

PROJECT TITLE**BRIEF SUMMARY OF PROJECT:**

Objectives: Deploying NextCloud inside VM running on Azure

Outcomes: Website hosted in the NextCloud accessible to all

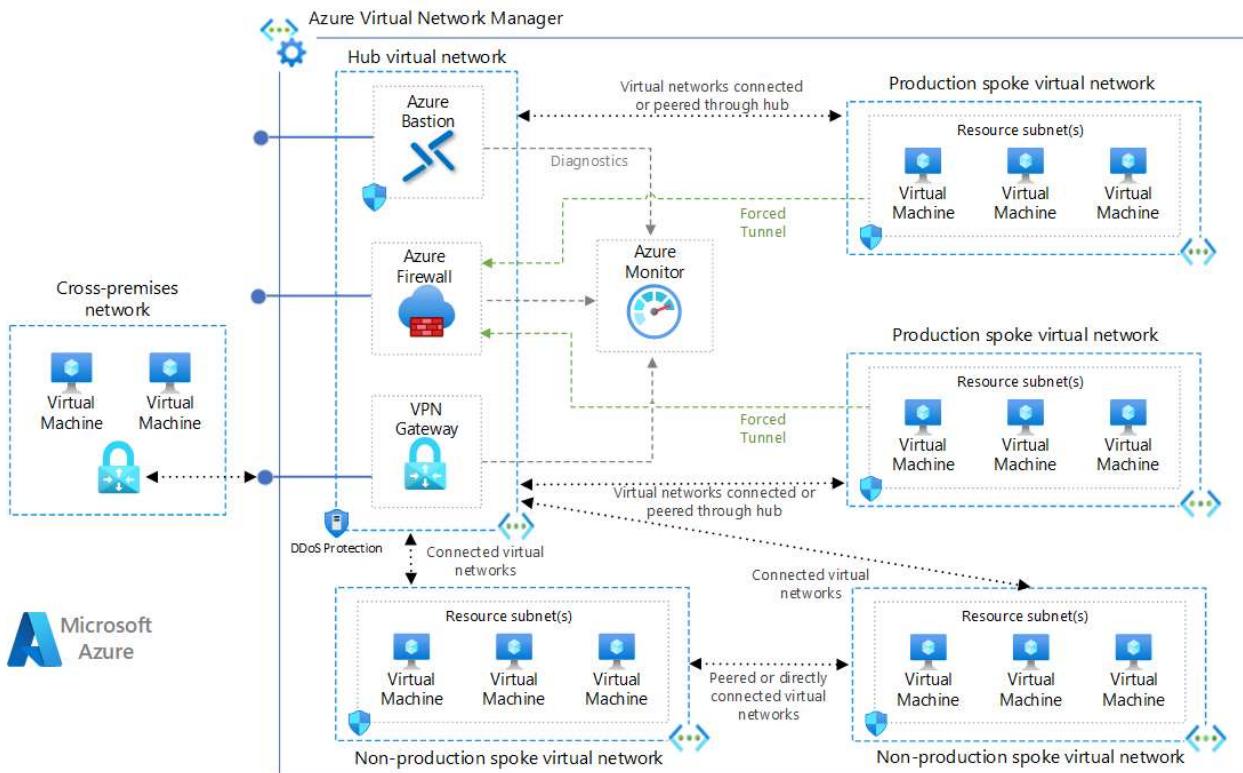
Where it can be used: Anywhere where hosting website is important with full-control over the web content and the resource and costing is not an issue.

Key Steps to perform

1. Set up a VNet, subnet, and NSG.
2. Create and configure the VM.
3. Use Bastion for secure SSH access.
4. Install and configure Nextcloud.
5. Enable and configure monitoring and alerts with Azure Monitor, Application Insights, and cost management features.

Setting up and configuring an Azure Virtual Machine for deploying a Nextcloud server, including key Azure monitoring features for managing and maintaining VM performance and availability.

Network Architecture



Steps to Set Up the Azure VM and Deploy Nextcloud

1. Create a Virtual Network (VNet)

- Log into your Azure portal, navigate to "Virtual Networks," and create a new VNet.

The screenshot shows the Microsoft Azure portal interface with the following sections visible:

- Azure services:** Includes links for Create a resource, Resource groups, Virtual machines, Azure Machine Learning, Virtual networks, Network security groups, Azure AI services, Azure AI services, Computer vision, and More services.
- Resources:** Shows a recent item: MSDN Platforms (Subscription, Last Viewed 6 months ago).
- Navigate:** Includes links for Subscriptions, Resource groups, All resources, and Dashboard.
- Bottom navigation bar:** Includes the Windows Start button, a search bar, and icons for File Explorer, Mail, Edge, OneDrive, Word, Excel, and Google Chrome.

Virtual networks - Microsoft Azure

portal.azure.com/#browse/Microsoft.Network%2FvirtualNetworks

Microsoft Azure

Virtual networks

No virtual networks to display

Create a virtual network to securely connect your Azure resources to each other. Connect your virtual network to your on-premises network using an Azure VPN Gateway or ExpressRoute.

Create virtual network

Type here to search

8:27 AM 11/7/2024

This screenshot shows the Microsoft Azure portal interface for managing virtual networks. The top navigation bar includes links for 'about', 'Parameters', 'Rules for dynamic...', 'Create a Rule to Per...', 'Recommended secu...', 'Plan security harden...', 'Enable Microsoft 36...', 'Microsoft 365 usag...', 'All Bookmarks', and user information. Below the navigation is the Microsoft Azure logo and a search bar. The main content area is titled 'Virtual networks' and displays a message stating 'No virtual networks to display'. It provides instructions for creating a virtual network using an Azure VPN Gateway or ExpressRoute, and features a prominent blue 'Create virtual network' button. The bottom of the screen shows the Windows taskbar with various pinned icons and the system clock indicating 8:27 AM on 11/7/2024.

Create virtual network - Microsoft Azure

portal.azure.com/#create/Microsoft.VirtualNetwork-ARM

Microsoft Azure

Create virtual network

Basics Security IP addresses Tags Review + create

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *: MSDN Platforms

Resource group *: (New) TestRG1

Create new

Instance details

Virtual network name *: TestVNet1

Region *: (US) East US

Previous Next Review + create

Give feedback

Type here to search

8:29 AM 11/7/2024

This screenshot shows the 'Create virtual network' wizard in the Microsoft Azure portal. The top navigation bar is identical to the previous screenshot. The main form has a tab bar with 'Basics' selected, followed by 'Security', 'IP addresses', 'Tags', and 'Review + create'. The 'Basics' section asks for the subscription and resource group, both set to 'MSDN Platforms' and '(New) TestRG1' respectively. Below this is the 'Instance details' section, which requires a 'Virtual network name' (set to 'TestVNet1') and a 'Region' (set to '(US) East US'). At the bottom of the form are 'Previous', 'Next', and 'Review + create' buttons, along with a 'Give feedback' link. The bottom of the screen shows the Windows taskbar and system status.

Create virtual network - Microsoft Azure

portal.azure.com/#create/Microsoft.VirtualNetwork-ARM

Microsoft Azure

ashokkmr.pandey@yahoo...
DEFAULT DIRECTORY (ASHOKKM...)

Home > Virtual networks >

Create virtual network

Basics Security IP addresses Tags Review + create

+ Add a subnet

10.0.0.0/16

Subnets	IP address range	Size	NAT gateway
default	10.0.0.0 - 10.0.0.255	/24 (256 addresses)	-

Delete address space

10.0.0.0 - 10.0.255.255 65,536 addresses

Previous Next Review + create Give feedback

Type here to search

8:30 AM 11/7/2024

Edit subnet - Microsoft Azure

portal.azure.com/#create/Microsoft.VirtualNetwork-ARM

Microsoft Azure

ashokkmr.pandey@yahoo...
DEFAULT DIRECTORY (ASHOKKM...)

Home > Virtual networks >

Create virtual network

Basics Security IP addresses Tags Review + create

+ Add a subnet

10.0.0.0/16

Subnets	IP address range	Size
default	10.0.0.0 - 10.0.0.255	/24 (256 addresses)

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

Subnet purpose

Name *

IPv4

Include an IPv4 address space

IPv4 address range *
10.0.0.0 - 10.0.255.255

Starting address *

Size

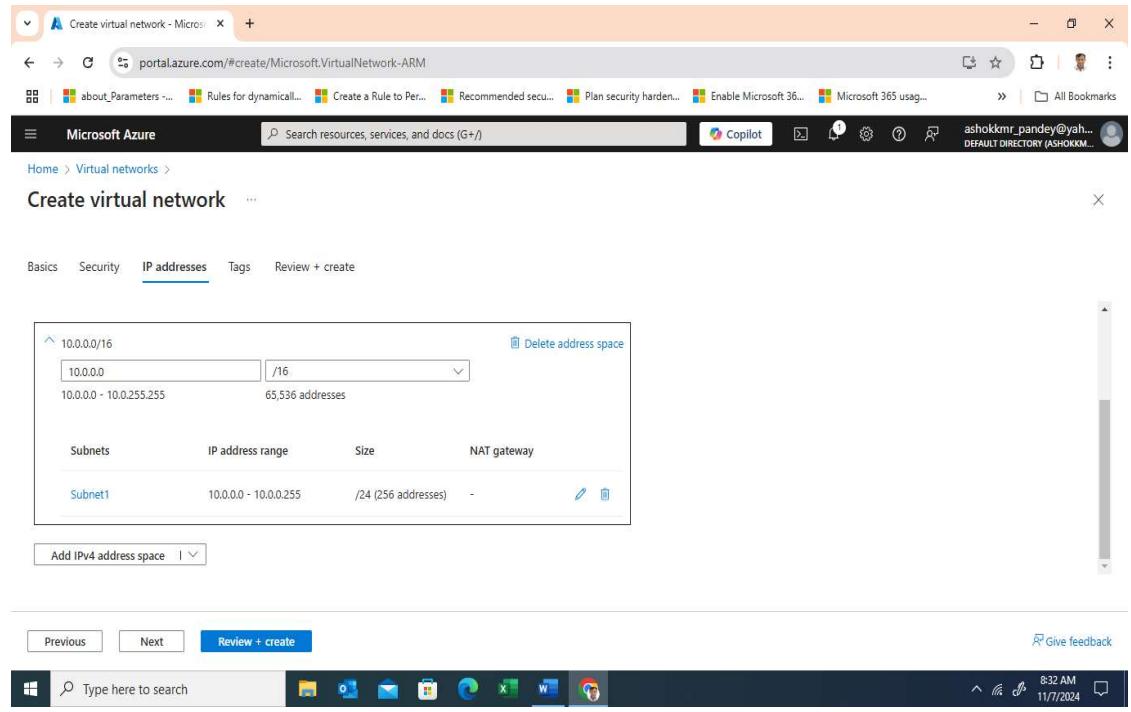
Subnet address range

IPv6

Save Cancel Give feedback

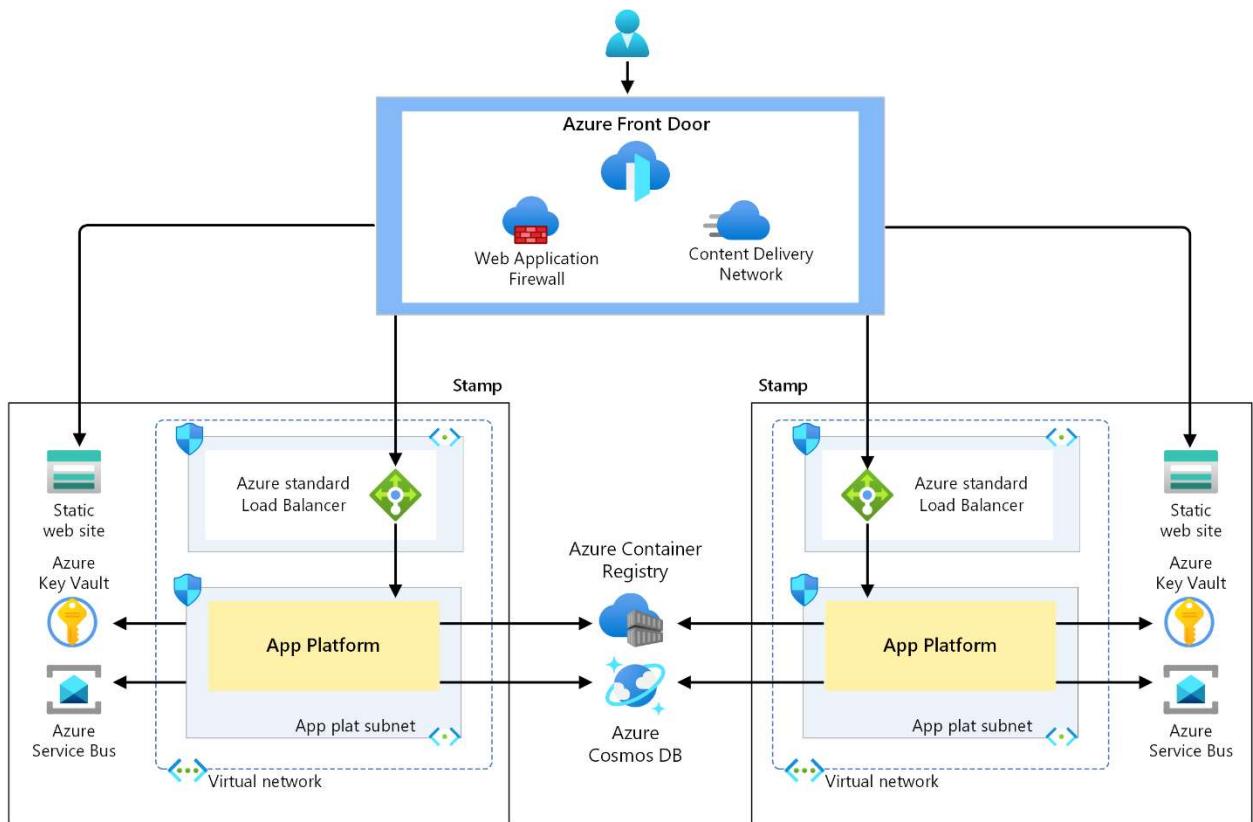
Type here to search

8:31 AM 11/7/2024



- Define a name, address space (e.g., 10.0.0.0/16), and create at least one subnet (e.g., 10.0.0.0/24).
- This network will allow your VM to communicate securely within the cloud environment.

2. Create the Network Security Group (NSG)



- In the Azure portal, create an NSG to control inbound and outbound traffic.

https://portal.azure.com/#blade/HubsExtension/BrowseResourceBlade/resourceType/Microsoft.Network%2FNetworkSecurityGroups

Create network security group

Basics

Project details

- Subscription *: MSDN Platforms
- Resource group *: TestRG1

Instance details

- Name *: CustomNSG
- Region *: East US

Review + create

9:11 AM 11/7/2024

Microsoft.NetworkSecurityGroup-20241107091015 | Overview

Deployment

Your deployment is complete

Deployment name : Microsoft.NetworkSecurityGroup-2024... Start time : 11/7/2024, 9:11:34 AM
Subscription : MSDN Platforms Correlation ID : 80411d8f-6f86-46cd-a610-07c5878dec...
Resource group : TestRG1

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

Cost management
Get notified to stay within your budget and prevent unexpected charges on your bill.
Set up cost alerts >

Microsoft Defender for Cloud
Secure your apps and infrastructure
Go to Microsoft Defender for Cloud >

Free Microsoft tutorials
Start learning today >

Work with an expert

9:11 AM 11/7/2024

CustomNSG - Microsoft Azure

portal.azure.com/#@ashokkmpandey@yahoo.co.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bddc-c2e6e8e35b09/resourcegroups/TestRG1/pr...

Microsoft Azure

CustomNSG

Network security group

Overview

Inbound security rules

Outbound security rules

Subnets

Properties

Locks

Monitoring

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Custom security rules : 0 inbound, 0 outbound

Associated with : 0 subnets, 0 network interfaces

Resource group (move) : TestRG1

Location : East US

Subscription (move) : MSDN Platforms

Subscription ID : 9ad1259f-9311-4912-bddc-c2e6e8e35b09

Tags (edit) : Add tags

Priority ↑ Name ↑ Port ↑ Protocol ↑ Source ↑ Destination ↑ Action ↑

Priority ↑	Name ↑	Port ↑	Protocol ↑	Source ↑	Destination ↑	Action ↑
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalanc...	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

JSON View

https://portal.azure.com/#@ashokkmpandey@yahoo.co.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bddc-c2e6e8e35b09/resourcegroups/TestRG1/providers/Microsoft.Network/networkSecurityGroups/CustomNSG/inboundSecurityRules

9:12 AM 11/7/2024

Add inbound security rule - Microsoft Azure

portal.azure.com/#@ashokkmpandey@yahoo.co.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bddc-c2e6e8e35b09/resourcegroups/TestRG1/pr...

Microsoft Azure

CustomNSG | Inbound security rules

Network security group

Source (Any)

Source port ranges (Any)

Destination (Any)

Service (HTTP)

Destination port ranges (80)

Protocol (TCP)

Priority ↑ Name ↑ Port ↑ Protocol ↑

Priority ↑	Name ↑	Port ↑	Protocol ↑
65000	AllowVnetInBound	Any	Any
65001	AllowAzureLoadBalanc...	Any	Any
65500	DenyAllInBound	Any	Any

Add Cancel Give feedback

9:13 AM 11/7/2024

The screenshot shows the Microsoft Azure portal interface. The user is navigating through the Azure Network Security Group (NSG) settings for a specific NSG named 'CustomNSG'. On the left, a sidebar menu is open, showing options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (Inbound security rules selected), Outbound security rules, Network interfaces, Subnets, Properties, Locks, Monitoring, and Automation. The main content area displays the 'Inbound security rules' section, which lists three existing rules: 'AllowVnetInBound' (port 65000), 'AllowAzureLoadBal...' (port 65001), and 'DenyAllInBound' (port 65500). A modal dialog box titled 'Add inbound security rule' is open, allowing the user to define a new rule. The 'Protocol' dropdown is set to 'TCP'. The 'Priority' field is set to 100. The 'Name' field contains 'AllowAnyHTTPinbound'. The 'Action' dropdown is set to 'Allow'. The 'Description' field is empty. At the bottom of the dialog are 'Add' and 'Cancel' buttons.

The screenshot shows the Microsoft Azure portal interface. The user is navigating through the Azure Network Security Group (NSG) settings for a specific NSG named 'CustomNSG'. On the left, a sidebar menu is open, showing options like Create, Manage view, Filter for any field..., Name, CustomNSG, Settings (Subnets selected), Inbound security rules, Outbound security rules, Network interfaces, Subnets (selected), Properties, Locks, Monitoring, and Automation. The main content area displays the 'Subnets' section, which shows a table with columns: Name, Address range, and Virtual network. The table is currently empty, displaying the message 'No results.' At the bottom of the screen, the Windows taskbar is visible with various pinned icons.

Note: -Repeat the same step to add rules for both Https and SSH

The screenshot shows two side-by-side Azure portal windows. The left window displays the 'CustomNSG | Outbound security rules' blade, where a new rule is being configured. The right window shows the 'Associate subnet' dialog, where a specific subnet is selected for association with the NSG.

Left Window: Add outbound security rule

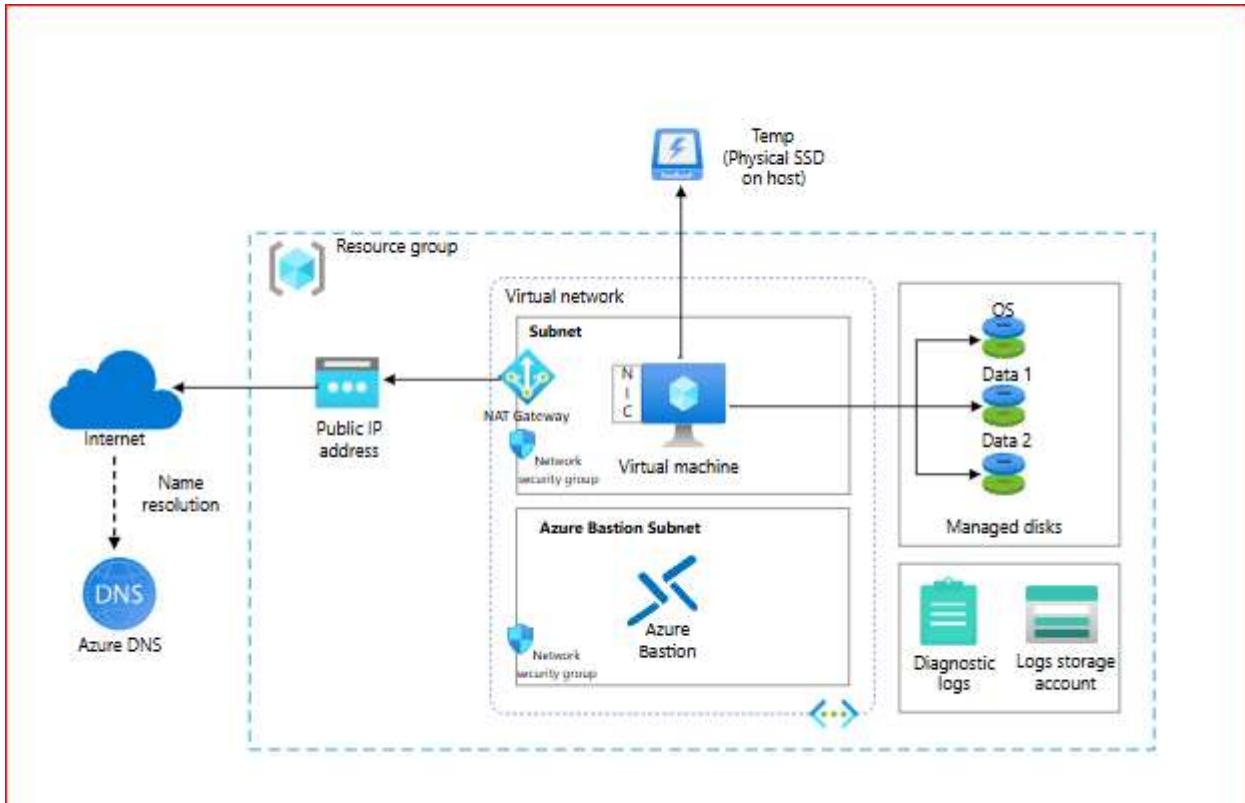
- Source:** Any
- Source port ranges:** * (empty)
- Destination:** Any
- Service:** RDP
- Destination port ranges:** 3389
- Protocol:** TCP (selected)

Right Window: Associate subnet

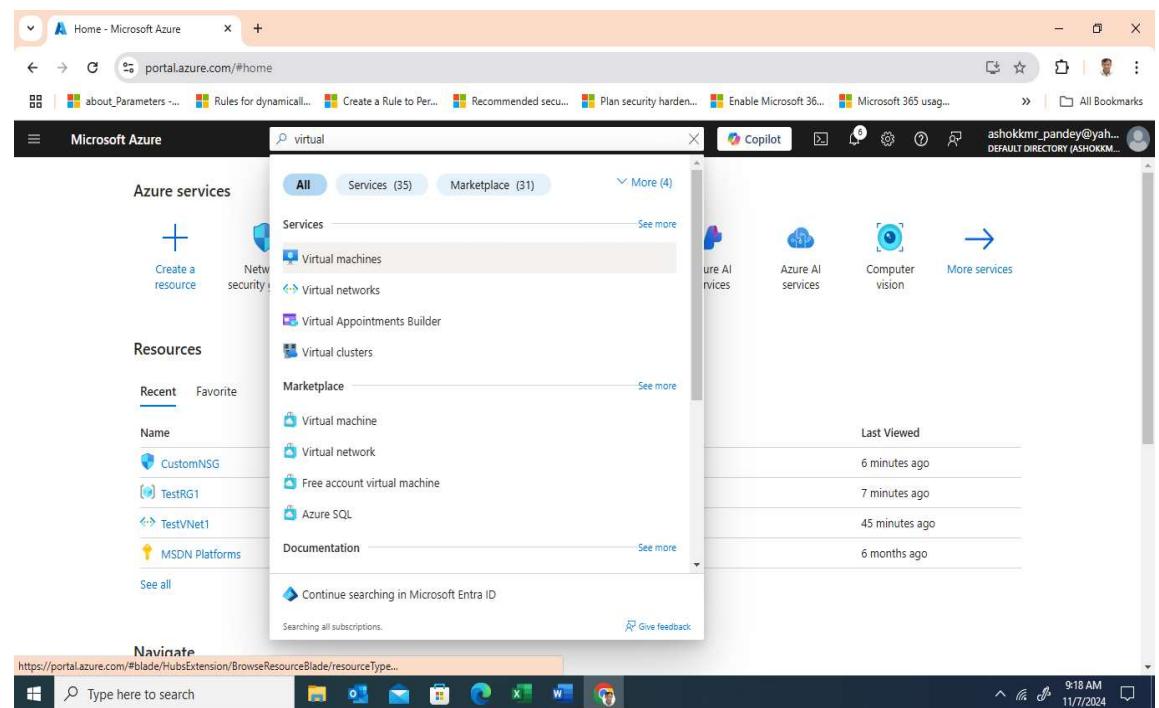
- Virtual network:** TestVNet1 (TestRG1)
- Subnet:** Subnet1

- Add rules to allow SSH on port 22 (initially), HTTP on port 80, and HTTPS on port 443.
- Later, you'll use Azure Bastion for SSH access, eliminating the need to open SSH to the public.

3. Create the Virtual Machine (VM)



- From the "Virtual Machines" section, create a new VM, selecting the appropriate operating system (e.g., Ubuntu).



Virtual machines

Showing 0 to 0 of 0 records.

Name ↑ Subscription ↑ Resource group ↑ Location ↑ Status ↑ Operating system ↑ Size ↑ Public IP address ↑ Disks ↑

Azure virtual machine
Create a virtual machine hosted by Azure

Azure virtual machine jet configuration
Create a virtual machine with presets based on your workloads

More VMs and related solutions
Discover and deploy full workloads and Azure products for your business needs

Create a virtual machine

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * Resource group * Create new

Instance details

Virtual machine name *

< Previous Next : Disks > Review + create

Create a virtual machine

Subscription * Resource group *

Virtual machine name *

< Previous Give feedback

Create a virtual machine

Virtual machine name * Region * Availability options Security type
Image * VM architecture Run with Azure Spot discount Size *

< Previous Give feedback

Screenshot of the Microsoft Azure portal showing the 'Create a virtual machine' wizard. The page is titled 'Create a virtual machine' and shows the 'Administrator account' step.

VM architecture: x64 (selected)

Run with Azure Spot discount: (checkbox)

Size: Standard_D4s_v3 - 4 vcpus, 16 GiB memory (₹11,660.57/month) (selected)

Enable Hibernation: (checkbox)

Administrator account:

- Authentication type:** SSH public key (selected)
- Password (radio button)

Review + create button is visible at the bottom.

Screenshot of the Microsoft Azure portal showing the 'Create a virtual machine' wizard. The page is titled 'Create a virtual machine' and shows the 'Administrator account' step.

Administrator account:

- Authentication type:** SSH public key (selected)
- Password (radio button)

A tooltip message appears: "Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine."

Username: azureuser

SSH public key source: Generate new key pair

SSH Key Type:

- RSA SSH Format (selected)
- Ed25519 SSH Format

A tooltip message for Ed25519: "Ed25519 provides a fixed security level of no more than 128 bits for 256-bit key, while RSA could offer better security with keys longer than 3072 bits."

Review + create button is visible at the bottom.

Screenshot of the Microsoft Azure portal showing the 'Create a virtual machine' wizard. The current step is 'Inbound port rules'. The 'Allow selected ports' option is selected, and 'SSH (22)' is chosen from the dropdown. A note states: 'All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.' Navigation buttons at the bottom include '< Previous', 'Next : Disks >', and 'Review + create'.

Screenshot of the Microsoft Azure portal showing the 'Create a virtual machine' wizard. The current step is 'Networking'. The 'Networking' tab is selected. Under 'Network interface', it shows 'Virtual network' set to 'TestVNet1', 'Subnet' set to 'Subnet1 (10.0.0.0/24)', and 'Public IP' set to '(new) TestVM1-ip'. The 'NIC network security group' dropdown is set to 'None'. Navigation buttons at the bottom include '< Previous', 'Next : Management >', and 'Review + create'.

Screenshot of the Microsoft Azure portal showing the 'Create a virtual machine' wizard.

The current step is 'Create a virtual machine'.

Configuration details:

- NIC network security group: Basic (selected)
- Public inbound ports: Allow selected ports (selected)
- Select inbound ports: SSH (22)
- A warning message: "⚠️ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses."
- Delete public IP and NIC when VM is deleted: Unchecked

Buttons at the bottom: < Previous, Next : Management >, Review + create, Give feedback.

Bottom navigation bar: Type here to search, taskbar icons (File Explorer, Mail, Edge, Task View, File Explorer, Task View, File Explorer, Task View), system tray (9:51 AM, 11/7/2024).

Screenshot of the Microsoft Azure portal showing the 'Create a virtual machine' wizard.

The current step is 'Create a virtual machine'.

Configuration details:

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

A section titled 'Load balancing' is present, with a note: "You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#)".

Load balancing options:

- None (selected)
- Azure load balancer: Supports all TCP/UDP network traffic, port-forwarding, and outbound flows.
- Application gateway: Web traffic load balancer for HTTP/HTTPS with URL-based routing, SSL termination, session persistence, and web application firewall.

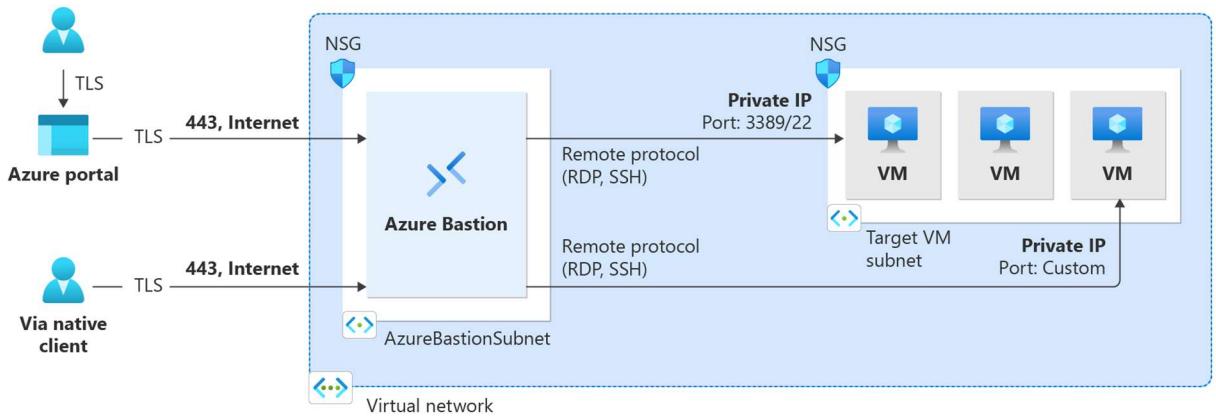
Buttons at the bottom: < Previous, Next : Management >, Review + create, Give feedback.

Bottom navigation bar: Type here to search, taskbar icons (File Explorer, Mail, Edge, Task View, File Explorer, Task View, File Explorer, Task View), system tray (9:52 AM, 11/7/2024).

- Select a VM size (e.g., Standard_B2s for testing purposes).
- Associate the VM with the VNet and subnet created in Step 1 and apply the NSG created in Step 2.

4. Configure Bastion for Secure SSH Access

Solution Architecture



This screenshot shows the Microsoft Azure portal interface for a virtual machine named 'TestVM1'. The page is titled 'TestVM1 - Microsoft Azure'. The left sidebar shows navigation options like 'Create', 'Switch to classic', and 'Virtual machines'. The main content area displays the 'Overview' tab for 'TestVM1'. The 'Essentials' section provides key details:

- Resource group: [TestRG1](#)
- Status: Running
- Location: East US
- Subscription: [9ad1259f-9311-4912-bdcd-c2e6e8e35b09](#)
- Operating system: Linux (ubuntu 20.04)
- Size: Standard D2s v3 (2 vcpus, 8 GiB memory)
- Public IP address: [172.191.4.250](#)
- Virtual network/subnet: [TestVNet1/Subnet1](#)
- DNS name: [Not configured](#)
- Health state: -
- Time created: 11/7/2024, 4:24 AM UTC

The URL in the browser bar is: <https://portal.azure.com/#@ashokkmrpandeyyahoo.co.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bdcd-c2e6e8e35b09/resourceGroups/TestRG1/providers/Microsoft.Compute/virtualMachines/TestVM1/bastionHost>.

The screenshot shows the Microsoft Azure portal interface. The left sidebar navigation bar is visible, showing 'Virtual machines' and 'TestVM1'. The main content area is titled 'TestVM1 | Bastion' and displays the 'Create Bastion' configuration page. The 'Name' field is set to 'TestVNet1-bastion', 'Resource group' to 'TestRG1', 'Virtual network' to 'TestVNet1', and 'Public IP address' to 'TestVNet1-ip'. A 'Deploy Bastion' button is prominently displayed at the bottom. On the right side of the screen, there is a 'Notifications' panel showing recent activity: 'Creating a new Bastion' (Running), 'Successfully added subnet' (a few seconds ago), and 'Started virtual machine' (3 minutes ago). The status bar at the bottom indicates the date and time as 11/7/2024, 6:36 PM.

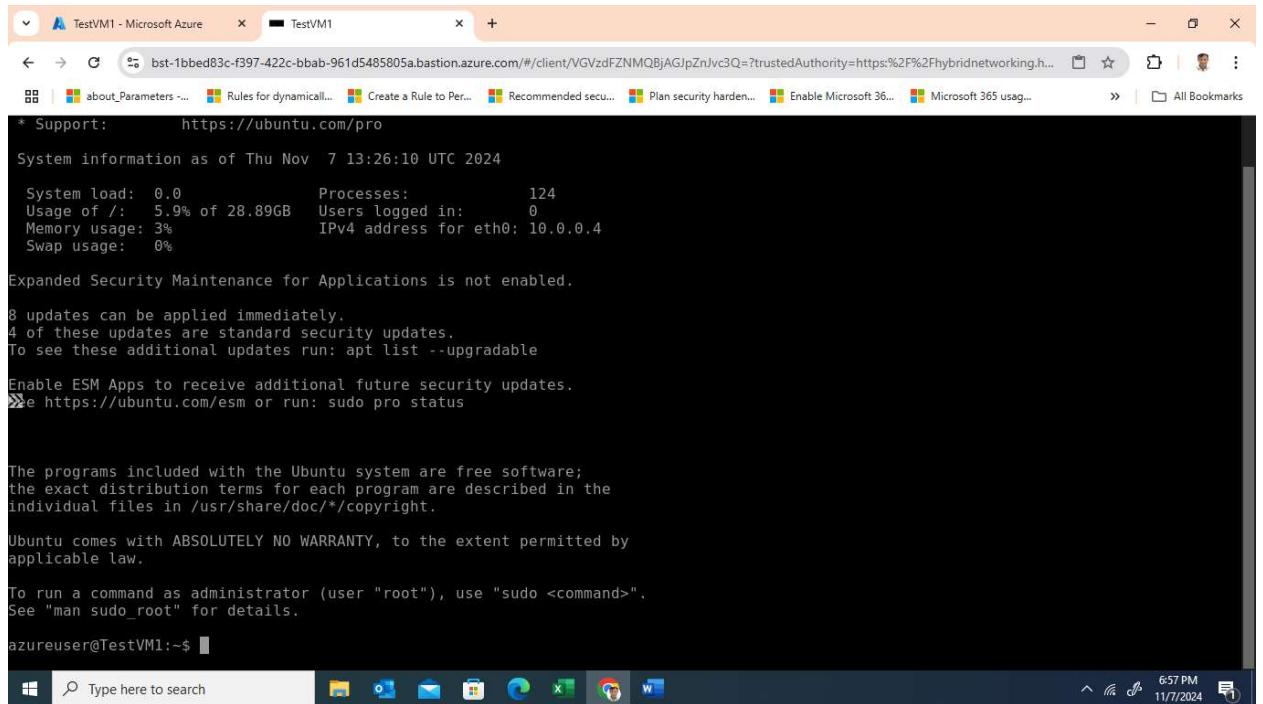
This screenshot is identical to the one above, showing the 'Create Bastion' configuration page for 'TestVM1'. The 'Deploy Bastion' button is highlighted. The 'Notifications' panel on the right is also present, displaying the same three recent events: 'Creating a new Bastion', 'Successfully added subnet', and 'Started virtual machine'. The status bar at the bottom shows the date and time as 11/7/2024, 6:37 PM.

The screenshot shows the Microsoft Azure portal interface. The left sidebar displays the navigation path: Home > Virtual machines > TestVM1. The main content area is titled "TestVM1 | Bastion" and shows the Bastion connection configuration for the virtual machine. The "Bastion" section is selected in the left sidebar. The right pane contains the following details:

- Using Bastion:** TestVNet1-bastion
- Provisioning State:** Succeeded
- Authentication Type:** VM Password
- Username:** (empty input field)
- VM Password:** (empty input field)
- Show** checkbox (unchecked)
- Open in new browser tab** checkbox (checked)

At the bottom of the right pane, there is a "Connect" button and a link to "Tell us what you think of the Bastion experience".

This screenshot is identical to the one above, but the "Authentication Type" dropdown is set to "SSH Private Key from Local File". The "Username" field contains "azureuser" and the "Local File" field contains "TestVM1_key (1).pem". All other elements, including the "Connect" button and feedback link, remain the same.



```
* Support: https://ubuntu.com/pro

System information as of Thu Nov 7 13:26:10 UTC 2024

System load: 0.0 Processes: 124
Usage of /: 5.9% of 28.89GB Users logged in: 0
Memory usage: 3% IPv4 address for eth0: 10.0.0.4
Swap usage: 0%

Expanded Security Maintenance for Applications is not enabled.

8 updates can be applied immediately.
4 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

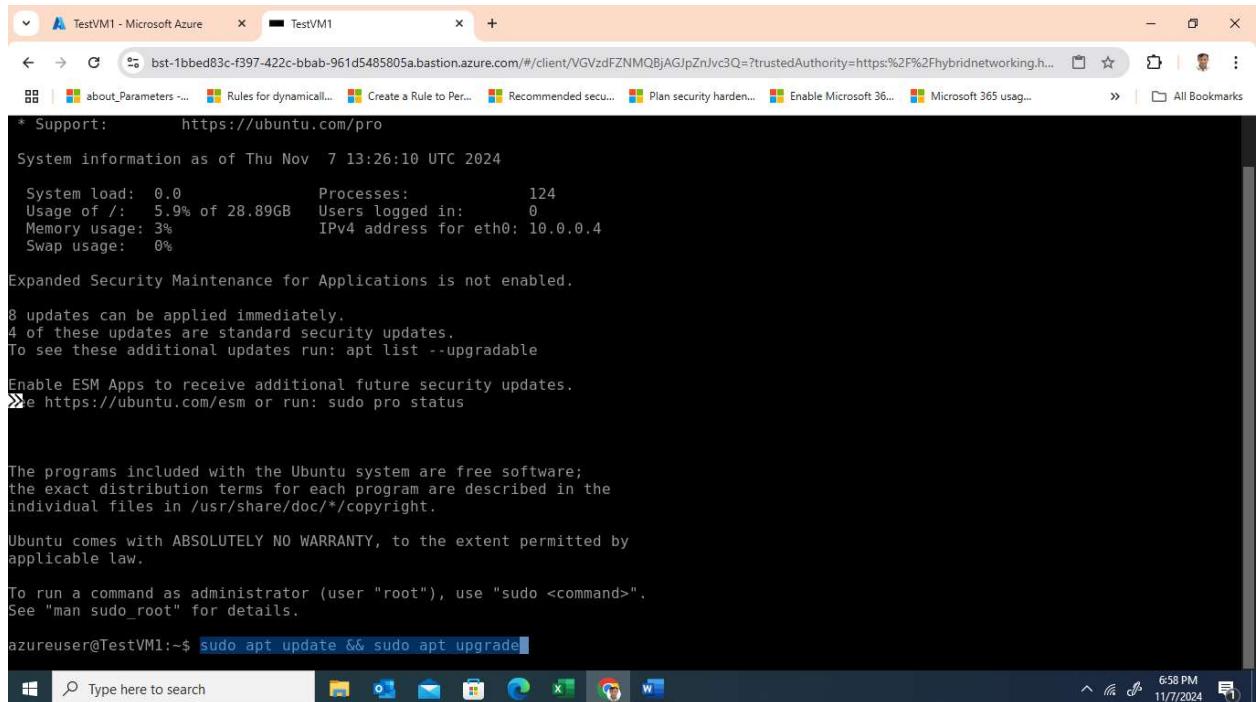
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@TestVM1:~$
```

- Navigate to the VM's settings and enable Azure Bastion, a secure SSH alternative that doesn't require open public ports.
- Once deployed, connect to the VM via Bastion using SSH, ensuring external SSH access is unnecessary.

5. Install the Nextcloud Server

- SSH into the VM using Azure Bastion.



```
* Support: https://ubuntu.com/pro

System information as of Thu Nov 7 13:26:10 UTC 2024

System load: 0.0          Processes:      124
Usage of /: 5.9% of 28.89GB Users logged in: 0
Memory usage: 3%          IPv4 address for eth0: 10.0.0.4
Swap usage: 0%          

Expanded Security Maintenance for Applications is not enabled.

8 updates can be applied immediately.
4 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

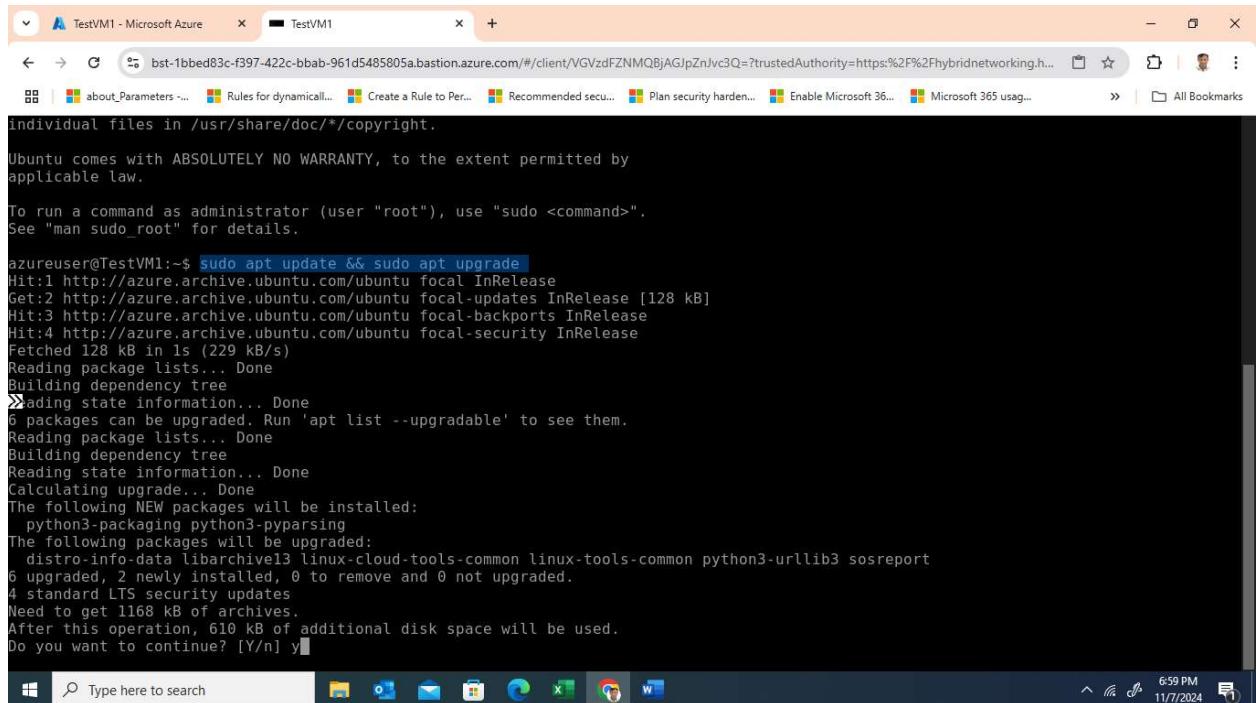
Enable ESM Apps to receive additional future security updates.
»e https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@TestVM1:~$ sudo apt update && sudo apt upgrade
```



```
individual files in /usr/share/doc/*/*copyright.

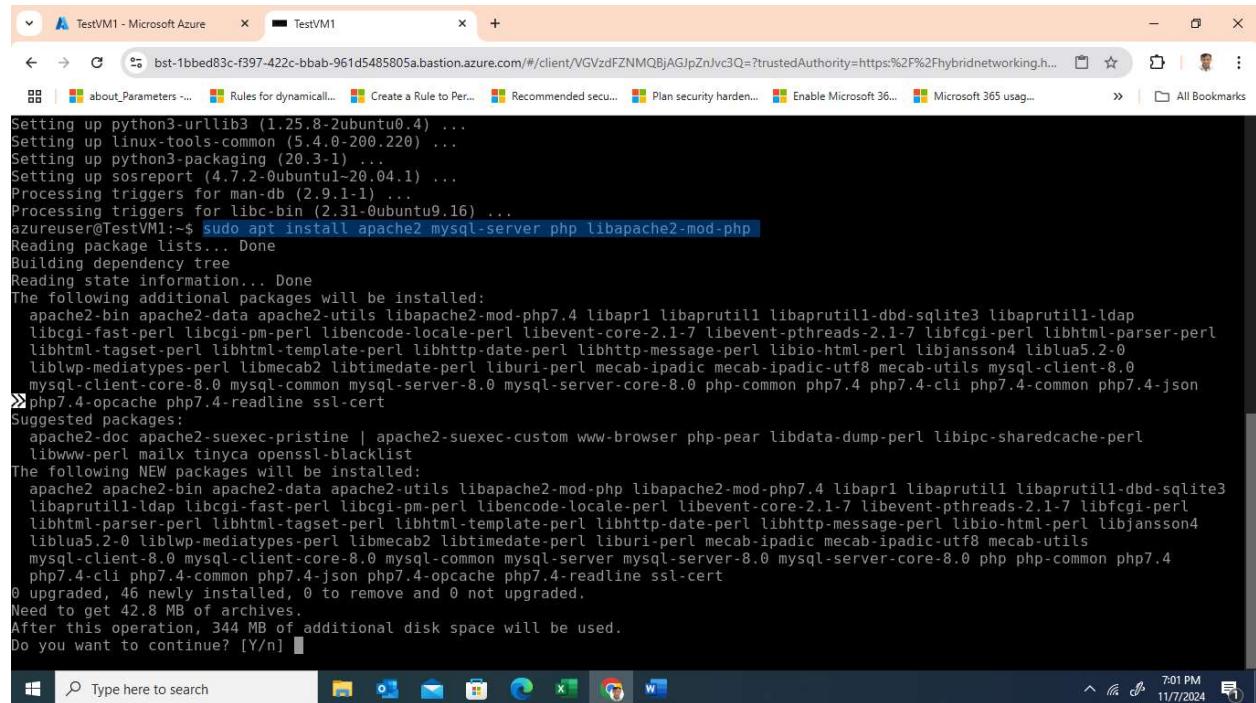
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

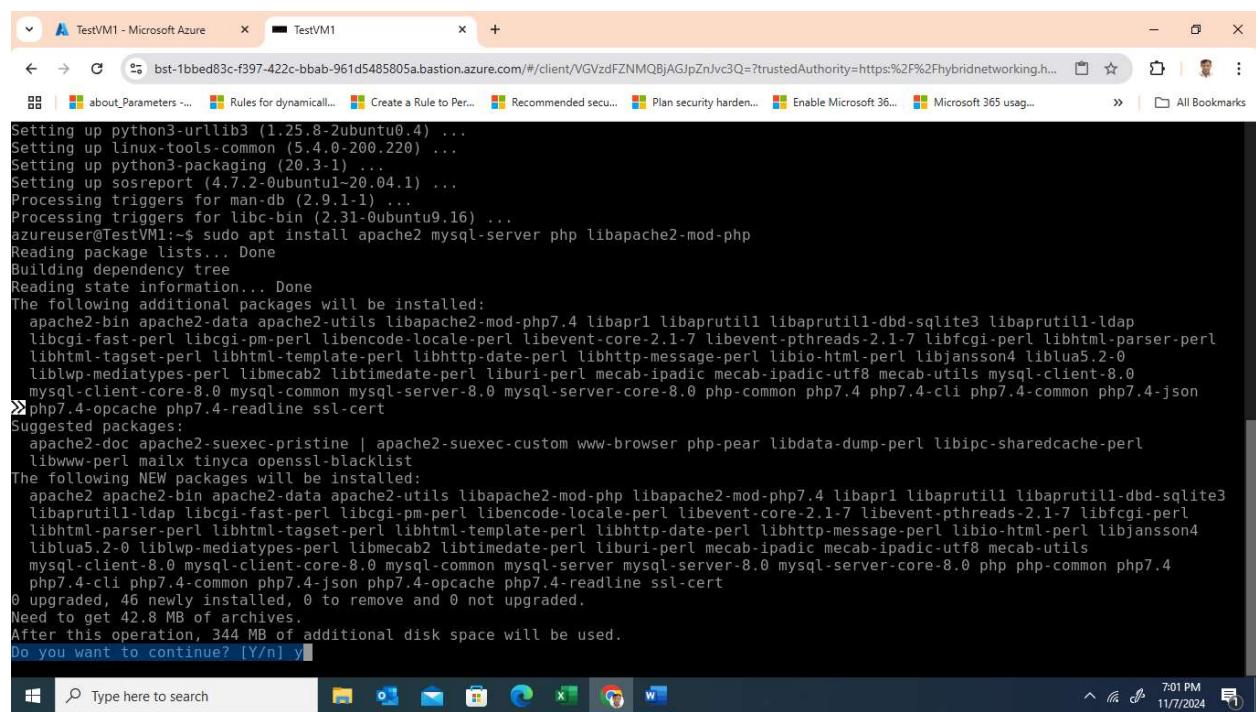
azureuser@TestVM1:~$ sudo apt update && sudo apt upgrade
Hit:1 http://azure.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://azure.archive.ubuntu.com/ubuntu focal-updates InRelease [128 kB]
Hit:3 http://azure.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:4 http://azure.archive.ubuntu.com/ubuntu focal-security InRelease
Fetched 128 KB in 1s (229 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
6 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following NEW packages will be installed:
  python3-packaging python3-pyparsing
The following packages will be upgraded:
  distro-info-data libarchive13 linux-cloud-tools-common linux-tools-common python3-urllib3 sosreport
6 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
4 standard LTS security updates
Need to get 1168 kB of archives.
After this operation, 610 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

- Update the VM: `sudo apt update && sudo apt upgrade`
- Install the Apache web server, MySQL, PHP, and Nextcloud:

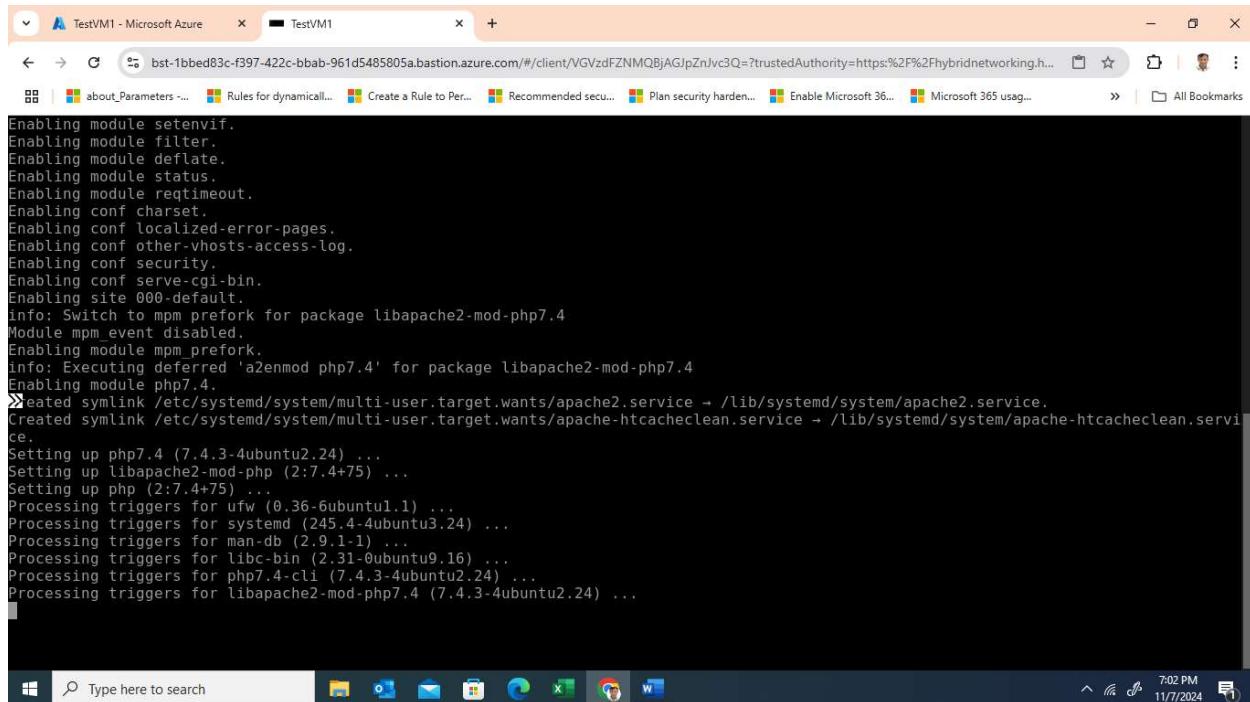
```
sudo apt install apache2 mysql-server php libapache2-mod-php
```



```
Setting up python3-urllib3 (1.25.8-2ubuntu0.4) ...
Setting up linux-tools-common (5.4.0-200.220) ...
Setting up python3-packaging (20.3-1) ...
Setting up sosreport (4.7.2-0ubuntu1-20.04.1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
azureuser@TestVM1:~$ sudo apt install apache2 mysql-server php libapache2-mod-php
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapache2-mod-php7.4 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap
  libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl
  libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl libjansson4 liblua5.2-0
  liblwp-mediatypes-perl libmecab2 libtimebase-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-common mysql-server-8.0 mysql-server-core-8.0 php-common php7.4 php7.4-cli php7.4-common php7.4-json
  php7.4-opcache php7.4-readline ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser php-pear libdata-dump-perl libipc-sharedcache-perl
  libwww-perl mailx tinyca openssl-blacklist
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapache2-mod-php libapr1 libaprutil1 libaprutil1-dbd-sqlite3
  libaprutil1-ldap libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl
  libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl libjansson4
  liblua5.2-0 liblwp-mediatypes-perl libmecab2 libtimebase-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils
  mysql-client-8.0 mysql-client-core-8.0 mysql-common mysql-server mysql-server-8.0 mysql-server-core-8.0 php php-common php7.4
  php7.4-cli php7.4-common php7.4-json php7.4-opcache php7.4-readline ssl-cert
0 upgraded, 46 newly installed, 0 to remove and 0 not upgraded.
Need to get 42.8 MB of archives.
After this operation, 344 MB of additional disk space will be used.
Do you want to continue? [Y/n] ■
```



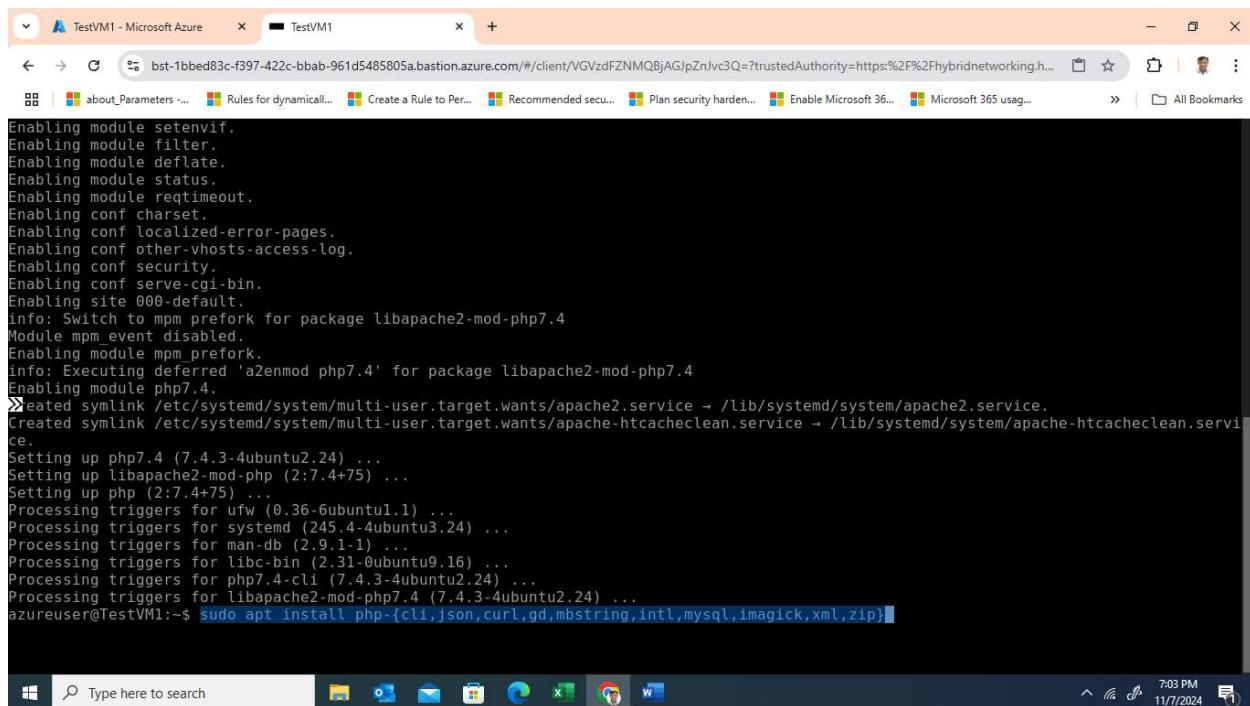
```
Setting up python3-urllib3 (1.25.8-2ubuntu0.4) ...
Setting up linux-tools-common (5.4.0-200.220) ...
Setting up python3-packaging (20.3-1) ...
Setting up sosreport (4.7.2-0ubuntu1-20.04.1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
azureuser@TestVM1:~$ sudo apt install apache2 mysql-server php libapache2-mod-php
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapache2-mod-php7.4 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap
  libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl
  libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl libjansson4 liblua5.2-0
  liblwp-mediatypes-perl libmecab2 libtimebase-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-common mysql-server-8.0 mysql-server-core-8.0 php-common php7.4 php7.4-cli php7.4-common php7.4-json
  php7.4-opcache php7.4-readline ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser php-pear libdata-dump-perl libipc-sharedcache-perl
  libwww-perl mailx tinyca openssl-blacklist
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapache2-mod-php libapr1 libaprutil1 libaprutil1-dbd-sqlite3
  libaprutil1-ldap libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl
  libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl libjansson4
  liblua5.2-0 liblwp-mediatypes-perl libmecab2 libtimebase-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils
  mysql-client-8.0 mysql-client-core-8.0 mysql-common mysql-server mysql-server-8.0 mysql-server-core-8.0 php php-common php7.4
  php7.4-cli php7.4-common php7.4-json php7.4-opcache php7.4-readline ssl-cert
0 upgraded, 46 newly installed, 0 to remove and 0 not upgraded.
Need to get 42.8 MB of archives.
After this operation, 344 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```



A screenshot of a Microsoft Edge browser window titled "TestVM1 - Microsoft Azure". The address bar shows a URL related to hybrid networking. The main content area displays a series of log messages from an Apache server, detailing the configuration of various modules like setenvif, filter, deflate, status, reqtimeout, charset, localized-error-pages, other-vhosts-access-log, security, serve-cgi-bin, and mpmp prefork. It also shows the execution of deferred modules and the creation of symlinks for systemd services. The logs conclude with the installation of PHP 7.4 and its dependencies.

```
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
info: Switch to mpm prefork for package libapache2-mod-php7.4
Module mpm_event disabled.
Enabling module mpmp prefork.
info: Executing deferred 'a2enmod php7.4' for package libapache2-mod-php7.4
Enabling module php7.4.
➤ Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
Setting up php7.4 (7.4.3-4ubuntu2.24) ...
Setting up libapache2-mod-php (2:7.4+75) ...
Setting up php (2:7.4+75) ...
Processing triggers for ufw (0.36-6ubuntu1.1) ...
Processing triggers for systemd (245.4-4ubuntu3.24) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.24) ...
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.24) ...
```

```
sudo apt install php-{cli,json,curl,gd,mbstring,intl,mysql,imagick,xml,zip}
```



A screenshot of a Microsoft Edge browser window titled "TestVM1 - Microsoft Azure". The address bar shows a URL related to hybrid networking. The main content area displays a terminal session where the user runs the command "sudo apt install php-{cli,json,curl,gd,mbstring,intl,mysql,imagick,xml,zip}". The terminal output shows the same Apache configuration logs as the previous screenshot, followed by the successful installation of the specified PHP packages.

```
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
info: Switch to mpm prefork for package libapache2-mod-php7.4
Module mpm_event disabled.
Enabling module mpmp prefork.
info: Executing deferred 'a2enmod php7.4' for package libapache2-mod-php7.4
Enabling module php7.4.
➤ Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
Setting up php7.4 (7.4.3-4ubuntu2.24) ...
Setting up libapache2-mod-php (2:7.4+75) ...
Setting up php (2:7.4+75) ...
Processing triggers for ufw (0.36-6ubuntu1.1) ...
Processing triggers for systemd (245.4-4ubuntu3.24) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.24) ...
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.24) ...
azureuser@TestVM1:~$ sudo apt install php-{cli,json,curl,gd,mbstring,intl,mysql,imagick,xml,zip}
```

```
Setting up libgs9-common (9.50~dfsg-5ubuntu4.13) ...
Setting up php-xml (2:7.4+75) ...
Setting up php-curl (2:7.4+75) ...
Setting up php-mysql (2:7.4+75) ...
Setting up fontconfig-config (2.13.1-2ubuntu3) ...
Setting up libavahi-common3:amd64 (0.7-4ubuntu7.3) ...
Setting up php7.4-mbstring (7.4.3-4ubuntu2.24) ...

Creating config file /etc/php/7.4/mods-available(mbstring.ini with new version
Setting up php-mbstring (2:7.4+75) ...
Setting up libtiff5:amd64 (4.1.0+git191117-2ubuntu0.20.04.14) ...
Setting up libfontconfig1:amd64 (2.13.1-2ubuntu3) ...
Setting up libavahi-client3:amd64 (0.7-4ubuntu7.3) ...
Setting up libmagickcore-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.1ubuntu11.10) ...
Setting up libgd3:amd64 (2.2.5-5.2ubuntu2.1) ...
Setting up libcurl5:amd64 (2.3.1-9ubuntu1.9) ...
Setting up libmagickwand-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.1ubuntu11.10) ...
Setting up php-imagick (3.4.4-4) ...
Setting up php7.4-gd (7.4.3-4ubuntu2.24) ...

Creating config file /etc/php/7.4/mods-available/gd.ini with new version
Setting up libgs9:amd64 (9.50~dfsg-5ubuntu4.13) ...
Setting up ghostscript (9.50~dfsg-5ubuntu4.13) ...
Setting up php-gd (2:7.4+75) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.24) ...
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.24) ...
azureuser@TestVM1:~$
```

- o Download and configure Nextcloud:

```
cd /var/www/
```

```
sudo wget https://download.nextcloud.com/server/releases/nextcloud-21.0.1.zip
```

```
sudo apt install unzip -y
```

```
sudo unzip nextcloud-21.0.1.zip
```

```
sudo chown -R www-data:www-data nextcloud
```

```
sudo systemctl restart apache2
```

```
Setting up libgs9-common (9.50-dfsg-5ubuntu4.13) ...
Setting up php-xml (2:7.4+75) ...
Setting up php-curl (2:7.4+75) ...
Setting up php-mysql (2:7.4+75) ...
Setting up fontconfig-config (2.13.1-2ubuntu3) ...
Setting up libavahi-common3:amd64 (0.7-4ubuntu7.3) ...
Setting up php7.4-mbstring (7.4.3-4ubuntu2.24) ...

Creating config file /etc/php/7.4/mods-available(mbstring.ini with new version
Setting up php-mbstring (2:7.4+75) ...
Setting up libtiff5:amd64 (4.1.0+git191117-2ubuntu0.20.04.14) ...
Setting up libfontconfig1:amd64 (2.13.1-2ubuntu3) ...
Setting up libavahi-client3:amd64 (0.7-4ubuntu7.3) ...
Setting up libmagickcore-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.1ubuntu11.10) ...
Setting up libgd3:amd64 (2.2.5-5.2ubuntu2.1) ...
Setting up libcurl2:amd64 (2.3.1-9ubuntu1.9) ...
Setting up libmagickwand-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.1ubuntu11.10) ...
Setting up php-imagick (3.4.4-4) ...
Setting up php7.4-gd (7.4.3-4ubuntu2.24) ...

Creating config file /etc/php/7.4/mods-available/gd.ini with new version
Setting up libgs9:amd64 (9.50-dfsg-5ubuntu4.13) ...
Setting up ghostscript (9.50-dfsg-Subuntu4.13) ...
Setting up php-gd (2:7.4+75) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.24) ...
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.24) ...
azreuser@TestVM1:~$ cd /var/www/
azreuser@TestVM1:/var/www$
```

```
Creating config file /etc/php/7.4/mods-available(mbstring.ini with new version
Setting up php-mbstring (2:7.4+75) ...
Setting up libtiff5:amd64 (4.1.0+git191117-2ubuntu0.20.04.14) ...
Setting up libfontconfig1:amd64 (2.13.1-2ubuntu3) ...
Setting up libavahi-client3:amd64 (0.7-4ubuntu7.3) ...
Setting up libmagickcore-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.1ubuntu11.10) ...
Setting up libgd3:amd64 (2.2.5-5.2ubuntu2.1) ...
Setting up libcurl2:amd64 (2.3.1-9ubuntu1.9) ...
Setting up libmagickwand-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.1ubuntu11.10) ...
Setting up php-imagick (3.4.4-4) ...
Setting up php7.4-gd (7.4.3-4ubuntu2.24) ...

Creating config file /etc/php/7.4/mods-available/gd.ini with new version
Setting up libgs9:amd64 (9.50-dfsg-5ubuntu4.13) ...
Setting up ghostscript (9.50-dfsg-Subuntu4.13) ...
Setting up php-gd (2:7.4+75) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.24) ...
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.24) ...
azreuser@TestVM1:~$ cd /var/www/
azreuser@TestVM1:/var/www$ sudo wget https://download.nextcloud.com/server/releases/nextcloud-21.0.1.zip
--2024-11-07 13:35:26- https://download.nextcloud.com/server/releases/nextcloud-21.0.1.zip
Resolving download.nextcloud.com (download.nextcloud.com)... 5.9.202.145, 2a01:4f8:210:21c8::145
Connecting to download.nextcloud.com (download.nextcloud.com)|5.9.202.145|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 155240687 (148M) [application/zip]
Saving to: 'nextcloud-21.0.1.zip'

nextcloud-21.0.1.zip          89%[=====] 132.42M  15.6MB/s eta 1s
```

```
A TestVM1 - Microsoft Azure x TestVM1 x +  
← → ⌂ bst-1bbbed83-cf397-422c-bbab-961d5485805a.bastion.azure.com/#/client/FGVzdFZNMQBjAGJpZnJvc3Q=?trustedAuthority=https%3A%2F%2Fhybridnetworking.h...  
about_Parameters ... Rules for dynamical... Create a Rule to Per... Recommended secur... Plan security harden... Enable Microsoft 36... Microsoft 365 usag...  
All Bookmarks  
Setting up libfontconfig1:amd64 (2.13.1-2ubuntu3) ...  
Setting up libbahavi-client3:amd64 (0.7-4ubuntu7.3) ...  
Setting up libmagickcore-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.lubuntu11.10) ...  
Setting up libgd3:amd64 (2.2.5-5.2ubuntu2.1) ...  
Setting up libcups2:amd64 (2.3.1-9ubuntu1.9) ...  
Setting up libmagickwand-6.q16-6:amd64 (8:6.9.10.23+dfsg-2.lubuntu11.10) ...  
Setting up php-imagick (3.4.4-4) ...  
Setting up php7.4-gd (7.4.3-4ubuntu2.24) ...  
  
Creating config file /etc/php/7.4/mods-available/gd.ini with new version  
Setting up libgs9:amd64 (9.50-dfsg-5ubuntu4.13) ...  
Setting up ghostscript (9.50-dfsg-5ubuntu4.13) ...  
Setting up php-gd (2:7.4+75) ...  
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...  
Processing triggers for man-db (2.9.1-1) ...  
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.24) ...  
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.24) ...  
azureuser@TestVM1:~$ cd /var/www/  
azureuser@TestVM1:/var/www$ sudo wget https://download.nextcloud.com/server/releases/nextcloud-21.0.1.zip  
--2024-11-07 13:35:26 - https://download.nextcloud.com/server/releases/nextcloud-21.0.1.zip  
Resolving download.nextcloud.com (download.nextcloud.com)... 5.9.202.145, 2a01:4f8:210:21c8::145  
Connecting to download.nextcloud.com (download.nextcloud.com)|5.9.202.145|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 155240687 (148M) [application/zip]  
Saving to: 'nextcloud-21.0.1.zip'  
  
nextcloud-21.0.1.zip          100%[=====] 148.05M  15.7MB/s   in 10s  
2024-11-07 13:35:37 (14.6 MB/s) - 'nextcloud-21.0.1.zip' saved [155240687/155240687]  
azureuser@TestVM1:/var/www$ sudo apt install unzip -y
```

```
TestVM1 - Microsoft Azure x TestVM1 x +  
bst-1bbbed83c-f397-422c-bbab-961d5485805a.bastion.azure.com/#/client/VGVzdFZNMQBjAGJpZnJvc3Q=?trustedAuthority=https%3F%2Fhybridnetworking.h...  
about_Parameters ~ Rules for dynamical... Create a Rule to Per... Recommended secur... Plan security harden... Enable Microsoft 36... Microsoft 365 usag... All Bookmarks  
HTTP request sent, awaiting response... 200 OK  
Length: 155240687 (148M) [application/zip]  
Saving to: 'nextcloud-21.0.1.zip'  
  
nextcloud-21.0.1.zip 100%[=====] 148.05M 15.7MB/s in 10s  
2024-11-07 13:35:37 (14.6 MB/s) - 'nextcloud-21.0.1.zip' saved [155240687/155240687]  
  
azureuser@TestVM1:/var/www$ sudo apt install unzip -y  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Suggested packages:  
  zip  
The following NEW packages will be installed:  
  unzip  
1 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.  
Need to get 169 kB of archives.  
After this operation, 593 kB of additional disk space will be used.  
Get:1 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 unzip amd64 6.0-25ubuntul.2 [169 kB]  
Fetched 169 kB in 0s (7063 kB/s)  
Selecting previously unselected package unzip.  
(Reading database ... 62353 files and directories currently installed.)  
Preparing to unpack .../unzip_6.0-25ubuntul.2_amd64.deb ...  
Unpacking unzip (6.0-25ubuntul.2) ...  
Setting up unzip (6.0-25ubuntul.2) ...  
Processing triggers for mime-support (3.64ubuntul) ...  
Processing triggers for man-db (2.9.1-1) ...  
azureuser@TestVM1:/var/www$ sudo unzip nextcloud-21.0.1.zip
```

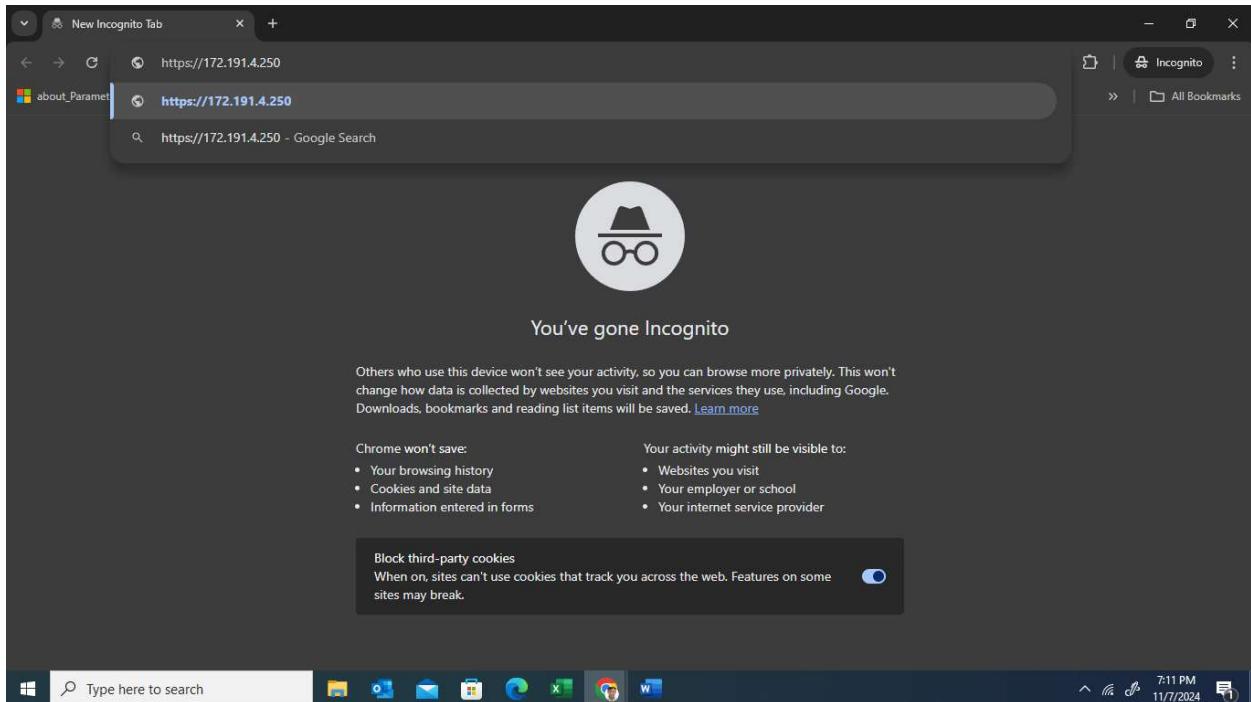
```
TestVM1 - Microsoft Azure TestVM1 +  
bst-1bbcd83c-f397-422c-bbab-961d5485805a.bastion.azure.com/#/client/VGvzfZNMQBjAGJpZnJvc3Q=?trustedAuthority=https%3A%2F%2Fhybridnetworking.h...  
about_Parameters -... Rules for dynamical... Create a Rule to Per... Recommended secu... Plan security harden... Enable Microsoft 36... Microsoft 365 usag... All Bookmarks  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/CopyBlobFromURLOptions.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/BlobPrefix.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/BlobProperties.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/BlobServiceOptions.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/GetBlobMetadataResult.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/SetBlobPropertiesOptions.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/Block.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/ContainerProperties.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/ListBlobBlocksResult.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/BlobSharedAccessSignatureHelper.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/BlobRestProxy.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/CONTRIBUTING.md  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/ChangeLog.md  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/composer.json  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/LICENSE  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/README.md  
creating: nextcloud/3rdparty/patchwork/  
creating: nextcloud/3rdparty/patchwork/jsqueeze/  
creating: nextcloud/3rdparty/patchwork/jsqueeze/src/  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/src/JSqueeze.php  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/src/LICENSE.ASL20  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/src/LICENSE.GPLV2  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/composer.json  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/README.md  
inflating: nextcloud/COPYING  
creating: nextcloud/config/  
extracting: nextcloud/config/CAN_INSTALL  
inflating: nextcloud/config/config.sample.php  
inflating: nextcloud/config/.htaccess  
azureuser@TestVM1:/var/www$ sudo chown -R www-data:www-data nextcloud  
Type here to search 7:08 PM 11/7/2024
```

```
TestVM1 - Microsoft Azure TestVM1 +  
bst-1bbcd83c-f397-422c-bbab-961d5485805a.bastion.azure.com/#/client/VGvzfZNMQBjAGJpZnJvc3Q=?trustedAuthority=https%3A%2F%2Fhybridnetworking.h...  
about_Parameters -... Rules for dynamical... Create a Rule to Per... Recommended secu... Plan security harden... Enable Microsoft 36... Microsoft 365 usag... All Bookmarks  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/BlobPrefix.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/BlobProperties.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/BlobServiceOptions.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/GetBlobMetadataResult.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/SetBlobPropertiesOptions.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/Block.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/ContainerProperties.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/Models/ListBlobBlocksResult.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/BlobSharedAccessSignatureHelper.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/src/Blob/BlobRestProxy.php  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/BreakingChanges.md  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/CONTRIBUTING.md  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/ChangeLog.md  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/composer.json  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/LICENSE  
inflating: nextcloud/3rdparty/microsoft/azure-storage-blob/README.md  
creating: nextcloud/3rdparty/patchwork/  
creating: nextcloud/3rdparty/patchwork/jsqueeze/  
creating: nextcloud/3rdparty/patchwork/jsqueeze/src/  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/src/JSqueeze.php  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/src/LICENSE.ASL20  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/src/LICENSE.GPLV2  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/composer.json  
inflating: nextcloud/3rdparty/patchwork/jsqueeze/README.md  
inflating: nextcloud/COPYING  
creating: nextcloud/config/  
extracting: nextcloud/config/CAN_INSTALL  
inflating: nextcloud/config/config.sample.php  
inflating: nextcloud/config/.htaccess  
azureuser@TestVM1:/var/www$ sudo chown -R www-data:www-data nextcloud  
azureuser@TestVM1:/var/www$ sudo systemctl restart apache2  
Type here to search 7:09 PM 11/7/2024
```

- Access the server by navigating to `http://<VM_public_IP>/nextcloud` in your browser.

The screenshot shows the Microsoft Azure portal interface for a virtual machine named TestVM1. The left sidebar lists various management options like Overview, Activity log, Tags, and Connect. Under Connect, the 'Bastion' option is selected. On the right, there's a detailed configuration panel for setting up Bastion access. It includes fields for Authentication Type (set to 'SSH Private Key from Local File'), Username ('azureuser'), and Local File ('TestVM1_key (1).pem'). A 'Connect' button is at the bottom. Below the main content, a feedback survey is visible. The status bar at the bottom indicates the URL as `https://portal.azure.com/#@ashokkmrpandeyyahoco.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bdcd-c2e6e8e35b09/resourceGroups/TestRG1/providers/Microsoft.Compute/virtualMachines/TestVM1/overview`, the time as 7:10 PM, and the date as 11/7/2024.

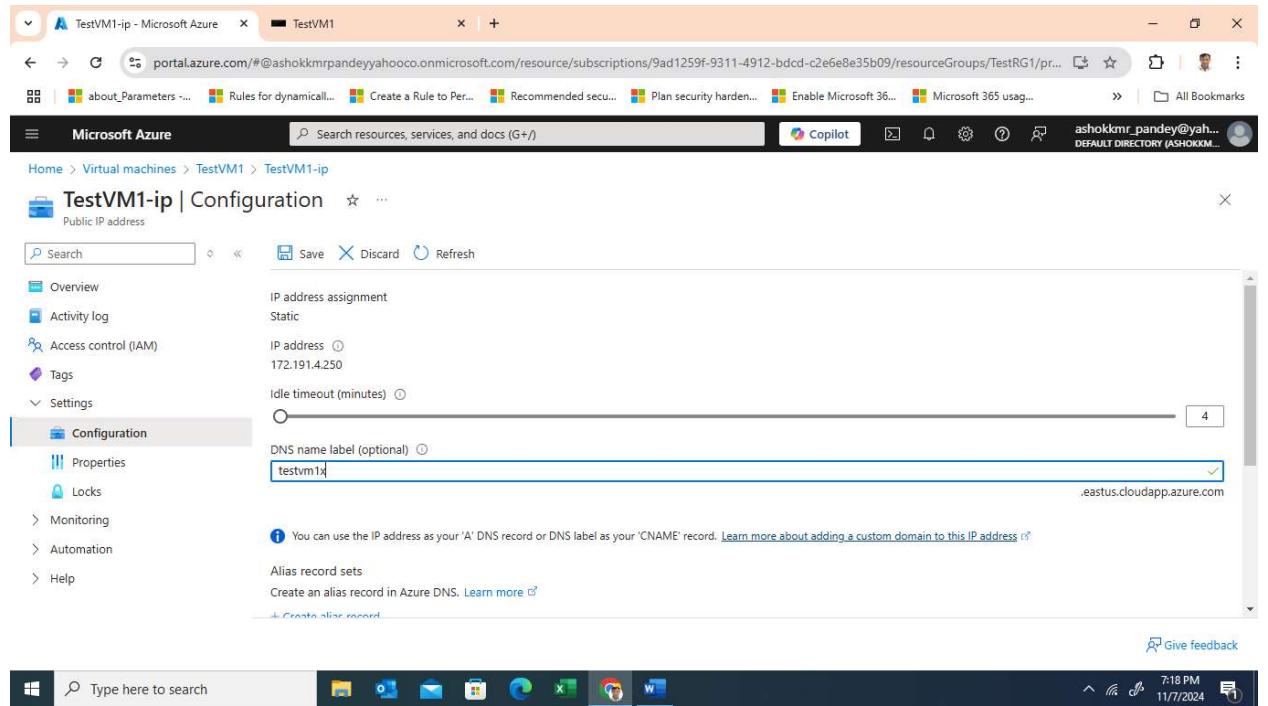
This screenshot shows the Microsoft Azure portal interface for the same virtual machine, TestVM1. The left sidebar is identical to the previous screenshot. On the right, the 'Overview' tab is selected, displaying basic information about the VM. It shows the Resource group (TestRG1), Status (Running), Location (East US), Subscription (MSDN Platforms), and Subscription ID (9ad1259f-9311-4912-bdcd-c2e6e8e35b09). A 'Help me copy this VM in any region' button is present. A JSON View link is located in the top right corner of the overview section. The status bar at the bottom indicates the URL as `https://portal.azure.com/#@ashokkmrpandeyyahoco.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bdcd-c2e6e8e35b09/resourceGroups/TestRG1/providers/Microsoft.Compute/virtualMachines/TestVM1/overview`, the time as 7:11 PM, and the date as 11/7/2024.



6. Assign a Public IP and DNS Label

- In the VM's settings, assign a public IP and configure a DNS label for easier access (e.g., <your-vm-name>.centralus.cloudapp.azure.com).

Screenshot of the Microsoft Azure portal showing the configuration of a virtual machine (TestVM1-ip). The IP address assignment is set to Static, with the IP address 172.191.4.250. The DNS name label is set to testvm1x, which is highlighted in the configuration pane. The status bar at the bottom shows the date and time as 11/7/2024 at 7:18 PM.



TestVM1-ip - Microsoft Azure | TestVM1

portal.azure.com/#@ashokkmrpandeyyahoo.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bdcd-c2e6e8e35b09/resourceGroups/TestRG1/pr...

Microsoft Azure | Search resources, services, and docs (G+)

ashokkmr_pandey@yahoo... DEFAULT DIRECTORY (ASHOKKM...)

Home > Virtual machines > TestVM1 > TestVM1-ip | Configuration

Public IP address

Search | Save | Discard | Refresh

Overview | Activity log | Access control (IAM) | Tags | Settings | Configuration | Properties | Locks

Monitoring | Automation | Help

IP address assignment
Static
IP address: 172.191.4.250
Idle timeout (minutes): 4
DNS name label (optional): testvm1x

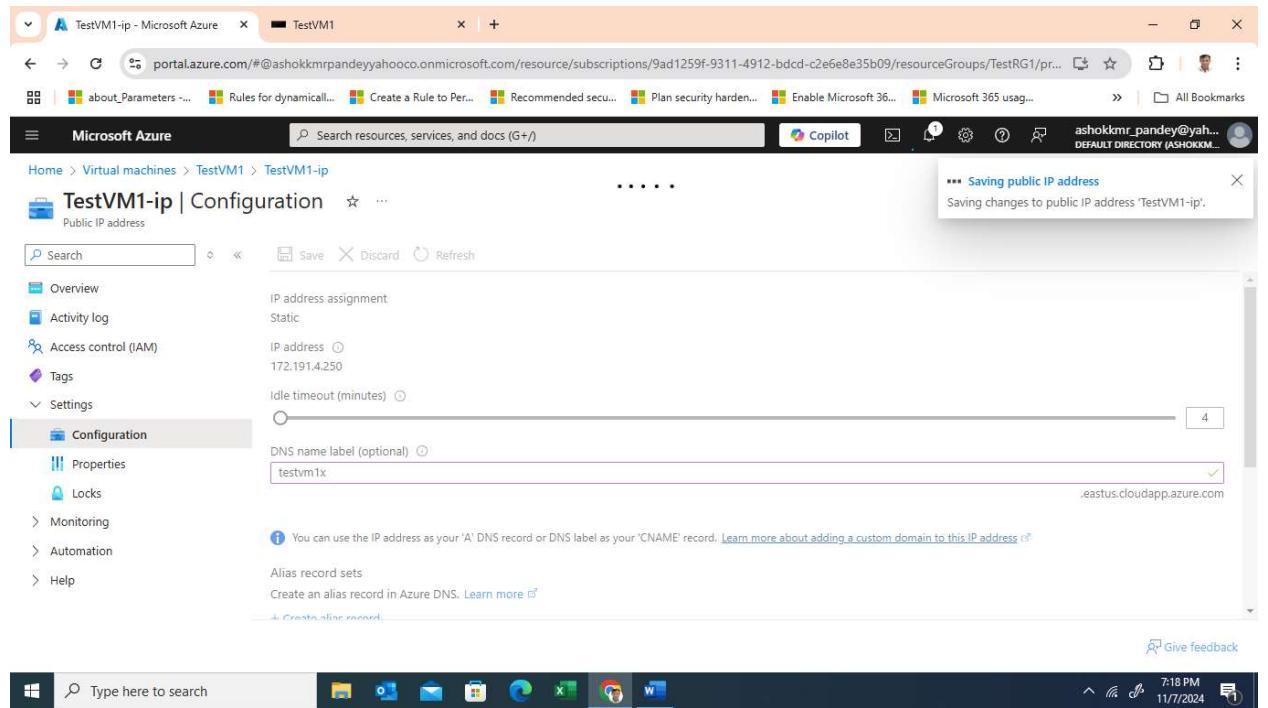
You can use the IP address as your 'A' DNS record or DNS label as your 'CNAME' record. [Learn more about adding a custom domain to this IP address](#).

Alias record sets
Create an alias record in Azure DNS. [Learn more](#)

Give feedback

Type here to search | 7:18 PM 11/7/2024

Screenshot of the Microsoft Azure portal showing the configuration of a virtual machine (TestVM1-ip). The IP address assignment is set to Static, with the IP address 172.191.4.250. The DNS name label is set to testvm1x, which is highlighted in the configuration pane. A notification message indicates that changes are being saved to the public IP address. The status bar at the bottom shows the date and time as 11/7/2024 at 7:18 PM.



TestVM1-ip - Microsoft Azure | TestVM1

portal.azure.com/#@ashokkmrpandeyyahoo.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bdcd-c2e6e8e35b09/resourceGroups/TestRG1/pr...

Microsoft Azure | Search resources, services, and docs (G+)

ashokkmr_pandey@yahoo... DEFAULT DIRECTORY (ASHOKKM...)

Home > Virtual machines > TestVM1 > TestVM1-ip | Configuration

Public IP address

Search | Save | Discard | Refresh

Overview | Activity log | Access control (IAM) | Tags | Settings | Configuration | Properties | Locks

Monitoring | Automation | Help

IP address assignment
Static
IP address: 172.191.4.250
Idle timeout (minutes): 4
DNS name label (optional): testvm1x

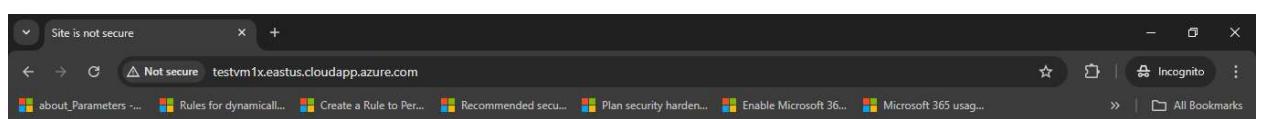
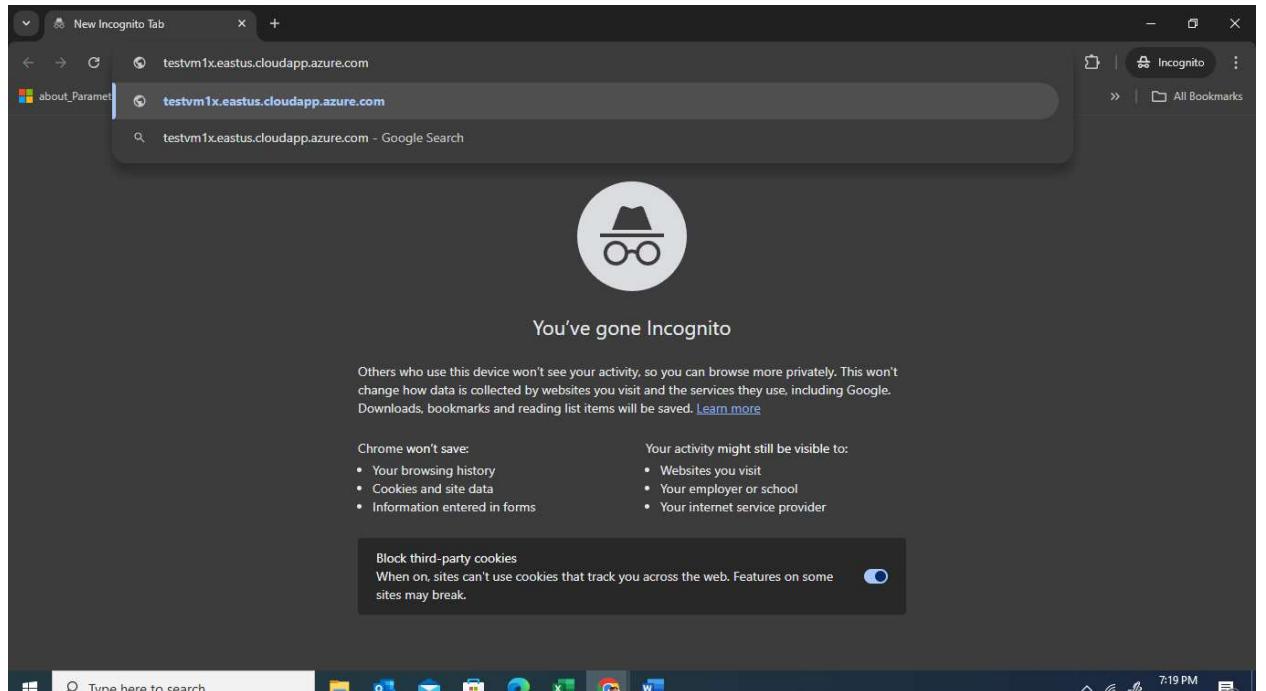
You can use the IP address as your 'A' DNS record or DNS label as your 'CNAME' record. [Learn more about adding a custom domain to this IP address](#).

Alias record sets
Create an alias record in Azure DNS. [Learn more](#)

*** Saving public IP address
Saving changes to public IP address 'TestVM1-ip'.

Give feedback

Type here to search | 7:18 PM 11/7/2024



- This allows you to access Nextcloud via a DNS name.

Monitoring Features for Azure VM

1. Azure Monitor

- **Create Alerts:** Configure alerts for CPU and memory thresholds (e.g., 80% usage) to notify you of potential performance bottlenecks.

The screenshot shows the Microsoft Azure portal interface. The main title bar says "TestVM1 - Microsoft Azure" and "TestVM1". The address bar shows the URL "portal.azure.com/#@ashokkmrpandeyyahoco.onmicrosoft.com/resource/subscriptions/9ad1259f-9311-4912-bdcd-c2e6e8e35b09/resourceGroups/TestRG1/pr...". The top navigation bar includes links for "about_Parameters", "Rules for dynamicall...", "Create a Rule to Per...", "Recommended secu...", "Plan security harden...", "Enable Microsoft 36...", "Microsoft 365 usag...", "Copilot", and "All Bookmarks". The user's email "ashokkmr_pandey@yah..." and "DEFAULT DIRECTORY ASHOKKM..." are also visible.

The left sidebar shows "Virtual machines" with a list containing "TestVM1". The main content area is titled "TestVM1" and "Virtual machine". It features a search bar, a "Help me copy this VM in any region" button, and a "Connect" dropdown. Below these are buttons for "Start", "Restart", "Stop", "Hibernate", "Capture", "Delete", and "Refresh". The "Monitoring" tab is selected, showing "7 events" and "No issues". A section for "Alerts" includes a button to "Enable recommended alert rules". The bottom status bar shows the time "7:31 PM" and date "11/7/2024".

This screenshot shows the "Set up recommended alert rules" dialog box overlaid on the Azure portal. The dialog has a header "Set up recommended alert rules" and a close button "X".

The "Select alert rules" section contains eight alert rules, each with a toggle switch:

- > Percentage CPU is greater than %
- > Available Memory Bytes is less than GB
- > Data Disk IOPS Consumed Percentage is greater than %
- > OS Disk IOPS Consumed Percentage is greater than %
- > Network In Total is greater than GB
- > Network Out Total is greater than GB
- > VmAvailabilityMetric is less than

The "Notify me by" section includes a link "More alerting options" and an estimated monthly cost "Estimated monthly total: 58.24 INR". At the bottom are "Save" and "Cancel" buttons.

The background shows the same Azure portal interface as the first screenshot, with the "Virtual machines" list and the "Monitoring" tab selected for "TestVM1". The bottom status bar shows "7:33 PM" and "11/7/2024".

Screenshot of the Microsoft Azure portal showing the 'Set up recommended alert rules' page for a virtual machine named 'TestVM1'. The page displays several pre-defined alert rules with their status toggles turned on.

Alert Rules:

- OS Disk IOPS Consumed Percentage is greater than 95 % (Enabled)
- Network In Total is greater than 500 GB (Enabled)
- Network Out Total is greater than 200 GB (Enabled)
- VmAvailabilityMetric is less than 1 (Enabled)

Notify me by:

- Email (Selected) - ashokkmr_pandey@yahoo.co.in
- Email Azure Resource Manager Role - Select an Azure Resource Manager role
- Azure mobile app notification - ashokkmr_pandey@yahoo.co.in
- Use an existing action group

More alerting options:

Estimated monthly total: 58.24 INR

Buttons: Save, Cancel

Screenshot of the Microsoft Azure portal showing the 'Set up recommended alert rules' page for a virtual machine named 'TestVM1'. A modal dialog box titled 'Create recommended alert rules' is displayed, indicating that 'Creating recommended alert rules' is in progress.

Alert Rules:

- OS Disk IOPS Consumed Percentage is greater than 95 % (Enabled)
- Network In Total is greater than 500 GB (Enabled)
- Network Out Total is greater than 200 GB (Enabled)
- VmAvailabilityMetric is less than 1 (Enabled)

Notify me by:

- Email (Selected) - ashokkmr_pandey@yahoo.co.in
- Email Azure Resource Manager Role - Select an Azure Resource Manager role
- Azure mobile app notification - ashokkmr_pandey@yahoo.co.in
- Use an existing action group

More alerting options:

Estimated monthly total: 58.24 INR

Buttons: Save, Cancel

Modal Dialog: Create recommended alert rules
Creating recommended alert rules
Success Message: Create action group
Action group created successfully

Screenshot of the Microsoft Azure portal showing the 'TestVM1' virtual machine details page.

The left sidebar shows the 'Virtual machines' list with 'TestVM1' selected. The main content area displays the 'Monitoring' tab for 'TestVM1'. Key details include:

- Help me copy this VM in any region**
- Properties**, **Monitoring** (selected), **Capabilities (7)**, **Recommendations**, **Tutorials**
- Show data for : Last 24 hours**
- Health events**: 7 events, No issues
- Alerts**: (No fired alerts in the selected time period)
- Performance and utilization**
- Platform metrics**: See all Metrics
- VM Availability (Preview)**: A chart showing availability over time, with values around 1.0 and 0.8.

The bottom status bar shows the date and time as 11/7/2024 at 7:35 PM.

Screenshot of the Microsoft Azure portal showing the 'TestVM1 | Insights' page.

The left sidebar shows the 'Virtual machines' list with 'TestVM1' selected. The main content area displays the 'Insights' tab for 'TestVM1'. Key details include:

- Resource Group Monitoring**, **Azure Monitor**, **Diagnose and solve problems**, **Refresh**
- Map visualization** showing infrastructure data about resources being deployed and monitored.
- Enable** button
- Information message**: The map data set collected with Azure Monitor for VMs is intended to be infrastructure data about the resources being deployed and monitored. For details on data collected please [click here](#).
- Warning message**: Having difficulties enabling Azure Monitors for VM? [Troubleshoot](#)
- Have more questions?**

The bottom status bar shows the date and time as 11/7/2024 at 7:37 PM.

Monitoring configuration

Subscription *: MSDN Platforms
Data collection rule: (new) MSVMI-DefaultWorkspace-9ad1259f-9311-4912-bdcd-c2e6e8e35b09-EUS
Create New
MSVMI-DefaultWorkspace-9ad1259f-9311-4912-bdcd-c2e6e8e35b09-EUS

Guest performance: Enabled
Processes and dependencies (Map): Disabled
Log Analytics workspace: DefaultWorkspace-9ad1259f-9311-4912-bdcd-c2e6e8e35b09-EUS

This will also enable System Assigned Managed Identity, in addition to existing User Assigned identities (if any).
Note: Unless specified in the request, the machine will default to using System Assigned Identity. [Learn More](#)

Monitoring configuration

Subscription *: MSDN Platforms
Data collection rule: (new) MSVMI-DefaultWorkspace-9ad1259f-9311-4912-bdcd-c2e6e8e35b09-EUS
Create New
MSVMI-DefaultWorkspace-9ad1259f-9311-4912-bdcd-c2e6e8e35b09-EUS

Guest performance: Enabled
Processes and dependencies (Map): Disabled
Log Analytics workspace: DefaultWorkspace-9ad1259f-9311-4912-bdcd-c2e6e8e35b09-EUS

This will also enable System Assigned Managed Identity, in addition to existing User Assigned identities (if any).
Note: Unless specified in the request, the machine will default to using System Assigned Identity. [Learn More](#)

Validating... Cancel

- **Automated Analysis:** Utilize Azure's AI-driven insights to detect anomalies in resource utilization, helping you quickly identify performance issues.

2. Log Analytics and Application Insights

- Use **Log Analytics** to gather detailed logs on server operations, error messages, and traffic to the Nextcloud application.
- Enable **Application Insights** for end-to-end tracing, identifying high-latency requests, and monitoring response times, useful for troubleshooting traffic issues or slow page loads.

3. Cost Management and Optimization

- Set up **cost alerts** and monitor cost-related metrics to reduce unnecessary compute, storage, or data transfer expenses.

The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar with the text "cost" typed in. Below the search bar, there's a "Recent services" section with icons for Cost alerts, Virtual machines, DNS zones, Network security groups, Virtual networks, Resource groups, Azure Machine Learning, and Azure AI services. To the right of these, a list of "Last Viewed" items is shown, each with a timestamp: "2 minutes ago", "31 minutes ago", "10 hours ago", "11 hours ago", and "6 months ago". At the bottom of the screenshot, the Windows taskbar is visible with the URL "https://portal.azure.com" and the system tray showing the date and time as "7:48 PM 11/7/2024".

A screenshot of the Microsoft Azure portal showing the Cost Management: MSDN Platforms | Cost alerts page. The left sidebar is expanded, showing the 'Cost alerts' section under 'Monitoring'. The main area displays a message: 'No Alerts to display' with a note: 'Your alerts will be shown here. [Learn more](#)'. The top navigation bar shows the URL as 'portal.azure.com/#view/Microsoft_Azure_CostManagement/Menu/~/costalerts/open/costalerts/openedBy/AzurePortal'.

A screenshot of the Microsoft Azure portal showing the 'Create alert rule - Microsoft Azure' page. The left sidebar is expanded, showing the 'Cost alerts' section under 'Monitoring'. A modal window titled 'Create alert rule' is open on the right, showing the configuration for a new alert rule. The 'Alert type' is set to 'Anomaly', 'View' is 'Daily anomaly by resource group', and the 'Start on' date is '2024-11-07' with a note: 'until 2025-11-07'. The 'Notifications' section includes a subject 'Cost anomaly detected in MSDN Platforms' and a recipient email 'ashokkmr_pandey@yahoo.co.in'. The top navigation bar shows the URL as 'portal.azure.com/#view/Microsoft_Azure_CostManagement/Menu/~/costalerts/open/costalerts/openedBy/AzurePortal'.

The screenshot shows the Azure portal interface for creating a cost alert. The main window is titled "Create alert rule" for the "MSDN Platforms (Subscription)" scope. The "Notifications" section is configured with a subject "Cost anomaly detected in MSDN Platforms" and a recipient email "ashokkmr_pandey@yahoo.co.in". The "Information" section includes an "Alert name" field with the value "Daily anomaly by resource group". The "Create" button is visible at the bottom right of the dialog. The background shows the "Cost Management: MSDN Platforms | Cost alerts" page with a sidebar menu.

The screenshot shows the "Cost Management: MSDN Platforms | Alert rules" page. It lists a single alert rule named "Daily anomaly by resou...". The rule is active, triggered by an "Anomaly detected" condition, and sends an "Email me" action. The rule is scoped to "MSDN Platforms". The sidebar menu on the left shows the "Alert rules" option under the "Cost alerts" section.

- Review **resource utilization metrics** to ensure your VM is right-sized, optimizing CPU and memory to prevent over-provisioning.

Risk Identification and Mitigation

The Risk Identification and Migration section of the Solution Design Document details the process and company specific risks that need to be accounted for and mitigated in the solution design. The number of risks and effects of each risk typically increases as a company moves down the scale from their first few workloads in the cloud towards an all-in posture. It consists of four phases.

Step 1 – Identify Step

Enforce / Monitor • Cost analysis General purpose tier is available with:

- 8 cores: \$736.29/month
- 16 cores: \$1,472.58/month
- 32 cores: \$2,208.87/month

A deployment comes with 32GiB of storage. Additional costs will include storage: Capacity: Each 32GiB block, up to 8TiB, will cost \$0.0575/GB IOPS: Every 1 million requests will cost \$0.10.