	Bansilal Ramnath Agarwal Charitable Trust's Vishwakarma Institute of Information Technology		
Department of Artificial Intelligence and Data Science			
Student Name: Vidhyapati Umesh Shelke			
Class: TY	Division: A		Roll No: 371069
Semester: 5 <sup>th</sup>		Academic Year: 2022-23	
Subject Name & Code: Cloud Computing			
Title of Assignment: Assignment 5: To create and access VM instances and demonstrate various components such as EC2, S3, Simple DB, DynamoDB.			
Date of Performance: 5/12/2022		Date of Submission: 6/12/2022	

**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.

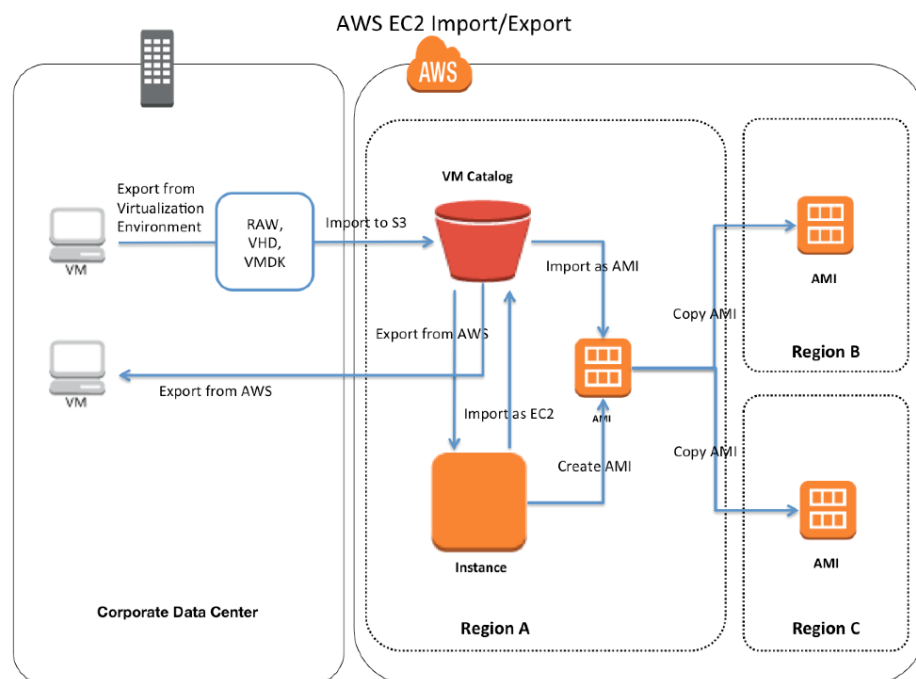
**Software Requirements:** AWS Console

### 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

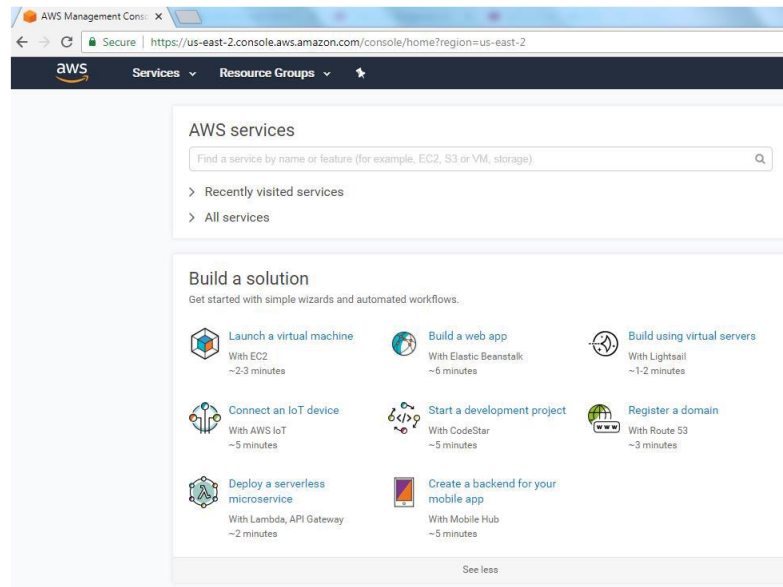
and memory, are not in the form of physical hardware. Instead, they are provided and managed as code within the physical computer.

- **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.



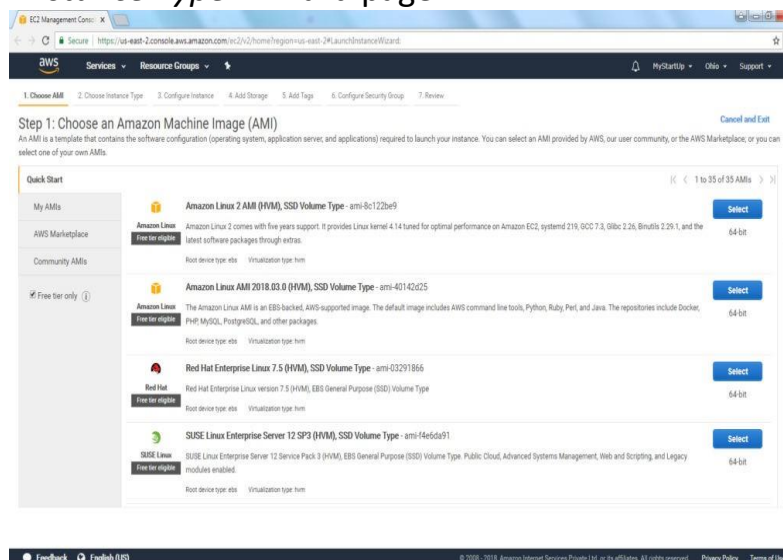
## AWS : Creating a Virtual Machine with EC2

**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).

The screenshot shows the AWS Management Console 'Configure Instance Details' page. The page is titled 'Step 3: Configure Instance Details' and includes a sub-header 'Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.' The page contains several configuration sections: 'Number of instances' (set to 1), 'Purchasing option' (Request Spot instances), 'Network' (vpc-... (default)), 'Subnet' (No preference (default subnet in any Availability Zone)), 'Auto-assign Public IP' (Use subnet setting (Enable)), 'Placement group' (Add instance to placement group), 'IAM role' (None), 'Shutdown behavior' (Stop), 'Enable termination protection' (Protect against accidental termination), 'Monitoring' (Enable CloudWatch detailed monitoring), 'Tenancy' (Shared - Run a shared hardware instance), and 'T2 Unlimited' (Enable). At the bottom, there are buttons for 'Cancel', 'Previous', 'Review and Launch', and 'Next: Add Storage'.

**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.

EC2 Management Console

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

Services Resource Groups

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1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

### Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more about storage options in Amazon EC2.](#)

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/xvda	snap-01	8	General Purpose SSD (GP2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more about free usage tier eligibility and usage restrictions.](#)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Tags](#)

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**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.

EC2 Management Console

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1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

### Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more about Amazon EC2 security groups.](#)

Assign a security group: ☒ Create a new security group ☐ Select an existing security group

Security group name:

Description:

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

[Add Rule](#)

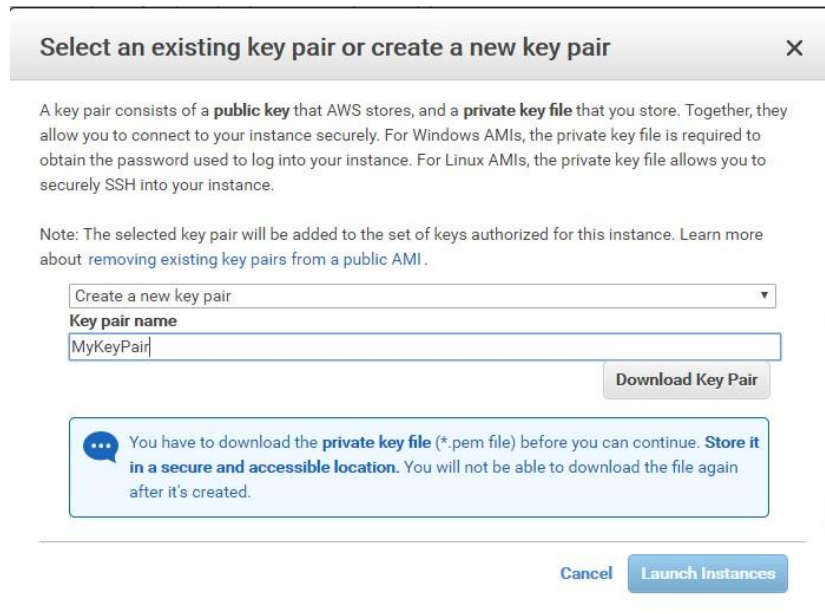
**Warning**  
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

[Cancel](#) [Previous](#) [Review and Launch](#)

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**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.

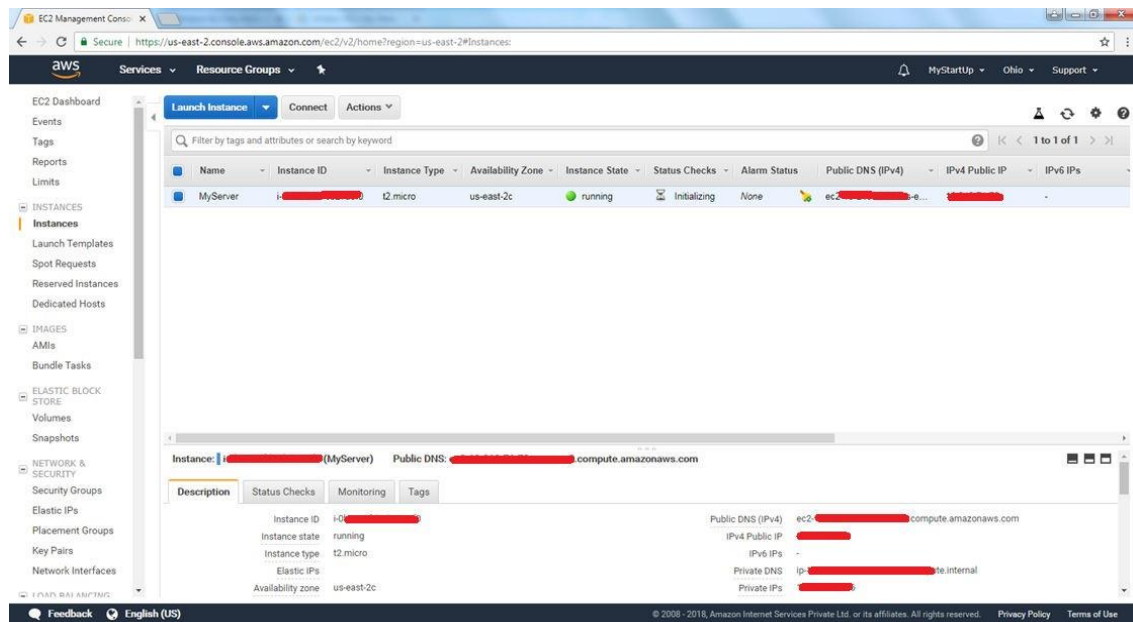


The screenshot shows a modal dialog titled "Select an existing key pair or create a new key pair" with a close button (X) in the top right corner. The dialog contains the following elements:

- Text:** "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:** "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."
- Form:** A dropdown menu with "Create a new key pair" selected, and a text input field labeled "Key pair name" containing the text "MyKeyPair".
- Buttons:** A "Download Key Pair" button is positioned to the right of the "Key pair name" input field.
- Message Box:** A light blue box with a speech bubble icon containing the text: "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."
- Footer:** "Cancel" and "Launch Instances" buttons.

**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.?



**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/Vidhyapati/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.