

Azure Compute Services Practical tasks

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Practical Task 1: Linux Virtual Machine Setup and NSG Configuration Create and configure a Linux Virtual Machine (VM) on Azure and secure it with a Network Security Group (NSG).

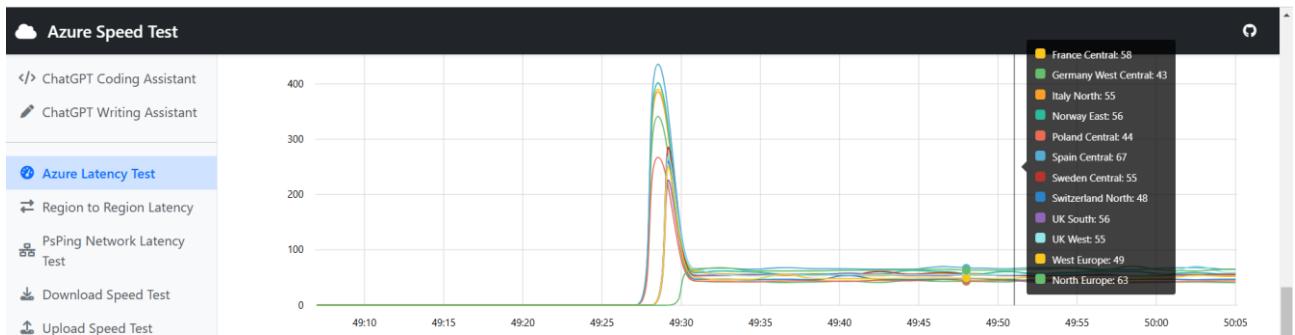
1. Create a Linux VM (Ubuntu or CentOS) in Azure using the free tier.

The screenshot shows the Microsoft Azure portal homepage. At the top, there's a search bar and a Copilot button. Below the search bar is a navigation bar with links for Policy, Education, Service providers, Subscriptions, All resources, Microsoft Entra ID, Resource groups, App Services, and More services. The main area is titled 'Azure services' and features a 'Create a resource' button. Below this, there's a 'Resources' section with tabs for 'Recent' and 'Favorite'. It lists two items: 'Sample' (Resource group, last viewed 2 minutes ago) and 'Azure for Students' (Subscription, last viewed 2 weeks ago). A 'See all' link is at the bottom of the list.

Click create a resource

The screenshot shows the 'Create a resource' blade in the Microsoft Azure portal. At the top, there's a 'Get Started' button and a search bar. Below the search bar are sections for 'Popular Azure services' (Virtual machine, Web App) and 'Popular Marketplace products' (Windows Server 2019 Datacenter, Ubuntu Server 20.04 LTS). On the left, there's a sidebar with categories like AI + Machine Learning, Analytics, and Blockchain. The 'Virtual machine' option is highlighted with a blue border. A callout text 'Click Virtual machine' is overlaid on this button.

Click Virtual machine



The least latency from this list is for *Poland Central* (*I have not found Germany West Cent*)

The screenshot shows the Microsoft Azure 'Create a virtual machine' wizard at the 'Review + create' step. The page is titled 'Create a virtual machine' and includes tabs for 'Basics', 'Disks', 'Networking', 'Management', 'Monitoring', 'Advanced', 'Tags', and 'Review + create'. The 'Basics' tab is active.

Project details:
Subscription: Azure for Students
Resource group: Sample

Instance details:
Virtual machine name: ubuntu-yakubsyn
Region: (Europe) Poland Central
Availability options: Availability zone: Zone 3 (selected)
Zone options: Self-selected zone (selected)
Availability zone: Zone 3 (selected)
Security type: Trusted launch virtual machines
Image: Ubuntu Server 24.04 LTS - x64 Gen2

VM architecture:
VM architecture: x64

Run with Azure Spot discount:
Run with Azure Spot discount: Standard_DS2_v3 - 2 vcpus, 8 GiB memory (96.36 USD/month)

Enable Hibernation:
Enable Hibernation: ⓘ Hibernation does not currently support Trusted launch and Confidential virtual machines for Linux images. [Learn more](#)

Administrator account:
Authentication type: SSH public key
Username: azureuser
SSH public key source: Generate new key pair
SSH Key Type: RSA SSH Format
Key pair name: ubuntu-yakubsyn.key

Inbound port rules:
Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.
Public inbound ports: Allow selected ports
Select inbound ports: SSH (22)
Info message: ⓘ 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: < Previous, Next : Disks >, Review + create

Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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

VM disk encryption

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host Encryption at host is not registered for the selected subscription. [Learn more](#)

OS disk

OS disk size Image default (30 GB) Standard SSD (locally-redundant storage)

OS disk type * Standard SSD (locally-redundant storage) The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM

Key management Platform-managed key Customer-managed key

Enable Ultra Disk compatibility

Data disks for ubuntu-yakubsyn

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	Delete with VM
0	(new) ubuntu-yakubsyn-disk1	100	Standard SSD	None	<input type="checkbox"/>

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

Advanced

< Previous Next : Networking > Review + create

changed OS disk type to Standard SSD

Advanced

Use managed disks Availability zone requires managed disks.

Ephemeral OS disk None OS cache placement Temp disk placement

i The selected image is too large for the temp disk of the selected instance.

< Previous Next : Networking > Review + create

Create a virtual machine

Network interface

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

Virtual network (new) ubuntu-yakubsyn-vnet Create new

Subnet * (new) default (10.0.0.0/24) Create new

Public IP (new) ubuntu-yakubsyn-ip Create new

NIC network security group None Basic Advanced

Public inbound ports * None Allow selected ports

Select inbound ports * SSH (22) All (0-65535)

⚠ 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

Enable accelerated networking

Load balancing

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

Load balancing options None 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.

< Previous Next : Management > Review + create

Added automatic public IP removal

Microsoft Azure

Home > 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

Configure management options for your VM.

Microsoft Defender for Cloud

Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

Enable basic plan for free This will apply to every VM in the selected subscription

Identity

Enable system assigned managed identity

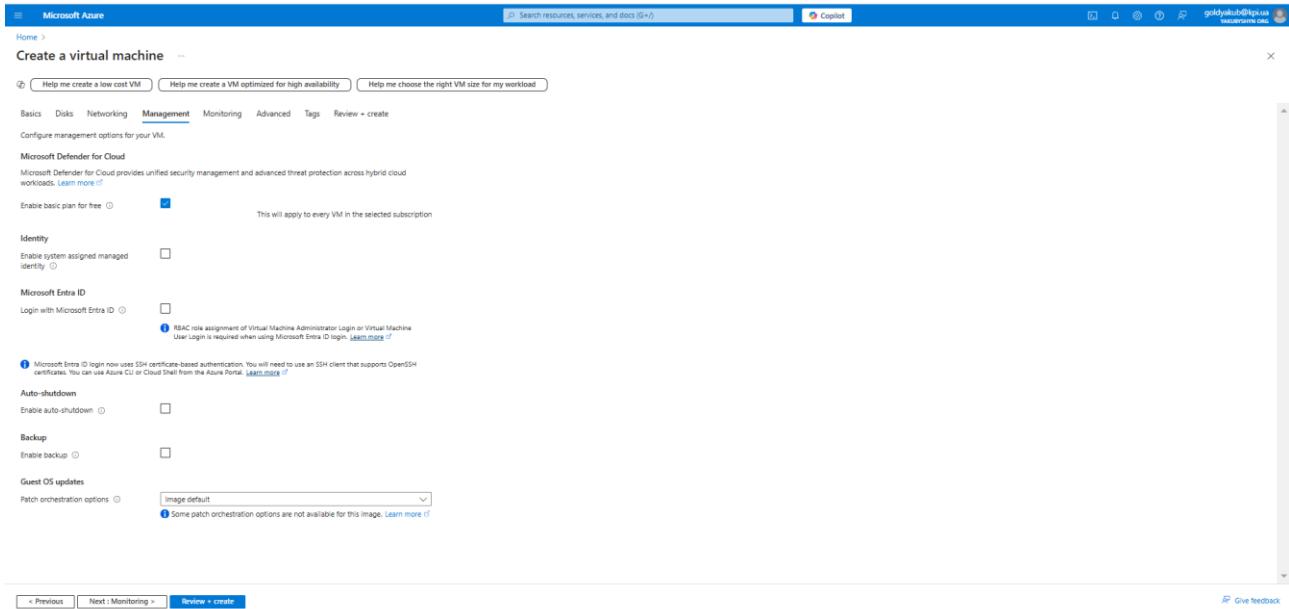
Microsoft Entra ID

Login with Microsoft Entra ID
RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Microsoft Entra ID login. [Learn more](#)

Guest OS updates

Patch orchestration options [Learn more](#)
 Some patch orchestration options are not available for this image. [Learn more](#)

< Previous Next : Monitoring > Review + create Give feedback



Microsoft Azure

Home > 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

Configure monitoring options for your VM.

Alerts

Enable recommended alert rules

Diagnostics

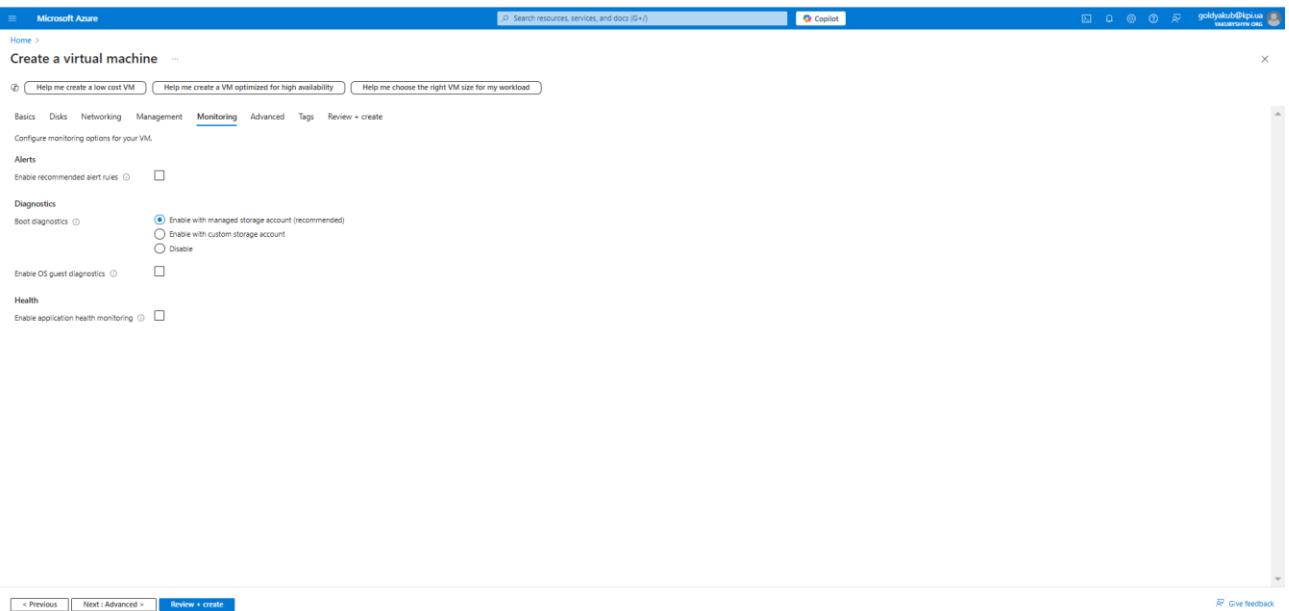
Boot diagnostics Enable with managed storage account (recommended) Enable with custom storage account Disable

Enable OS guest diagnostics

Health

Enable application health monitoring

< Previous Next : Advanced > Review + create Give feedback



Then Review and create

Microsoft Azure

Home > Create a virtual machine ...

Validation passed

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

Price
1 X Standard D2s v3 by Microsoft Subscription credits apply. 0.1120 USD/hr
Terms of use | Privacy policy Pricing for other VM sizes

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

Name: AmericanReyfusun
Preferred e-mail address: godlyakub@kpi.ua
Preferred phone number:

⚠ You have set SSH port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics
Subscription: Azure for Students
Resource group: Sample
Virtual machine name: ubuntu-yakubshyn

< Previous Next > Create Download a template for automation Give feedback

Generate new key pair

An SSH key pair contains both a public key and a private key. **Azure doesn't store the private key.** After the SSH key resource is created, you won't be able to download the private key again. [Learn more](#)

[Download private key and create resource](#)

[Return to create a virtual machine](#)

2. Connect to the VM via SSH using a public-private key pair.

Microsoft Azure

Home > ubuntu-yakubshyn

Virtual machine

Overview Connect Start Stop Restart Hibernation Capture Delete Refresh Open in mobile Feedback CLI / PS

Activity log Access control (IAM) Tags Diagnose and solve problems Connect

Resource group (move) : Sample Status : Running Location : Poland Central (Zone 3)

Operating system : Linux (Ubuntu 24.04)
Size : Standard D2s v3 (2 vcpus, 8 GiB memory)
Public IP address : 20.215.232.32

JSON View

Copy public IP address

Refresh Troubleshoot More Options Feedback

Connecting using Public IP address | 20.215.232.32

Admin username : azureuser
Port (change) : 22 Check access
Just-in-time policy : Unsupported by plan

Copied admin username

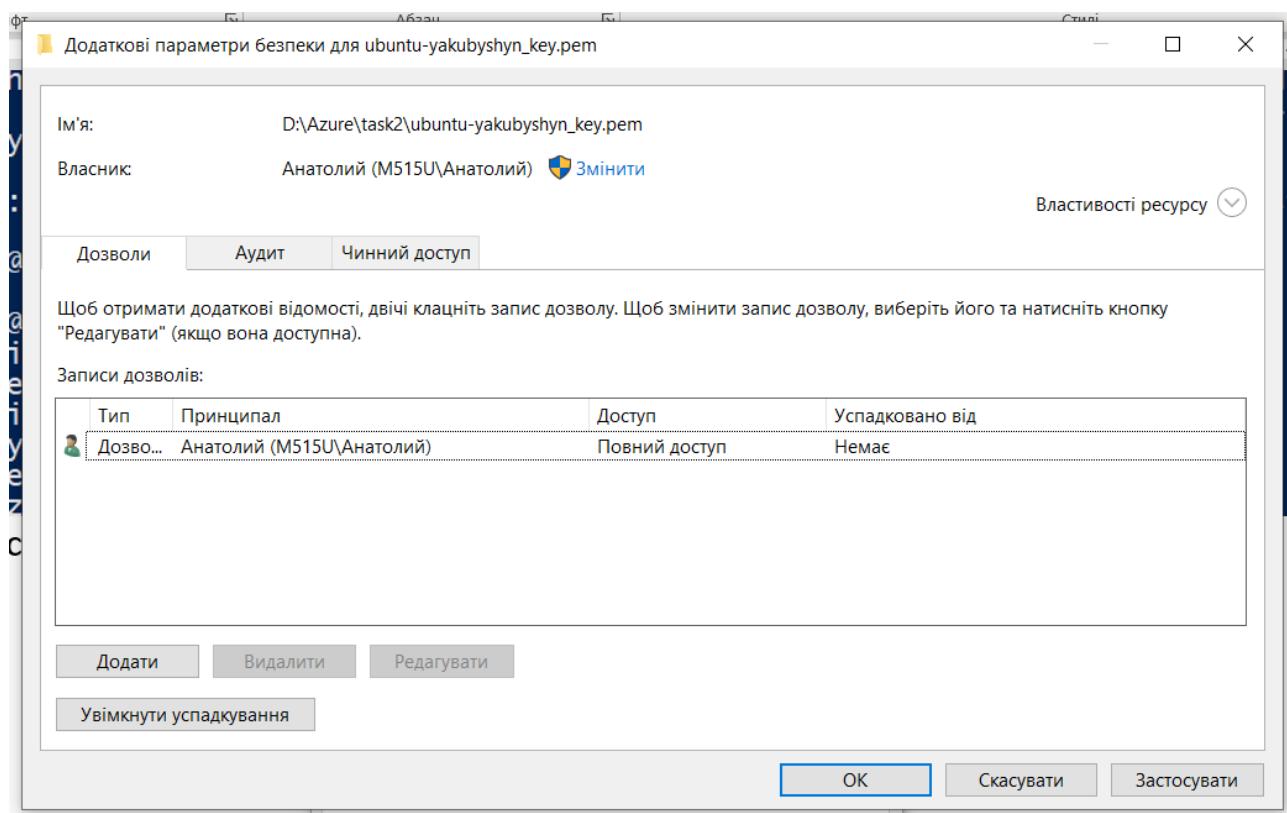
```

PS D:\Azure\task2> ssh -i ubuntu-yakubyshyn_key.pem azureuser@20.215.232.32
The authenticity of host '20.215.232.32 (20.215.232.32)' can't be established.
ED25519 key fingerprint is SHA256:vWFPPpH/c/6zH9V3J91c3t0nR60iocGgWNILw8L50ic4.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '20.215.232.32' (ED25519) to the list of known hosts.

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
@           WARNING: UNPROTECTED PRIVATE KEY FILE!           @
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
Permissions for 'ubuntu-yakubyshyn_key.pem' are too open.
It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "ubuntu-yakubyshyn_key.pem": bad permissions
azureuser@20.215.232.32: Permission denied (publickey).
PS D:\Azure\task2>

```

So, I will change access to key only for current user



```
PS D:\Azure\task2> ssh -i ubuntu-yakubyshyn_key.pem azureuser@20.215.232.32
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-1017-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Mon Jan 13 12:21:42 UTC 2025

System load: 0.0          Processes:      131
Usage of /: 5.4% of 28.02GB  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.

0 updates can be applied immediately.

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

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

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@ubuntu-yakubyshyn:~$
```

After that I had connected

3. Install and configure an Nginx web server on the VM.

```
azureuser@ubuntu-yakubyshyn:~$ sudo apt update
Hit:1 http://azure.archive.ubuntu.com/ubuntu noble_inRelease
Do you want to continue? [Y/n] Y
azureuser@ubuntu-yakubyshyn:~$ sudo apt install nginx -y
Reading package lists... Done
```

4. Create and configure a Network Security Group (NSG) to allow only HTTP (port 80) and SSH (port 22) traffic.

Microsoft Azure

Home > ubuntu-yakubshyn

ubuntu-yakubshyn | Network settings

Virtual machine

Search: This is a new experience. Please provide feedback.

Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Networking, Network settings, Load balancing, Application security groups, Network manager, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, Monitoring, Automation, Help.

Network interface / IP configuration: ubuntu-yakubshyn211_z3 (primary) / ipconfig1 (primary)

Essentials:

Network interface	: ubuntu-yakubshyn211_z3	Load balancers	: 0 (Configure)
Virtual network / subnet	: ubuntu-yakubshyn-vnet / default	Application security groups	: 0 (Configure)
Public IP address	: 20.215.232.32	Network security group	: ubuntu-yakubshyn-nsg
Private IP address	: 10.0.0.4	Accelerated networking	: Enabled
Admin security rules	: 0 (Configure)	Effective security rules	: 0

Rules: + Create port rule

Network security group ubuntu-yakubshyn-nsg (attached to networkInterface: ubuntu-yakubshyn211_z3) Impacts 0 subnets, 1 network interfaces

Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

Create port rule -> inbound port rule

Add inbound security rule

ubuntu-yakubshyn-nsg

Source: Any

Source port ranges: *

Destination: Any

Service: Custom

Destination port ranges: *

Protocol: TCP

Action: Allow

Priority: 310

Name: AllowHTTPtraffic

Description:

Add Cancel Give feedback

Click add

5. Test access to the Nginx web server from a browser.

The top screenshot shows a browser window with the URL <http://20.215.232.32/>. The page title is "Welcome to nginx!". It contains the text: "If you see this page, the nginx web server is successfully installed and working. Further configuration is required. For online documentation and support please refer to nginx.org. Commercial support is available at nginx.com. Thank you for using nginx." The bottom screenshot shows a similar browser window with the same content, but the text is in Russian: "Welcome to nginx! Если вы видите эту страницу, то nginx веб-сервер успешно установлен и работает. Дальнейшая конфигурация требуется. Для онлайн-документации и поддержки обратитесь по адресу nginx.org. Коммерческая поддержка доступна на nginx.com. Спасибо за использование nginx."

6. Verify that any other ports are blocked by the NSG.

Downloaded Nmap on client machine

Zenmap interface showing the results of the nmap scan. The target is set to 20.215.232.32. The command used was nmap -T4 -A -v -Pn 20.215.232.32. The "Ports / Hosts" tab is selected. The results table shows two open ports:

Port	Protocol	State	Service	Version
22	tcp	open	ssh	OpenSSH 9.6p1 Ubuntu 3ubuntu1.35 (Ubuntu Linux; protocol 2.0)
80	tcp	open	http	nginx 1.24.0 (Ubuntu)

So, scan shows that only these ports are not blocked by the NSG.

Deleting VM (network interface and public ip will be deleted automatically because I set this option while creating a VM)

The screenshot shows the Microsoft Azure portal interface. On the left, the navigation menu includes Home, ubuntu-yakubushyn (Virtual machine), Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Networking, Network settings, Load balancing, Application security groups, Network manager, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, Monitoring, Automation, Help, and Azure SSO. The main area displays the "ubuntu-yakubushyn" virtual machine details under the "Virtual machine" section. The "Properties" tab is selected, showing the following details:

Computer name	ubuntu-yakubushyn
Operating system	Linux (ubuntu 24.04)
VM generation	V2
VM architecture	x86
Agent status	Ready
Agent version	2.12.0
Hibernation	Disabled
Host group	-
Host	-
Proximity placement group	-
Colocation status	N/A
Capacity reservation group	-
Disk controller type	SCSI

To the right, a "Delete ubuntu-yakubushyn" dialog box is open. It states: "This action will permanently delete this virtual machine." It lists the resources to be deleted: "ubuntu-yakubushyn" (Virtual machine). There is a checkbox for "Apply force delete" which is checked. A note says: "This virtual machine can be safely force deleted because all of its associated resources are being deleted." Below that, it says: "You can also choose to delete associated resources at the same time. Resources that aren't deleted will be orphaned. Associated resources that are in use by other resources are not shown here." Under "Associated resource type", there are three items: "OS disk" (Quantity: 1), "Network interfaces" (Quantity: 1), and "Public IP addresses" (Quantity: 1, checked). At the bottom, there is a checkbox for "I have read and understand that this virtual machine as well as any selected associated resources listed above will be deleted." Buttons for "Delete" and "Cancel" are at the bottom right.

Then deleted NSG.

Practical Task 2: Windows Virtual Machine and RDP Access Setup Set up a Windows Virtual Machine (VM) on Azure and configure access via Remote Desktop Protocol (RDP).

1. Create a Windows VM (e.g., Windows Server 2019) in Azure using the free tier

Microsoft Azure

Home > 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 ↗](#)

ⓘ This subscription may not be eligible to deploy VMs of certain sizes in certain regions.

Project details

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

Subscription * ⓘ Azure for Students

Resource group * ⓘ Sample ⓘ Create new

Instance details

Virtual machine name * ⓘ windows-yakubshyn

Region * ⓘ (Europe) Poland Central

Availability options ⓘ

Zone options ⓘ

Self-selected zone
Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)
Let Azure assign the best zone for your needs

Availability zone * ⓘ Zone 1

ⓘ You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more ↗](#)

Security type ⓘ

Image * ⓘ Windows Server 2019 Datacenter - x64 Gen2

VM architecture ⓘ

Arm64

x64

ⓘ Arm64 is not supported with the selected image.

Run with Azure Spot discount ⓘ

Size * ⓘ Standard_DS1_v2 - 1 vcpu, 3.5 GiB memory (88.33 USD/month)

Enable Hibernation ⓘ

ⓘ Hibernate is not supported by the size that you have selected. Choose a size that is compatible with Hibernate to enable this feature. [Learn more ↗](#)

Administrator account

Username * ⓘ anatoliy

< Previous Next : Disks > Review + create

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 *

i All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

< Previous

Next : Disks >

Review + create

Microsoft Azure

Home > 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

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

VM disk encryption

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

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

OS disk

OS disk size Image default (127 GB)
OS disk type * Standard SSD (locally-redundant storage)
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM
Key management Platform-managed key
Enable Ultra Disk compatibility
Ultra disk is not supported for the selected VM size Standard_DS1_v2 in Poland Central.

Data disks for windows-yakubsyn

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	Delete with VM
					<input type="checkbox"/>

Create and attach a new disk

Advanced

< Previous Next : Networking > Review + create Give feedback

Home >

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](#)

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.

[Learn more ↗](#)

Network interface

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

Virtual network * ⓘ Subnet * ⓘ Public IP ⓘ NIC network security group ⓘ None Basic AdvancedPublic inbound ports * ⓘ None Allow selected portsSelect inbound ports *

⚠ 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 Enable accelerated networking

Load balancing

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

Load balancing options ⓘ None 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.[< Previous](#) [Next : Management >](#) [Review + create](#)

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

Configure management options for your VM.

Microsoft Defender for Cloud

Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#) ⓘ

Your subscription is protected by Foundational Cloud Security Posture Management Free Plan.

Identity

Enable system assigned managed identity ⓘ

Microsoft Entra ID

Login with Microsoft Entra ID ⓘ

RBAC role assignment of Virtual Machine Administrator Login or Virtual Machine User Login is required when using Microsoft Entra ID login. [Learn more](#) ⓘ

Auto-shutdown

Enable auto-shutdown ⓘ

Backup

Enable backup ⓘ

Guest OS updates

Enable hotpatch ⓘ

Hotpatch is not available for this image. [Learn more](#) ⓘ

Patch orchestration options ⓘ

Some patch orchestration options are not available for this image. [Learn more](#) ⓘ

Create a virtual machine

...

Validation passed



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

Price

1 X Standard DS1 v2

by Microsoft

[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ

0.1210 USD/hr[Pricing for other VM sizes](#)

TERMS

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

You have set RDP port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics

Subscription	Azure for Students
Resource group	Sample
Virtual machine name	windows-yakubshyn
Region	Poland Central
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1
Security type	Trusted launch virtual machines
Enable secure boot	Yes
Enable vTPM	Yes
Integrity monitoring	No
Image	Windows Server 2019 Datacenter - Gen2
VM architecture	x64
Size	Standard DS1 v2 (1 vcpu, 3.5 GiB memory)
Enable Hibernation	No
Username	anatolii
Public inbound ports	RDP
Already have a Windows license?	No
Azure Spot	No

Disks

OS disk size	Image default
OS disk type	Standard SSD LRS
Use managed disks	Yes
Delete OS disk with VM	Enabled
Ephemeral OS disk	No

Networking

< Previous Next > **Create**

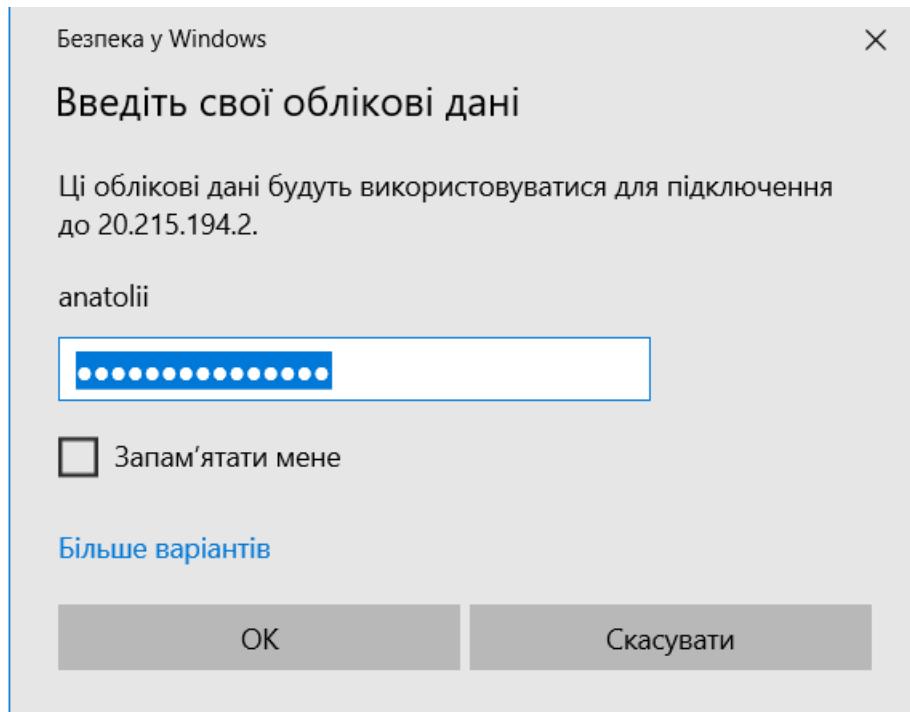
2. Enable and configure Remote Desktop Protocol (RDP) for secure access to the VM.

Was set during VM creation

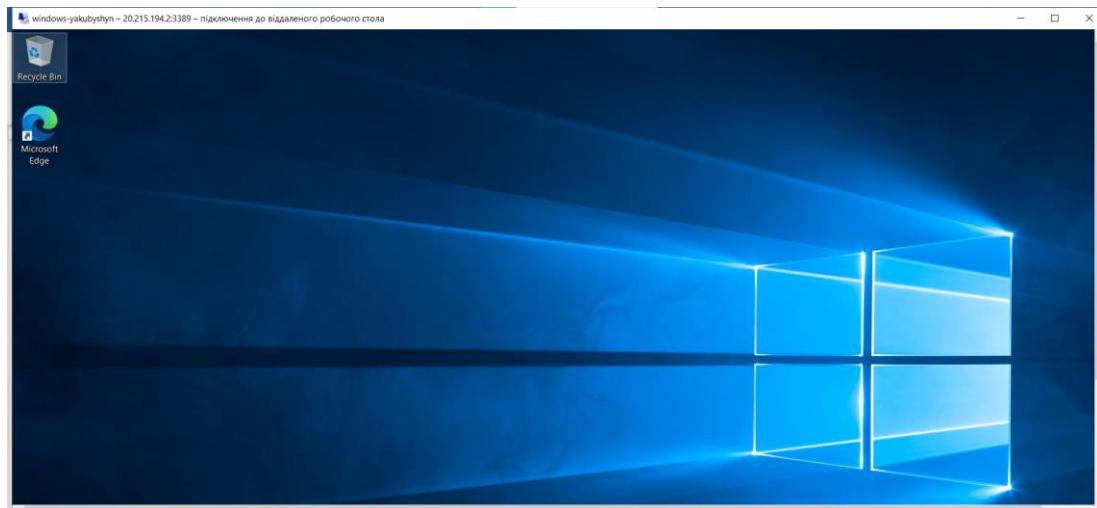
3. Connect to the VM via RDP using Azure credentials.

The screenshot shows the Azure portal interface for a virtual machine named 'windows-yakubysyn'. In the 'Connect' section, there are two main options: 'Native RDP' and 'SSH - Check access'. The 'Native RDP' option is highlighted. Below these options are two buttons: 'Select' and 'Download RDP file'. To the right of the connection methods, there is a note: 'Unsupported by plan'.

Download rdp file



Open rdp file



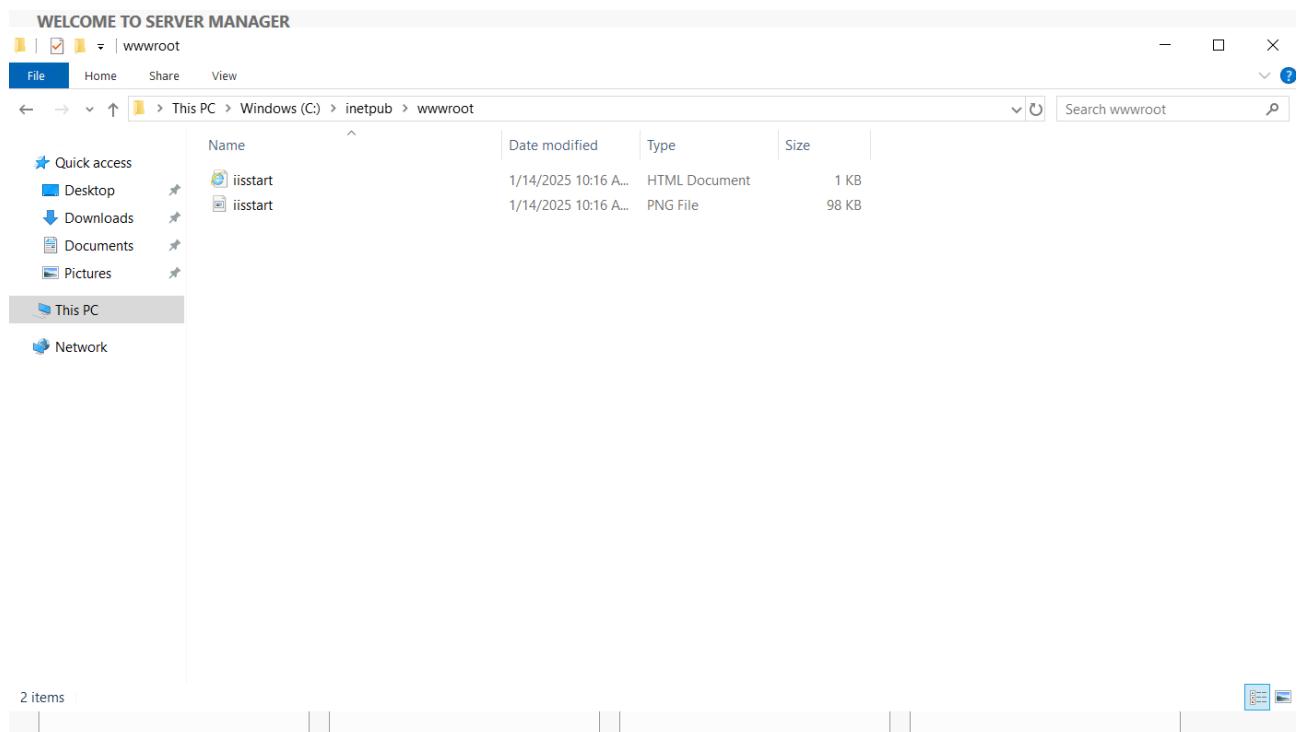
4. Install a web server role (IIS) and deploy a simple test HTML page.

The screenshot shows the Windows Server Manager Dashboard. On the left, there's a navigation bar with 'Dashboard', 'Local Server', 'All Servers', and 'File and Storage Services'. A 'QUICK START' sidebar on the left has 'WHAT'S NEW' and 'LEARN MORE' sections. The main area is titled 'WELCOME TO SERVER MANAGER' with a 'Configure this local server' wizard. Step 1 is 'Configure this local server', and steps 2 through 5 are listed below it: 'Add roles and features', 'Add other servers to manage', 'Create a server group', and 'Connect this server to cloud services'. Below the wizard, there's a section titled 'ROLES AND SERVER GROUPS' showing 'File and Storage Services', 'Local Server', and 'All Servers' each with a count of 1. Each item has a 'Manageability' icon and a list of sub-options: Events, Performance, BPA results.

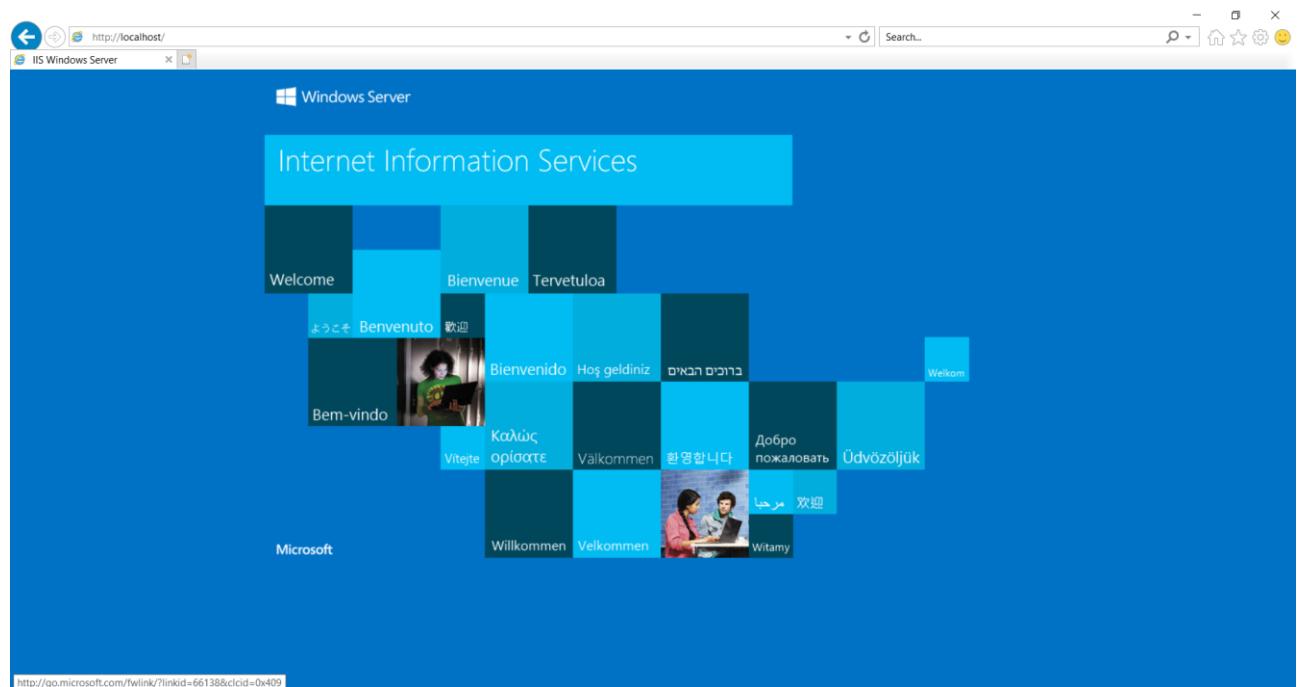
Add roles and features

The screenshot shows the 'Add Roles and Features Wizard' window. The title bar says 'Add Roles and Features Wizard'. The left sidebar shows steps: 'Before You Begin', 'Installation Type', 'Server Selection', 'Server Roles' (which is selected), 'Features', 'Confirmation', and 'Results'. The main pane is titled 'Select server roles' and shows 'Add features that are required for Web Server (IIS)?'. It lists 'Web Server (IIS)' and 'Management Tools' under it, with '[Tools] IIS Management Console'. There is a checked checkbox 'Include management tools (if applicable)'. At the bottom are 'Add Features' and 'Cancel' buttons. The right side of the window shows the 'DESTINATION SERVER windows-yakubys' and a summary bar indicating 1 feature to be installed. At the bottom, there are 'Previous', 'Next >', 'Install', and 'Cancel' buttons.

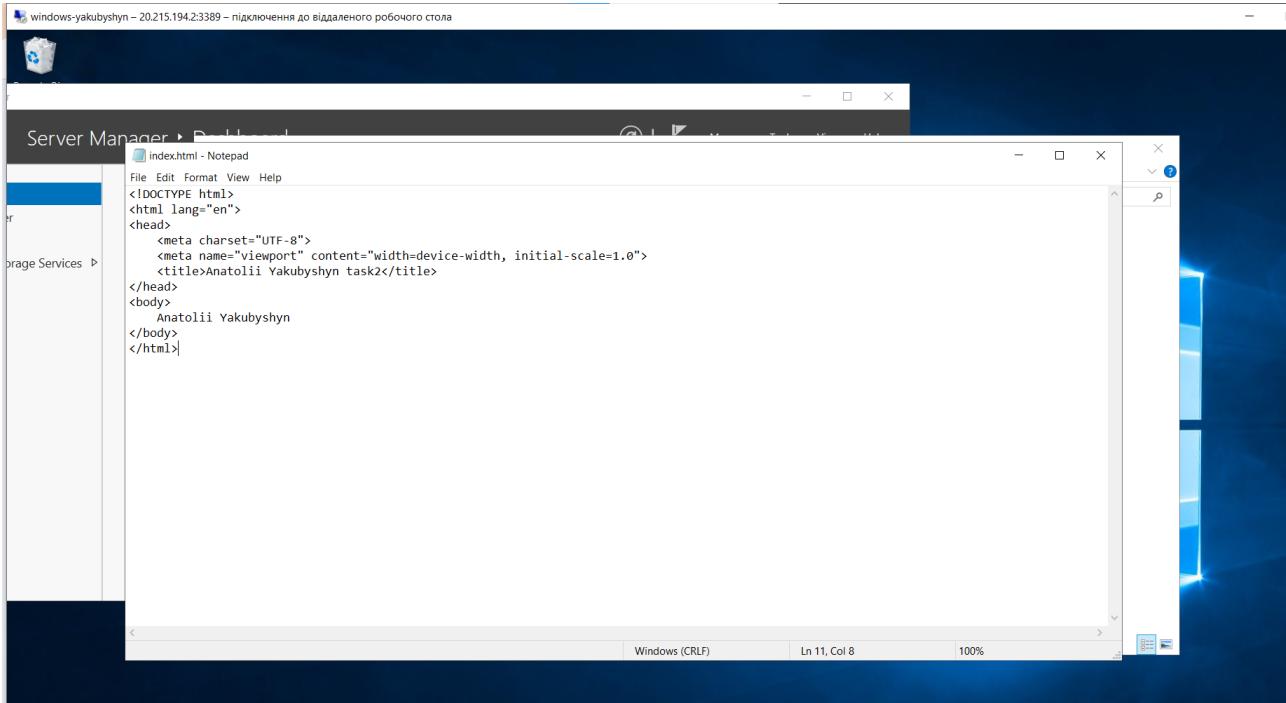
Add features -> Install



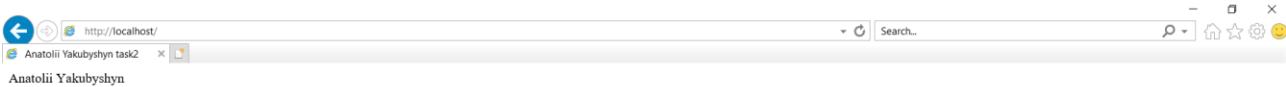
Folders with files created



Deleted files in wwwroot



Created index.html



Deployed simple html page

Microsoft Azure

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20250114114103 | Overview > windows-yakubshyn

windows-yakubshyn | Network settings

Virtual machine

Search This is a new experience. Please provide feedback

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Connect Bastion Windows Admin Center Network settings Load balancing Application security groups Network manager Settings Availability + scale Security Backup + disaster recovery Operations Monitoring Automation Help

Network interface : windows-yakubshyn954_1 Network network / subnet : ubuntu-yakubshyn-vnet / default Public IP address : 20.215.194.2 Private IP address : 10.0.0.4 Admin security rules : 0 (Configure)

Load balancers : 0 (Configure) Application security groups : 0 (Configure) Network security group : windows-yakubshyn-nsg Accelerated networking : Enabled Effective security rules : 0

Rules Collapse all

Network security group windows-yakubshyn-nsg (attached to networkInterface: windows-yakubshyn954_1) Impacts 0 subnets, 1 network interfaces

+ Create port rule

Priority	Name	Port	Protocol	Source	Destination	Action
1	Inbound port rules (4)					
300	RDP	3389	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
	Outbound port rules (3)					

<https://portal.azure.com/#/resource/subscriptions/3a612e70-8e22-4425-b3ea-29f6acf32428/resourcegroups/Sample/providers/Microsoft.Compute/virtualMachines/windows-yakubshyn/networkSettings>

I will add port 80 rule to access from my browser

Add inbound security rule

windows-yakubshyn-nsg

Source: Any

Source port ranges: *

Destination: Any

Service: HTTP

Destination port ranges: 80

Protocol: TCP

Action: Allow

Priority: 310

Name: AllowAnyHTTPInbound

Description:

Add Cancel Give feedback

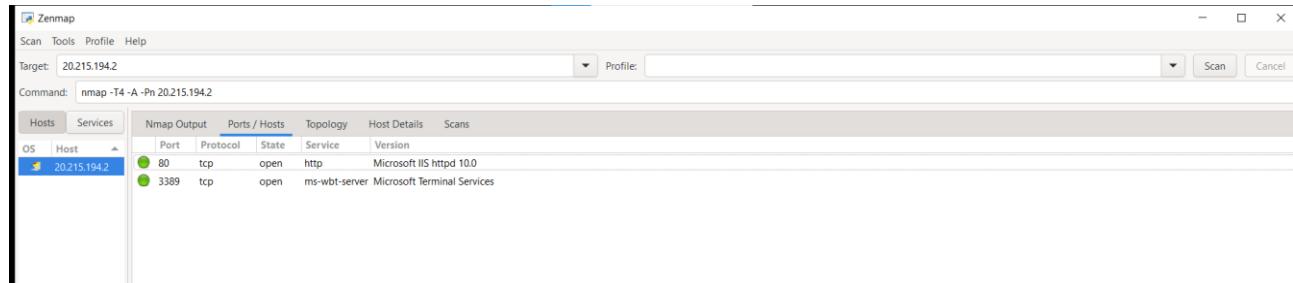
5. Verify access to the test page from a browser.

Copy IP address from Overview



6. Ensure that unnecessary ports are closed, allowing only RDP (port 3389) and HTTP (port 80)

I will use Nmap scanner again to proof that only those ports are allowed



Practical Task 3: Configuring an Azure Load Balancer Create and configure a Basic Azure Load Balancer to distribute traffic across multiple virtual machines.

1. Create two Linux or Windows virtual machines in the same region and virtual network using the Azure Free Tier.

2. Install and configure a web server (e.g., Nginx on Linux or IIS on Windows) on both VMs with unique content for testing.

The screenshot shows the 'Create virtual network' wizard in the Microsoft Azure portal. The 'Basics' tab is selected. In the 'Project details' section, the subscription is set to 'Azure for Students' and the resource group is 'Sample'. In the 'Instance details' section, the virtual network name is 'Task3' and the region is '(Europe) Poland Central'. At the bottom, there are 'Previous' and 'Next' buttons, a 'Review + create' button, and a 'Give feedback' link.

The screenshot shows the 'IP addresses' step of the 'Create virtual network' wizard. It displays the configured IPv4 address space: '10.0.0.0/29'. Below this, there are sections for 'Subnets', 'IP address range', 'Size', and 'NAT gateway'. At the bottom, there is an 'Add IPv4 address space' button and a 'Review + create' button.

Microsoft Azure

Home > Task3 Virtual network

Search Move Delete Refresh Give feedback

Overview Essentials

Activity log Resource group (move) : Sample
Access control (IAM) Location (move) : Poland Central
Tags Subscription (move) : Azure for Students
Diagnose and solve problems Subscription ID : 3a612e70-8e22-4425-b3ea-29f6acf32428

Address space : 10.0.0.0/29
DNS servers : Azure provided DNS service
Flow timeout : Configure
BGP community string : Configure
Virtual network ID : adb09cbe-4765-4312-b67b-b1c64031a4ba

Tags (edit) : Add tags

Topology Properties Capabilities (5) Recommendations Tutorials

DDoS protection : Configure additional protection from distributed denial of service attacks. Not configured

Azure Firewall : Protect your network with a stateful L3-L7 firewall. Not configured

Peerings : Seamlessly connect two or more virtual networks. Not configured

Microsoft Defender for Cloud : Strengthen the security posture of your environment. Not configured

Private endpoints : Privately access Azure services without sending traffic across internet. Not configured

JSON View

Microsoft Azure

Home > Create a resource > Marketplace >

Ubuntu 22.04 LTS with Nginx Belinda CZ s.r.o.

Ubuntu 22.04 LTS with Nginx Add to Favorites

Belinda CZ s.r.o. | Virtual Machine

Plan Create Start with a pre-set configuration

Want to deploy programmatically? Get started

Overview Plans + Pricing Usage Information + Support Ratings + Reviews

Offered under Microsoft Standard Contract.

Nginx is a powerful open-source software that can be used for various purposes such as web serving, reverse proxying, caching, load balancing, media streaming, and more. It was initially designed as a web server for maximum performance and stability, making it a reliable choice for businesses.

This image is particularly suitable for customers who are looking to deploy a pre-installed Nginx server for low or heavy-traffic websites and web applications, and who want to get up and running as quickly and easily as possible.

In addition to its HTTP server capabilities, Nginx can also function as:

- proxy server for email (IMAP, POP3, and SMTP)
- reverse proxy
- load balancer for HTTP, TCP, and UDP servers.

Nginx is pre-configured on this image. You can apply further configurations for your needs.

Ports

The following ports are automatically open during deployment. If you are using a custom NSG or firewall appliance, you may have to open them:

- HTTP: 80
- HTTPS: 443

More products from Belinda CZ s.r.o. See All

https://portal.azure.com/# idows Optimized tiny server with IIS on Windows Server 2019 SQL Express on Windows

Give feedback

I decided not to do everything again, so I will use image from marketplace.

[Home](#) > [Ubuntu 22.04 LTS with Nginx](#) >

Create a virtual machine

[!\[\]\(eb3ff164f79f6658783ec1f6462fa176_img.jpg\) Help me create a low cost VM](#) [!\[\]\(c190f051f2010bbea1b69262b355c2d7_img.jpg\) Help me create a VM optimized for high availability](#) [!\[\]\(e8dc8e02202b74b10ced9e88c02da2b3_img.jpg\) 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](#)

 This subscription may not be eligible to deploy VMs of certain sizes in certain regions.

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 *  

Region *  

Availability options  

Zone options  Self-selected zone
Choose up to 3 availability zones, one VM per zone
 Azure-selected zone (Preview)
Let Azure assign the best zone for your needs

Availability zone *  

 You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

VM architecture

Arm64
 x64

 Arm64 is not supported with the selected image.

Run with Azure Spot discount

Size *



[See all sizes](#)

Enable Hibernation

 Hibernation is not supported by the image and size that you have selected. Choose an image and size that is compatible with Hibernation to enable this feature.
[Learn more](#)

Administrator account

Authentication type

SSH public key

Password

 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 *



SSH public key source



SSH Key Type

RSA SSH Format

Ed25519 SSH Format

 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.

Key pair name *



[< Previous](#)

[Next : Disks >](#)

[Review + create](#)

[Home](#) > [Ubuntu 22.04 LTS with Nginx](#) >

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

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

VM disk encryption

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host 

 Encryption at host is not registered for the selected subscription. [Learn more](#)

OS disk

OS disk size 

Image default (30 GiB)

OS disk type * 

Standard SSD (locally-redundant storage)

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

Delete with VM 



Key management 

Platform-managed key

Enable Ultra Disk compatibility 



Ultra disk is not supported for the selected VM size Standard_DS1_v2 in Poland Central.

Data disks for WeddingWebsite1

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

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

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

< Previous

Next : Networking >

Review + create

Add a subnet

X

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 ⓘ	<input type="button" value="Default"/>
Name * ⓘ	<input type="text" value="default"/>
IPv4	
Include an IPv4 address space	<input checked="" type="checkbox"/>
IPv4 address range ⓘ	<input type="button" value="10.0.0/29"/> 10.0.0.0 - 10.0.0.7
Starting address * ⓘ	<input type="text" value="10.0.0.0"/>
Size ⓘ	<input type="button" value="/29 (8 addresses)"/>
Subnet address range ⓘ	10.0.0.0 - 10.0.0.7
IPv6	
Include an IPv6 address space	<input type="checkbox"/> This virtual network has no IPv6 address ranges.
Private subnet	
Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. Learn more	
Enable private subnet (no default outbound access)	<input type="checkbox"/>
Security	
Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. Learn more	
NAT gateway ⓘ	<input type="button" value="None"/>
A NAT gateway is recommended for outbound internet access from subnets. Edit the subnet to add a NAT gateway. Learn more	
Network security group ⓘ	<input type="button" value="None"/>

[Add](#) [Cancel](#) [Give feedback](#)

Created subnet

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 v

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.
[Learn more](#)

Network interface

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

Virtual network *  Task3
[Create new](#)

Subnet *  default (10.0.0.0/29)
[Manage subnet configuration](#)

Public IP  (new) WeddingWebsite1-ip
[Create new](#)

NIC network security group  None

 Advanced

 This VM image has preconfigured NSG rules

Configure network security group *  (new) WeddingWebsite1-nsg
[Create new](#)

Delete public IP and NIC when VM is deleted

Enable accelerated networking  The selected image does not support accelerated networking.

Load balancing

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

Load balancing options  None

 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.

It fails, I will configure nginx by my self

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 * [Change](#)

Resource group * [Create new](#)

Instance details

Virtual machine name * [Check status](#)

Region * [View regions](#)

Availability options [View zones](#)

Zone options [Choose up to 3 availability zones, one VM per zone](#)
 [Self-selected zone](#) [Choose up to 3 availability zones, one VM per zone](#)
 [Azure-selected zone \(Preview\)](#) [Let Azure assign the best zone for your needs](#)

Availability zone * [View zones](#)

[You can now select multiple zones. Selecting multiple zones will create one VM per zone. \[Learn more\]\(#\)](#)

Security type [Configure security features](#)

Image * [Ubuntu Minimal 22.04 LTS - x64 Gen2](#)
[See all images](#) | [Configure VM generation](#)

VM architecture [Arm64](#)
 [x64](#)
[Arm64 is not supported with the selected image.](#)

Run with Azure Spot discount

Size * [View details](#)
[See all sizes](#)

Enable Hibernation
[Hibernate does not currently support Trusted launch and Confidential virtual machines for Linux images. \[Learn more\]\(#\)](#)

Administrator account

Authentication type [SSH public key](#)

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

Disk -> standard SSD

Microsoft Azure Search

Home > Sample > Marketplace > Ubuntu Minimal 22.04 LTS >

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

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.
[Learn more](#)

Network interface

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

Virtual network *

Subnet *

Public IP

NIC network security group None Basic Advanced

Public inbound ports * None Allow selected ports

Select inbound ports *

⚠ 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

Enable accelerated networking

Load balancing

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

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

```
PS D:\Azure\task2> ssh -i Weddingwebsite1_key.pem azureuser@20.215.194.107
The authenticity of host '20.215.194.107 (20.215.194.107)' can't be established.
ED25519 key fingerprint is SHA256:JiFgA5f/Bc2UZ9202WPs9WFwhfZh31umAxxcSREuh7k.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '20.215.194.107' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-1020-azure x86_64)
```

```
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
```

This system has been minimized by removing packages and content that are not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

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

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

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.

```

#!/bin/bash

zip_url=$1
folder_name=$2

sudo apt install nginx -y
sudo apt install node -y
sudo apt install npm -y
sudo apt install unzip -y
sudo wget $zip_url
sudo unzip master.zip
cd $folder_name
sudo npm install
sudo npm install --global gulp-cli
gulp
sudo cp -r $(pwd)/* /var/www/html/

```

```

PS D:\Azure\task2> scp -i WeddingWebsite1_key.pem install-wedding-website.sh azureuser@20.215.194.107:~
install-wedding-website.sh
100% 300 7.3KB/s 00:00
PS D:\Azure\task2>

```

```

azureuser@weddingwebsite1:~$ chmod +x install-wedding-website.sh

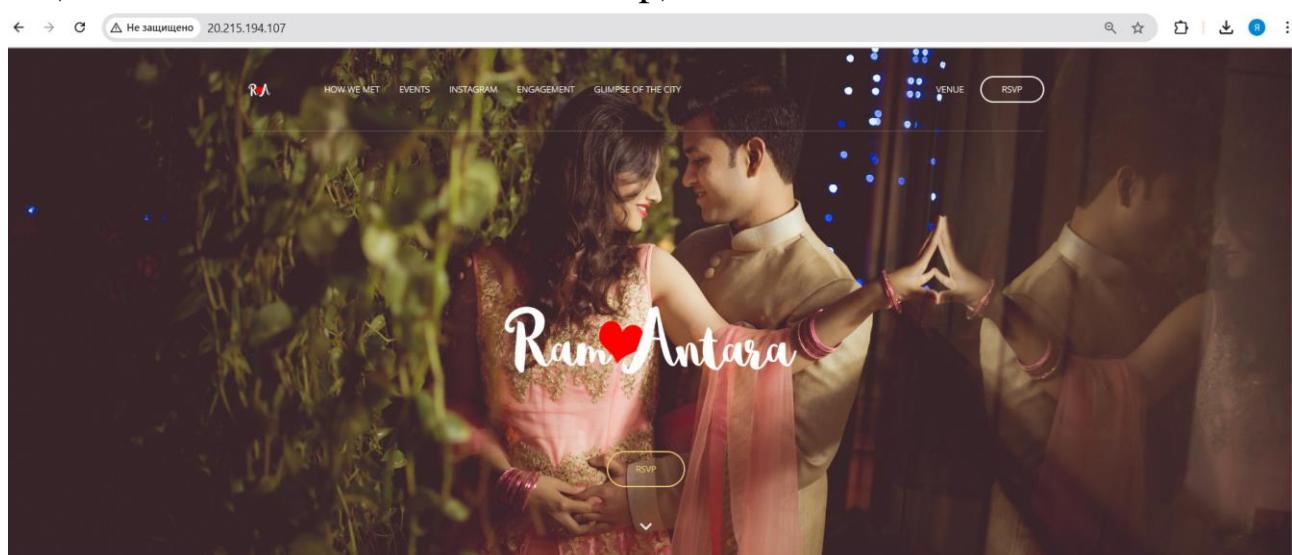
```

```

./install-wedding-website.sh https://github.com/rampatra/wedding-website/archive/refs/heads/master.zip wedding-website-master

```

(Added before inbound rule for http)



WE ARE GETTING Hitched
The dates are 27th & 28th of November '17 and we would like you to be a part of it.

Creating 2nd vm.

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

This subscription may not be eligible to deploy VMs of certain sizes in certain regions.

Project details

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

Subscription: Azure for Students

Resource group: Sample

Create new

Instance details

Virtual machine name: vm2

Region: Europe Central

Availability options:

Zone options:

Availability zone: Self selected zone (Choose a specific availability zone, one VM per zone)

Zone 1 (Leave selected zone (Recommended) Let Azure assign the best zone for your needs)

You can now select multiple zones. Selecting multiple zones will create one VM per zone. Learn more?

Security type: Tutored launch virtual machines

Image: Ubuntu Server 22.04 LTS - v64 Gen2

VM architecture: ARM

Run with Azure Spot discount: Off

Size: Standard D8s v2 - 1 vcpu, 3.5 GB memory (24.00 USD/month)

Enable hibernation: Off

Administrator account: SSH public key

Review + create

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

Network interface

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

Virtual network: Task3

Subnet: default (10.0.0.0/29)

Public IP: (new) VM IP

NIC network security group: Basic

Public inbound ports: Allow selected ports

Select inbound ports: SSH (22)

⚠️ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Delete public IP and NIC when VM is deleted: Off

Enable accelerated networking: Off

Load balancing

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

Load balancing options: None

None

Azure load balancer

Supports all TCP/UDP network traffic, port-forwarding, and outbound flows.

Application gateway

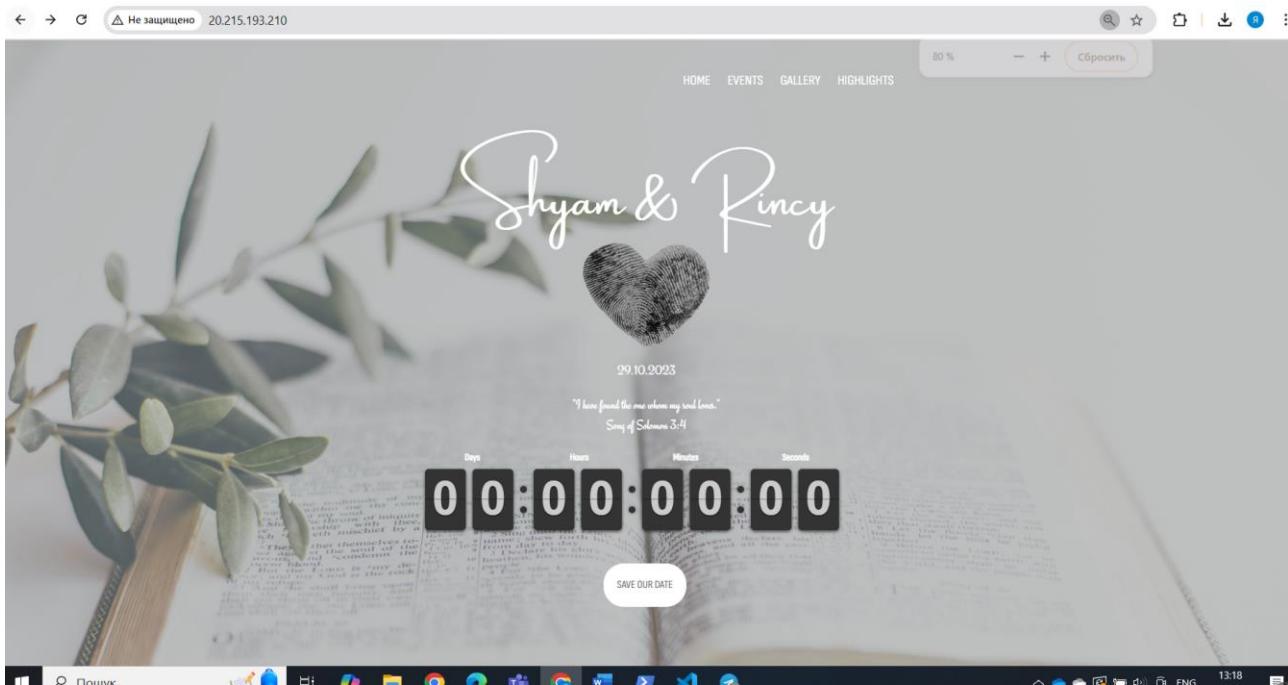
Web traffic load balancer for HTTP/HTTPS with URL-based routing, SSL termination, session persistence, and web application firewall.

< Previous Next: Management > Review + create

```
#!/bin/bash
zip_url=$1
folder_name=$2

sudo apt install nginx -y
sudo apt install node -y
sudo apt install npm -y
sudo apt install unzip -y
sudo wget $zip_url
sudo unzip main.zip
cd $folder_name
sudo npm install
sudo npm install --global gulp-cli
gulp
sudo cp -r $(pwd)/* /var/www/html/
```

```
azureuser@VM2:~/Desktop$ ./install-wedding-website.sh https://github.com/shyamjos/wedding-website/archive/refs/heads/main.zip wedding-website-main
```



3. Create a Basic Load Balancer in Azure (included in the free tier) and configure it to balance HTTP (port 80) traffic between the two virtual machines

4. Configure a health probe to monitor the availability of the VMs.

Overview Plan Usage Information + Support Ratings + Reviews

What is a load balancer? View details

Active Directory Health Check Microsoft Active Directory

AD Replication Status Microsoft Active Directory

Device Update for IoT Hub Microsoft Azure IoT

Front Door and CDN profiles Microsoft Azure Front Door

goldyakub@lcpi.ua 

Add frontend IP configuration

WeddingLB

Name *

IP version IPv4 IPv6

IP type IP address IP prefix

Public IP address * [Create new](#)

Gateway Load balancer

[Save](#) [Cancel](#) [Give feedback](#)

Microsoft Azure

Home > Samples > Marketplace > Load Balancer > Create load balancer >

Add backend pool

Name *

Virtual network

Backend Pool Configuration

IP configurations

If configurations associated to virtual machines and virtual machine scale sets must be in same location as the load balancer and be in the same virtual network.

+ Add | X Remove

Resource Name	Resource group	Type	IP configuration	IP Address	Availability set
VM2	Sample	Virtual machine	ipconfig1	10.0.0.1	-
WeddingVMset1	Sample	Virtual machine	ipconfig1	10.0.0.4	-

Save | Cancel | Give feedback

Add load balancing rule

WeddingLB

A load balancing rule distributes incoming traffic that is sent to a selected IP address and port combination across a group of backend pool instances. Only backend instances that the health probe considers healthy receive new traffic. [Learn more.](#)

Name *

IP version * IPv4 IPv6

Frontend IP address *

Backend pool *

Protocol TCP UDP

Port *

Backend port *

Health probe * [Create new](#)

Session persistence (Optional) Session persistence specifies that traffic from a client should be handled by the same virtual machine in the backend pool for the duration of a session. [Learn more.](#)

Idle timeout (minutes) *

Enable TCP Reset

Enable Floating IP

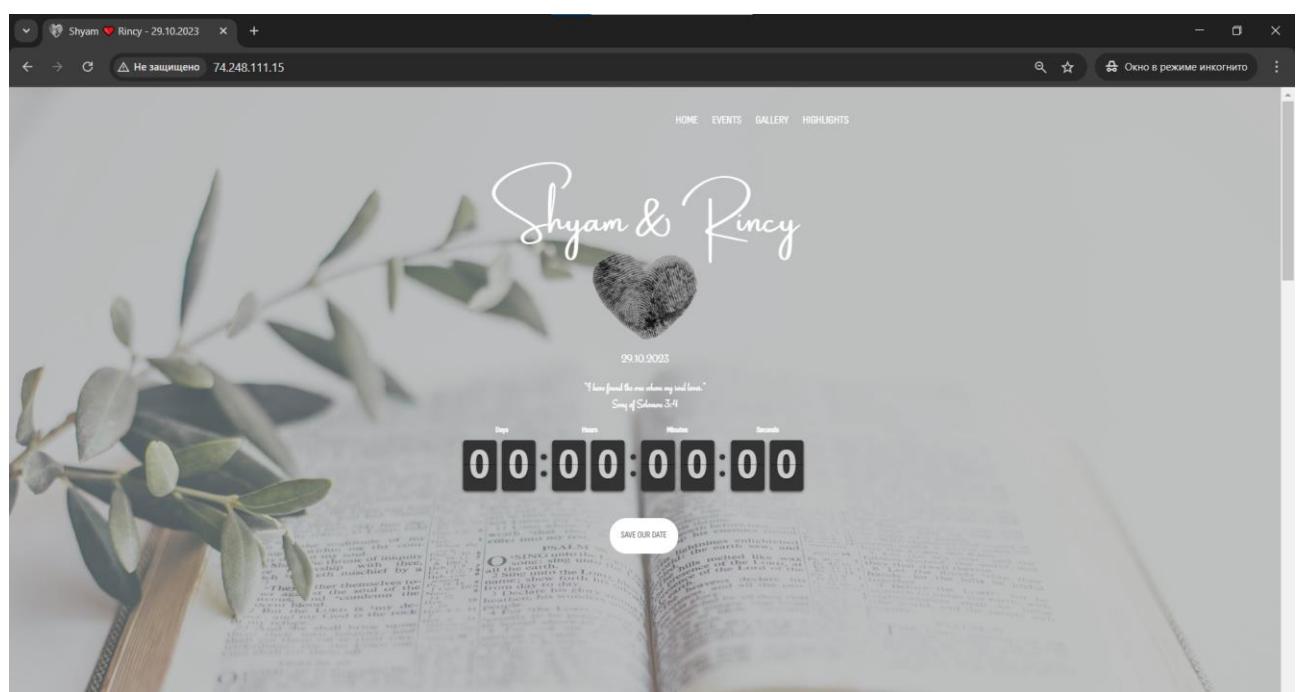
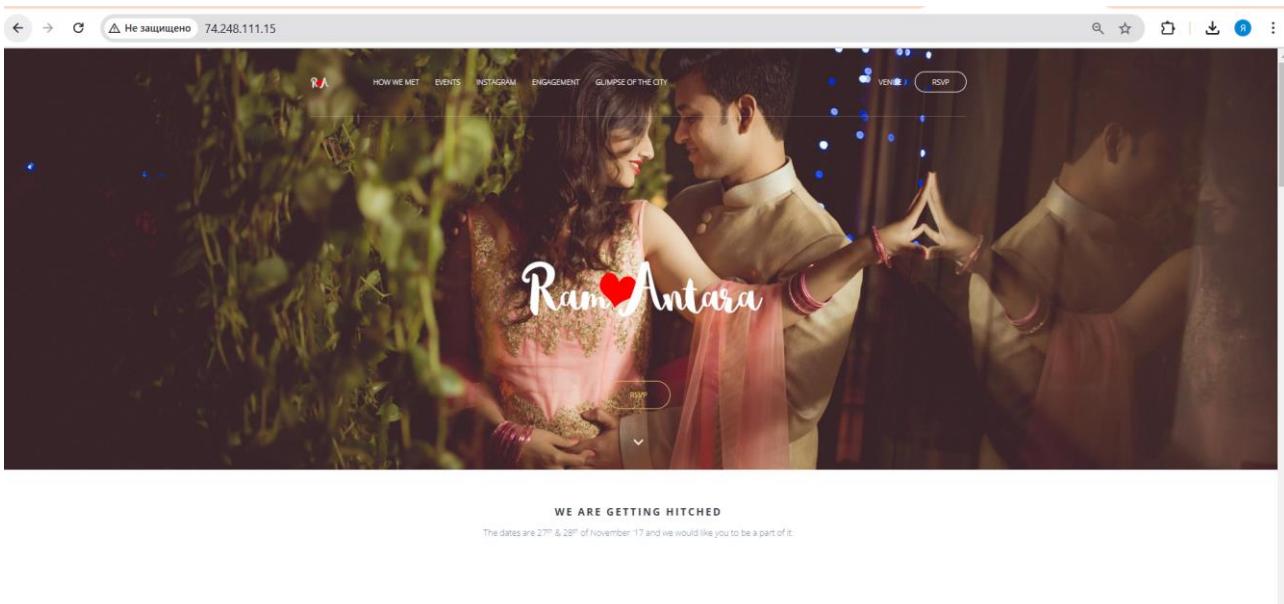
Outbound source network address translation (SNAT)

Save | Cancel | Give feedback

click create

The screenshot shows the Azure portal interface for managing a load balancer. The left sidebar has 'Microsoft Azure' at the top, followed by 'Home > WeddingLB'. Under the 'Load balancer' section, 'WeddingLB' is selected. The main content area is titled 'WeddingLB | Frontend IP configuration'. It displays a table with one row for 'LFRIP', which has an 'IP address' of '74.248.111.15'. A note above the table states: 'The frontend IP address configuration of a load balancer serves as the entry point for incoming traffic to the load balancer, and the load balancer then distributes the traffic to the backend pool of virtual machines or services.' Below the table are sections for 'Settings' and 'Backend IP configuration'.

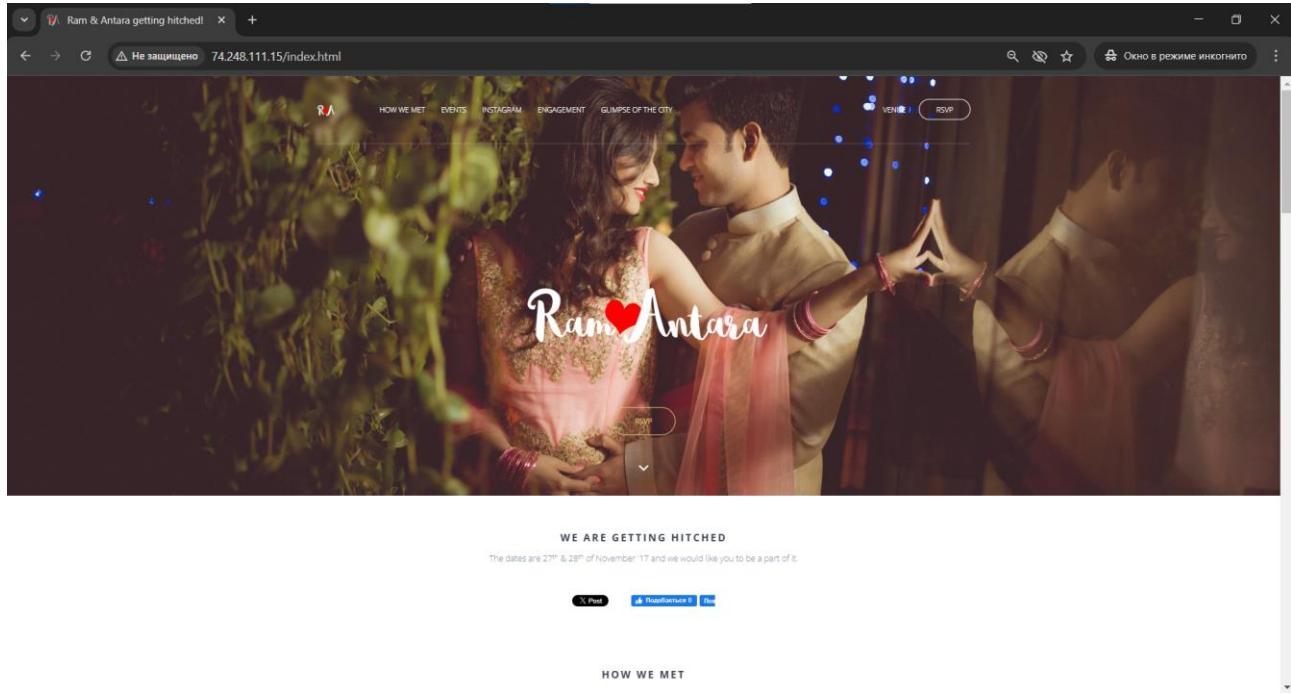
5. Test the Load Balancer by accessing its public IP address from a browser and verify that traffic is routed to both VMs (by observing the unique content from each server).



6. Verify that the Load Balancer removes unavailable VM from the traffic pool when it fails the health probe

The screenshot shows the Microsoft Azure portal interface for a virtual machine named 'VM2'. The 'Overview' tab is selected, displaying basic information like the VM's state (Running), location (West Europe), and resource group (WeddingLB). A warning message at the top indicates an upgrade is available. Below the main content area are several action buttons: Connect, Start, Stop, Hibernate, Delete, Refresh, Open in mobile, Feedback, and CLI / PS.

Stop



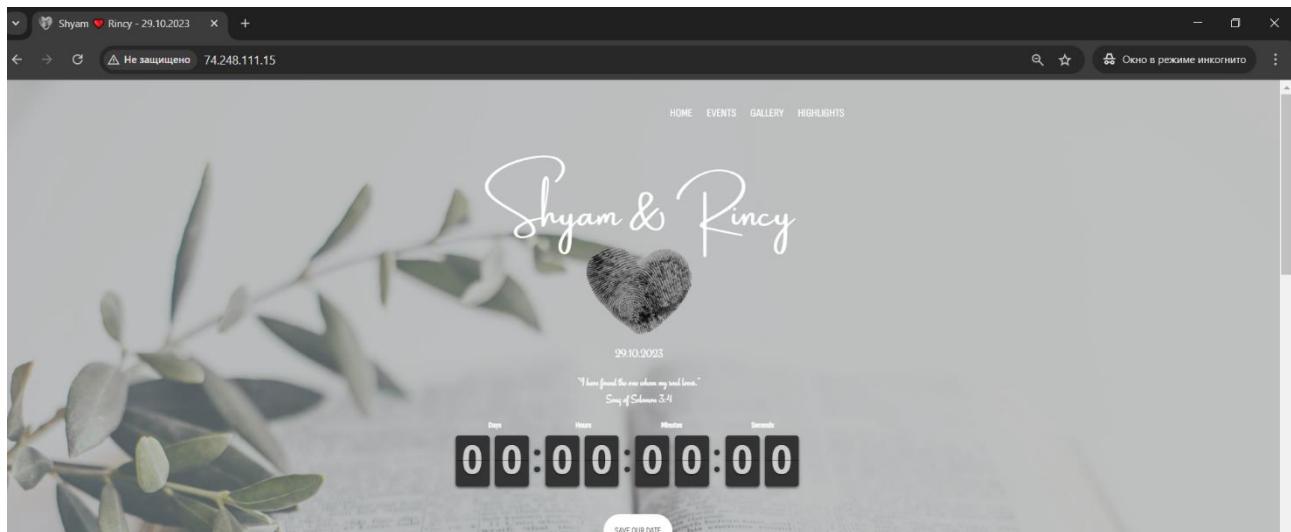
I refreshed more than 10 times and only this appeared.

The screenshot shows the Microsoft Azure portal for the 'WeddingLB' load balancer. Under the 'Backend pools' section, there is a table listing two backend VMs: 'WeddingVM' and 'VM2'. The 'WeddingVM' row shows 'Running' status and 'None' for Admin state. The 'VM2' row shows 'Stopped (deallocated)' status and 'None' for Admin state. The table includes columns for Back-end pool, Resource Name, IP address, Network interface, Availability zone, Rules count, Resource Status, and Admin state.

Back-end pool	Resource Name	IP address	Network interface	Availability zone	Rules count	Resource Status	Admin state
WeddingVM (2)	WeddingVM	10.0.0.4	weddingwebsite102_z1	1	1	Running	None
	VM2	10.0.0.5	vm2957_z1	1	1	Stopped (deallocated)	None

Deallocated

Then I turned VM on



It appears after refreshing

Then I deleted all resources from Resource group.

Practical Task 4: Configuring a Basic Load Balancer with Virtual Machine Scale Sets (VMSS)

Set up a Basic Azure Load Balancer to distribute traffic across a Virtual Machine Scale Set (VMSS).

1. Create a Virtual Machine Scale Set (VMSS) in Azure using Linux or Windows instances within the free tier (for example B1s size). Limit the scale set to two VM instances to avoid exceeding the free-tier 750-hour limit.

2. Deploy the scale set with a custom configuration to install and configure a web server (e.g., Nginx on Linux or IIS on Windows) on each VM instance

3. Configure the Basic Load Balancer to distribute HTTP (port 80) traffic across the VM instances in the scale set.

4. Add a health probe to monitor the availability of instances in the VMSS

The screenshot shows the Microsoft Azure portal interface with the title 'Create virtual network'. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (G+)', 'Copilot', and a user profile. The main content area is titled 'Create virtual network' with a sub-section 'Basics'. It displays the following information:

- Subscription:** Azure for Students
- Resource group:** Sample (with a 'Create new' button)
- Virtual network name:** Task4
- Region:** (Europe) North Europe
- Deploy to an Azure Extended Zone:** (checkbox)

Below these fields, there are two horizontal progress bars: one blue and one grey, indicating the status of the deployment process.

Microsoft Azure

Home > Sample > Marketplace > Virtual network

Create virtual network

Basics Security IP addresses Tags Review + create

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. Learn more ↗

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. Learn more ↗

+ Add a subnet

10.0.0.0/29	/29	Delete address space	
10.0.0.0/29	/29	8 addresses	
10.0.0.0 - 10.0.0.7			
Subnets	IP address range	Size	NAT gateway

Add IPv4 address space ↴

Previous Next Review + create ↗ Give feedback 17/12

Microsoft Azure

Home > Sample > Marketplace > Virtual machine scale set

Create a virtual machine scale set

Basics Spot Disks Networking Management Health Advanced Tags Review + create

Azure virtual machine scale sets let you create and manage a group of load balanced VMs. The number of VM instances can automatically increase or decrease in response to demand or a defined schedule. Scale sets provide high availability to your applications, and allow you to centrally manage, configure, and update a large number of VMs.

Learn more about virtual machine scale sets ↗

Project details

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

Subscription * Azure for Students

Resource group * Sample

Create new

Scale set details

Virtual machine scale set name * Task4

Region * (Europe) North Europe

Availability zone (None)

Orchestration

A scale set has a "scale set mode" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set mode.

Learn more about the scale set mode ↗

Orchestration mode * Flexible: achieve high availability at scale with identical or multiple virtual machine types Uniform: optimized for large scale stateless workloads

Security type (Trusted launch virtual machines

Scaling

Scaling mode * Manually update the capacity: Maintain a fixed amount of instances. Autoscaling: Scaling based on a CPU metric, on any schedule. No scaling profile: manual attach virtual machines after deployment

Improve your availability by selecting multiple zones

Improve your availability by selecting multiple zones

Instance count *

Configure scaling options

Instance details

Image *

[See all images](#) | [Configure VM generation](#)

VM architecture Arm64 x64

Size *

[See all sizes](#)

Enable Hibernation

Hibernate does not currently support Trusted launch and Confidential virtual machines for Linux images. [Learn more](#)

Administrator account

Authentication type Password SSH public key

Username *

SSH public key source

RSA SSH Format Ed25519 SSH Format

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.

Key pair name *

[« Previous](#) [Next »](#) [Skip](#) [Review + Create](#)

Microsoft Azure							
Task4 Subnets							
Virtual network							
<input type="text"/>	<input type="button" value="Search"/>	<input type="button" value="Subnet"/>	<input type="button" value="Gateway subnet"/>	<input type="button" value="Refresh"/>	<input type="button" value="Manage users"/>	<input type="button" value="Delete"/>	
<input type="button" value="Overview"/>		<input type="button" value="Search subnets"/>					
<input type="button" value="Activity log"/>	Name	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
<input type="button" value="Access control (IAM)"/>	default	10.0.0.0/29		3			
<input type="button" value="Tags"/>							
<input type="button" value="Diagnose and solve problems"/>							

Created subnet for vnet

[Microsoft Azure](#)

Home > Virtual machine scale set >

Create a virtual machine scale set

Basics Spot Disks Networking Management Health Advanced Tags Review + Create

Virtual network configuration

Azure Virtual Network (VNet) enables many types of Azure resources to securely communicate with each other, the internet, and on-premises networks. Learn more about VNETs

Virtual network *

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

<input type="button" value="Create new nic"/>	<input type="button" value="Delete"/>			
<input type="checkbox"/> NAME: Task4-nic1	<input type="checkbox"/> CREATE PUBLIC: Yes	<input type="checkbox"/> SUBNET: default (10.0.0.0/28)	<input type="checkbox"/> NETWORK SECUR.: Basic	<input type="checkbox"/> ACCELERATED N.: On

Load balancing

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

Load balancing options None 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 firewalls.

[« Previous](#) [Next : Management](#) [Review + Create](#) [Give feedback](#)

Microsoft Azure

Home > Virtual machine scale set >

Create a virtual machine scale set

Add

Install order Application name Azure compute g... Version number Treat as failure

Click 'Add' to get started with VM applications.

Custom data and cloud init

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

Custom data

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

User data

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

Enable user data

User data *

```
#!/bin/bash
sudo apt install nginx -y
cat <<EOF > /var/www/html/index.html
<?php echo "hostname is " .gethostname(); ?>
EOF
```

Performance (NVMe)

Enable capabilities to enhance the performance of your resources.

Higher remote disk storage performance

with NVMe The selected size is not supported for NVMe. [See supported size families](#)

Host

Allow Deactivated Hosts allows us to provision and manage a hybrid cluster within our data centers that are deactivated for us.

< Previous Next > Tags Review + create Give feedback

```
#!/bin/bash
```

```
# Update the package list and upgrade existing packages
```

```
sudo apt update
```

```
sudo apt upgrade -y
```

```
# Install Apache and PHP
```

```
sudo apt install -y apache2 php
```

```
# Start and enable the Apache service
```

```
sudo systemctl start apache2
```

```
sudo systemctl enable apache2
```

```
# Create a health check file
```

```
echo 'OK' | sudo tee /var/www/html/health.html > /dev/null
```

```
# Create a PHP file to display the hostname
```

```
echo '<?php echo "hostname is " .gethostname(); ?>' | sudo tee /var/www/html/server-info.php > /dev/null
```

```
# Set permissions (optional, ensures Apache can access the files)
```

```
sudo chmod -R 755 /var/www/html
```

```
# Restart Apache to apply changes
```

```
sudo systemctl restart apache2
```

The screenshot shows a configuration interface for an application health monitor. At the top, there are several icons: a mail icon, a bell icon, a gear icon, a question mark icon, and a user profile icon. To the right of the icons, the email address "goldyakub@kpi.ua" and the organization name "YAKUBYSHYN ORG" are displayed. Below the header, the title "Application health monitor" is centered above a "X" button.

The main form area contains the following fields:

- Application health monitor ***: A dropdown menu set to "Application health extension". A tooltip message states: "To select the health Probe option, you'll need to add a load balancer."
- Health states * ⓘ**: A dropdown menu set to "Binary - healthy or unhealthy".
- Protocol * ⓘ**: A dropdown menu set to "HTTP".
- Port number * ⓘ**: An input field containing the value "80".
- Request path * ⓘ**: An input field containing the value "/health.htm|".

At the bottom of the form, there are two buttons: "Save" (highlighted in blue) and "Discard".

[Home](#) > [Virtual machine scale set](#) >

Create a virtual machine scale set ...

 Validation passed

Networking

Virtual network	Task4
Network interfaces	Task4-nic01
Load balancing	No

Management

Upgrade mode	Manual
Boot diagnostics	On
Microsoft Defender for Cloud	Free
System assigned managed identity	Off
Login with Microsoft Entra ID	Off
Enable overprovisioning	Off
Enable automatic OS upgrades	Off
Enable hotpatch	Off
Patch orchestration options	Azure-orchestrated
Reboot setting	Reboot if required

Health

Application health monitor	ApplicationHealthExtension
Protocol	HTTP
Port number	80
Path	/health.html

Advanced

Enable scaling beyond 100 instances	Yes
Proximity placement group	None
Spreading algorithm	1
Extensions	None
VM applications	None
Cloud init	No
Disk controller type	SCSI
Capacity reservation group	None

[**< Previous**](#)[**Next >**](#)[**Create**](#)

Create a virtual machine scale set

Virtual network configuration

Virtual network configuration for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.

Virtual network * Create virtual network Manage selected virtual network

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

+ Create new nic NAME: Task4-nic01 CREATE PUBLIC: Yes SUBNET: default (10.0.0.0/29) NETWORK SECURITY GROUP: Basic ACCELERATED NETWORKING: On

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. Learn more if...

Load balancing options:

- None
- 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.

⚠ To allow traffic from your load balancing product, please update the appropriate port configuration on your network security group associated with your network interface.

Select a load balancer * No existing load balancers in current subscription and location.

Create **Cancel**

Task4 | Network settings

This is a new experience. [Give us feedback](#)

Attach network interface Detach network interface View topology Refresh Give feedback

Task4-nic01 (primary) / Task4-nic01-defaultIpConfiguration (primary)

Essentials

Network interface	: Task4-nic01	Load balancers	: 0 (Configure)
Virtual network / subnet	: Task / default	Application security groups	: 0 (Configure)
Network security group	: basicNsgTask4-nic01	Accelerated networking	: Disabled
Admin security rules	: 0 (Configure)		

Rules

Network security group basicNsgTask4-nic01 (attached to networkInterface: Task4-nic01) Impacts 0 subnets, 2 network interfaces

Priority	Name	Port	Protocol	Source
1	Inbound port rules (3)			
65000	AllowVnetInBound	Any	Any	VirtualNetwork
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer
65500	DenyAllInBound	Any	Any	Any
2	Outbound port rules (3)			

Add inbound security rule

Source: Any Source port range: * Destination: Any Destination port range: 80 Protocol: TCP Action: Allow Priority: 100 Name: AllowAnyHttpInbound Description:

Add **Cancel** **Give feedback**

5. Scale the VMSS manually by increasing the number of instances to verify the Load Balancer routes traffic to the newly added VMs.

6. Test the setup by accessing the Load Balancer's public IP address and verifying traffic distribution across multiple VM instances.

7. Verify that the Load Balancer removes an unavailable instance from the traffic pool when it fails the health probe.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (S+)', 'Copilot', and a user profile. Below the navigation is a breadcrumb trail: 'Home > Task > Task | Frontend IP configuration'. The main content area is titled 'Frontend IP configuration' under 'Load balancer'. A table lists one item: 'Task-frontendconfig01' with 'IP address' 52.178.154.207 (Task-publicip) and 'Rules count' 2. On the left sidebar, there are sections for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, and Settings. Under Settings, 'Frontend IP configuration' is selected. At the bottom of the page, a browser window shows the URL 52.178.154.207/server-info.php with the content 'hostname is task4sbxjG1G0IH'.

Scale to 3 instances

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (S+)', 'Copilot', and a user profile. Below the navigation is a breadcrumb trail: 'Home > Sample > Task4 > Task4 | Scaling'. The main content area is titled 'Scaling' under 'Visual machine scale set'. A table shows one item: 'Task4' with 'Instances' set to 1. Below the table, a section titled 'Choose how to scale your resource' offers two options: 'Manual scale' (selected) and 'Custom autoscale'. Under 'Manual scale', there is an 'Override condition' field and an 'Instance count' slider set to 3. On the left sidebar, there are sections for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Instances (Networking, Network settings, Load balancing, Application security groups, Network manager), Settings, Availability + scale (Scaling, Size, Security, Operations, Monitoring), and Monitoring.

Filter for any field... Status equals all Add filter

Showing 1 to 3 of 3 records.

Name	Computer name	Status	Type	Provisioning state	Size	...
Task4_c560a3bd	task4sbxG9KAR7	Running	VM	Succeeded	Standard_DS1_v2	...
Task4_c630b867	task4sbxG1GOIH	Running	VM	Succeeded	Standard_DS1_v2	...
Task4_dd095ff1		Creating	VM	Creating	Standard_DS1_v2	...

Microsoft Azure

Home > Sample > Task4

Task4 | Address space

Virtual network

Address space

Address range: 10.0.0.0/16

Address count: 16

Peered virtual network address space

Peer name: Peered to Address space: Address range:

Connected devices: goldyakub@kpi.ua YAKUBYSHYN.ORG

Notifications

More events in the activity log →

Dismiss all

! Failed to start virtual machine

Failed to start virtual machine 'Task4_dd095ff1'. Error: Cannot create more than 3 public IP addresses for this subscription in this region.

Help me troubleshoot

a few seconds ago

Microsoft Azure

Home > Sample > Task4

Task4 | Instances

Virtual machine scale set

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Instances

Show 1 to 3 of 3 records.

Name	Computer name	Status	Type	Provisioning state	Size	...
Task4_c560a3bd	task4sbxG9KAR7	Running	VM	Succeeded	Standard_DS1_v2	...

I will delete it

← → ⌂ Не защищено 52.178.154.207/server-info.php

hostname is task4sbxG1GOIH

After refresh redirects to another VM

Microsoft Azure

Home > Task4

Task4 | Instances

Virtual machine scale set

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Instances

Networking

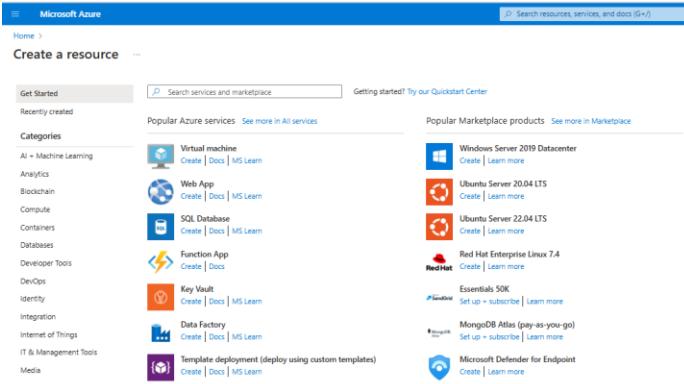
- Network settings
- Load balancing
- Application security groups
- Network manager

Show 1 to 2 of 2 records.

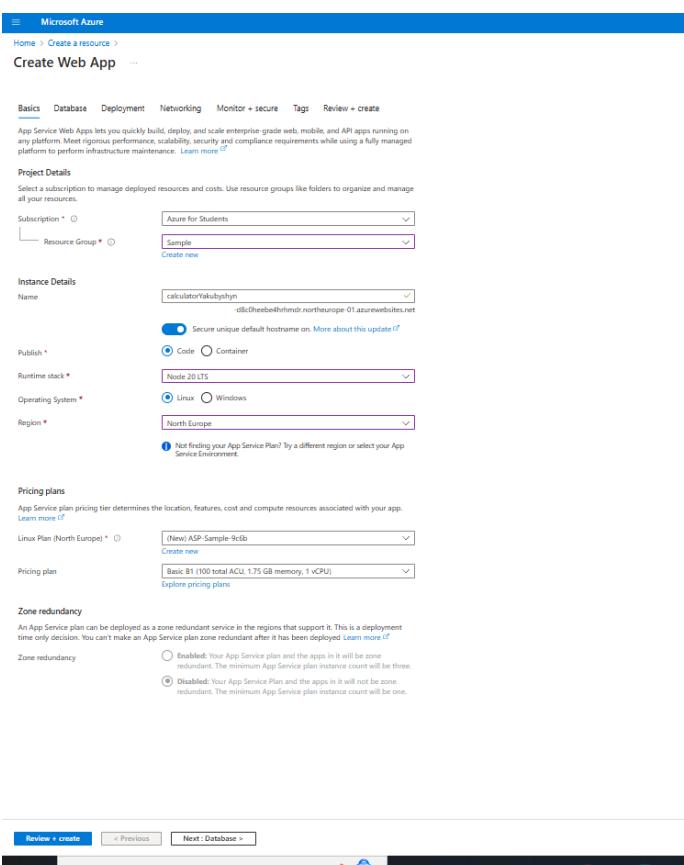
Name	Computer name	Status	Type	Provisioning state	Size	...
Task4_50e895dc		Creating	VM	Creating	Standard_DS1_v2	...
Task4_e8300687	task4sbxG1GOIH	Running	VM	Succeeded	Standard_DS1_v2	...

Automatic creation after deletion and specifying size 2

Practical Task 5: Deploying a Web Application Using Azure App Services Set up and deploy a simple web application using Azure App Service



Web App



Microsoft Azure

Home > Create a resource >

Create Web App

Networking

Basics Database Deployment Networking Monitor + secure Tags Review + create

Web Apps can be provisioned with the inbound address being public to the internet or isolated to an Azure virtual network. Web Apps can also be provisioned with outbound traffic able to reach endpoints in a virtual network, be governed by network security groups or affected by virtual network routes. By default, your app is open to the internet and cannot reach into a virtual network. These aspects can also be changed after the app is provisioned. [Learn more](#)

Enable public access * On Off

Enable network injection * On Off

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

Review+create

rYakubyshyn | Deployment Center

Settings * Logs FTPS credentials

You're now in the production slot, which is not recommended for setting up CI/CD. [Learn more](#)

Deploy and build code from your preferred source and build provider. [Learn more](#)

for Cloud Source * GitHub

Building with GitHub Actions. [Change provider](#).

Credentials (preview) GitHub

Sign in Authorize

Build

Runtime stack Node

Version Node 20 LTS

Authentication settings

Select how you want your GitHub Action workflow to authenticate to Azure. If you choose user-assigned identity, the identity selected will be federated with GitHub as an authorized client and given write permissions on the app. [Learn more](#)

Then Authorize

n

ubshyn | Deployment Center ⋮

Save Discard Browse Manage publish profile Sync Leave Feedback

Settings Logs FTPS credentials

You're now in the production slot, which is not recommended for setting up CI/CD. Learn more

Deploy and build code from your preferred source and build provider. Learn more

Source* GitHub

Building with GitHub Actions. Change provider.

GitHub

App Service will place a GitHub Actions workflow in your chosen repository to build and deploy your app whenever there is a commit on the chosen branch. If you can't find an organization or repository, you may need to enable additional permissions on GitHub. You must have write access to your chosen GitHub repository to deploy with GitHub Actions. Learn more

Signed in as YakubT Change Account ⓘ

Organization* YakubT

Repository* NodeCalculator

Branch* main

Build

Runtime stack Node

Version Node 20 LTS

Authentication settings

Select how you want your GitHub Action workflow to authenticate to Azure. If you choose user-assigned identity, the identity selected will be federated with GitHub as an authorized client and given write permissions on the app. Learn more

Authentication type* User-assigned identity Basic authentication

Subscription* Azure for Students

Identity* (Create new)

Workflow Configuration

File with the workflow configuration defined by the settings above.

Preview file

```

const express = require('express')
const app = express()

const port = process.env.PORT || 80;
app.get('/:query', function (req, res) {
  res.send(eval(req.params['query']).toString())
})

app.listen(port)

```



10



7

The screenshot shows the Microsoft Azure portal interface for the 'calculatorYakubshyn' resource group. The 'Overview' tab is selected, displaying basic information such as the resource group name, status (Running), location (North Europe), and subscription details. A 'Log stream' section is visible, showing a log entry about a service starting. The left sidebar shows navigation options like Home, Overview, Activity log, and Deployment.

The screenshot shows the 'Logs' tab for the 'calculatorYakubshyn' resource group. It displays a live log stream with numerous entries. One prominent entry at the top indicates the service is starting up. The left sidebar shows the same navigation options as the previous screenshot.

then deleted all resources from resource group

Practical Task 6: Creating and Deploying an Azure Function to Process HTTP Requests

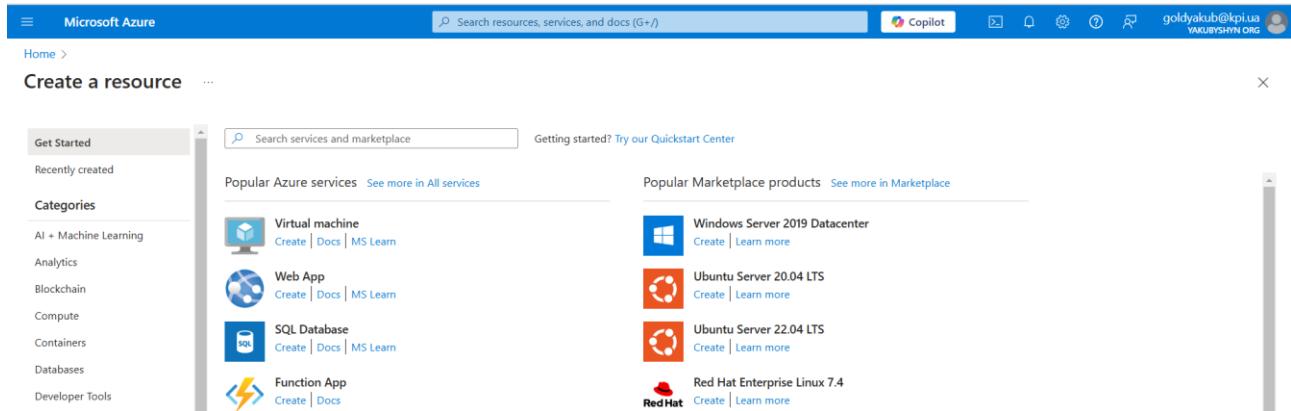
Set up and deploy an Azure Function that processes HTTP requests directly from the Azure portal.

1. Set Up the Function App: Access the Azure portal and navigate to Azure Functions. Create a new Function App using the Consumption (Serverless) plan within the free tier.



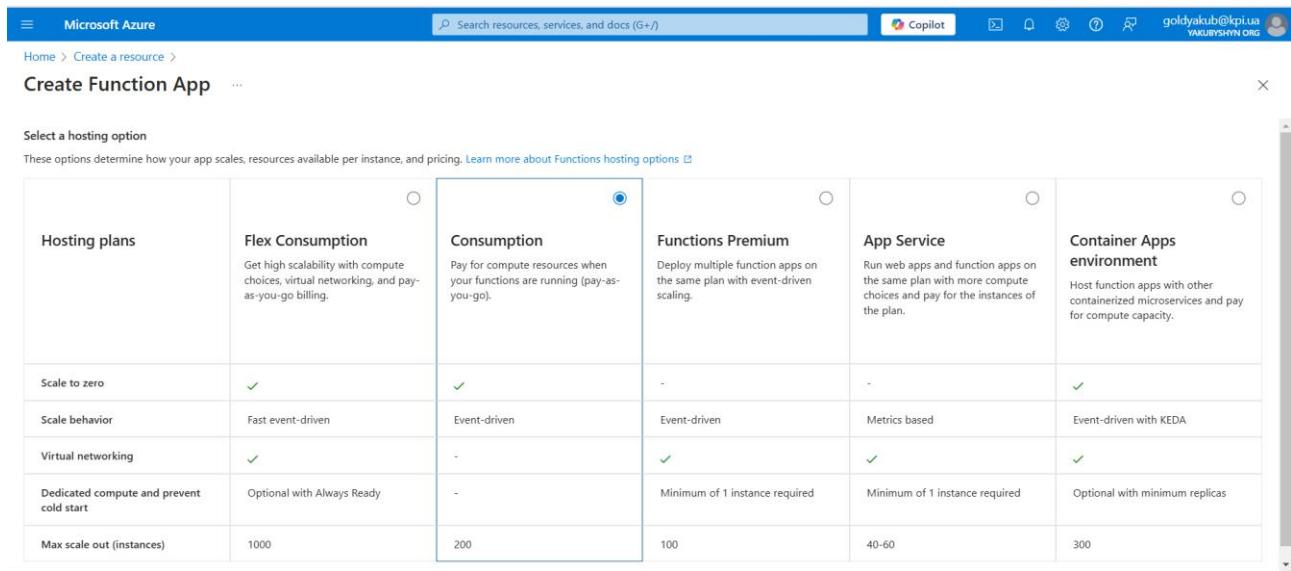
The screenshot shows the Microsoft Azure portal homepage. At the top, there's a search bar and a Copilot button. Below the search bar is a navigation bar with icons for Resource groups, Education, Policy, Service providers, Subscriptions, All resources, Microsoft Entra ID, App Services, and More services. A large yellow callout box highlights the 'Create a resource' button on the left side of the page.

Create a resource



The screenshot shows the 'Create a resource' page. On the left, there's a sidebar with 'Get Started' and 'Recently created' sections, followed by a 'Categories' section listing AI + Machine Learning, Analytics, Blockchain, Compute, Containers, Databases, and Developer Tools. The main area has a search bar and two sections: 'Popular Azure services' (Virtual machine, Web App, SQL Database, Function App) and 'Popular Marketplace products' (Windows Server 2019 Datacenter, Ubuntu Server 20.04 LTS, Ubuntu Server 22.04 LTS, Red Hat Enterprise Linux 7.4). A yellow callout box highlights the 'Function App' option under Popular Azure services.

Function App



The screenshot shows the 'Create Function App' page. It starts with a 'Select a hosting option' section where users can learn more about hosting options. Below this is a comparison table for five hosting plans:

Hosting plans	Flex Consumption	Consumption	Functions Premium	App Service	Container Apps environment
Get high scalability with compute choices, virtual networking, and pay-as-you-go billing.			Deploy multiple function apps on the same plan with event-driven scaling.	Run web apps and function apps on the same plan with more compute choices and pay for the instances of the plan.	Host function apps with other containerized microservices and pay for compute capacity.
Scale to zero	✓	✓	-	-	✓
Scale behavior	Fast event-driven	Event-driven	Event-driven	Metrics based	Event-driven with KEDA
Virtual networking	✓	-	✓	✓	✓
Dedicated compute and prevent cold start	Optional with Always Ready	-	Minimum of 1 instance required	Minimum of 1 instance required	Optional with minimum replicas
Max scale out (instances)	1000	200	100	40-60	300

A blue 'Select' button is located at the bottom left of the table.

Microsoft Azure

Home > Create a resource > Create Function App > Create Function App (Consumption) ...

Basics Storage Networking Monitoring Deployment Tags Review + create

Create a function app, which lets you group functions as a logical unit for easier management, deployment and sharing of resources. Functions lets you execute your code in a serverless environment without having to first create a VM or publish a web application.

Project Details

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

Subscription * Resource Group *

Instance Details

Function App name * Try a secure unique default hostname (preview). [More about this update](#)

Runtime stack * Version * Region * Operating System * Linux Windows

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

Microsoft Azure

Home > Create a resource > Create Function App > Create Function App (Consumption) ...

Basics Storage Networking Monitoring Deployment Tags Review + create

Storage

When creating a function app, you must create or link to a general-purpose Azure Storage account that supports Blobs, Queues, and Table storage. [Learn more](#)

Storage account * If you don't see a storage account, it may not be supported. [Learn more](#)

Add an Azure Files connection Azure Files is used to enable certain features but you can create an app without one if you don't want to add another connection to your storage account. [What is Azure Files used for?](#)

Diagnostic Settings

The storage account associated with the function app stores important app data. You may wish to enable monitoring for the account. You can quickly configure basic diagnostic settings as you create the function app, or you can fully customize the diagnostics settings on the storage account resource after creation. [Learn more](#)

Blob service diagnostic settings [Don't configure diagnostic settings now](#) You can configure diagnostic settings later from the storage account resource. Choose this if you want full control over log destinations, retention policies, and which logs and metrics are configured. [Configure diagnostic settings now](#) You can configure diagnostic settings now for your Azure Log Analytics with StorageWrite logs and Transaction metrics for the blob service. You can modify your diagnostic settings later from the storage account resource.

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

Microsoft Azure

Home > Create a resource > Create Function App > ...

Create Function App (Consumption)

Basics Storage Networking Monitoring Deployment Tags Review + create

Function Apps can be provisioned with the inbound address being public to the internet or isolated to an Azure virtual network. Function Apps can also be provisioned with outbound traffic able to reach endpoints in a virtual network, be governed by network security groups or affected by virtual network routes. By default, your app is open to the internet and cannot reach into a virtual network. These aspects can and be changed after the app is provisioned. [Learn more](#)

Enable public access * On Off

⚠️ Network injection is only available in Functions Premium and Basic, Standard, Premium, Premium V2, Premium V3 Dedicated App Service plans and F1s Consumption.

Enable network injection On Off

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

Microsoft Azure

Home > Create a resource > Create Function App > ...

Create Function App (Consumption)

Basics Storage Networking **Monitoring** Deployment Tags Review + create

Application Insights

Azure Monitor Application Insights is an Application Performance Management (APM) service for developers and DevOps professionals. Enable it before to automatically monitor your application. It will detect performance anomalies, and includes powerful analytics tools to help you diagnose issues and to understand what users actually do with your app. Your bill is based on amount of data used by Application Insights and your data retention settings. [Learn more](#)

App Insights pricing [?](#)

Enable Application Insights * No Yes

Application Insights * (New) Task&Yakubovych (UK West) [Create new](#)

Region UK West

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

Microsoft Azure

Home > Create a resource > Create Function App >

Create Function App (Consumption)

Basics Storage Networking Monitoring Deployment Tags Review + create

Continuous deployment settings

Set up continuous deployment to easily deploy code from your GitHub repository via GitHub Actions. [Learn more](#)

Continuous deployment Disable Enable

GitHub settings

Set up GitHub Actions to push content to your app whenever there are code changes made to your repository. Note: Your GitHub account must have write access to the selected repository in order to add a workflow file which manages deployments to your app.

GitHub account

Organization

Repository

Branch

Workflow configuration

Click the button below to preview what the GitHub Actions workflow file will look like before setting up continuous deployment.

Complete the Basics tab and the form above to preview the GitHub Actions workflow file.

Authentication settings

Choose if you would like to allow basic authentication to deploy code to your app. [Learn more](#)

Basic authentication Disable Enable

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

portalgate.com // view // dashboard // extensions // app services // create

Microsoft Azure

Home > Create a resource > Create Function App >

Create Function App (Consumption)

Basics Storage Networking Monitoring Deployment Tags Review + create

Summary

 **Function App**
by Microsoft

Basic authentication for this app is currently disabled and may impact deployments. Click to learn more.

Details

Subscription	3a612e70-8e22-4425-b3ea-29f6acf32428
Resource Group	Sample
Name	Task6Yakubshyn
Runtime stack	Python 3.11

Hosting

Storage (New)

Storage account	sampleb1d0
-----------------	------------

Plan (New)

Hosting options and plans	Consumption
Name	ASP-Sample-b48e
Operating System	Linux
Region	UK West
SKU	Dynamic

Monitoring (New)

Application Insights	Enabled
Name	Task6Yakubshyn
Region	UK West

Deployment

Basic authentication	Disabled
Continuous deployment	Not enabled / Set up after app creation

I had a problem with deployment on my personal account (student subscription).

Moving to

The screenshot shows two screenshots of the Microsoft Azure portal.

Screenshot 1: Create Function App (Consumption)

This screenshot shows the 'Create Function App (Consumption)' wizard. The 'Basics' tab is selected. The 'Project Details' section shows:

- Subscription: Azure subscription 1
- Resource Group: AnatoliYakubshyn
- Function App name: YakubshynFunction
- Runtime stack: Python
- Version: 3.11
- Region: UK South
- Operating System: Linux

Screenshot 2: Microsoft.Web-FunctionApp-Portal-7a8b3148-8975 | Overview

This screenshot shows the deployment status of the function app. It indicates that the deployment is complete. Deployment details include:

- Deployment name: Microsoft.Web-FunctionApp-Portal-7a8b3148-8975
- Subscription: Azure subscription 1
- Resource group: AnatoliYakubshyn
- Start time: 1/19/2025, 10:15:21 AM
- Correlation ID: 9fb4c7a5-d4ca-4ee8-90d5-dccde8b08ec13

On the right side, there are promotional links for Cost management, Microsoft Defender for Cloud, and Work with an expert.

2. Create a Function: o Select the HTTP trigger template. o Choose a language of your choice (e.g., C#, JavaScript, or Python)

Microsoft Azure

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YakubshynFunction Function App

Search

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Overview

Essentials

Resource group ([move](#)) : AnatoliYakubshyn

Status : Running

Location ([move](#)) : UK South

Subscription ([move](#)) : Azure subscription 1

Subscription ID : 9a6ae428-d8c3-44fe-bdf2-4e08593901a0

Tags ([edit](#)) : Add tags

Default domain : [yakubshynfunction.azurewebsites.net](#)

Operating System : Linux

App Service Plan : ASP-AnatoliYakubshyn-hg9c (V1: 0)

Runtime version : 4.1036.2.2

Functions Metrics Properties Notifications (0)

Create functions in your preferred environment

Create in Azure portal

Best optimized for:

- Getting started without local setup
- Choose from our Function templates

VS Code Desktop

Best optimized for:

- Local development within VS Code
- Custom development tool requirements

Other editors or CLI

Best optimized for:

- Using preferred editor for development
- Visual Studio, IntelliJ, command line

Create function Create with VS Code Desktop Set up your editor

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Tags ([edit](#)) : Add tags

Create function

1 Select a template 2 Template details

Programming Model v2 Programming Model

Use a template to create a function. Triggers describe the type of events that invoke your functions. [Learn more](#)

Search

Name

Trigger

A function that will be run whenever it receives an HTTP request, responding based on data in the body or query string

Create function



1 Select a template

2 Template details

We need more information to create the function. [Learn more](#) 

Job type *

Create new app



Provide a function name * 

http_triggeryakubshyn

Authorization level * 

FUNCTION



Create

Cancel

3. Customize the Function:
o Modify the default code to return the following response: Hello, [name]!
Welcome to Azure Functions.
o If no name parameter is provided in the query string or request body, the response should be: Hello! Please provide your name.

```
 1 import os
 2
 3
 4 app = func.FunctionApp(http_auth_level=func.AuthLevel.FUNCTION)
 5
 6 @app.route(route="http_triggeryakubshyn")
 7 def http_triggeryakubshyn(req: func.HttpRequest) -> func.HttpResponse:
 8     logging.info('Python HTTP trigger function processed a request.')
 9
10     name = req.params.get('name')
11     if not name:
12         try:
13             req_body = req.get_json()
14         except ValueError:
15             pass
16         else:
17             name = req_body.get('name')
18
19     if name:
20         return func.HttpResponse(f"Hello, {name}! Welcome to Azure Functions.")
21     else:
22         return func.HttpResponse(
23             "Hello! Please provide your name.",
24             status_code=200
25         )
```

4. Test the Function:
o Use the Test/Run feature in the Azure portal to send HTTP requests.
o Verify the Function responds appropriately with and without the name parameter

Test/Run

Input Output

Provide parameters to test the HTTP request. Results can be found in the Output tab.

HTTP method * Key *

Query parameters

Name	Value
<input type="text" value="name"/>	<input type="text" value="Anatolii"/> <input type="button" value="Delete"/>
<input type="text"/>	<input type="text"/> <input type="button" value="Delete"/>

Headers

Name	Value
<input type="text"/>	<input type="text"/> <input type="button" value="Delete"/>

Body

1

DEFAULT DIRECTORY (DMYTROS...)

Test/Run

[Input](#) [Output](#)

HTTP response code

HTTP response content
Hello, Anatoli! Welcome to Azure Functions.

DEFAULT DIRECTORY (DMYTROS...)

Test/Run

[Input](#) [Output](#)

Provide parameters to test the HTTP request. Results can be found in the Output tab.

HTTP method *

Key *

Query parameters

Name	Value
<input type="text"/>	<input type="text"/> <input type="button" value="Delete"/>

Headers

Name	Value
<input type="text"/>	<input type="text"/> <input type="button" value="Delete"/>

Body

1

Test/Run

Input Output

HTTP response code

200 OK

HTTP response content

Hello! Please provide your name.

5. Verify External Access:

- o Retrieve the public URL of the Azure Function.
- o Test the Function using a browser or a tool like Postman to ensure it's externally accessible

6. Monitor and Inspect:

- o Navigate to the Monitor tab of the Function App.
- o Check metrics like execution count, response time, and error

Time	Count
9:45 UTC	0.00
10:00 UTC	1.00
10:10 UTC	1.00
10:15 UTC	2.00
10:20 UTC	0.00