Creating Images

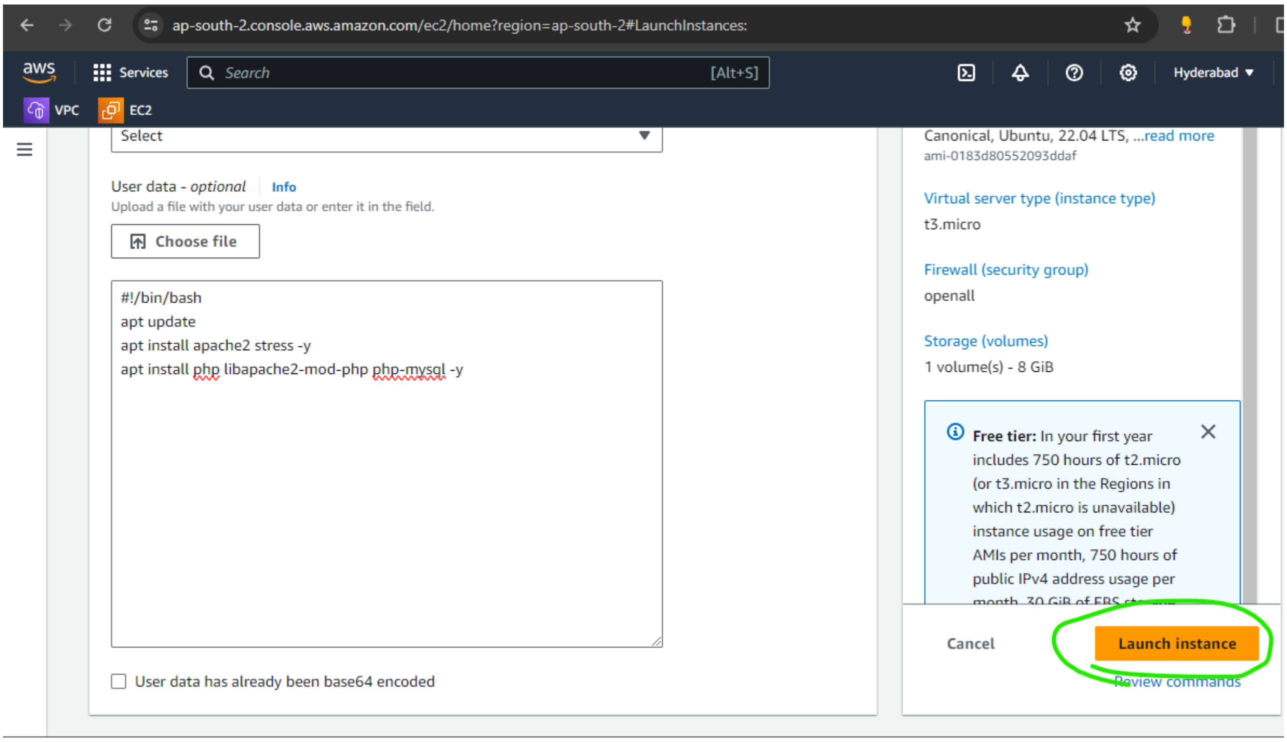
Setup

- our application:
  - apache
  - php
  - stress
- Create an ubuntu 22.04 based Linux instance and execute the following commands

```
#!/bin/bash
sudo apt update
sudo apt install apache2 stress -y
sudo apt install php libapache2-mod-php php-mysql -y
echo "<?php phpinfo(); ?>" > /var/www/html/info.php
```

- User data: This is the script that gets executed when the virtual machine/ec2 instance is created. This is referred as userdata or custom data. This gets executed only once during creation.

- User data in AWS: Navigate to Advanced Details => UserData



User data - *optional*

Upload a file with your user data or enter it in the field.

```
#!/bin/bash
apt update
apt install apache2 stress -y
apt install php libapache2-mod-php php-mysql -y
```

□ User data has already been base64 encoded

Canonical, Ubuntu, 22.04 LTS, ...read more
ami-0183d80552093ddaf

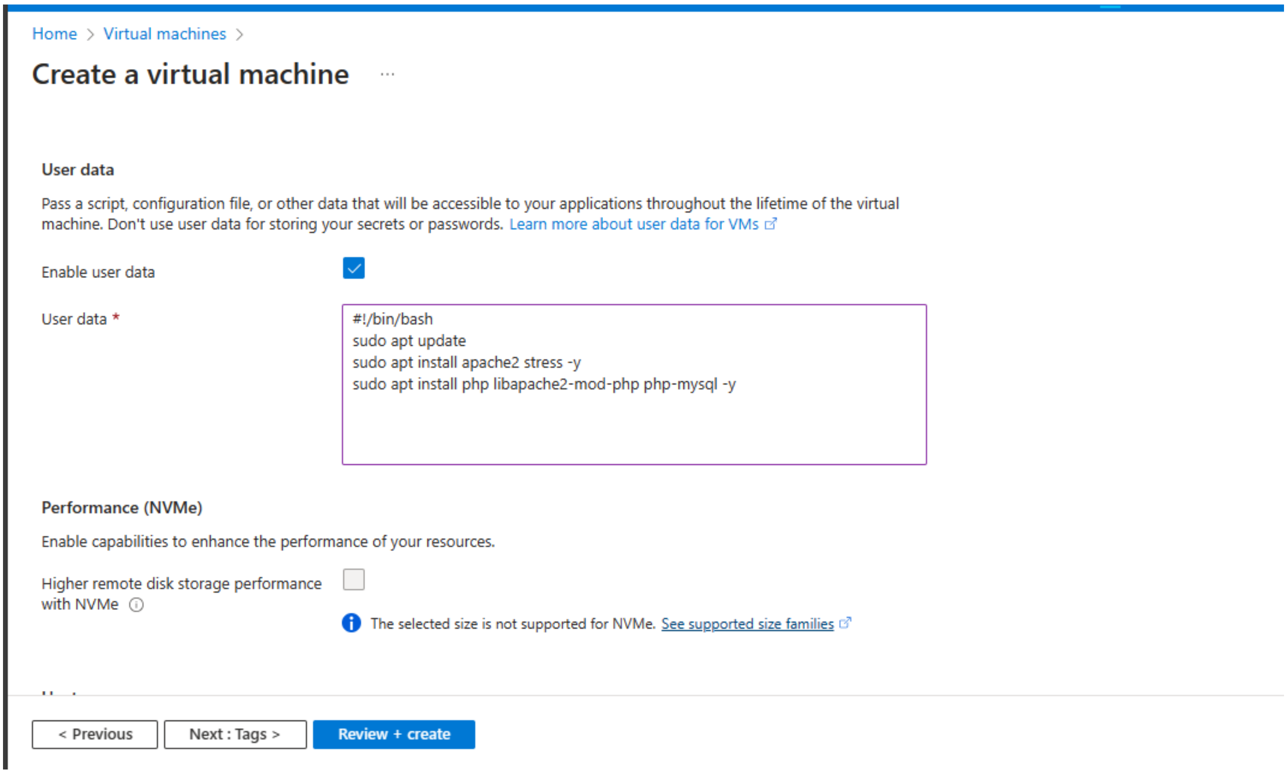
Virtual server type (instance type)
t3.micro

Firewall (security group)
openall

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage

- User data in Azure: Advance tab => userdata



Create a virtual machine

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 VMs

Enable user data ☑

User data *

```
#!/bin/bash
sudo apt update
sudo apt install apache2 stress -y
sudo apt install php libapache2-mod-php php-mysql -y
```

Performance (NVMe)

Enable capabilities to enhance the performance of your resources.

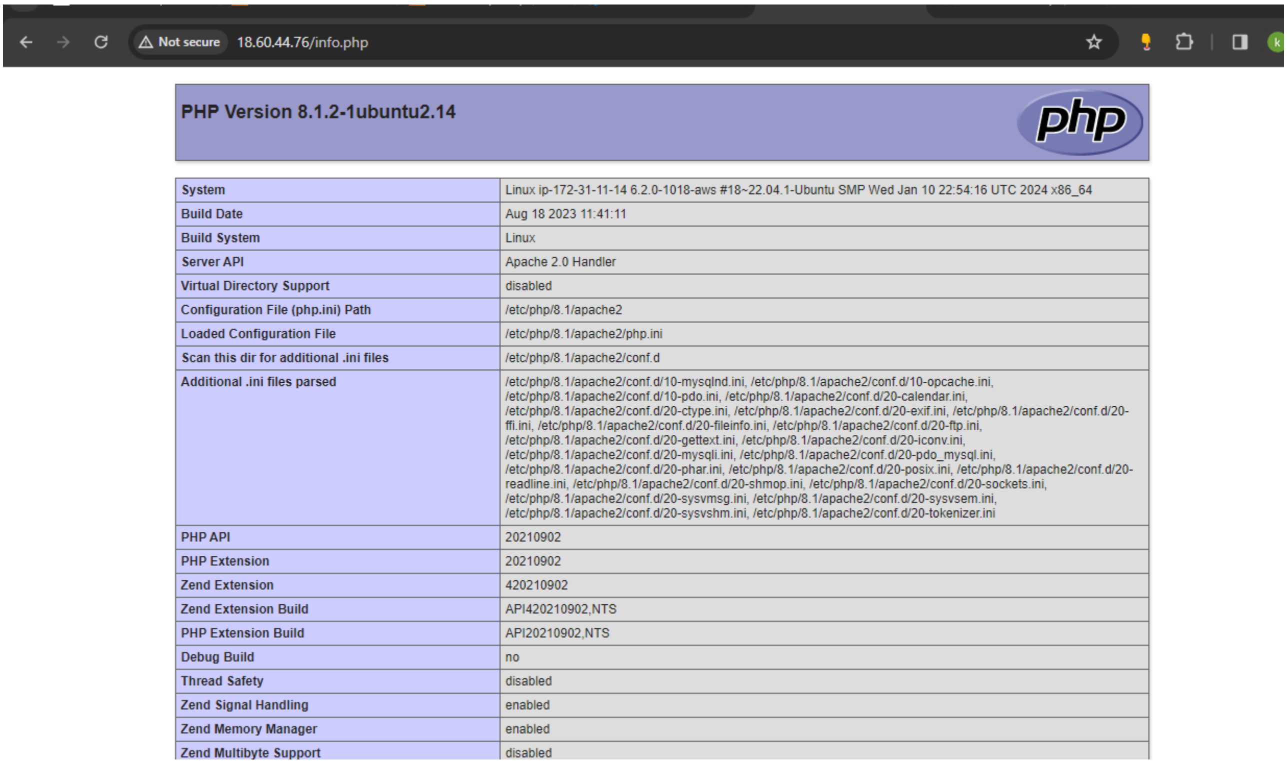
Higher remote disk storage performance with NVMe □

The selected size is not supported for NVMe. See supported size families

- Now lets create a page in /var/www/html/info.php

```
<?php phpinfo(); ?>
```

- Now access `http://<ip>/info.php`



PHP Version 8.1.2-1ubuntu2.14

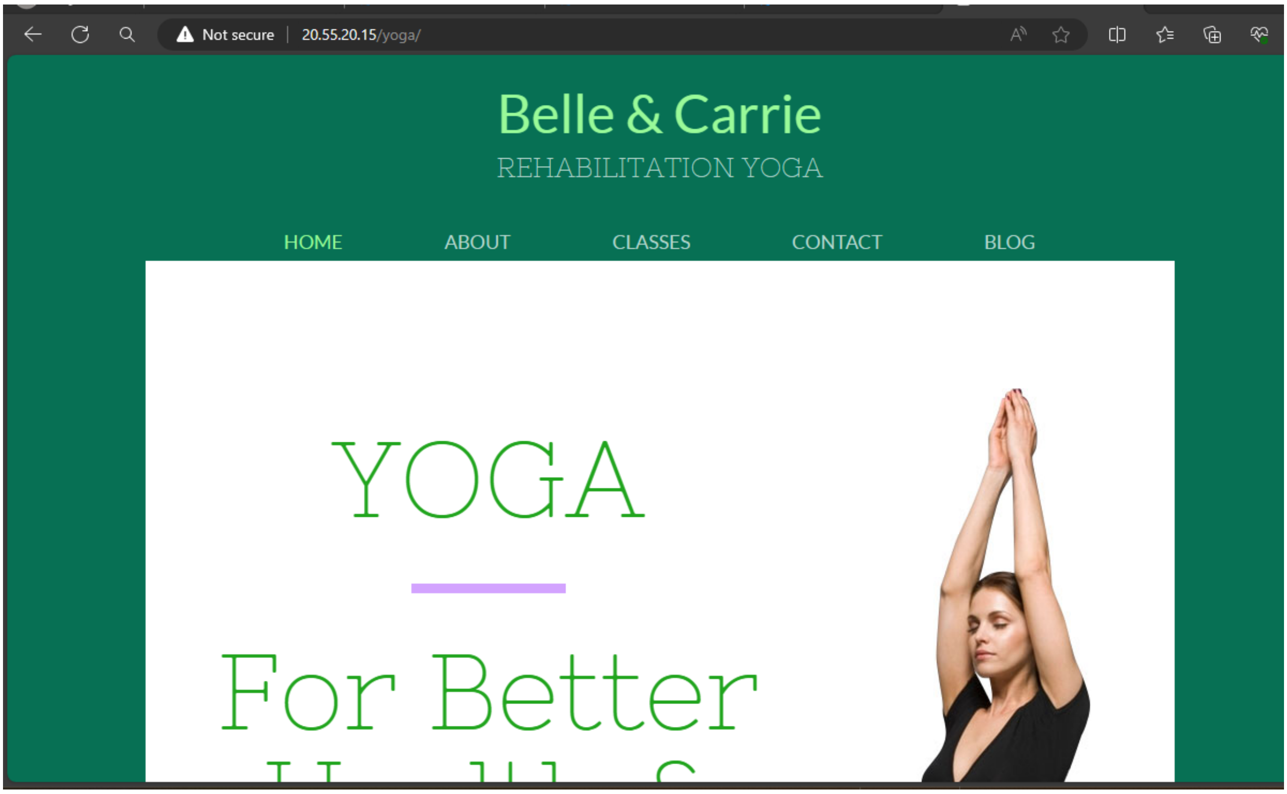
System	Linux ip-172-31-11-14 6.2.0-1018-aws #18~22.04.1-Ubuntu SMP Wed Jan 10 22:54:16 UTC 2024 x86_64
Build Date	Aug 18 2023 11:41:11
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/apache2
Loaded Configuration File	/etc/php/8.1/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/apache2/conf.d
Additional .ini files parsed	/etc/php/8.1/apache2/conf.d/10-mysqlnd.ini, /etc/php/8.1/apache2/conf.d/10-opcache.ini, /etc/php/8.1/apache2/conf.d/10-pdo.ini, /etc/php/8.1/apache2/conf.d/20-calendar.ini, /etc/php/8.1/apache2/conf.d/20-ctype.ini, /etc/php/8.1/apache2/conf.d/20-exif.ini, /etc/php/8.1/apache2/conf.d/20-ffi.ini, /etc/php/8.1/apache2/conf.d/20-fileinfo.ini, /etc/php/8.1/apache2/conf.d/20-ftp.ini, /etc/php/8.1/apache2/conf.d/20-gettext.ini, /etc/php/8.1/apache2/conf.d/20-iconv.ini, /etc/php/8.1/apache2/conf.d/20-mysqli.ini, /etc/php/8.1/apache2/conf.d/20-pdo_mysql.ini, /etc/php/8.1/apache2/conf.d/20-phar.ini, /etc/php/8.1/apache2/conf.d/20-posix.ini, /etc/php/8.1/apache2/conf.d/20-readline.ini, /etc/php/8.1/apache2/conf.d/20-shmop.ini, /etc/php/8.1/apache2/conf.d/20-sockets.ini, /etc/php/8.1/apache2/conf.d/20-sysvmsg.ini, /etc/php/8.1/apache2/conf.d/20-sysvsem.ini, /etc/php/8.1/apache2/conf.d/20-sysvshm.ini, /etc/php/8.1/apache2/conf.d/20-tokenizer.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902,NTS
PHP Extension Build	API20210902,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled

- Now lets try to deploy sample website

- become a root user `sudo -i`

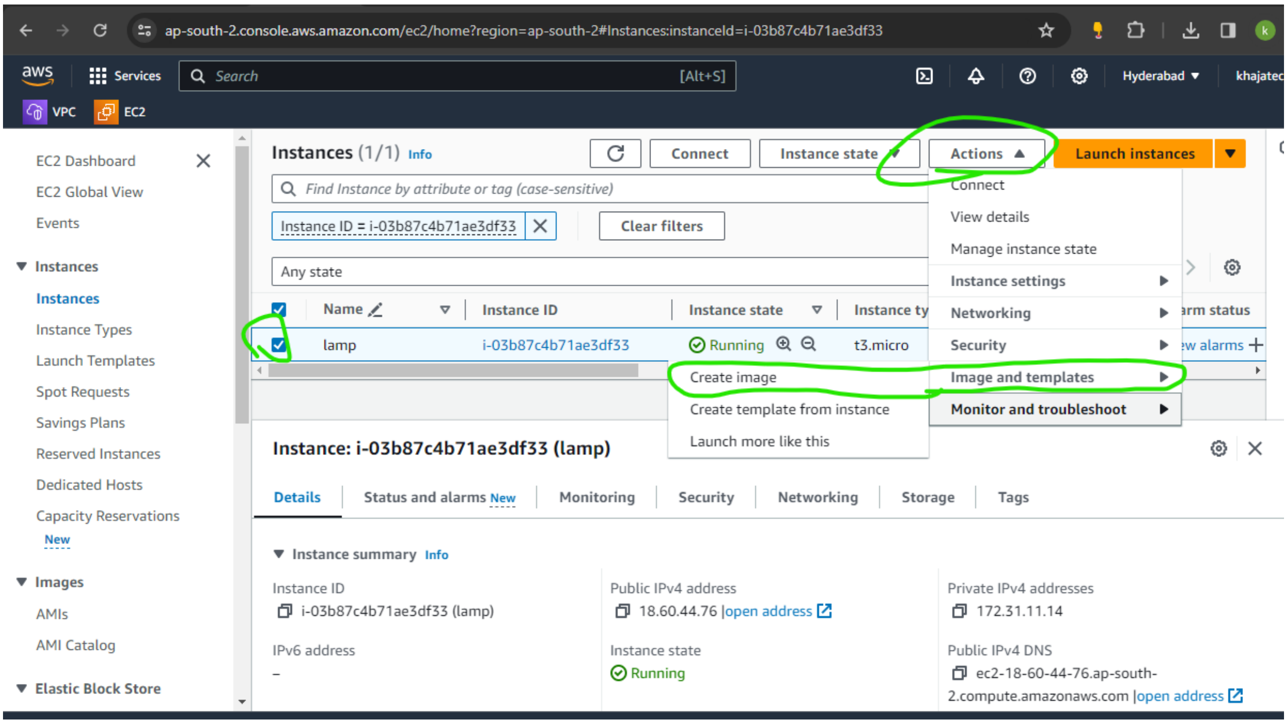
```
wget https://freewebsitetemplates.com/download/rehabilitation-yoga.zip
apt install unzip -y
mkdir yoga
mv rehabilitation-yoga.zip yoga/
cd yoga/
unzip rehabilitation-yoga.zip
cd rehabilitation-yoga/
mv upload/ /var/www/html/yoga
```

- Now access `http://<ip>/yoga`



Amazon Machine Images (AMI's)

- Lets create an AMI for an application



Instances (1/1) Info

☑	Name	Instance ID	Instance state	Instance ty	arm status
☑	lamp	i-03b87c4b71ae3df33	Running	t3.micro	ew alarms +

Instance: i-03b87c4b71ae3df33 (lamp)

▼ Instance summary Info

Instance ID
i-03b87c4b71ae3df33 (lamp)

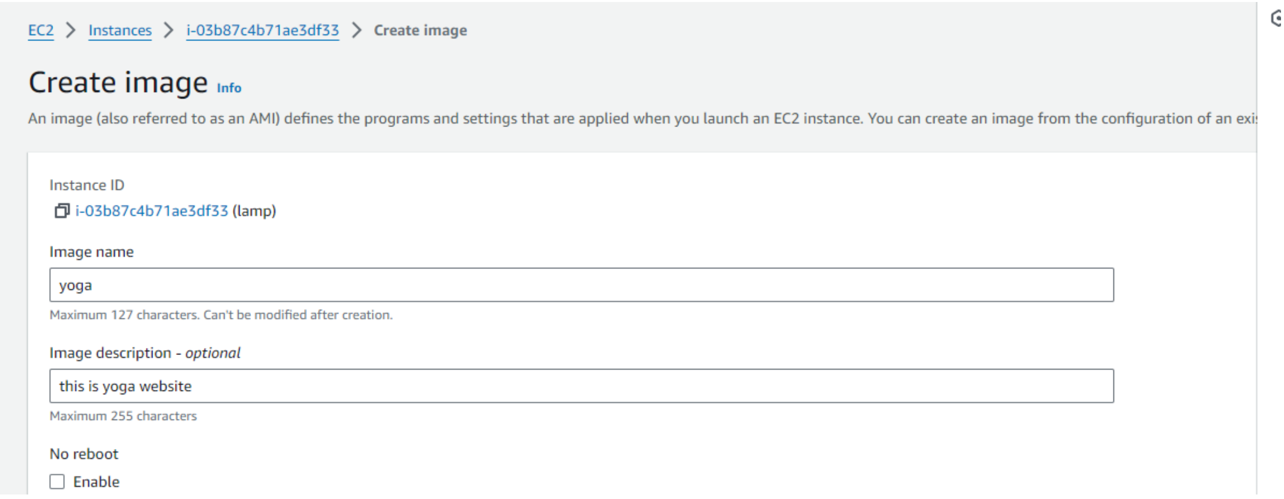
IPv6 address
–

Public IPv4 address
18.60.44.76 |open address

Instance state
Running

Private IPv4 addresses
172.31.11.14

Public IPv4 DNS
ec2-18-60-44-76.ap-south-2.compute.amazonaws.com |open address



Create image Info

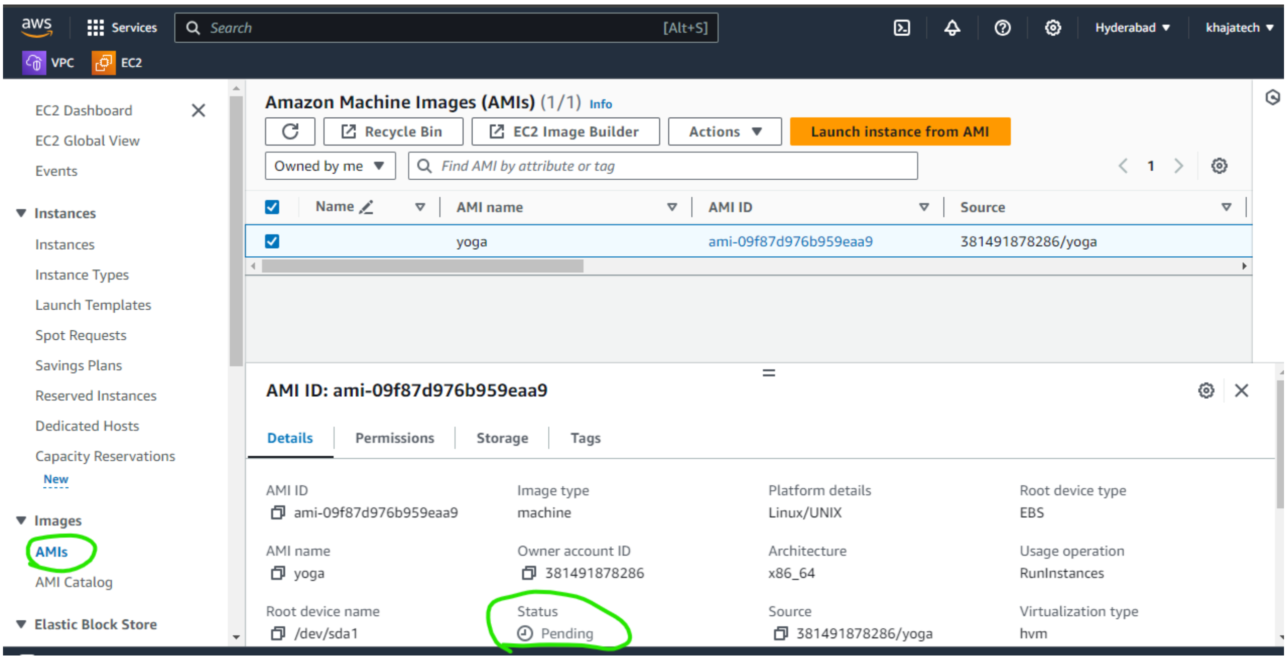
An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an exi

Instance ID
i-03b87c4b71ae3df33 (lamp)

Image name
yoga
Maximum 127 characters. Can't be modified after creation.

Image description - *optional*
this is yoga website
Maximum 255 characters

No reboot
□ Enable



Amazon Machine Images (AMIs) (1/1) Info

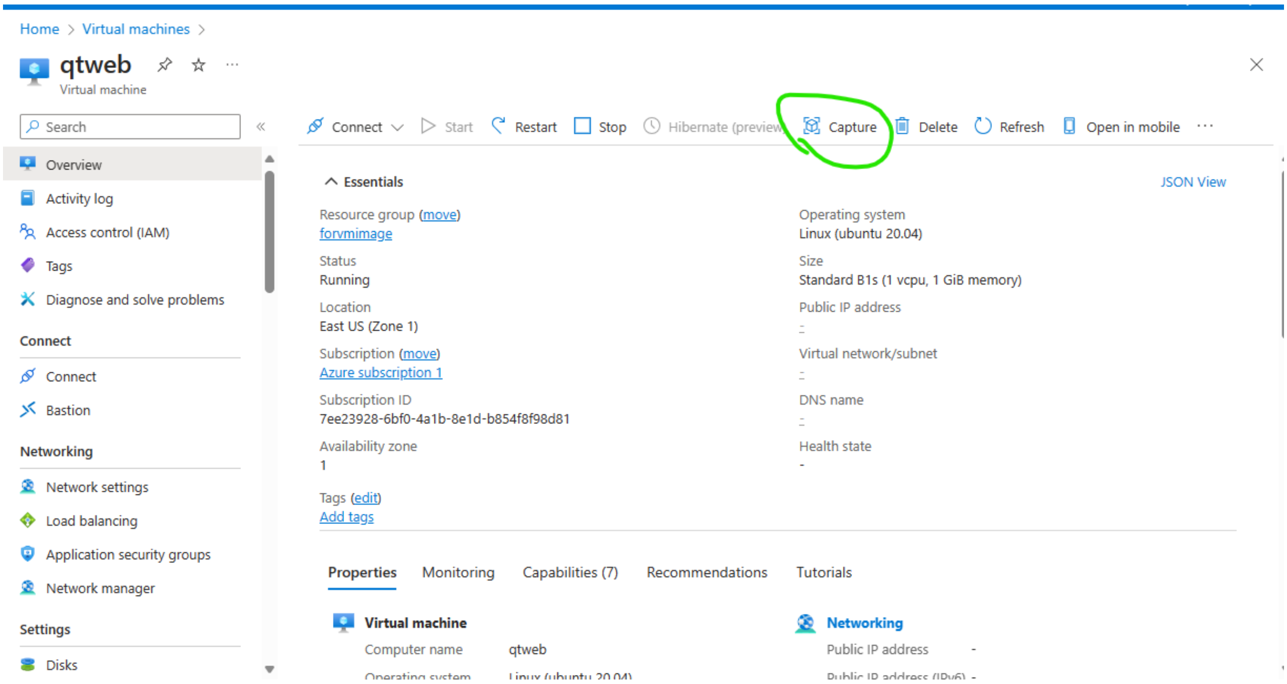
☑	Name	AMI name	AMI ID	Source
☑		yoga	ami-09f87d976b959eaa9	381491878286/yoga

AMI ID: ami-09f87d976b959eaa9

AMI ID	Image type	Platform details	Root device type
ami-09f87d976b959eaa9	machine	Linux/UNIX	EBS
AMI name	**Owner account ID**	**Architecture**	**Usage operation**
yoga	381491878286	x86_64	RunInstances
Root device name	**Status**	**Source**	**Virtualization type**
/dev/sda1	Pending	381491878286/yoga	hvm

Virtual Machine Images

- In Azure we have two types of images
    - Generalized:
        - These image will not have any specific user in it i.e. while create vm you have to set username and credentials
    - Specialized:
        - These vm images will have a user and will not let setting credentials while creating vm
- While creating Generalized vm images, azure vm becomes unusable, so its better to delete it.
- Lets create a new resource group to store vmimage



Resource group (move)
forvmimage

Status
Running

Location
East US (Zone 1)

Subscription (move)
Azure subscription 1

Subscription ID
7ee23928-6bf0-4a1b-8e1d-b854f8f98d81

Availability zone
1

Tags (edit)
Add tags

Operating system
Linux (ubuntu 20.04)

Size
Standard B1s (1 vcpu, 1 GiB memory)

Public IP address
-

Virtual network/subnet
-

DNS name
-

Health state
-

Virtual machine

Computer name qtweb

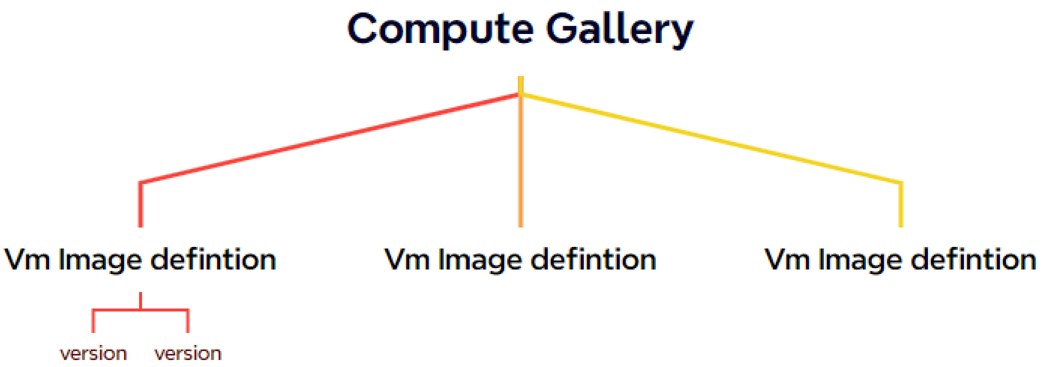
Operating system Linux (ubuntu 20.04)

Networking

Public IP address -

Public IP address (IPv6) -

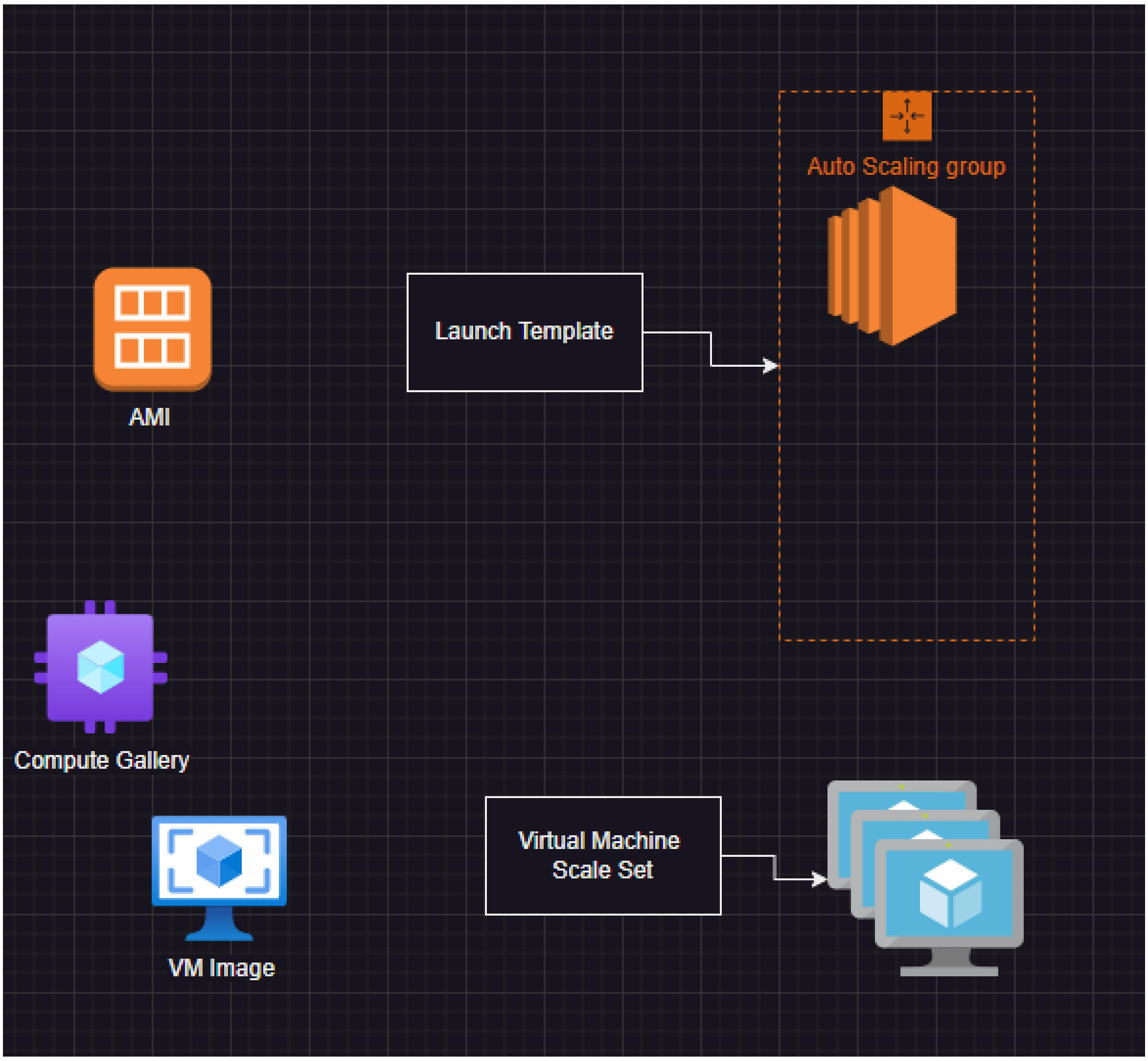
- Azure Recommends storing the image in Azure compute gallery



- Once the image is create in the gallery, we can use it to create virtual machines.
- Azure identifies image using
    - publisher
    - offer
    - sku

Horizontal scaling

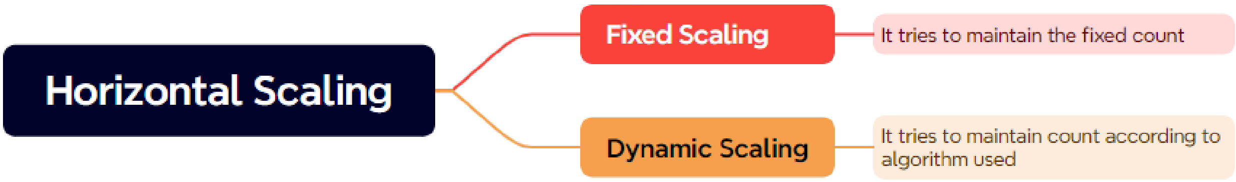
- Overview



- AWS:
  - AMI
  - Launch Tempalte
  - Autoscaling group
- Azure
  - Compute Gallery
  - VMSS (Virtual machine scale set)

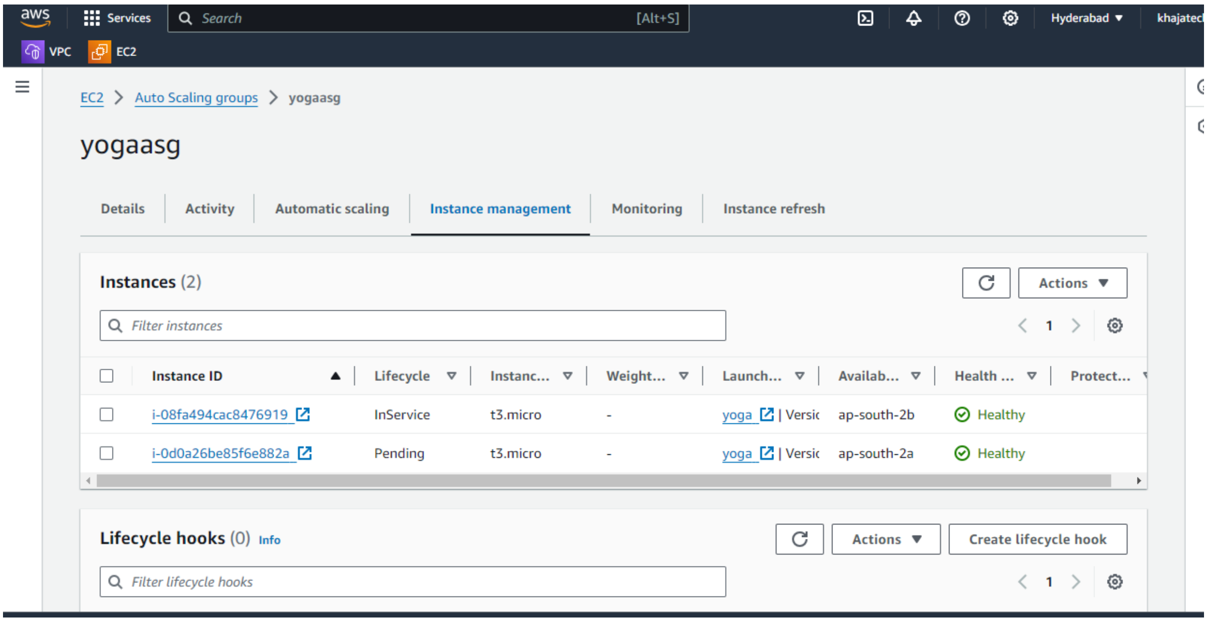
Fixed Scaling

- Overview


Horizontal Scaling
Fixed Scaling
It tries to maintain the fixed count
Dynamic Scaling
It tries to maintain count according to algorithm used

Fixed Scaling in AWS

- Steps:
  - create a launch template
  - then create autoscaling group with launch template
  - select desired count to some fixed number

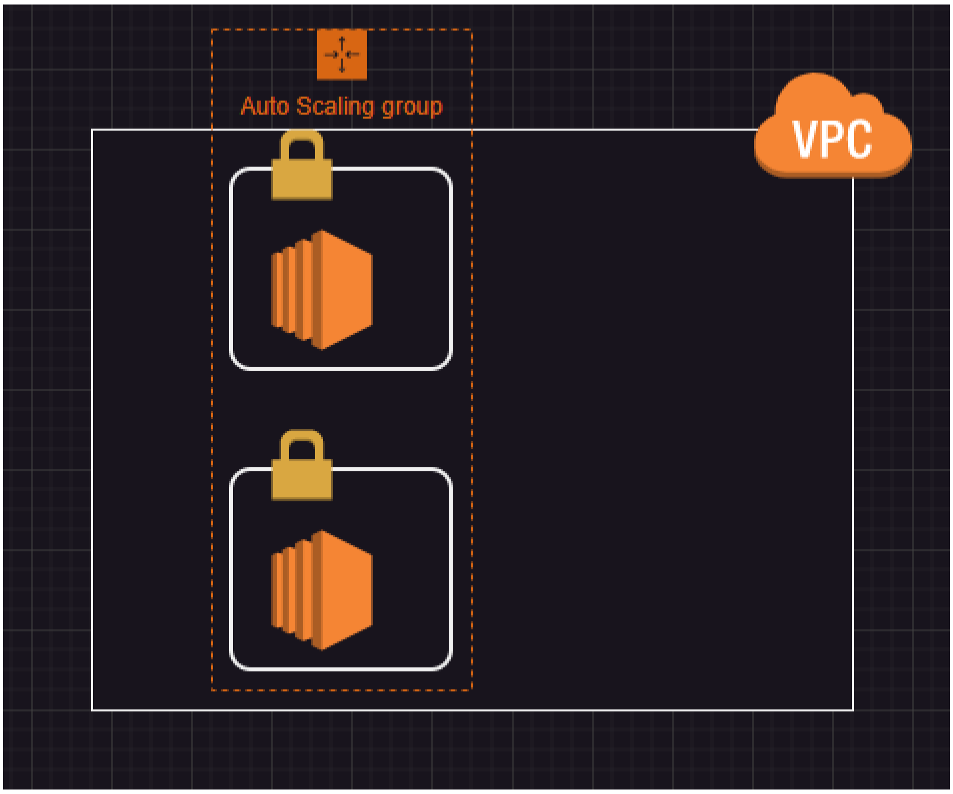


yogaasg

Instances (2)

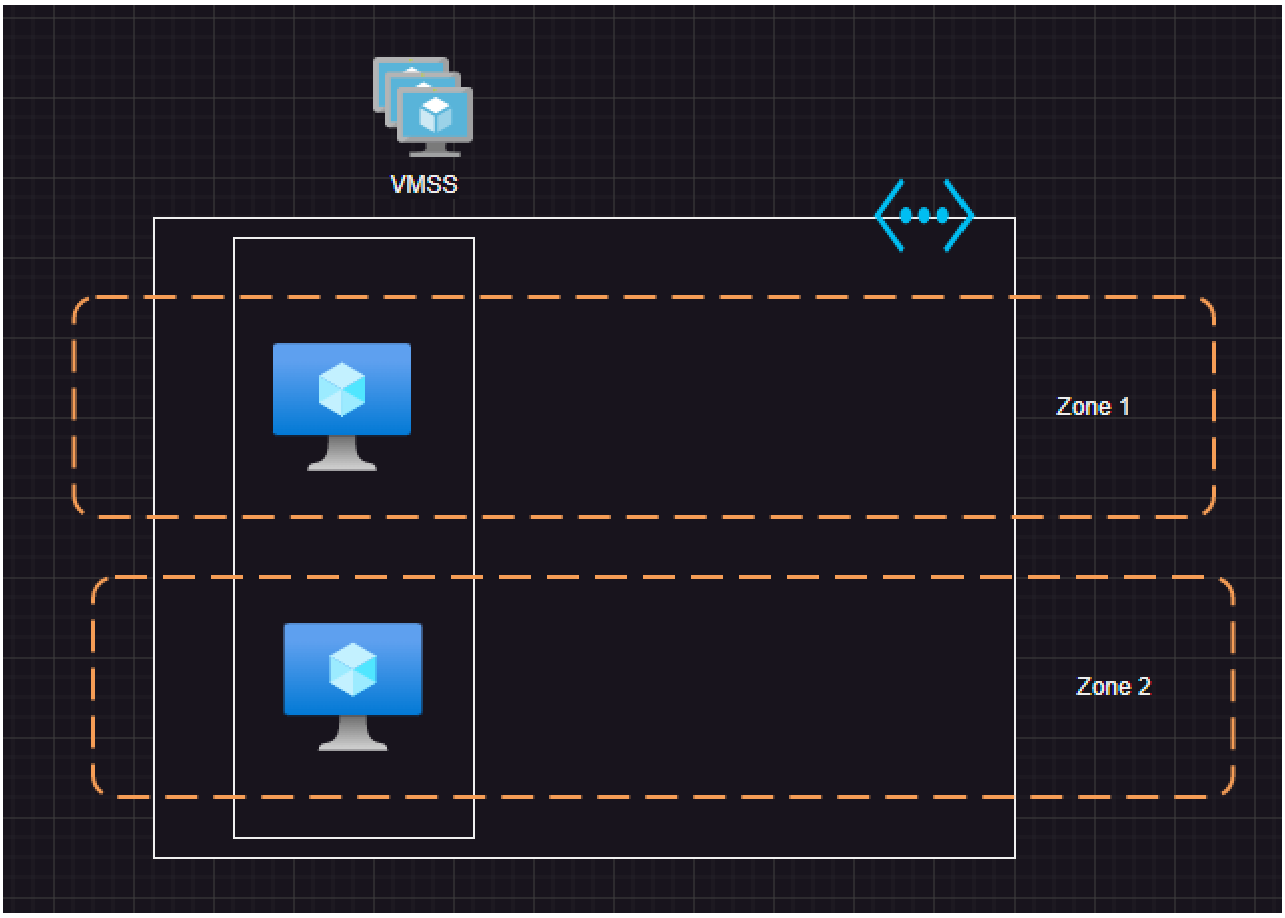
□	Instance ID	Lifecycle	Instanc...	Weight...	Launch...	Availab...	Health ...	Protect...
□	i-08fa494cac8476919	InService	t3.micro	-	yoga | Versic	ap-south-2b	✓ Healthy	
□	i-0d0a26be85f6e882a	Pending	t3.micro	-	yoga | Versic	ap-south-2a	✓ Healthy	

- For visual guidance use classroom video.



Fixed Scaling in Azure

- Steps:
  - Create a vmss
  - use manual scaling policy with fixed count
- For visual guidance use classroom video.



Autoscaling or elasticity

- Scaling based on metrics:
- Instance warmup: Time taken by your appliaction to be up once the virtual machine/ec2 instance is created.
- Which machine to remove during scale in?
- How to spread machines across zone ?
- How to deploy vms/ec2 instances automatically during new release with zero downtime ?

Terms

- Throttle
- Scale up or down: Vertical scaling
- Scale in or out: Horizontal scaling