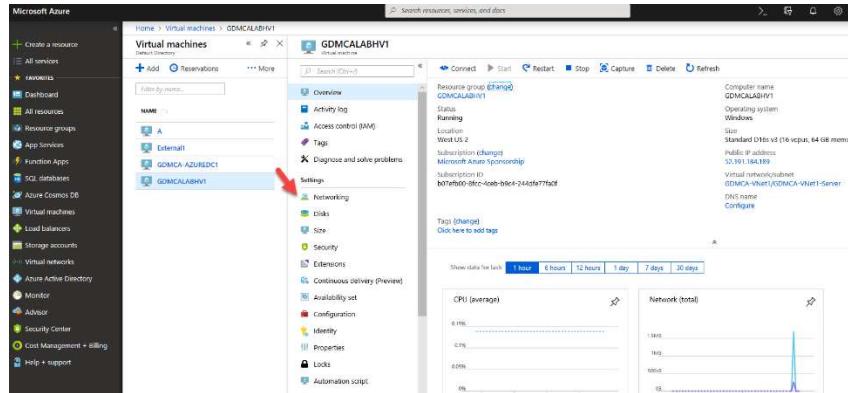
1. On the Microsoft Azure portal page, select Virtual machines.

The screenshot shows the Microsoft Azure portal dashboard. The left sidebar has a 'Virtual machines' link with a red arrow pointing to it. The main content area displays a list of resources under 'All resources'. The resources listed are: AGATLABHV1 (Virtual machine), External1 (Virtual machine), agatlabhv1610 (Network interface), AGATLABHV1-nsg (Network security group), GDMCA-AZUREDC1-nsg (Network security group), GDMCA-GW (Virtual network gateway), GDMCA-VnettoCaryHQ (Connection), Cary-HQ (Local network gateway), GDMCA-VNet1 (Virtual network), gdmca-azuredc1622 (Network interface), GDMCA-GWIP (Public IP address), and carysun (Storage account). A 'Create DevOps Project' button is located in the center of the dashboard.

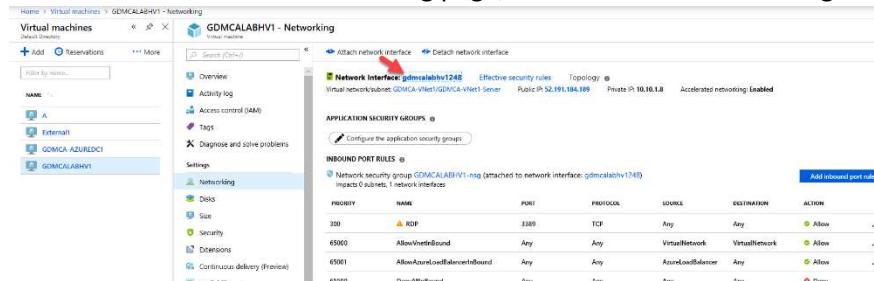
2. On the Virtual machines page, click GDMCALABHV1.

The screenshot shows the 'Virtual machines' page in the Microsoft Azure portal. The left sidebar has a 'Virtual machines' link with a red arrow pointing to it. The main content area displays a list of virtual machines. The machines listed are: A (Virtual machine, Running, AG - - - - -), External1 (Virtual machine, Running, External1), GDMCA-AZUREDC1 (Virtual machine, Running, GDMCALABHV1), and GDMCALABHV1 (Virtual machine, Running, GDMCALABHV1). The 'GDMCALABHV1' row is highlighted with a red box.

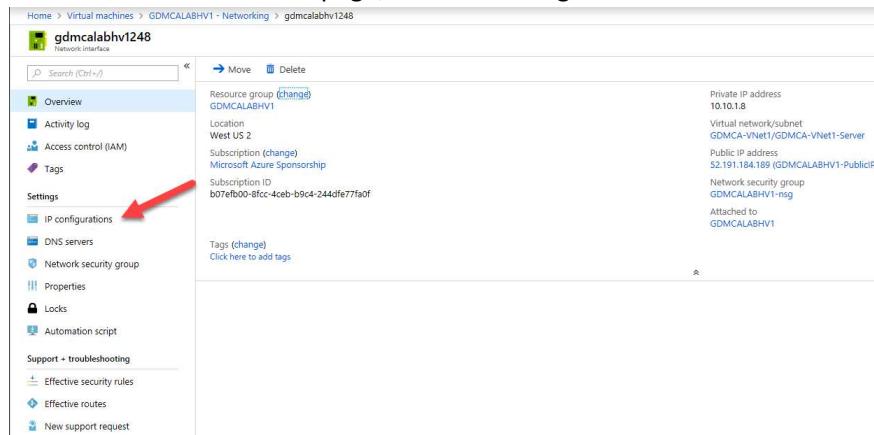
3. On the GDMCALABHV1page, select Networking.



4. On the GDMCALABHV1-Networking page, select Network Interface: gdmcalabhv1238.



5. On the Network Interface page, select IP configurations.



6. On the IP configurations page, select ipconfig1.

NAME	IP VERSION	TYPE	PRIVATE IP ADDRESS	PUBLIC IP ADDRESS
ipconfig1	IPv4	Primary	10.10.1.8 (Dynamic)	52.191.184.189 (GDMCALABHV1-PublicIP)

7. Change assignment setting from Dynamic to Static, and then click Save.

8. Go back to the IP configurations page, click Add.

NAME	IP VERSION	TYPE	PRIVATE IP ADDRESS	PUBLIC IP ADDRESS
ipconfig1	IPv4	Primary	10.10.1.8 (Static)	52.191.184.189 (GDMCALABHV1-PublicIP)

9. On the Add IP configuration page, settings as follow and then click OK.

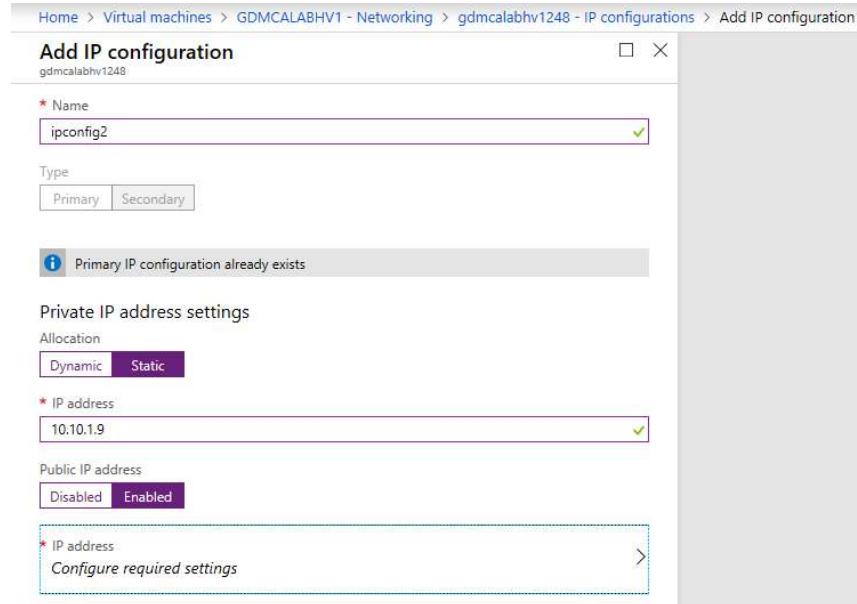
**Name:** ipconfig2

**Private IP address Allocation:** Static

**IP address:** 10.10.1.9

**Public IP address:** Enable

**IP address:** click configure required settings



10. Choose public IP address: Create new

**Name:** Enter name for Public IP

**SKU:** Basic

**Assignment: Static and then click OK**

**Add IP configuration**

- Name: ipconfig2
- Type: Primary
- Allocation: Static
- IP address: 10.10.1.9
- Public IP address: Enabled

**Choose public IP address**

These are the public IP addresses in the selected subscription and location 'West US 2':

- AGATLABH1-PublicIP1 (AGATLABH1) 13.77.150.126 (...)
- AGATLABH1-PublicIP2 (AGATLABH1) 52.183.32.206 (...)
- AGATLABH1-PublicIP3 (AGATLABH1) 13.66.198.200 (...)
- External1-ip (External1) 13.77.153.151 (...)
- GDMCA-AZUREDC1-ip (GDMCA-AZUREDC1) 13.66.204.136 (...)
- GDMCA-GWIP (GDMCAinet) 52.183.34.241 (...)
- GDMCALABH1-PublicIP1 (GDMCALABH1) 52.191.184.189 (...)

**Create public IP address**

- Name: GDMCALABH1-PublicIP2
- SKU: Basic
- Assignment: Static

**Choose public IP address: Create new**

**Name:** Enter name for Public IP

**SKU:** Basic

**Assignment: Static and then click OK**

**Add IP configuration**

- Name: ipconfig2
- Type: Primary
- Allocation: Static
- IP address: 10.10.1.9
- Public IP address: Enabled

**Choose public IP address**

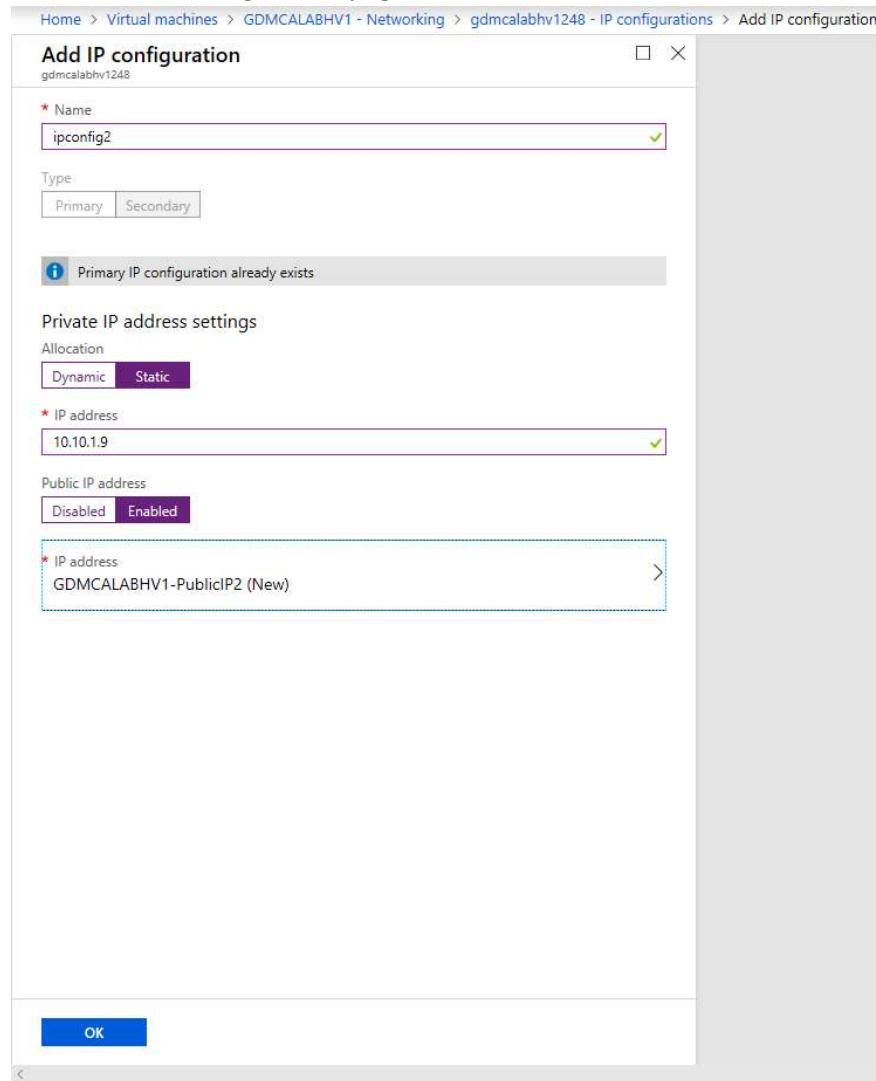
These are the public IP addresses in the selected subscription and location 'West US 2':

- AGATLABH1-PublicIP1 (AGATLABH1) 13.77.150.126 (...)
- AGATLABH1-PublicIP2 (AGATLABH1) 52.183.32.206 (...)
- AGATLABH1-PublicIP3 (AGATLABH1) 13.66.198.200 (...)
- External1-ip (External1) 13.77.153.151 (...)
- GDMCA-AZUREDC1-ip (GDMCA-AZUREDC1) 13.66.204.136 (...)
- GDMCA-GWIP (GDMCAinet) 52.183.34.241 (...)
- GDMCALABH1-PublicIP1 (GDMCALABH1) 52.191.184.189 (...)

**Create public IP address**

- Name: GDMCALABH1-PublicIP2
- SKU: Basic
- Assignment: Static

11. On the Add IP configuration page, click OK.



12. Repeat Add IP configurations steps If you need more public IP addresses.

gdmcalabhv1248 - IP configurations

IP forwarding settings: Enabled

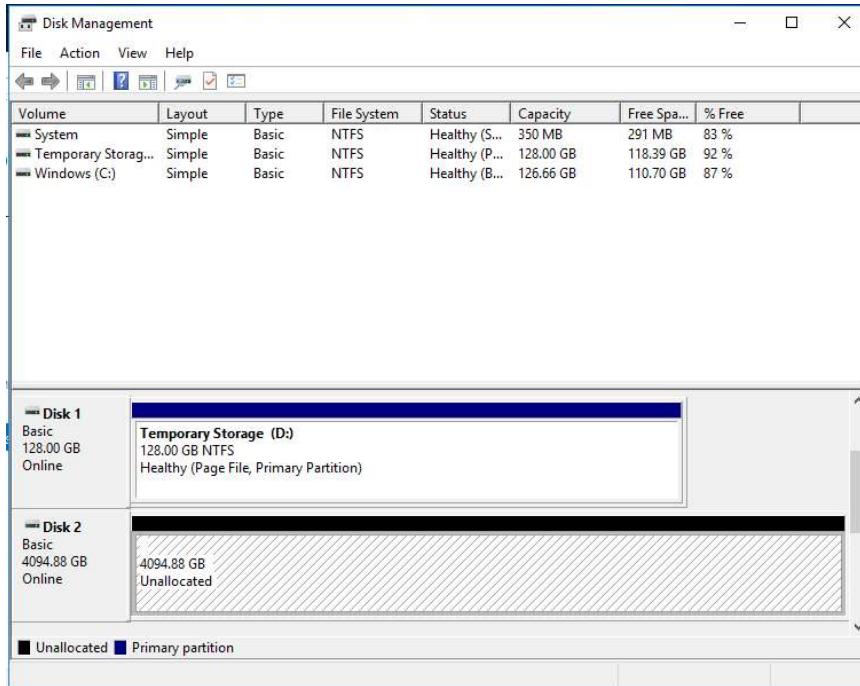
Virtual network: GDMCALABHV1-Vnet1

IP configurations: Subnet: GDMCALABHV1-Subnet (10.0.1.0/24)

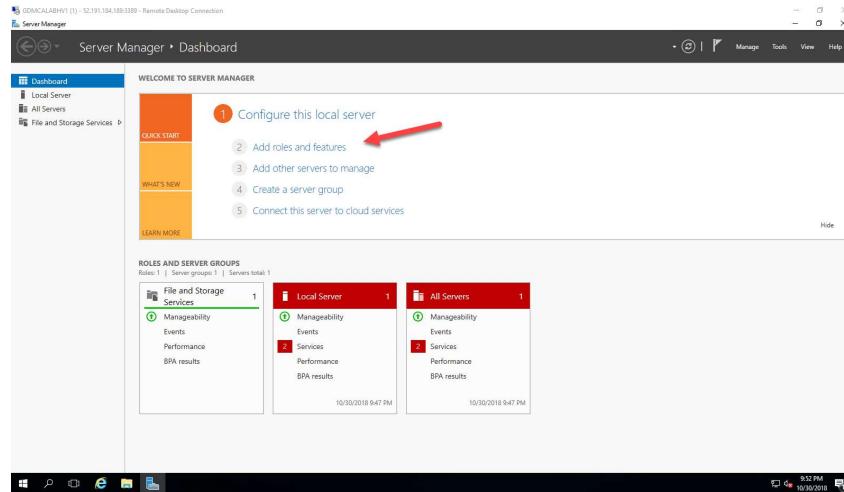
NAME	IP VERSION	TYPE	PRIVATE IP ADDRESS	PUBLIC IP ADDRESS
ipconfig1	IPv4	Primary	10.0.1.8 (Static)	52.191.184.189 (GDMCALABHV1-PublicIP1)
ipconfig2	IPv4	Secondary	10.0.1.9 (Static)	13.77.183.49 (GDMCALABHV1-PublicIP2)
ipconfig3	IPv4	Secondary	10.0.1.10 (Static)	13.84.166.42 (GDMCALABHV1-PublicIP3)

## Enable Hyper-V in the LAB Virtual Machine

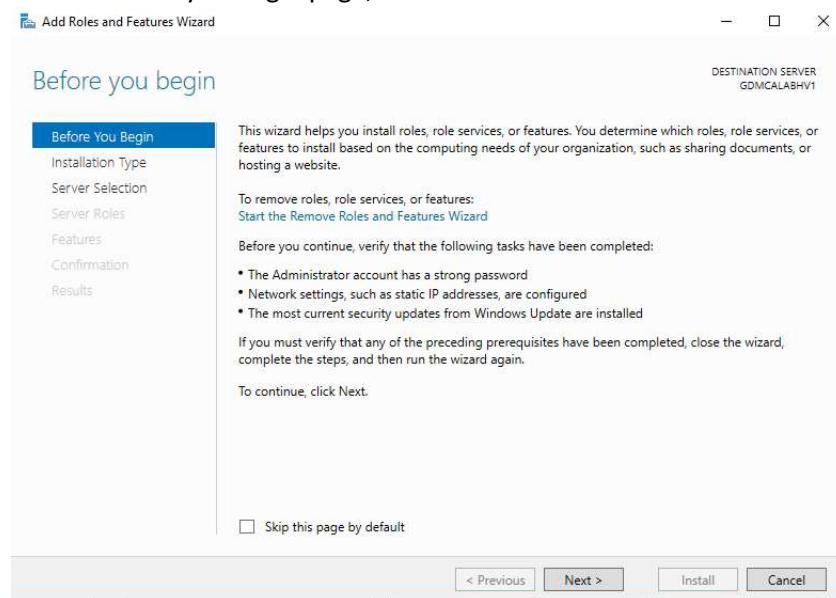
1. Start Azure virtual machine and log in.
2. Open Disk Management to partition and format for your new 4TB storage space. (Use ReFS + 64 KB Block Size.)



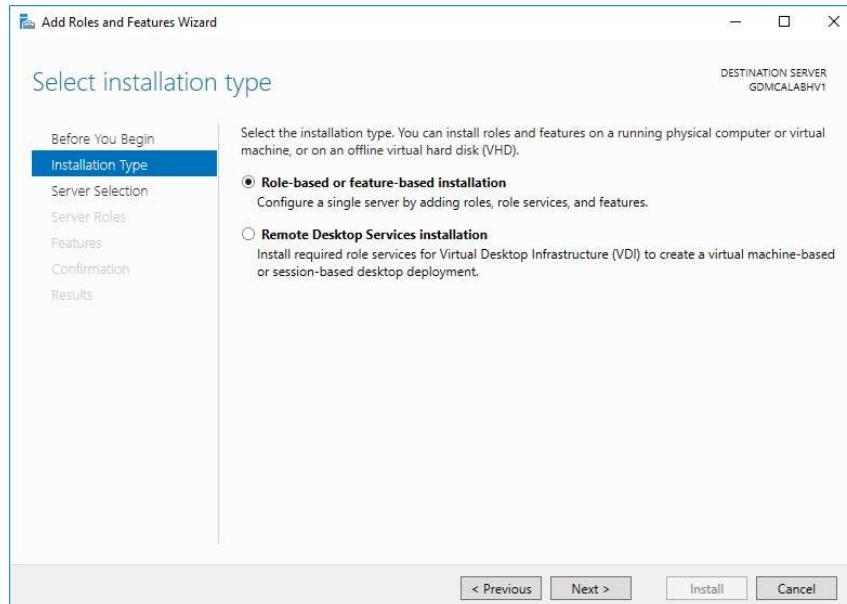
3. On the Server Manager Dashboard, click Add roles and feature.



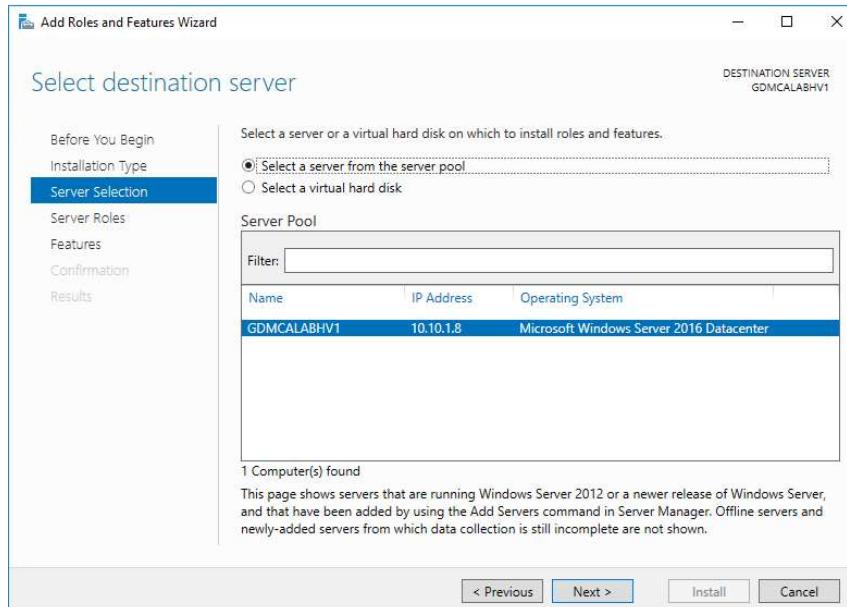
4. On the Before you begin page, click Next.



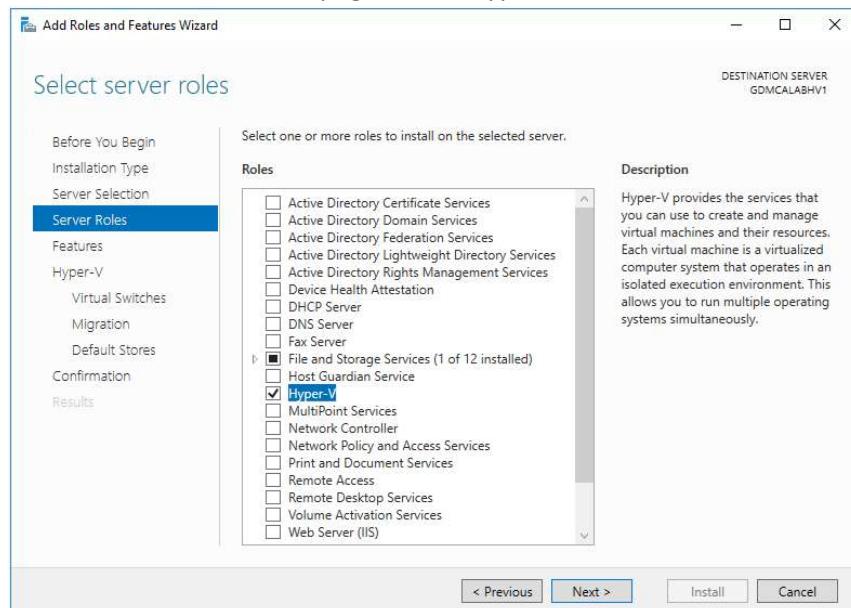
5. On the Select installation type, select Role-based or feature-based installation and then click Next.



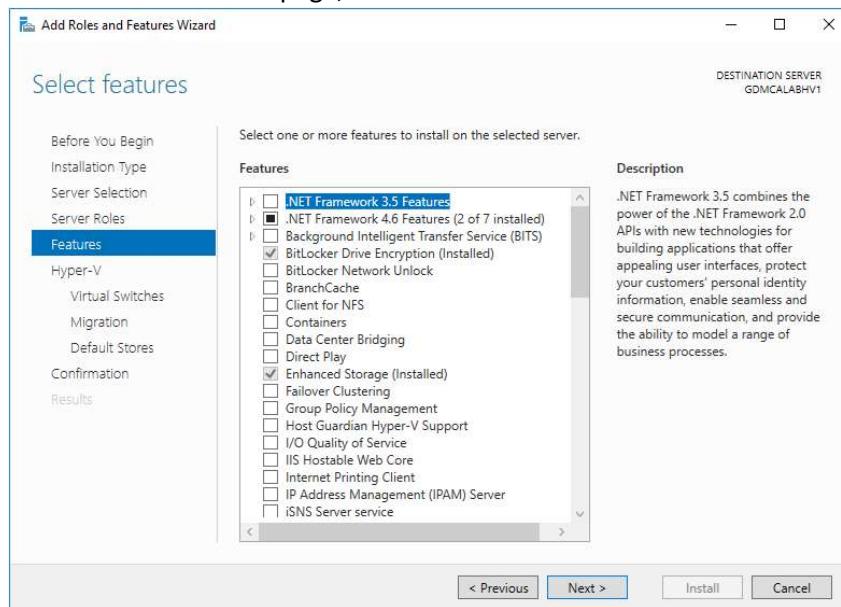
6. On the Select destination server page, click Next.



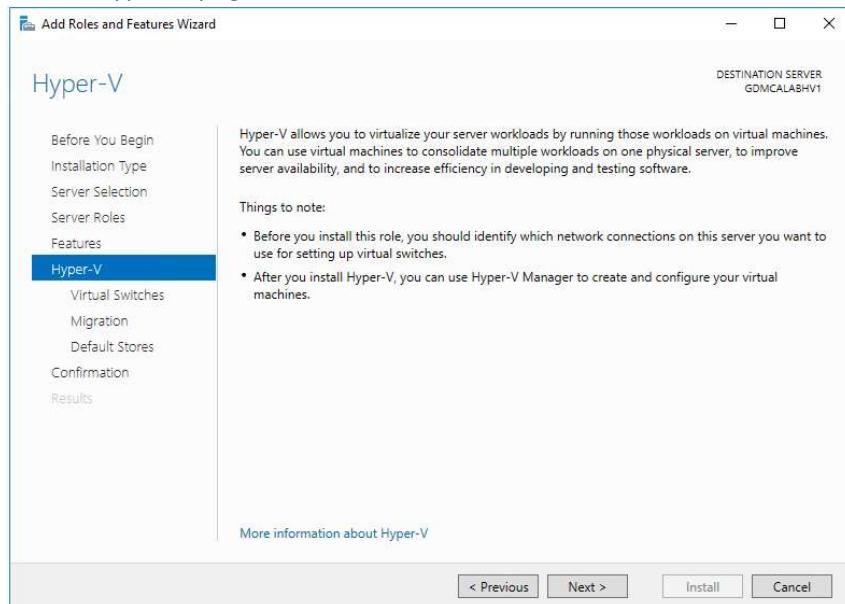
7. On the Select server roles page, select Hyper-V, click Add Features and then click Next.



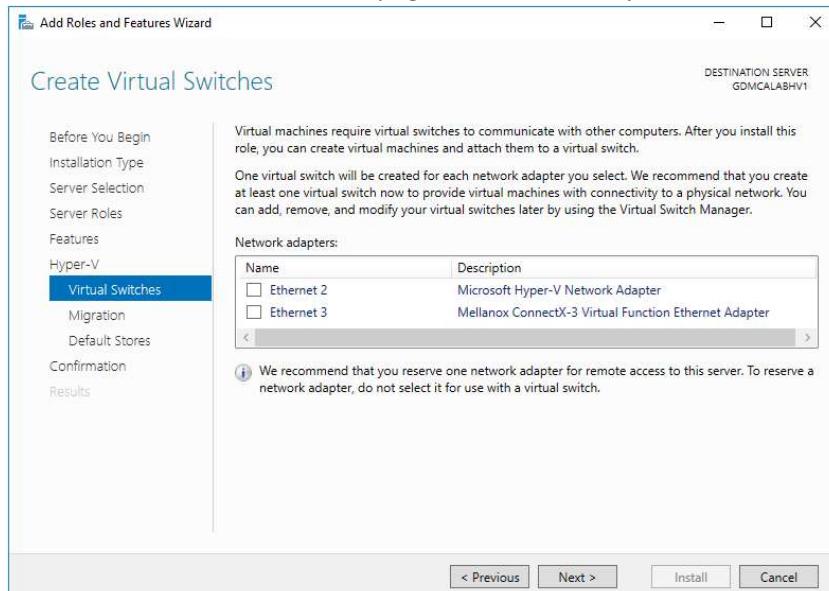
8. On the Select features page, click Next.



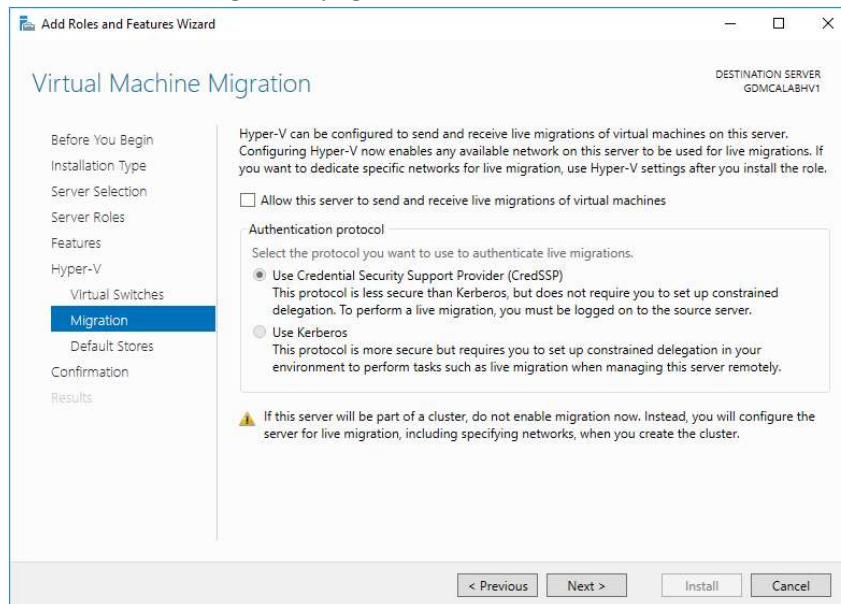
9. On the Hyper-V page, click Next.



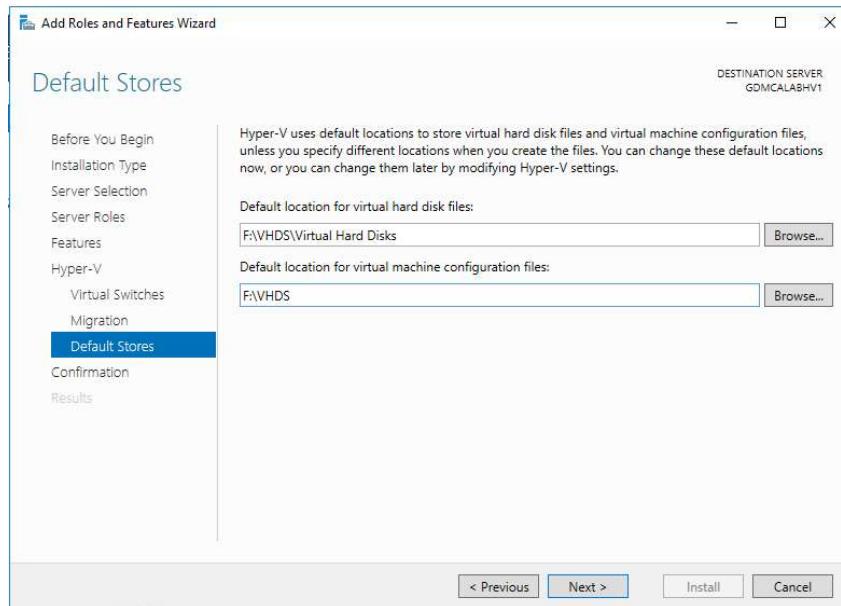
10. On the Create Virtual Switches page, don't select any interface and click Next.



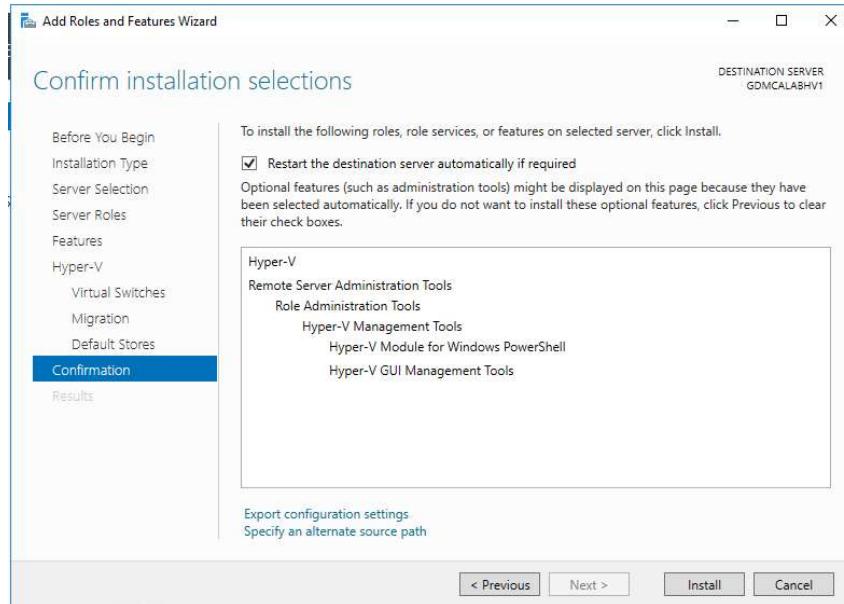
11. Once the Virtual Migration page, click Next.



12. On the Default Stores page, you can change the default location to your new 4TB storage space and then click Next.

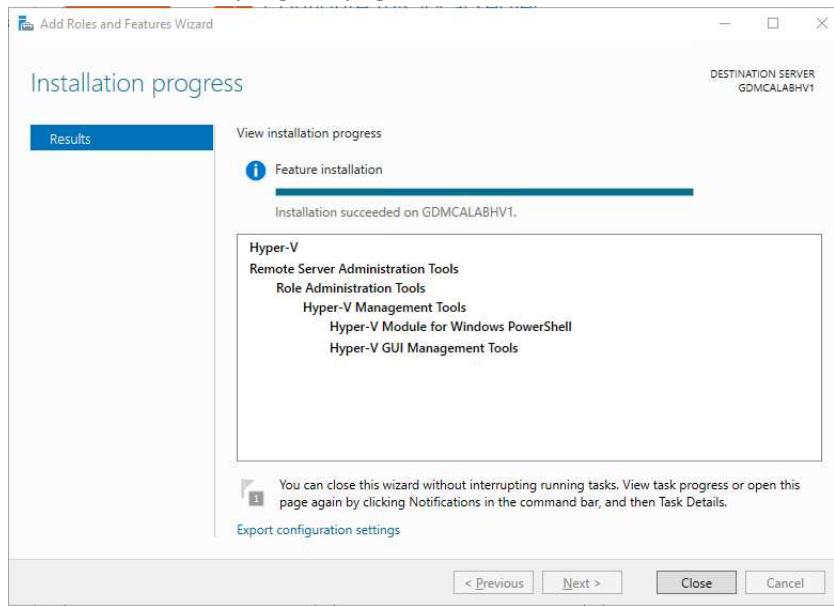


13. On the Confirm installation selections page, select Restart the destination server automatically if required and then click install.



14. Login to Azure Virtual machine after it restarted.

15. On the installation progress page, click Close.





## Configuring NAT Networking with one Public IP Address

To configure NAT Networking, we need to create an Internal Virtual Switch for nested guest VMs. In general, there are two options for networking with nested virtual machines, MAC Address Spoofing, and NAT networking. Unfortunately, MAC Address Spoofing is not possible in a public cloud environment. So, If you are using an Azure virtual machine network interface as your Hyper-V external virtual switch and have assigned it to nested guest VMS, the guest VMs won't be able to access the Internet. At this point, we have no choice, but to use NAT networking.

The steps below show how to configure a NetNat Virtual Switch with a single Public IP Address.

1. We can create an internal virtual switch and create NAT rules via Powershell cmdlet as follow:

```
PS C:\Windows\system32> $NetAdapter = Get-NetAdapter | Where-Object { $_.Name -eq "Virtual Machine Adapter" }  
PS C:\Windows\system32> $NetAdapter  
Name : Virtual Machine Adapter  
Status : Ready  
MacAddress : 00:0C:29:4D:4A:00  
InterfaceIndex : 14  
Dchet : 00000000000000000000000000000000  
LinkLayer : 00000000000000000000000000000000  
PS C:\Windows\system32> $NetAdapter | New-NetIPAddress -IPAddress 192.168.100.1 -PrefixLength 24 -  
InterfaceIndex 14  
PS C:\Windows\system32> $NetAdapter | New-NetNat -Name "NATNetwork" -InternalIPInterfaceAddressPrefix  
192.168.100.0/24
```