



Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute of Information Technology

Department of
Artificial Intelligence and Data Science

Name: Ayush Shende

Class: TY

Division: A

Roll No: 371056

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Subject Name & Code: Cloud Computing and Analytics

Title of Assignment: To create and access VM instances and demonstrate various components such as EC2, S3, Simple DB, DynamoDB.

Date of Performance: 2/09/2022

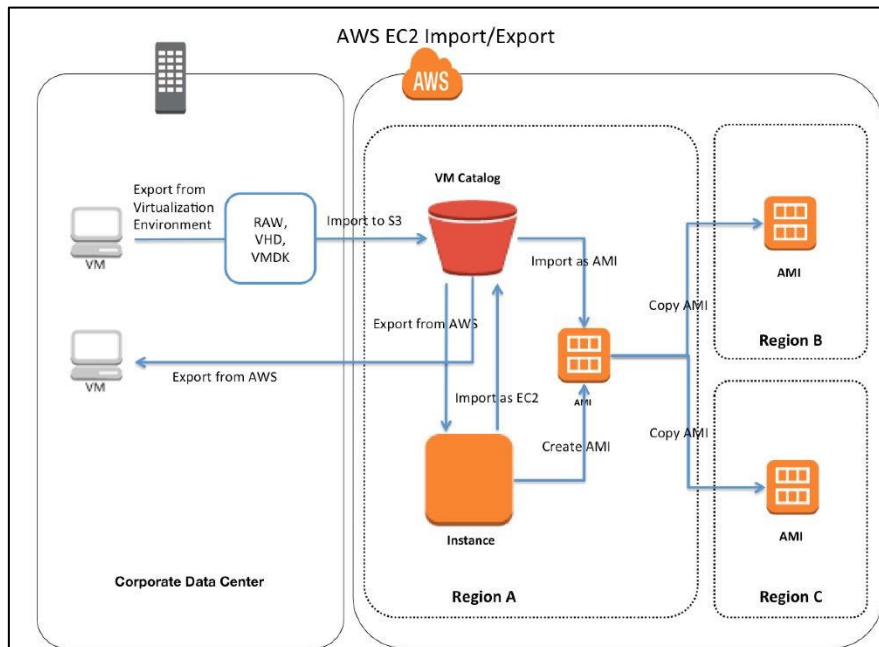
Date of Submission: 05/12/2022

Aim: To create and access VM instances and demonstrate various components such as EC2, S3, Simple DB, DynamoDB.

Problem Statement: To create and access VM instances and demonstrate various components such as EC2, S3, Simple DB, DynamoDB.

Background Information:

- An **instance** in cloud computing is a server resource provided by third-party cloud services. While you can manage and maintain physical server resources on premises, it is costly and inefficient to do so.
- A **virtual machine** is a computer that exists in the virtual environment. Virtual machines use the compute resources that are available in the physical computer. However, those compute resources, such as processing power and memory, are not in the form of physical hardware. Instead, they are provided and managed as code within the physical computer.
- **Instance vs. virtual machine:** You can run multiple virtual machines on a single computer, but when you run virtual machines in the cloud environment, they are known as instances. Running virtual machines on the cloud allows organizations to benefit from the cost effectiveness of sharing and scaling resources.
- There are two main benefits of cloud instances: Scalability, Fault tolerance.
- An **instance group** is a collection of many instances that share the same configuration. Developers use instance groups to set uniform policies and rules across multiple instances easily. All instances in an instance group go through the same lifecycle simultaneously.
 - **Single instance vs. multi-instance:** Single instance describes a cloud infrastructure setup where only one instance of the compute resources is created and allocated to the user. Meanwhile, multi-instance is a term used for more than one identical instance that run parallel to each other. In a multi-instance setup, each instance has its own compute resources.
- **AWS Elastic Compute Cloud (Amazon EC2)** allows developers to build scalable apps in the cloud environment. Amazon EC2 offers several types of instances that are optimized for different workloads.

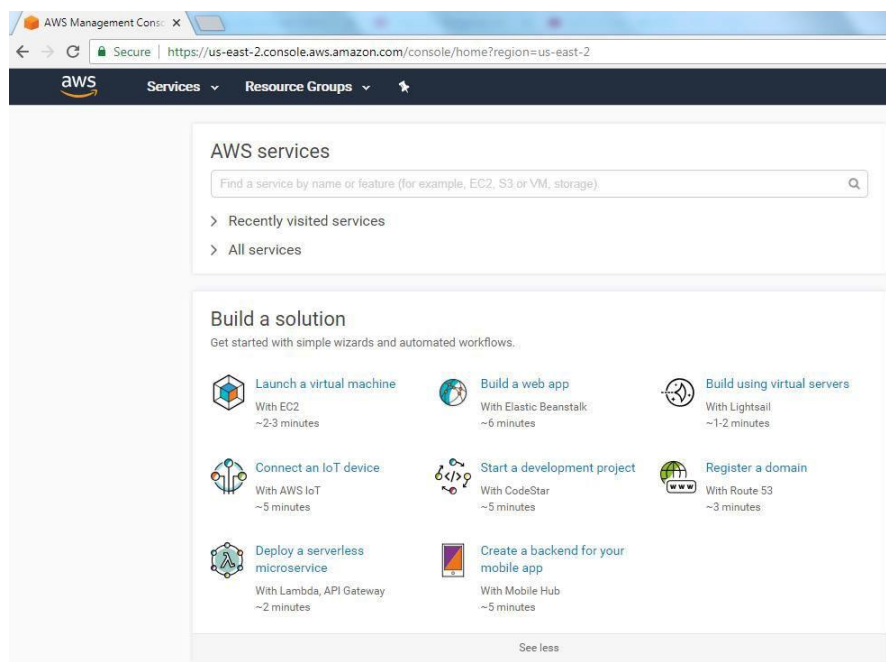


Cloud Resource Requirements: AWS

Steps:

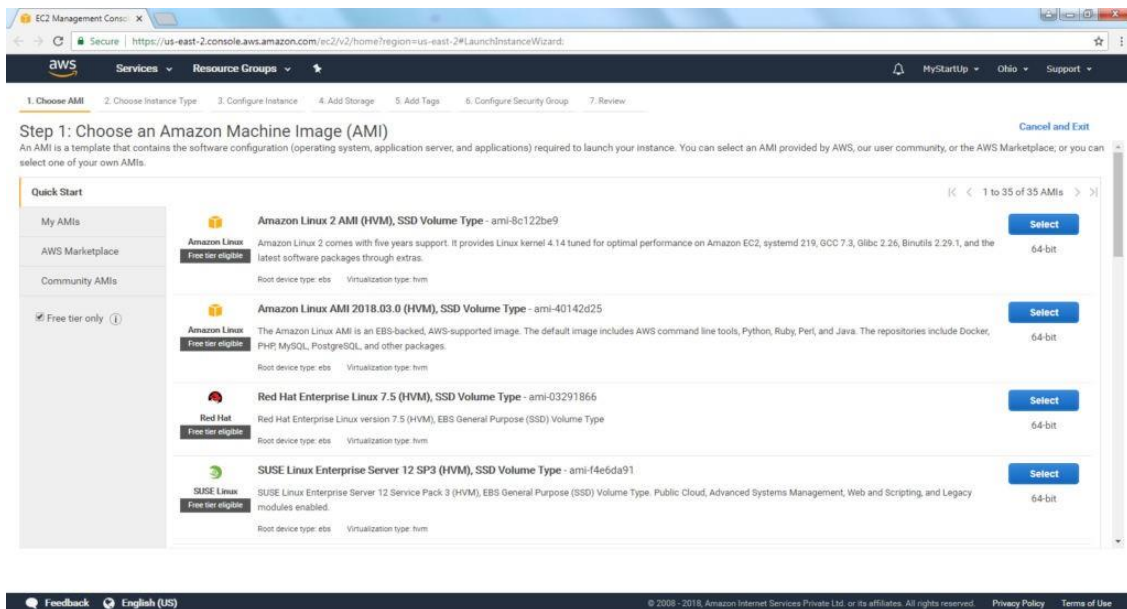
AWS : Creating a Virtual Machine with EC2

Step 1: Log in to “AWS Management Console”.



Step 2: Under the *Build Solution* group, click on the “Launch a virtual machine” link. AWS will open a wizard to allow us to create a Virtual Machine instance (EC2 instance).

Step 3: Choose an Amazon Machine Image (AMI) that contains the software configuration required to launch the EC2 instance. Select the AMI which is suitable for your need by clicking on the **Select** button next to the displayed AMI template. Once selected, the Console will take us to the next step to select an instance from the “Choose an Instance Type” wizard page.

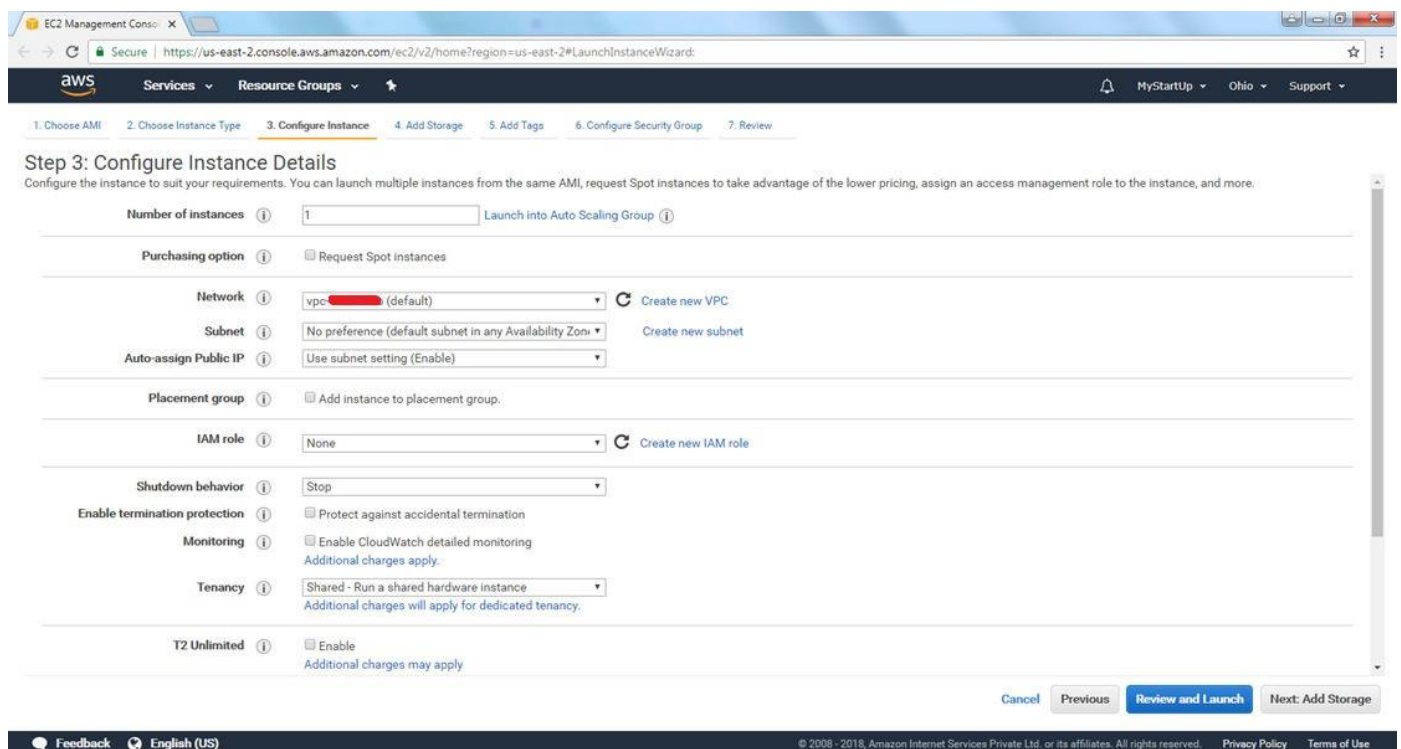


Step 4: Select the instance type which suits our requirement, and click on **“Next: Configure Instance**

Step 5: *“Configure Instance Details”* allows you to configure the instance to suit your requirements. Keep the default values, if you do not want to modify anything.

- Give a number of instances value in the “Number of instances” field; to launch the number of instances from the same selected AMI.
- You can assign the access management role to the Instance through the “IAM role” field.

Once the necessary values are entered, click on the **“Next: Add Storage”** button to add the storage to the instance(s).



Step 6: The “Add Storage” wizard page, allows you to update the storage device settings. You can also add new volumes depending on your requirements. Once the values are given, click on the “Next: Add Tags” button.

The screenshot shows the 'Add Storage' step of the EC2 instance launch wizard. The breadcrumb trail at the top indicates the current step is '4. Add Storage'. The main heading is 'Step 4: Add Storage'. Below this, a paragraph explains that the instance will be launched with specific storage settings and that additional EBS volumes can be attached. A table lists the existing storage configuration for the 'Root' volume, showing it is a 'General Purpose SSD (GP2)' with a size of 8 GiB. Below the table is an 'Add New Volume' button. A blue box contains information about free tier eligible customers. At the bottom right, there are buttons for 'Cancel', 'Previous', 'Review and Launch', and 'Next: Add Tags'.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/xvda	snap-0k...	8	General Purpose SSD (GP2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Step 7: After adding the Tags, click on the “Next: Configure Security Group” button.

Step 8: “Configure Security Group” wizard allows to add rules to control the traffic for the EC2 instance. Once required changes are done, click on the “Review and Launch” button.

The screenshot shows the 'Configure Security Group' step of the EC2 instance launch wizard. The breadcrumb trail at the top indicates the current step is '6. Configure Security Group'. The main heading is 'Step 6: Configure Security Group'. Below this, a paragraph explains that a security group is a set of firewall rules that control traffic. A section titled 'Assign a security group' has two radio buttons: 'Create a new security group' (selected) and 'Select an existing security group'. Below this, there are input fields for 'Security group name' (filled with 'launch-wizard-1') and 'Description' (filled with 'launch-wizard-1 created 2018-07-07T20:59:13.123+05:30'). A table lists the existing security group rules, showing a rule for 'SSH' using 'TCP' protocol on port '22' with a source of '0.0.0.0/0'. Below the table is an 'Add Rule' button. A yellow warning box states: 'Warning: Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' At the bottom right, there are buttons for 'Cancel', 'Previous', and 'Review and Launch'.

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop

Step 9: Before launching the instance, AWS Management Console will prompt a message, to create a key pair entry to attach to the instance. You can create a new key pair or you can use the already created one. This key pair is important to connect to the EC2 instance. Key pair contains both public & private keys. You need to download the Key Pair and store it in a secured location from where you can access it whenever you want to connect to the EC2 instance.

Provide the “*Key pair name*” & click on the **Download Key Pair** button to download the key pair file (*.pem file). Once downloaded, click on the **Launch Instances** button to launch the EC2 instances.

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about removing existing key pairs from a public AMI .

Create a new key pair

Key pair name

MyKeyPair

Download Key Pair

You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

Cancel Launch Instances

Step 10: If everything goes fine, you will see the “**Your instances are now launching**” message. And you can also review the settings you have done. Click on the “**View Instances**” button to view the instances which we created just now through the above steps.

Step 11: You can see the list of instances and their statuses on the instances page. Now the EC2 instance is ready, which means, your own virtual machine is ready. Everything is ready; then how to connect to it?

EC2 Management Console

Secure | https://us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#Instances:

aws Services Resource Groups

MyStartUp Ohio Support

EC2 Dashboard Events Tags Reports Limits INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts IMAGES AMIs Bundle Tasks ELASTIC BLOCK STORE Volumes Snapshots NETWORK & SECURITY Security Groups Elastic IPs Placement Groups Key Pairs Network Interfaces

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
MyServer	i-...	t2.micro	us-east-2c	running	Initializing	None	ec2-...	...	-

Instance: i-... (MyServer) Public DNS: ... compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID i-...

Instance state running

Instance type t2.micro

Elastic IPs

Availability zone us-east-2c

Public DNS (IPv4) ec2-... compute.amazonaws.com

IPv4 Public IP ...

IPv6 IPs -

Private DNS ip-... .internal

Private IPs ...

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Step 12: Click on **Connect** button, which is on top of the EC2 instances page. AWS Management Console will display the steps to connect to the EC2 instances. You can connect to EC2 instances, using an SSH client or through a web browser.

[GitHub Repo Link:](#)

https://github.com/ayush270707/CCA_Assignments

[Conclusion:](#)

You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.