

**Graded Project**  
**Cloud basics (Azure)**  
**Week 10**

# Table of Content

Context.....	3
Learning Outcome.....	3
Steps to be taken:.....	3
1. Create Virtual Machine.....	4
a) Region: East US 2.....	4
b) Instance: 1 (Ubuntu 18.04).....	4
c) VM Size: D2s- V3.....	4
d) Storage: Standard HDD.....	4
2. Setup Apache and run default website.....	6
a) Open Port using Inbound Ports.....	6
b) Install Apache Server on VM using the script below in Bash Shell.....	6
c) Configure Default Website(index.html).....	8
d) Change Text (“Azure Project – Great Learning”) on default Page.....	8

## Context

Creating web applications that are both resilient and scalable is an essential part of any application architecture. A well-designed application should scale seamlessly as demand increases and decreases, and be resilient enough to withstand the loss of one or more compute resources.

## Learning Outcome

- Deploy Virtual Machine Scale sets
- Set up a web server on a virtual machine

## Steps to be taken:

### 1) Create Virtual Machine

- a) Region: East US 2
- b) Instance: 1 (Ubuntu 18.04)
- c) VM Size: D2s- V3
- d) Storage: Standard HDD

*Note : The VM size and region given here is for reference only. You are free to change these values as required.*

### 2) Setup Apache and run default website:

- a) Open Port using Inbound Ports
- b) Install Apache Server on VM using the script below in Bash Shell
- c) Configure Default Website(index.html)
- d) Change Text (“Azure Project – Great Learning”) on default Page

Script for installing Apache

```
sudo apt-get update
```

```
sudo apt-get -y install apache2
```

```
sudo ufw allow 'Apache Full'
```

```
sudo systemctl start apache2.service
```

*The file index.html is located in /var/www/html*

# 1. Create Virtual Machine

a) Region: East US 2

b) Instance: 1 (Ubuntu 18.04)

c) VM Size: D2s- V3

Microsoft Azure

Home > Virtual machines >

## Create a virtual machine

Basics Disks Networking Management Advanced Tags Review + create

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

**Project details**

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

Subscription \*

Resource group \*  [Create new](#)

**Instance details**

Virtual machine name \*

Region \*  **a**

Availability options

Availability zone \*

Security type

Image \*  **b**  
[See all images](#) | [Configure VM generation](#)

Azure Spot instance ☐

Size \*  **c**  
[See all sizes](#)

**Administrative account**

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

d) Storage: Standard HDD

Microsoft Azure

Home > Virtual machines >

## Create a virtual machine

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

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

**Disk options**

OS disk type \*  **d**  
If performance is critical for your workloads, choose Premium SSD disks for lower latency, higher IOPS and bandwidth, and bursting. [Learn more](#)

Encryption type \*

Enable Ultra Disk compatibility ☐  
Ultra disk is not supported for the selected VM size Standard\_DS1\_v2 in East US 2.

**Data disks**

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

LUN	Name	Size (GiB)	Disk type	Host caching
-----	------	------------	-----------	--------------

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

Advanced

Microsoft Azure

Search resources, services, and docs (G+/I)

Anastasiya@glcazure.on...  
GREATLEARNINGCOMPANY IGL...

Home > Virtual machines >

Create a virtual machine

Validation passed

Basics

Subscription

azuredae

Resource group

(new) project-gl

Virtual machine name

vm

Region

East US 2

Availability options

Availability zone

Availability zone

3

Security type

Standard

Image

Ubuntu Server 18.04 LTS - Gen2

Size

Standard DS1 v2 (1 vcpu, 3.5 GiB memory)

Authentication type

SSH public key

Username

anastasiya

Key pair name

vm\_key

Public inbound ports

SSH, HTTPS, HTTP

Azure Spot

No

Disks

OS disk type

Standard HDD LRS

Use managed disks

Yes

Ephemeral OS disk

No

Networking

Virtual network

(new) project-gl-vnet

Subnet

(new) default (10.0.0/24)

Public IP

(new) vm-ip

Accelerated networking

On

Create

< Previous

Next >

Download a template for automation

Microsoft Azure

Search resources, services, and docs (G+/I)

Anastasiya@glcazure.on...  
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Home >

vm  
Virtual machine

Search (Ctrl+J)

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

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Networking

Connect

Disks

Size

Security

Advisor recommendations

Extensions + applications

Continuous delivery

Availability + scaling

Configuration

Identity

Properties

Locks

Operations

Bastion

Auto-extend

Essentials

Resource group (Move): project-gl

Status: Running

Location: East US 2 (Zone 3)

Subscription (Move): azuredae

Subscription ID: 2578e29f-4981-4b17-aa4e-2d2b86ac45e1

Availability zone: 3

Tags (Edit): Click here to add tags

JSON View

Properties

Monitoring

Capabilities (7)

Recommendations

Tutorials

Virtual machine

Computer name

vm

Health state

-

Operating system

Linux (ubuntu 18.04)

Publisher

Canonical

Offer

UbuntuServer

Plan

18\_04-lts-gen2

VM generation

V2

Agent status

Ready

Agent version

2.5.0.2

Host group

None

Host

-

Proximity placement group

-

Colocation status

N/A

Capacity reservation group

-

Networking

Public IP address

20.81.176.32

Public IP address (IPv6)

-

Private IP address

10.0.0.4

Private IP address (IPv6)

-

Virtual network/subnet

project-gl-vnet/default

DNS name

Configure

Size

Size

Standard DS1 v2

vCPUs

1

RAM

3.5 GiB

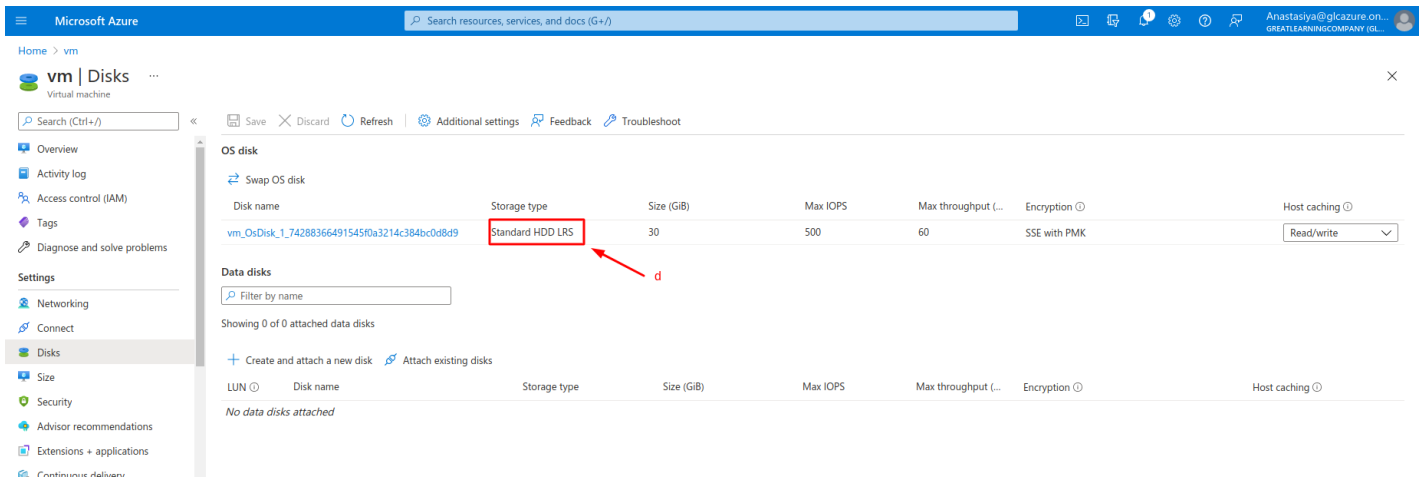
Disk

OS disk

vm\_OsDisk\_1\_74288366491545f0a3214c384bcd0d8d9

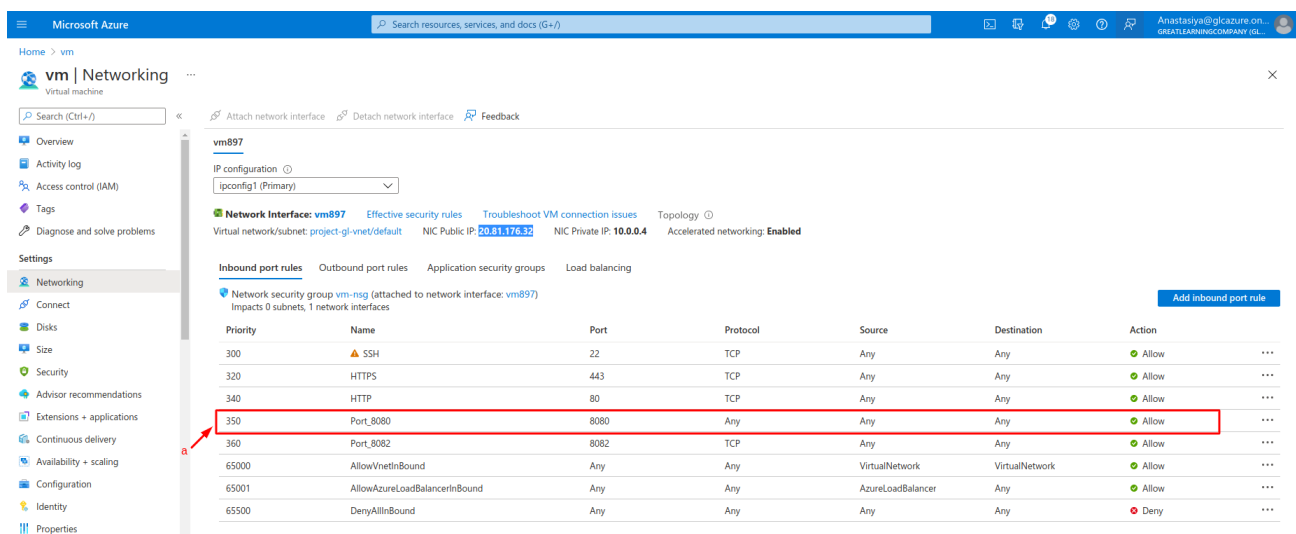
Azure disk encryption

Not enabled



## 2. Setup Apache and run default website

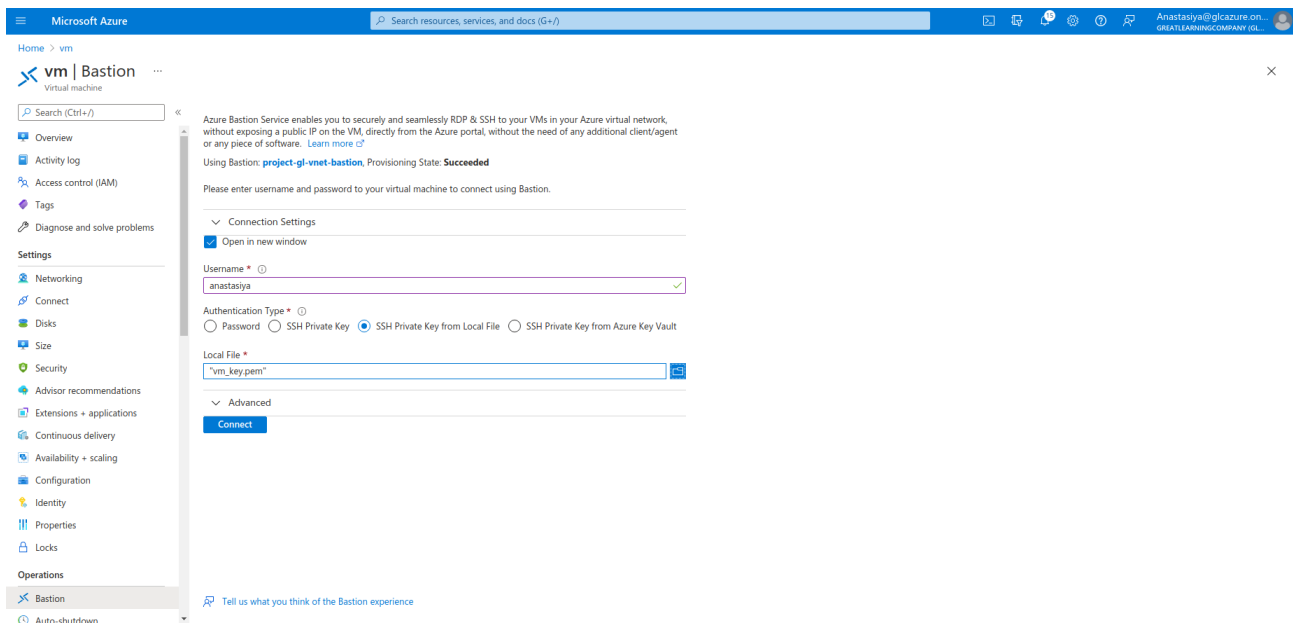
### a) Open Port using Inbound Ports



### b) Install Apache Server on VM using the script below in Bash Shell

For installation Apache Server I have used Bastion

Checking my credentials for Bastion



```
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-1064-azure x86_64)

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

System information as of Sun Dec  5 20:35:16 UTC 2021

System load:  0.08          Processes:           107
Usage of /:   4.7% of 28.90GB Users logged in:       0
Memory usage: 6%           IP address for eth0: 10.0.0.4
Swap usage:   0%

0 updates can be applied immediately.

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.

anastasiya@vm:~$
```

Check Apache version on VM

```
anastasiya@vm:~$ apache2 -v
Server version: Apache/2.4.29 (Ubuntu)
Server built:   2021-11-14T23:52:18
```

## c) Configure Default Website(index.html)

Check file location

```
anastasiya@vm:~$ cd /var/www/html/  
anastasiya@vm:/var/www/html$ ls  
index.html
```

## d) Change Text (“Azure Project – Great Learning”) on default Page

For changing text I have used sudo nano comand

```
anastasiya@vm:~$  
anastasiya@vm:~$ sudo nano /var/www/html/index.html
```

The screenshot shows the Microsoft Azure portal interface. On the left, there is a sidebar with navigation options like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Settings', and 'Networking'. The main area displays the 'Essentials' section for a virtual machine named 'vm'. Key details include: Resource group (project-gl), Status (Running), Location (East US 2 (Zone 3)), Subscription (azuredae), Subscription ID (2578e29f-4981-4b17-aa4e-2d2b86ac45e1), Availability zone (3), and Tags (Click here to add tags). On the right, technical specifications are listed: Operating system (Linux (ubuntu 18.04)), Size (Standard D51 v2 (1 vcpu, 3.5 GiB memory)), Public IP address (20.81.176.32, highlighted with a red box), Virtual network/subnet (project-gl-vnet/default), and DNS name (Not configured).

The screenshot shows a web browser window with the title 'Azure Project – Great Learning'. The address bar shows the URL '20.81.176.32'. The website content includes a header with the title 'Azure Project – Great Learning' and the subtitle 'Week 10'. Below the header, there is a navigation bar with links: 'GreatLearning', 'Home', 'Page 2', and 'Page 3'. The main content area is divided into four columns: 'About Me' (with a photo placeholder and text), 'Context' (with a title description and text), 'Some Links' (with three links: 'Link 1', 'Link 2', and 'Link 3'), and 'Learning Outcome' (with a title description and two bullet points). At the bottom, there is a 'Footer' section. The browser's taskbar at the bottom shows a file named 'vm\_key.pem' and a button labeled 'Показати все'.