Xavier Institute of Engineering
Mahim, Mumbai 400016
Department of Information Technology

(Affiliated to University of Mumbai)

(Academic Year: 2022-23   Semester: ODD)

Class: TE IT

Subject: Advance DevOps Lab

Experiment No.	1
Title	To explain the benefits of Cloud Infrastructure and Setup AWS Cloud9 IDE, Launch AWS Cloud9 IDE and Perform Collaboration Demonstration.
Lab Outcome No.	1
Date of Performance	26/07/2022
Date of submission	10/08/2022
ID	202003040
Name of the Student	Sarvesh Chavan

Evaluation:

	Below Expectation	Average	Good
Knowledge (3)	1	2	3
Performance (3)	1	2	3
Content &Neatness of Documentation(2)	0	1	2
Punctuality & Submission on Time (2)	0	1	2

Signature of the Teacher: ⎯⎯⎯⎯⎯⎯⎯

What is cloud computing?

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data canters and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).

Users no longer need to rely on their hardware or software resources and can instead access data, programs, and services hosted on remote servers from any location. Because you only pay for the cloud services you use, you can cut your operational costs and improve the efficiency of your infrastructure.

Essential Characteristics of Cloud Computing:

➢ Resources Pooling
➢ On-Demand Self-Service
➢ Scalability And Rapid Elasticity
➢ Large Network Access
➢ Measured And Reporting Service

Cloud Deployment Models:

Different types of cloud computing deployment models are:

➢ Public cloud
➢ Private cloud
➢ Hybrid cloud
➢ Community cloud

1. Public Cloud
The public cloud makes it possible for anybody to access systems and services. The public cloud may be less secure as it is open for everyone. The public cloud is one in which cloud infrastructure services are provided over the internet to the general people or major industry groups. The infrastructure in this cloud model is owned by the entity that delivers the cloud services, not by the consumer. It is a type of cloud hosting that allows customers and users to easily access systems and services. This form of cloud computing is an excellent example of cloud hosting, in which service providers supply services to a variety of customers. In this arrangement, storage backup and retrieval services are given for free, as a subscription, or on a per-use basis. Example: Google App Engine etc.

Advantages of the public cloud model:
- **Minimal Investment:** Because it is a pay-per-use service, there is no substantial upfront fee, making it excellent for enterprises that require immediate access to resources.
- **No setup cost:** The entire infrastructure is fully subsidized by the cloud service providers, thus there is no need to set up any hardware.
- **Infrastructure Management is not required:** Using the public cloud does not necessitate infrastructure management.
- **No maintenance:** The maintenance work is done by the service provider (Not users).
- **Dynamic Scalability:** To fulfil your company's needs, on-demand resources are accessible.

2. Private Cloud

The private cloud deployment model is the exact opposite of the public cloud deployment model. It's a one-on-one environment for a single user (customer). There is no need to share your hardware with anyone else. The distinction between private and public cloud is in how you handle all of the hardware. It is also called the "internal cloud" & it refers to the ability to access systems and services within a given border or organization. The cloud platform is implemented in a cloud-based secure environment that is protected by powerful firewalls and under the supervision of an organization's IT department. The private cloud gives the greater flexibility of control over cloud resources.

Advantages of the private cloud model:

- **Better Control:** You are the sole owner of the property. You gain complete command over service integration, IT operations, policies, and user behaviour.
- **Data Security and Privacy:** It's suitable for storing corporate information to which only authorized staff have access. By segmenting resources within the same infrastructure, improved access and security can be achieved.
- **Supports Legacy Systems:** This approach is designed to work with legacy systems that are unable to access the public cloud.
- **Customization:** Unlike a public cloud deployment, a private cloud allows a company to tailor its solution to meet its specific needs.

3. Hybrid cloud

By bridging the public and private worlds with a layer of proprietary software, hybrid cloud computing gives the best of both worlds. With a hybrid solution, you may host the app in a safe environment while taking advantage of the public cloud's cost savings. Organizations can move data and applications between different clouds using a combination of two or more cloud deployment methods, depending on their needs.

Advantages of the hybrid cloud model:

- **Flexibility and control:** Businesses with more flexibility can design personalized solutions that meet their particular needs.
- **Cost:** Because public clouds provide for scalability, you'll only be responsible for paying for the extra capacity if you require it.
- **Security:** Because data is properly separated, the chances of data theft by attackers are considerably reduced.

4. Community cloud

It allows systems and services to be accessible by a group of organizations. It is a distributed system that is created by integrating the services of different clouds to address the specific needs of a community, industry, or business. The infrastructure of the community could be shared between the organization which has shared concerns or tasks. It is generally managed by a third party or by the combination of one or more organizations in the community.

Advantages of the community cloud model:

- **Cost Effective:** It is cost-effective because the cloud is shared by multiple organizations or communities.
- **Security:** Community cloud provides better security.

- **Shared resources:** It allows you to share resources, infrastructure, etc. with multiple organizations.
- **Collaboration and data sharing:** It is suitable for both collaboration and data sharing.

Cloud Computing Services:

IaaS
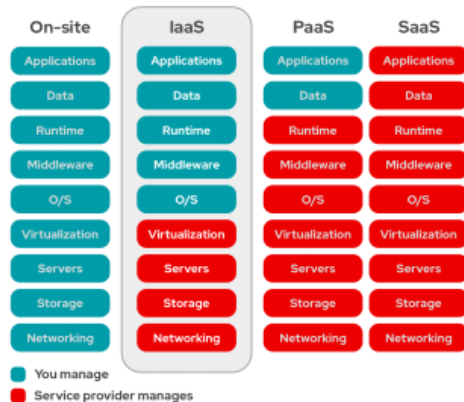
IaaS means a cloud service provider manages the infrastructure for you—the actual servers, network, virtualization, and data storage—through an internet connection. The user has access through an API or dashboard, and essentially rents the infrastructure. The user manages things like the operating system, apps, and middleware while the provider takes care of any hardware, networking, hard drives, data storage, and servers; and has the responsibility of taking care of outages, repairs, and hardware issues. This is the typical deployment model of cloud storage providers.

PaaS
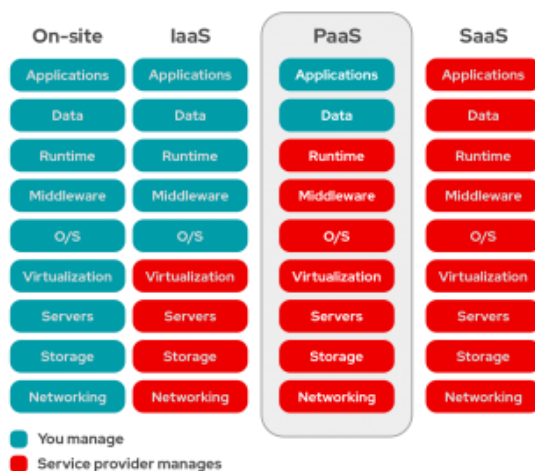
PaaS means the hardware and an application-software platform are provided and managed by an outside cloud service provider, but the user handles the apps running on top of the platform

and the data the app relies on. Primarily for developers and programmers, PaaS gives users a shared cloud platform for application development and management (an important DevOps component) without having to build and maintain the infrastructure usually associated with the process.

SaaS

	On-site	IaaS	PaaS	SaaS
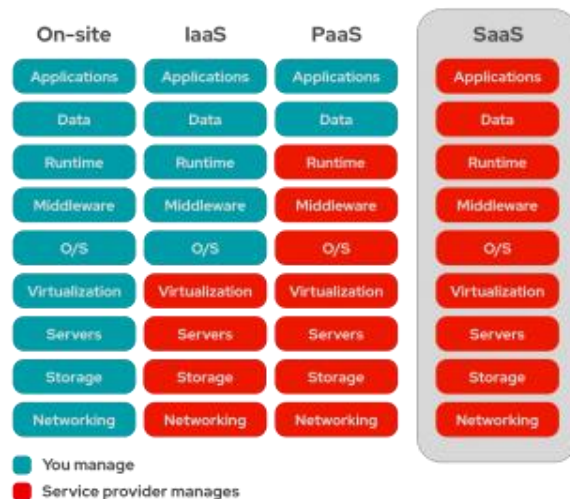
SaaS is a service that delivers a software application—which the cloud service provider manages—to its users. Typically, SaaS apps are web applications or mobile apps that users can access via a web browser. Software updates, bug fixes, and other general software maintenance are taken care of for the user, and they connect to the cloud applications via a dashboard or API. SaaS also eliminates the need to have an app installed locally on each individual user's computer, allowing greater methods of group or team access to the software.

Different Cloud Service Providers:

Amazon Web Services (AWS)

Amazon Web Services is a cloud computing platform that provides services such as compute power, database storage, content delivery and many other functions which will help to integrate a business.

ServerSpace Cloud Servers

These are Cloud Servers with Windows & Linux OS. At ServerSpace Cloud Servers, you can choose your own custom configurations, spin up your VM in 40 sec, change the configuration at any time and pay as you go. Unlimited traffic, High-end performance and 24/7/365 human tech support.

Microsoft Azure

Microsoft Azure is a cloud computing service which is used for building testing deploying and managing the application. This process is done in a global network of the Microsoft-managed data centre. It is private as well as a **public cloud** platform.

Uses of DevOps:

- Continuous delivery of software

- Better collaboration between teams

- Easy deployment

- Better efficiency and scalability

- Errors are fixed at the initial stage

- More security

- Less manual intervention (which means fewer chances of error)

Uses of Advance DevOps:

- Using automated unit tests to provide in-depth code review and QA
- Using Docker containers for continuous apps delivery
- Using rolling updates to ensure an uninterrupted end-user experience.
- Using Kubernetes for fast and reliable container management
- Using Terraform for state-of-the-art infrastructure orchestration
- Provisioning, configuring and managing the infrastructure on AWS, Azure, and GCP for our customers
- Using Prometheus & Grafana, Sumologic and ELK Stack for in-depth service monitoring and logging.
- Using Jenkins, Gitlab CI and CircleCI for building continuous software delivery pipelines

AWS:

AWS Cloud9 is a cloud-based integrated development environment (IDE) that lets you write, run, and debug your code with just a browser. It includes a code editor, debugger, and terminal. Cloud9 comes prepackaged with essential tools for popular programming languages, including JavaScript, Python, PHP, and more, so you don't need to install files or configure your development machine to start new projects. Since your Cloud9 IDE is cloud-based, you can work on your projects from your office, home, or anywhere using an internet-connected machine. Cloud9 also provides a seamless experience for developing serverless applications enabling you to easily define resources, debug, and switch between local and remote execution of serverless applications. With Cloud9, you can quickly share your development environment with your team, enabling you to pair program and track each other's inputs in real time.

Steps to perform this experiment:

- Log in into your AWS account. (IAM/Root).
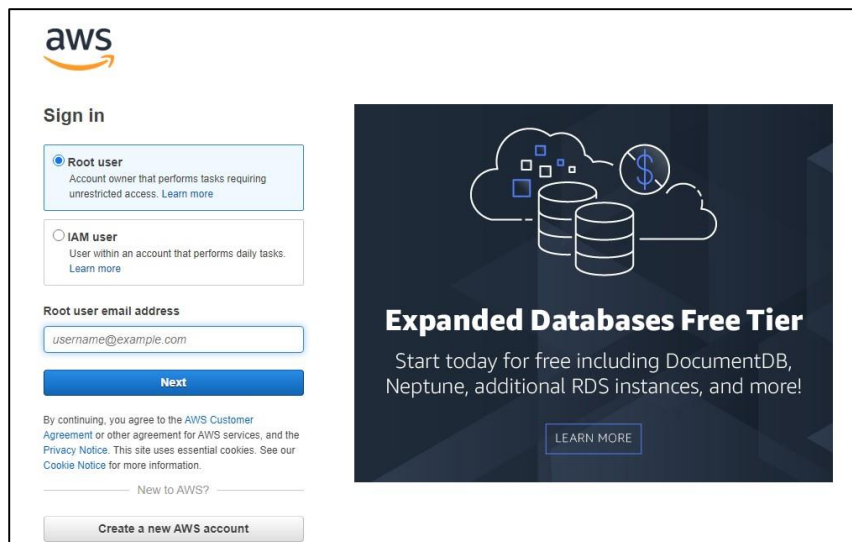
- Navigate to Cloud9 service from developer tool section as shown below.
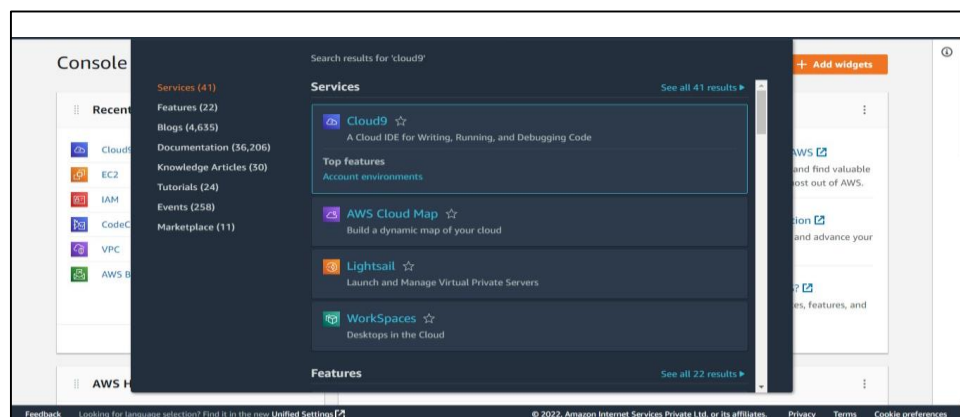
- Click on create environment.
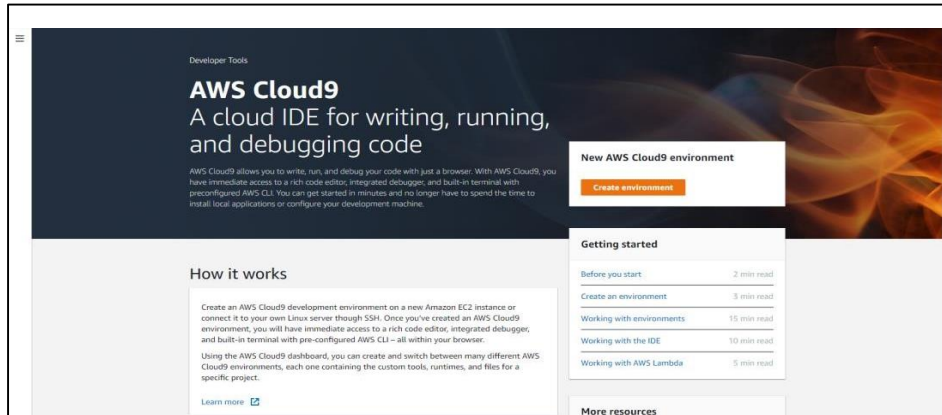
- Provide name for the environment (environment name), click on next.

- Keep all the default setting as shown below.

Review the environment and setting and click on create environment

- Till that time open the IAM Identity and access management in order to add user in other tab
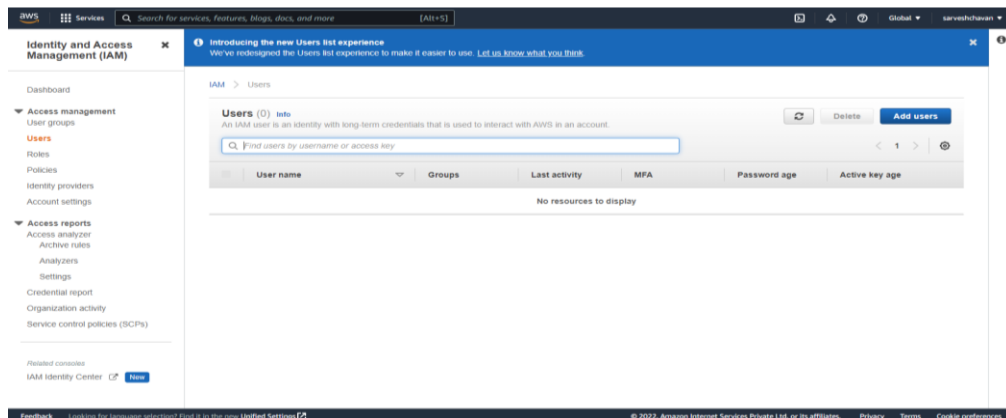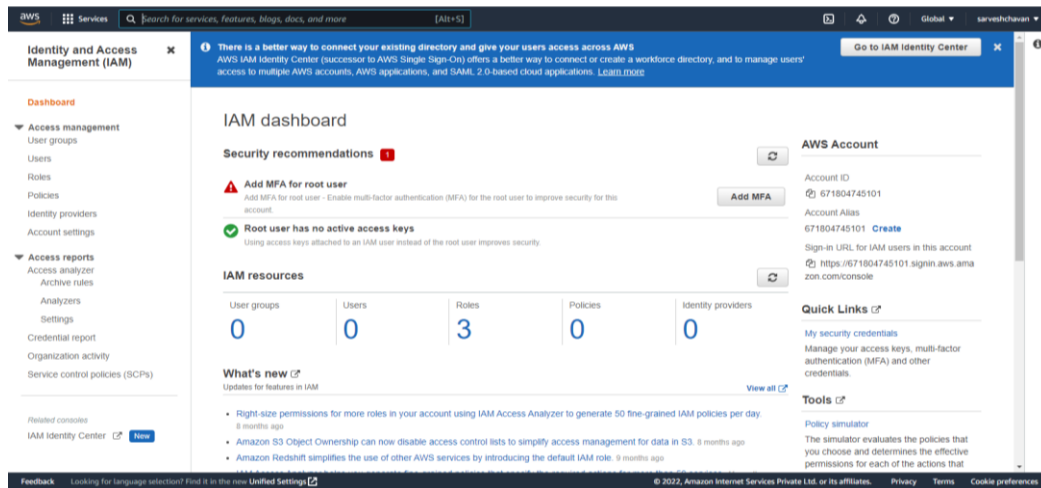
- Add User provide with password selection with auto generate password and click on auto generate tab.
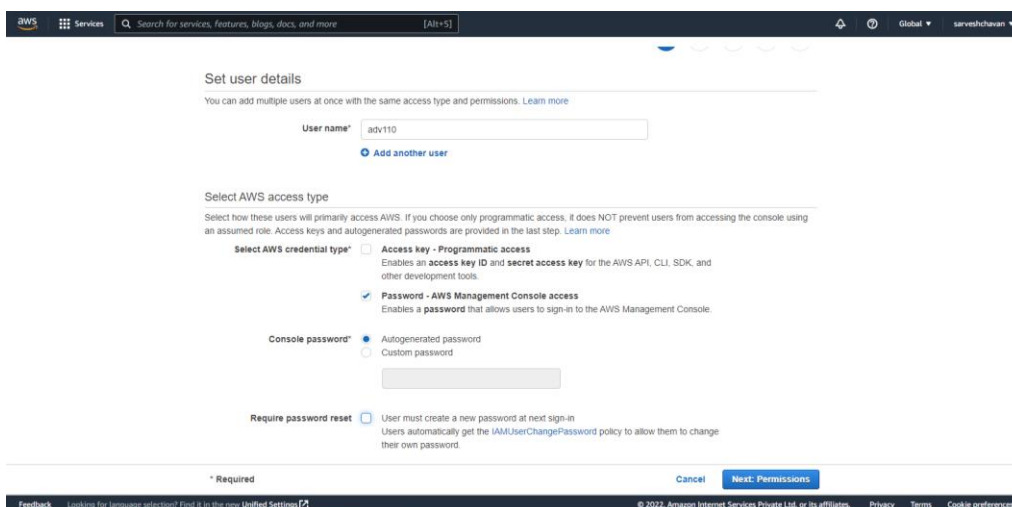
- Click on create group.

- Provide group name and click create group by selecting current policy.

- After the group is created click on next if you want provide tag else click on review for user setting and click on create user as shown below.

- Now close that window to create the user.

- Now move towards Cloud9 IDE environment tab as shown below.
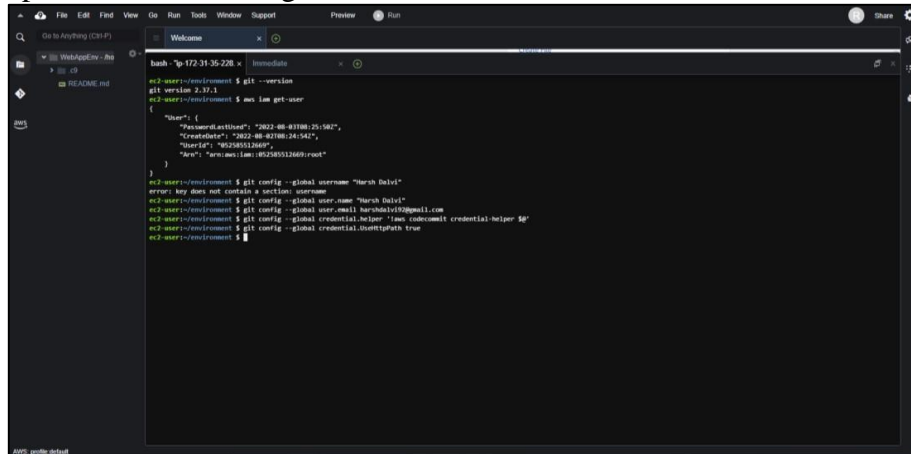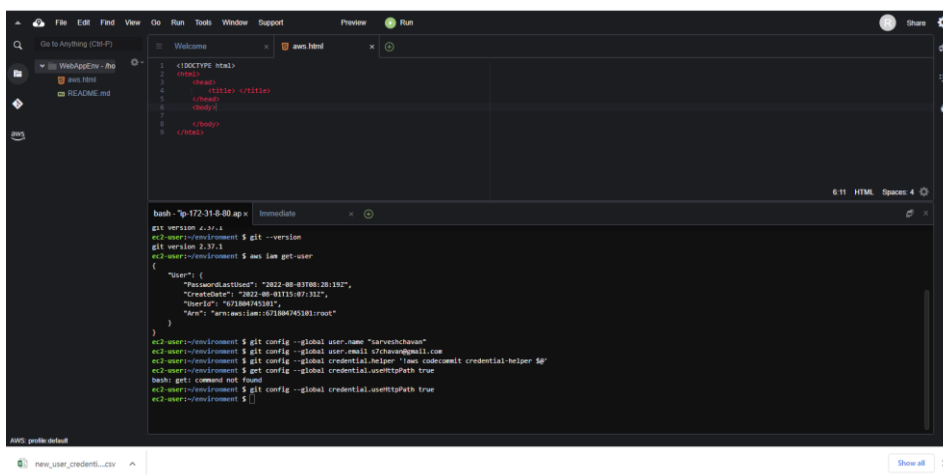
- If you check at bottom side cloud9 IDE also giving you an AWS CLI for command operations. To check git version, IAM user details and so on.

- Now setup collaborative environment. Create HTML file from the file tab. Edit HTML file and save it.

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- Now, in order to share this file to collaborate with other members of your team click on share option right-side of your window and username which you created in IAM.
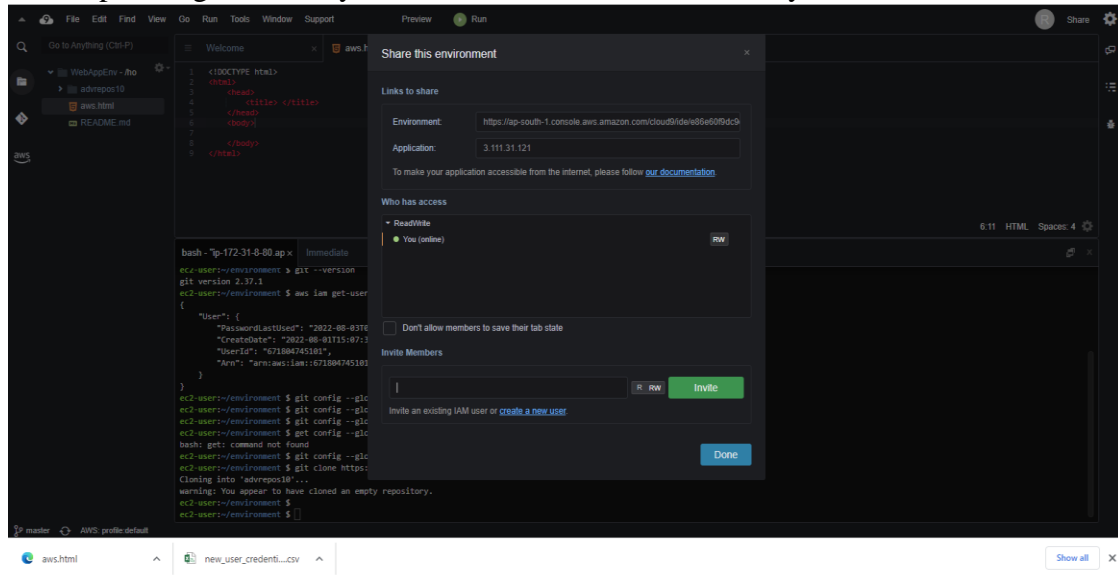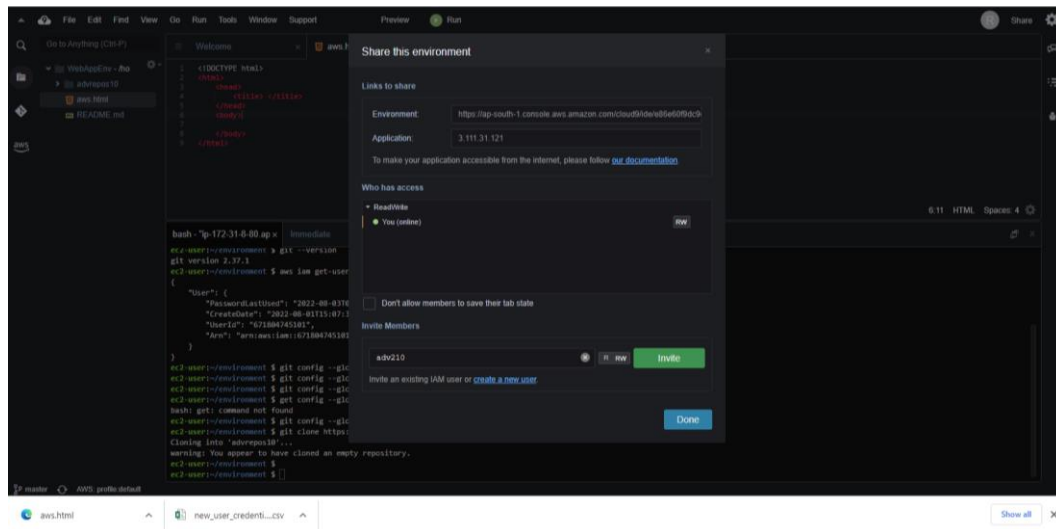

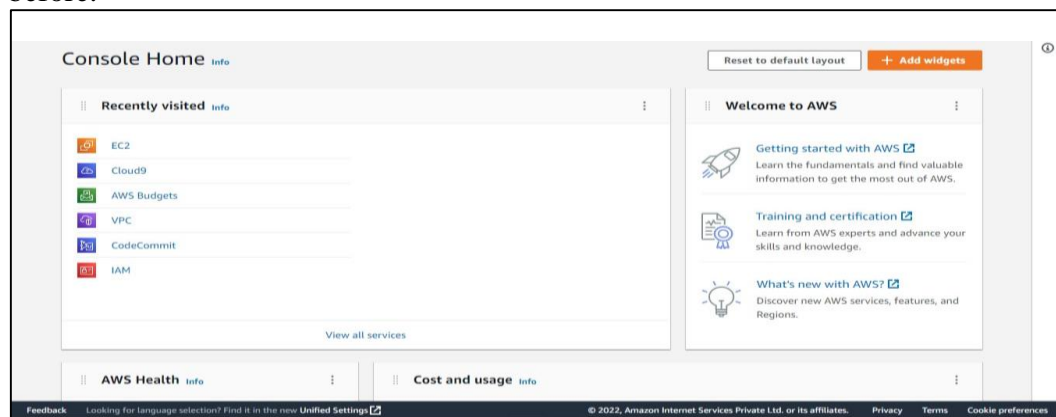- Click on create New User and follow the same steps to create the user.
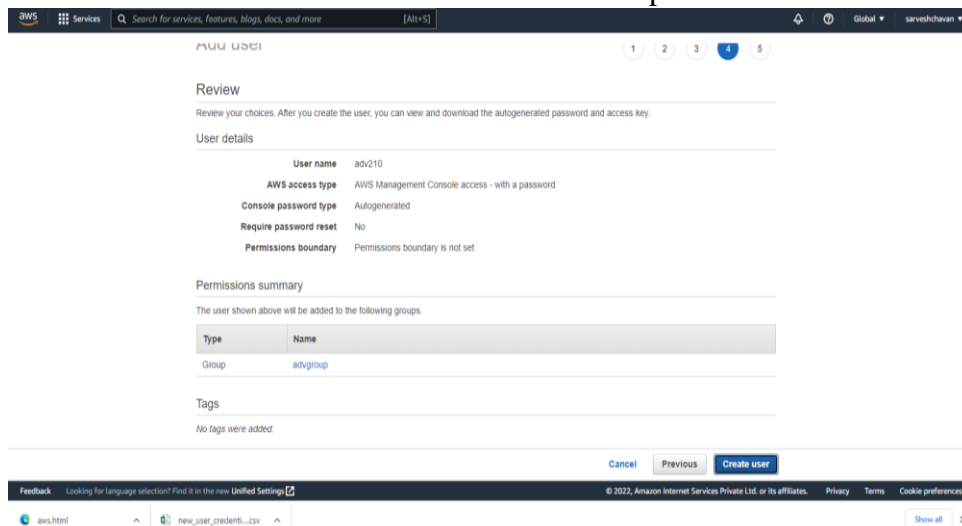
- Invite the new user by giving read and write permission and click on done. Click OK for security warning.

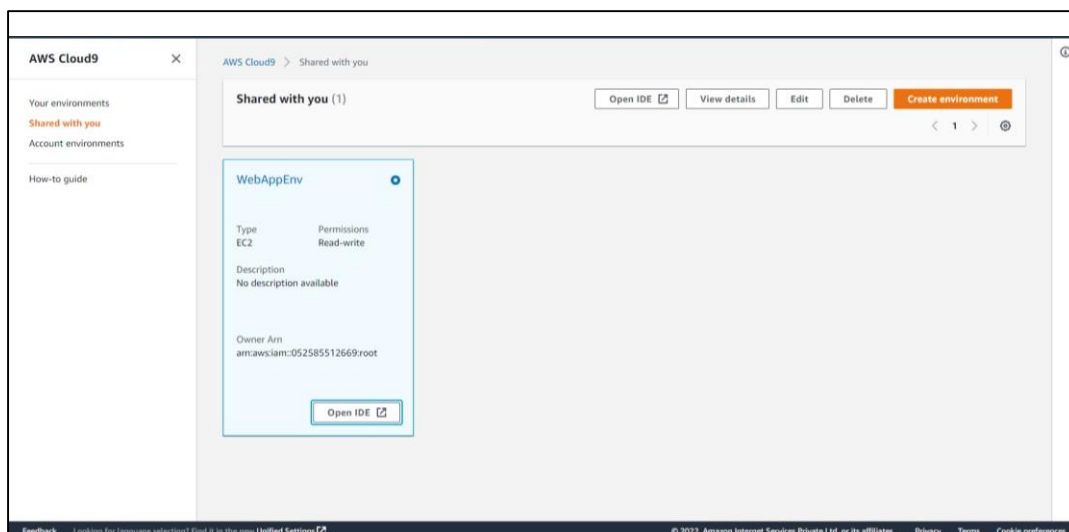- Now, open your browser incognito window and login with IAM user which you configured before.

- After successful login with IAM user. Open cloud9 service from dashboard services and click on share with you environment to collaborate.
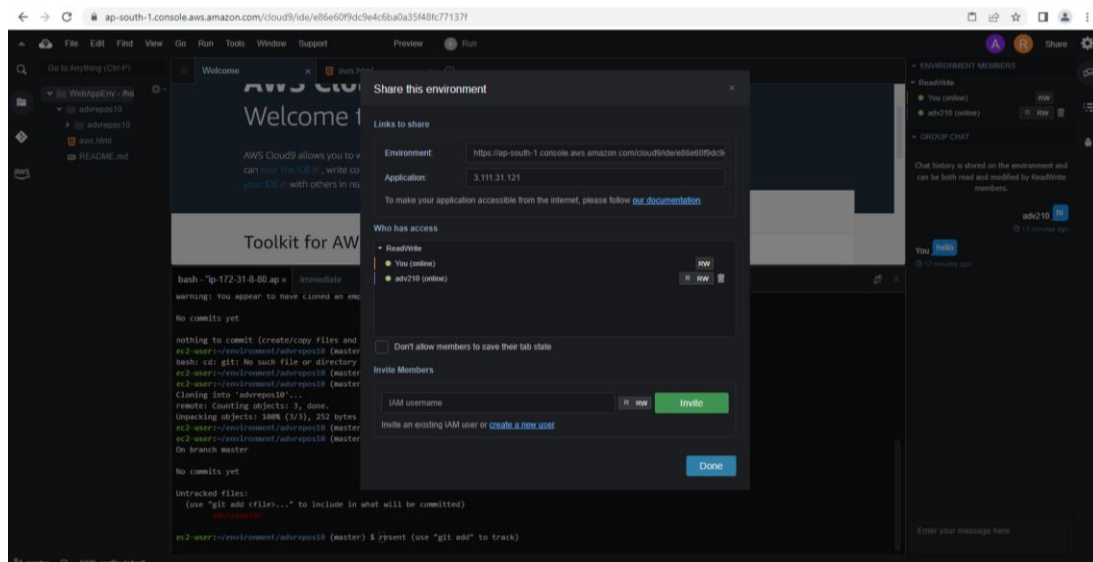
- Click on open IDE you will get same interface as your other member have to collaborate in real time, also all you in team can do group chats as shown below.
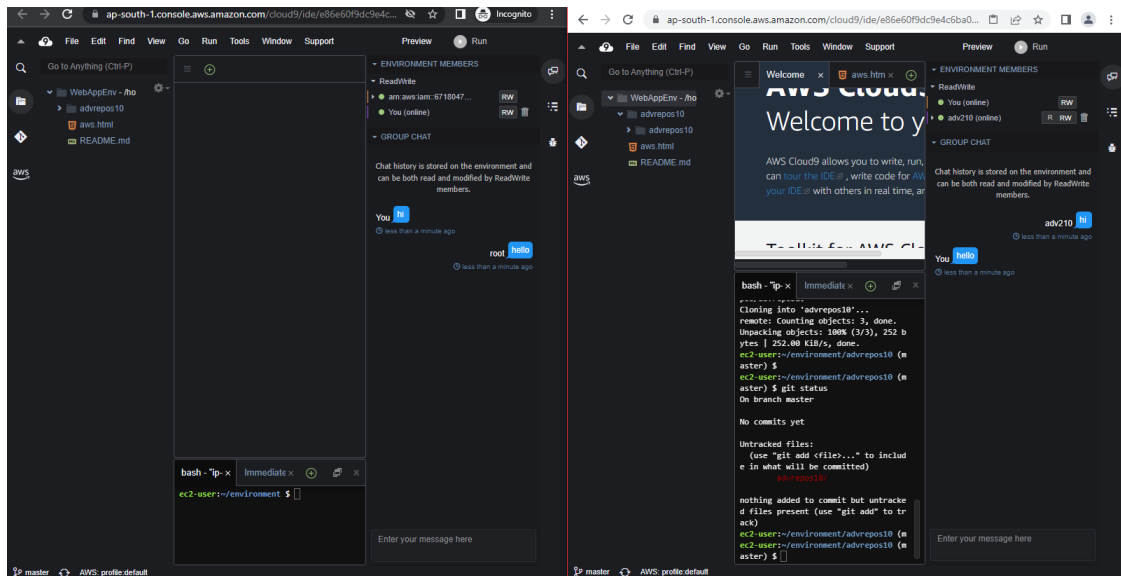
- You can also explore settings where you can update permission of your team members from read write to write only or and you can remove user too.

Conclusion:

From the above experiment I was able to explain the benefits of Cloud Infrastructure and Setup AWS Cloud9 IDE, Launch AWS Cloud9 IDE and Perform Collaboration Demonstration, thus achieving LO1.