Smart Text Extraction

Automated Extraction for Enhanced Insights

A report submitted in partial fulfillment of the requirements for the Award of Degree of

BACHELOR OF TECHNOLOGY

in

Information technology

By

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DEPARTMENT OF INFORMATION TECHNOLOGY

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CERTIFICATE

This is to certify that the Summer Internship Report titled “Smart Text Extraction:Automated Extraction for advanced Insights” is the bonafide work done by Mr. Mohammad Jabir bearing 20B91A12B8 at the end of third year second semester at Blackbuck Engineer Pvt Ltd from 5th June 2023 to 4th August 2023 in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science.

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Abstract

Automated Text Extraction is a cutting-edge technology that revolutionizes the process of extracting textual information from diverse sources. With the exponential growth of digital data in various formats, such as documents, images and multimedia content, there is a growing need to efficiently extract and analyze the textual content embedded within these sources. Traditional manual extraction methods are time-consuming, error-prone, and cannot handle the scale and complexity of modern data.

This project presents an advanced automated text extraction framework that leverages state-of-the-art machine learning and natural language processing techniques. By utilizing a combination of AWS services, including VPC, EC2, AWS Lambda, and AWS Glue, along with the advanced machine learning capabilities of Amazon Textract, this project automates the extraction of valuable text data from various file formats. The extracted data is transformed into machine-readable text and stored in AWS S3, while AWS Glue facilitates further data transformations and analysis. Smarttext Extraction empowers businesses with efficient and accurate information, enabling data-driven decision-making and unlocking hidden insights within documents.

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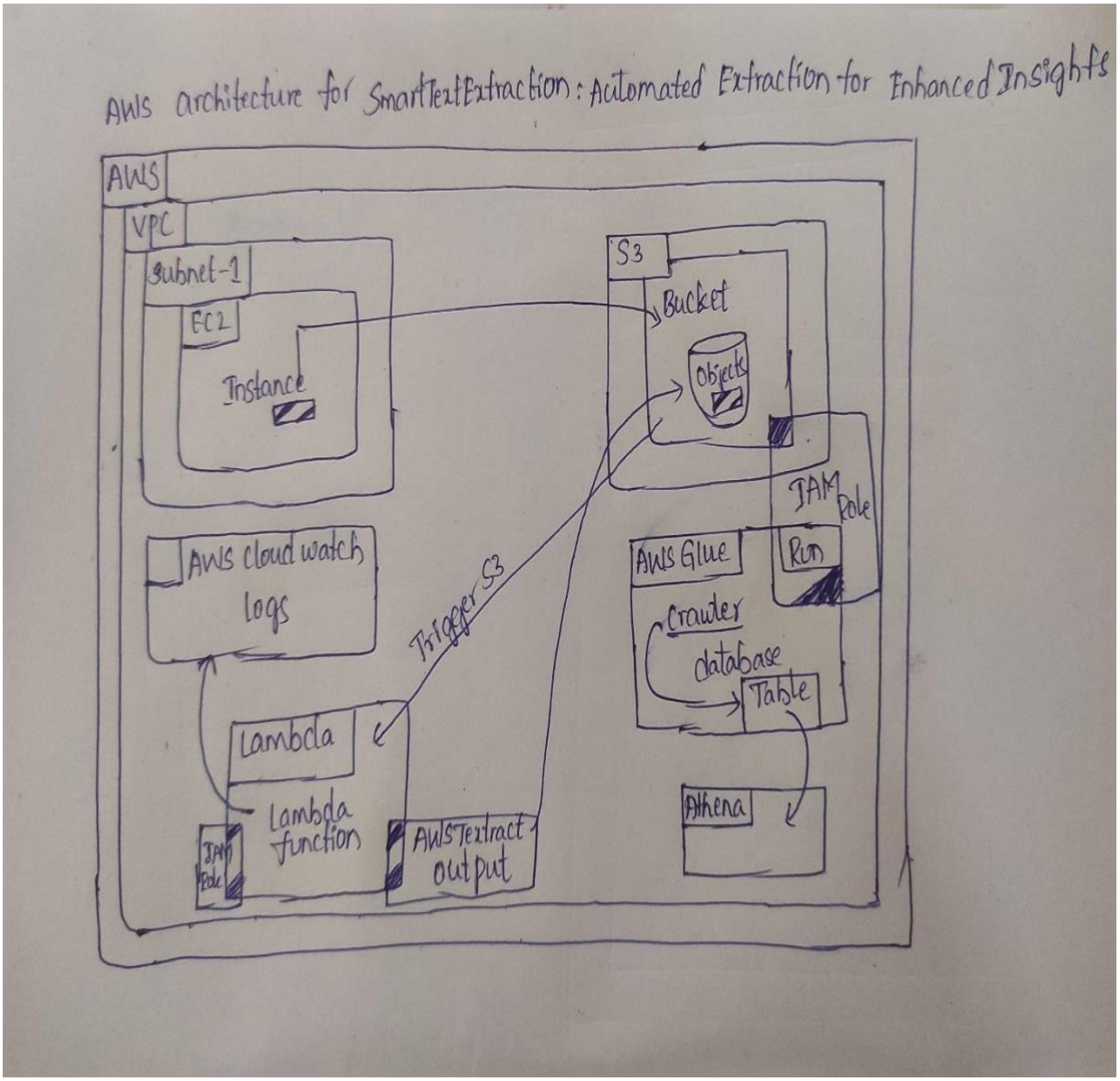
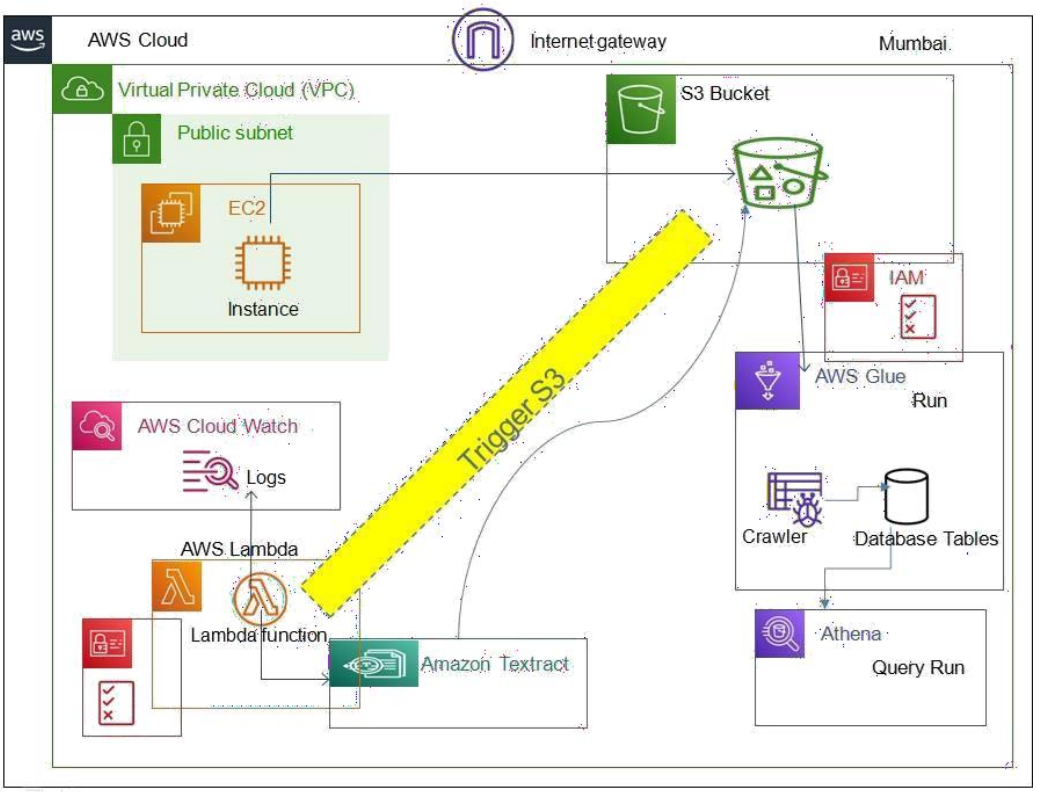
- AWS Lambda
- Amazon Textract
- AWS Glue
- AWS Athena

Rough architecture



Final architecture



Description

Smarttext Extraction is an innovative project that leverages the power of AWS services to automate the extraction of valuable insights from various types of documents. By utilizing a combination of VPC, EC2, AWS Lambda, and AWS Glue, we have created a seamless workflow for extracting and analyzing text data.At the core of our solution is Amazon Textract, a powerful machine learning service provided by AWS. Amazon Textract enables us to extract text and data from images, scanned documents, and other file formats. By harnessing the capabilities of Amazon Textract, we can efficiently process vast amounts of unstructured data and convert it into a structured format.

The extracted data is stored in AWS S3, providing a secure and scalable storage solution. Images and other file formats are transformed into machine-readable text, allowing for easier analysis and data manipulation. Additionally, the output from Amazon Textract is seamlessly integrated into AWS Glue tables, enabling further data transformations and analysis.

With Smarttext Extraction, businesses and organizations can unlock valuable insights hidden within their documents. By automating the extraction process, we eliminate the need for manual data entry and greatly improve efficiency. This project empowers decision-makers with timely and accurate information, enabling them to make data-driven decisions and gain a competitive edge.

Experience the power of Smarttext extraction and unleash the true potential of your document-based data.

Cloud Computing

A cloud provider, often known as CSP, manages a remote data center where applications, servers (both real and virtual), data storage, development tools, networking capabilities, and other computing resources are hosted. Cloud computing is the on- demand internet access to these resources. These materials are made available by the CSP in exchange for a monthly subscription fee or usage-based services.

Depending on the cloud services you choose and in comparison, to conventional on-premises IT, cloud computing aids in the following:

- **Lower IT expenses**: By using the cloud, you may outsource some or all of the expenses and labor associated with building, installing, configuring and maintaining your own on-premises infrastructure.
- **Boost agility and time-to-value:** By utilizing the cloud, your company may begin using corporate apps immediately rather of waiting weeks or months for IT to reply to a request, buy and setup supplementary hardware, and install software. Additionally, you may empower some users via the cloud, particularly engineers and data scientists.
- **Boost agility and time-to-value**: By utilizing the cloud, your company may begin using corporate apps immediately rather of waiting weeks or months for IT to reply to a request, buy and set up supplementary hardware, and install software. Additionally, you may empower some users via the cloud, particularly engineers and data scientists.
- **Scale more easily and affordably**: The cloud offers elasticity, allowing you to scale capacity up and down in response to spikes and dips in demand rather of purchasing extra capacity that sits idle during slack times. You may distribute your applications closer to users all over the world by utilizing the worldwide network of your cloud provider.

  The technology that makes clouds function is often referred to as "cloud computing." This comprises some type of virtualized IT infrastructure, such as servers, operating systems, networking, and other infrastructure that has been

abstracted using specialized software to allow pooling and dividing without regard to physical hardware limits. One hardware server, for instance, could be split up into several virtual servers.

Cloud Computing Services:

- IaaS (Infrastructure-as-a-Service)
- PaaS (Platform-as-a-Service)
- SaaS (Software-as-a-service)

IaaS (Infrastructure-as-a-Service)

IaaS provides on-demand access to fundamental computing resources—physical and virtual servers, networking, and storage—over the internet on a pay-as-you-go basis. IaaS enables end users to scale and shrink resources on an as-needed basis, reducing the need for high, up-front capital expenditures or unnecessary on-premises or 'owned' infrastructure and for overbuying resources to accommodate periodic spikes in usage.

In contrast to SaaS and PaaS (and even newer PaaS computing models such as containers and serverless), IaaS provides the users with the lowest-level control of computing resources in the cloud.IaaS was the most popular cloud computing model when it emerged in the early 2010s. While it remains the cloud model for many types of workloads, use of SaaS and PaaS is growing at a muchfaster rate.

PaaS (Platform-as-a-service)

PaaS provides software developers with on-demand platform—hardware, complete software stack, infrastructure, and even development tools—for running, developing, and managing applications without the cost, complexity, and inflexibility of maintaining that platform on-premises.

With PaaS, the cloud provider hosts everything—servers, networks, storage, operating system software, middleware, databases—at their data center. Developers simply pick from a menu to 'spin up' servers and environments they need to run, build, test, deploy, maintain, update, and scale applications.
Today, PaaS is often often built around *containers*, a virtualized compute model one step removed from virtual servers. containers virtualize the operating system, enabling developers to package the application with only the operating system services it needs to run on any platform, without modification and without need for middleware.

SaaS (Software-as-a-Service)

SaaS—also known as cloud-based software or cloud applications—is application software that's hosted in the cloud, and that user's access via a web browser, a dedicated desktop client, or an API that integrates with a desktop or mobile operating system. In most cases, SaaS users pay a monthly or annual subscription fee; some may offer 'pay-as-you-go' pricing based on your actual usage.

In addition to the cost savings, time-to-value, and scalability benefits of cloud, SaaS offers the following:

- **Automatic upgrades:** With SaaS, users take advantage of new features as soon as the provider adds them, without having to orchestrate an on-premises upgrade.
- **Protection from data loss:** Because SaaS stores application data in the cloud with the application, users don't lose data if their device crashes or breaks.

SaaS is the primary delivery model for most commercial software today—there are hundreds of thousands of SaaS solutions available, from the most focused industry and departmental applications to powerful enterprise software database and AI (artificial intelligence) software.

Cloud Service Providers

- Amazon Web Services
- Microsoft Azure
- Google Cloud Platform
- Oracle
- IBM cloud
- Salesforce
-

Amazon Web Services

Amazon Web Services, Inc. (AWS) is a subsidiary of Amazon that provides on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered, pay-as-you-go basis. Oftentimes, clients will use this in combination with autoscaling (a process that allows a client to use more computing in times of high application usage, and then scale down to reduce costs when there is less traffic). These cloud computing web services provide various services related to networking, computing, storage, middleware, IoT and other processing capacity, as well as software tools via AWS server farms. This frees clients from managing, scaling, and patching hardware, and operating systems.

One of the foundational services is Amazon Elastic Compute Cloud (EC2), which allows users to have at their disposal a virtual cluster of computers, with extremely high availability, which can be interacted with over the internet via REST APIs, a CLI or the AWS console. AWS's virtual computers emulate most of the attributes of a real computer, including hardware central processing units (CPUs) and graphics processing units (GPUs) for processing; local/RAM memory; hard disk /SSD storage; a choice of operating systems; networking; and pre-loaded application software such as web servers, databases, and customer relationship management (CRM).

AWS services are delivered to customers via a network of AWS server farms located throughout the world. Fees are based on a combination of usage (known as a "Pay-as-you-go" model), hardware, operating system, software, or networking features chosen by the subscriber required availability, redundancy, security, and service options. Subscribers can pay for a single virtual AWS computer, a dedicated physical computer, or clusters of either.

Amazon provides select portions of security for subscribers (e.g., physical security of the data centers) while other aspects of security are the responsibility of the subscriber (e.g., account management, vulnerability scanning, patching). AWS operates for many global geographical regions including seven in North America.

Amazon markets AWS to subscribers as a way of obtaining large-scale computing capacity more quickly and cheaply than building an actual physical server farm. All services are billed based on usage, but each service measures usage in varying ways. As of 2021 Q4, AWS has 33% market share for cloud infrastructure while the next two competitors Microsoft Azure and Google Cloud have 21%, and 10% respectively, according to Synergy Group.

Why AWS?

- **Easy to use:**
  AWS is designed to allow application providers, ISVs, and vendors to host your applications quickly and securely – whether an existing application or a new SaaS-based application. You can use the AWS Management Console or well-documented web services APIs to access AWS's application hosting platform**.**
- **Flexible:**
  AWS enables you to select the operating system, programming language, web application platform, database, and other services you need. With AWS, you receive a virtual environment that lets you load the software and services your application requires. This eases the migration process for existing applications while preserving options for building new solutions.
- **Cost-effective:**
  You pay only for the compute power, storage, and other resources you use, with no long-term contracts or up-front commitments. For more information on comparing the costs of other hosting alternatives with AWS, see the AWS Economics Center.
- **Reliable:**
  With AWS, you take advantage of a scalable, reliable, and secure global computing infrastructure, the virtual backbone of Amazon.com's multi-billion-dollar online business that has been honed for over a decade**.**
- **Scalable and High performance:**
  Using AWS tools, Auto Scaling, and Elastic Load Balancing, your application can scale up or down based on demand. Backed by Amazon's massive infrastructure, you have access to compute and storage resources when you need them.
- **Secure:**
  Using AWS tools, Auto Scaling, and Elastic Load Balancing, your application can scale up or down based on demand. Backed by Amazon's massive infrastructure, you have access to compute and storage resources when you need them.

List of AWS Services

Amazon, the preeminent cloud vendor, broke new ground by establishing the first cloud computing service, Amazon EC2, in 2008. AWS offers more solutions and features than any other provider and has free tiers with access to the AWS Console, where users can centrally control their ministrations.

Designed around ease-of-use for various skill sets, AWS is tailored for those unaccustomed to software development utilities. Web applications can be deployed in minutes with AWS facilities, without provisioning servers or writing additional code.

- Amazon EC2 (Elastic Compute Cloud)
- Amazon RDS (Relational Database Services)
- Amazon S3 (Simple Storage Service)
- Amazon Lambda
- Amazon Cognito
- Amazon Glacier
- Amazon SNS (Simple Notification Service)
- Amazon VPC (Virtual Private Cloud)
- Amazon Lightsail
- Amazon CloudWatch
- Amazon Cloud9
- Amazon Elastic Beanstalk
- Amazon CodeCommit
- Amazon IAM (Identity and Access Management)
- Amazon Inspector
- Amazon Kinesis
- Amazon Dynamo DB
- Amazon Codecatalyst
- Amazon Kinesis
- AWS Athena
- AWS Amplify
- AWS Quicksight
- AWS Cloudformation

Amazon EC2

Amazon Elastic Compute Cloud (EC2) is a part of Amazon.com's cloud-computing platform, Amazon Web Services (AWS), that allows users to rent virtual computers on which to run their own computer applications. EC2 encourages scalable deployment of applications by providing a web service through which a user can boot an Amazon Machine Image (AMI) to configure a virtual machine, which Amazon calls an "instance", containing any software desired. A user can create, launch, and terminate server-instances as needed, paying by the second for active servers – hence the term "elastic". EC2 provides users with control over the geographical location of instances that allows for latency optimization and high levels of redundancy. In November 2010, Amazon switched its own retail website platform to EC2 and AWS.

Amazon announced a limited public beta test of EC2 on August 25, 2006, offering access on a first-come, first-served basis. Amazon added two new instance types (Large and Extra-Large) on October 16, 2007. On May 29, 2008, two more types were added, High-CPU Medium and High-CPU Extra Large. There were twelve types of instances available.

Amazon added three new features on March 27, 2008, static IP addresses, availability zones, and user selectable kernels. On August 20, 2008, Amazon added Elastic Block Store (EBS) This provides persistent storage, a feature that had been lacking since the service was introduced.

Instance types:

Initially, EC2 used Xen virtualization exclusively. However, on November 6, 2017, Amazon announced the new C5 family of instances that were based on a custom architecture around the KVM hypervisor, called Nitro. Each virtual machine, called an "instance", functions as a virtual private server. Amazon sizes instances based on "Elastic Compute Units". The performance of otherwise identical virtual machines may vary. On November 28, 2017, AWS announced a bare-metal instance type offering marking a remarkable departure from exclusively offering virtualized instance types.

As of January 2019, the following instance types were offered:

- General Purpose: A1, T3, T2, M5, M5a, M4, T3a
- Compute Optimized: C5, C5n, C4
- Memory Optimized: R5, R5a, R4, X1e, X1, High Memory, z1d
- Accelerated Computing: P3, P2, G3, F1
- Storage Optimized: H1, I3, D2

As of April 2018, the following payment methods by instance were offered:

- On-demand: pay by the hour without commitment.
- Reserved: rent instances with one-time payment receiving discounts on the hourly charge.
- Spot: bid-based service runs the jobs only if the spot price is below the bid specified by bidder. The spot price is claimed to be supply-demand based, however a 2011 study concluded that the price was generally not set to clear the market but was dominated by undisclosed reserve price.

Amazon RDS

Amazon Relational Database Service (or **Amazon RDS**) is a distributed relational database service by Amazon Web Services (AWS). It is a web service running "in the cloud" designed to simplify the setup, operation, and scaling of a relational database for use in applications. Administration processes like patching the database software, backing up databases and enabling point-in-time recovery are managed automatically. Scaling storage and compute resources can be performed by a single API call to the AWS control plane on-demand. AWS does not offer an SSH connection to the underlying virtual machine as part of the managed service.

Multiple Availability Zone (AZ) Deployment

In May 2010 Amazon announced Multi-Availability Zone deployment support. Amazon RDS Multi-Availability Zone (AZ) allows users to automatically provision and maintain a synchronous physical or logical "standby" replica, depending on database engine, in a different Availability Zone (independent infrastructure in a physically separate location). Multi-AZ database instance can be developed at creation time or modified to run as a multi-AZ deployment later. Multi-AZ deployments aim to provide enhanced availability and data durability for MySQL, MariaDB, Oracle, PostgreSQL and SQL Server instances and are targeted for production environments. In the event of planned database maintenance or unplanned service disruption, Amazon RDS automatically fails over to the up-to-date standby, allowing database operations to resume without administrative intervention.

Multi-AZ RDS instances are optional and have a cost associated with them. When creating a RDS instance, the user is asked if they would like to use a multi-AZ RDS instance. In Multi-AZ RDS deployments backups are done in the standby instance so I/O activity is not suspended any time, but users may experience elevated latencies for a few minutes during backups.

Read replicas.

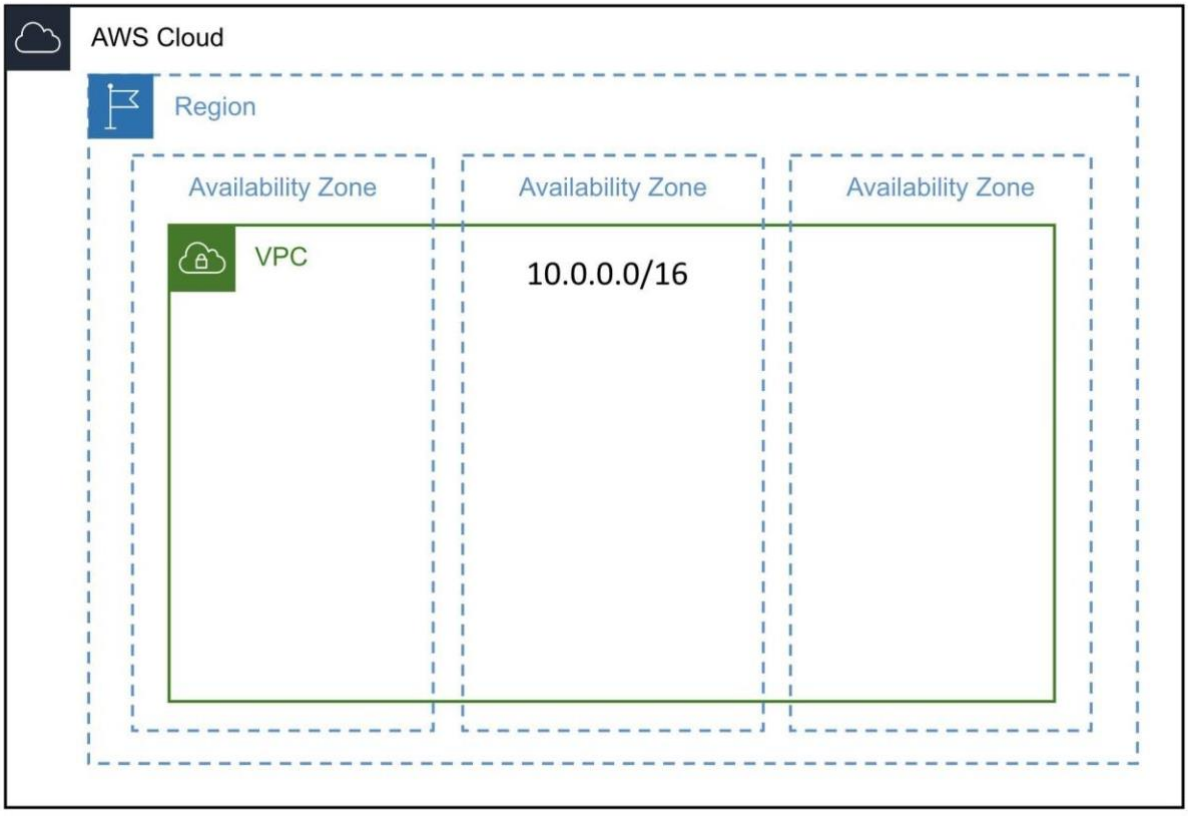
Read replicas allow different use cases such as scale in for read-heavy database workloads. There are up to five replicas available for MySQL, MariaDB, and PostgreSQL. Instances use the native, asynchronous replication functionality of their respective database engines. They have no backups configured by default and are accessible and can be used for read scaling. MySQL and MariaDB read replicas and can be made writeable again since October 2012; PostgreSQL read replicas do not support it. Replicas are done at database instance level and do not support replication at database or table level.

Performance metrics and monitoring

Performance metrics for Amazon RDS are available from the AWS Management Console or the Amazon CloudWatch API. In December 2015, Amazon announced an optional enhanced monitoring feature that provides an expanded set of metrics for the MySQL, MariaDB, and Aurora database engines.

Amazon VPC

Amazon Virtual Private Cloud (VPC) is a commercial cloud computing service that provides a virtual private cloud, by provisioning a logically isolated section of Amazon Web Services (AWS) Cloud. Enterprise customers are able to access the Amazon Elastic Compute Cloud (EC2) over an IPsec based virtual private network. Unlike traditional EC2 instances which are allocated internal and external IP numbers by Amazon, the customer can assign IP numbers of their choosing from one or more subnets.



Amazon Web Services launched Amazon Virtual Private Cloud on 26 August 2009, which allows the Amazon Elastic Compute Cloud service to be connected to legacy infrastructure over an IPsec VPN.In AWS, the basic VPC is free to use, with users being charged by usage for additional features.EC2 and RDS instances running in a VPC can also be purchased using Reserved Instances, however will have a limitation on resources being guaranteed.[citation needed]

IBM Cloud launched IBM Cloud VPC on 4 June 2019, provides an ability to manage virtual machine-based compute, storage, and networking resources. Pricing for IBM Cloud Virtual Private Cloud is applied separately for internet data transfer, virtual server instances, and block storage used within IBM Cloud VPC.

Google Cloud Platform resources can be provisioned, connected, and isolated in a virtual private cloud (VPC) across all GCP regions. With GCP, VPCs are global resources and subnets within that VPC are regional resources. This allows users to connect zones and regions without the use of additional networking complexity as all data travels, encrypted in transit and at rest, on Google's

own global, private network. Identity management policies and security rules allow for private access to Google's storage, big data, and analytics managed services. VPCs on Google Cloud Platform leverage the security of Google's data centers.

Amazon S3

Amazon S3 manages data with an object storage architecture which aims to provide scalability, high availability, and low latency with high durability. The basic storage units of Amazon S3 are objects which are organized into buckets. Each object is identified by a unique, user-assigned key. Buckets can be managed using the console provided by Amazon S3, programmatically with the AWS SDK, or the REST application programming interface.

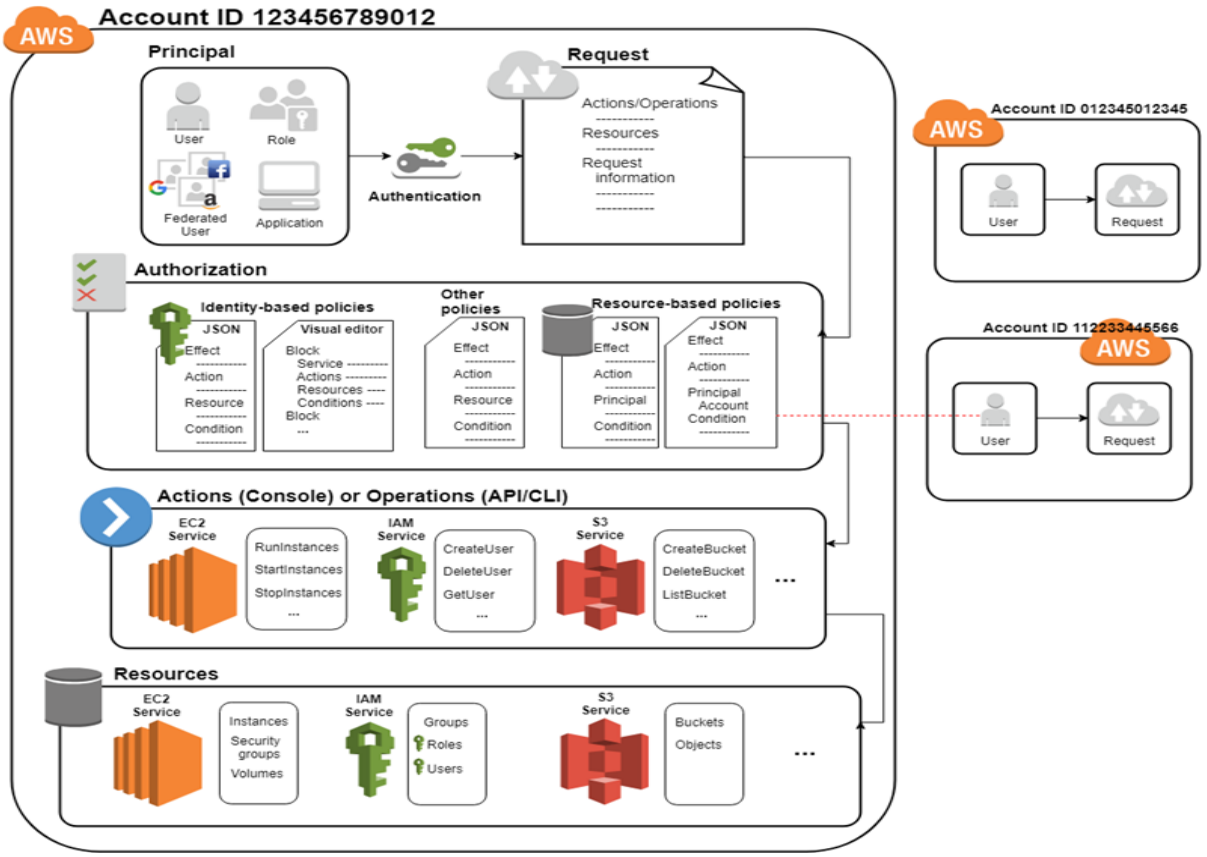
Objects can be up to five terabytes in size. Requests are authorized using an access control list associated with each object bucket and support versioning which is disabled by default. Since buckets are typically the size of an entire file system mount in other systems, this access control scheme is very coarse-grained. In other words, unique access controls cannot be associated with individual files. [citation needed] Amazon S3 can be used to replace static web-hosting infrastructure with HTTP client-accessible objects, index document support and error document support.

The Amazon AWS authentication mechanism allows the creation of authenticated URLs, valid for a specified amount of time. Every item in a bucket can also be served as a BitTorrent feed. The Amazon S3 store can act as a seed host for a torrent and any BitTorrent client can retrieve the file. This can drastically reduce the bandwidth cost for the download of popular objects. A bucket can be configured to save HTTP log information to a sibling bucket; this can be used in data mining operations.

There are various User Mode File System (FUSE)–based file systems for Unix-like operating systems (for example, Linux) that can be used to mount an S3 bucket as a file system. The semantics of the Amazon S3 file system is not that of a POSIX file system, so the file system may not behave entirely as expected.

Amazon IAM

IAM provides the infrastructure necessary to control authentication and authorization foryour AWS account. The IAM infrastructure is illustrated by the following diagram.



First, a human user or an application uses their sign-in credentials to authenticate with AWS. Authentication is provided by matching the sign-in credentials to a principal (an IAM user, federated user, IAM role, or application) trusted by the AWS account.

Next, a request is made to grant the principal access to resources. Access is granted in response to an authorization request. For example, when you first sign into the console and are on the console home page, you are not accessing a specific service. When you select a service, the request for authorization is sent to that service and it looks to see if your identity is on the list of authorized users, what policies are being enforced to control the level of access granted, and any other policies that might be in effect. Authorization requests can be made by principals within your AWS account or from another AWS account that you trust.

Once authorized, the principal can take action or perform operations on resources in your AWS account. For example, the principal could launch a new Amazon Elastic Compute Cloud instance, modify IAM group membership, or delete Amazon Simple Storage Service buckets.

The previous illustration we used specific terminology to describe how to obtain access to resources. These IAM terms are commonly used when working with AWS

IAM Resources

: The user, group, role, policy, and identity provider objects that are stored in IAM. As with other AWS services, you can add, edit, and remove resources from IAM.

IAM Identities

: The IAM resource objects that are used to identify and group. You can attach a policy to an IAM identity. These include users, groups, and roles.

IAM Entities

: The IAM resource objects that AWS uses for authentication. These include IAM users and roles.

Principals

: A person or application that uses the AWS account root user, an IAM user, or an IAM role to sign in and make requests to AWS. Principals include federated users and assumed roles.

Human users

: Also known as human identities; the people, administrators, developers, operators, and consumers of your applications.

Workload

: A collection of resources and code that delivers business value, such as an application or backend process. Can include applications, operational tools, and components

AWS Lambda

AWS Lambda is a compute service that lets you run code without provisioning or managing servers. Lambda runs your code on a high-availability compute infrastructure and performs all of the administration of the compute resources, including server and operating system maintenance, capacity provisioning and automatic scaling, and logging. With Lambda, all you need to do is supply your code in one of the language runtimes that Lambda supports.

You organize your code into Lambda functions. The Lambda service runs your function only when needed and scales automatically. You only pay for the compute time that you consume—there is no charge when your code is not running.

When using Lambda, you are responsible only for your code. Lambda manages the compute fleet that offers a balance of memory, CPU, network, and other resources to run your code. Because Lambda manages these resources, you cannot log in to compute instances or customize the operating system on provided runtimes.

Lambda performs operational and administrative activities on your behalf, including managing capacity, monitoring, and logging your Lambda functions.

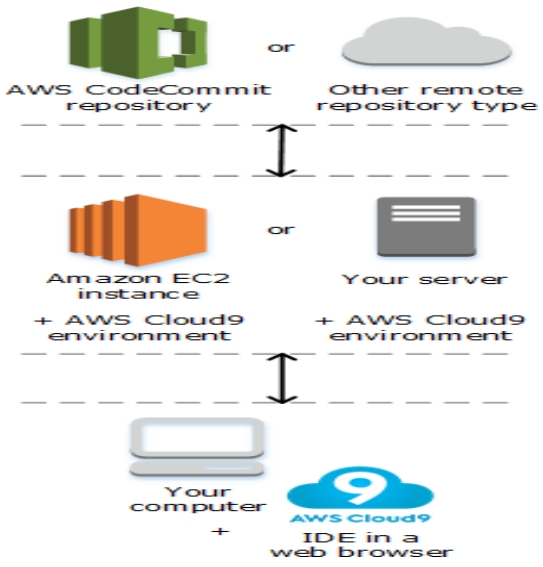
If you do need to manage your compute resources, AWS has other compute services to consider, such as:

- AWS App Runner builds and deploys containerized web applications automatically, load balances traffic with encryption, scales to meet your traffic needs, and allows for the configuration of how services are accessed and communicate with other AWS applications in a private Amazon VPC.
- AWS Fargate with Amazon ECS runs containers without having to provision, configure, or scale clusters of virtual machines.
- Amazon EC2 lets you customize operating system, network and security settings, and the entire software stack. You are responsible for provisioning capacity, monitoring fleet health and performance, and using Availability Zones for fault tolerance.

You can use environment variables to adjust your function's behavior without updating code. An environment variable is a pair of strings that is stored in a function's version-specific configuration. The Lambda runtime makes environment variables available to your code and sets additional environment variables that contain information about the function and invocation request.

AWS Cloud9

AWS Cloud9 is an integrated development environment, or *IDE*.
The AWS Cloud9 IDE offers a rich code-editing experience with support for several programming languages and runtime debuggers, and a built-in terminal. It contains a collection of tools that you use to code, build, run, test, and debug software, and helps you release software to the cloud.
You access the AWS Cloud9 IDE through a web browser. You can configure the IDE to your preferences. You can switch color themes, bind shortcut keys, enable programming language-specific syntax coloring and code formatting, and more.



Environments and computing resources

Behind the scenes, there are a couple of ways you can connect your environments to computing resources:

- You can instruct AWS Cloud9 to create an Amazon EC2 instance, and then connect the environment to that newly created EC2 instance. This type of setup is called an *EC2 environment.*
- You can instruct AWS Cloud9 to connect an environment to an existing cloud compute instance or to your own server. This type of setup is called an *SSH environment.*

EC2 environments and SSH environments have some similarities and some differences. If you're new to AWS Cloud9, we recommend that you use an EC2 environment because AWS Cloud9 takes care of much of the configuration for you. As you learn more about AWS Cloud9, and want to understand these similarities and differences better, see EC2 environments compared with SSH environments in AWS Cloud9.

AWS Elastic BeanStalk

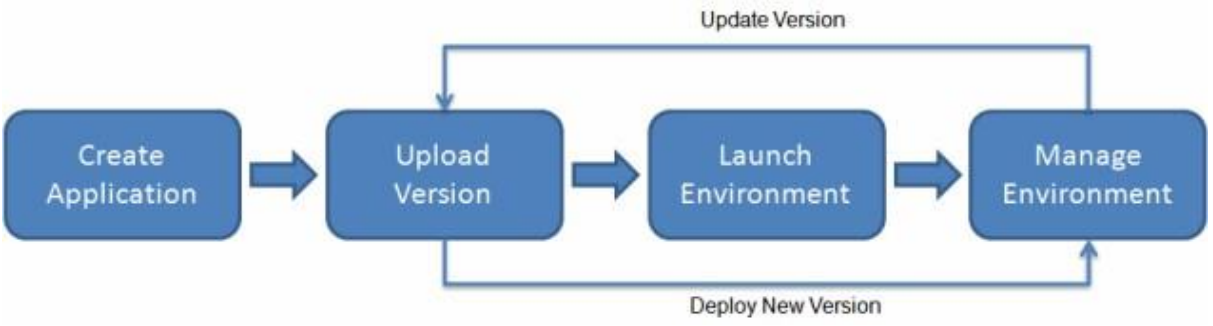
Amazon Web Services (AWS) comprises over one hundred services, each of which exposes an area of functionality. While the variety of services offers flexibility for how you want to manage your AWS infrastructure, it can be challenging to figure out which services to use and how to provision them.

With Elastic Beanstalk, you can quickly deploy and manage applications in the AWS Cloud without having to learn about the infrastructure that runs those applications. Elastic Beanstalk reduces management complexity without restricting choice or control. You simply upload your application, and Elastic Beanstalk automatically handles the details of capacity provisioning, load balancing, scaling, and application health monitoring.

Elastic Beanstalk supports applications developed in Go, Java, .NET, Node.js, PHP, Python, and Ruby. When you deploy your application, Elastic Beanstalk builds the selected supported platform version and provisions one or more AWS resources, such as Amazon EC2 instances, to run your application.You can interact with Elastic Beanstalk by using the Elastic Beanstalk console, the AWS Command Line Interface (AWS CLI), or **eb**, a high-level CLI designed specifically for Elastic Beanstalk.

To learn more about how to deploy a sample web application using Elastic Beanstalk, see Getting Started with AWS: Deploying a Web App.You can also perform most deployment tasks, such as changing the size of your fleet of Amazon EC2 instances or monitoring your application, directly from the Elastic Beanstalk web interface (console).

To use Elastic Beanstalk, you create an application, upload an application version in the form of an application source bundle (for example, a Java .war file) to Elastic Beanstalk, and then provide some information about the application. Elastic Beanstalk automatically launches an environment and creates and configures the AWS resources needed to run your code. After your environment is launched, you can then manage your environment and deploy new application versions. The following diagram illustrates the workflow of Elastic Beanstalk.

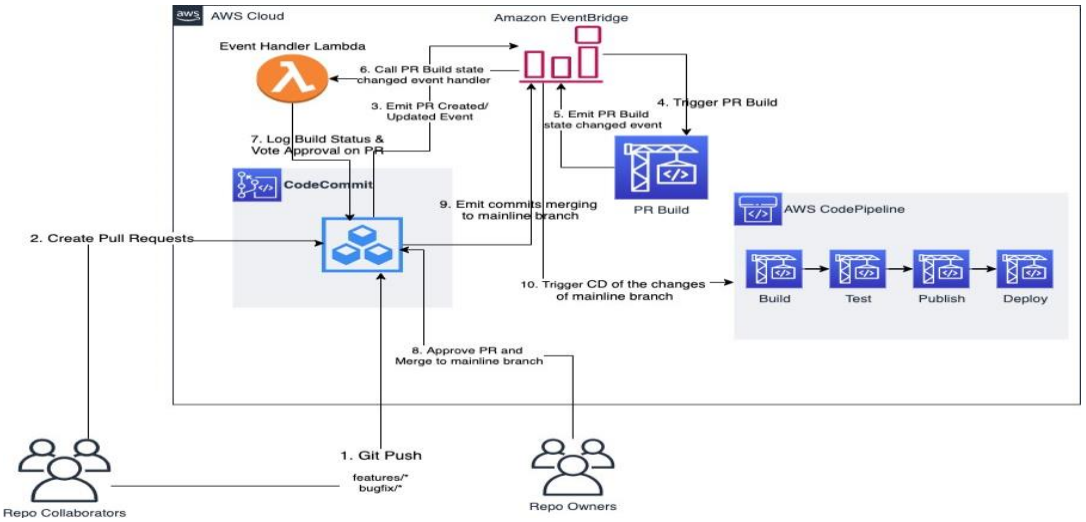


AWS CodeCommit

CodeCommit is a secure, highly scalable, managed source control service that hosts private Git repositories. CodeCommit eliminates the need for you to manage your own source control system or worry about scaling its infrastructure. You can use CodeCommit to store anything from code to binaries. It supports the standard functionality of Git, so it works seamlessly with your existing Git-based tools.

With CodeCommit, you can:

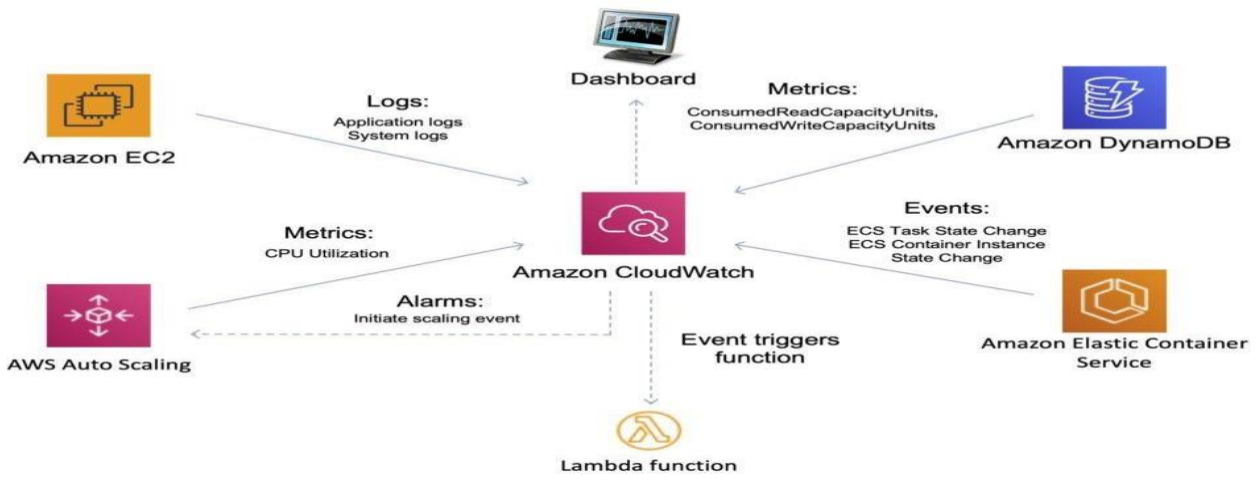
- **Benefit from a fully managed service hosted by AWS**. CodeCommit provides high service availability and durability and eliminates the administrative overhead of managing your own hardware and software. There is no hardware to provision and scale and no server software to install, configure, and update.
- **Store your code securely**. CodeCommit repositories are encrypted at rest as well as in transit.
- **Work collaboratively on code.** CodeCommit repositories support pull requests, where users can review and comment on each other's code changes before merging them to branches; notifications that automatically send emails to users about pull requests and comments; and more.
- **Easily scale your version control projects**. CodeCommit repositories can scale up to meet your development needs. The service can handle repositories with large numbers of files or branches, large file sizes, and lengthy revision histories.
- **Store anything, anytime**. CodeCommit has no limit on the size of your repositories or on the file types you can store.
- **Integrate with other AWS and third-party services**. CodeCommit keeps your repositories close to your other production resources in the AWS Cloud, which helps increase the speed and frequency of your development lifecycle. It is integrated with IAM and can be used with other AWS services and in parallel with other repositories. For more information, see Product and service integrations with AWS CodeCommit.
- **Easily migrate files from other remote repositories**. You can migrate to CodeCommit from any Git-based repository.
- **Use the Git tools you already know**. CodeCommit supports Git commands as well as its own AWS CLI commands and APIs.



Amazon CloudWatch

Amazon CloudWatch monitors your Amazon Web Services (AWS) resources and the applications you run on AWS in real time. You can use CloudWatch to collect and track metrics, which are variables you can measure for your resources and applications.The CloudWatch home page automatically displays metrics about every AWS service you use. You can additionally create custom dashboards to display metrics about your custom applications and display custom collections of metrics that you choose.

You can create alarms that watch metrics and send notifications or automatically make changes to the resources you are monitoring when a threshold is breached. For example, you can monitor the CPU usage and disk reads and writes of your Amazon EC2 instances and then use that data to determine whether you should launch additional instances to handle increased load. You can also use this data to stop underused instances to save money.With CloudWatch, you gain system-wide visibility into resource utilization, application performance, and operational health.



Amazon EBS (Elastic Block Store)

Amazon Elastic Block Store (Amazon EBS) provides block level storage volumes for use with EC2 instances. EBS volumes behave like raw, unformatted block devices. You can mount these volumes as devices on your instances. EBS volumes that are attached to an instance are exposed as storage volumes that persist independently from the life of the instance. You can create a file system on top of these volumes or use them in any way you would use a block device (such as a hard drive). You can dynamically change the configuration of a volume attached to an instance.

We recommend Amazon EBS for data that must be quickly accessible and requires long-term persistence. EBS volumes are particularly well-suited for use as the primary storage for file systems, databases, or for any applications that require fine granular updates and access to raw, unformatted, block-level storage. Amazon EBS is well suited to both database-style applications that rely on random reads and writes, and to throughput-intensive applications that perform long, continuous reads and writes.

With Amazon EBS, you pay only for what you use. For more information about Amazon EBS pricing, see the Projecting Costs Section of the Amazon Elastic Block Store page.

Features of Amazon EBS

- You create an EBS volume in a specific Availability Zone, and then attach it to an instance in that same Availability Zone. To make a volume available outside of the Availability Zone, you can create a snapshot and restore that snapshot to a new volume anywhere in that Region. You can copy snapshots to other Regions and then restore them to new volumes there, making it easier to leverage multiple AWS Regions for geographical expansion, data center migration, and disaster recovery.

- Amazon EBS provides the following volume types: General Purpose SSD, Provisioned IOPS SSD, Throughput Optimized HDD, and Cold HDD. For more information, see EBS volume types.
  The following is a summary of performance and use cases for each volume type.
  - General Purpose SSD volumes (gp2 and gp3) balance price and performance for a wide variety of transactional workloads. These volumes are ideal for use cases such as boot volumes, medium-size single instance databases, and development and test environments.
  - Provisioned IOPS SSD volumes (io1 and io2) are designed to meet the needs of I/O-intensive workloads that are sensitive to storage performance and consistency. They provide a consistent IOPS rate that you specify when you create the volume. This enables you to predictably scale to tens of thousands of IOPS per instance. Additionally, io2 volumes provide the highest levels of volume durability.
  - Throughput Optimized HDD volumes (st1) provide low-cost magnetic storage that defines performance in terms of throughput rather than IOPS. These volumes are ideal for large, sequential workloads such as Amazon EMR, ETL, data warehouses, and log processing.

- Cold HDD volumes (sc1) provide low-cost magnetic storage that defines performance in terms of throughput rather than IOPS. These volumes are ideal for large, sequential, cold-data workloads. If you require infrequent access to your data and are looking to save costs, these volumes provide inexpensive block storage.

- You can create your EBS volumes as encrypted volumes, in order to meet a wide range of data-at-rest encryption requirements for regulated/audited data and applications. When you create an encrypted EBS volume and attach it to a supported instance type, data stored at rest on the volume, disk I/O, and snapshots created from the volume are all encrypted. Encryption occurs on the servers that host EC2 instances, providing encryption of data-in-transit from EC2 instances to EBS storage. For more information, see Amazon EBS encryption.

- Performance metrics, such as bandwidth, throughput, latency, and average queue length, are available through the AWS Management Console. These metrics, provided by Amazon CloudWatch, allow you to monitor the performance of your volumes to make sure that you are providing enough performance for your applications without paying for resources you don't need.

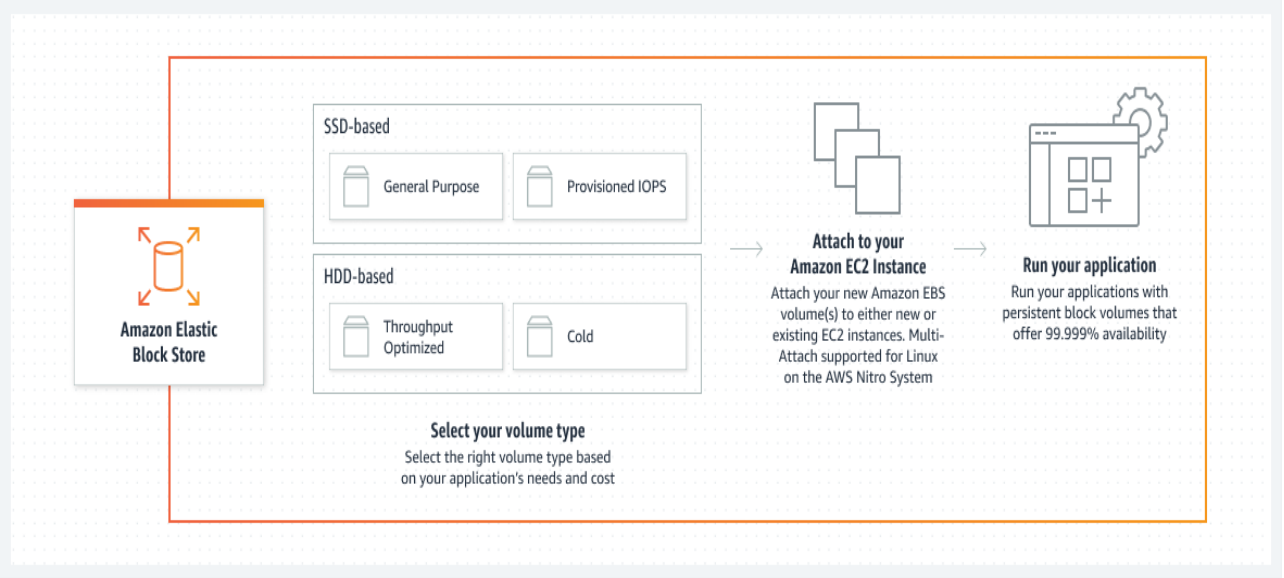


Fig. High-Performance Block Storage

Amazon Aurora

Amazon Aurora (Aurora) is a fully managed relational database engine that's compatible with MySQL and PostgreSQL. You already know how MySQL and PostgreSQL combine the speed and reliability of high-end commercial databases with the simplicity and cost-effectiveness of open-source databases. The code, tools, and applications you use today with your existing MySQL and PostgreSQL databases can be used with Aurora. With some workloads, Aurora can deliver up to five times the throughput of MySQL and up to three times the throughput of PostgreSQL without requiring changes to most of your existing applications.

Aurora includes a high-performance storage subsystem. Its MySQL- and PostgreSQL-compatible database engines are customized to take advantage of that fast distributed storage. The underlying storage grows automatically as needed. An Aurora cluster volume can grow to a maximum size of 128 tebibytes (TiB). Aurora also automates and standardizes database clustering and replication, which are typically among the most challenging aspects of database configuration and administration.

Aurora is part of the managed database service Amazon Relational Database Service (Amazon RDS). Amazon RDS is a web service that makes it easier to set up, operate, and scale a relational database in the cloud. If you are not already familiar with Amazon RDS, see the *Amazon Relational Database Service User Guide*.
The following points illustrate how Amazon Aurora relates to the standard MySQL and PostgreSQL engines available in Amazon RDS:

- You choose Aurora MySQL or Aurora PostgreSQL as the DB engine option when setting up new database servers through Amazon RDS.
- Aurora takes advantage of the familiar Amazon Relational Database Service (Amazon RDS) features for management and administration. Aurora uses the Amazon RDS AWS Management Console interface, AWS CLI commands, and API operations to handle routine database tasks such as provisioning, patching, backup, recovery, failure detection, and repair.
- Aurora management operations typically involve entire clusters of database servers that are synchronized through replication, instead of individual database instances. The automatic clustering, replication, and storage allocation make it simple and cost-effective to set up, operate, and scale your largest MySQL and PostgreSQL deployments.

You can bring data from Amazon RDS for MySQL and Amazon RDS for PostgreSQL into Aurora by creating and restoring snapshots, or by setting up one-way replication. You can use push-button migration tools to convert your existing RDS for MySQL and RDS for PostgreSQL applications to Aurora

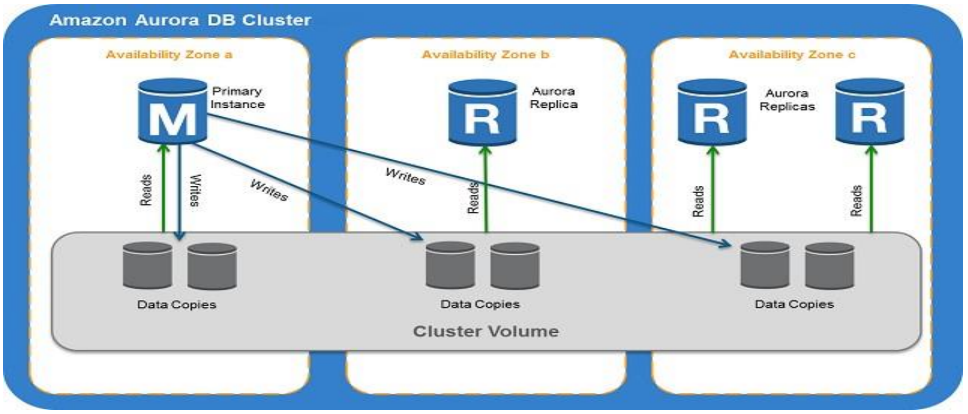
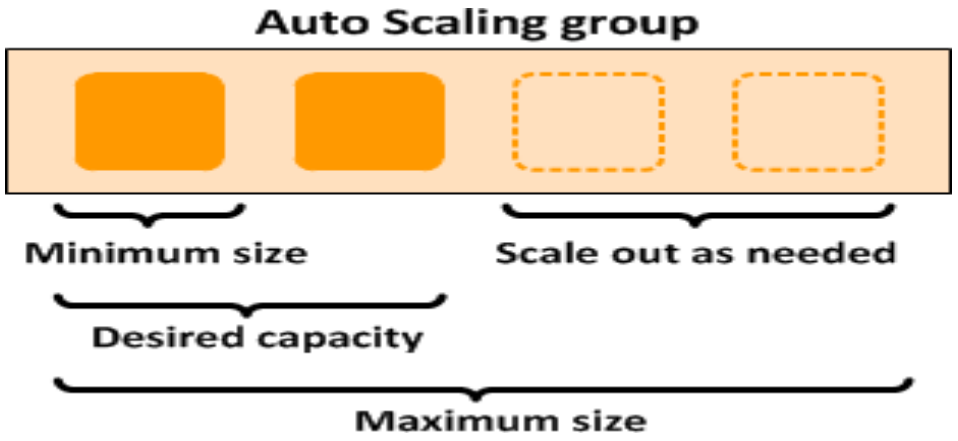


Fig. Amazon Auora DB Clusters

AWS Autoscaling

Amazon EC2 Auto Scaling helps you ensure that you have the correct number of Amazon EC2 instances available to handle the load for your application. You create collections of EC2 instances, called *Auto Scaling groups*. You can specify the minimum number of instances in each Auto Scaling group, and Amazon EC2 Auto Scaling ensures that your group never goes below this size. You can specify the maximum number of instances in each Auto Scaling group, and Amazon EC2 Auto Scaling ensures that your group never goes above this size. If you specify the desired capacity, either when you create the group or at any time thereafter, Amazon EC2 Auto Scaling ensures that your group has this many instances. If you specify scaling policies, then Amazon EC2 Auto Scaling can launch or terminate instances as demand on your application increases or decreases.

For example, the following Auto Scaling group has a minimum size of one instance, a desired capacity of two instances, and a maximum size of four instances. The scaling policies that you define adjust the number of instances, within your minimum and maximum number of instances, based on the criteria that you specify.



Auto scaling benefits

Adding Amazon EC2 Auto Scaling to your application architecture is one way to maximize the benefits of the AWS Cloud. When you use Amazon EC2 Auto Scaling, your applications gain the following benefits:

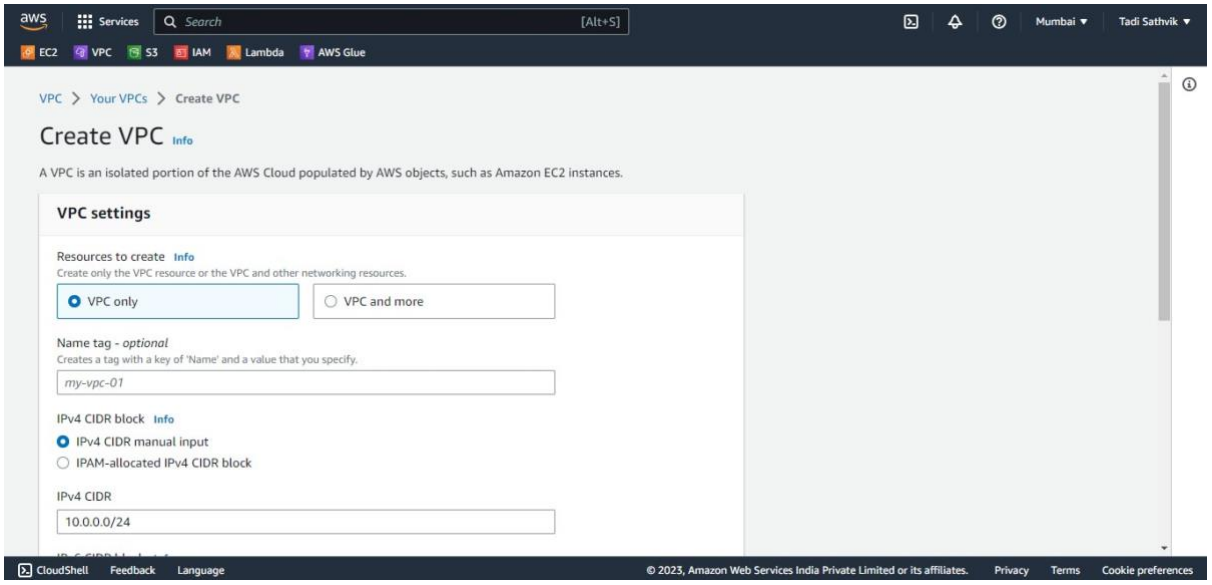
- Better fault tolerance. Amazon EC2 Auto Scaling can detect when an instance is unhealthy, terminate it, and launch an instance to replace it. You can also configure Amazon EC2 Auto Scaling to use multiple Availability Zones. If one Availability Zone becomes unavailable, Amazon EC2 Auto Scaling can launch instances in another one to compensate.
- Better availability. Amazon EC2 Auto Scaling helps ensure that your application always has the right amount of capacity to handle the current traffic demand.
- Better cost management. Amazon EC2 Auto Scaling can dynamically increase and decrease capacity as needed. Because you pay for the EC2 instances you use, you save money by launching instances when they are needed and terminating them when they aren't.

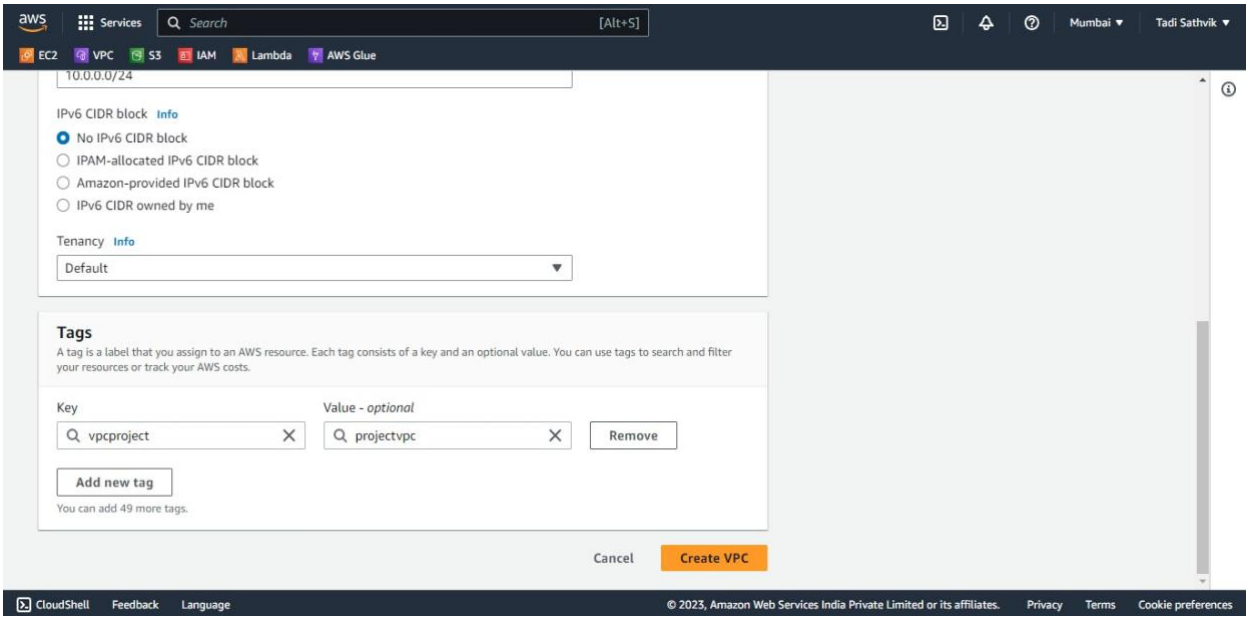
IMPLEMENTATION

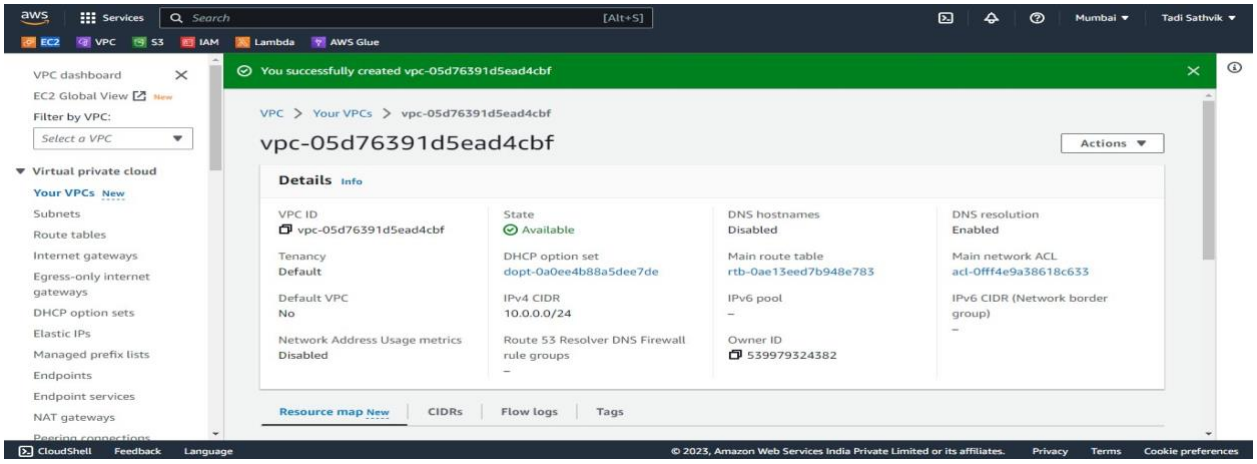
Steps to perform

Step-1: VPC

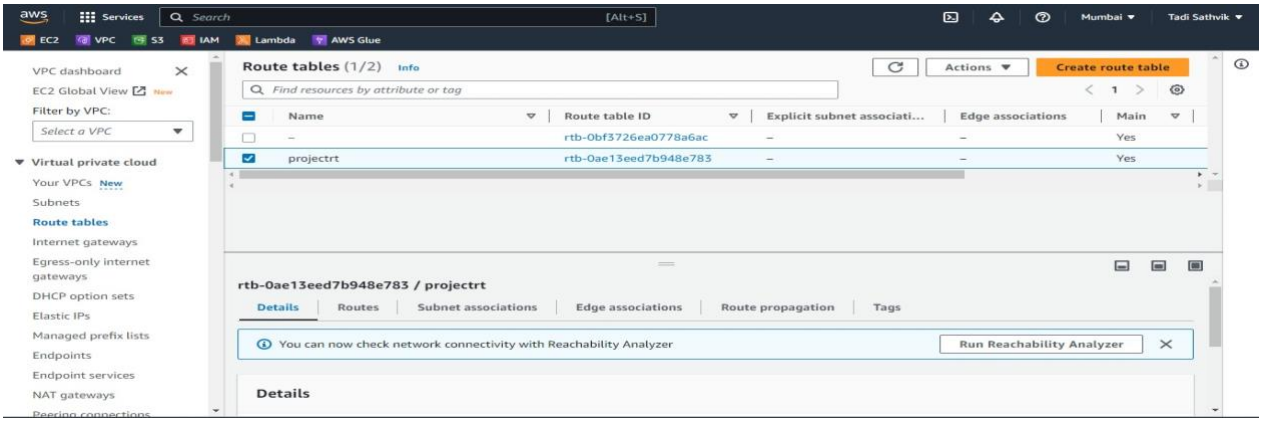
1(a): Go to VPC and create VPC by giving its name and ipv4 CIDR and click on create vpc.



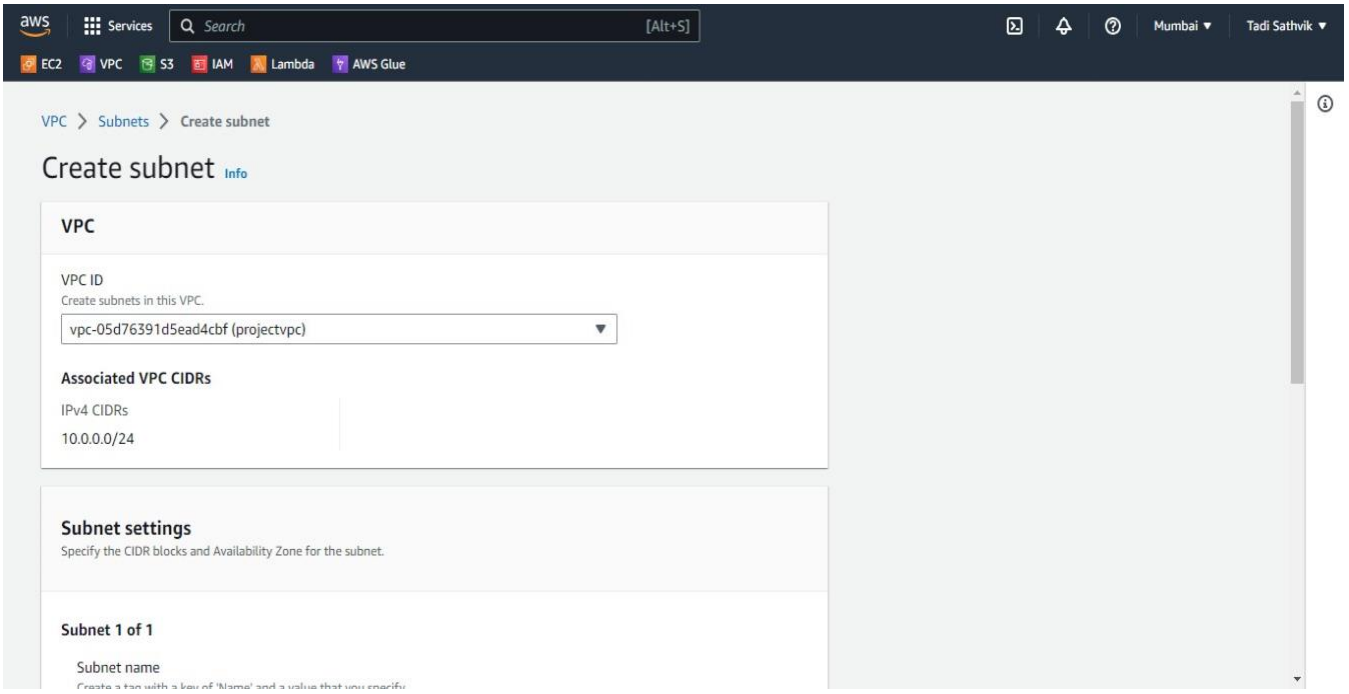


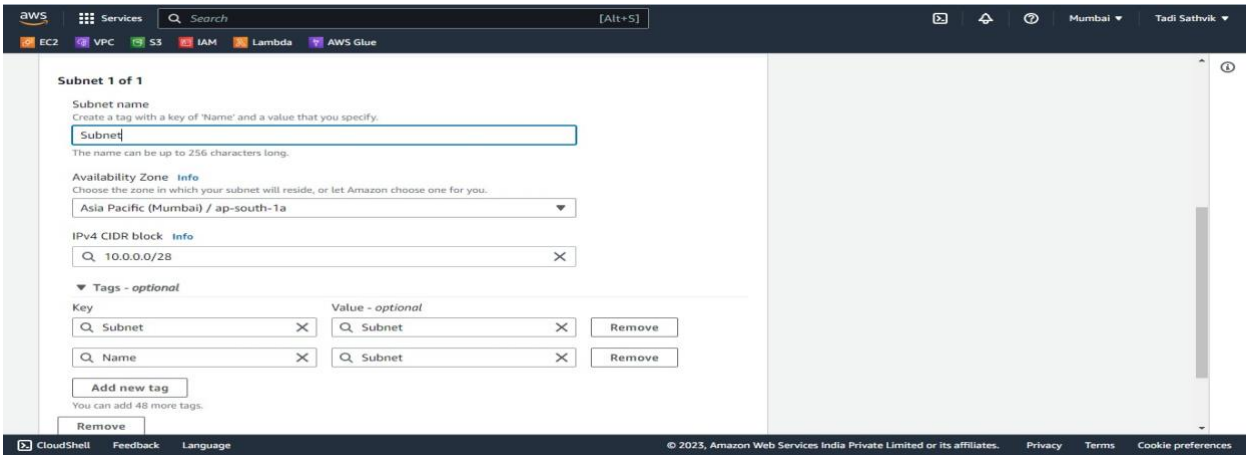


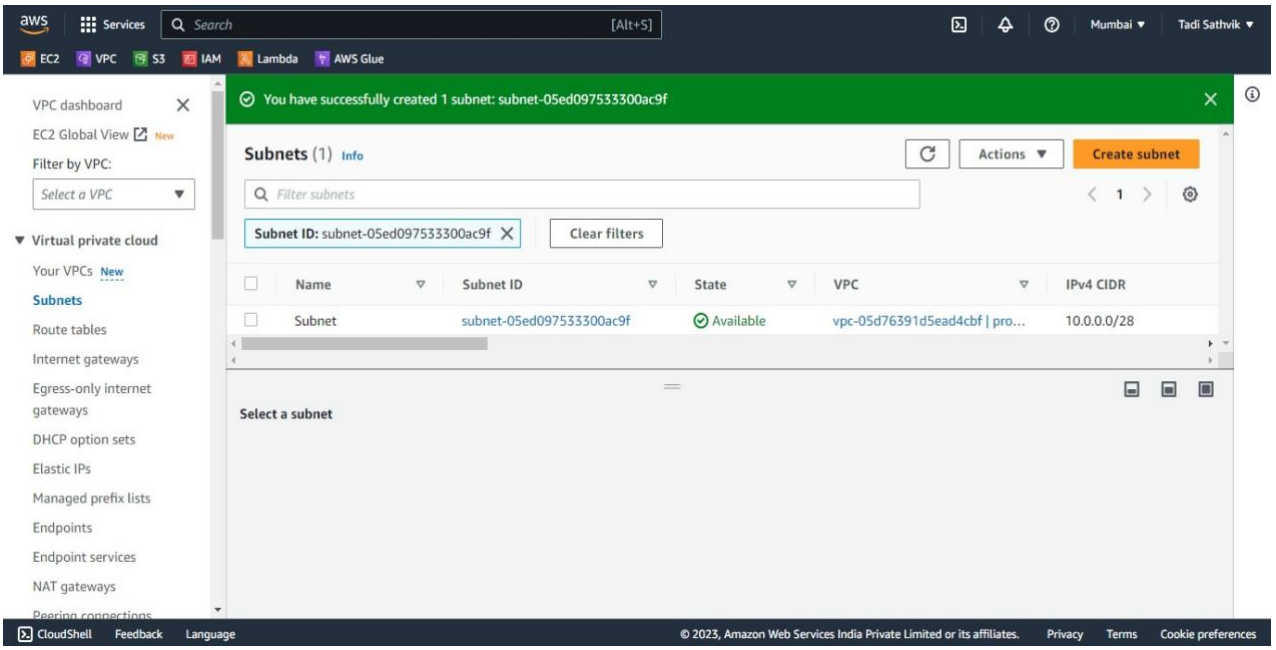
1(b): Edit route table name



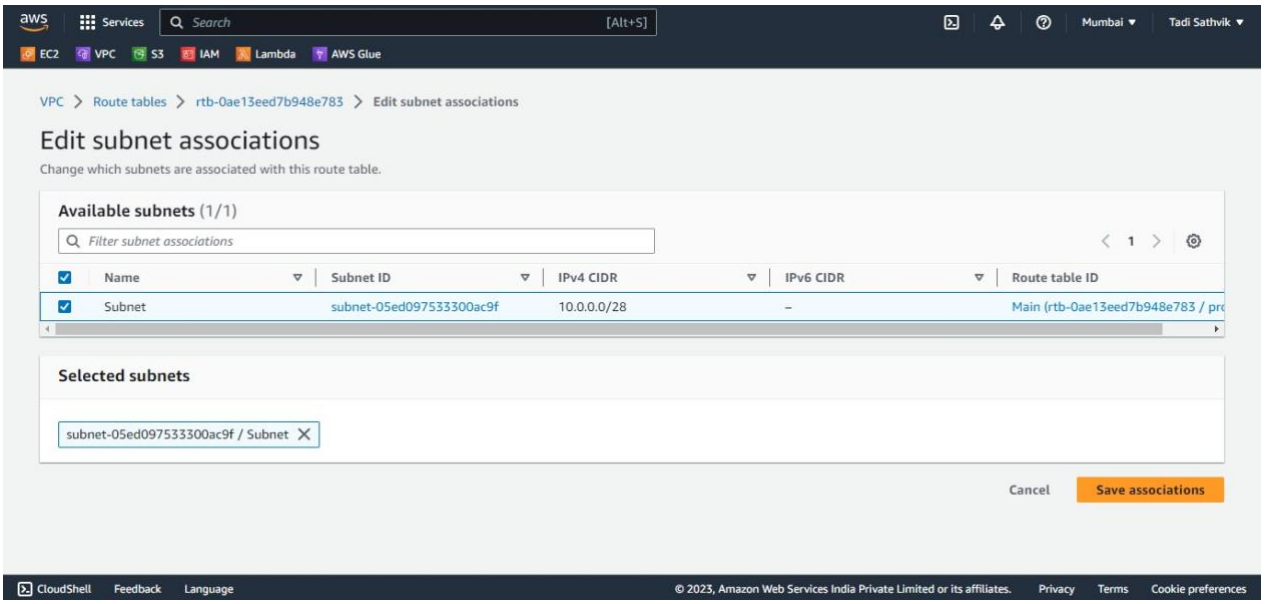
1(c): Creating a subnet using the created vpc with CIDR:10.0.0.0/24:



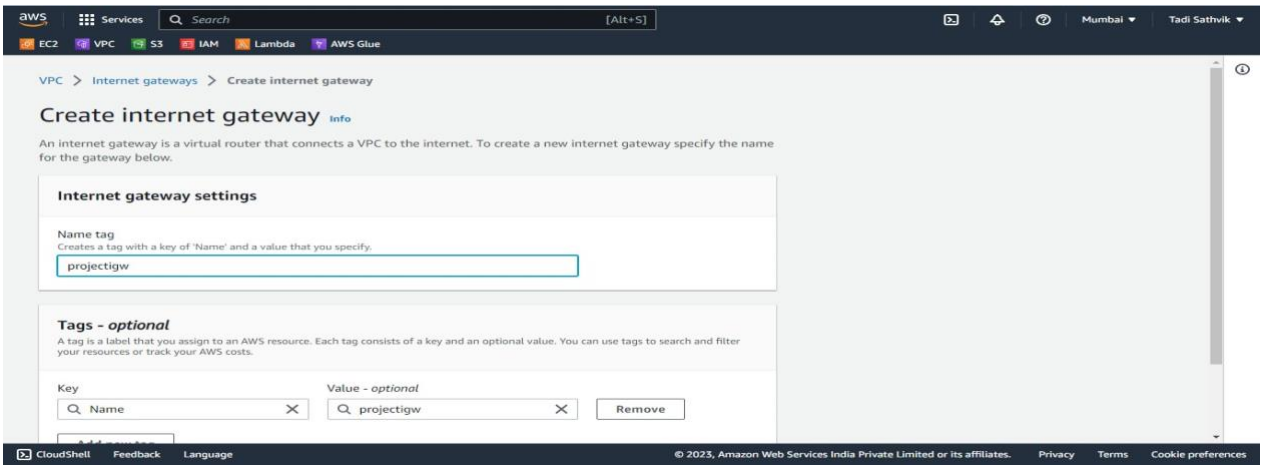


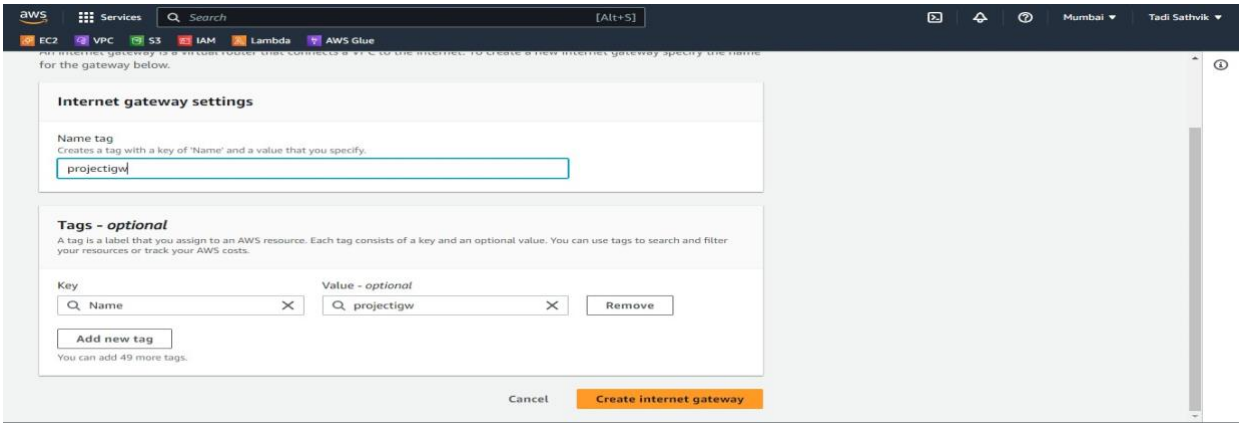


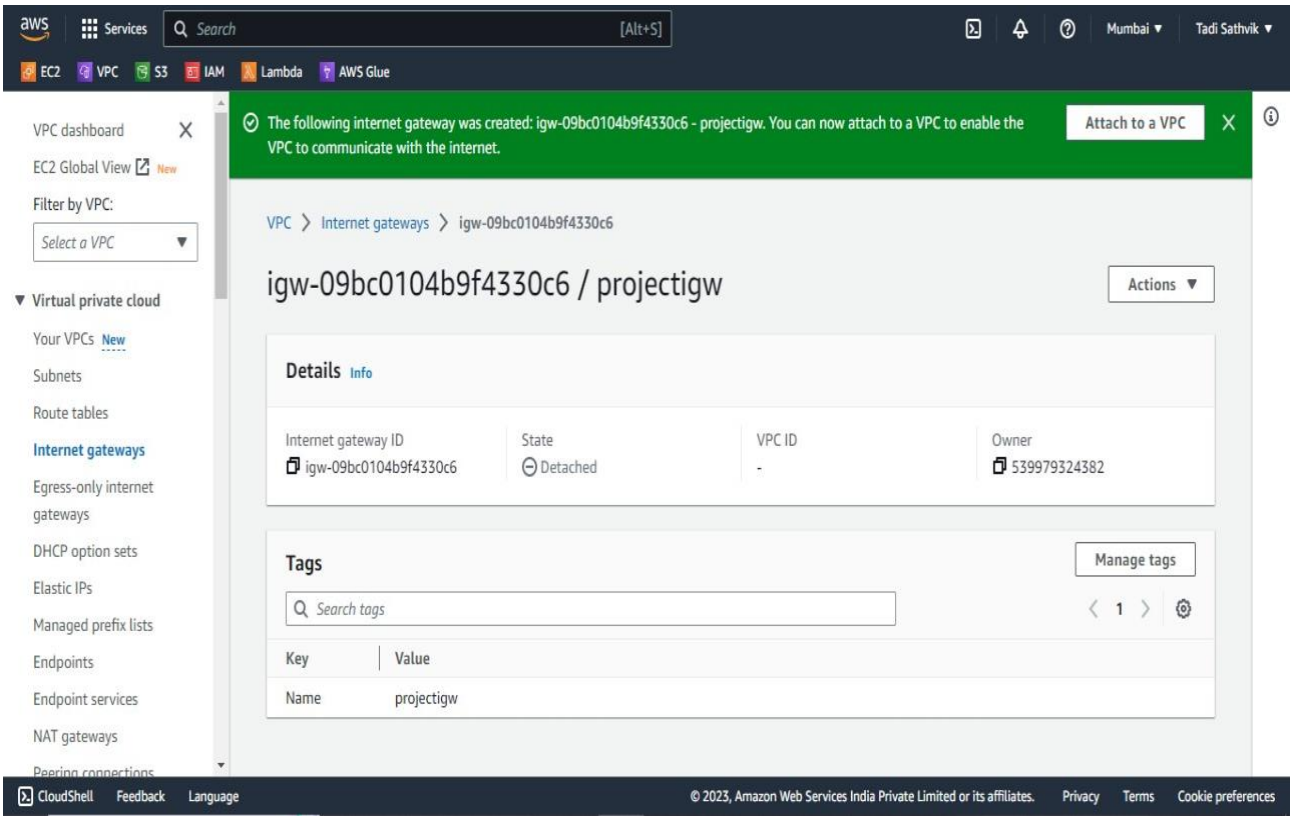
1(d): Edit subnet association in route tables.



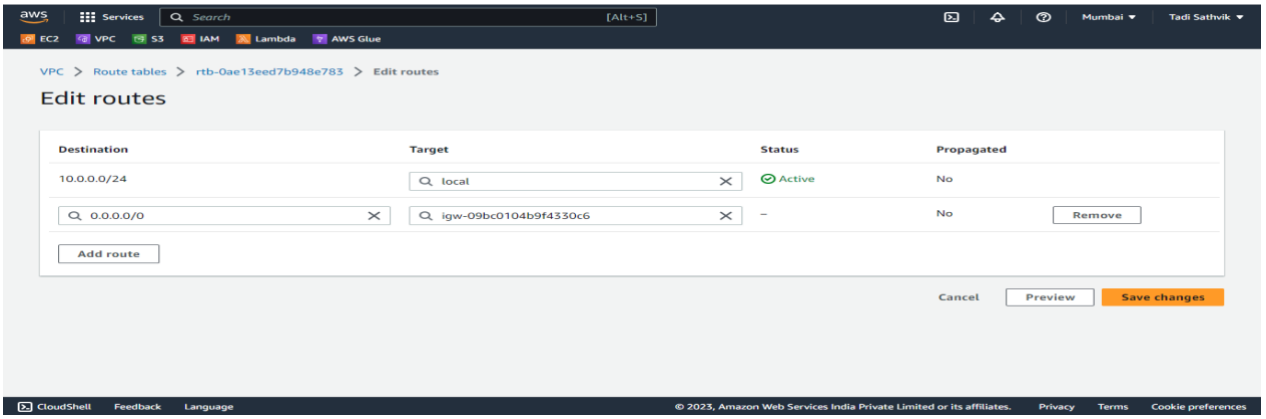
1(e) Create internet gateway





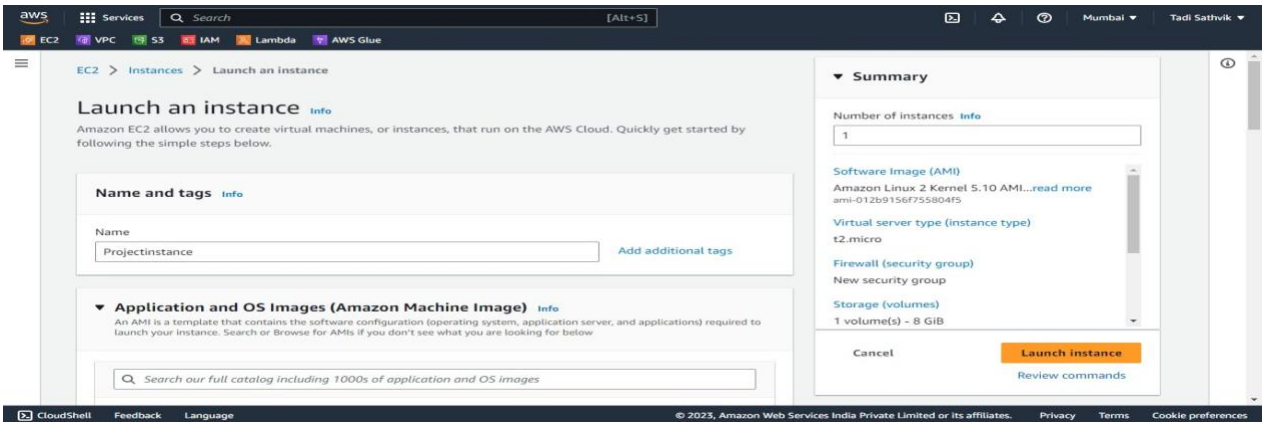


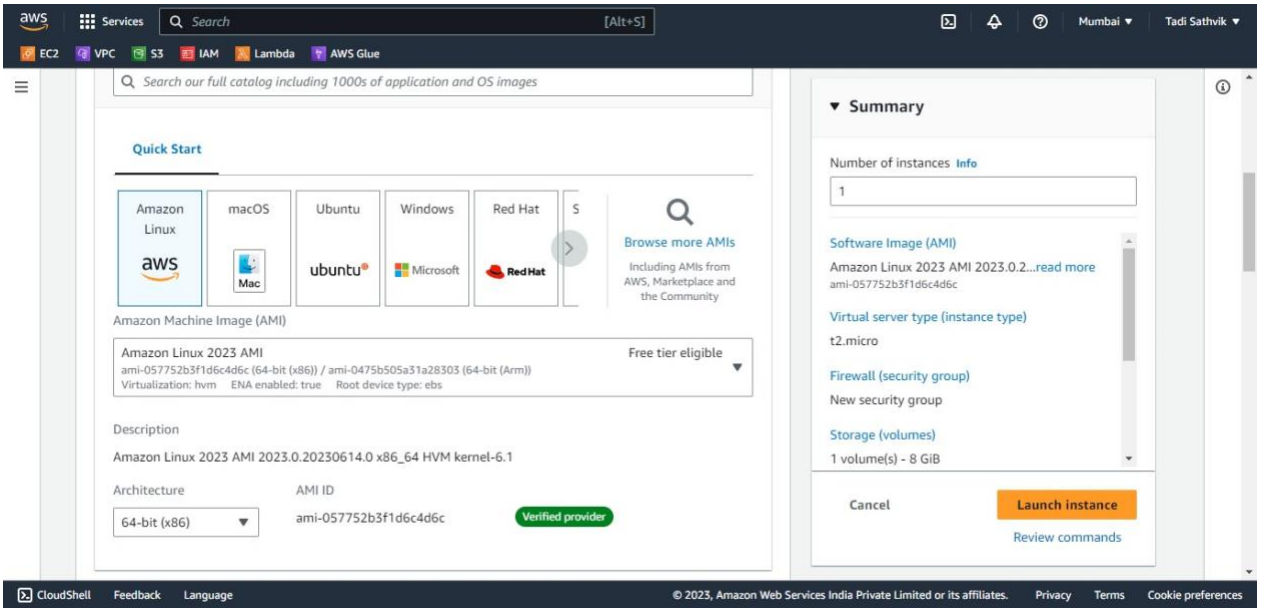
1(f): Edit routes

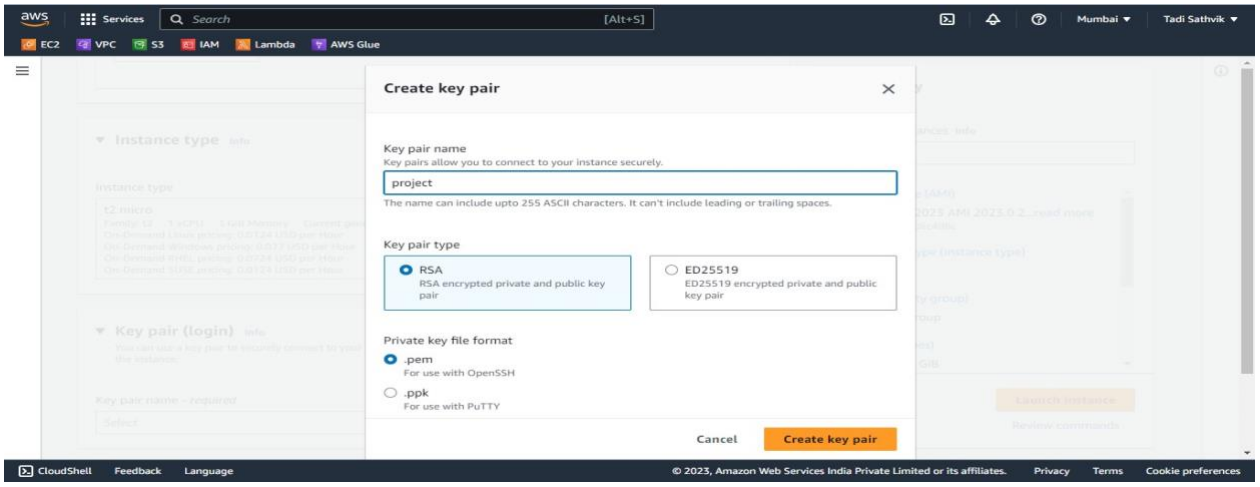


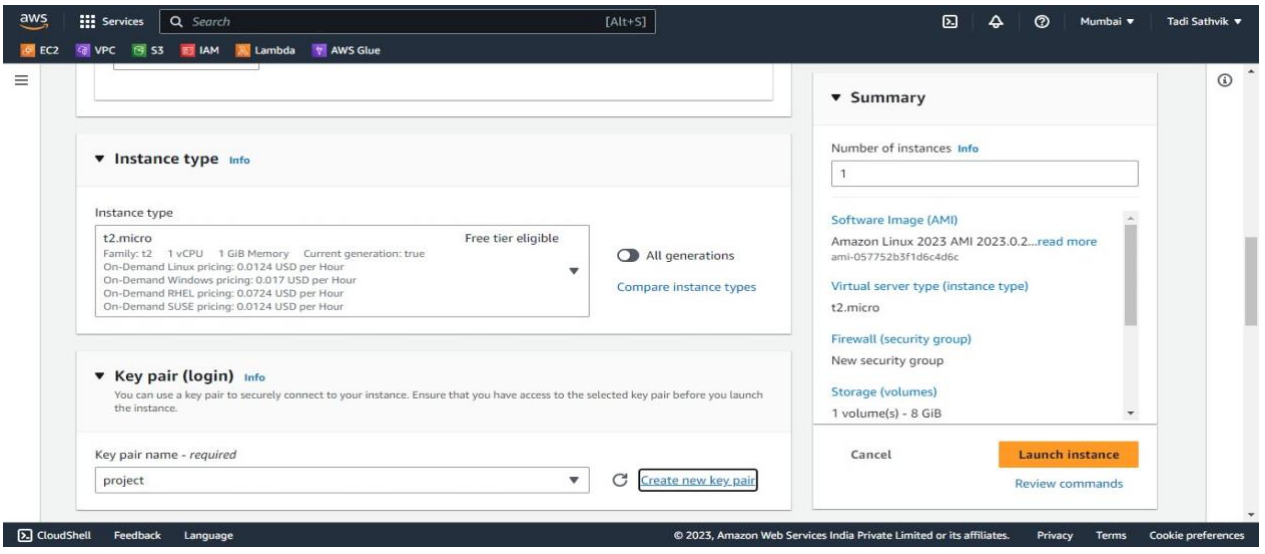
Step-2: EC2 Instance

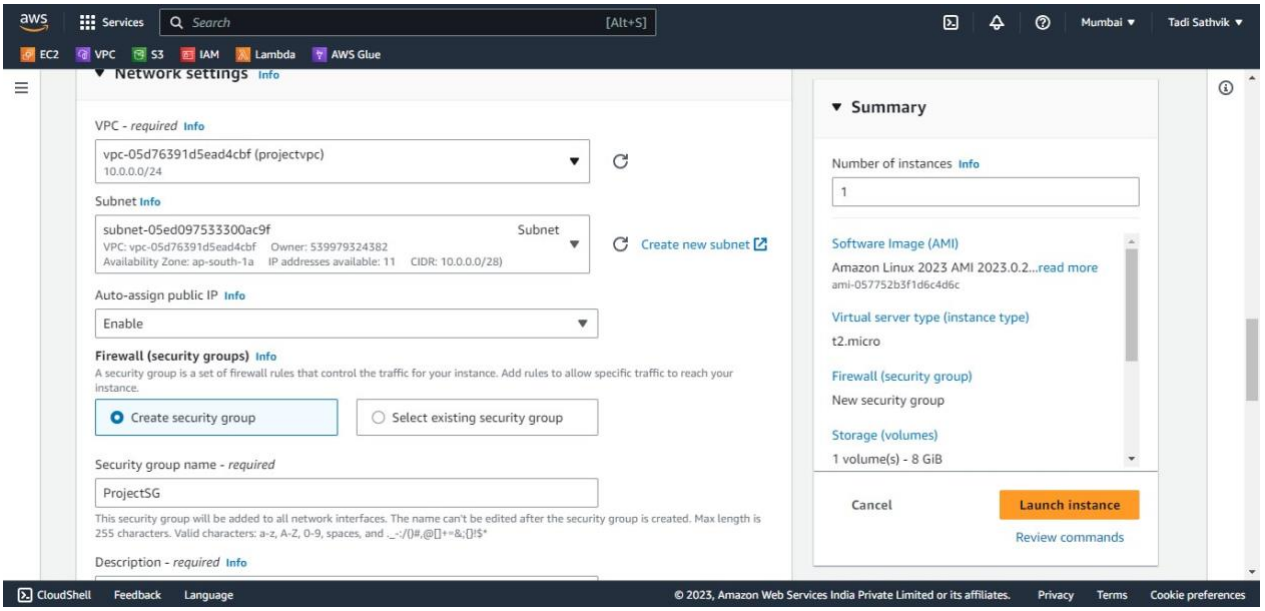
2(a) Launch instance

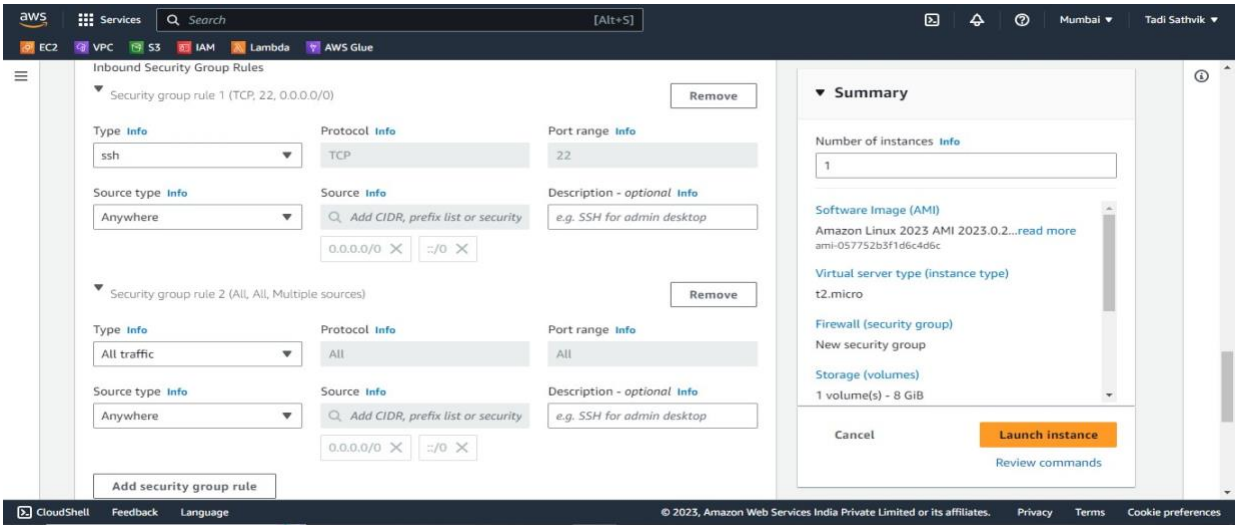





Create key pair
Key pair name
Key pairs allow you to connect to your instance securely.
project
The name can include upto 255 ASCII characters. It can't include leading or trailing spaces.
Key pair type
RSA
RSA encrypted private and public key pair
ED25519
ED25519 encrypted private and public key pair
Private key file format
.pem
For use with OpenSSH
.ppk
For use with PuTTY
Cancel
Create key pair


Instance type Info
Instance type
t2.micro
Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Linux pricing: 0.0124 USD per Hour
On-Demand Windows pricing: 0.017 USD per Hour
On-Demand RHEL pricing: 0.0724 USD per Hour
On-Demand SUSE pricing: 0.0124 USD per Hour
All generations
Compare instance types
Key pair (login) Info
You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.
Key pair name - required
project
Create new key pair
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.0.2...read more
ami-057752b3f1d6c4d6c
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Review commands


Network settings Info
VPC - required Info
vpc-05d76391d5ead4cbf (projectvpc)
10.0.0.0/24
Subnet Info
subnet-05ed097533300ac9f
Subnet
VPC: vpc-05d76391d5ead4cbf Owner: 539979324382
Availability Zone: ap-south-1a IP addresses available: 11 CIDR: 10.0.0.0/28)
Create new subnet
Auto-assign public IP Info
Enable
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
Security group name - required
ProjectSG
This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and ._-:/()#,@[]+=&;{}!$*
Description - required Info
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.0.2...read more
ami-057752b3f1d6c4d6c
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Review commands


Inbound Security Group Rules
Security group rule 1 (TCP, 22, 0.0.0.0/0)
Remove
Type Info
ssh
Protocol Info
TCP
Port range Info
22
Source type Info
Anywhere
Source Info
Add CIDR, prefix list or security
Description - optional Info
e.g. SSH for admin desktop
0.0.0.0/0
::/0
Security group rule 2 (All, All, Multiple sources)
Remove
Type Info
All traffic
Protocol Info
All
Port range Info
All
Source type Info
Anywhere
Source Info
Add CIDR, prefix list or security
Description - optional Info
e.g. SSH for admin desktop
0.0.0.0/0
::/0
Add security group rule
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.0.2...read more
ami-057752b3f1d6c4d6c
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Review commands
CloudShell
Feedback
Language
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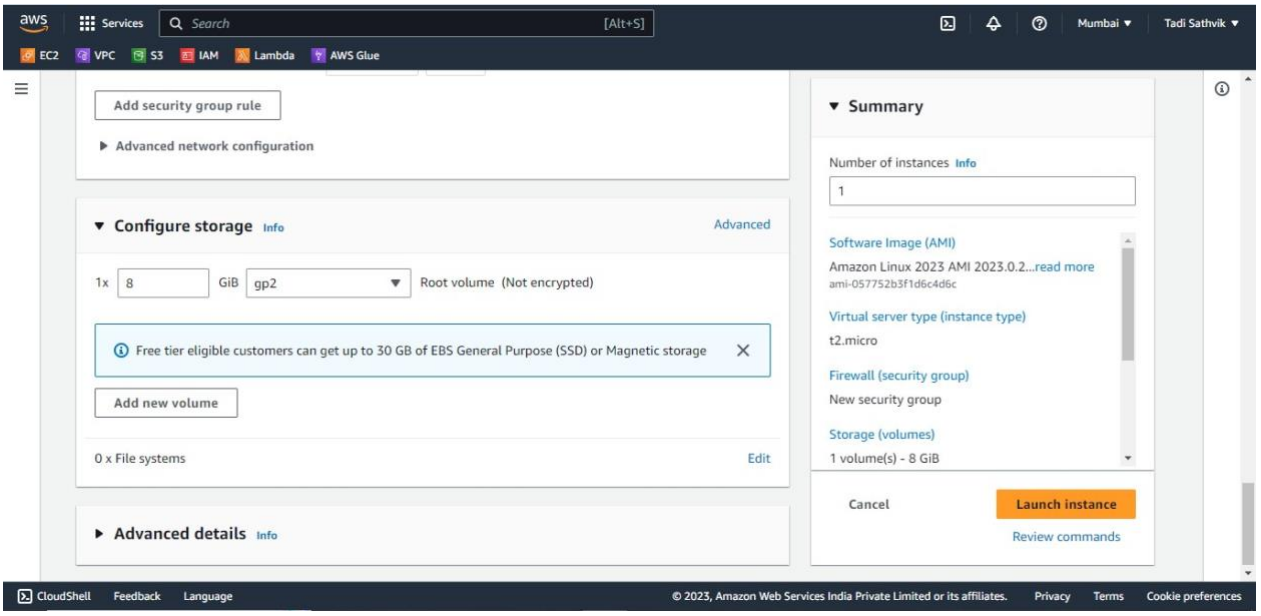
Terms
Cookie preferences


Add security group rule
Advanced network configuration
Configure storage Info
Advanced
1x
8
GiB
gp2
Root volume (Not encrypted)
Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage
Add new volume
0 x File systems
Edit
Advanced details Info
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.0.2...read more
ami-057752b3f1d6c4d6c
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Review commands
CloudShell
Feedback
Language
© 2023, Amazon Web Services India Private Limited or its affiliates.
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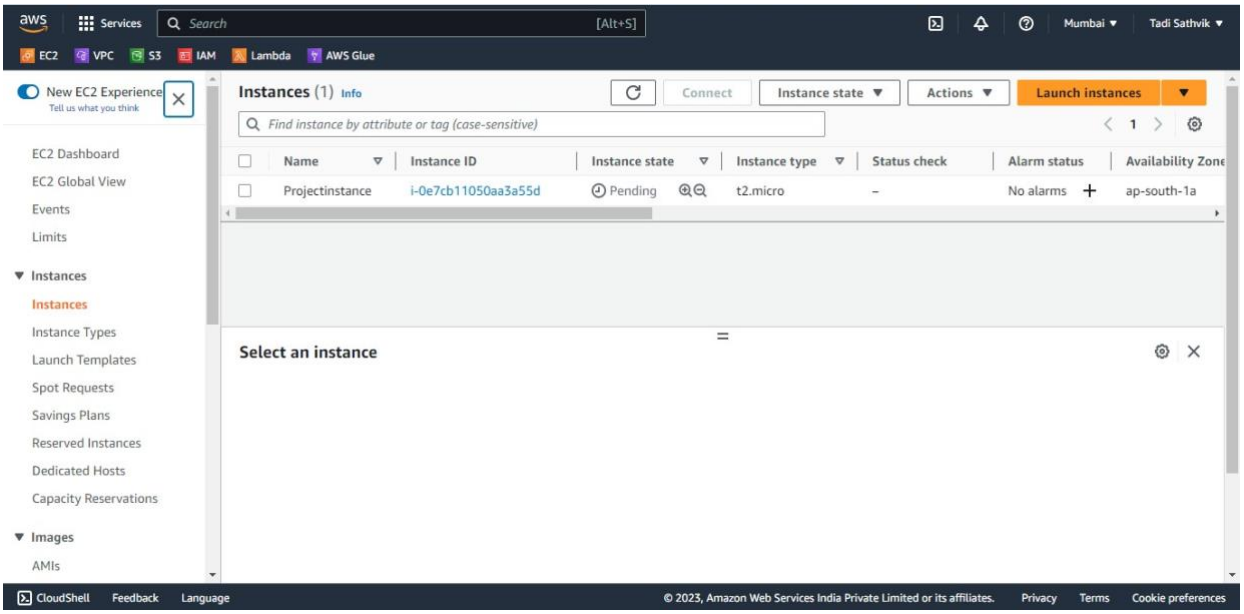
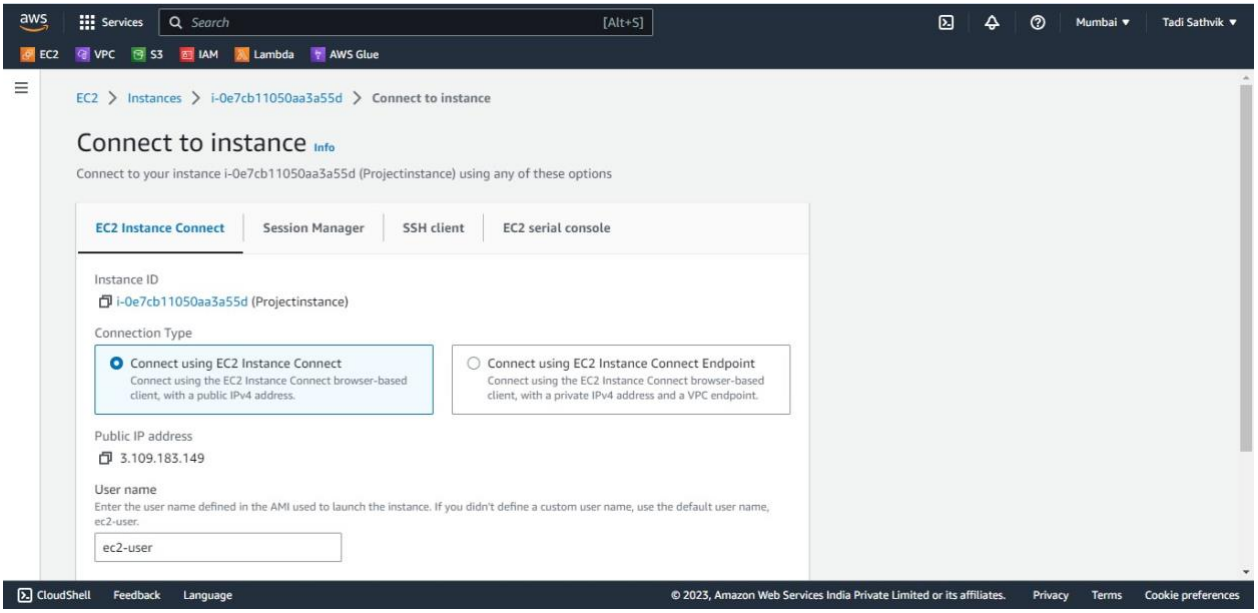
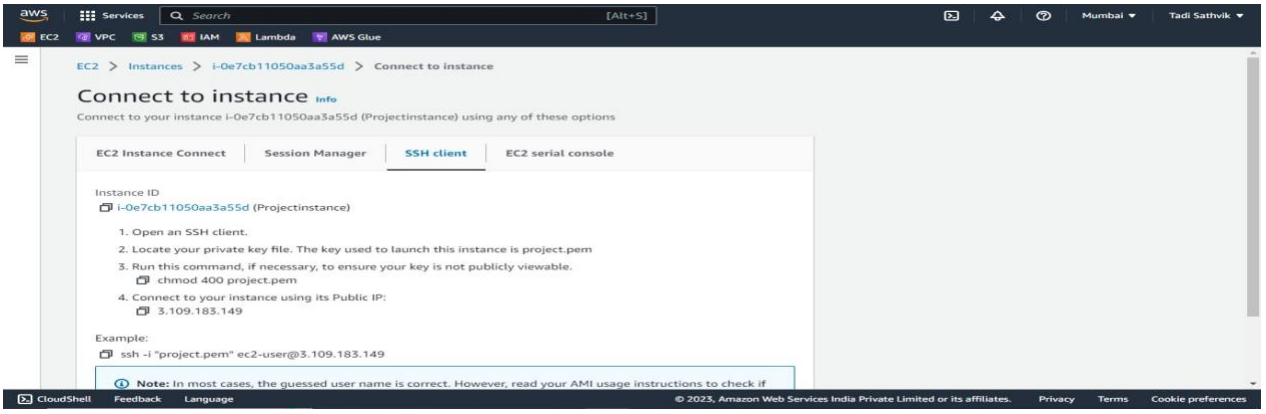
Cookie preferences

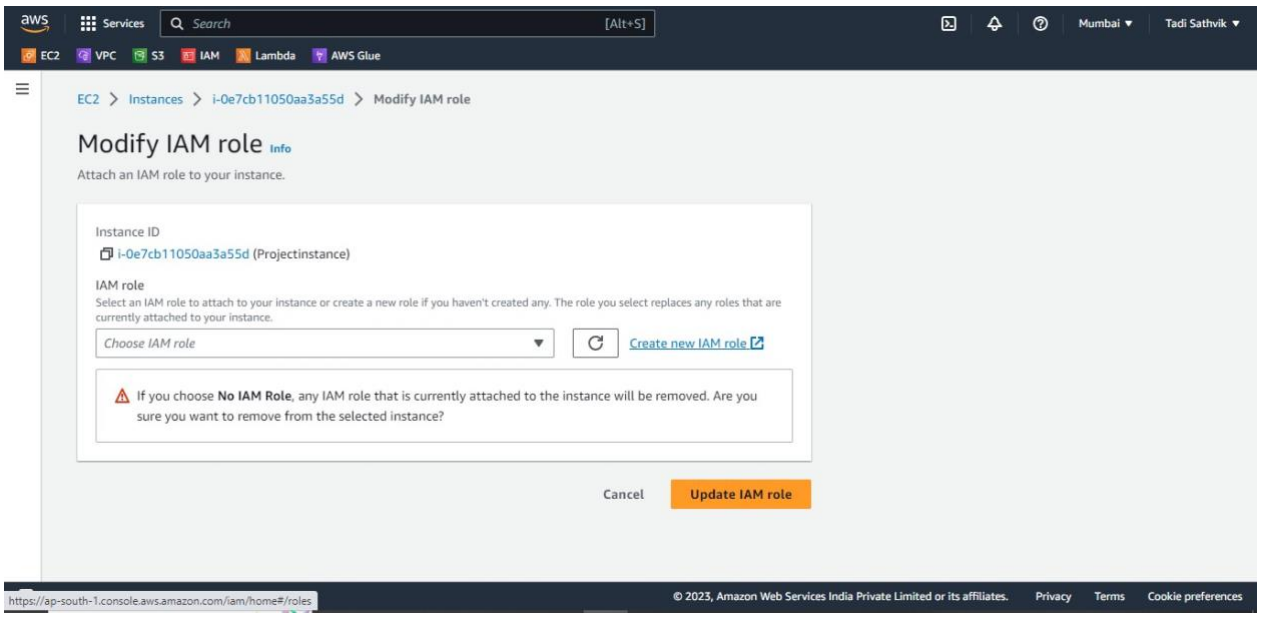

New EC2 Experience
Tell us what you think
EC2 Dashboard
EC2 Global View
Events
Limits
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
Instances (1) Info
Connect
Instance state
Actions
Launch instances
Find instance by attribute or tag (case-sensitive)
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Projectinstance
i-0e7cb11050aa3a55d
Pending
t2.micro
–
No alarms
ap-south-1a
Select an instance
CloudShell
Feedback
Language
© 2023, Amazon Web Services India Private Limited or its affiliates.
Privacy
Terms
Cookie preferences

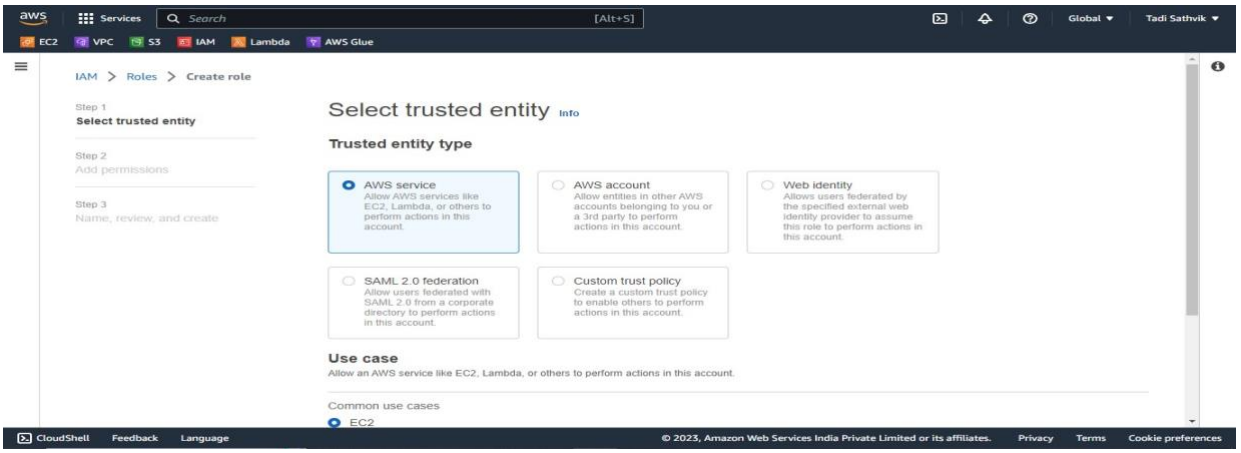
2(b): Connect to the instance

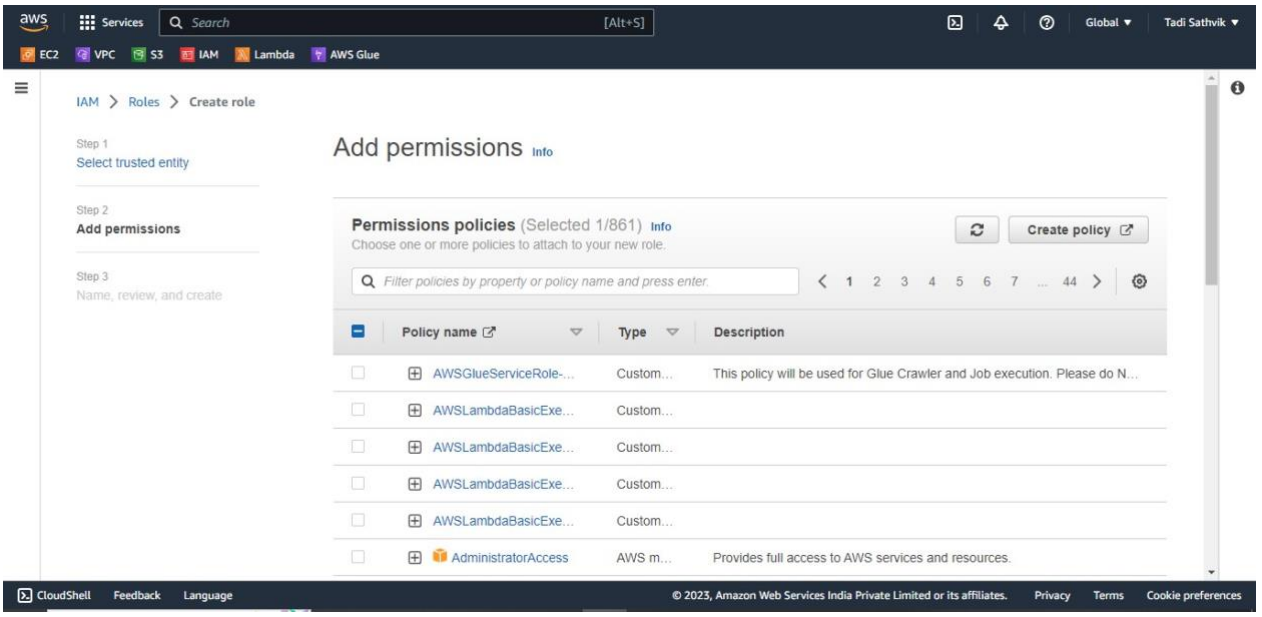


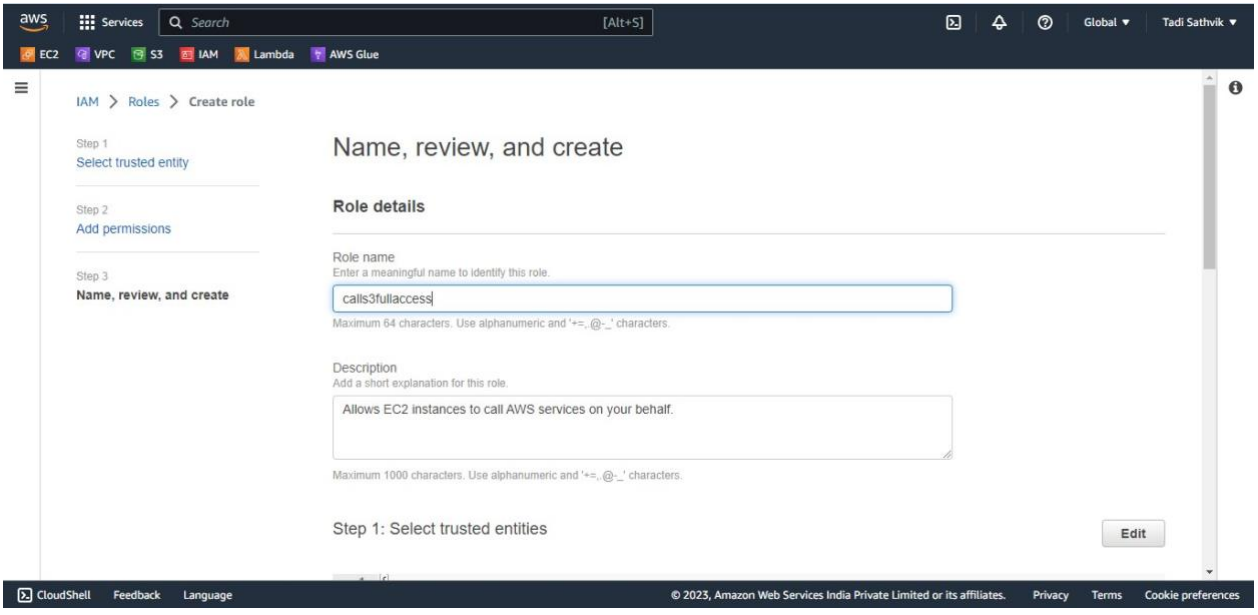


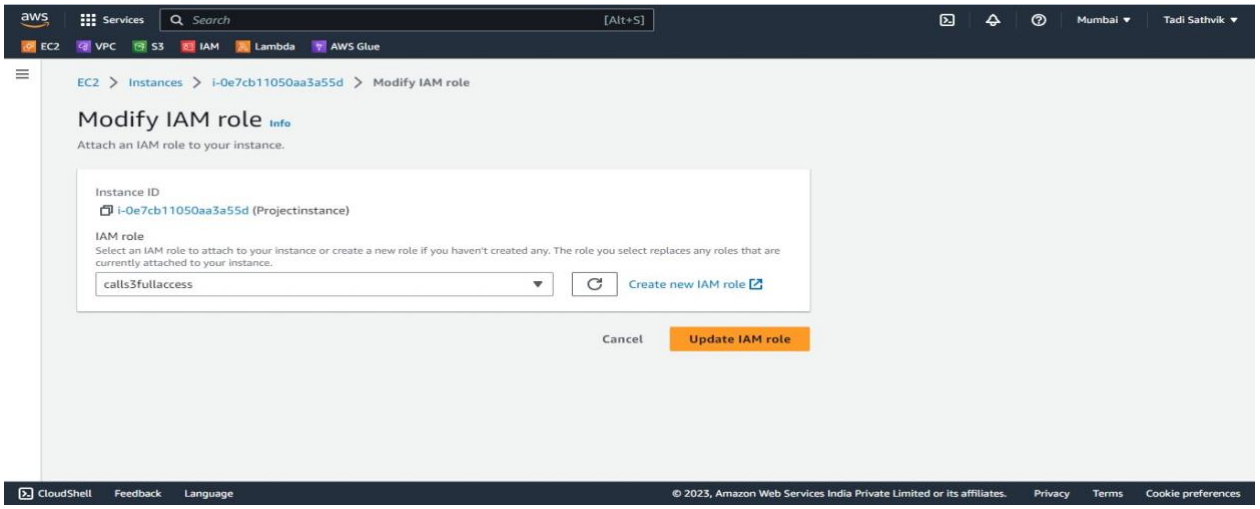
2(c): Modify IAM role



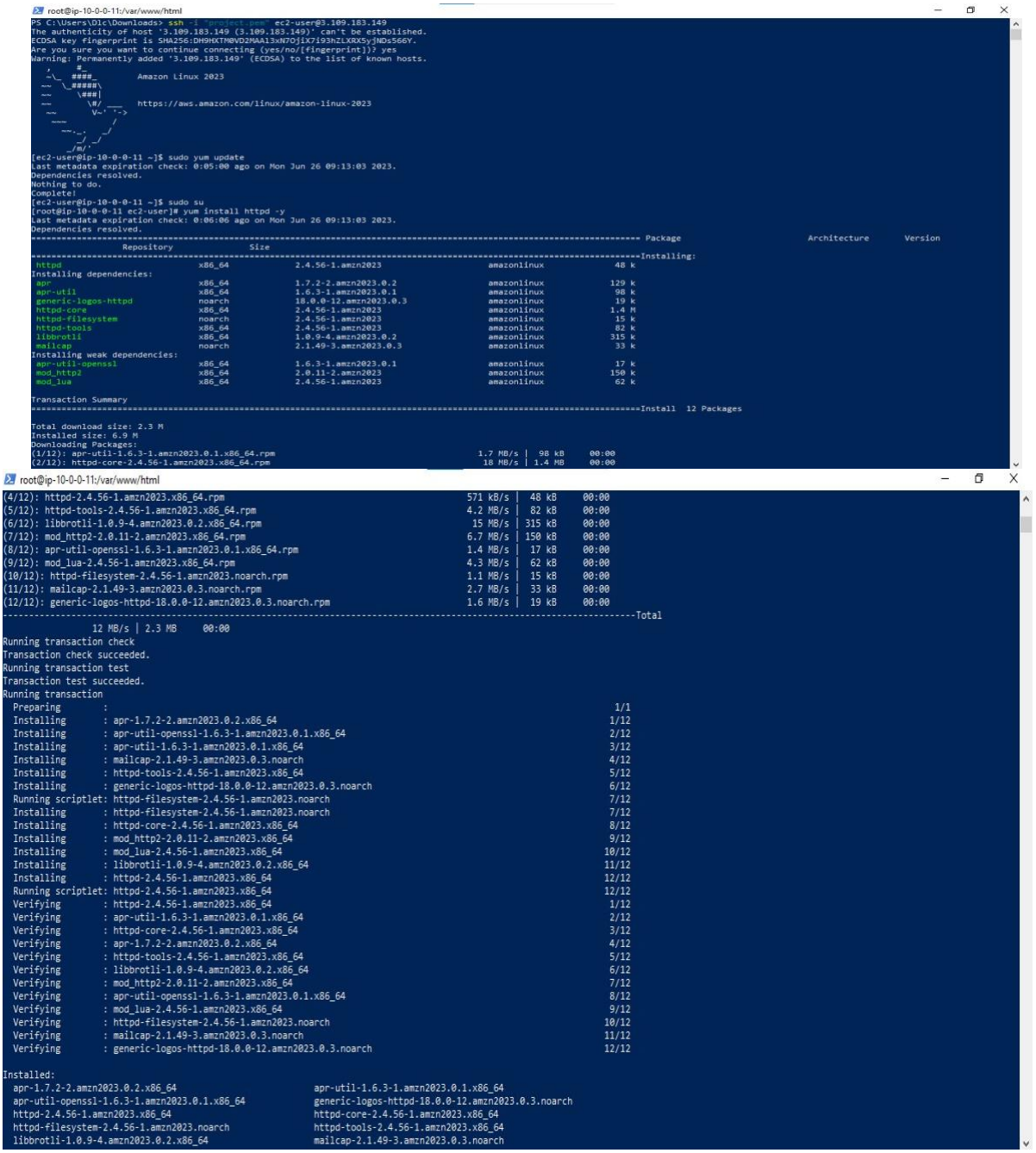

Services
Search
[Alt+S]
Global
Tadi Sathvik
EC2
VPC
S3
IAM
Lambda
AWS Glue
IAM > Roles > Create role
Step 1
Select trusted entity
Step 2
Add permissions
Step 3
Name, review, and create
Select trusted entity Info
Trusted entity type
AWS service
Allow AWS services like EC2, Lambda, or others to perform actions in this account.
AWS account
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
Web identity
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
SAML 2.0 federation
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
Custom trust policy
Create a custom trust policy to enable others to perform actions in this account.
Use case
Allow an AWS service like EC2, Lambda, or others to perform actions in this account.
Common use cases
EC2
CloudShell
Feedback
Language
© 2023, Amazon Web Services India Private Limited or its affiliates.
Privacy
Terms
Cookie preferences


Services
Search
[Alt+S]
Global
Tadi Sathvik
EC2
VPC
S3
IAM
Lambda
AWS Glue
IAM > Roles > Create role
Step 1
Select trusted entity
Step 2
Add permissions
Step 3
Name, review, and create
Add permissions Info
Permissions policies (Selected 1/861) Info
Choose one or more policies to attach to your new role.
Create policy
Filter policies by property or policy name and press enter.
1 2 3 4 5 6 7 ... 44
Policy name
Type
Description
AWSGlueServiceRole-...
Custom...
This policy will be used for Glue Crawler and Job execution. Please do N...
AWSLambdaBasicExe...
Custom...
AWSLambdaBasicExe...
Custom...
AWSLambdaBasicExe...
Custom...
AWSLambdaBasicExe...
Custom...
AdministratorAccess
AWS m...
Provides full access to AWS services and resources.
CloudShell
Feedback
Language
© 2023, Amazon Web Services India Private Limited or its affiliates.
Privacy
Terms
Cookie preferences

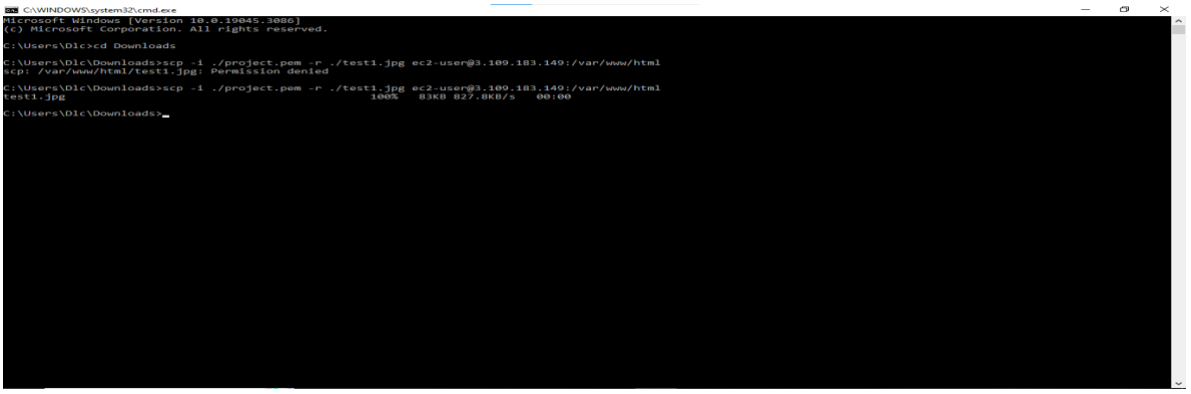

Services
Search
[Alt+S]
Global
Tadi Sathvik
EC2
VPC
S3
IAM
Lambda
AWS Glue
IAM > Roles > Create role
Step 1
Select trusted entity
Step 2
Add permissions
Step 3
Name, review, and create
Name, review, and create
Role details
Role name
Enter a meaningful name to identify this role.
calls3fullaccess
Maximum 64 characters. Use alphanumeric and '+=,.@-_' characters.
Description
Add a short explanation for this role.
Allows EC2 instances to call AWS services on your behalf.
Maximum 1000 characters. Use alphanumeric and '+=,.@-_' characters.
Step 1: Select trusted entities
Edit
CloudShell
Feedback
Language
© 2023, Amazon Web Services India Private Limited or its affiliates.
Privacy
Terms
Cookie preferences



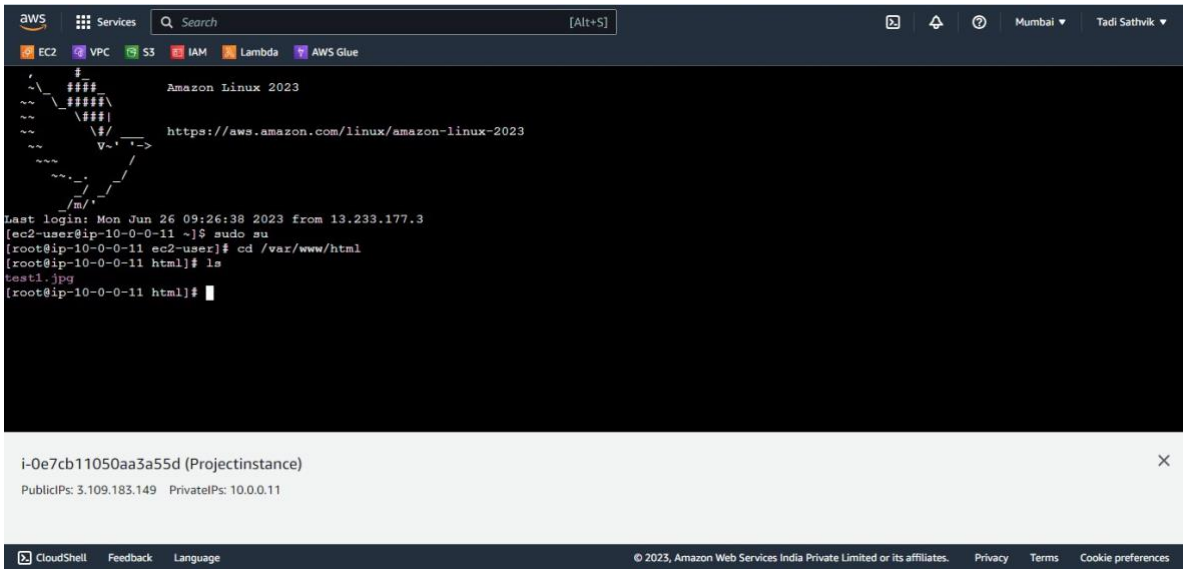
2(d): Now open window power shell and do below commands for the image.



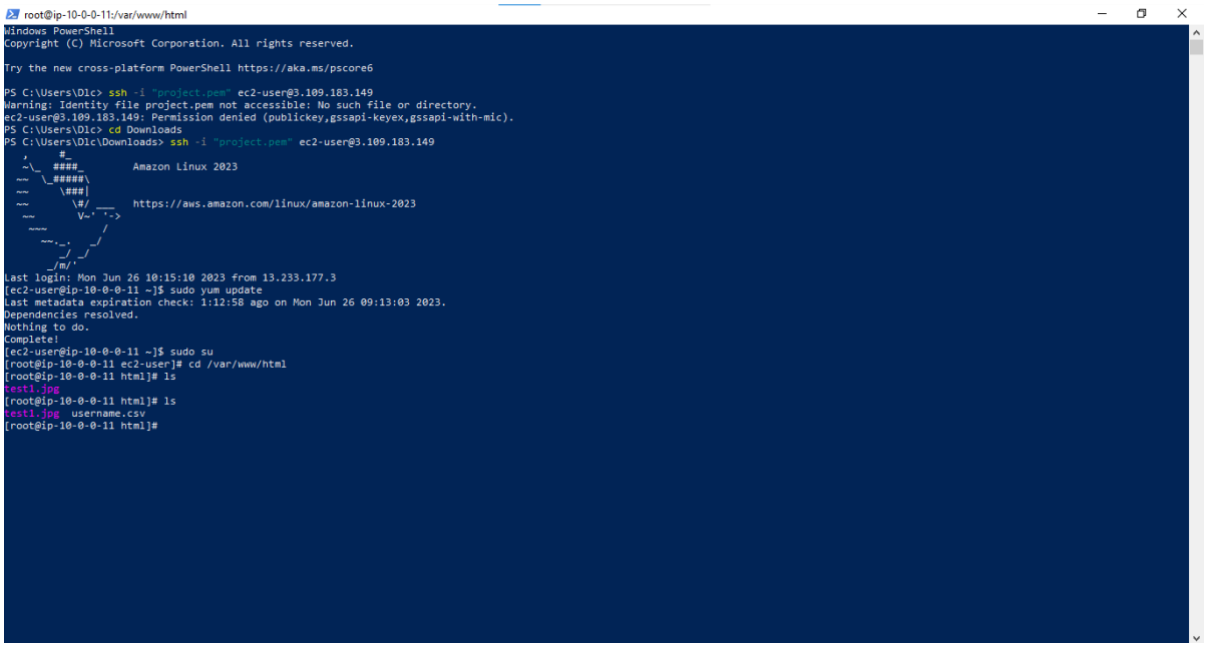
2(e): Go the cmd.



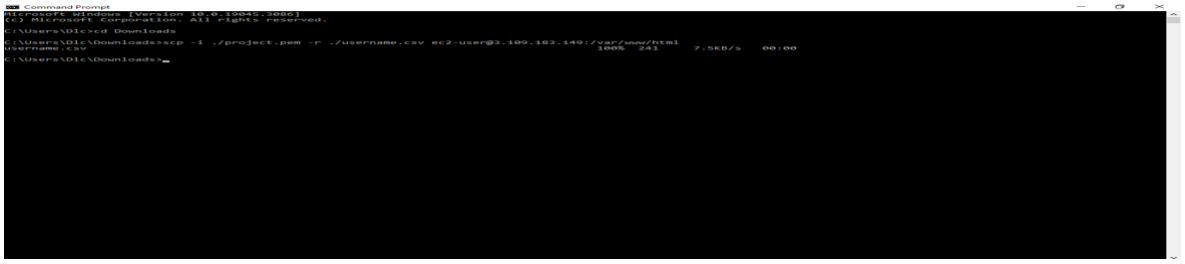
2(f): After getting connected to the instance



2(g): Now open window power shell and apply below codes for csv files.

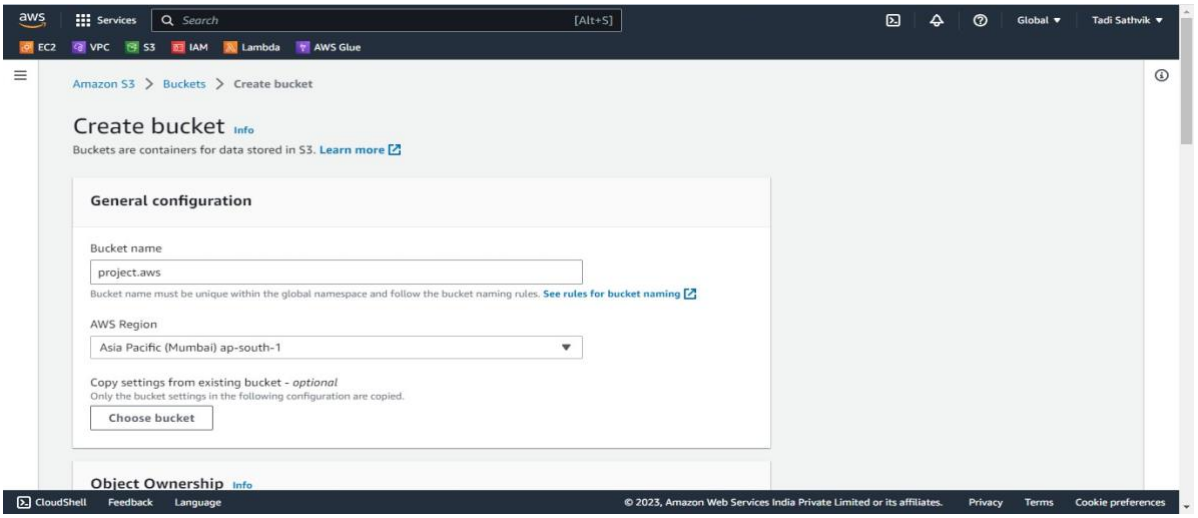


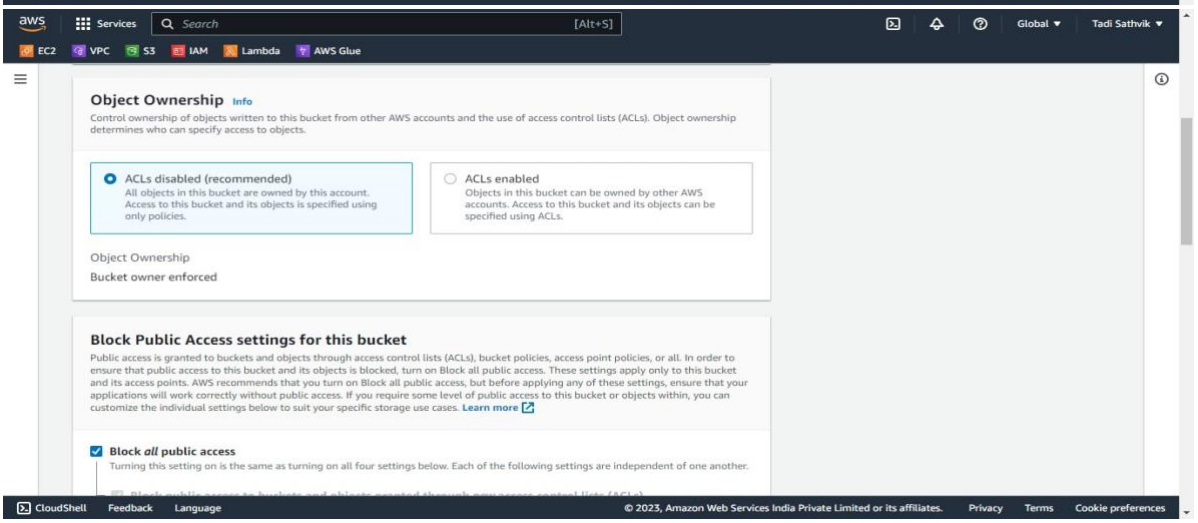
2(h): Open cmd and do the following commands.

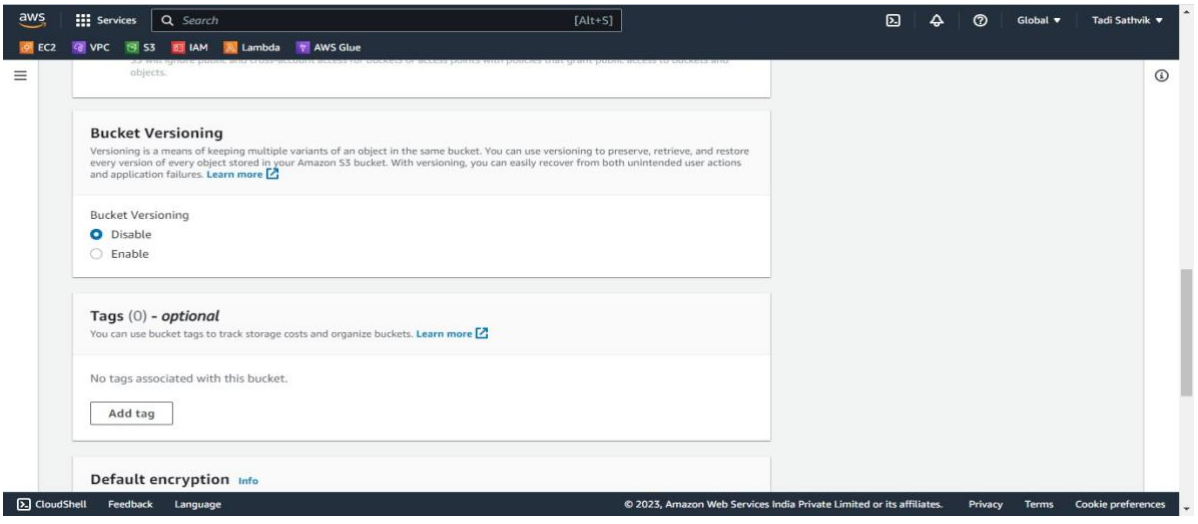


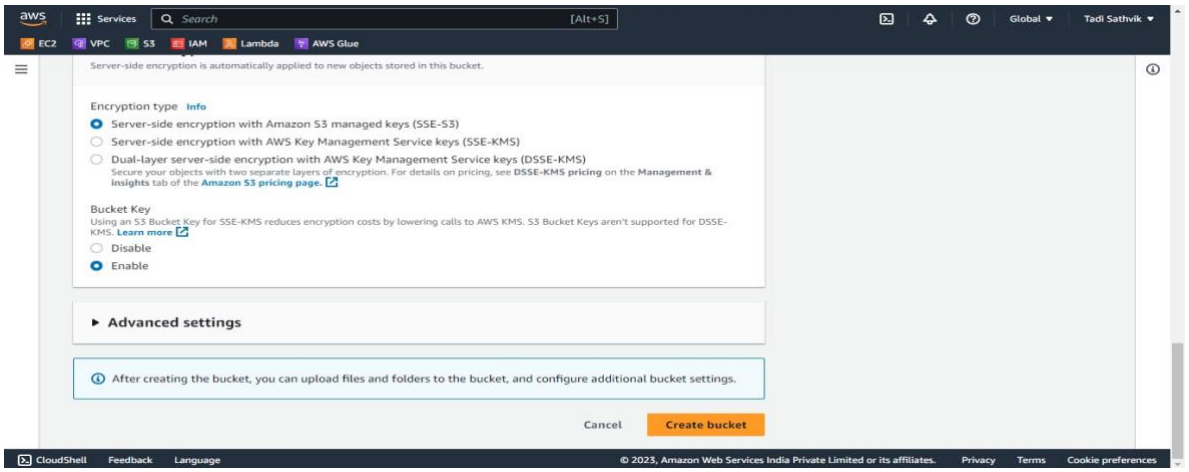
Step-3: S3

3(a): Creating s3 bucket.

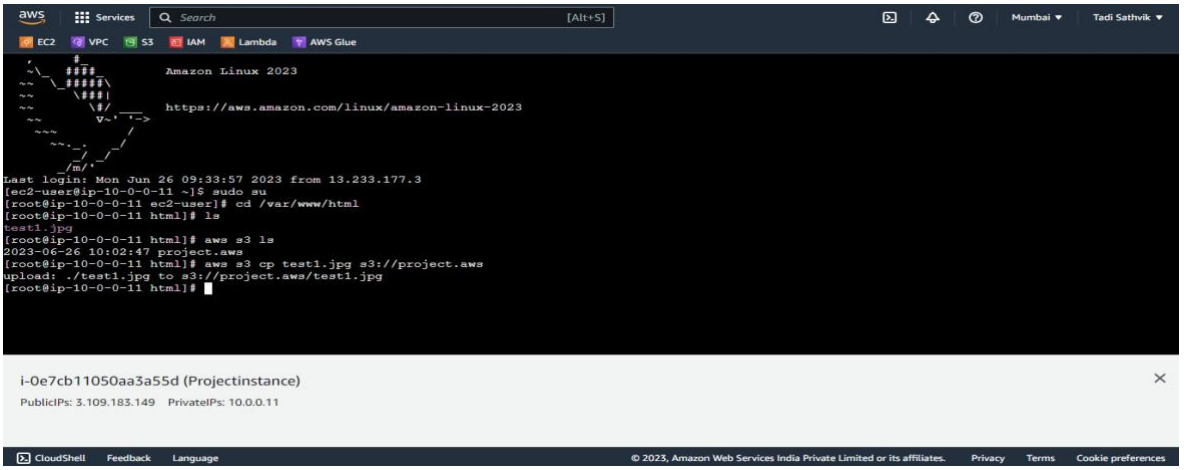




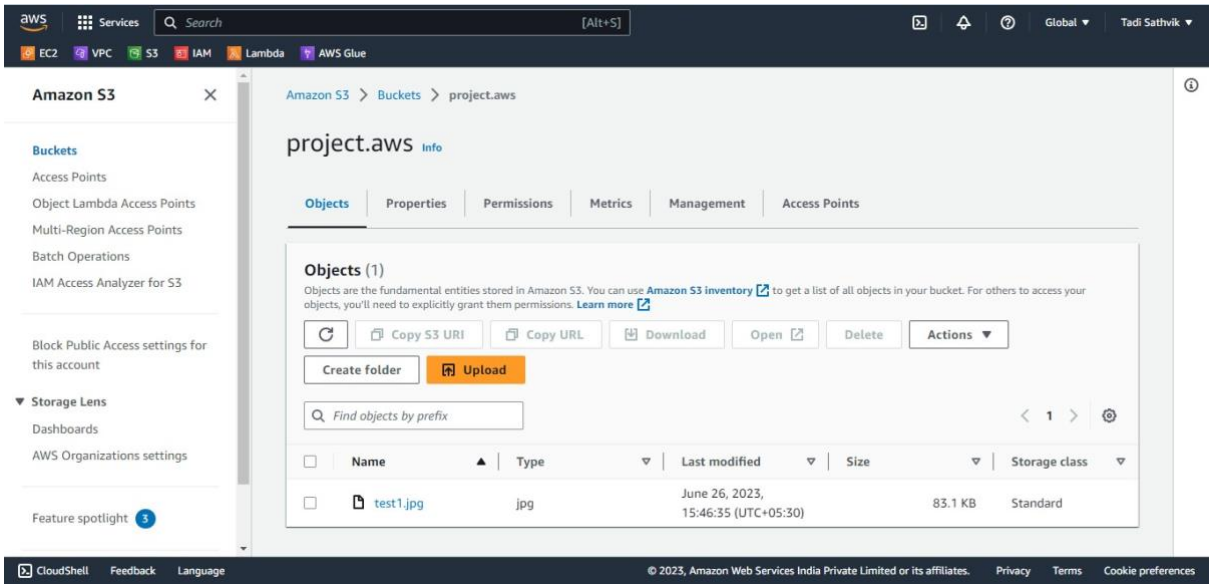




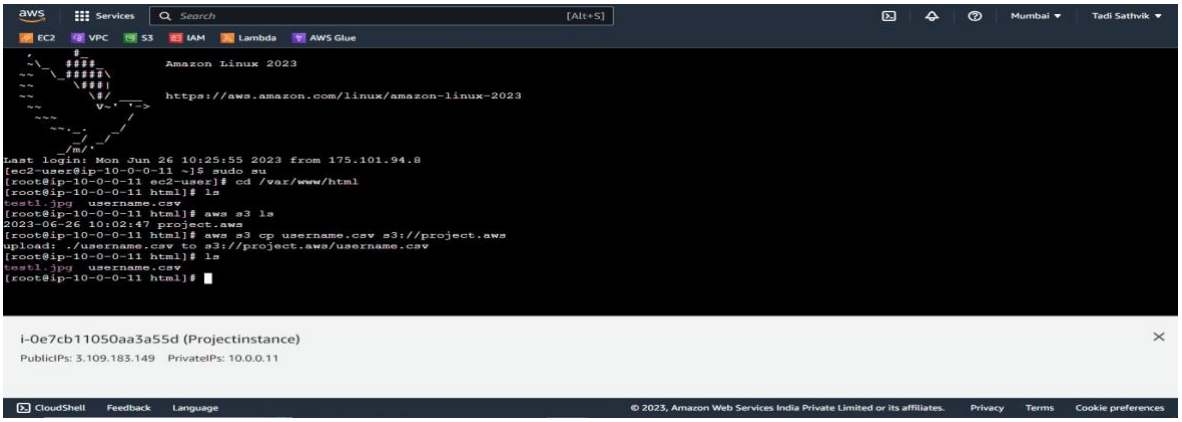
3(b): Connection between EC2 and s3 for jpg file.



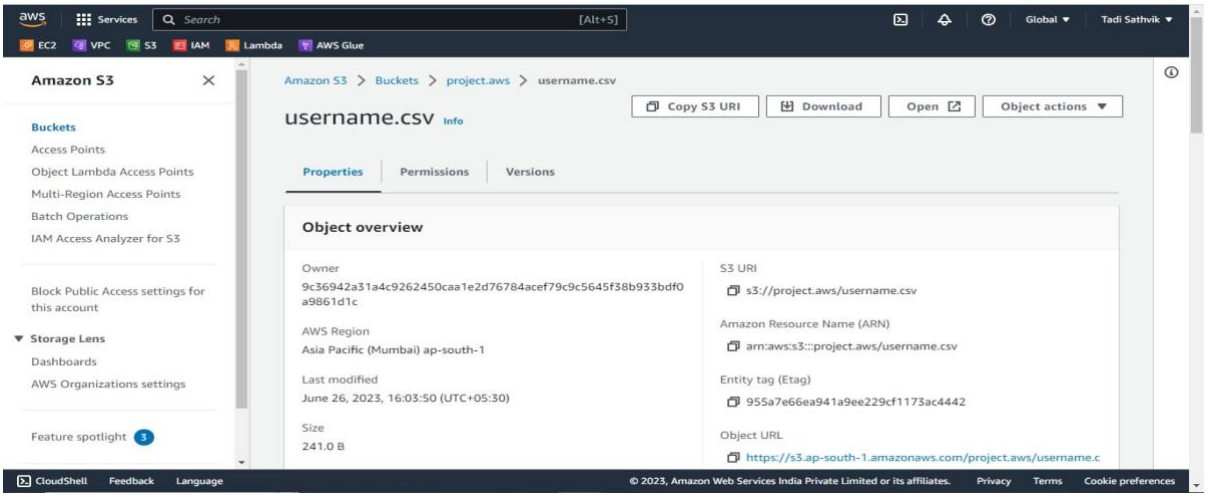
3(c): After successful uploading of image.



3(d): Connect EC2 instance to s3 for csv file.

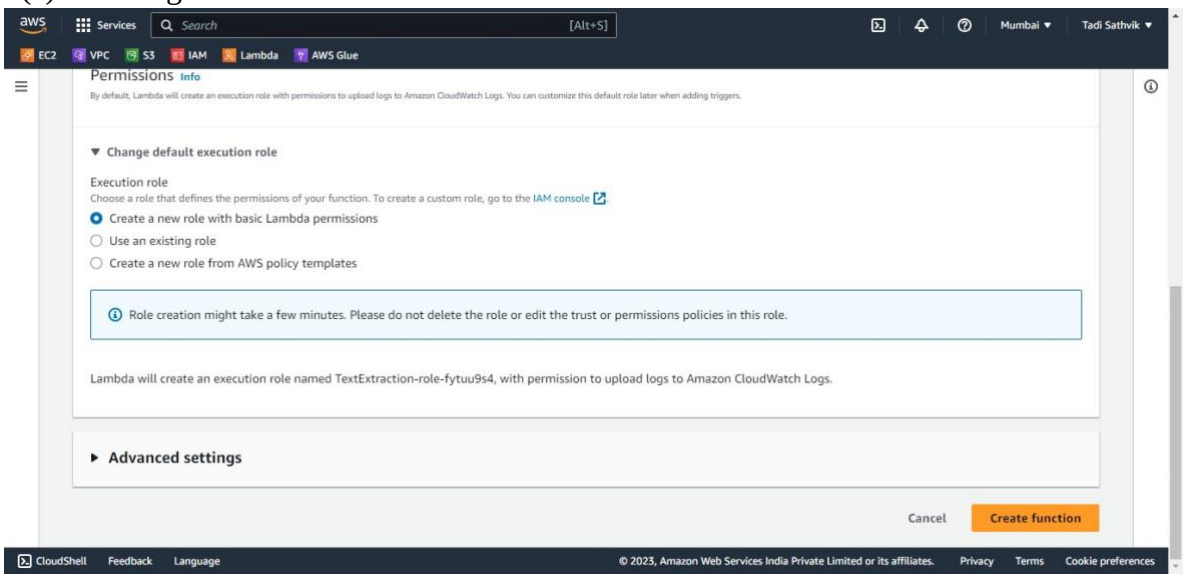


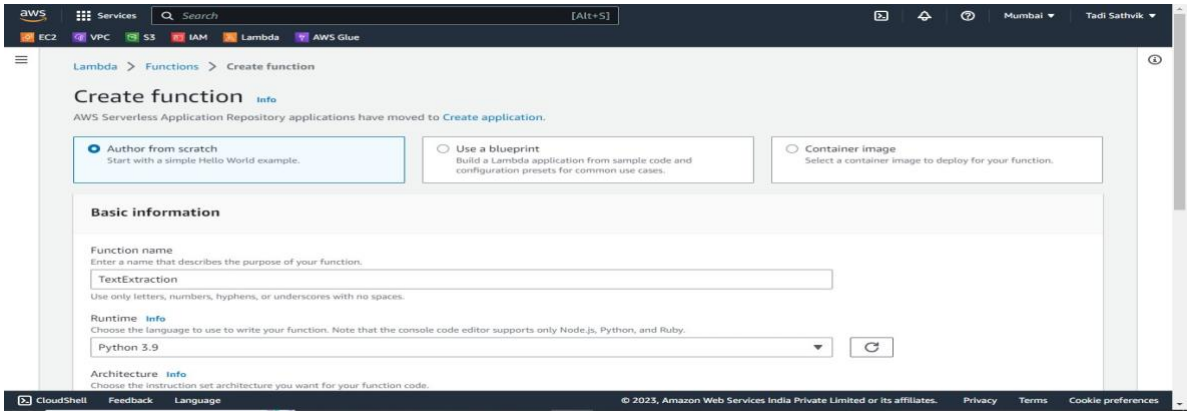
3(e): After successful uploading of csv file.



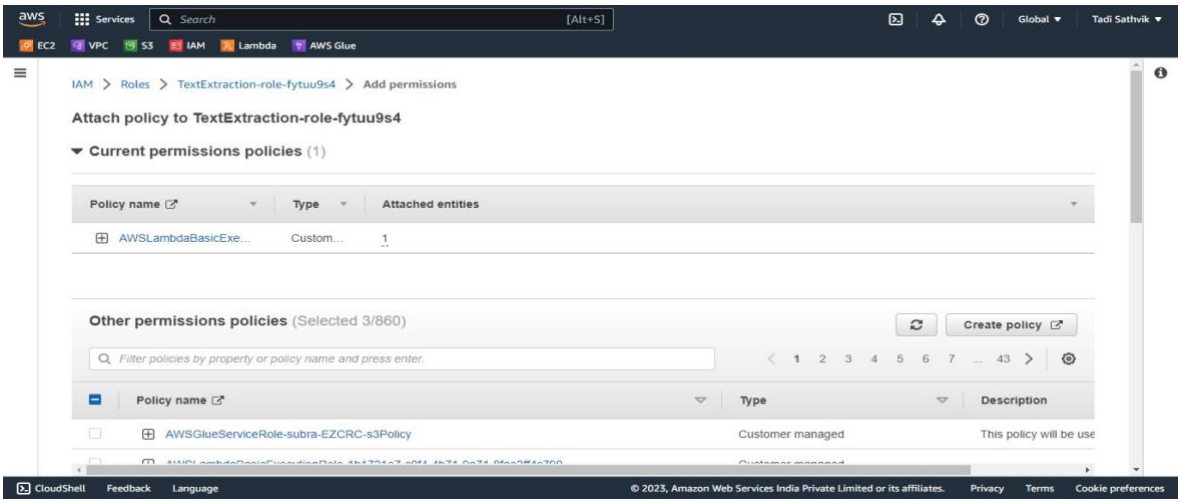
Step-4: Lambda

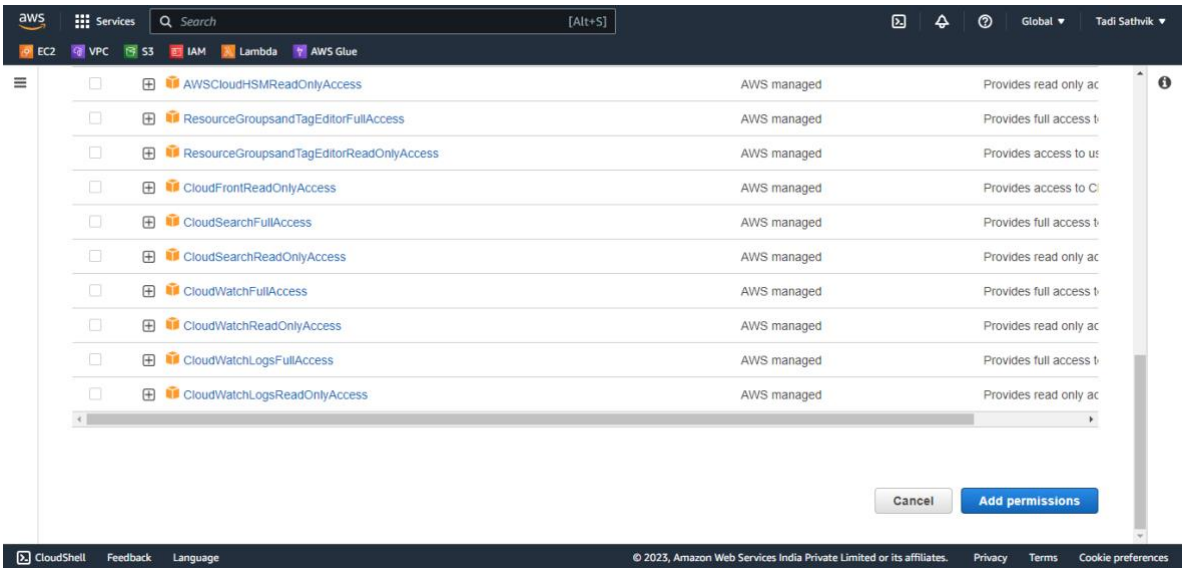
4(a): Creating lambda function



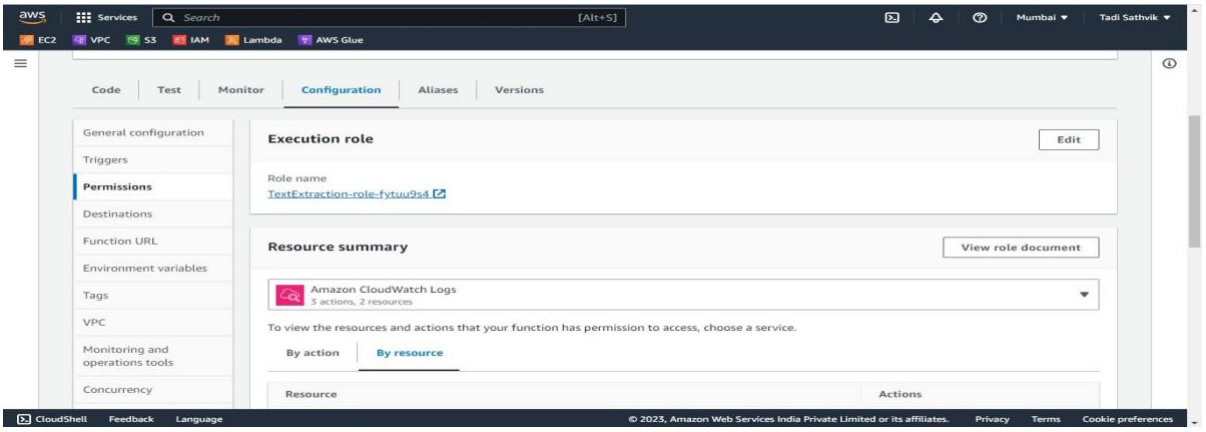


4(b): Add permissions.

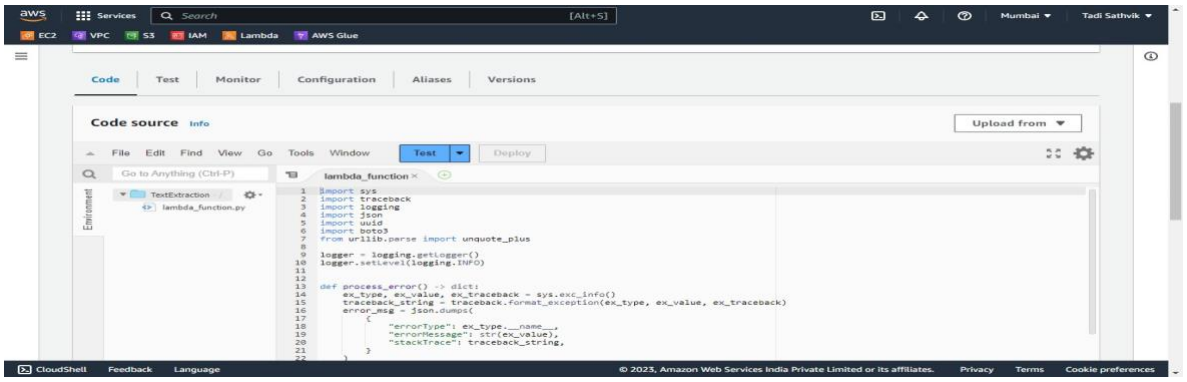




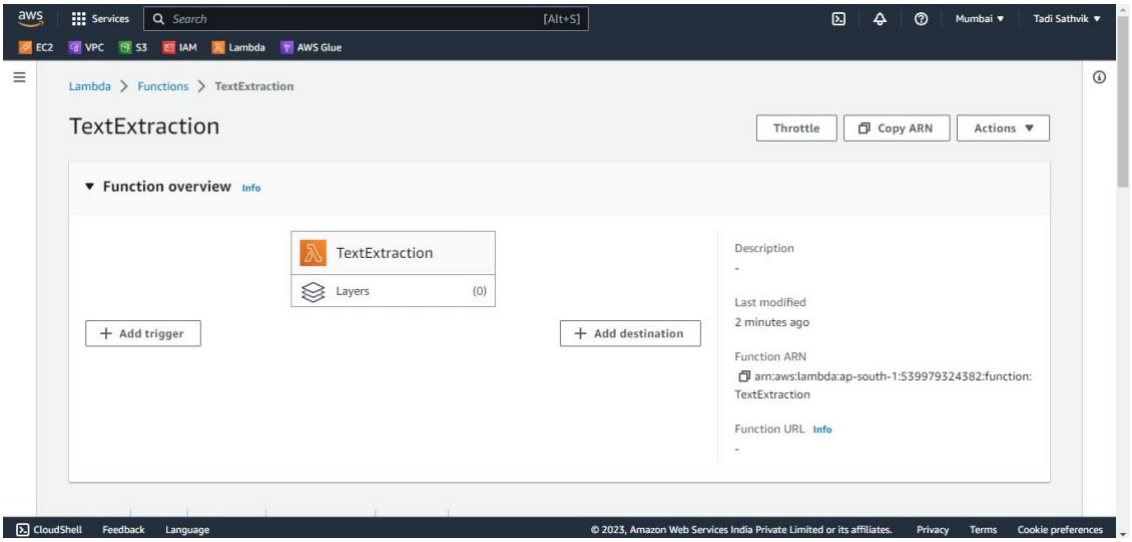
4(c): Add configuration



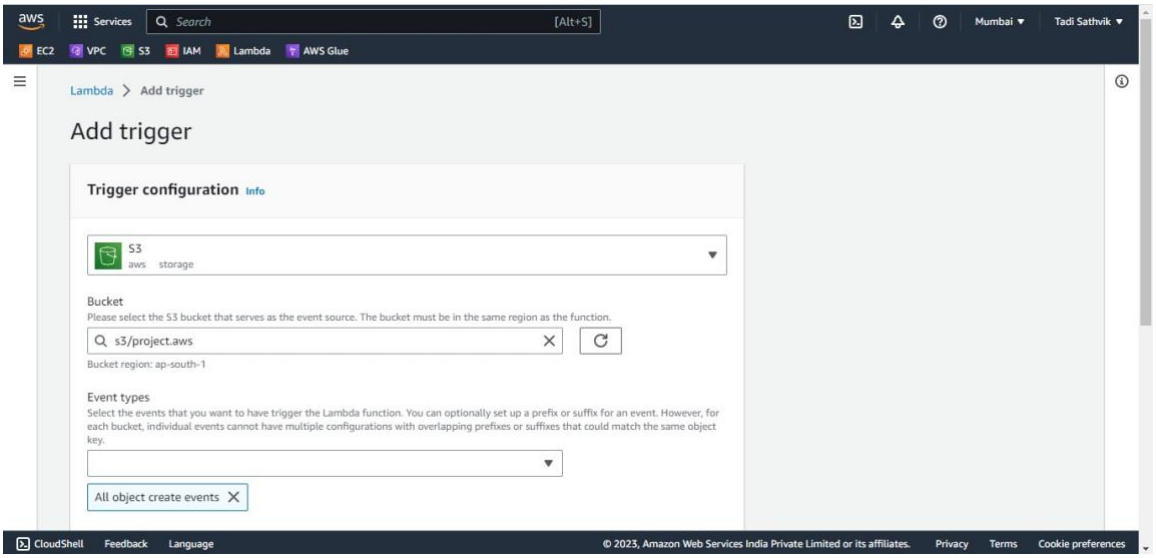
4(d): Add Code

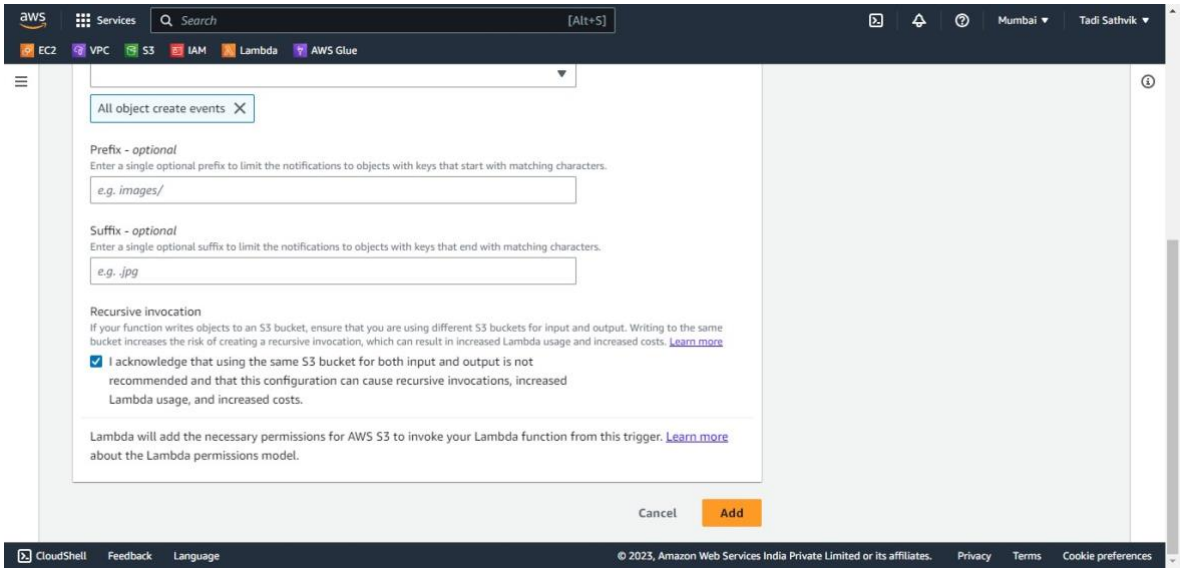


Before Adding Trigger

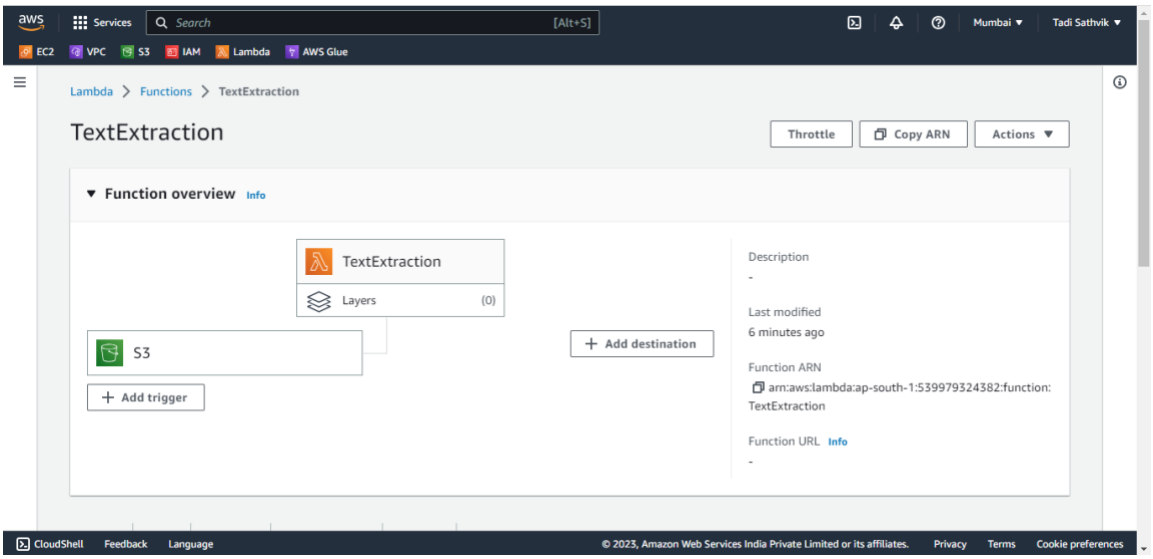


4(e): Now adding trigger



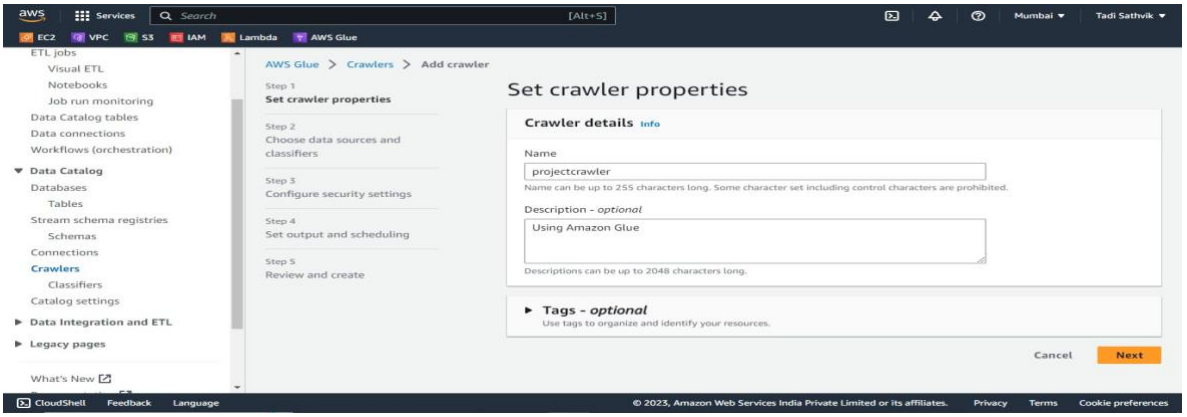


4(f): After successful adding of trigger.

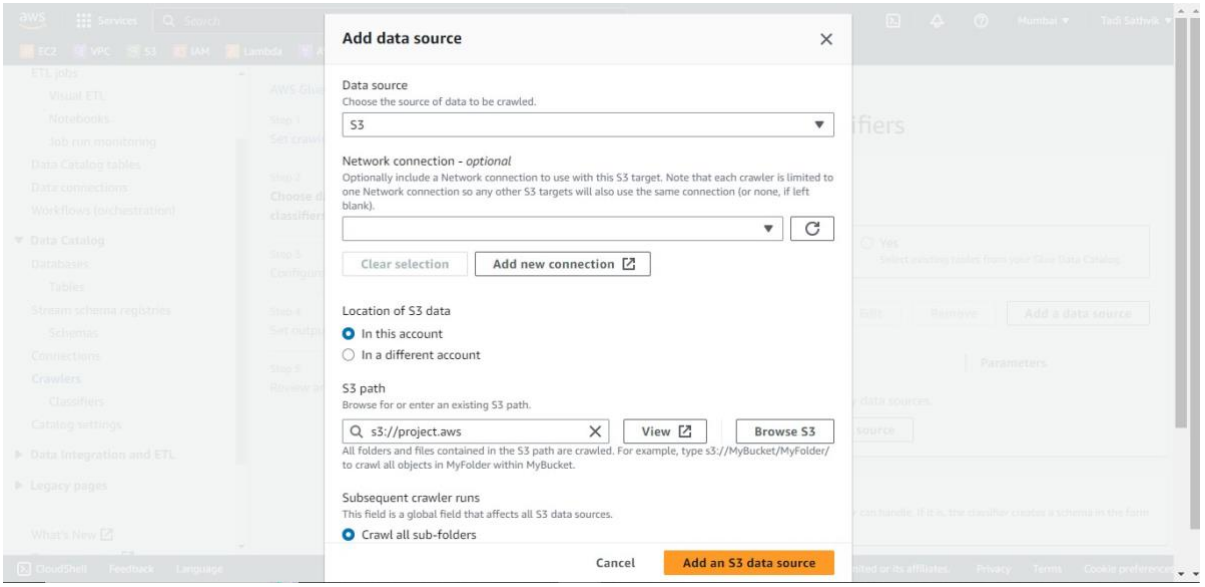


Step-5: Glue

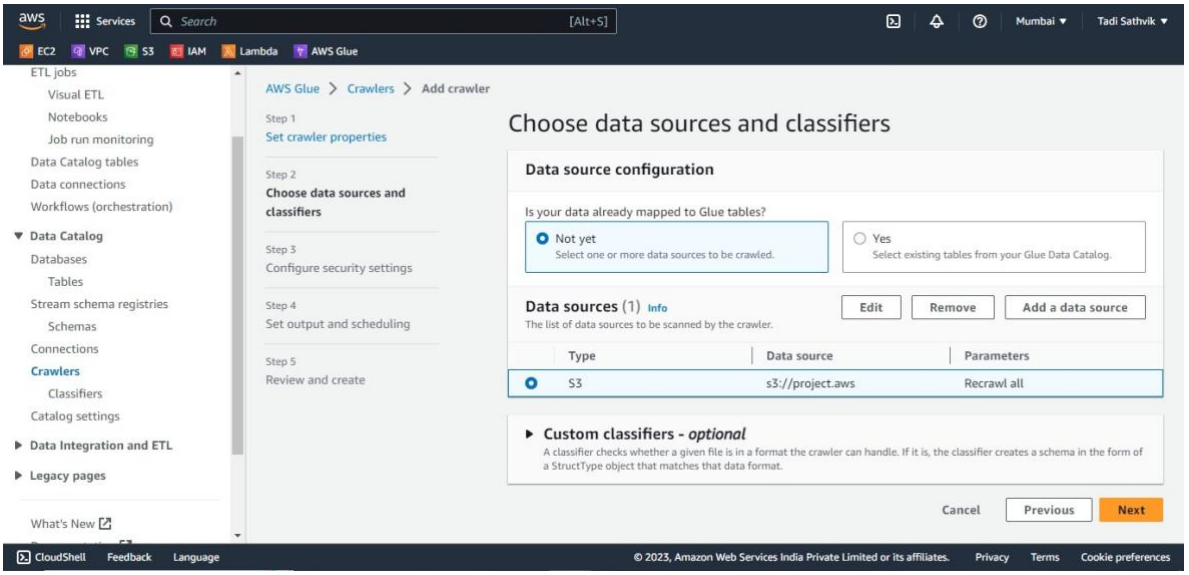
5(a): Create crawler



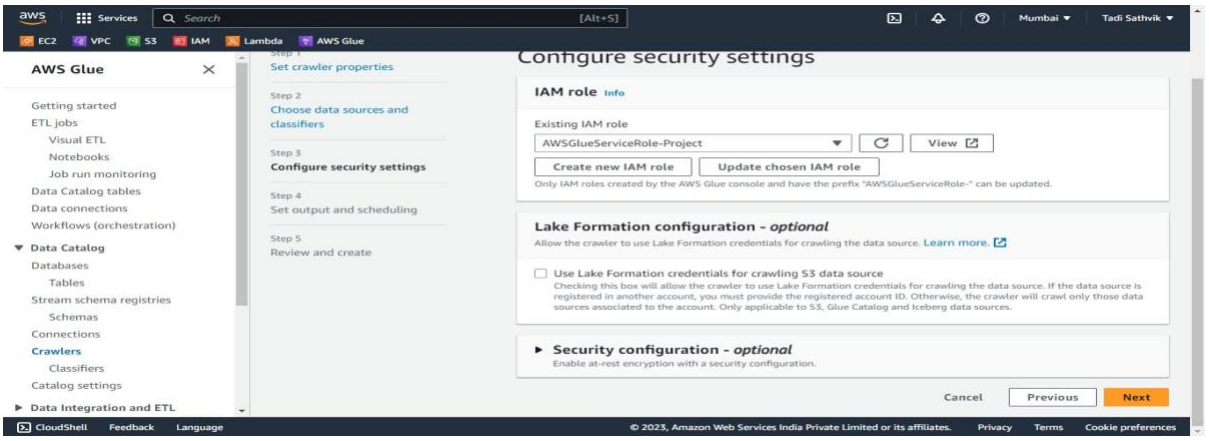
5(b): Add data source



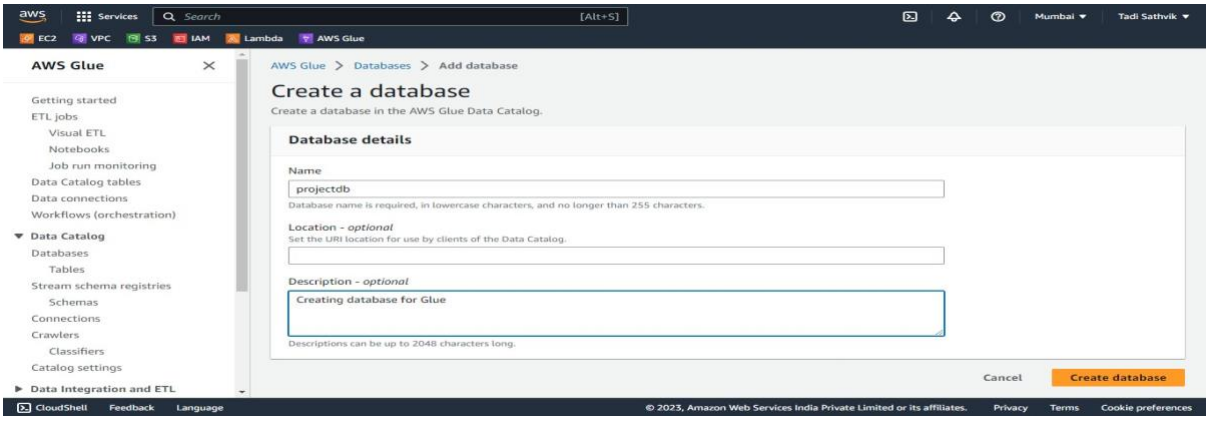
5(c): Choose data sources and classifiers.



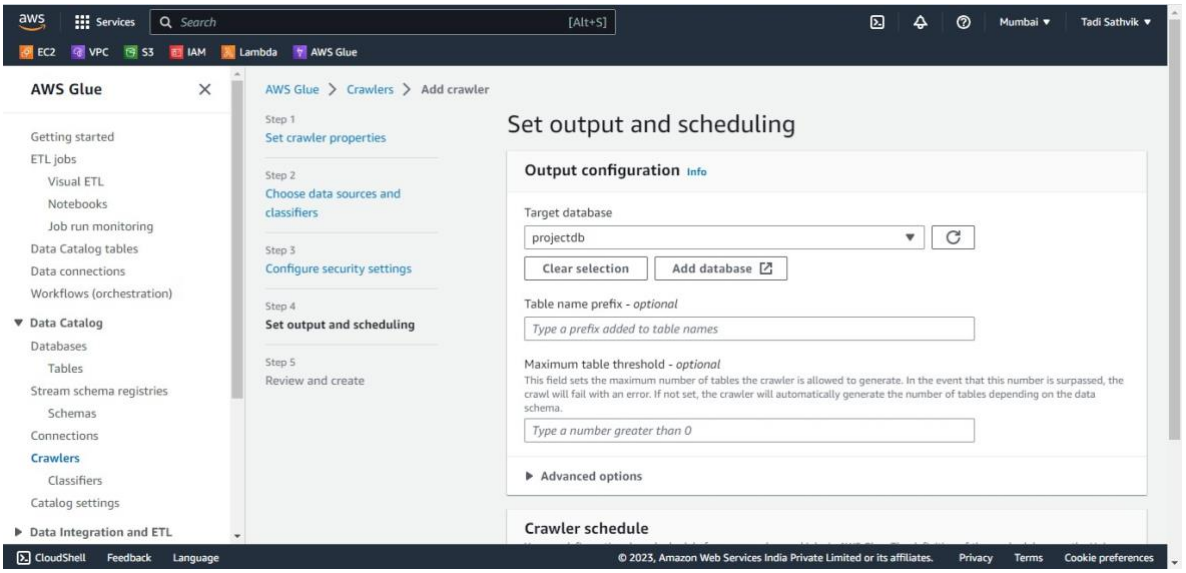
5(d): Configure security settings



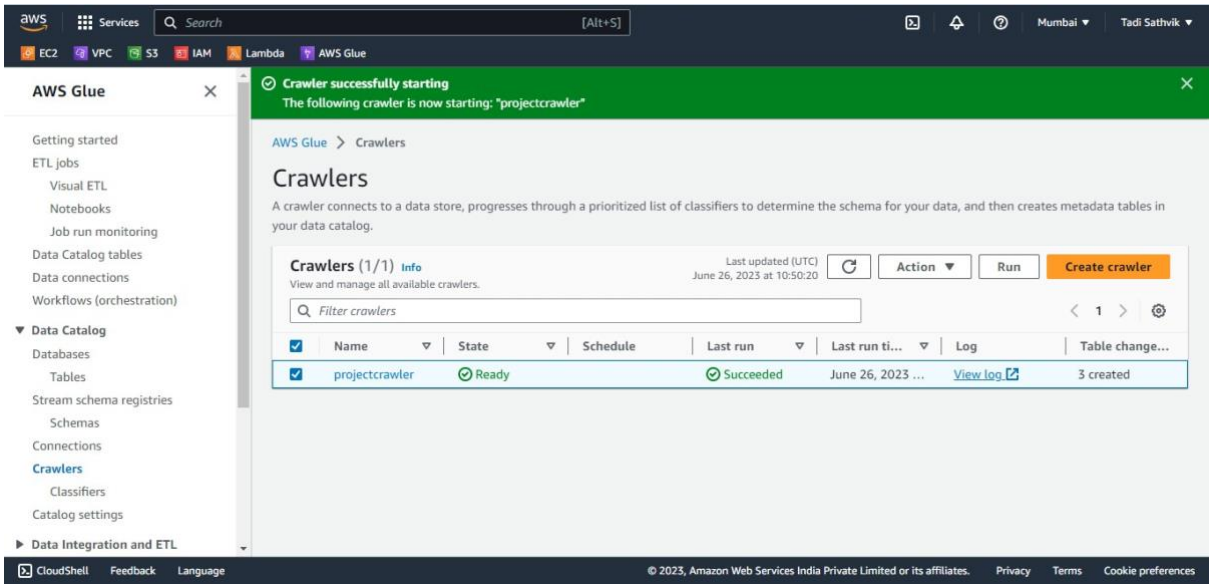
5(e): Create a database



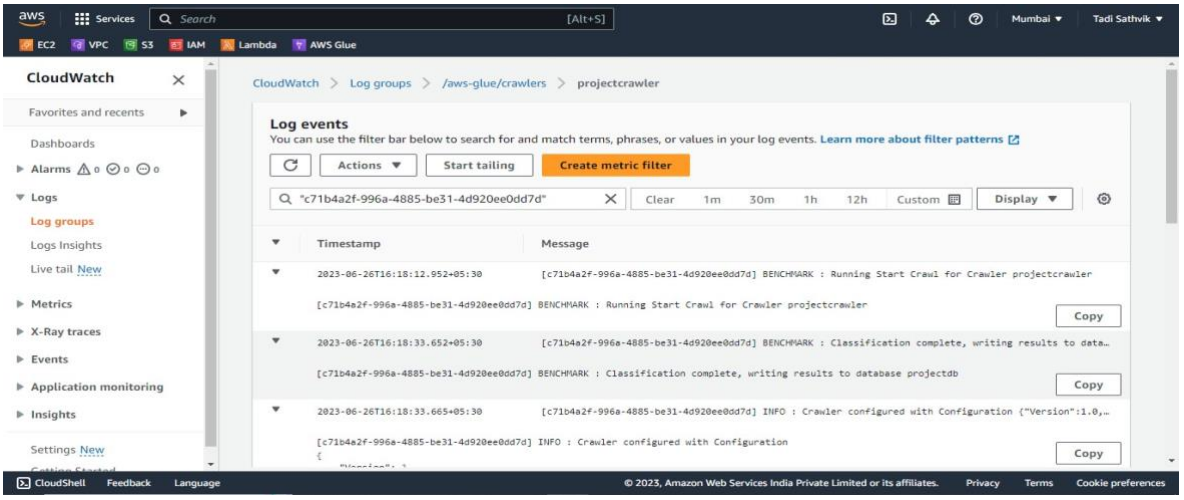
5(f): Set output and scheduling.



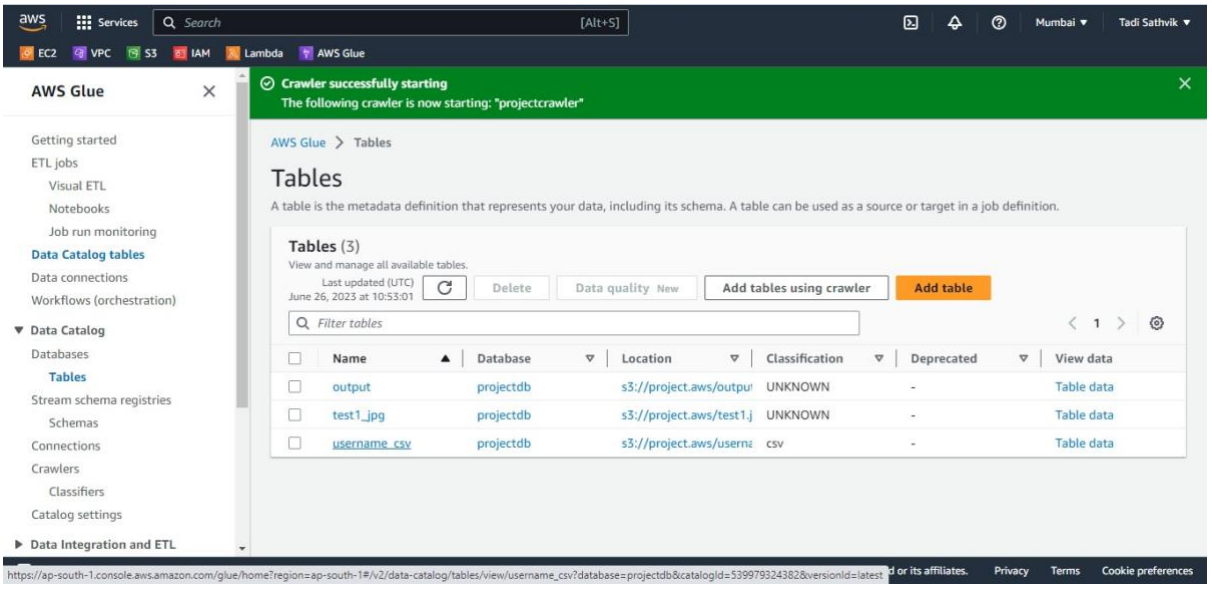
5(g): After successful creation of crawler.

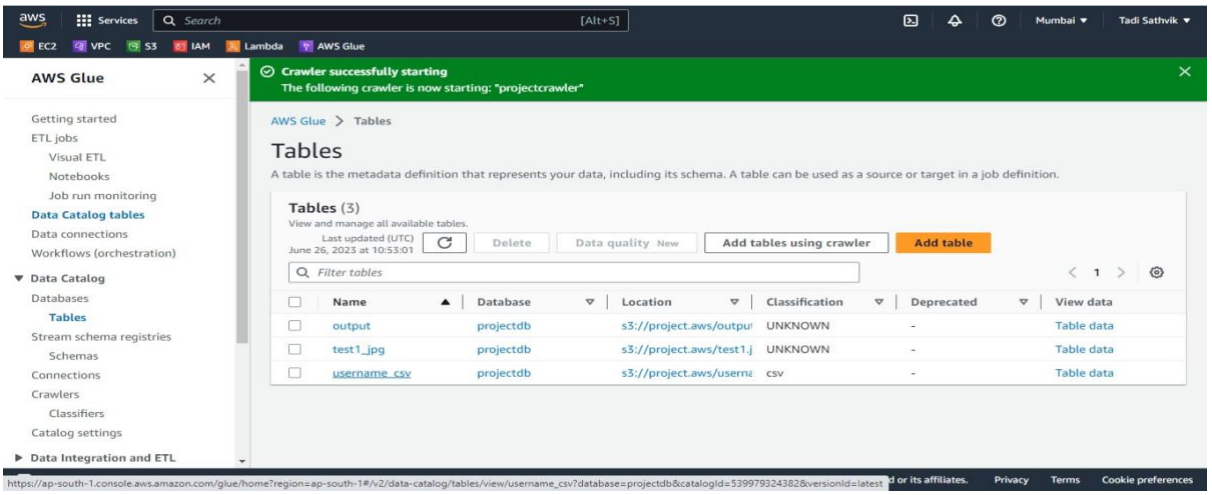


5(h): Now open cloud watch logs and check that tables are created or not.

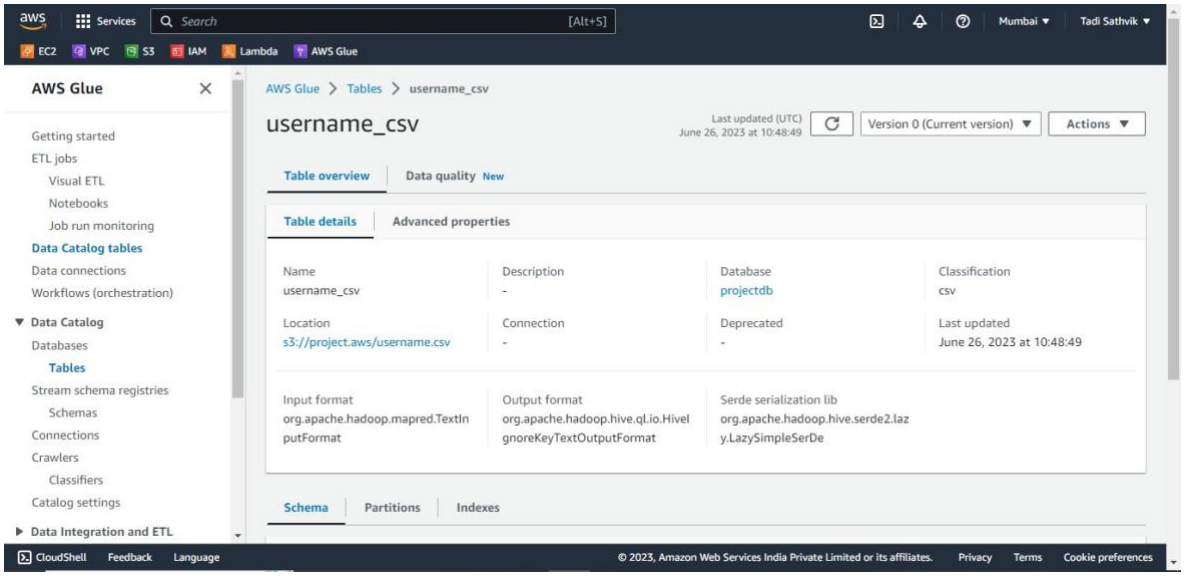


5(i): Open tables

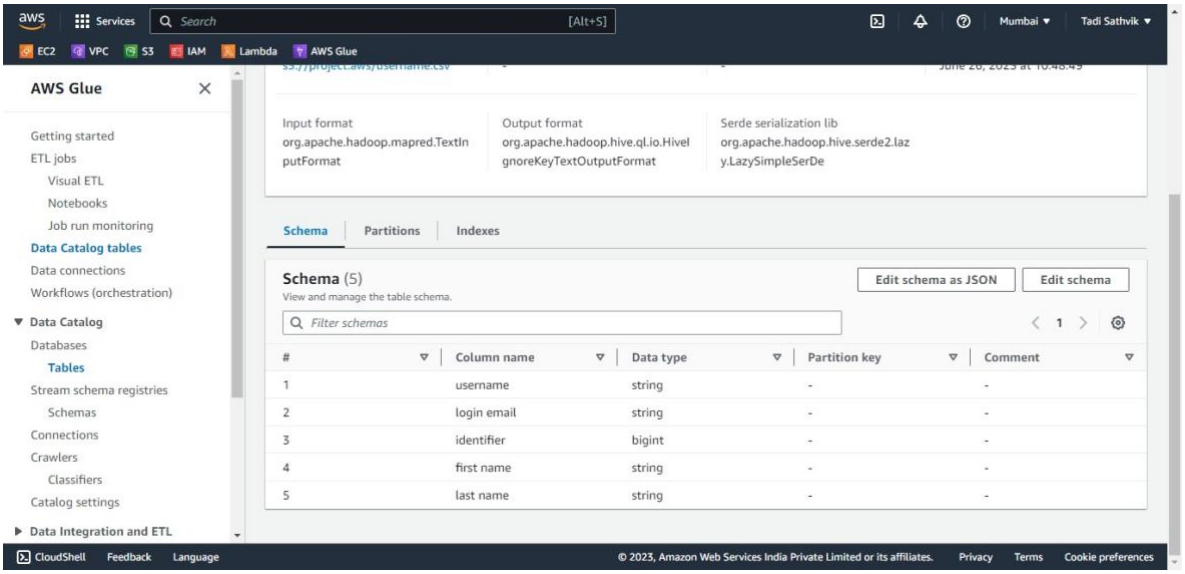




5(j): Now open username.csv table.

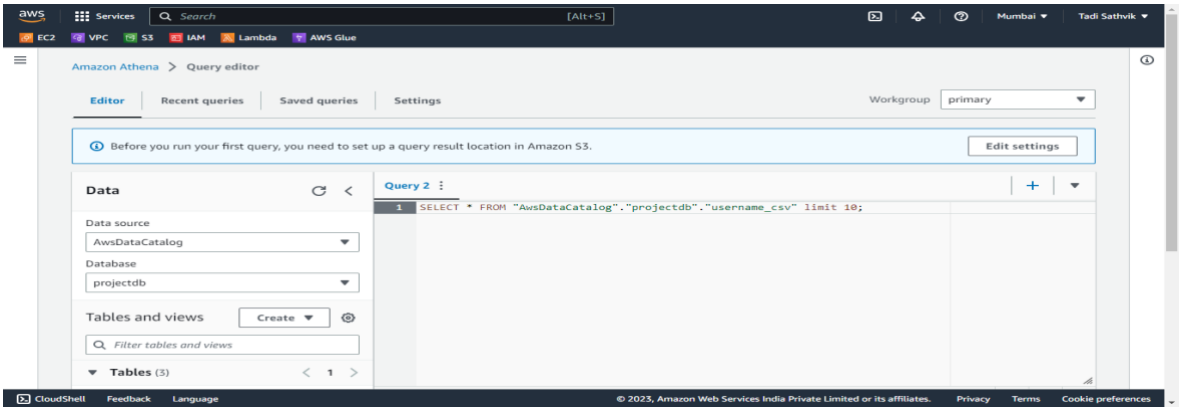


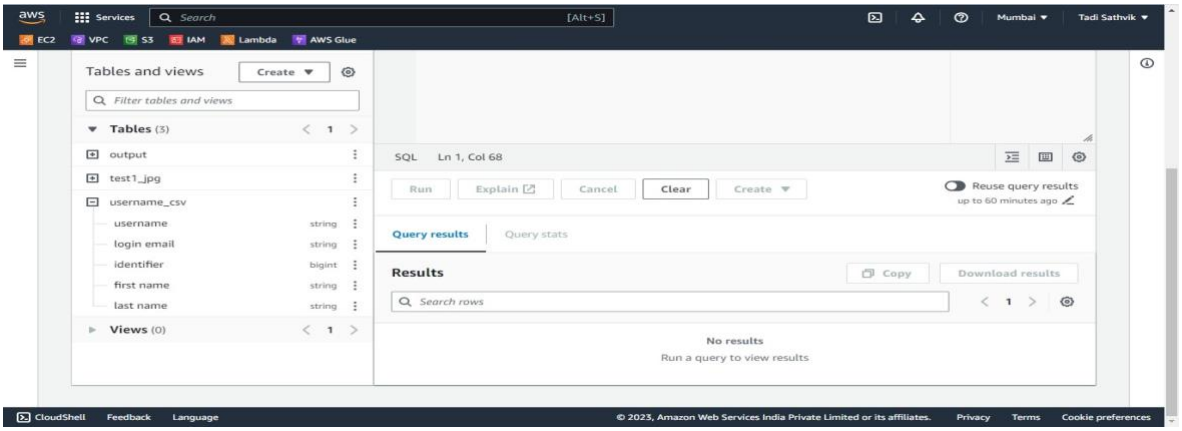
5(k): This is the schema of the csv file.



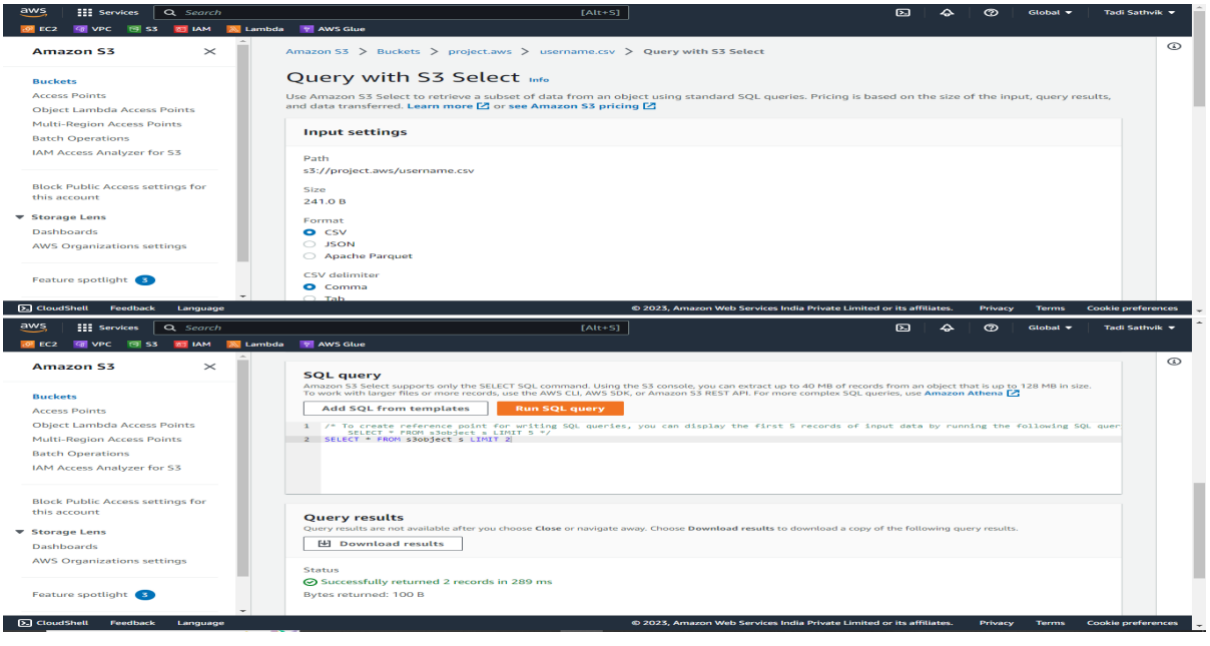
Step-6: Athena:

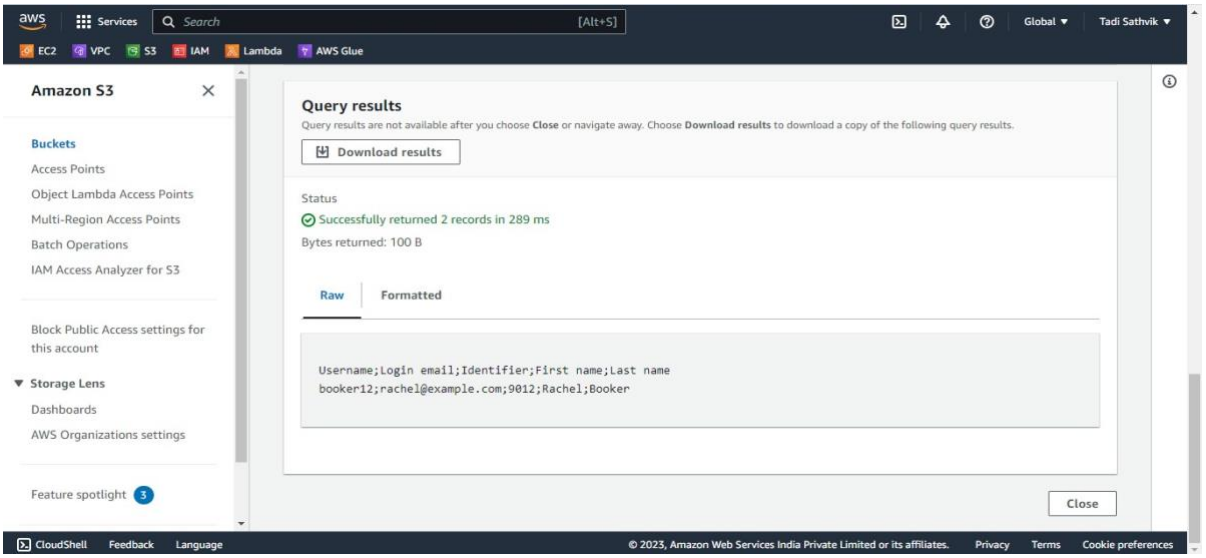
6(a): Query with Athena





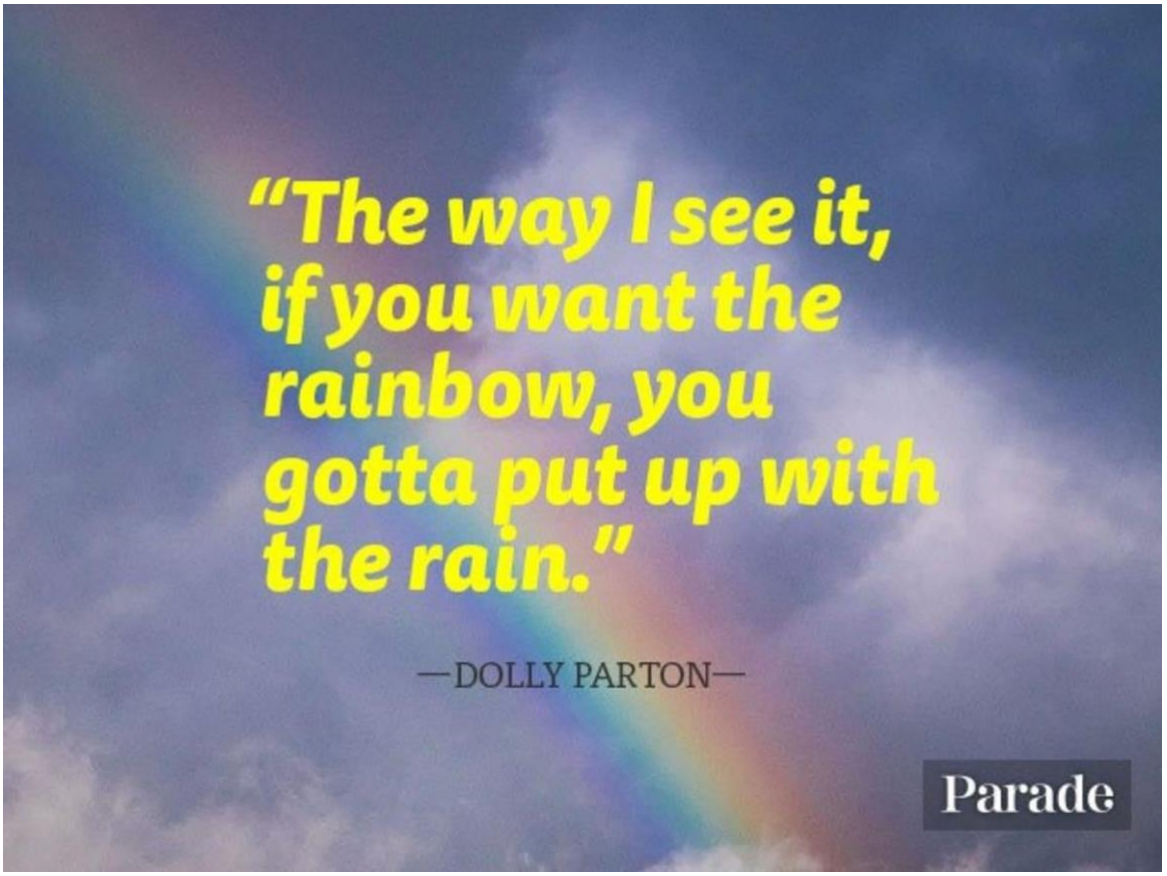
6(b): Now you can also query with s3.





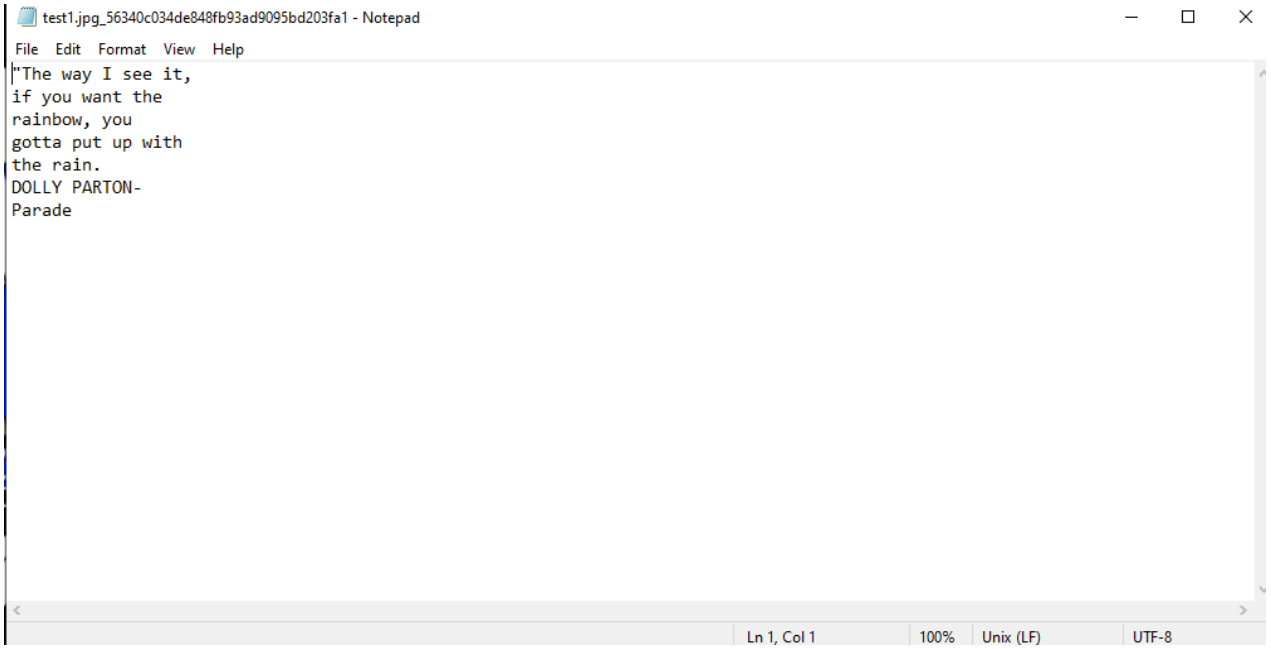
Step-7: Input file

7(a): Image file1:image file



Output file1:

And again stored in s3 bucket



7(b): Input file2:csv file

Output file2:

Username;Login email;Identifier;First name;Last name
booker12;rachel@example.com;9012;Rachel;Booker
grey07;;2070;Laura;Grey
johnson81;;4081;Craig;Johnson
jenkins46;mary@example.com;9346;Mary;Jenkins
smith79;jamie@example.com;5079;Jamie;Smith

Conclusion

As it is used to extract text information from files of any formats it is widely used in detecting typed and hand written text in variety of documents,including financial reports, medical records and tax forms.Textract can extract the data in minutes instead of hours and days,which can be used to quickly automate document processing and act on the information extracted by extracting information from invoices and receipts like automating loans and it has wide applications in real life.